

# Capacitors All Guide 2021



# CONTENTS

## Aluminum electrolytic capacitors (screw terminal type)



## Radial type Aluminum electrolytic capacitors

## Aluminum electrolytic capacitors (snap mount type)



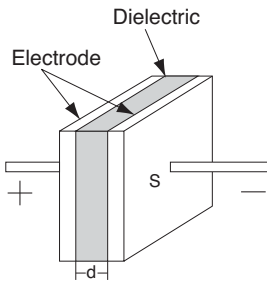
## Plastic film capacitors (Power electronics use)



Series	See page	Description
● VF	24	Standard
● VG	30	Standard
● VFL	36	Standard
● VGL	40	Standard
● VFH	44	Standard
● VFR	48	High -ripple current
● VGR	52	High -ripple current
● VFLR	56	High -ripple current
● VGLR	60	High -ripple current
● VFHR	64	High -ripple current
● HCGWA	68	Ultra small
● HCGW2	70	Ultra small
● HCGW3	72	Ultra small
● FXW	74	Ultra small
● FXW2	76	Ultra small
● HCG7A	78	Not recommended for the new design. "Recommended series : VF"
● HCGF5A	82	Not recommended for the new design. "Recommended series : VF"
● HCGF6A	86	Not recommended for the new design. "Recommended series : VF"
● FXA	88	Not recommended for the new design. "Recommended series : VFL"
● FX2	90	Not recommended for the new design. "Recommended series : VFL"
● FX3	94	Not recommended for the new design. "Recommended series : VFL"
● FXR3	96	Not recommended for the new design. "Recommended series : VFHR"
● HXA	100	Not recommended for the new design. "Recommended series : VF"
● HCGHA	102	Not recommended for the new design. "Recommended series : VG"
● GXA	106	Not recommended for the new design. "Recommended series : VGL"
● GX2	108	Not recommended for the new design. "Recommended series : VGL"
● GX3	110	Not recommended for the new design. "Recommended series : VGL"
● GXR3	112	Not recommended for the new design. "Recommended series : VGLR"
● HU	116	Standard
● HL	120	Standard
● HP3	126	Standard
● HU3	130	Standard
● HU	134	Standard
● ZL	138	Standard
● HL	142	Standard
● YL	146	Standard
● XL1	148	Standard
● CU	150	High -ripple current
● ZLR	152	High -ripple current
● DH	154	Special application
● HW	156	Small
● HS	158	Standard
● MLC	170	Metallized polypropylene
● MLC2	176	Metallized polypropylene
● MKCP4	180	Metallized polypropylene
● MKCP4T	182	Metallized polypropylene
● E51	184	Metallized polypropylene
● E51(AC)	184	Metallized polypropylene
● E53(AC)	188	Metallized polypropylene
● E53H	192	Metallized polypropylene
● E55	194	Metallized polypropylene
● E59	196	Metallized polypropylene
● E61	200	Metallized polypropylene
● E62(AC)	202	Metallized polypropylene
● E62-TAB(AC)	210	Metallized polypropylene
● E62-3HF(AC)	218	Metallized polypropylene
● E66	222	Metallized polypropylene

Description		Operating voltage (V.DC)	Capacitance range ( $\mu\text{F}$ )
	Useful of 4,000hours at 85°C	6.3 ~ 650	820 ~ 680,000
	Useful of 4,000hours at 105°C	25 ~ 500	1,500 ~ 330,000
Long-life	Useful of 8,000hours at 85°C	350 ~ 600	1,200 ~ 22,000
Long-life	Useful of 8,000hours at 105°C	350 ~ 500	1,500 ~ 18,000
Long-life	Useful of 20,000hours at 85°C	350 ~ 500	1,500 ~ 18,000
	Useful of 4,000hours at 85°C	350 ~ 500	1,800 ~ 22,000
	Useful of 4,000hours at 105°C	350 ~ 500	1,500 ~ 18,000
Long-life	Useful of 8,000hours at 85°C	350 ~ 500	1,800 ~ 22,000
Long-life	Useful of 8,000hours at 105°C	350 ~ 500	1,500 ~ 18,000
Long-life	Useful of 20,000hours at 85°C	350 ~ 500	1,500 ~ 18,000
	Useful of 4,000hours at 85°C	350 ~ 500	5,600 ~ 57,000
Large-capacitance	Useful of 4,000hours at 85°C	400 ~ 500	7,500 ~ 29,000
Large-capacitance	Useful of 4,000hours at 70°C	350 ~ 500	10,000 ~ 44,000
Long-life	Useful of 8,000hours at 85°C	350 ~ 450	9,000 ~ 38,000
Long-life Large-capacitance	Useful of 8,000hours at 85°C	400	13,000 ~ 30,000
	Useful of 4,000hours at 85°C	6.3 ~ 100	3,300 ~ 680,000
	Useful of 4,000hours at 85°C	160 ~ 450	270 ~ 39,000
	Useful of 4,000hours at 85°C	400 ~ 500	1,200 ~ 22,000
	Useful of 8,000hours at 85°C	350 ~ 450	1,000 ~ 18,000
	Useful of 8,000hours at 85°C	400 ~ 600	1,000 ~ 22,000
	Useful of 8,000hours at 85°C	400 ~ 500	1,200 ~ 22,000
Small-sized	Useful of 8,000hours at 85°C	400 ~ 500	1,800 ~ 22,000
	Useful of 20,000hours at 85°C	350 ~ 450	1,000 ~ 15,000
	Useful of 4,000hours at 105°C	25 ~ 400	330 ~ 330,000
	Useful of 8,000hours at 105°C	350 ~ 450	1,000 ~ 15,000
	Useful of 8,000hours at 105°C	400 ~ 500	1,000 ~ 10,000
	Useful of 8,000hours at 105°C	400, 450	1,500 ~ 12,000
Small-sized	Useful of 8,000hours at 105°C	400, 450	2,200 ~ 18,000
Standard	Useful of 2,000hours at 105°C	200 ~ 450	8.2 ~ 560
Long-life	Useful of 5,000hours at 105°C	200 ~ 450	8.2 ~ 560
85°C	Useful of 4,000hours at 85°C	16 ~ 450	82 ~ 33,000
	Useful of 4,000hours at 105°C	16 ~ 450	47 ~ 33,000
Small-sized	Useful of 4,000hours at 105°C	200 ~ 550	56 ~ 2,200
	Useful of 5,000hours at 105°C	200 ~ 550	56 ~ 2,700
	Useful of 8,000hours at 105°C	200 ~ 500	56 ~ 2,700
	Useful of 10,000hours at 105°C	400 ~ 500	82 ~ 680
	Useful of 15,000hours at 105°C	200 ~ 450	39 ~ 1,500
Side-vent	Useful of 4,000hours at 105°C	400 ~ 500	120 ~ 1,200
	Useful of 5,000hours at 105°C	400 ~ 450	68 ~ 680
Charge-Discharge	Useful of 5,000hours at 105°C	400, 450	82 ~ 680
For flash application		330, 360, 400	370 ~ 3,800
For flash application		450	300 ~ 1,900
Aluminum encased type	Standard product	900, 1,100, 1,300, 1,500	70 ~ 2300
Aluminum encased type	Large capacity	800, 900	230 ~ 3,800
Resin encased type	Standard product	700, 900, 1,100	7 ~ 80
Resin encased type	High resistance	700, 900, 1,100	6 ~ 80
Resin encased type	Low inductance	1,300 ~ 50,000	0.2 ~ 700
Resin encased type	Low inductance	2,000 ~ 35,000	0.13 ~ 5
Resin encased type	Low inductance	280 ~ 2,450	0.22 ~ 380
Resin encased type	Low inductance	600 ~ 2,200	13 ~ 400
Resin encased type	Low inductance	900 ~ 5,000	10 ~ 250
Metal case	Custom design	—	—
Resin encased type	Low inductance	500 ~ 4,000	4.5 ~ 560
Aluminum encased type	Standard product	420 ~ 4,000	0.2 ~ 2,000
Aluminum encased type	Tab terminal	420 ~ 5,000	0.1 ~ 300
Aluminum encased type	For three phase	640 ~ 1,400	3×8 ~ 3×200
Aluminum encased type	For direct current	600 ~ 1,500	160 ~ 4,530

## 1. Capacitance of capacitors



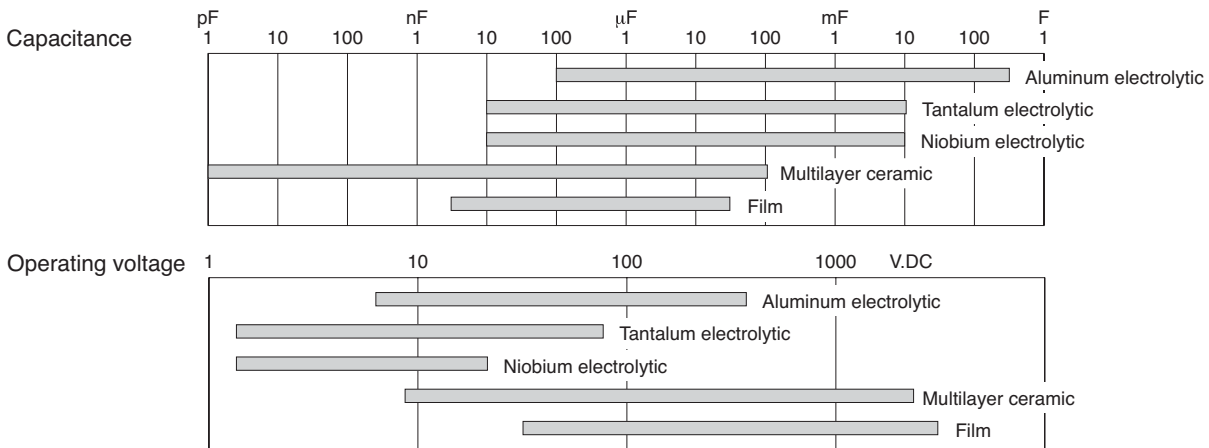
A capacitor is so designed that a dielectric is sandwiched between two electrodes as shown in Fig. 1. The capacitance (C) is expressed as:

$$C = \epsilon \frac{S}{d} \quad \epsilon = \epsilon_r \epsilon_o$$

$\epsilon_r$  : specific dielectric constant.  $\epsilon_o$  : dielectric constant of vacuum ( $8.85 \times 10^{-12} \text{F/m}$ )  
 d : distance between electrodes (m). S : electrode surface ( $\text{m}^2$ )

Fig1 Basic structure of capacitor

## 2. Ranges of capacitance and operating voltage of various capacitors



## 3. Characteristics of various capacitors

	Aluminum	Film	Tantalum	Niobium	Ceramic
Dielectric	Aluminum oxide ( $\text{Al}_2\text{O}_3$ )	Polyester, polypropylene, etc.	Tantalum pentoxide ( $\text{Ta}_2\text{O}_5$ )	Niobium pentoxide ( $\text{Nb}_2\text{O}_5$ )	Based on barium titanate, etc.
Specific dielectric constant	8~10	2.1~3.1	27	41	1500~15000 (barium titanate)
Shape	Screw terminal type, Snap mount type, Radial type, chip type	Dip type (main power), For SMD. case type	Chip type (main power) Dip type	Chip type	Chip type (main power), dip type
Advantages	<ul style="list-style-type: none"> <li>Cheap</li> <li>Small-size and large-capacity</li> </ul>	<ul style="list-style-type: none"> <li>Good characteristics</li> <li>Can be made for low- to high-voltage applications</li> <li>High reliability</li> </ul>	<ul style="list-style-type: none"> <li>Small and comparatively large capacitance</li> <li>Semi-permanent service life</li> </ul>	<ul style="list-style-type: none"> <li>Small and comparatively large capacitance</li> <li>Semi-permanent service life</li> </ul>	<ul style="list-style-type: none"> <li>Small-size (particularly multilayer types)</li> <li>No polarity</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>Short service life in hot environment</li> <li>Large capacitance tolerance</li> <li>Polarity</li> </ul>	<ul style="list-style-type: none"> <li>Large outside dimensions</li> </ul>	<ul style="list-style-type: none"> <li>To be used with some voltage leeway</li> <li>Polarity</li> </ul>	<ul style="list-style-type: none"> <li>To be used with some voltage leeway</li> <li>Polarity</li> </ul>	<ul style="list-style-type: none"> <li>Great changes in capacitance due to changes in temperature and DC voltage</li> </ul>

\*When placing an order:

When placing an order, please order a quantity equal to an integral multiple of the basic ordering unit of a specific product.

## Aluminum electrolytic capacitor

### Snap mount type

φ D (mm)	Q'ty
φ 20	100
φ 22	100
φ 25	100
φ 30	100
φ 35	100
φ 40	80

### Screw terminal type

φ D (mm)	Q'ty
φ 36	100
φ 51	50
φ 64	50
φ 77	50
φ 90	50
φ 101	50
φ 121	20

### Radial type

Series	Q'ty
HU, HL	300

## Film capacitor

Series		Q'ty
MLC	φ 85 ~ 100	8
MLC2	φ 116, 140	6
MKCP4		100
MKCP4T		
E51		*
E51 (AC)		
E53 (AC)		
E53H		
E55		
E59		
E61		
E62 (AC)		
E62-TAB (AC)		
E62-3HF (AC)		
E66		

\* Refer to standard value and case size chart of each series.

Hitachi AIC, as a member of society, is reinforcing its CSR endeavors in order to play our part in realizing a sustainable society under the philosophy of harmonizing cooperate activities with the environmental protection.

We have the regular product line-up which is compliant with RoHS Directive, such as Pb free, PVC free from molding materials.

Type	RoHS Status	RoHS Directive 6 restricted substances			PVC free	See page	
		Pb	Cr <sup>6+</sup>	Hg, Cd PBB, PBDE			
Aluminum electrolytic capacitors	Screw terminal type VF, VG, VFL, VGL, VFH, VFR, VGR, VFLR, VGLR, VFHR, HCGWA, HCGW2, HCGW3, FXW, FXW2, HCG7A, HCGF5A, HCGF6A, FXA, FX2, FX3, FXR3, HXA, HCGHA, GXA, GX2, GX3, GXR3	compliant	no include	no include	no include	possible sleeve : polyolefin plate : PET	24 ~
	Snap mount type, Radial type HP3, HU3, HU, ZL, HL, YL, XL1, CU, ZLR, DH, HW, HS, HU, HL	compliant	no include	no include	no include	possible sleeve : PET (standard product) polyolefin plate : less (standard product)	116 ~
Plastic film capacitors	Metal case type MLC, MLC2, E59, E62, E62-3HF, E62-TAB, E66	compliant	no include	no include	no include	no include	170 ~
	Resin encased type MKC-P4, MKC-P4T, E51, E53, E53H, E55, E61	compliant	no include	no include	no include	no include	180 ~

※ Regarding compliance for EU REACH Regulation

According to the content of “Guidance on requirements for substances in articles (published on May 2008)”, our electronic components are “articles without any intended release”. Therefore they are not applicable for “Registration” for European REACH Regulation Article 7 (1) .

※ The descriptions stated in above list are based on products information as of Jan. 2021.

Please contact us for more information about the current dealing items.

※ The product names stated in above are our major items only.

Please ask us for the specification data to confirm the contents and the characteristics in order to use the products safely and properly.

※ The descriptions stated in above list are subject to change without notice for the further improvement purpose.



# ALUMINUM ELECTROLYTIC CAPACITORS



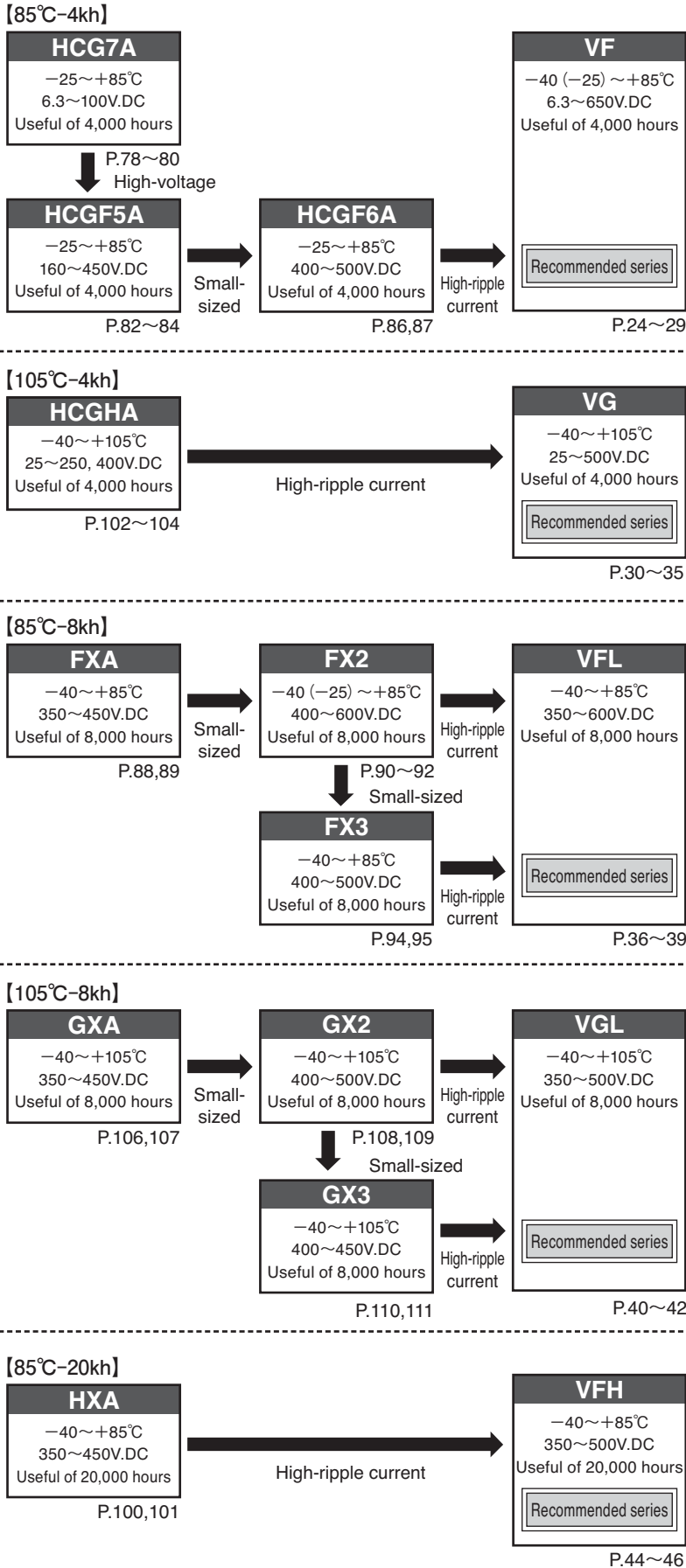
## Contents

Aluminum electrolytic capacitors - Product Line Chart, Features Table

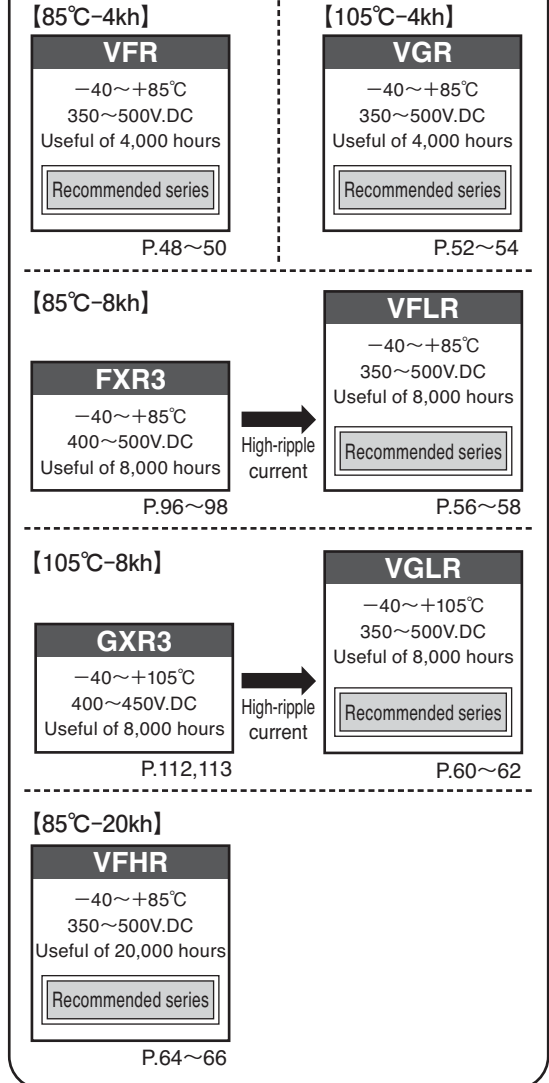
Precautions on use

Series specifications

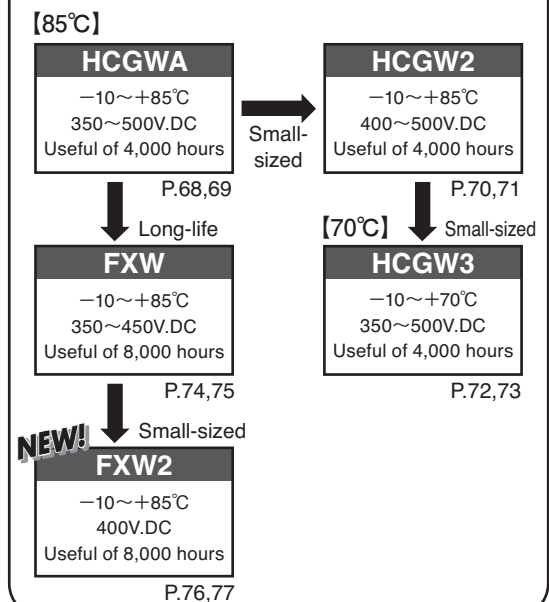
### Standard product



### High-ripple current product



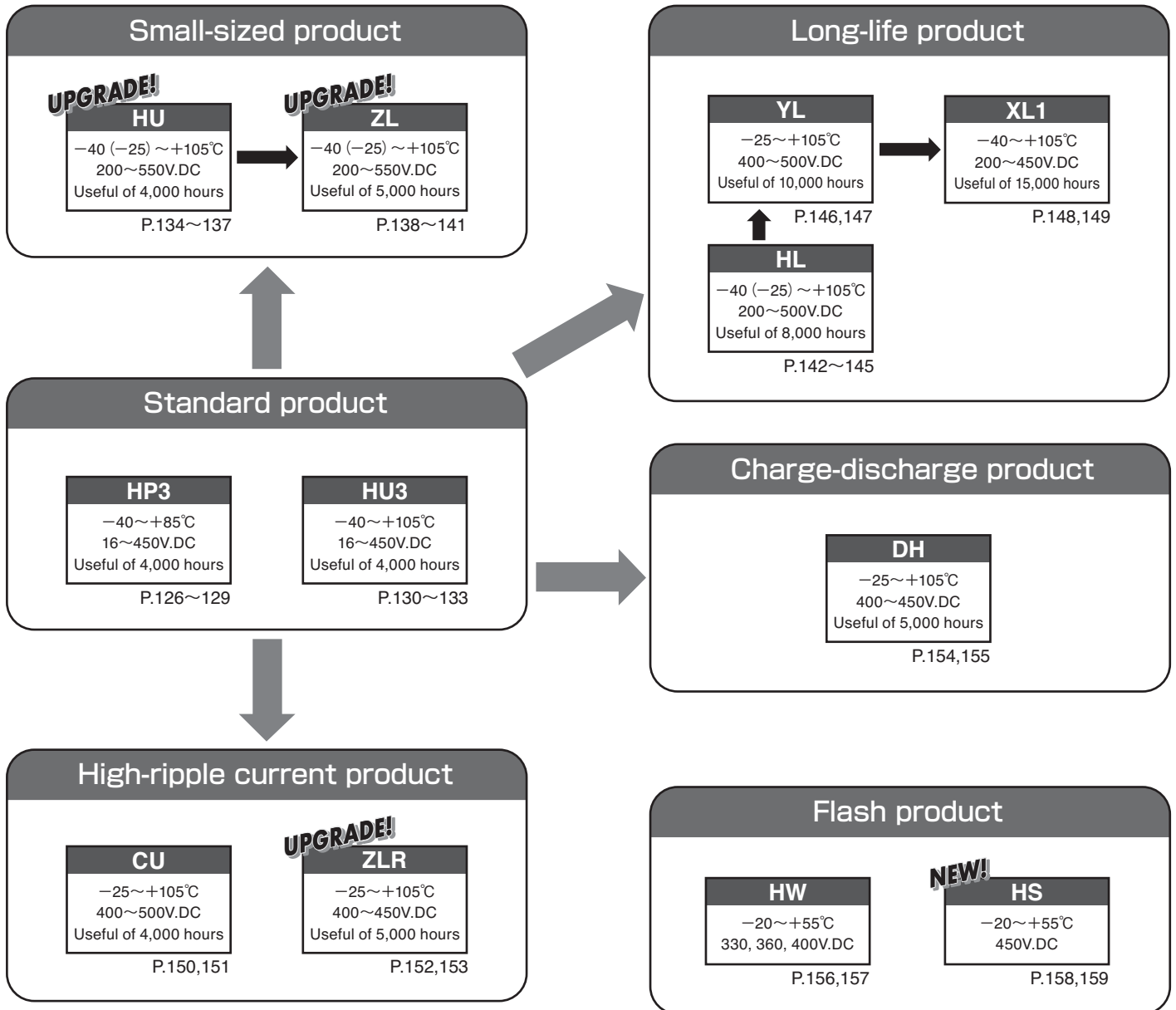
### Ultra small, large-capacitance product





## Product line chart of snap mount type

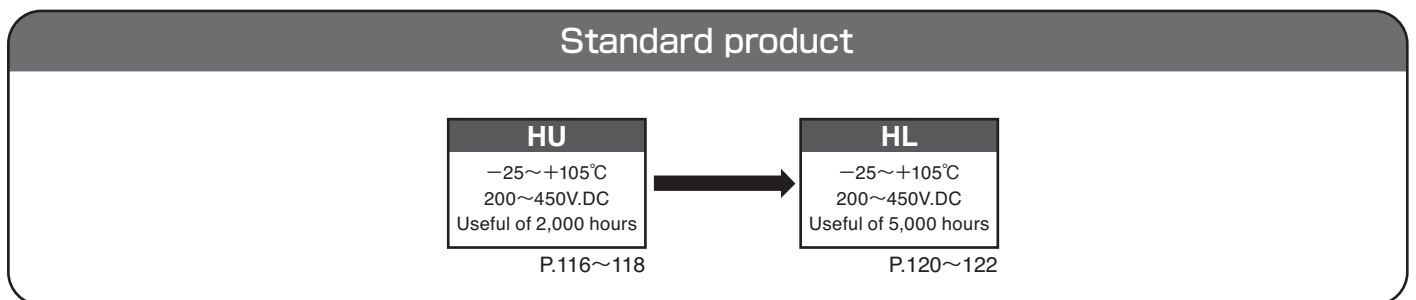
All series Conform RoHS



ALUMINUM ELECTROLYTIC CAPACITORS

## Product line chart of radial type

All series Conform RoHS



# ALUMINUM ELECTROLYTIC CAPACITORS

## Product Table

### Screw terminal type Aluminum electrolytic capacitors

Type	Series	Feature	Useful Life time [h]	Operating Temperature range [°C]	Standard product	Small-sized product	High-reliability product	Operating voltage [V.DC]	Capacitance range [μ F]	Page
Standard	VF	Standard	4,000	-40(-25)~+85	○			6.3~650	820~680,000	24
	VG	105°C, Standard	4,000	-40~+105	○			25~500	1,500~330,000	30
	VFL	Long-life, Standard	8,000	-40~+85	○			350~600	1,200~22,000	36
	VGL	105°C, Long-life, Standard	8,000	-40~+105	○			350~500	1,500~18,000	40
	VFH	20kh	20,000	-40~+85	○		○	350~500	1,500~18,000	44
High-ripple current	VFR	Small-sized, High-ripple current	4,000	-40~+85	○		○	350~500	1,800~22,000	48
	VGR	Small-sized, High-ripple current	4,000	-40~+105	○		○	350~500	1,500~18,000	52
	VFLR	Small-sized, High-ripple current	8,000	-40~+85	○		○	350~500	1,800~22,000	56
	VGLR	Small-sized, High-ripple current	8,000	-40~+105	○		○	350~500	1,500~18,000	60
	VFHR	Small-sized, High-ripple current	20,000	-40~+85	○		○	350~500	1,500~18,000	64
Large-capacitance	HCGWA	Ultra small	4,000	-10~+85	○	○		350~500	5,600~57,000	68
	HCGW2	Ultra small	4,000	-10~+85		◎		400~500	7,500~29,000	70
	HCGW3	Ultra small	4,000	-10~+70		◎		350~500	10,000~44,000	72
	FXW	Ultra small, Long-life	8,000	-10~+85		○	○	350~450	9,000~38,000	74
	FXW2 <b>NEW!</b>	Ultra small, Long-life	8,000	-10~+85		◎	○	400	13,000~30,000	76
Not recommended for the new design.	HCG7A	★Recommended series : VF™	4,000	-25~+85				6.3~100	3,300~680,000	78
	HCGF5A	★Recommended series : VF™	4,000	-25~+85				160~450	270~39,000	82
	HCGF6A	★Recommended series : VF™	4,000	-25~+85				400~500	1,200~22,000	86
	FXA	★Recommended series : VFL™	8,000	-40~+85				350~450	1,000~18,000	88
	FX2	★Recommended series : VFL™	8,000	-40(-25)~+85				400~600	1,000~22,000	90
	FX3	★Recommended series : VFL™	8,000	-40~+85				400~500	1,200~22,000	94
	FXR3	★Recommended series : VFLR™	8,000	-40~+85				400~500	1,800~22,000	96
	HXA	★Recommended series : VFH™	20,000	-40~+85				350~450	1,000~15,000	100
	HCGHA	★Recommended series : VG™	4,000	-40~+105				25~400	330~330,000	102
	GXA	★Recommended series : VGL™	8,000	-40~+105				350~450	1,000~15,000	106
	GX2	★Recommended series : VGL™	8,000	-40~+105				400~500	1,000~10,000	108
	GX3	★Recommended series : VGL™	8,000	-40~+105				400, 450	1,500~12,000	110
	GXR3	★Recommended series : VGLR™	8,000	-40~+105				400, 450	2,200~18,000	112

Option Service : To our regular series (VF, VG, VFL, VGL, VFH, FXA, FX2, HXA, GXA, GX2), we can add Charge-Discharge function. Please contact us.

### Radial type Aluminum electrolytic capacitors

Series	Feature	Useful Life time [h]	Operating Temperature range [°C]	Standard product	Small-sized product	High-reliability product	Operating voltage [V.DC]	Capacitance range [μ F]	Page
Standard	HU	Standard	2,000	-25~+105	○		200~450	8.2~560	116
	HL	Standard, 5kh	5,000	-25~+105	○		200~450	8.2~560	120

### Snap mount type Aluminum electrolytic capacitors

Type	Series	Feature	Useful Life time [h]	Operating Temperature range [°C]	Standard product	Small-sized product	High-reliability product	Operating voltage [V.DC]	Capacitance range [μ F]	Page
Standard	HP3	Standard	4,000	-40~+85	○			16~450	82~33,000	126
	HU3	105°C, Standard	4,000	-40~+105	○			16~450	47~33,000	130
	HU <b>UPGRADE!</b>	105°C, Small-sized	4,000	-40(-25)~+105		◎		200~550	56~2,200	134
	ZL <b>UPGRADE!</b>	105°C, Small-sized	5,000	-40(-25)~+105		○		200~550	56~2,700	138
Long-life	HL	105°C, Small-sized	8,000	-40(-25)~+105		○	○	200~500	56~2,700	142
	YL	105°C, Small-sized	10,000	-25~+105		○	○	400~500	82~680	146
	XL1	105°C	15,000	-40~+105	○		○	200~450	39~1,500	148
Special application	CU	105°C, side-vent type, High-ripple current	4,000	-25~+105			○	400~500	120~1,200	150
	ZLR <b>UPGRADE!</b>	105°C, Small-sized, High-ripple current	5,000	-25~+105		○	○	400~450	68~680	152
	DH	Charge-Discharge	5,000	-25~+105			◎	400, 450	82~680	154
	HW	Flash	—	-20~+55		◎		330, 360, 400	370~3,800	156
	HS <b>NEW!</b>	Flash	—	-20~+55		○		450	300~1,900	158

## Standardization

Some of the series listed below have been removed from the catalog.  
On designing, please select from the new series for your applications.

Table-1

Type	Contents	Obsolete Type • Series	New Type • Series	Page		
Screw Terminal Type	85°C 4kh	HCG2	①Diameter $\phi$ 36~51 • HCG7A (6.3~100V) • HCGF5A (160~250V)	78		
		HCG3		82		
		HCG4				
		HCG5				
		HCG6				
		HCGFA				
		HCGF2		②Diameter $\phi$ 64~90	24	
		HCGF3		• VF		
		HCGF4				
		PH				
	85°C 8kh High ripple current	FXR	VFLR	56		
	105°C 8kh High ripple current	GXR	VGLR	60		
GXH		Please contact us	—			
	Charge-discharge type	HF	—	—		
Snap Mount Type	85°C 1kh	HPW	HP3	126		
	85°C 2kh	HPF				
		HP1				
		HF1				
		HPR				
		HFR				
	HF2					
	105°C 1kh	HPU	①16~160V • HU3	130		
	105°C 4kh	HFU				
		HU1			②200~500V • HU	134
		HU4				
		HU5				
		HV1				
		HUR				
	HVR					
105°C 5kh	HV2	ZL	138			
105°C 8kh	ZL1	HL	142			
	HUL					
	HVL					
	HL1					
High-ripple current & large capacitance product	HL2	Please contact us	—			
	PS2					
Overvoltage-proof product	US2					
	SS3					
For Photo Flash	Lead wire, Radial type	SS2				
	Lug terminal type	SR7	—	—		
		HD6	HW, HS	156, 158		

In addition, with regard to the type of deletion schedule from the next catalog, so you thank you for your adopted a new series.

Table-2

Type	Contents	Obsolete Type • Series	New Type • Series	Page
Screw Terminal Type	85°C 4kh standard type	HCG7A	VF	24
		HCGF5A		
		HCGF6A		
	85°C 8kh standard type	FXA	VFL	36
		FX2		
		FX3		
	85°C 8kh high ripple type	FXR3	VFLR	56
	85°C 20kh standard type	HXA	VFH	44
	105°C 4kh standard type	HCGHA	VG	30
	105°C 8kh standard type	GXA	VGL	40
GX2				
GX3				
105°C 8kh high ripple type	GXR3	VFLR	56	

## I. STRUCTURE, CHARACTERISTICS AND FAILURES OF ALUMINUM ELECTROLYTIC CAPACITORS

### 1 . Diagram of internal structure of aluminum electrolytic capacitors

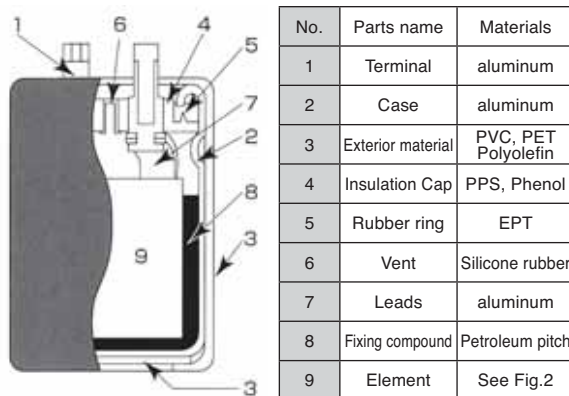


Fig.1 Diagram of Internal Structure (Screw terminal type)

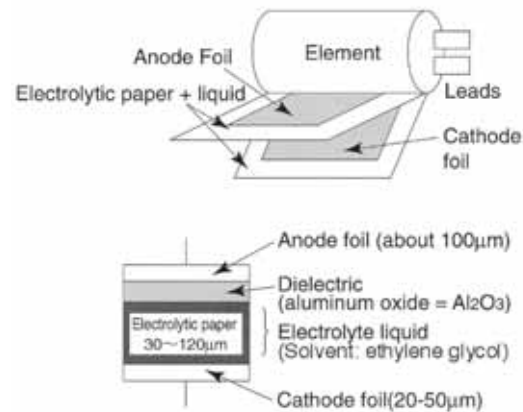


Fig.2 Diagram of Device and Basic Structure

### 2 . Meanings of terms

#### ① Working voltage (W.V.) and surge voltage (SV)

W.V. is the voltage that can be constantly applied while SV is the maximum voltage (450SV at 400W.V.) that can be withstood for a short period of time (30 seconds according to JIS C 5101-4).

#### ② Permissible tolerance in electrostatic capacitance

The allowable range of dispersion in electrostatic capacitance. Aluminum corrodes the electrodes (etches), which increases the amount of surface area and causes the dispersions.

#### ③ Equivalent Series Resistance

The Equalizer Series Resistance puts together electrical resistance of anode and cathode foils, electrolytic fluid resistance, and contact resistance of each connecting section.

#### ④ Tangent of loss angle (generally called Tan delta (tan $\delta$ ))

When current is placed on an ideal capacitor, the current moves ahead 90 degrees in phase from the voltage. However, because some loss occurs in the general capacitor, the forward angle of phase is  $90^\circ - \delta$ . The  $\delta$  is called dielectric loss.  $\tan \delta$  is obtained by the following formula.

$$\tan \delta = \omega CR$$

$\omega$  :  $2\pi f$  [f= frequency (Hz)]

C : electrolytic capacitance (F)

R : Equivalent Series Resistance ( $\Omega$ )

#### ⑤ Impedance [Z]

$$\text{Resistance in an AC circuit } |Z| = \sqrt{R^2 + \left(\omega L - \frac{1}{\omega C}\right)^2}$$

R : Equivalent Series Resistance ( $\Omega$ )

C : electrolytic capacitance (F)

L : inductance (H)

$\omega$  :  $2\pi f$  [f = frequency (Hz)]

#### ⑥ Leakage current (generally called LC)

DC current will not flow in an ideal capacitor after it has been completely charged with DC Current But, in the real, dielectric resistance is not infinite and a micro-current will flow through the capacitor. Electrolytic capacitors in particular can be damaged during processing by oxide film and when that is recovered the micro-current will flow.

## 3. Manufacturing processes for aluminum electrolytic capacitors

### ① Etching (expanding surface area)

The processing for expanding the surface of aluminum foil.

High purity aluminum foil, 500mm wide and 0.1mm thick is continuously processed electrochemically by flowing direct current through a chlorine bath solution. The surface area is expanded 50- 100 times for low-voltage use capacitors and 10-40 times for medium to high-voltage use capacitors.



Fig.3 Diagram of etching model

### ② Forming (dielectric formation)

The process of forming the dielectric ( $Al_2O_3$ ).

The dielectric is formed in a continuous electrochemical process by passing a voltage that is 120-200 percent of the working voltage through etched aluminum foil that is in a bath of boric acid ammonium. The dielectric is extremely thin, about  $14\text{\AA}/V$ .

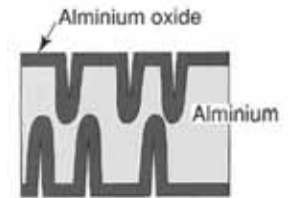


Fig.4 Diagram of formation model

### ③ Slitting

The formed aluminum foil (anode foil), cathode foil and electrolytic paper are slit according to the product size.

### ④ Winding

Electrolytic paper is inserted between the slit anode foil and the opposite cathode foil and rolled into a tube. Leads are connected because both electrode foils are concerted to a terminal. To prevent mechanical contact between the anode and cathode electrode foils, the electrolytic pass functions to hold the electrolytic liquid which is a cathode electrode.

### ⑤ Impregnation

The process of inserting the electrolytic liquid into the device by pressurization and depressurization.

The electrolytic fluid is uses such things for solvents as boric acid and organic acid ammonium with ethylene glycol as the main medium. These have a very big effect on the life, frequency characteristics, range of operating temperature and temperature characteristics of the capacitor.

### ⑥ Assembly

After making holes on lead tab insulation cap are connected to lead.

### ⑦ Sealing

The impregnated device is sealed by an aluminum case and sealant to keep it airtight.

### ⑧ Reforming (aging)

This is the process of applying voltage at high temperature to debug, to form the dielectric that has been damaged during assembly and to shear the anode foil during slitting.

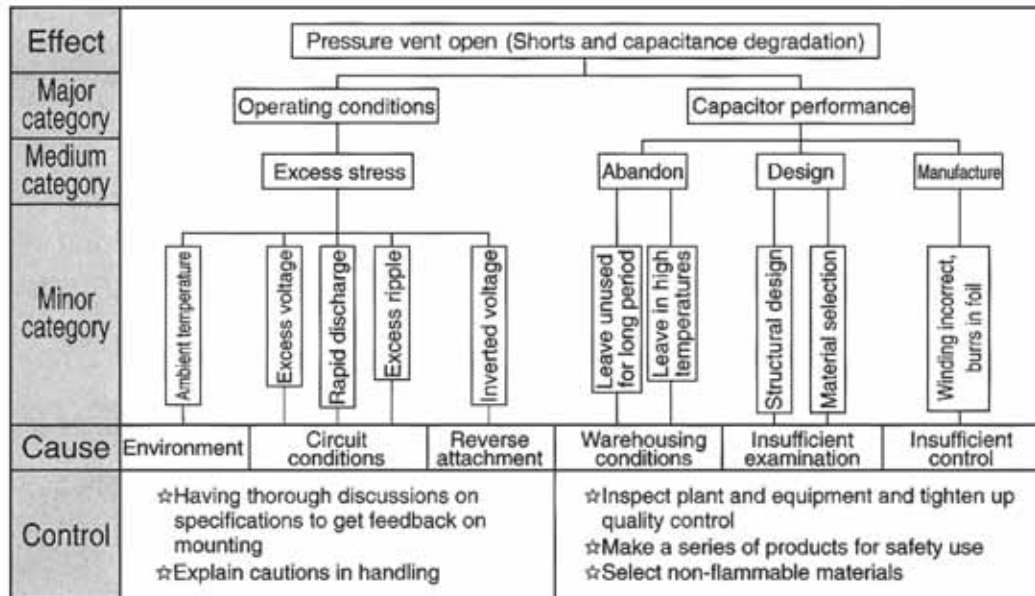
### ⑨ Inspection of all parts

Inspection is made of the external appearance and the electrical characteristics of all aged parts.

### ⑩ Sampling, packaging and shipping

An inspection is made according to fixed sampling standards and the capacitors that pass the inspection are packed and shipped. Detailed tests are made periodically to check quality.

## 4. FTA map of failures



## II. NOTES TO USERS OF ALUMINUM ELECTROLYTIC CAPACITORS

### 1. Operating environment

- (1) Water, saltwater, oil or other electrically conductive liquid on a capacitor, or using a capacitor when it is damp with dew may cause a failure. Oil on the rubber seal or safety vent may cause a decline in airtightness. Do not use any capacitor in contact with liquid. Do not use capacitors that have been immersed in rainwater or other contaminated water.
- (2) Do not use or leave a capacitor in areas where there is halide compound gas such as hydrogen sulfide, nitrous acid, sulfurous acid, chlorine and bromine, or ammonia or other hazardous gas. The ingress of any of these gases into a capacitor may corrode it.
- (3) Do not use or leave a capacitor in an area exposed to ozone, ultraviolet light, or radiation.
- (4) Powders (dust, etc.) that settle between terminals can absorb moisture and cause corrosion and tracking of the terminal. When there is conspicuous dust between terminals, stop the current, allow the capacitor to discharge, and wipe the terminals with paper or a towel lightly dampened with water or ethanol. Do not use cleaning agents or other chemicals.
- (5) Do not use a capacitor in an area subject to excessive vibration or impact.

### 2. Operating conditions

#### 2-1 Operating temperature, ripple current

- (1) Check the operating and installation environment and use the capacitor within the range of the rated performance specified in the catalog or specifications.
- (2) Maintain operating temperature and ripple current within the specified ranges. Base your choice of capacitors on the maximum load conditions. A capacitor will overheat under excessive current, potentially resulting in short circuit, fire, or other major failure.
- (3) A capacitor also generates the self heating. Please bear in mind that the capacitor heats up the interior of the equipment, and take appropriate precautions. Operate the unit under normal conditions and check the temperature of the area surrounding the capacitor.
- (4) The permissible ripple current declines with the rise in ambient temperature (the temperature of the capacitor's surroundings). Consider the permissible ripple current at the maximum predictable ambient temperature.
- (5) Electric characteristics change as frequencies change. Check frequency changes in order to choose the right capacitor. Special attention needs to be given to the self heating and short life time both low and high frequency, when equivalent series resistance and inductance change.



## 2- 2 Applied voltage and other operating conditions

- (1) In general, capacitors have polarity. Applying reverse voltage or AC voltage to a capacitor may activate the vent or cause a short circuit, fire or other major failure.
- (2) Use a bipolar capacitor for circuits whose polarity reverses. However, as in any other case, do not use a bipolar capacitor in an AC circuit. Use a special AC capacitor for AC voltage.
- (3) Do not apply voltage in excess of the rated voltage. When an AC voltage is superimposed on DC voltage, prevent the peak value from exceeding the rated voltage. Excessive voltage may cause a short circuit, fire, or other major failure.
- (4) Specifications on surge voltage have restricted conditions and therefore do not guarantee long hours of operation. Voltage should never exceed the rated voltage of the capacitor, even for brief periods. Choose your capacitor accordingly.
- (5) When connecting more than one capacitor in parallel, give proper consideration to the resistance of the wiring. Establish the connections so that the wiring resistance will be equal at every capacitor.
- (6) When connecting more than one capacitor in series, all must be of identical rating, then the balancing resistors connected in parallel. At that time, design the circuit so that equal voltage levels are applied to all the capacitors. Ascertain that the voltage applied to each individual capacitor does not exceed its rated voltage.
- (7) Take into account the service life of the equipment in the use of the capacitor. Use of the capacitor beyond its service life risks such failures as safety vent activation or short circuit. Replace as necessary at regular inspection.
- (8) Do not use a capacitor for a circuit that is quickly charged and discharged repeatedly. Use a dedicated capacitor for an application like a welding unit or photo flash charging/discharging. Consult us for selecting the proper capacitor, since the control circuits of certain rotation equipment, like servo motors, charge and discharge repeatedly.
- (9) Even slow charging/discharging can shorten the service life of a capacitor, resulting in premature failure, where there are marked changes in voltage changes. Check the installation in your equipment carefully and consult us.
- (10) General purpose capacitors should not be used for a circuit involving rapid charge and discharge or an AC circuit. Capacitors specially made for such applications should be used. → Check the self heating of the capacitor used in such a circuit in addition to the types and levels to be imposed to the capacitor of the rapid charge/discharge, rush current and voltage.

## 3. Installation

### 3- 1 Before installation

- (1) Check the specifications of the capacitors, and install them within the prescribed specifications.
- (2) Do not reverse the polarity. Do not use a capacitor where reverse voltage is applied, even if it appears problem-free. Not taking these precautions could lead to a major failure.
- (3) Dropping or otherwise impacting a capacitor may result in a decline in its electric performance, causing a failure. Do not use any capacitor whose packaging has a noticeable abnormality on delivery.
- (4) Do not distort the shape of the capacitor, which may lead the major failures such as liquid leakage or short circuit.
- (5) Do not reuse a capacitor that has previously been installed on a machine and energized. No capacitor can be reused (with the exception of removal for measuring electrical performance during periodic checkups).

### 3- 2 Installation method

- (1) Do not install wiring or a circuit pattern near the vent. When the vent is activated, electrolyte may spurt out, resulting in short circuit followed by fire or other secondary hazard due to tracking or migration.
- (2) Do not lay out heat-generating components near the capacitor. Radiated heat and other partially high temperatures may shorten the life of the capacitor. PCB temperature that is higher than the internal temperature of the capacitor markedly hinders the dissipation of heat inside the capacitor, greatly shortening its life. When designing equipment, check temperature distribution first.
- (3) When installing the vent of the capacitor against the PCB, drill a gas bleeder hole to allow the gas to escape when the vent is activated. If the diffusion of gas is hindered while the vent is in operation, the internal pressure can rise, with danger of explosion, fire or other serious failure.

#### 3- 2- 1 Snap mount type capacitors, Radial type capacitors

- (1) When fixing with the snap mount type capacitors had two claw terminal and the length of the capacitor more than 55 mm to PCB, use adhesive glue.

- (2) Do not connect the blank terminal (reinforced terminal) of multi-terminal (3-, 4-) snap mount capacitors, as this could cause a short circuit.
- (3) Use a completely isolated circuit between the case and the electrode terminal, and between the case and the circuit pattern.
- (4) Do not hinder the activation of the vent. Allow for the following clearance above the vent. If dissipation of gas is inhibited while the vent is in operation, the inner pressure will rise, with danger of explosion, fire or other major failure.

Capacitor diameter	Clearance
$\phi$ 10 ~ 16	2mm or more
$\phi$ 18 ~ 35	3mm or more
$\phi$ 40 or more	5mm or more

- (5) Exterior sleeves are for labeling purposes, not for insulation. Consult us if you need insulation.
- (6) Failure to tightly solder the capacitor to the PCB may result in one of its terminals breaking or its pattern peeling off due to vibration. Insert the capacitor snugly and correctly into the designated holes in the PCB, then solder it.
- (7) Terminal pitch and dimensions for the terminals are specified for a capacitor. → Check whether the terminal pitch and the mounting holes on the board match properly. The electrolyte leaks from inside if mismatched.
- (8) Solder at 260°C for not more than 10 seconds (In the case of dip) or at 380°C for not more than 3 seconds (In the case of tip of iron). Exceeding these specifications may result in a decline in electrical performance, leading to trouble. Do not let the tip of the soldering iron come in contact with the capacitor body.
- (9) If it becomes necessary to remove a capacitor after soldering, melt the solder with a soldering iron to avoid subjecting the terminals to stress.
- (10) Flux on the rubber seal may result in corrosion. Do not let flux stick to any part other than the terminals.
- (11) Some cutting oils contribute to swelling of rubber, with the risk of corrosion and a decline in air-tightness. If the rubber surface will be exposed to cutting oils, use washable capacitors.
- (12) Do not twist or otherwise physically move the capacitor after soldering it to the PCB. Do not take hold of the capacitor to move a PCB either, as this may deform the terminal or decrease its air tightness.
- (13) Do not apply physical impact to the capacitor (striking, etc.) after it is soldered to a PCB. When stacking PCBs, make sure that the capacitors don't contact PCBs or other components.

### 3- 2- 2 Screw-terminal type capacitors

- (1) Don't turn cap face to downward. If a capacitor is installed sideways, please put anode terminal or vent upward.
- (2) Recommended tightening torque and terminal permissible current (maximum current a terminal can withstand) for each terminal screw are listed below. Consult us if you wish to use a capacitor on a machine that vibrates significantly.

Terminal	Recommended torque(permissible level) [N.m]	Terminal permissible current [A]
M 5	2.2 (1.5 ~ 3.0)	60
M 6	3.5 (3.0 ~ 4.0)	100
M 8	7.5 (7.0 ~ 8.0)	120

- (3) Refer to page 19 for recommended clamping value of the bracket.
- (4) The terminal screws (M5 standard under head: 10mm, M6 standard under head : 12mm, M8 standard under head : 16mm) in the separate package are designed for wire thickness not exceeding 2mm. Add to the screw length for wires more than 2mm thick. Heat generated due to a small screw clamping area could cause a failure.
- (5) If a screw is loose or angled, that portion generates heat, with a danger of fire or other serious failure. Check that the screw is inserted on the perpendicular and securely tightened.
- (6) We recommend a bar hole diameter of 6mm for M5 terminals. An excessively large hole diameter may result in poor contact between the terminal surface and the bar, causing local heat buildup, with a danger of fire or other serious failure.
- (7) Do not apply physical stress (tightening with fixtures, etc.) to the curled portion (seal contacting the case and cap). Any such practice may cause a liquid leak or sleeve breakage.

### 4. About washing PCB and fixative

- (1) In washing, please avoid using a material which destroy the ozone layer.
- (2) For cleaning flux, we recommend an aqueous or higher alcohol detergent or isopropyl alcohol. The recommended concentration of flux with regard to the cleaning agent is 2wt% or less. Excessively high flux concentration may cause corrosion due to halide. For use of other cleaning agents, consult us.
- (3) If you must clean the capacitor with halogen solvents, etc., we recommend that you use washable capacitors. Make sure that the cleaning conditions are within those stipulated in the specifications, and measure the

cleaning agent for conductivity, pH, specific gravity and moisture content for contamination control. After cleaning, thoroughly dry the capacitors together with PCBs. Do not store the capacitors in the same atmosphere as the cleaning agent or in a sealed container. For details on washable capacitors, consult us.

- (4) Thoroughly remove all traces of the cleaning agent from the capacitor. Even when not cleaning the flux, dry the flux itself. Cleaning agent or flux residue may cause the halide to penetrate the rubber seal, leading to corrosion.
- (5) When fixing a PCB and capacitor with a coating agent or fixative, use a substance completely free of halide compounds. Thoroughly dry the flux or detergent before applying the coating. Do not let the coating block the entire surface of the seal. Any halide compound present in the coating may lead to corrosion.

## 5. Storage

- (1) Store all capacitors indoors at a temperature of 5-35°C and relative humidity of not more than 75%RH (25°C), away from direct sunlight. Store capacitors in their original packaging whenever possible.
- (2) The maximum shelf life of capacitors is 3 years. The maximum shelf life of capacitors for snap mount capacitors is 2 years using leadless soldered terminals, beyond which solderability deteriorates.
- (3) All capacitors which have been on the shelf for more than 2 years have an excessively high leakage current. Treat them with appropriate voltage before using. As treating method, it is used current density less than specified leakage current in room temperature.
  - Firstly, 80% of rated voltage applied and keep 1 hour after reaching 80% of rated voltages.
  - Secondarily, 90% of rated voltage applied and keep 1 hour after reaching 90% of rated voltages.
  - Finally, 100% of rated voltage applied and keep 1 hour after reaching 100% of rated voltages.
- (4) Even after discharged, capacitors may hold an electrical charge due to re-striking. Do not touch the terminals with bare hands. Touching the terminals could cause an electric shock. Discharge all capacitors with a resistor (approx. 1kΩ) or a discharge plate before use.

## 6. About fumigation

- (1) To control insects during export, fumigation may be done using halide compounds such as methyl bromide. Direct fumigation of capacitors or equipment incorporating capacitors or use of fumigated timber as a pallet may cause corrosion inside a capacitor, resulting in failure. Even when covered in plastic, chemicals may penetrate through small gaps. Likewise, do not apply insecticides directly on or near the capacitors.
- (2) When using a sterilizer against infectious diseases, do not spray it directly on or close to capacitors and equipment incorporating capacitors. Some sterilizers contain a high concentration of halide compounds. The sterilizer spray may accelerate internal corrosion, resulting in failure.

## 7. Miscellaneous

### 7 - 1 Maintenance and servicing

- (1) Conduct periodic checkups on capacitors for industrial equipment. Before each periodic checkup, turn off the equipment and completely discharge the capacitor.
 

following these checkpoints:

  - ① Appearance: Condition of the vent (open, notably swollen), liquid leaks or other considerable abnormality
  - ② Electrical performance: Capacity, tangent of loss angle, leakage current, and other items specified in the delivery specifications.

The standard temperature for measuring electrical performance is 20°C. Leave the capacitor at 20°C and wait for the inside of the capacitor to reach the specified temperature before taking measurements.
- (2) Please ask us the advisability of using capacitor which is inspected.
- (3) Replace all capacitors whose service life has reached its end. When replacing one capacitor, always replace all of them. Mixing old and new capacitors may cause an imbalance in the ripple current or voltage sharing, risking failures such as activation of the vent or short circuit.

### 7 - 2 In an emergency

- (1) If gas is detected while a product is in use, turn off the main power supply or unplug it.
- (2) When the safety vent of a capacitor is activated, a hot gas exceeding 100°C will escape. Do not place your face in close proximity to the vent and avoid proximity to areas exposed to the gas.
- (3) Should the gas jet get in your eyes, wash them immediately with clean water. If you inhale the gas, gargle immediately. The gas is composed of a gaseous form of hydrogen or organic solvents.
- (4) Should the electrolyte come in contact with your skin, wash with soap and water. Never put it into your mouth.

## 7-3 For scrapping

- (1) Scrapped capacitors are classified as scrapped metal. For burial they are handled as controllable industrial waste because of the nature of the contents (electrolyte). Commission an industrial waste disposal specialist for their disposal. Ensure that no waste products enter the market.
- (2) Most of the material is aluminum and cannot be completely burned. In incineration, take the following into consideration:
  - Burning the capacitors in an airtight state may cause an explosion. Before incinerating, either pierce the exterior or break them open. Be sure to wear protective clothing during this operation, since electrolyte or gas will jet out if the inner pressure of the capacitor is high.
  - Because of the exterior material (polyvinyl chloride), low-temperature incineration may emit hazardous gases. Burn the material at high temperatures (800°C or above). Incineration requires separation of the exterior materials.
- (3) Do not attempt to crush the capacitors, as this may cause electric shock or injury.

## 7-4 Remarks

For details, see the Guidelines on the Operation of Fixed Aluminum Electrolytic Capacitors for Electronic Equipment EIAJ RCR-2367B March, 2002 issue.

### III. Service Life of an Aluminum Electrolytic Capacitor

#### 1. Factors affecting service life

Environmental factors affecting the service life of an aluminum electrolytic capacitor include temperature, humidity and vibration (environment), as well as electrical factors, applied voltage, ripple current and charging/discharging conditions. In capacitors for mid-to-high-voltage filters, temperature and applied voltage are the most important controlling factors. The estimated service life may be calculated based on the core temperature of the capacitor and the applied voltage.

#### 1-1 Temperature conditions

Capacitance change or tangent change for loss angle indicates that the product life has been affected by temperature. Generally, as the ambient temperature (neighboring temperature of the capacitor) increases, capacitance decreases and tangent change for loss angle takes place more rapidly. This is mainly because electrolytic solution generates gas due to electrode reaction and diffuses it outside via a sealing rubber. The following expression (1) indicates the relation between the ambient temperature and electric characteristic that changes with time (while the capacitor is used normally according to the rules of serviceability).

$$L = L_0 \times 2^{\frac{T_0 - T}{10}} \quad \dots (1)$$

Where,

L : Estimated service life in actual use

L<sub>0</sub> : Standard service life when allowable ripple current load or rated voltage is applied at the maximum operating temperature

T<sub>0</sub> : Maximum core temperature setting when subjected to the maximum allowable ripple load at the maximum operating temperature (settings differ in different series or products. Contact us for details)

T : Core temperature of the capacitor during actual use

Therefore, the lower the core temperature of the capacitor during actual use, the longer the estimated service life is. The core temperature of a capacitor may be lowered by lowering either the ambient temperature or the load current (operating conditions), or by either boosting capacitance or lowering internal resistance. Some capacitors feature a radiating structure to lower the core temperature. Consult us for the selection of capacitors.

When multiple capacitors are connected in parallel, check the core temperature in each capacitors and the balance of the total series resistance to each capacitors. If capacitors are used at high frequency, the circuit resistance is especially need to considered. The estimating service life is needed to calculated from the maximum core temperature.

## 1 - 2 Voltage conditions

The service life of an aluminum electrolytic capacitor for mid- to high-voltage filters is affected by the applied voltage. If the applied voltage is between 60% and 100% of the rated voltage, the estimated service can be extended by lowering the applied voltage below the rated voltage. However, if the applied voltage is less than 60% of the rated voltage or the capacitor is used in low-pressure (100 WV or less) applications, the impact of the applied voltage on the service life is negligible. Therefore, service life is estimated assuming no impact from voltage. Continuous application of a voltage over the rated voltage rapidly increases leakage current in a capacitor. This may increase internal pressure due to generation of gases, resulting in activation of the safety vent in a short time and/or formation of an internal short circuit.

For this reason, the applied voltage must be maintained below the rated voltage during use. Besides, it should be noted that the circuit design is such that the applied voltage will remain 80% or less of the rated voltage during use.

Where more than one capacitor connected in series is used, the applied voltages across the individual capacitors may become out of balance, resulting in the application of excessive voltage to them. To avoid this, either choose a rated voltage allowing for voltage imbalances, or connect a voltage divider (resistors) to the capacitors. Please be careful about charge/discharge.

## 2. Formula for estimating service life

- (1) Estimating from the core temperature of the capacitor and applied voltage Formula for calculating the service life of our capacitors in mid-to-high voltage applications (filters).

$$L = L_0 \times 2^{\frac{T_0 - T}{10}} \times \left( \frac{WV}{V} \right)^{2.5} \quad \dots (2)$$

Where,

$T_0$  : Maximum core temperature setting when subjected to the maximum allowable ripple load at the maximum operating temperature

$L_0$  : Standard service life when core temperature is  $T_0$  and rated voltage is (WV)

$L$  : Estimated service life when core temperature is  $T$  and applied voltage is (V)

If  $V/WV < 0.6$ , use  $V/WV = 0.6$ .

- (2) Estimating core temperature of a capacitor from load ripple current

We recommend that you estimate service life by measuring the core temperature of the capacitor with a thermocouple. We can manufacture samples with inserted thermocouples according to customer requests.

If for some reason it is impossible to measure the core temperature, you can estimate the service life by making a rough estimate of the core temperature of the capacitor from the load ripple current. As shown below, assuming the rise in temperature and the square of load current to be nearly proportionate, obtain the core temperature of the capacitor that occurs when the capacitor is loaded with a ripple current.

$$T = T_a + \Delta T_0 \times \left( \frac{I}{I_R} \right)^2 \quad \dots (3)$$

Where,

$T$  : Core temperature of the capacitor when ripple current  $I$  is loaded

$T_a$  : Ambient temperature

$\Delta T_0$  : Rise in maximum core temperature setting for the capacitor when permissible ripple current  $I_R$  is loaded

(settings differ in different series or products. Contact us for details)

Note : Observe the rule:  $I \leq I_R$ . Never use a capacitor loaded with a ripple current greater than  $I_R$ .

For safety reasons, estimate the service life on the basis of the core temperature of the capacitor at maximum load. Temperature distribution should be taken into account when more than one capacitor is used.

## 3. Other factors affecting service life

## (1) Reverse voltage

When a reverse voltage is applied to the capacitor, the capacitor's cathode foil that is not coated with oxide is energized, resulting in forced formation of an oxide film on its surface. During the process of forced formation, heat and gases are generated. This will shorten the service life significantly.

## (2) Charge and discharge

Generally, where aluminum electrolytic capacitors are used in a charge/discharge circuit, oxide films are gradually formed on the surfaces of their cathode foils due to discharge current. This will shorten the service life significantly. For this reason, general-purpose capacitors are not suitable for circuits in which frequent charge and discharge are common. Examples include circuits for photo flash and welding.

## (3) Inrush current

Upon switching on the power supply of a welding machine, a large current flows instantaneously at the beginning of charging. Such a current, called an inrush current, is 10 to 1,000 times as large as the normal value. Inrush currents pose no problem as long as they occur with very low frequency during operation. The reason for this is that their heat-generating energy is relatively small. However, if an inrush current occurs repeatedly during operation, it may shorten the service life significantly.

**IV. Reducing Substances with Environmental Impact**

As part of our initiatives for global environment protection under ISO 14001, we recommend products without any substances with environmental impact to our customers.

## (1) Lead-free

Regarding Snap mount type and Radial type Aluminum Electrolytic Capacitors, our standard specification is to use Tin instead of Lead on the surface of terminal plating. We discontinued producing Tin + Lead plating.

Regarding Screw terminal type Aluminum Electrolytic Capacitors, they do not contain Lead at all.

Please contact us for details.

## (2) Eliminating Chromate Treatment

The previous chromate treatment on the surface of bracket contained hexavalent chromium.

To avoid this material, we changed to trivalent chromium.

The surface treatment is changed but no change in size or other specification.

In addition to Lead-free, aluminum electrolytic capacitors that we produce have suited RoHS Directive.

## (3) PVC-free

For PVC-free Snap mount type and Radial type Aluminum Electrolytic Capacitors, the capacitors are covered with PET insulating sleeve, and The bottoms not covered.

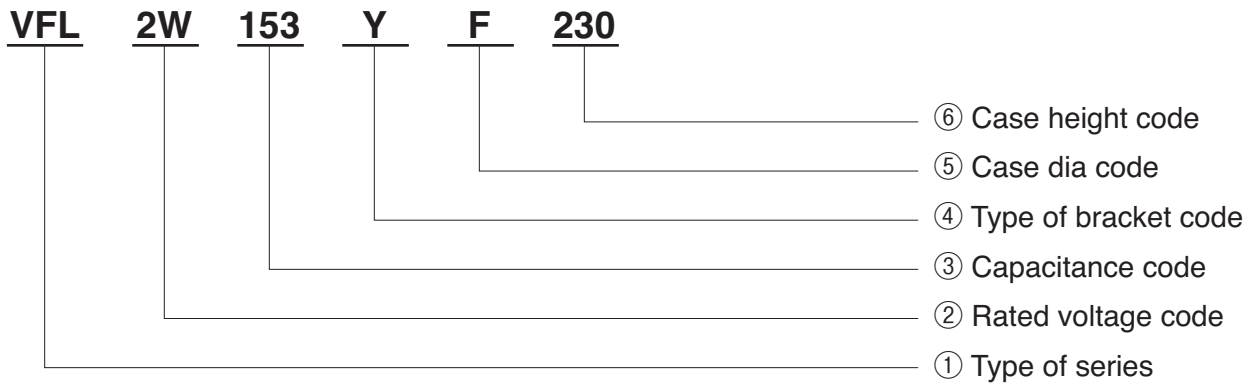
Please contact us for other PVC-free products.

## (4) Conform RoHS

All series (Screw terminal type Aluminum Electrolytic Capacitors, Snap mount type Aluminum Electrolytic Capacitors, Radial type Aluminum Electrolytic Capacitors) apply RoHS.



## ■ HOW TO ORDER



### ① Type of series

Type of series
VF
VG
VFL
VGL
VFH
VFR
VGR
VFLR
VGLR
VFHR
HCGWA
HCGW2
HCGW3
FXW
FXW2
HCG7A
HCGF5A
HCGF6A
FXA
FX2
FX3
FXR3
HXA
HCGHA
GXA
GX2
GX3
GXR3

### ② Rated voltage code

Rated voltage code	Rated voltage (V)
0J	6.3
1A	10
1C	16
1E	25
1V	35
1H	50
1J	63
1K	80
2A	100
2C	160
2D	200
2E	250
2V	350
2G	400
2W	450
2H	500
2L	550
600V	600
650V	650

### ③ Capacitance code

Capacitance code	Capacitance (μ F)	Capacitance code	Capacitance (μ F)
271	270	822	8,200
331	330	103	10,000
391	390	123	12,000
471	470	153	15,000
561	560	183	18,000
681	680	223	22,000
821	820	273	27,000
102	1,000	333	33,000
122	1,200	393	39,000
152	1,500	473	47,000
182	1,800	683	68,000
222	2,200	104	100,000
272	2,700	154	150,000
332	3,300	224	220,000
392	3,900	334	330,000
472	4,700	474	470,000
562	5,600	564	560,000
682	6,800	684	680,000

The first two digits are significant.  
 The last digit indicates the number of following zeros.

### ④ Type of bracket code

Type of bracket code	Bracket
I	Bracket I type
Y	Bracket Y type
X	Bracket X type
B	Stud screw type
IUC	Insulation holder I type
YUC	Insulation holder Y type

### ⑤ Case dia code

Case dia code	Case dia (mm)
A	36
C	51
D	64
E	77
F	90
G	101
K	121

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

## Assembling method

Bracket(1) is used as the standard.

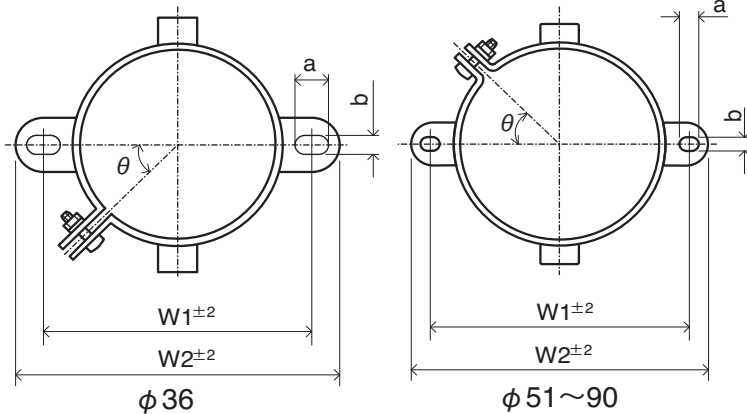
(Except the external deter of case of  $\phi 51 \sim 101$ , the Y-type bracket is used as the standard.)

### (1) Bracket

#### I type

Type of bracket code : I

Available dia : Case dia size  $\phi 36 \sim 90$



$\phi D$ (mm)	a (mm)	b (mm)	$\theta$ ( $^{\circ}$ )	W1 (mm)	W2 (mm)
36	6.0	3.5	45	48.0	58.0
51	6.0	4.5	45	68.0	80.0
64	6.0	4.5	45	81.0	93.0
77	6.0	4.5	45	93.5	106.0
90	7.0	5.0	30	108.0	120.5

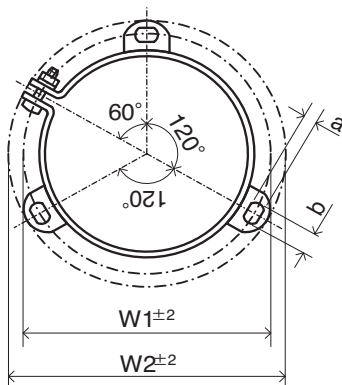
#### Clamping value of the bracket

$\phi D$ (mm)	Screw size	Recommended torque (permissible) (N·m)
36	M3	0.5 (0.5 ~ 0.6)
51 ~ 90	M4	1.3 (1.0 ~ 1.6)

#### Y type

Type of bracket code : Y

Available dia : Case dia size  $\phi 51 \sim 101$



$\phi D$ (mm)	a (mm)	b (mm)	W1 (mm)	W2 (mm)
51	4.5	7	63.5	73.0
64	4.5	7	76.2	85.1
77	4.5	7	88.9	98.4
90	4.5	7	101.6	111.1
101	5.5	8	115.0	127.0

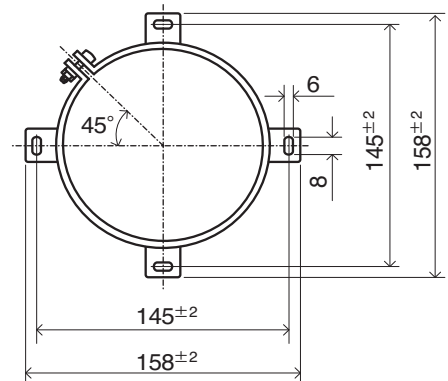
#### Clamping value of the bracket

$\phi D$ (mm)	Screw size	Recommended torque (permissible) (N·m)
51 ~ 90	M4	1.3 (1.0 ~ 1.6)
101	M5	1.8 (1.5 ~ 2.0)

#### X type

Type of bracket code : X

Available dia : Case dia size  $\phi 121$



#### Clamping value of the bracket

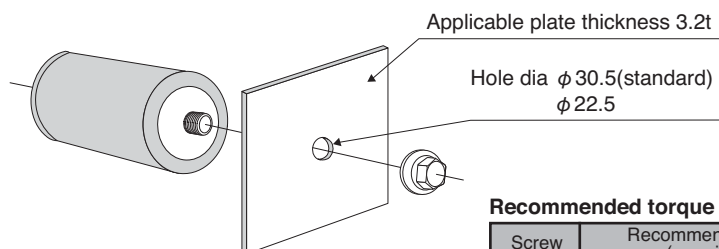
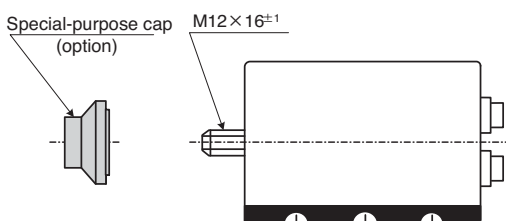
$\phi D$ (mm)	Screw size	Recommended torque (permissible) (N·m)
121	M5	1.8 (1.5 ~ 2.0)

### (2) Stud screw type

#### B type

Type of bracket code : B

Available dia : Case dia size  $\phi 51 \sim 101$



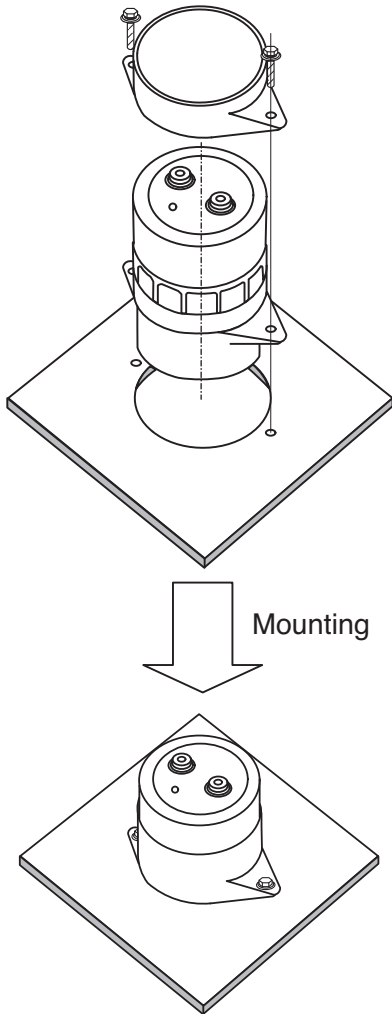
#### Recommended torque of stud screw

Screw size	Recommended torque (permissible) (N·m)
M12	15

Capacitor diameter  $\phi 36$ (M8 x 10) became available.

## (3) Insulation holder

Best suited for improving insulation and vibration resistance and for cutting back on assembly costs.  
Please contact us if this holder is used so that a special aluminum case is necessary.



**■ I type**  
Type of bracket code : IUC  
Available dia : Case dia size  $\phi 77$

**■ Y type**  
Type of bracket code : YUC  
Available dia : Case dia size  $\phi 90 \sim 101$

$\phi D$ (mm)	$\phi a$ (mm)	$\phi b$ (mm)	W1 (mm)	W2 (mm)
90	101.0	95.5	115.0	127.0
101	112.0	106.0	126.0	138.0

# Option Service:Charge-Discharge

- Conform RoHS

## Features

- Suited to high frequency Charge-Discharge for AC servomotor, general inverter.
- To our regular series, we add Charge-Discharge function. The size / performance is as it is.



## Product Specifications

Items	Specifications
Rated voltage	400, 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV ( $\mu A$ ) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance ( $\mu F$ ), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	Please refer to the Reference page of Charge-Discharge available series.
Endurance of high temperature load behavior	After an application of specified ripple current on top of rated voltage for Warranty life at the maximum operating temperature, following requirements must be met. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Endurance of charge-discharge behavior	After an application of charge-discharge voltage for 50 million times (charge-discharge ( $\Delta V$ ) = 150V, cycle 3 or 2 Hz <sup>(*)</sup> ) at 40°C, following requirements must be met. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

\*1 Charge-Discharge frequency:

The highest Charge-Discharge frequency is 2Hz as for the products of 10,000  $\mu F$  or more, all other products are 3Hz.

## Charge-Discharge option available series

Type of series	VF	VFL	FXA	FX2	VFH	HXA	VG	VGL	GXA	GX2
Temperature range	-40°C~85°C						-40°C~105°C			
Useful life	4,000h	8,000h	8,000h	8,000h	20,000h	20,000h	4,000h	8,000h	8,000h	8,000h
Reference page	P.24	P.36	P.88	P.90	P.44	P.100	P.30	P.40	P.106	P.108

- Product code  
To figure this option, add "DH" at the end of the product name.  
Please refer to the Reference page of Charge-Discharge option available series.
- Standard Products Table  
Please refer to the Reference page of Charge-Discharge option available series.
- Ripple current correction coefficient  
Please refer to the Reference page of Charge-Discharge option available series.

# MEMO

---

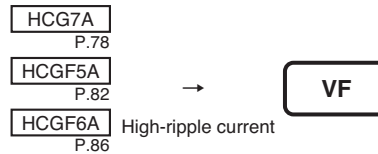
## VF Series

Useful of 4,000 hours at 85°C

- Conform RoHS

### Features

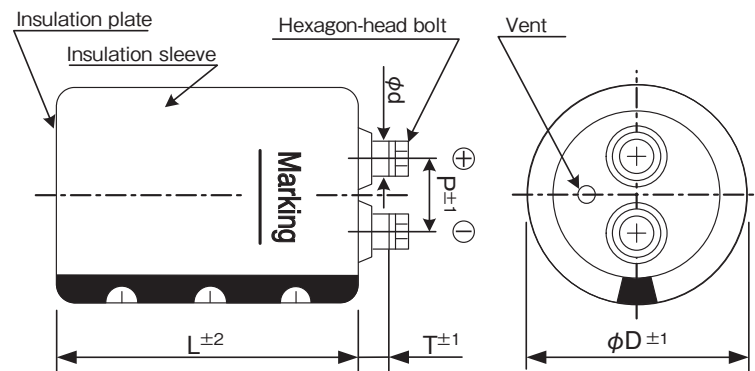
- Ripple current increased by 10% by new heat radiation construction with HCGF6A series.



### Product Specifications

Items	Specifications
Temperature range	- 40°C ~ + 85°C (6.3 ~ 600V.DC) - 25°C ~ + 85°C (650V.DC)
Rated voltage	6.3 ~ 650V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (μA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (μF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value mesured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	8.0	11.0	M5×10	Phenol resin
90	31.5	7.0	11.0	M5×10	Phenol resin

### Ripple current correction coefficient

Temperature correction coefficient

Temperature(°C)	60		85	
	6.3 ~ 100V.DC	160 ~ 250V.DC	6.3 ~ 100V.DC	160 ~ 250V.DC
Correction coefficient	2.19	2.02	1.00	1.00
	350 ~ 650V.DC	1.67	1.00	

Frequency correction coefficient

Frequency(Hz)	120	300	1K	≥ 10K
Correction coefficient	1.0	1.1	1.3	1.4

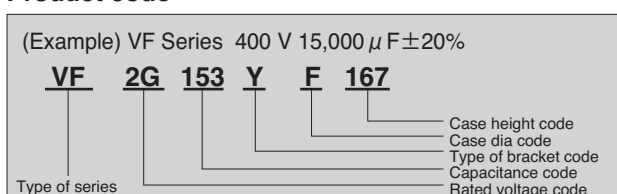
Forced wind correction coefficient

Forced wind(m/s)	< 0.5	0.5 ≤
Correction coefficient	1.0	1.1

Terminal permissible currents : 60Arms for M5.

Please use this type of capacitor at a terminal current below the permissible.

### Product code



Refer to page 19 for product code.

Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.



# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VF Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
6.3	330,000	64 $\times$ 94	1.50	16.1	8	9	22	VF0J334YD094
	470,000	64 $\times$ 107	1.80	18.6	7	8	22	VF0J474YD107
	560,000	64 $\times$ 123	2.40	19.7	6	7	22	VF0J564YD123
		77 $\times$ 95	2.40	18.3	6	7	24	VF0J564YE095
	680,000	77 $\times$ 108	2.90	20.1	5	7	24	VF0J684YE108
10	330,000	64 $\times$ 94	1.80	17.2	5	6	22	VF1A334YD094
	390,000	64 $\times$ 107	2.00	18.7	4	6	22	VF1A394YD107
	470,000	64 $\times$ 123	2.30	21.1	4	6	22	VF1A474YD123
		77 $\times$ 95	2.30	19.4	4	6	24	VF1A474YE095
	560,000	77 $\times$ 108	3.00	21.0	3	5	24	VF1A564YE108
	680,000	77 $\times$ 124	3.70	23.8	3	5	24	VF1A684YE124
		90 $\times$ 97	3.70	22.9	3	5	24	VF1A684YF097
16	270,000	64 $\times$ 94	1.60	16.2	4	6	22	VF1C274YD094
	330,000	64 $\times$ 123	1.80	18.3	4	6	22	VF1C334YD123
		77 $\times$ 95	1.80	18.0	4	6	24	VF1C334YE095
	390,000	77 $\times$ 108	2.40	19.5	4	5	24	VF1C394YE108
	470,000	77 $\times$ 124	2.90	22.0	3	5	24	VF1C474YE124
		90 $\times$ 97	2.90	21.9	3	5	24	VF1C474YF097
	560,000	90 $\times$ 110	3.20	23.7	3	5	24	VF1C564YF110
25	180,000	64 $\times$ 94	1.20	13.7	5	6	22	VF1E184YD094
	220,000	64 $\times$ 107	1.20	15.1	4	5	22	VF1E224YD107
	270,000	64 $\times$ 123	1.40	17.2	4	5	22	VF1E274YD123
	330,000	77 $\times$ 95	1.40	19.2	4	5	24	VF1E334YE095
	390,000	77 $\times$ 108	2.10	20.8	4	5	24	VF1E394YE108
		77 $\times$ 124	2.30	23.4	3	5	24	VF1E474YE124
	470,000	90 $\times$ 97	2.30	22.9	3	5	24	VF1E474YF097
		560,000	90 $\times$ 110	2.30	24.8	3	4	24
35	120,000	64 $\times$ 94	1.00	12.9	5	7	22	VF1V124YD094
	150,000	64 $\times$ 107	1.00	14.4	5	7	22	VF1V154YD107
	180,000	64 $\times$ 123	1.20	16.3	5	7	22	VF1V184YD123
		77 $\times$ 95	1.20	15.2	5	7	24	VF1V184YE095
	220,000	77 $\times$ 108	1.20	16.8	5	7	24	VF1V224YE108
	270,000	77 $\times$ 124	1.80	19.0	4	6	24	VF1V274YE124
		90 $\times$ 97	1.80	18.8	4	6	24	VF1V274YF097
	330,000	90 $\times$ 110	2.00	20.7	4	6	24	VF1V334YF110
50	82,000	64 $\times$ 94	0.70	12.1	7	8	22	VF1H823YD094
	100,000	64 $\times$ 107	0.70	13.4	6	7	22	VF1H104YD107
	150,000	64 $\times$ 123	0.90	16.8	5	7	22	VF1H154YD123
		77 $\times$ 95	0.90	13.9	5	7	24	VF1H154YE095
	180,000	77 $\times$ 108	1.40	15.2	5	6	24	VF1H184YE108
	220,000	77 $\times$ 124	1.50	17.2	4	6	24	VF1H224YE124
		90 $\times$ 97	1.50	16.5	4	6	24	VF1H224YF097
	270,000	90 $\times$ 110	1.50	18.2	3	5	24	VF1H274YF110
63	56,000	64 $\times$ 94	0.50	13.3	8	9	22	VF1J563YD094
	68,000	64 $\times$ 107	0.50	14.6	7	8	22	VF1J683YD107
	82,000	64 $\times$ 123	0.70	16.5	7	8	22	VF1J823YD123
	100,000	77 $\times$ 95	0.70	15.5	7	8	24	VF1J104YE095
	120,000	77 $\times$ 108	1.10	16.9	6	7	24	VF1J124YE108
		77 $\times$ 124	1.20	19.3	6	7	24	VF1J154YE124
	150,000	90 $\times$ 97	1.20	18.3	6	7	24	VF1J154YF097
		180,000	90 $\times$ 110	1.20	19.9	5	6	24

ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
80	39,000	64 $\times$ 94	0.35	12.8	6	7	22	VF1K393YD094
	47,000	64 $\times$ 107	0.35	14.0	6	7	22	VF1K473YD107
	56,000	64 $\times$ 123	0.40	15.7	5	7	22	VF1K563YD123
		77 $\times$ 95	0.40	15.3	5	7	24	VF1K563YE095
	68,000	77 $\times$ 108	0.40	16.8	4	7	24	VF1K683YE108
		77 $\times$ 124	0.60	18.9	3	6	24	VF1K823YE124
82,000	90 $\times$ 97	0.60	18.1	3	6	24	VF1K823YF097	
	100,000	90 $\times$ 110	0.70	19.8	3	6	24	VF1K104YF110
100	22,000	64 $\times$ 94	0.20	9.6	8	9	22	VF2A223YD094
	33,000	64 $\times$ 107	0.25	11.7	6	7	22	VF2A333YD107
	39,000	64 $\times$ 123	0.30	13.1	5	7	22	VF2A393YD123
		77 $\times$ 95	0.30	12.8	5	7	24	VF2A393YE095
	47,000	77 $\times$ 108	0.30	14.0	5	7	24	VF2A473YE108
		77 $\times$ 124	0.45	15.6	4	6	24	VF2A563YE124
56,000	90 $\times$ 97	0.45	15.8	4	6	24	VF2A563YF097	
	68,000	90 $\times$ 110	0.50	17.3	4	6	24	VF2A683YF110
160	12,000	64 $\times$ 94	0.25	12.3	12	15	22	VF2C123YD094
	15,000	64 $\times$ 107	0.25	13.7	11	12	22	VF2C153YD107
		64 $\times$ 123	0.25	15.4	9	11	22	VF2C183YD123
	18,000	77 $\times$ 95	0.25	17.4	9	11	24	VF2C183YE095
		64 $\times$ 147	0.25	16.8	8	8	22	VF2C223YD147
	22,000	77 $\times$ 108	0.25	19.1	8	8	24	VF2C223YE108
		77 $\times$ 124	0.25	21.7	7	8	24	VF2C273YE124
	27,000	90 $\times$ 97	0.25	24.6	7	8	24	VF2C273YF097
77 $\times$ 148		0.25	23.5	6	7	24	VF2C333YE148	
33,000	90 $\times$ 110	0.25	27.0	6	7	24	VF2C333YF110	
	39,000	90 $\times$ 126	0.25	29.1	5	7	24	VF2C393YF126
200	12,000	64 $\times$ 94	0.25	12.3	12	14	22	VF2D123YD094
	15,000	64 $\times$ 123	0.25	14.1	10	13	22	VF2D153YD123
		77 $\times$ 95	0.25	15.8	10	13	24	VF2D153YE095
	18,000	64 $\times$ 147	0.25	15.2	8	12	22	VF2D183YD147
		77 $\times$ 108	0.25	17.3	8	12	24	VF2D183YE108
	22,000	77 $\times$ 124	0.25	19.6	7	7	24	VF2D223YE124
		90 $\times$ 97	0.25	22.2	7	7	24	VF2D223YF097
	27,000	77 $\times$ 148	0.25	21.3	6	7	24	VF2D273YE148
90 $\times$ 110		0.25	24.4	6	7	24	VF2D273YF110	
33,000	90 $\times$ 126	0.25	26.7	5	7	24	VF2D333YF126	
250	8,200	64 $\times$ 94	0.25	10.2	15	16	22	VF2E822YD094
	10,000	64 $\times$ 123	0.25	11.5	12	14	22	VF2E103YD123
		64 $\times$ 147	0.25	12.4	10	11	22	VF2E123YD147
	12,000	77 $\times$ 95	0.25	14.2	10	11	24	VF2E123YE095
		77 $\times$ 124	0.25	16.2	8	11	24	VF2E153YE124
	15,000	90 $\times$ 97	0.25	18.3	8	11	24	VF2E153YF097
		77 $\times$ 148	0.25	17.4	7	10	24	VF2E183YE148
	18,000	90 $\times$ 110	0.25	19.9	7	10	24	VF2E183YF110
22,000		90 $\times$ 126	0.25	21.8	6	8	24	VF2E223YF126

ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VF Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	4,700	64×94	0.20	15.1	21	22	22	VF2V472YD094
	5,600	64×107	0.20	16.4	18	19	22	VF2V562YD107
	6,800	64×123	0.20	18.6	15	15	22	VF2V682YD123
		77×95	0.20	20.9	15	15	24	VF2V682YE095
	8,200	64×147	0.20	20.1	12	15	22	VF2V822YD147
		77×108	0.20	22.9	12	15	24	VF2V822YE108
	10,000	64×187	0.20	22.9	10	15	22	VF2V103YD187
		77×124	0.20	25.9	10	15	24	VF2V103YE124
		90×97	0.20	29.3	10	15	24	VF2V103YF097
	12,000	77×148	0.20	27.8	8	13	24	VF2V123YE148
		90×126	0.20	31.7	8	13	24	VF2V123YF126
	15,000	77×188	0.20	31.9	7	10	24	VF2V153YE188
		90×150	0.20	35.2	7	10	24	VF2V153YF150
	18,000	77×228	0.20	36.0	7	10	24	VF2V183YE228
90×167		0.20	37.9	7	10	24	VF2V183YF167	
22,000	90×230	0.20	41.1	6	9	24	VF2V223YF230	
400	3,900	64×94	0.20	13.7	26	28	22	VF2G392YD094
	4,700	64×107	0.20	15.0	21	22	22	VF2G472YD107
	5,600	64×123	0.20	16.9	18	19	22	VF2G562YD123
		77×95	0.20	19.0	18	19	24	VF2G562YE095
	6,800	64×147	0.20	18.3	15	15	22	VF2G682YD147
		77×108	0.20	20.8	15	15	24	VF2G682YE108
	8,200	64×187	0.20	20.8	12	15	22	VF2G822YD187
		77×124	0.20	23.5	12	15	24	VF2G822YE124
		90×97	0.20	26.6	12	15	24	VF2G822YF097
	10,000	77×148	0.20	25.4	10	15	24	VF2G103YE148
		90×110	0.20	29.1	10	15	24	VF2G103YF110
	12,000	77×188	0.20	28.5	8	13	24	VF2G123YE188
		90×126	0.20	31.7	8	13	24	VF2G123YF126
	15,000	77×228	0.20	32.9	8	10	24	VF2G153YE228
90×167		0.20	34.6	8	10	24	VF2G153YF167	
18,000	90×190	0.20	38.2	6	9	24	VF2G183YF190	
22,000	90×230	0.20	41.1	5	7	24	VF2G223YF230	
450	2,700	64×94	0.20	11.7	38	40	22	VF2W272YD094
	3,300	64×107	0.20	12.9	30	35	22	VF2W332YD107
	3,900	64×123	0.20	14.4	27	32	22	VF2W392YD123
		77×95	0.20	16.2	27	32	24	VF2W392YE095
	4,700	77×108	0.20	17.8	21	21	24	VF2W472YE108
	5,600	64×147	0.20	17.0	20	20	22	VF2W562YD147
		77×124	0.20	19.9	20	20	24	VF2W562YE124
		90×97	0.20	22.5	20	20	24	VF2W562YF097
	6,800	64×187	0.20	19.4	15	18	22	VF2W682YD187
		77×148	0.20	21.4	15	18	24	VF2W682YE148
		90×110	0.20	24.6	15	18	24	VF2W682YF110
	8,200	77×165	0.20	24.0	14	16	24	VF2W822YE165
		90×126	0.20	26.8	14	16	24	VF2W822YF126
	10,000	77×188	0.20	26.7	10	15	24	VF2W103YE188
		90×150	0.20	29.4	10	15	24	VF2W103YF150
	12,000	77×228	0.20	30.2	9	12	24	VF2W123YE228
		90×167	0.20	31.7	9	12	24	VF2W123YF167
	15,000	90×190	0.20	35.7	7	10	24	VF2W153YF190
18,000	90×230	0.20	38.1	6	9	24	VF2W183YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

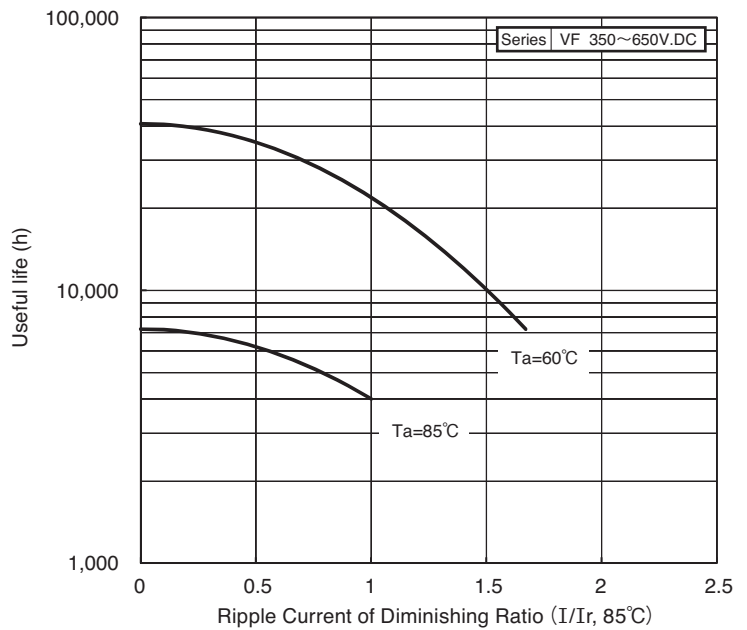
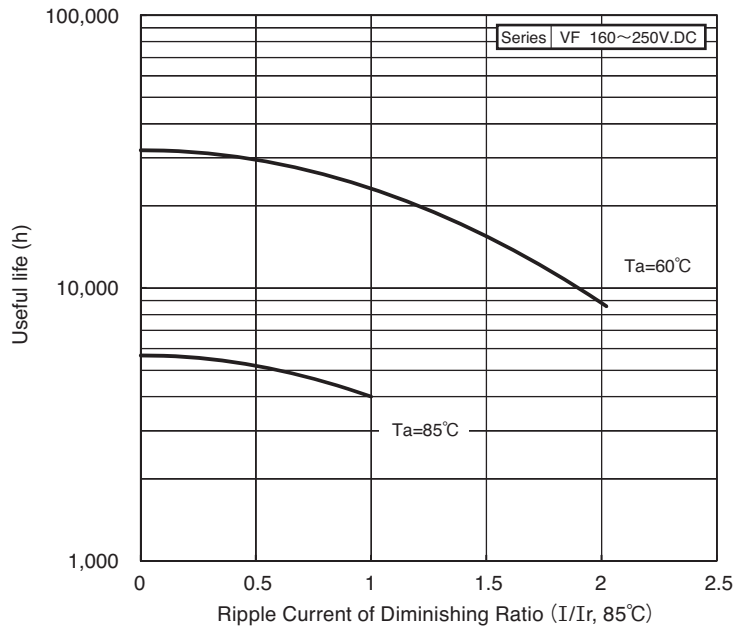
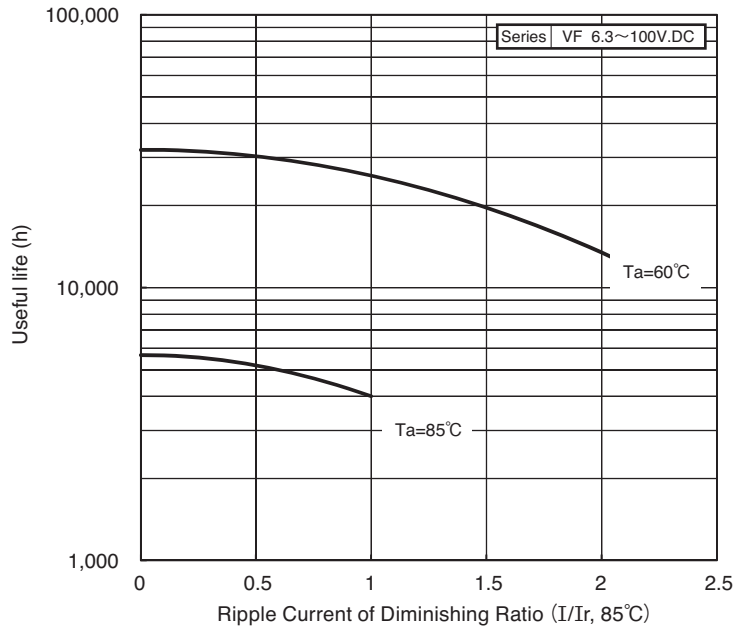
# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
500	1,800	64 $\times$ 94	0.20	9.1	53	50	22	VF2H182YD094
	2,200	64 $\times$ 107	0.20	10.0	40	35	22	VF2H222YD107
	2,700	64 $\times$ 123	0.20	11.4	37	33	22	VF2H272YD123
		77 $\times$ 95	0.20	12.9	37	33	24	VF2H272YE095
	3,300	64 $\times$ 147	0.20	12.4	36	32	22	VF2H332YD147
		77 $\times$ 108	0.20	14.2	36	32	24	VF2H332YE108
		64 $\times$ 164	0.20	13.9	27	29	22	VF2H392YD164
	3,900	77 $\times$ 124	0.20	15.8	27	29	24	VF2H392YE124
		90 $\times$ 97	0.20	17.9	27	29	24	VF2H392YF097
		64 $\times$ 187	0.20	15.4	25	25	22	VF2H472YD187
	4,700	77 $\times$ 148	0.20	17.0	25	25	24	VF2H472YE148
		90 $\times$ 110	0.20	19.5	25	25	24	VF2H472YF110
		77 $\times$ 165	0.20	18.9	23	21	24	VF2H562YE165
	5,600	90 $\times$ 126	0.20	21.1	23	21	24	VF2H562YF126
		77 $\times$ 188	0.20	20.9	20	18	24	VF2H682YE188
6,800	90 $\times$ 150	0.20	23.1	20	18	24	VF2H682YF150	
	77 $\times$ 228	0.20	23.8	17	16	24	VF2H822YE228	
8,200	90 $\times$ 167	0.20	25.0	17	16	24	VF2H822YF167	
	10,000	90 $\times$ 190	0.20	27.8	14	16	24	VF2H103YF190
12,000	90 $\times$ 230	0.20	29.6	12	14	24	VF2H123YF230	
550	1,200	64 $\times$ 94	0.20	7.2	93	100	22	VF2L122YD094
	1,500	64 $\times$ 107	0.20	8.1	74	80	22	VF2L152YD107
	1,800	64 $\times$ 123	0.20	9.1	61	50	22	VF2L182YD123
		77 $\times$ 95	0.20	10.3	61	50	24	VF2L182YE095
	2,200	64 $\times$ 147	0.20	9.9	53	50	22	VF2L222YD147
		77 $\times$ 108	0.20	11.3	53	50	24	VF2L222YE108
	2,700	64 $\times$ 164	0.20	11.3	40	35	22	VF2L272YD164
		90 $\times$ 97	0.20	14.5	40	35	24	VF2L272YF097
	3,300	64 $\times$ 187	0.20	12.6	38	32	22	VF2L332YD187
		77 $\times$ 124	0.20	14.2	38	32	24	VF2L332YE124
		90 $\times$ 110	0.20	16.0	38	32	24	VF2L332YF110
	3,900	77 $\times$ 165	0.20	15.4	30	27	24	VF2L392YE165
		90 $\times$ 126	0.20	17.2	30	27	24	VF2L392YF126
	4,700	77 $\times$ 188	0.20	17.0	25	20	24	VF2L472YE188
		90 $\times$ 150	0.20	18.8	25	20	24	VF2L472YF150
5,600	77 $\times$ 228	0.20	19.2	20	17	24	VF2L562YE228	
	90 $\times$ 167	0.20	20.2	20	17	24	VF2L562YF167	
6,800	90 $\times$ 190	0.20	22.4	17	17	24	VF2L682YF190	
8,200	90 $\times$ 230	0.20	23.9	14	14	24	VF2L822YF230	
600	1,500	64 $\times$ 107	0.20	8.7	84	63	22	VF600V152YD107
	1,800	64 $\times$ 123	0.20	9.8	70	53	22	VF600V182YD123
		77 $\times$ 95	0.20	11.0	70	53	24	VF600V182YE095
	2,200	64 $\times$ 147	0.20	10.6	58	44	22	VF600V222YD147
		77 $\times$ 108	0.20	12.1	58	44	24	VF600V222YE108
	2,700	64 $\times$ 164	0.20	12.1	47	35	22	VF600V272YD164
		77 $\times$ 124	0.20	13.8	47	35	24	VF600V272YE124
		90 $\times$ 97	0.20	15.6	47	35	24	VF600V272YF097
	3,300	64 $\times$ 187	0.20	13.5	39	29	22	VF600V332YD187
		77 $\times$ 148	0.20	14.9	39	29	24	VF600V332YE148
		90 $\times$ 110	0.20	17.1	39	29	24	VF600V332YF110
	3,900	77 $\times$ 165	0.20	16.5	33	25	24	VF600V392YE165
		90 $\times$ 126	0.20	18.5	33	25	24	VF600V392YF126
	4,700	77 $\times$ 188	0.20	18.3	27	20	24	VF600V472YE188
		90 $\times$ 150	0.20	20.2	27	20	24	VF600V472YF150
5,600	77 $\times$ 228	0.20	20.6	23	17	24	VF600V562YE228	
	90 $\times$ 167	0.20	21.6	23	17	24	VF600V562YF167	
6,800	90 $\times$ 230	0.20	23.4	19	14	24	VF600V682YF230	
650	820	64 $\times$ 94	0.20	6.3	157	118	22	VF650V821YD094
	1,000	64 $\times$ 107	0.20	6.9	129	97	22	VF650V102YD107
	1,200	64 $\times$ 123	0.20	7.8	107	81	22	VF650V122YD123
		77 $\times$ 95	0.20	8.8	107	81	24	VF650V122YE095
	1,500	64 $\times$ 147	0.20	8.6	86	65	22	VF650V152YD147
		77 $\times$ 108	0.20	9.8	86	65	24	VF650V152YE108
		90 $\times$ 97	0.20	11.3	86	65	24	VF650V152YF110
	1,800	77 $\times$ 124	0.20	11.0	71	54	24	VF650V182YE124
		90 $\times$ 110	0.20	12.3	71	54	24	VF650V182YF110
	2,200	77 $\times$ 148	0.20	11.9	58	44	24	VF650V222YE148
90 $\times$ 126		0.20	13.5	58	44	24	VF650V222YF126	

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz



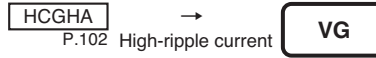
## VG Series

Useful of 4,000 hours at 105°C

- Conform RoHS

### Features

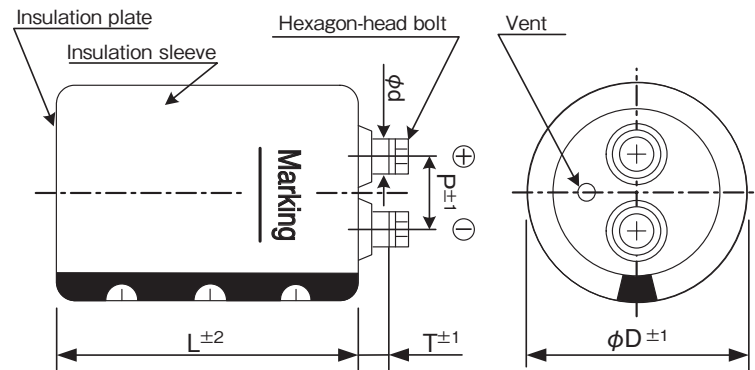
- Ripple current increased by 50% by new heat radiation construction with HCGHA series.



### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	25 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (μA) or 5mA, whichever is smaller or less (20°C, after 5minutes) [C = nominal capacitance (μF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	8.0	11.0	M5×10	Phenol resin
90	31.5	7.0	11.0	M5×10	Phenol resin

### Ripple current correction coefficient

Temperature correction coefficient

Temperature(°C)		60	85	105
Correction coefficient	25 ~ 250V.DC	3.60	1.80	1.00
	350 ~ 500V.DC	2.16	2.00	1.00

Frequency correction coefficient

Frequency(Hz)	120	300	1K	≥ 10K
Correction coefficient	1.0	1.1	1.3	1.4

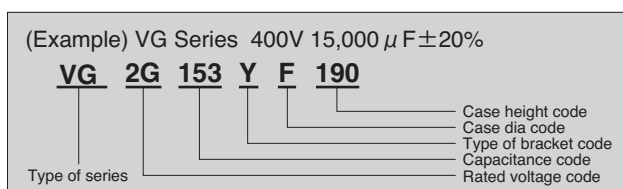
Forced wind correction coefficient

Forced wind(m/s)	< 0.5	0.5 ≤
Correction coefficient	1.0	1.1

Terminal permissible currents : 60Arms for M5.

Please use this type of capacitor at a terminal current below the permissible.

### Product code



Refer to page 19 for product code.

Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I ).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
25	150,000	64×94	0.80	12.9	6	7	22	VG1E154YD094
	180,000	64×107	0.90	14.1	5	6	22	VG1E184YD107
	220,000	64×123	1.00	16.0	4	5	22	VG1E224YD123
		77×95	1.00	14.9	4	5	24	VG1E224YE095
	270,000	77×108	1.00	16.4	4	5	24	VG1E274YE108
		90×97	1.00	18.2	4	5	24	VG1E274YF097
330,000	90×110	1.00	20.0	4	5	24	VG1E334YF110	
35	100,000	64×94	0.60	12.3	6	7	22	VG1V104YD094
	120,000	64×107	0.70	13.4	6	7	22	VG1V124YD107
	150,000	64×123	0.70	15.4	5	7	22	VG1V154YD123
		77×95	0.70	14.0	5	7	24	VG1V154YE095
	180,000	77×108	0.70	15.2	5	7	24	VG1V184YE108
		90×97	0.70	16.3	5	7	24	VG1V184YF097
	220,000	77×124	0.70	17.2	5	7	24	VG1V224YE124
		90×110	0.70	17.9	5	7	24	VG1V224YF110
50	68,000	64×94	0.45	11.2	8	9	22	VG1H683YD094
	82,000	64×107	0.50	12.3	8	8	22	VG1H823YD107
	100,000	64×123	0.50	13.9	6	7	22	VG1H104YD123
		77×95	0.50	14.2	6	7	24	VG1H104YE095
	120,000	77×108	0.50	15.5	5	7	24	VG1H124YE108
		77×124	0.50	17.7	5	7	24	VG1H154YE124
	150,000	90×97	0.50	19.2	5	7	24	VG1H154YF097
		90×110	0.50	20.9	4	6	24	VG1H184YF110
63	47,000	64×94	0.35	10.5	8	9	22	VG1J473YD094
	56,000	64×107	0.40	11.5	8	9	22	VG1J563YD107
	68,000	64×123	0.40	13.0	7	8	22	VG1J683YD123
		77×95	0.40	12.9	7	8	24	VG1J683YE095
	82,000	77×108	0.40	14.1	7	8	24	VG1J823YE108
		90×97	0.40	15.5	7	8	24	VG1J823YF097
	100,000	77×124	0.40	16.0	7	8	24	VG1J104YE124
		90×110	0.40	17.0	7	8	24	VG1J104YF110
80	27,000	64×94	0.30	8.6	8	9	22	VG1K273YD094
	33,000	64×107	0.30	9.5	7	7	22	VG1K333YD107
	47,000	64×123	0.30	11.7	6	7	22	VG1K473YD123
		77×95	0.30	12.2	6	7	24	VG1K473YE095
	56,000	77×108	0.30	13.2	5	7	24	VG1K563YE108
		90×97	0.30	15.3	5	7	24	VG1K563YF097
	68,000	77×124	0.30	14.9	4	7	24	VG1K683YE124
		90×110	0.30	16.8	4	7	24	VG1K683YF110

ALUMINUM ELECTROLYTIC CAPACITORS



# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
100	18,000	64 $\times$ 94	0.20	8.6	9	10	22	VG2A183YD094
	22,000	64 $\times$ 107	0.20	9.5	8	9	22	VG2A223YD107
	33,000	64 $\times$ 123	0.25	12.0	6	7	22	VG2A333YD123
		77 $\times$ 95	0.25	12.1	6	7	24	VG2A333YE095
	39,000	77 $\times$ 108	0.25	13.1	5	7	24	VG2A393YE108
	47,000	77 $\times$ 124	0.25	14.7	5	7	24	VG2A473YE124
		90 $\times$ 97	0.25	15.2	5	7	24	VG2A473YF097
56,000	90 $\times$ 110	0.25	16.5	4	6	24	VG2A563YF110	
160	8,200	64 $\times$ 94	0.25	5.8	18	19	22	VG2C822YD094
	10,000	64 $\times$ 107	0.25	6.4	15	16	22	VG2C103YD107
	15,000	64 $\times$ 123	0.25	8.1	14	14	22	VG2C153YD123
		77 $\times$ 95	0.25	9.1	14	14	24	VG2C153YE095
	18,000	64 $\times$ 147	0.25	8.7	12	12	22	VG2C183YD147
		77 $\times$ 108	0.25	9.9	12	12	24	VG2C183YE108
	22,000	77 $\times$ 124	0.25	11.2	10	10	24	VG2C223YE124
		90 $\times$ 97	0.25	12.7	10	10	24	VG2C223YF097
	27,000	77 $\times$ 148	0.25	12.2	8	8	24	VG2C273YE148
		90 $\times$ 110	0.25	14.0	8	8	24	VG2C273YF110
33,000	90 $\times$ 126	0.25	15.3	7	7	24	VG2C333YF126	
200	6,800	64 $\times$ 94	0.25	5.3	21	20	22	VG2D682YD094
	10,000	64 $\times$ 107	0.25	6.4	14	14	22	VG2D103YD107
	12,000	64 $\times$ 123	0.25	7.2	12	12	22	VG2D123YD123
		77 $\times$ 95	0.25	8.1	12	12	24	VG2D123YE095
	15,000	64 $\times$ 147	0.25	7.9	10	10	22	VG2D153YD147
		77 $\times$ 108	0.25	9.1	10	10	24	VG2D153YE108
	18,000	90 $\times$ 97	0.25	10.5	10	10	24	VG2D153YF097
		77 $\times$ 124	0.25	10.2	8	8	24	VG2D183YE124
90 $\times$ 110	0.25	11.4	8	8	24	VG2D183YF110		
250	4,700	64 $\times$ 94	0.25	4.4	25	23	22	VG2E472YD094
	5,600	64 $\times$ 107	0.25	4.8	21	20	22	VG2E562YD107
	8,200	64 $\times$ 123	0.25	6.0	15	15	22	VG2E822YD123
		77 $\times$ 95	0.25	6.7	15	15	24	VG2E822YE095
	10,000	64 $\times$ 147	0.25	6.5	13	13	22	VG2E103YD147
		77 $\times$ 108	0.25	7.4	13	13	24	VG2E103YE108
	12,000	77 $\times$ 124	0.25	8.3	11	11	24	VG2E123YE124
		90 $\times$ 97	0.25	9.4	11	11	24	VG2E123YF097
	15,000	77 $\times$ 148	0.25	9.1	9	9	24	VG2E153YE148
		90 $\times$ 126	0.25	10.3	9	9	24	VG2E153YF126

ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VG Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	3,900	64 $\times$ 94	0.20	10.5	27	32	22	VG2V392YD094
	4,700	64 $\times$ 107	0.20	11.9	22	23	22	VG2V472YD107
	5,600	64 $\times$ 123	0.20	13.0	20	21	22	VG2V562YD123
		77 $\times$ 95	0.20	14.6	20	21	24	VG2V562YE095
	6,800	64 $\times$ 147	0.20	14.1	18	18	22	VG2V682YD147
		77 $\times$ 108	0.20	16.0	18	18	24	VG2V682YE108
		90 $\times$ 97	0.20	18.5	18	18	24	VG2V682YF097
	8,200	64 $\times$ 187	0.20	15.9	15	17	22	VG2V822YD187
		77 $\times$ 124	0.20	18.0	15	17	24	VG2V822YE124
		90 $\times$ 110	0.20	20.2	15	17	24	VG2V822YF110
	10,000	77 $\times$ 148	0.20	19.5	12	15	24	VG2V103YE148
		90 $\times$ 126	0.20	22.1	12	15	24	VG2V103YF126
	12,000	77 $\times$ 188	0.20	21.8	10	13	24	VG2V123YE188
		90 $\times$ 150	0.20	24.1	10	13	24	VG2V123YF150
	15,000	77 $\times$ 228	0.20	25.2	8	11	24	VG2V153YE228
		90 $\times$ 167	0.20	26.5	8	11	24	VG2V153YF167
18,000	90 $\times$ 190	0.20	29.3	6	9	24	VG2V183YF190	
22,000	90 $\times$ 230	0.20	31.5	5	7	24	VG2V223YF230	
400	3,300	64 $\times$ 94	0.20	9.7	30	35	22	VG2G332YD094
	3,900	64 $\times$ 107	0.20	10.8	27	32	22	VG2G392YD107
	4,700	64 $\times$ 123	0.20	11.9	22	23	22	VG2G472YD123
		77 $\times$ 95	0.20	13.3	22	23	24	VG2G472YE095
	5,600	64 $\times$ 147	0.20	12.8	20	21	22	VG2G562YD147
		77 $\times$ 108	0.20	14.5	20	21	24	VG2G562YE108
		90 $\times$ 97	0.20	16.8	20	21	24	VG2G562YF097
	6,800	64 $\times$ 187	0.20	14.5	18	18	22	VG2G682YD187
		77 $\times$ 124	0.20	16.4	18	18	24	VG2G682YE124
		90 $\times$ 110	0.20	18.4	18	18	24	VG2G682YF110
	8,200	77 $\times$ 165	0.20	18.0	15	17	24	VG2G822YE165
		90 $\times$ 126	0.20	20.0	15	17	24	VG2G822YF126
	10,000	77 $\times$ 188	0.20	19.9	12	15	24	VG2G103YE188
		90 $\times$ 150	0.20	22.0	12	15	24	VG2G103YF150
	12,000	90 $\times$ 167	0.20	23.7	10	13	24	VG2G123YF167
	15,000	90 $\times$ 190	0.20	26.7	8	11	24	VG2G153YF190
18,000	90 $\times$ 230	0.20	28.5	7	9	24	VG2G183YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

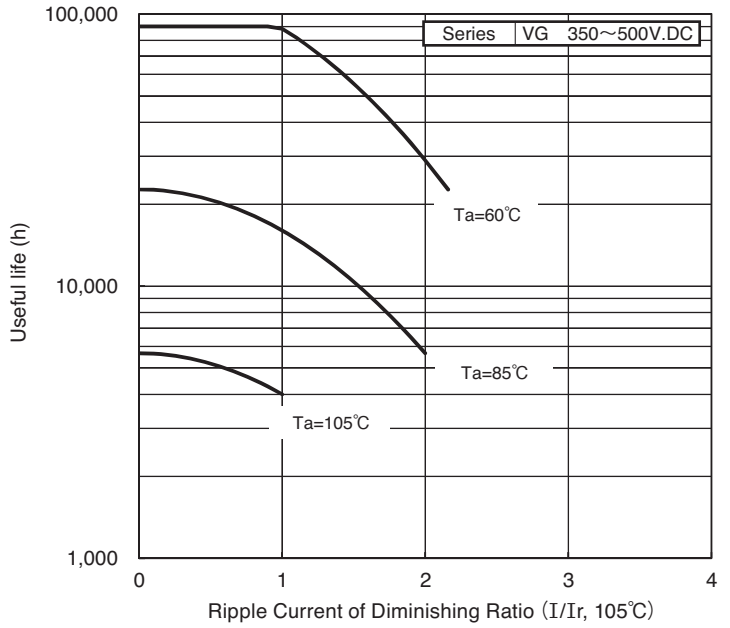
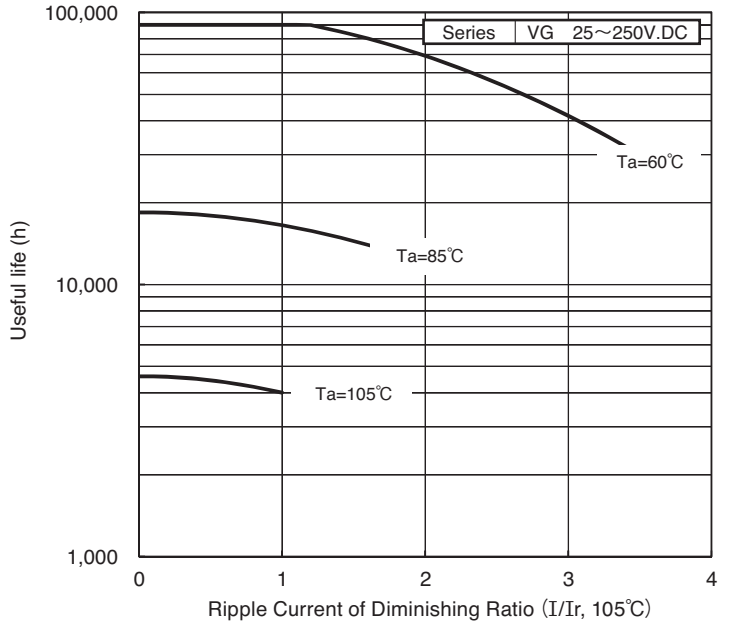
Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
450	2,700	64 $\times$ 94	0.20	9.0	42	42	22	VG2W272YD094
	3,300	64 $\times$ 107	0.20	10.2	35	40	22	VG2W332YD107
		77 $\times$ 95	0.20	11.4	35	40	24	VG2W332YE095
	3,900	64 $\times$ 147	0.20	10.9	27	32	22	VG2W392YD147
		77 $\times$ 108	0.20	12.4	27	32	24	VG2W392YE108
	4,700	64 $\times$ 164	0.20	12.2	24	27	22	VG2W472YD164
		77 $\times$ 124	0.20	13.9	24	27	24	VG2W472YE124
		90 $\times$ 97	0.20	15.8	24	27	24	VG2W472YF097
	5,600	77 $\times$ 148	0.20	14.9	24	23	24	VG2W562YE148
		90 $\times$ 110	0.20	17.1	24	23	24	VG2W562YF110
	6,800	77 $\times$ 165	0.20	16.8	20	20	24	VG2W682YE165
		90 $\times$ 126	0.20	18.7	20	20	24	VG2W682YF126
	8,200	77 $\times$ 188	0.20	18.5	18	18	24	VG2W822YE188
		90 $\times$ 150	0.20	20.4	18	18	24	VG2W822YF150
10,000	90 $\times$ 167	0.20	22.2	15	15	24	VG2W103YF167	
12,000	90 $\times$ 190	0.20	24.5	13	12	24	VG2W123YF190	
15,000	90 $\times$ 230	0.20	26.6	10	10	24	VG2W153YF230	
500	1,500	64 $\times$ 107	0.20	6.5	74	80	22	VG2H152YD107
	1,800	64 $\times$ 123	0.20	7.2	62	50	22	VG2H182YD123
		77 $\times$ 95	0.20	8.0	62	50	24	VG2H182YE095
	2,200	64 $\times$ 147	0.20	7.8	53	50	22	VG2H222YD147
		77 $\times$ 108	0.20	8.9	53	50	24	VG2H222YE108
	2,700	64 $\times$ 164	0.20	8.8	40	35	22	VG2H272YD164
		90 $\times$ 97	0.20	11.4	40	35	24	VG2H272YF097
	3,300	64 $\times$ 187	0.20	9.8	38	32	22	VG2H332YD187
		77 $\times$ 124	0.20	11.1	38	32	24	VG2H332YE124
		90 $\times$ 110	0.20	12.5	38	32	24	VG2H332YF110
	3,900	77 $\times$ 148	0.20	11.9	30	27	24	VG2H392YE148
		90 $\times$ 126	0.20	13.5	30	27	24	VG2H392YF126
	4,700	77 $\times$ 165	0.20	13.3	25	20	24	VG2H472YE165
		90 $\times$ 150	0.20	14.7	25	20	24	VG2H472YF150
	5,600	77 $\times$ 188	0.20	14.6	20	17	24	VG2H562YE188
		90 $\times$ 167	0.20	15.8	20	17	24	VG2H562YF167
6,800	90 $\times$ 190	0.20	17.5	17	17	24	VG2H682YF190	
8,200	90 $\times$ 230	0.20	18.8	14	14	24	VG2H822YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz



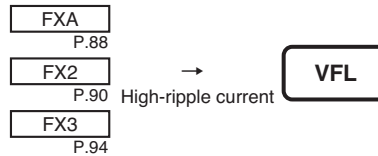
## VFL Series

Useful of 8,000 hours at 85°C

- Conform RoHS

### Features

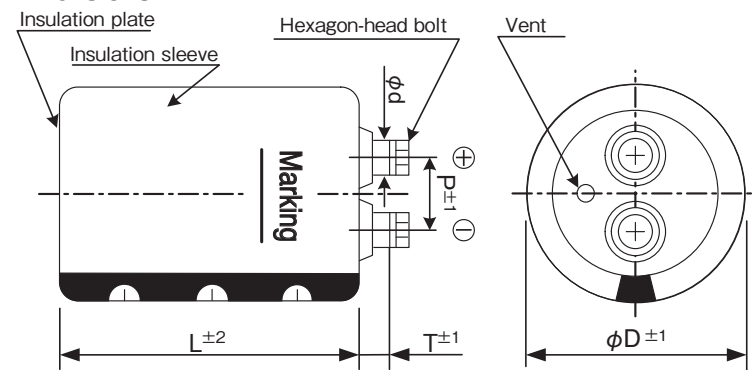
- About 10% ripple current has improved to FX2 series by radiation structure.



### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	350 ~ 600V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	8.0	11.0	M5×10	Phenol resin
90	31.5	7.0	11.0	M5×10	Phenol resin

### Ripple current correction coefficient

Temperature (°C)	60	85		
Correction coefficient	1.67	1.00		
Frequency (Hz)	120	300	1K	≥10K
Correction coefficient	1.0	1.1	1.3	1.4
Forced wind (m/s)	< 0.5	0.5 ≤		
Correction coefficient	1.0	1.1		

Terminal permissible currents: 60Arms for M5.

Please use this type of capacitor at a terminal current below the permissible.

### Product code

(Example) VFL Series 400 V 15,000 µF ±20%

**VFL 2G 153 Y F 167**

- VFL: Type of series
- 2G: Case height code
- 153: Case dia code
- Y: Type of bracket code
- F: Capacitance code
- 167: Rated voltage code

Refer to page 19 for product code.

Bracket

- Refer to page 20-21 for shapes and dimensions.

- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).

- If bracket are not necessary, enter "N" for the type of bracket code.

- Bracket will be delivered separately.

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VFL Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	4,700	64 $\times$ 94	0.20	15.1	21	22	22	VFL2V472YD094
	5,600	64 $\times$ 107	0.20	16.9	18	19	22	VFL2V562YD107
	6,800	64 $\times$ 123	0.20	18.7	15	15	22	VFL2V682YD123
		77 $\times$ 95	0.20	20.9	15	15	24	VFL2V682YE095
	8,200	64 $\times$ 147	0.20	20.2	12	15	22	VFL2V822YD147
		77 $\times$ 108	0.20	22.9	12	15	24	VFL2V822YE108
	10,000	64 $\times$ 187	0.20	22.9	10	15	22	VFL2V103YD187
		77 $\times$ 124	0.20	25.9	10	15	24	VFL2V103YE124
		90 $\times$ 97	0.20	29.3	10	15	24	VFL2V103YF097
	12,000	77 $\times$ 148	0.20	27.8	8	13	24	VFL2V123YE148
		90 $\times$ 126	0.20	31.7	8	13	24	VFL2V123YF126
	15,000	77 $\times$ 188	0.20	31.9	7	10	24	VFL2V153YE188
		90 $\times$ 150	0.20	35.2	7	10	24	VFL2V153YF150
	18,000	77 $\times$ 228	0.20	36.0	7	10	24	VFL2V183YE228
90 $\times$ 167		0.20	37.9	7	10	24	VFL2V183YF167	
22,000	90 $\times$ 230	0.20	41.1	6	9	24	VFL2V223YF230	
400	3,900	64 $\times$ 94	0.20	13.8	26	28	22	VFL2G392YD094
	4,700	64 $\times$ 107	0.20	15.5	21	22	22	VFL2G472YD107
	5,600	64 $\times$ 123	0.20	16.9	18	19	22	VFL2G562YD123
		77 $\times$ 95	0.20	19.0	18	19	24	VFL2G562YE095
	6,800	64 $\times$ 147	0.20	18.4	15	15	22	VFL2G682YD147
		77 $\times$ 108	0.20	20.8	15	15	24	VFL2G682YE108
	8,200	64 $\times$ 187	0.20	20.8	12	15	22	VFL2G822YD187
		77 $\times$ 124	0.20	23.5	12	15	24	VFL2G822YE124
		90 $\times$ 97	0.20	26.6	12	15	24	VFL2G822YF097
	10,000	77 $\times$ 148	0.20	25.4	10	15	24	VFL2G103YE148
		90 $\times$ 126	0.20	28.9	10	15	24	VFL2G103YF126
	12,000	77 $\times$ 188	0.20	28.5	8	13	24	VFL2G123YE188
		90 $\times$ 150	0.20	31.5	8	13	24	VFL2G123YF150
	15,000	77 $\times$ 228	0.20	32.9	8	10	24	VFL2G153YE228
90 $\times$ 167		0.20	34.6	8	10	24	VFL2G153YF167	
18,000	90 $\times$ 230	0.20	37.2	6	9	24	VFL2G183YF230	
450	2,700	64 $\times$ 94	0.20	11.7	38	40	22	VFL2W272YD094
	3,300	64 $\times$ 107	0.20	13.3	30	35	22	VFL2W332YD107
	3,900	64 $\times$ 123	0.20	14.5	27	32	22	VFL2W392YD123
		77 $\times$ 95	0.20	16.2	27	32	24	VFL2W392YE095
	4,700	64 $\times$ 147	0.20	15.6	21	21	22	VFL2W472YD147
		77 $\times$ 108	0.20	17.8	21	21	24	VFL2W472YE108
	5,600	64 $\times$ 164	0.20	17.5	20	20	22	VFL2W562YD164
		77 $\times$ 124	0.20	19.9	20	20	24	VFL2W562YE124
		90 $\times$ 97	0.20	22.5	20	20	24	VFL2W562YF097
	6,800	64 $\times$ 187	0.20	19.4	15	18	22	VFL2W682YD187
		77 $\times$ 148	0.20	21.4	15	18	24	VFL2W682YE148
		90 $\times$ 110	0.20	24.6	15	18	24	VFL2W682YF110
	8,200	77 $\times$ 165	0.20	24.0	14	16	24	VFL2W822YE165
		90 $\times$ 126	0.20	26.8	14	16	24	VFL2W822YF126
	10,000	77 $\times$ 188	0.20	26.7	10	15	24	VFL2W103YE188
		90 $\times$ 150	0.20	29.4	10	15	24	VFL2W103YF150
	12,000	77 $\times$ 228	0.20	30.2	9	12	24	VFL2W123YE228
		90 $\times$ 167	0.20	31.7	9	12	24	VFL2W123YF167
15,000	90 $\times$ 230	0.20	34.8	7	10	24	VFL2W153YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

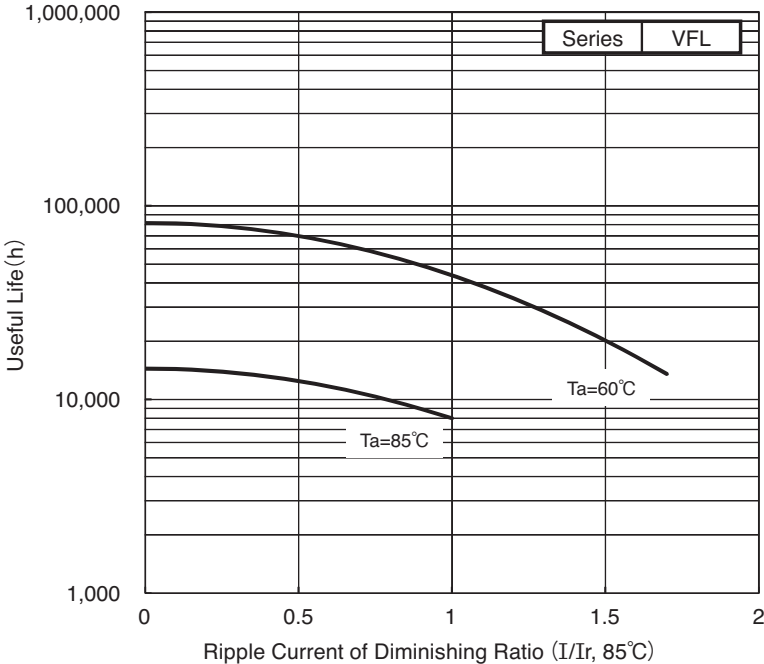
Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D×L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
500	1,800	64×94	0.20	9.1	53	50	22	VFL2H182YD094
	2,200	64×107	0.20	10.3	40	35	22	VFL2H222YD107
	2,700	64×123	0.20	11.5	37	33	22	VFL2H272YD123
		77×95	0.20	12.9	37	33	24	VFL2H272YE095
	3,300	64×147	0.20	12.5	36	32	22	VFL2H332YD147
		77×108	0.20	14.2	36	32	24	VFL2H332YE108
	3,900	64×164	0.20	13.9	27	29	22	VFL2H392YD164
		77×124	0.20	15.8	27	29	24	VFL2H392YE124
		90×97	0.20	17.9	27	29	24	VFL2H392YF097
	4,700	64×187	0.20	15.4	25	25	22	VFL2H472YD187
		77×148	0.20	17.0	25	25	24	VFL2H472YE148
		90×110	0.20	19.5	25	25	24	VFL2H472YF110
	5,600	77×165	0.20	18.9	23	21	24	VFL2H562YE165
		90×126	0.20	21.1	23	21	24	VFL2H562YF126
	6,800	77×188	0.20	20.9	20	18	24	VFL2H682YE188
90×150		0.20	23.1	20	18	24	VFL2H682YF150	
8,200	90×167	0.20	25.0	17	16	24	VFL2H822YF167	
10,000	90×190	0.20	27.8	14	12	24	VFL2H103YF190	
12,000	90×230	0.20	29.6	12	10	24	VFL2H123YF230	
550	1,200	64×94	0.20	7.3	93	100	22	VFL2L122YD094
	1,500	64×107	0.20	8.3	74	80	22	VFL2L152YD107
	1,800	64×123	0.20	9.1	61	50	22	VFL2L182YD123
		77×95	0.20	10.3	61	50	24	VFL2L182YE095
	2,200	64×147	0.20	10.0	53	50	22	VFL2L222YD147
		77×108	0.20	11.3	53	50	24	VFL2L222YE108
	2,700	64×164	0.20	11.3	40	35	22	VFL2L272YD164
		77×124	0.20	12.8	40	35	24	VFL2L272YE124
		90×97	0.20	14.5	40	35	24	VFL2L272YF097
	3,300	64×187	0.20	12.6	38	32	22	VFL2L332YD187
		77×148	0.20	13.9	38	32	24	VFL2L332YE148
		90×110	0.20	16.0	38	32	24	VFL2L332YF110
	3,900	77×165	0.20	15.4	30	27	24	VFL2L392YE165
		90×126	0.20	17.2	30	27	24	VFL2L392YF126
	4,700	77×188	0.20	17.0	25	20	24	VFL2L472YE188
		90×150	0.20	18.8	25	20	24	VFL2L472YF150
	5,600	90×167	0.20	20.2	20	17	24	VFL2L562YF167
6,800	90×190	0.20	22.4	17	17	24	VFL2L682YF190	
8,200	90×230	0.20	23.9	14	15	24	VFL2L822YF230	
600	1,200	64×94	0.20	7.0	122	125	22	VFL600V122YD094
	1,500	64×123	0.20	8.0	111	114	22	VFL600V152YD123
		77×95	0.20	9.0	111	114	24	VFL600V152YE095
	1,800	64×147	0.20	8.6	99	102	22	VFL600V182YD147
		77×108	0.20	9.8	99	102	24	VFL600V182YE108
	2,200	64×164	0.20	9.8	85	87	22	VFL600V222YD164
		77×124	0.20	11.1	85	87	24	VFL600V222YE124
		90×97	0.20	12.6	85	87	24	VFL600V222YF097
	2,700	64×187	0.20	10.9	66	68	22	VFL600V272YD187
		90×110	0.20	13.8	66	68	24	VFL600V272YF110
	3,300	77×148	0.20	13.3	44	45	24	VFL600V332YE148
		90×126	0.20	15.2	44	45	24	VFL600V332YF126
	3,900	77×188	0.20	14.9	33	25	24	VFL600V392YE188
		90×150	0.20	16.4	33	25	24	VFL600V392YF150
	4,700	77×228	0.20	16.9	27	20	24	VFL600V472YE228
		90×167	0.20	17.7	27	20	24	VFL600V472YF167
	5,600	90×190	0.20	19.5	23	17	24	VFL600V562YF190
6,800	90×230	0.20	20.9	19	14	24	VFL600V682YF230	



Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz



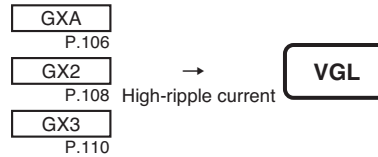
ALUMINUM ELECTROLYTIC CAPACITORS

## VGL Series Useful of 8,000 hours at 105°C

- Conform RoHS

### Features

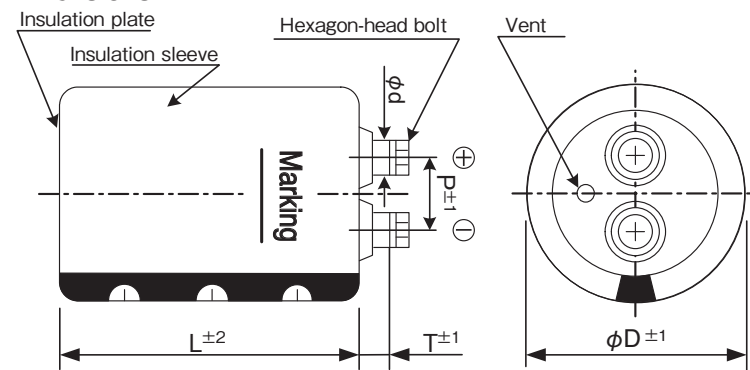
- About 10% ripple current has improved to GX2 series by radiation structure.



### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	8.0	11.0	M5×10	Phenol resin
90	31.5	7.0	11.0	M5×10	Phenol resin

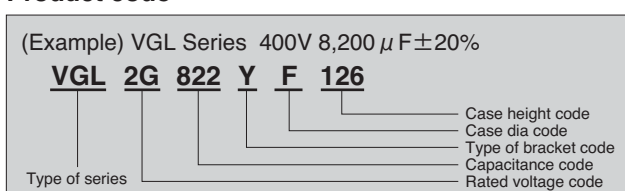
### Ripple current correction coefficient

Temperature (°C)	60	85	105	
Correction coefficient	2.16	2.00	1.00	
Frequency (Hz)	120	300	1K	≥10K
Correction coefficient	1.0	1.1	1.3	1.4
Forced wind (m/s)	<0.5	0.5≤		
Correction coefficient	1.0	1.1		

Terminal permissible currents: 60Arms for M5.

Please use this type of capacitor at a terminal current below the permissible.

### Product code



Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VGL Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	3,900	64×94	0.20	10.5	27	32	22	VGL2V392YD094
	4,700	64×107	0.20	11.9	22	23	22	VGL2V472YD107
	5,600	64×123	0.20	13.0	20	21	22	VGL2V562YD123
		77×95	0.20	14.6	20	21	24	VGL2V562YE095
	6,800	64×147	0.20	14.1	18	18	22	VGL2V682YD147
		77×108	0.20	16.0	18	18	24	VGL2V682YE108
		90×97	0.20	18.5	18	18	24	VGL2V682YF097
	8,200	64×187	0.20	15.9	15	17	22	VGL2V822YD187
		77×124	0.20	18.0	15	17	24	VGL2V822YE124
		90×110	0.20	20.2	15	17	24	VGL2V822YF110
	10,000	77×148	0.20	19.5	12	15	24	VGL2V103YE148
		90×126	0.20	22.1	12	15	24	VGL2V103YF126
	12,000	77×188	0.20	21.8	10	13	24	VGL2V123YE188
		90×150	0.20	24.1	10	13	24	VGL2V123YF150
15,000	77×228	0.20	25.2	8	11	24	VGL2V153YE228	
	90×167	0.20	26.5	8	11	24	VGL2V153YF167	
18,000	90×190	0.20	29.3	6	9	24	VGL2V183YF190	
22,000	90×230	0.20	31.5	5	7	24	VGL2V223YF230	
400	3,300	64×94	0.20	9.7	30	35	22	VGL2G332YD094
	3,900	64×107	0.20	10.8	27	32	22	VGL2G392YD107
	4,700	64×123	0.20	11.9	22	23	22	VGL2G472YD123
		77×95	0.20	13.3	22	23	24	VGL2G472YE095
	5,600	64×147	0.20	12.8	20	21	22	VGL2G562YD147
		77×108	0.20	14.5	20	21	24	VGL2G562YE108
		90×97	0.20	16.8	20	21	24	VGL2G562YF097
	6,800	64×187	0.20	14.5	18	18	22	VGL2G682YD187
		77×124	0.20	16.4	18	18	24	VGL2G682YE124
		90×110	0.20	18.4	18	18	24	VGL2G682YF110
	8,200	77×165	0.20	18.0	15	17	24	VGL2G822YE165
		90×126	0.20	20.0	15	17	24	VGL2G822YF126
	10,000	77×188	0.20	19.9	12	15	24	VGL2G103YE188
		90×150	0.20	22.0	12	15	24	VGL2G103YF150
12,000	90×167	0.20	23.7	10	13	24	VGL2G123YF167	
15,000	90×190	0.20	26.7	8	11	24	VGL2G153YF190	
18,000	90×230	0.20	28.5	7	9	24	VGL2G183YF230	
450	2,200	64×94	0.20	8.1	46	48	22	VGL2W222YD094
	2,700	64×107	0.20	9.2	40	42	22	VGL2W272YD107
	3,300	64×123	0.20	10.2	35	35	22	VGL2W332YD123
		77×95	0.20	11.4	35	35	24	VGL2W332YE095
	3,900	64×147	0.20	10.9	27	32	22	VGL2W392YD147
		77×108	0.20	12.4	27	32	24	VGL2W392YE108
	4,700	64×164	0.20	12.2	24	27	22	VGL2W472YD164
		77×124	0.20	13.9	24	27	24	VGL2W472YE124
		90×97	0.20	15.8	24	27	24	VGL2W472YF097
	5,600	64×187	0.20	13.5	22	23	22	VGL2W562YD187
		77×148	0.20	14.9	22	23	24	VGL2W562YE148
		90×110	0.20	17.1	22	23	24	VGL2W562YF110
	6,800	77×165	0.20	16.8	20	20	24	VGL2W682YE165
		90×126	0.20	18.7	20	20	24	VGL2W682YF126
	8,200	77×188	0.20	18.5	18	18	24	VGL2W822YE188
		90×150	0.20	20.4	18	18	24	VGL2W822YF150
10,000	90×167	0.20	22.2	15	15	24	VGL2W103YF167	
12,000	90×190	0.20	24.5	13	12	24	VGL2W123YF190	
15,000	90×230	0.20	26.6	11	10	24	VGL2W153YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

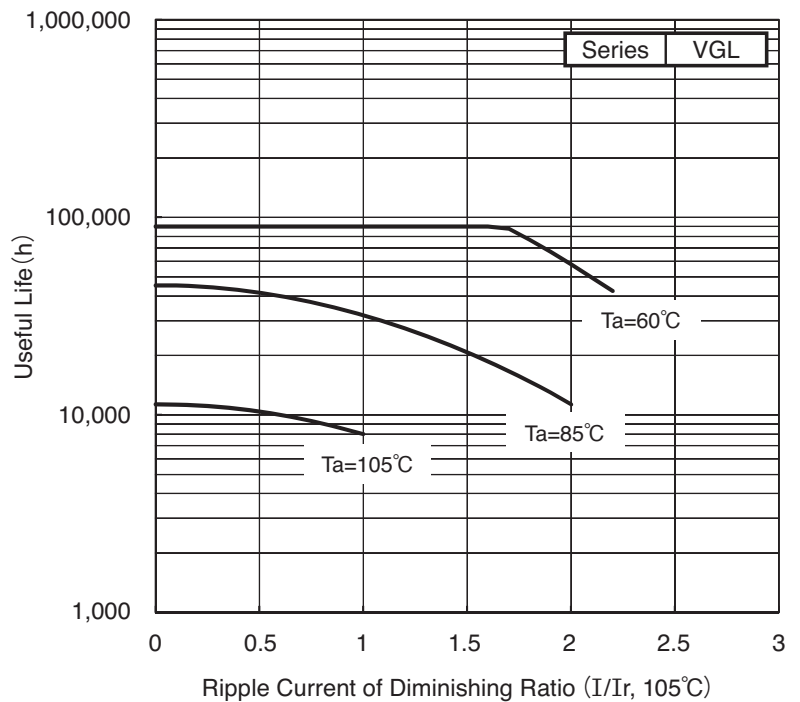
Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D×L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
500	1,500	64×107	0.20	6.5	74	80	22	VGL2H152YD107
	1,800	64×123	0.20	7.2	62	50	22	VGL2H182YD123
		77×95	0.20	8.0	62	50	24	VGL2H182YE095
	2,200	64×147	0.20	7.8	53	50	22	VGL2H222YD147
		77×108	0.20	8.9	53	50	24	VGL2H222YE108
	2,700	64×164	0.20	8.8	40	35	22	VGL2H272YD164
		90×97	0.20	11.4	40	35	24	VGL2H272YF097
	3,300	64×187	0.20	9.8	38	32	22	VGL2H332YD187
		77×124	0.20	11.1	38	32	24	VGL2H332YE124
		90×110	0.20	12.5	38	32	24	VGL2H332YF110
	3,900	77×148	0.20	11.9	30	27	24	VGL2H392YE148
		90×126	0.20	13.5	30	27	24	VGL2H392YF126
	4,700	77×165	0.20	13.3	25	20	24	VGL2H472YE165
		90×150	0.20	14.7	25	20	24	VGL2H472YF150
	5,600	77×188	0.20	14.6	20	17	24	VGL2H562YE188
		90×167	0.20	15.8	20	17	24	VGL2H562YF167
6,800	90×190	0.20	17.5	17	17	24	VGL2H682YF190	
8,200	90×230	0.20	18.8	14	14	24	VGL2H822YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz



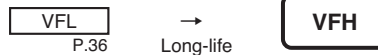


## VFH Series Useful of 20,000 hours at 85°C

- Conform RoHS

### Features

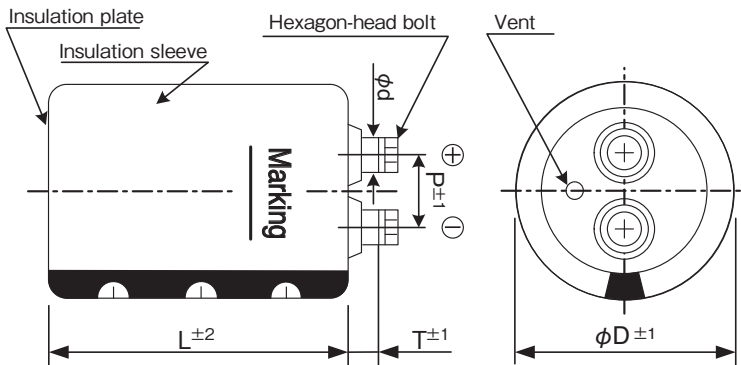
- High-reliability series with the warranty of 20,000 hours realized through improvement of the VFL series into longer-life series.



### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 20,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	8.0	11.0	M5×10	Phenol resin
90	31.5	7.0	11.0	M5×10	Phenol resin

### Ripple current correction coefficient

Temperature (°C)	60	85		
Correction coefficient	2.16	1.00		
Frequency (Hz)	120	300	1k	≥10k
Correction coefficient	1.0	1.1	1.3	1.4
Forced wind (m/s)	<0.5	0.5≤		
Correction coefficient	1.0	1.1		

Terminal permissible currents : 60Arms for M5 ; 100Arms for M6.  
Please use this type of capacitor at a terminal current below the permissible.

### Product code

(Example) VFH type 400V 5,600 µF ±20%

**VFH 2G 562 Y F 097**

- VFH: Type of series
- 2G: Case dia code
- 562: Capacitance code
- Y: Type of bracket code
- F: Case height code
- 097: Rated voltage code

Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	3,900	64×94	0.20	10.5	27	32	22	VFH2V392YD094
	4,700	64×107	0.20	11.9	22	23	22	VFH2V472YD107
	5,600	64×123	0.20	13.0	20	21	22	VFH2V562YD123
		77×95	0.20	14.6	20	21	24	VFH2V562YE095
	6,800	64×147	0.20	14.1	18	18	22	VFH2V682YD147
		77×108	0.20	16.0	18	18	24	VFH2V682YE108
		90×97	0.20	18.5	18	18	24	VFH2V682YF097
	8,200	64×187	0.20	15.9	15	17	22	VFH2V822YD187
		77×124	0.20	18.0	15	17	24	VFH2V822YE124
		90×110	0.20	20.2	15	17	24	VFH2V822YF110
	10,000	77×148	0.20	19.5	12	15	24	VFH2V103YE148
		90×126	0.20	22.1	12	15	24	VFH2V103YF126
	12,000	77×188	0.20	21.8	10	13	24	VFH2V123YE188
		90×150	0.20	24.1	10	13	24	VFH2V123YF150
15,000	77×228	0.20	25.2	8	11	24	VFH2V153YE228	
	90×167	0.20	26.5	8	11	24	VFH2V153YF167	
18,000	90×190	0.20	29.3	6	9	24	VFH2V183YF190	
22,000	90×230	0.20	31.5	5	7	24	VFH2V223YF230	
400	3,300	64×94	0.20	9.7	30	35	22	VFH2G332YD094
	3,900	64×107	0.20	10.8	27	32	22	VFH2G392YD107
	4,700	64×123	0.20	11.9	22	23	22	VFH2G472YD123
		77×95	0.20	13.3	22	23	24	VFH2G472YE095
	5,600	64×147	0.20	12.8	20	21	22	VFH2G562YD147
		77×108	0.20	14.5	20	21	24	VFH2G562YE108
		90×97	0.20	16.8	20	21	24	VFH2G562YF097
	6,800	64×187	0.20	14.5	18	18	22	VFH2G682YD187
		77×124	0.20	16.4	18	18	24	VFH2G682YE124
		90×110	0.20	18.4	18	18	24	VFH2G682YF110
	8,200	77×165	0.20	18.0	15	17	24	VFH2G822YE165
		90×126	0.20	20.0	15	17	24	VFH2G822YF126
	10,000	77×188	0.20	19.9	12	15	24	VFH2G103YE188
		90×150	0.20	22.0	12	15	24	VFH2G103YF150
12,000	90×167	0.20	23.7	10	13	24	VFH2G123YF167	
15,000	90×190	0.20	26.7	8	11	24	VFH2G153YF190	
18,000	90×230	0.20	28.5	7	9	24	VFH2G183YF230	
450	2,200	64×94	0.20	8.1	46	48	22	VFH2W222YD094
	2,700	64×107	0.20	9.2	40	42	22	VFH2W272YD107
	3,300	64×123	0.20	10.2	35	35	22	VFH2W332YD123
		77×95	0.20	11.4	35	35	24	VFH2W332YE095
	3,900	64×147	0.20	10.9	27	32	22	VFH2W392YD147
		77×108	0.20	12.4	27	32	24	VFH2W392YE108
	4,700	64×164	0.20	12.2	24	27	22	VFH2W472YD164
		77×124	0.20	13.9	24	27	24	VFH2W472YE124
		90×97	0.20	15.8	24	27	24	VFH2W472YF097
	5,600	64×187	0.20	13.5	22	23	22	VFH2W562YD187
		77×148	0.20	14.9	22	23	24	VFH2W562YE148
		90×110	0.20	17.1	22	23	24	VFH2W562YF110
	6,800	77×165	0.20	16.8	20	20	24	VFH2W682YE165
		90×126	0.20	18.7	20	20	24	VFH2W682YF126
	8,200	77×188	0.20	18.5	18	18	24	VFH2W822YE188
		90×150	0.20	20.4	18	18	24	VFH2W822YF150
10,000	90×167	0.20	22.2	15	15	24	VFH2W103YF167	
12,000	90×190	0.20	24.5	13	12	24	VFH2W123YF190	
15,000	90×230	0.20	26.6	11	10	24	VFH2W153YF230	

ALUMINUM ELECTROLYTIC CAPACITORS



# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

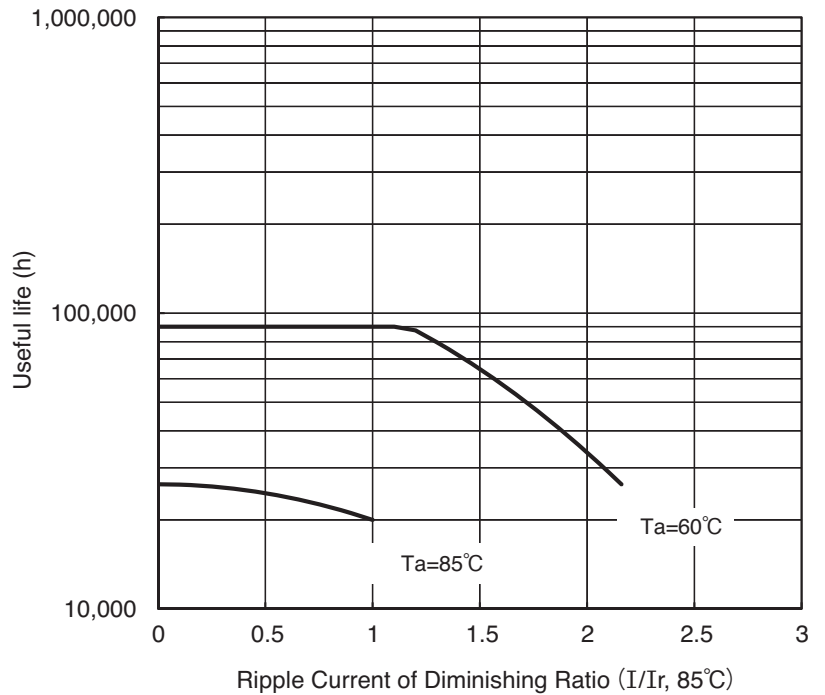
Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
500	1,500	64 $\times$ 107	0.20	6.5	74	80	22	VFH2H152YD107
	1,800	64 $\times$ 123	0.20	7.2	62	50	22	VFH2H182YD123
		77 $\times$ 95	0.20	8.0	62	50	24	VFH2H182YE095
	2,200	64 $\times$ 147	0.20	7.8	53	50	22	VFH2H222YD147
		77 $\times$ 108	0.20	8.9	53	50	24	VFH2H222YE108
	2,700	64 $\times$ 164	0.20	8.8	40	35	22	VFH2H272YD164
		90 $\times$ 97	0.20	11.4	40	35	24	VFH2H272YF097
	3,300	64 $\times$ 187	0.20	9.8	38	32	22	VFH2H332YD187
		77 $\times$ 124	0.20	11.1	38	32	24	VFH2H332YE124
		90 $\times$ 110	0.20	12.5	38	32	24	VFH2H332YF110
	3,900	77 $\times$ 148	0.20	11.9	30	27	24	VFH2H392YE148
		90 $\times$ 126	0.20	13.5	30	27	24	VFH2H392YF126
	4,700	77 $\times$ 165	0.20	13.3	25	20	24	VFH2H472YE165
		90 $\times$ 150	0.20	14.7	25	20	24	VFH2H472YF150
	5,600	77 $\times$ 188	0.20	14.6	20	17	24	VFH2H562YE188
		90 $\times$ 167	0.20	15.8	20	17	24	VFH2H562YF167
6,800	90 $\times$ 190	0.20	17.5	17	17	24	VFH2H682YF190	
8,200	90 $\times$ 230	0.20	18.8	14	14	24	VFH2H822YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating condition  $I$  versus rated ripple current at 85°C, 120Hz



# MEMO

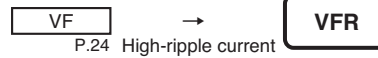
---

# VFR Series Useful of 4,000 hours at 85°C

- Conform RoHS

## Features

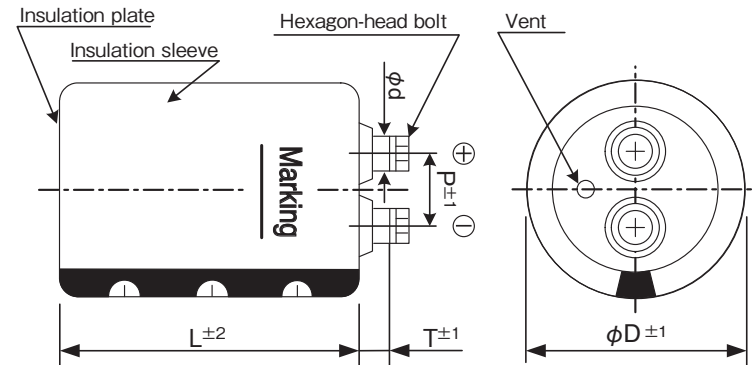
- The permissible ripple current is improved to VF series by approx.30% using low ESR material.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	85	
Correction coefficient	1.89	1.67	1.00	
Frequency (Hz)	120	300	1k	≥10k
Correction coefficient	1.0	1.1	1.3	1.4
Forced wind (m/s)	<0.5	0.5≤		
Correction coefficient	1.0	1.1		

Terminal permissible currents : 60Arms for M5 ; 100Arms for M6.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) VFR type 400V 6,800 µF ±20%

**VFR 2G 682 Y F 110**

- VFR: Type of series
- 2G: Case height code
- 682: Capacitance code
- Y: Type of bracket code
- F: Case dia code
- 110: Rated voltage code

Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VFR Series

Standard Products Table

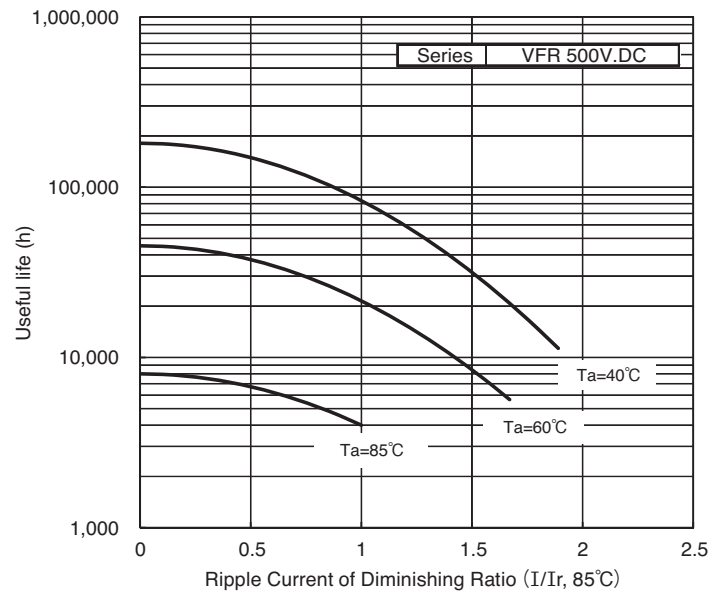
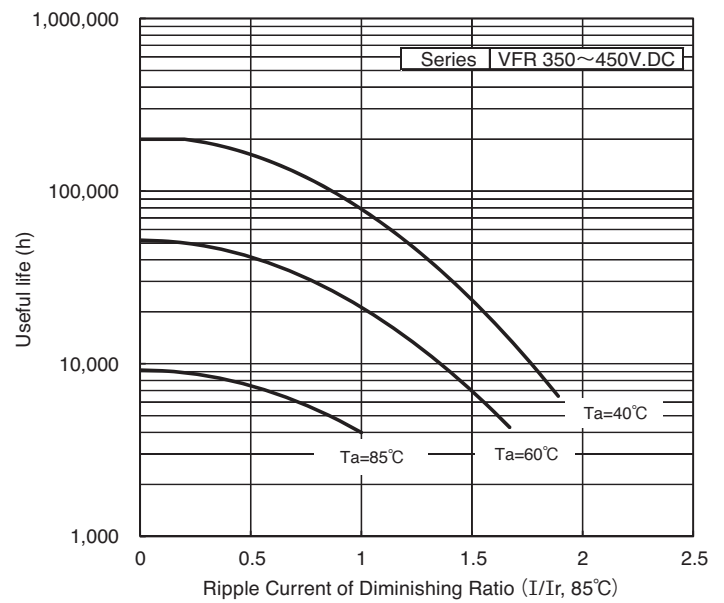
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	3,900	64×107	0.20	17.0	24	26	22	VFR2V392YD107
	4,700	64×123	0.20	19.2	20	21	22	VFR2V472YD123
	5,600	64×147	0.20	20.6	17	18	22	VFR2V562YD147
		77×108	0.20	23.5	17	18	24	VFR2V562YE108
	6,800	64×164	0.20	23.3	14	15	22	VFR2V682YD164
		77×124	0.20	26.5	14	15	24	VFR2V682YE124
	8,200	64×187	0.20	25.8	12	12	22	VFR2V822YD187
		77×148	0.20	28.5	12	12	24	VFR2V822YE148
		90×110	0.20	32.6	12	12	24	VFR2V822YF110
	10,000	77×165	0.20	32.1	9	10	24	VFR2V103YE165
		90×126	0.20	35.9	9	10	24	VFR2V103YF126
	12,000	77×188	0.20	35.3	8	8	24	VFR2V123YE188
		90×150	0.20	39.1	8	8	24	VFR2V123YF150
	15,000	77×228	0.20	40.8	6	7	24	VFR2V153YE228
		90×167	0.20	43.3	6	7	24	VFR2V153YF167
	18,000	90×190	0.20	47.1	5	6	24	VFR2V183YF190
22,000	90×230	0.20	51.2	4	5	24	VFR2V223YF230	
400	3,300	64×107	0.20	15.7	29	30	22	VFR2G332YD107
	3,900	64×123	0.20	17.5	24	26	22	VFR2G392YD123
	4,700	64×147	0.20	18.9	20	21	22	VFR2G472YD147
		77×108	0.20	21.5	20	21	24	VFR2G472YE108
	5,600	64×164	0.20	21.2	17	18	22	VFR2G562YD164
		77×124	0.20	24.0	17	18	24	VFR2G562YE124
	6,800	64×187	0.20	23.5	14	15	22	VFR2G682YD187
		77×148	0.20	26.0	14	15	24	VFR2G682YE148
		90×110	0.20	29.7	14	15	24	VFR2G682YF110
	8,200	77×165	0.20	29.1	12	12	24	VFR2G822YE165
		90×126	0.20	32.5	12	12	24	VFR2G822YF126
	10,000	77×188	0.20	32.2	9	10	24	VFR2G103YE188
		90×150	0.20	35.7	9	10	24	VFR2G103YF150
	12,000	77×228	0.20	36.5	8	8	24	VFR2G123YE228
		90×167	0.20	38.7	8	8	24	VFR2G123YF167
	15,000	90×190	0.20	43.0	6	7	24	VFR2G153YF190
18,000	90×230	0.20	46.3	5	6	24	VFR2G183YF230	
450	2,700	64×107	0.20	14.5	35	37	22	VFR2W272YD107
	3,300	64×123	0.20	16.5	29	30	22	VFR2W332YD123
	3,900	64×147	0.20	17.6	24	26	22	VFR2W392YD147
		77×108	0.20	20.1	24	26	24	VFR2W392YE108
	4,700	64×164	0.20	19.9	20	21	22	VFR2W472YD164
		77×124	0.20	22.6	20	21	24	VFR2W472YE124
	5,600	64×187	0.20	21.9	17	18	22	VFR2W562YD187
		77×148	0.20	24.1	17	18	24	VFR2W562YE148
		90×110	0.20	27.6	17	18	24	VFR2W562YF110
	6,800	77×165	0.20	27.1	14	15	24	VFR2W682YE165
		90×126	0.20	30.3	14	15	24	VFR2W682YF126
	8,200	77×188	0.20	29.9	12	12	24	VFR2W822YE188
		90×150	0.20	33.1	12	12	24	VFR2W822YF150
	10,000	77×228	0.20	34.1	9	10	24	VFR2W103YE228
		90×167	0.20	36.2	9	10	24	VFR2W103YF167
	12,000	90×190	0.20	39.4	8	8	24	VFR2W123YF190
15,000	90×230	0.20	43.3	6	7	24	VFR2W153YF230	
500	1,800	64×107	0.20	11.3	58	61	22	VFR2H182YD107
	2,200	64×123	0.20	12.8	47	50	22	VFR2H222YD123
	2,700	64×147	0.20	13.9	39	41	22	VFR2H272YD147
		77×108	0.20	15.9	39	41	24	VFR2H272YE108
	3,300	64×164	0.20	15.8	32	33	22	VFR2H332YD164
		77×124	0.20	18.0	32	33	24	VFR2H332YE124
	3,900	64×187	0.20	17.3	27	28	22	VFR2H392YD187
		77×148	0.20	19.1	27	28	24	VFR2H392YE148
		90×110	0.20	21.9	27	28	24	VFR2H392YF110
	4,700	77×165	0.20	21.4	22	23	24	VFR2H472YE165
		90×126	0.20	24.0	22	23	24	VFR2H472YF126
	5,600	77×188	0.20	23.5	19	20	24	VFR2H562YE188
		90×150	0.20	26.0	19	20	24	VFR2H562YF150
	6,800	77×228	0.20	26.7	15	16	24	VFR2H682YE228
		90×167	0.20	28.4	15	16	24	VFR2H682YF167
	8,200	90×190	0.20	31.0	13	13	24	VFR2H822YF190
10,000	90×230	0.20	33.6	10	11	24	VFR2H103YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating condition  $I$  versus rated ripple current at  $85^\circ\text{C}$ , 120Hz



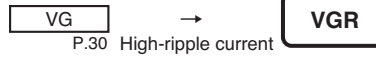


# VGR Series Useful of 4,000 hours at 105°C

- Conform RoHS

## Features

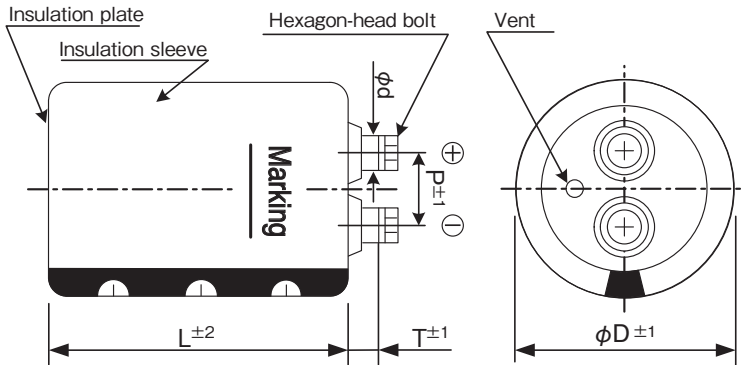
- The permissible ripple current is improved to VG series by approx.60% using low ESR material.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	85	105	
Correction coefficient	350 ~ 450V.DC	2.10	1.90	1.55	1.00
	500V.DC	2.10	2.00	1.87	1.00
Frequency (Hz)	120	300	1k	≥10k	
Correction coefficient	1.0	1.1	1.3	1.4	
Forced wind (m/s)	<0.5	0.5 ≤			
Correction coefficient	1.0	1.1			

Terminal permissible currents : 60Arms for M5; 100Arms for M6.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) VGR type 400V 5,600 µF ±20%

**VGR 2G 562 Y F 110**

- VGR: Type of series
- 2G: Case height code
- 562: Capacitance code
- Y: Type of bracket code
- F: Case dia code
- 110: Rated voltage code

Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately



Standard Products Table

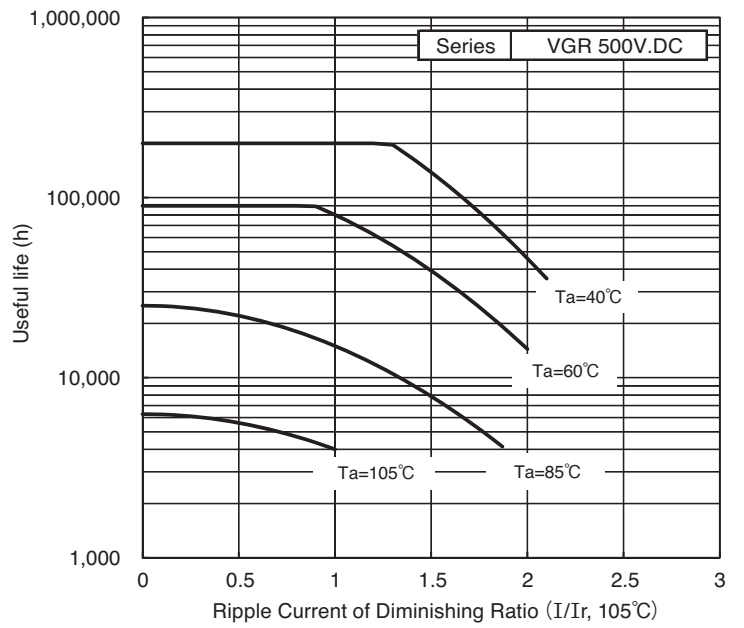
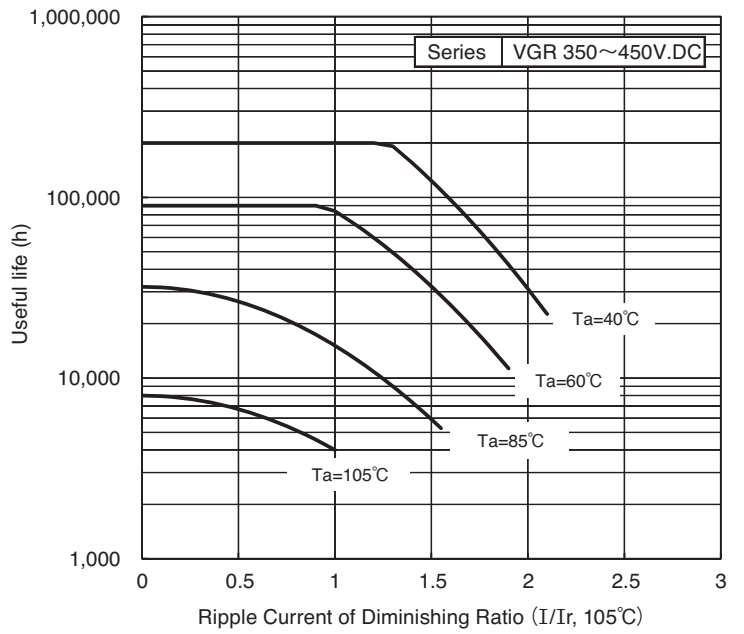
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	3,300	64×107	0.20	15.1	29	30	22	VGR2V332YD107
	3,900	64×123	0.20	16.8	24	26	22	VGR2V392YD123
	4,700	64×147	0.20	18.2	20	21	22	VGR2V472YD147
		77×108	0.20	20.6	20	21	24	VGR2V472YE108
	5,600	64×164	0.20	20.3	17	18	22	VGR2V562YD164
		77×124	0.20	23.1	17	18	24	VGR2V562YE124
	6,800	64×187	0.20	22.6	14	15	22	VGR2V682YD187
		77×148	0.20	24.9	14	15	24	VGR2V682YE148
		90×110	0.20	28.6	14	15	24	VGR2V682YF110
	8,200	77×165	0.20	27.9	12	12	24	VGR2V822YE165
		90×150	0.20	31.0	12	12	24	VGR2V822YF150
	10,000	77×188	0.20	31.0	9	10	24	VGR2V103YE188
		90×150	0.20	34.2	9	10	24	VGR2V103YF150
	12,000	77×228	0.20	35.1	8	8	24	VGR2V123YE228
90×167		0.20	36.8	8	8	24	VGR2V123YF167	
15,000	90×190	0.20	41.5	6	7	24	VGR2V153YF190	
18,000	90×230	0.20	44.3	5	6	24	VGR2V183YF230	
400	2,700	64×107	0.20	13.6	35	37	22	VGR2G272YD107
	3,300	64×123	0.20	15.5	29	30	22	VGR2G332YD123
	3,900	64×147	0.20	16.5	24	26	22	VGR2G392YD147
		77×108	0.20	18.8	24	26	24	VGR2G392YE108
	4,700	64×164	0.20	18.6	20	21	22	VGR2G472YD164
		77×124	0.20	21.2	20	21	24	VGR2G472YE124
	5,600	64×187	0.20	20.5	17	18	22	VGR2G562YD187
		77×148	0.20	22.6	17	18	24	VGR2G562YE148
		90×110	0.20	26.0	17	18	24	VGR2G562YF110
	6,800	77×165	0.20	25.4	14	15	24	VGR2G682YE165
		90×150	0.20	28.2	14	15	24	VGR2G682YF150
	8,200	77×188	0.20	28.1	12	12	24	VGR2G822YE188
		90×150	0.20	31.0	12	12	24	VGR2G822YF150
	10,000	77×228	0.20	32.0	9	10	24	VGR2G103YE228
90×167		0.20	33.6	9	10	24	VGR2G103YF167	
12,000	90×190	0.20	37.1	8	8	24	VGR2G123YF190	
15,000	90×230	0.20	40.4	6	7	24	VGR2G153YF230	
450	2,200	64×107	0.20	12.6	43	45	22	VGR2W222YD107
	2,700	64×123	0.20	14.4	35	37	22	VGR2W272YD123
		77×108	0.20	16.1	35	37	24	VGR2W272YE108
	3,300	64×147	0.20	15.6	29	30	22	VGR2W332YD147
		77×124	0.20	18.2	29	30	24	VGR2W332YE124
	3,900	64×164	0.20	17.5	24	26	22	VGR2W392YD164
		77×148	0.20	19.4	24	26	24	VGR2W392YE148
		90×110	0.20	22.3	24	26	24	VGR2W392YF110
	4,700	64×187	0.20	19.3	20	21	22	VGR2W472YD187
		77×148	0.20	21.3	20	21	24	VGR2W472YE148
		90×126	0.20	24.2	20	21	24	VGR2W472YF126
	5,600	77×165	0.20	23.7	17	18	24	VGR2W562YE165
		90×150	0.20	26.3	17	18	24	VGR2W562YF150
	6,800	77×188	0.20	26.3	14	15	24	VGR2W682YE188
90×167		0.20	28.5	14	15	24	VGR2W682YF167	
8,200	77×228	0.20	29.8	12	12	24	VGR2W822YE228	
	90×190	0.20	31.5	12	12	24	VGR2W822YF190	
10,000	90×230	0.20	33.9	9	10	24	VGR2W103YF230	
500	1,500	64×107	0.20	8.4	69	73	22	VGR2H152YD107
	1,800	64×123	0.20	9.5	58	61	22	VGR2H182YD123
	2,200	64×147	0.20	10.3	47	50	22	VGR2H222YD147
		77×108	0.20	11.7	47	50	24	VGR2H222YE108
	2,700	64×187	0.20	11.8	39	41	22	VGR2H272YD187
		77×124	0.20	13.3	39	41	24	VGR2H272YE124
	3,300	77×148	0.20	14.4	32	33	24	VGR2H332YE148
		90×110	0.20	16.5	32	33	24	VGR2H332YF110
	3,900	77×165	0.20	15.9	27	28	24	VGR2H392YE165
		90×126	0.20	17.8	27	28	24	VGR2H392YF126
	4,700	77×188	0.20	17.6	22	23	24	VGR2H472YE188
		90×150	0.20	19.4	22	23	24	VGR2H472YF150
	5,600	77×228	0.20	19.8	19	20	24	VGR2H562YE228
		90×167	0.20	20.8	19	20	24	VGR2H562YF167
6,800	90×190	0.20	23.1	15	16	24	VGR2H682YF190	
8,200	90×230	0.20	24.7	13	13	24	VGR2H822YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating condition  $I$  versus rated ripple current at 105°C, 120Hz



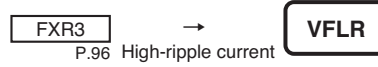


# VFLR Series Useful of 8,000 hours at 85°C

- Conform RoHS

## Features

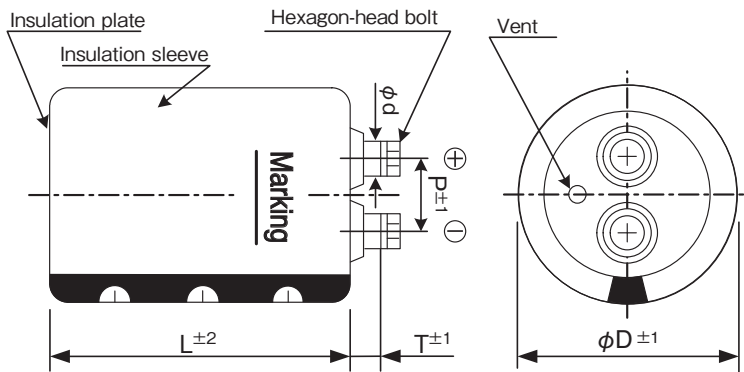
- The permissible ripple current is improved to FXR type by approx.10 ~ 20% using the new heat radiation, low ESR and the new anode foil.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

## Ripple current correction coefficient

Temperature correction coefficient

Temperature(°C)	40	60	85
Correction coefficient	1.89	1.67	1.00

Frequency correction coefficient

Frequency(Hz)	120	300	1K	≥ 10K
Correction coefficient	1.0	1.1	1.3	1.4

Forced wind correction coefficient

Forced wind(m/s)	< 0.5	0.5 ≤
Correction coefficient	1.0	1.1

Terminal permissible currents : 60Arms for M5 ; 100Arms for M6.

Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) VFLR Series 450V 15,000 µF ±20%

**VFLR 2W 153 Y F 230**

- VFLR: Type of series
- 2W: Case height code
- 153: Case dia code
- Y: Type of bracket code
- F: Capacitance code
- 230: Rated voltage code

Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket Code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VFLR Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	3,900	64×107	0.20	17.0	24	26	22	VFLR2V392YD107
	4,700	64×123	0.20	19.2	20	21	22	VFLR2V472YD123
	5,600	64×147	0.20	20.6	17	18	22	VFLR2V562YD147
		77×108	0.20	23.5	17	18	24	VFLR2V562YE108
	6,800	64×164	0.20	23.3	14	15	22	VFLR2V682YD164
		77×124	0.20	26.5	14	15	24	VFLR2V682YE124
	8,200	64×187	0.20	25.8	12	12	22	VFLR2V822YD187
		77×148	0.20	28.5	12	12	24	VFLR2V822YE148
		90×110	0.20	32.6	12	12	24	VFLR2V822YF110
	10,000	77×165	0.20	32.1	9	10	24	VFLR2V103YE165
		90×126	0.20	35.9	9	10	24	VFLR2V103YF126
	12,000	77×188	0.20	35.3	8	8	24	VFLR2V123YE188
		90×150	0.20	39.1	8	8	24	VFLR2V123YF150
	15,000	77×228	0.20	40.8	6	7	24	VFLR2V153YE228
		90×167	0.20	43.3	6	7	24	VFLR2V153YF167
	18,000	90×190	0.20	47.1	5	6	24	VFLR2V183YF190
22,000	90×230	0.20	51.2	4	5	24	VFLR2V223YF230	
400	3,300	64×107	0.20	15.7	29	30	22	VFLR2G332YD107
	3,900	64×123	0.20	17.5	24	26	22	VFLR2G392YD123
	4,700	64×147	0.20	18.9	20	21	22	VFLR2G472YD147
		77×108	0.20	21.5	20	21	24	VFLR2G472YE108
	5,600	64×164	0.20	21.2	17	18	22	VFLR2G562YD164
		77×124	0.20	24.0	17	18	24	VFLR2G562YE124
	6,800	64×187	0.20	23.5	14	15	22	VFLR2G682YD187
		77×148	0.20	26.0	14	15	24	VFLR2G682YE148
		90×110	0.20	29.7	14	15	24	VFLR2G682YF110
	8,200	77×165	0.20	29.1	12	12	24	VFLR2G822YE165
		90×126	0.20	32.5	12	12	24	VFLR2G822YF126
	10,000	77×188	0.20	32.2	9	10	24	VFLR2G103YE188
		90×150	0.20	35.7	9	10	24	VFLR2G103YF150
	12,000	77×228	0.20	36.5	8	8	24	VFLR2G123YE228
		90×167	0.20	38.7	8	8	24	VFLR2G123YF167
	15,000	90×190	0.20	43.0	6	7	24	VFLR2G153YF190
18,000	90×230	0.20	46.3	5	6	24	VFLR2G183YF230	
450	2,700	64×107	0.20	14.5	35	37	22	VFLR2W272YD107
	3,300	64×123	0.20	16.5	29	30	22	VFLR2W332YD123
	3,900	64×147	0.20	17.6	24	26	22	VFLR2W392YD147
		77×108	0.20	20.1	24	26	24	VFLR2W392YE108
	4,700	64×164	0.20	19.9	20	21	22	VFLR2W472YD164
		77×124	0.20	22.6	20	21	24	VFLR2W472YE124
	5,600	64×187	0.20	21.9	17	18	22	VFLR2W562YD187
		77×148	0.20	24.1	17	18	24	VFLR2W562YE148
		90×110	0.20	27.6	17	18	24	VFLR2W562YF110
	6,800	77×165	0.20	27.1	14	15	24	VFLR2W682YE165
		90×126	0.20	30.3	14	15	24	VFLR2W682YF126
	8,200	77×188	0.20	29.9	12	12	24	VFLR2W822YE188
		90×150	0.20	33.1	12	12	24	VFLR2W822YF150
	10,000	77×228	0.20	34.1	9	10	24	VFLR2W103YE228
		90×167	0.20	36.2	9	10	24	VFLR2W103YF167
	12,000	90×190	0.20	39.4	8	8	24	VFLR2W123YF190
15,000	90×230	0.20	43.3	6	7	24	VFLR2W153YF230	
500	1,800	64×107	0.20	11.3	58	61	22	VFLR2H182YD107
	2,200	64×123	0.20	12.8	47	50	22	VFLR2H222YD123
	2,700	64×147	0.20	13.9	39	41	22	VFLR2H272YD147
		77×108	0.20	15.9	39	41	24	VFLR2H272YE108
	3,300	64×164	0.20	15.8	32	33	22	VFLR2H332YD164
		77×124	0.20	18.0	32	33	24	VFLR2H332YE124
	3,900	64×187	0.20	17.3	27	28	22	VFLR2H392YD187
		77×148	0.20	19.1	27	28	24	VFLR2H392YE148
		90×110	0.20	21.9	27	28	24	VFLR2H392YF110
	4,700	77×165	0.20	21.4	22	23	24	VFLR2H472YE165
		90×126	0.20	24.0	22	23	24	VFLR2H472YF126
	5,600	77×188	0.20	23.5	19	20	24	VFLR2H562YE188
		90×150	0.20	26.0	19	20	24	VFLR2H562YF150
	6,800	77×228	0.20	26.7	15	16	24	VFLR2H682YE228
		90×167	0.20	28.4	15	16	24	VFLR2H682YF167
	8,200	90×190	0.20	31.0	13	13	24	VFLR2H822YF190
10,000	90×230	0.20	33.6	10	11	24	VFLR2H103YF230	

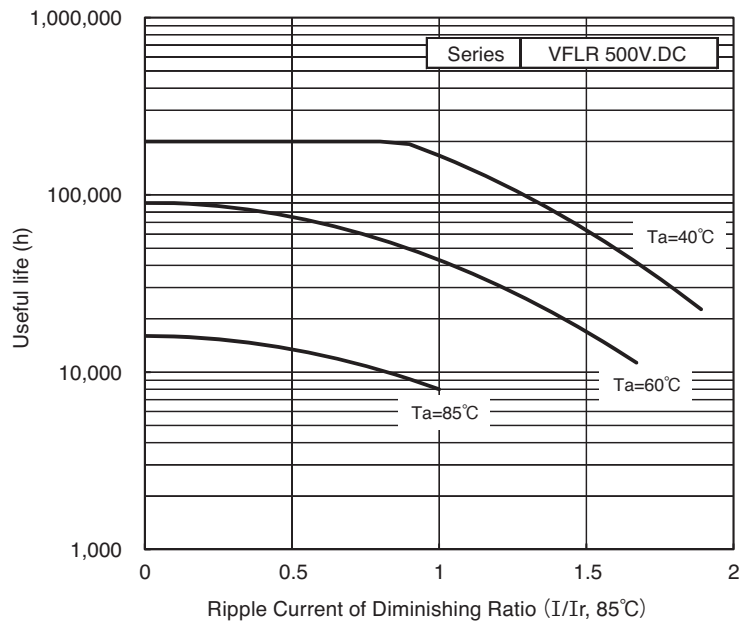
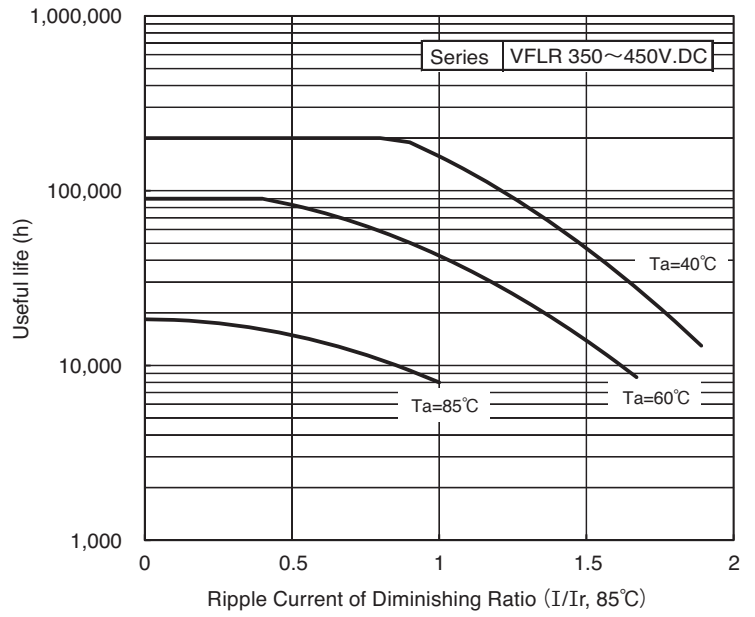
ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at  $85^\circ\text{C}$ , 120Hz

ALUMINUM ELECTROLYTIC CAPACITORS



# MEMO

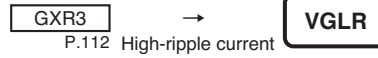
---

# VGLR Series Useful of 8,000 hours at 105°C

- Conform RoHS

## Features

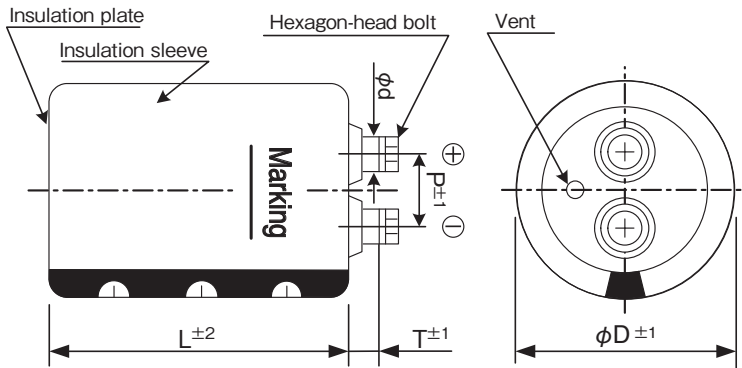
- The permissible ripple current is improved to GXR type by approx. 20~40% using the new heat radiation, low ESR and the new anode foil.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

## Ripple current correction coefficient

### Temperature correction coefficient

Temperature(°C)		40	60	85	105
Correction coefficient	350 ~ 450V.DC	2.10	1.90	1.55	1.00
	500V.DC	2.10	2.00	1.87	1.00

### Frequency correction coefficient

Frequency(Hz)	120	300	1K	≥ 10K
Correction coefficient	1.0	1.1	1.3	1.4

### Forced wind correction coefficient

Forced wind(m/s)	< 0.5	0.5 ≤
Correction coefficient	1.0	1.1

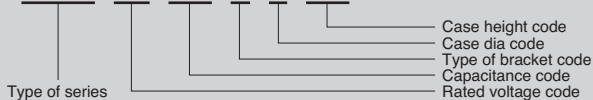
Terminal permissible currents : 60Arms for M5 ; 100Arms for M6.

Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) VGLR Series 400V 15,000 µF ±20%

**VGLR 2G 153 Y F 230**



Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.



# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VGLR Series

Standard Products Table

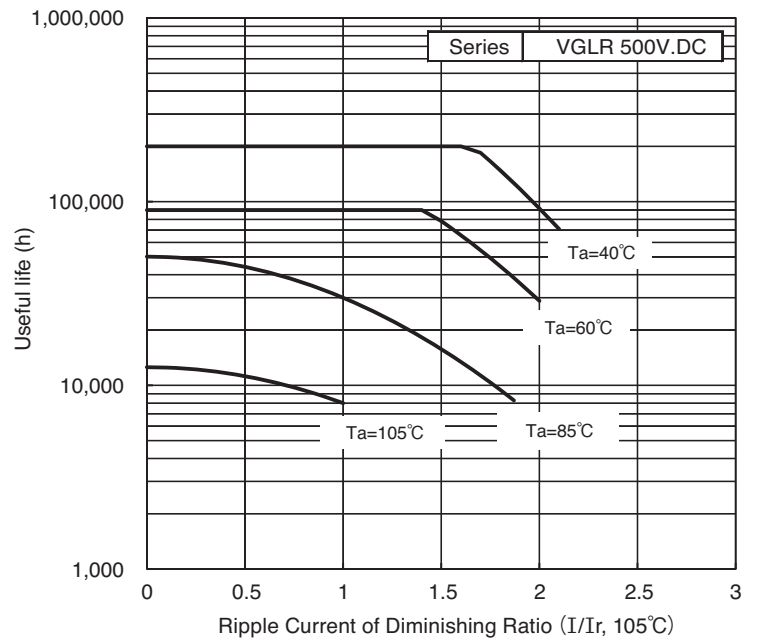
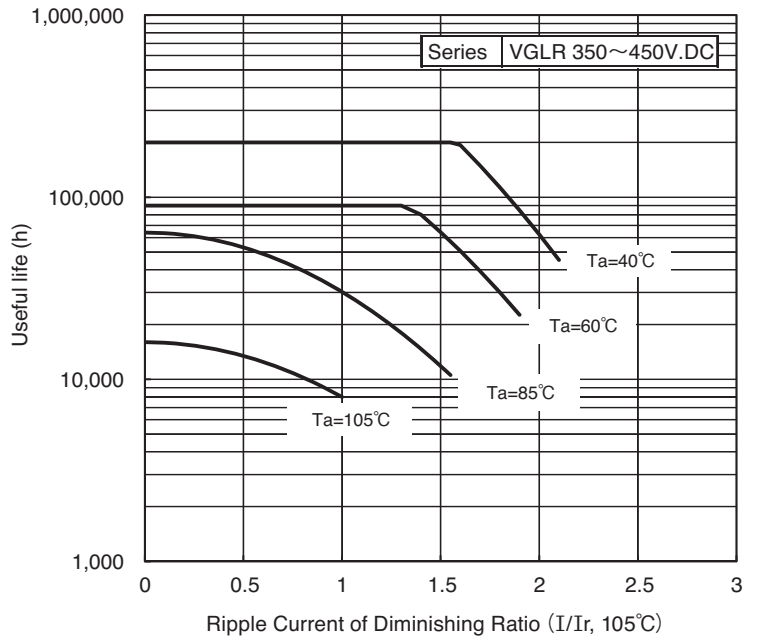
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	3,300	64×107	0.20	15.1	29	30	22	VGLR2V332YD107
	3,900	64×123	0.20	16.8	24	26	22	VGLR2V392YD123
	4,700	64×147	0.20	18.2	20	21	22	VGLR2V472YD147
		77×108	0.20	20.6	20	21	24	VGLR2V472YE108
	5,600	64×164	0.20	20.3	17	18	22	VGLR2V562YD164
		77×124	0.20	23.1	17	18	24	VGLR2V562YE124
	6,800	64×187	0.20	22.6	14	15	22	VGLR2V682YD187
		77×148	0.20	24.9	14	15	24	VGLR2V682YE148
		90×110	0.20	28.6	14	15	24	VGLR2V682YF110
	8,200	77×165	0.20	27.9	12	12	24	VGLR2V822YE165
		90×150	0.20	31.0	12	12	24	VGLR2V822YF150
	10,000	77×188	0.20	31.0	9	10	24	VGLR2V103YE188
		90×150	0.20	34.2	9	10	24	VGLR2V103YF150
	12,000	77×228	0.20	35.1	8	8	24	VGLR2V123YE228
90×167		0.20	36.8	8	8	24	VGLR2V123YF167	
15,000	90×190	0.20	41.5	6	7	24	VGLR2V153YF190	
18,000	90×230	0.20	44.3	5	6	24	VGLR2V183YF230	
400	2,700	64×107	0.20	13.6	35	37	22	VGLR2G272YD107
	3,300	64×123	0.20	15.5	29	30	22	VGLR2G332YD123
	3,900	64×147	0.20	16.5	24	26	22	VGLR2G392YD147
		77×108	0.20	18.8	24	26	24	VGLR2G392YE108
	4,700	64×164	0.20	18.6	20	21	22	VGLR2G472YD164
		77×124	0.20	21.2	20	21	24	VGLR2G472YE124
	5,600	64×187	0.20	20.5	17	18	22	VGLR2G562YD187
		77×148	0.20	22.6	17	18	24	VGLR2G562YE148
		90×110	0.20	26.0	17	18	24	VGLR2G562YF110
	6,800	77×165	0.20	25.4	14	15	24	VGLR2G682YE165
		90×150	0.20	28.2	14	15	24	VGLR2G682YF150
	8,200	77×188	0.20	28.1	12	12	24	VGLR2G822YE188
		90×150	0.20	31.0	12	12	24	VGLR2G822YF150
	10,000	77×228	0.20	32.0	9	10	24	VGLR2G103YE228
90×167		0.20	33.6	9	10	24	VGLR2G103YF167	
12,000	90×190	0.20	37.1	8	8	24	VGLR2G123YF190	
15,000	90×230	0.20	40.4	6	7	24	VGLR2G153YF230	
450	2,200	64×107	0.20	12.6	43	45	22	VGLR2W222YD107
	2,700	64×123	0.20	14.4	35	37	22	VGLR2W272YD123
		77×108	0.20	16.1	35	37	24	VGLR2W272YE108
	3,300	64×147	0.20	15.6	29	30	22	VGLR2W332YD147
		77×124	0.20	18.2	29	30	24	VGLR2W332YE124
	3,900	64×164	0.20	17.5	24	26	22	VGLR2W392YD164
		77×148	0.20	19.4	24	26	24	VGLR2W392YE148
		90×110	0.20	22.3	24	26	24	VGLR2W392YF110
	4,700	64×187	0.20	19.3	20	21	22	VGLR2W472YD187
		77×148	0.20	21.3	20	21	24	VGLR2W472YE148
		90×126	0.20	24.2	20	21	24	VGLR2W472YF126
	5,600	77×165	0.20	23.7	17	18	24	VGLR2W562YE165
		90×150	0.20	26.3	17	18	24	VGLR2W562YF150
	6,800	77×188	0.20	26.3	14	15	24	VGLR2W682YE188
90×167		0.20	28.5	14	15	24	VGLR2W682YF167	
8,200	77×228	0.20	29.8	12	12	24	VGLR2W822YE228	
	90×190	0.20	31.5	12	12	24	VGLR2W822YF190	
10,000	90×230	0.20	33.9	9	10	24	VGLR2W103YF230	
500	1,500	64×107	0.20	8.4	69	73	22	VGLR2H152YD107
	1,800	64×123	0.20	9.5	58	61	22	VGLR2H182YD123
	2,200	64×147	0.20	10.3	47	50	22	VGLR2H222YD147
		77×108	0.20	11.7	47	50	24	VGLR2H222YE108
	2,700	64×187	0.20	11.8	39	41	22	VGLR2H272YD187
		77×124	0.20	13.3	39	41	24	VGLR2H272YE124
	3,300	77×148	0.20	14.4	32	33	24	VGLR2H332YE148
		90×110	0.20	16.5	32	33	24	VGLR2H332YF110
	3,900	77×165	0.20	15.9	27	28	24	VGLR2H392YE165
		90×126	0.20	17.8	27	28	24	VGLR2H392YF126
	4,700	77×188	0.20	17.6	22	23	24	VGLR2H472YE188
		90×150	0.20	19.4	22	23	24	VGLR2H472YF150
	5,600	77×228	0.20	19.8	19	20	24	VGLR2H562YE228
		90×167	0.20	20.8	19	20	24	VGLR2H562YF167
6,800	90×190	0.20	23.1	15	16	24	VGLR2H682YF190	
8,200	90×230	0.20	24.7	13	13	24	VGLR2H822YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz

ALUMINUM ELECTROLYTIC CAPACITORS



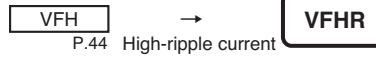


# VFHR Series Useful of 20,000 hours at 85°C

- Conform RoHS

## Features

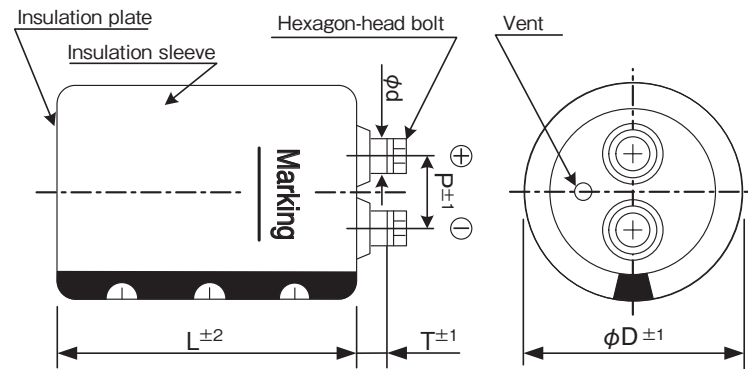
- High-reliability series with the warranty of 20,000 hours realized through improvement of the VFLR series into longer-life series.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 20,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φ D	P	T	φ d	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	85	
Correction coefficient	350~450V.DC	1.90	1.75	1.00
	500V.DC	2.10	1.90	1.00
Frequency (Hz)	120	300	1k	≥10k
	Correction coefficient	1.0	1.1	1.3
Forced wind (m/s)	<0.5	0.5≤		
	Correction coefficient	1.0	1.1	

Terminal permissible currents : 60Arms for M5; 100Arms for M6. Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) VFHR type 400V 5,600 µF ±20%

**VFHR 2G 562 Y F 110**

- VFHR: Type of series
- 2G: Case height code
- 562: Case dia code
- Y: Type of bracket code
- F: Capacitance code
- 110: Rated voltage code

Refer to page 19 for product code.

## Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VFHR Series

Standard Products Table

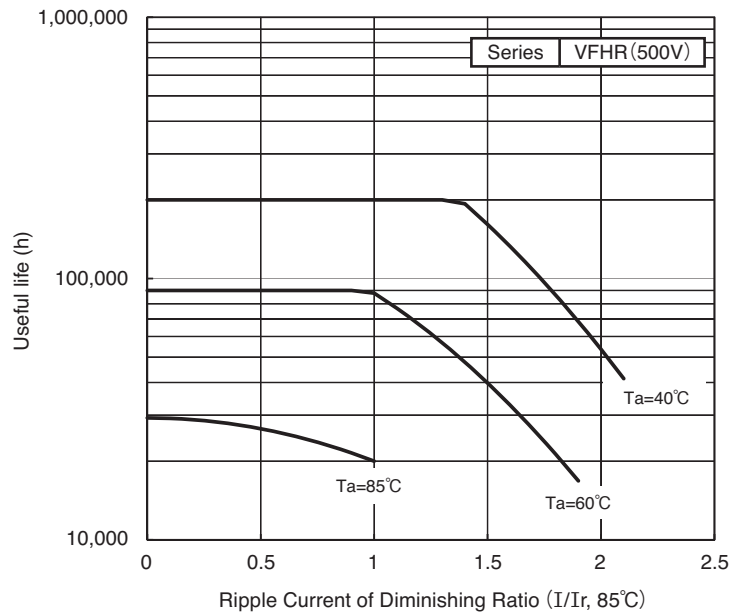
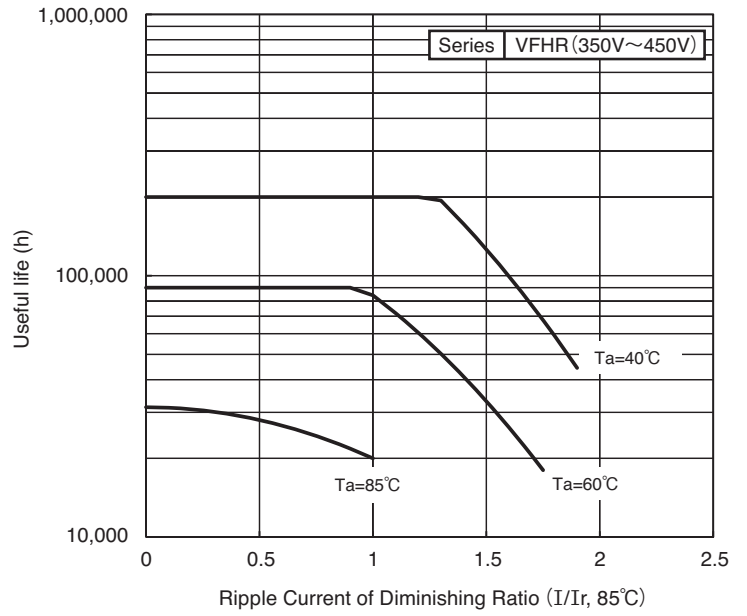
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	3,300	64×107	0.20	15.1	29	30	22	VFHR2V332YD107
	3,900	64×123	0.20	16.8	24	26	22	VFHR2V392YD123
	4,700	64×147	0.20	18.2	20	21	22	VFHR2V472YD147
		77×108	0.20	20.6	20	21	24	VFHR2V472YE108
	5,600	64×164	0.20	20.3	17	18	22	VFHR2V562YD164
		77×124	0.20	23.1	17	18	24	VFHR2V562YE124
	6,800	64×187	0.20	22.6	14	15	22	VFHR2V682YD187
		77×148	0.20	24.9	14	15	24	VFHR2V682YE148
		90×110	0.20	28.6	14	15	24	VFHR2V682YF110
	8,200	77×165	0.20	27.9	12	12	24	VFHR2V822YE165
		90×150	0.20	31.0	12	12	24	VFHR2V822YF150
	10,000	77×188	0.20	31.0	9	10	24	VFHR2V103YE188
		90×150	0.20	34.2	9	10	24	VFHR2V103YF150
	12,000	77×228	0.20	35.1	8	8	24	VFHR2V123YE228
90×167		0.20	36.8	8	8	24	VFHR2V123YF167	
15,000	90×190	0.20	41.5	6	7	24	VFHR2V153YF190	
18,000	90×230	0.20	44.3	5	6	24	VFHR2V183YF230	
400	2,700	64×107	0.20	13.6	35	37	22	VFHR2G272YD107
	3,300	64×123	0.20	15.5	29	30	22	VFHR2G332YD123
	3,900	64×147	0.20	16.5	24	26	22	VFHR2G392YD147
		77×108	0.20	18.8	24	26	24	VFHR2G392YE108
	4,700	64×164	0.20	18.6	20	21	22	VFHR2G472YD164
		77×124	0.20	21.2	20	21	24	VFHR2G472YE124
	5,600	64×187	0.20	20.5	17	18	22	VFHR2G562YD187
		77×148	0.20	22.6	17	18	24	VFHR2G562YE148
		90×110	0.20	26.0	17	18	24	VFHR2G562YF110
	6,800	77×165	0.20	25.4	14	15	24	VFHR2G682YE165
		90×150	0.20	28.2	14	15	24	VFHR2G682YF150
	8,200	77×188	0.20	28.1	12	12	24	VFHR2G822YE188
		90×150	0.20	31.0	12	12	24	VFHR2G822YF150
	10,000	77×228	0.20	32.0	9	10	24	VFHR2G103YE228
90×167		0.20	33.6	9	10	24	VFHR2G103YF167	
12,000	90×190	0.20	37.1	8	8	24	VFHR2G123YF190	
15,000	90×230	0.20	40.4	6	7	24	VFHR2G153YF230	
450	2,200	64×107	0.20	12.6	43	45	22	VFHR2W222YD107
	2,700	64×123	0.20	14.4	35	37	22	VFHR2W272YD123
		77×108	0.20	16.1	35	37	24	VFHR2W272YE108
	3,300	64×147	0.20	15.6	29	30	22	VFHR2W332YD147
		77×124	0.20	18.2	29	30	24	VFHR2W332YE124
	3,900	64×164	0.20	17.5	24	26	22	VFHR2W392YD164
		77×148	0.20	19.4	24	26	24	VFHR2W392YE148
		90×110	0.20	22.3	24	26	24	VFHR2W392YF110
	4,700	64×187	0.20	19.3	20	21	22	VFHR2W472YD187
		77×148	0.20	21.3	20	21	24	VFHR2W472YE148
		90×126	0.20	24.2	20	21	24	VFHR2W472YF126
	5,600	77×165	0.20	23.7	17	18	24	VFHR2W562YE165
		90×150	0.20	26.3	17	18	24	VFHR2W562YF150
	6,800	77×188	0.20	26.3	14	15	24	VFHR2W682YE188
90×167		0.20	28.5	14	15	24	VFHR2W682YF167	
8,200	77×228	0.20	29.8	12	12	24	VFHR2W822YE228	
	90×190	0.20	31.5	12	12	24	VFHR2W822YF190	
10,000	90×230	0.20	33.9	9	10	24	VFHR2W103YF230	
500	1,500	64×107	0.20	8.4	69	73	22	VFHR2H152YD107
	1,800	64×123	0.20	9.5	58	61	22	VFHR2H182YD123
	2,200	64×147	0.20	10.3	47	50	22	VFHR2H222YD147
		77×108	0.20	11.7	47	50	24	VFHR2H222YE108
	2,700	64×187	0.20	11.8	39	41	22	VFHR2H272YD187
		77×124	0.20	13.3	39	41	24	VFHR2H272YE124
	3,300	77×148	0.20	14.4	32	33	24	VFHR2H332YE148
		90×110	0.20	16.5	32	33	24	VFHR2H332YF110
	3,900	77×165	0.20	15.9	27	28	24	VFHR2H392YE165
		90×126	0.20	17.8	27	28	24	VFHR2H392YF126
	4,700	77×188	0.20	17.6	22	23	24	VFHR2H472YE188
		90×150	0.20	19.4	22	23	24	VFHR2H472YF150
	5,600	77×228	0.20	19.8	19	20	24	VFHR2H562YE228
		90×167	0.20	20.8	19	20	24	VFHR2H562YF167
6,800	90×190	0.20	23.1	15	16	24	VFHR2H682YF190	
8,200	90×230	0.20	24.7	13	13	24	VFHR2H822YF230	

ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating condition  $I$  versus rated ripple current at 85°C, 120Hz

ALUMINUM ELECTROLYTIC CAPACITORS



# MEMO

---

# HCGWA Series

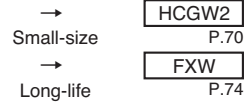
Useful of 4,000 hours at 85°C

- Conform RoHS

## Features

- Product primarily designed for circuits requiring large energy momentarily like those for the uninterruptible power supply (UPS) and X-ray power supply.
- Capacitance improved by 40%, comparison with the HCGF6A series (smallest series)
- The correspondence size has been expanded to  $\phi 121 \times 283L$ .

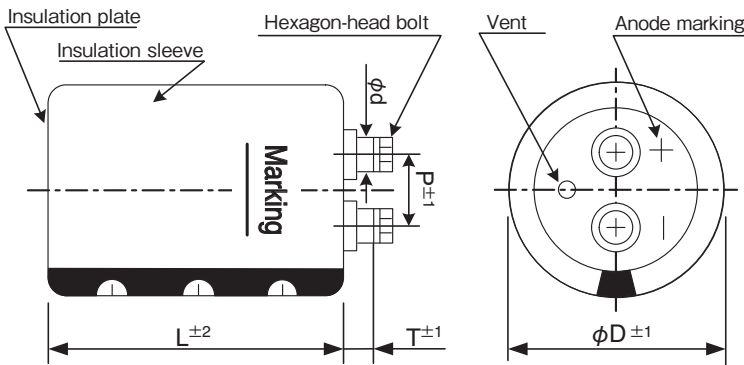
HCGWA



## Product Specifications

Items	Specifications
Temperature range	-10°C ~ +85°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV ( $\mu$ A) or 7mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance ( $\mu$ F), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

$\phi D$	P	T	$\phi d$	Hexagon-head bolt	Cap material
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin
101	31.5	3.0	14.0	M6×12	Phenol resin
121	41.5	3.0	14.0	M6×12	PPS resin

## Ripple current correction coefficient

Temperature (°C)	40	60	70	85
Correction coefficient	2.2	1.9	1.6	1.0
Frequency (Hz)	120	300	1k	≥10k
Correction coefficient	1.0	1.1	1.3	1.4

Terminal allowance current : 60Arms for M5 ; 100Arms for M6  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) HCGWA Series 450V 22,000  $\mu$ F ±20%

**HCGWA 2W 223 Y F 236 (PH)**



Refer to page 19 for product code.

## Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I ).
- $\phi 121$  products become correspondence only of Type X.
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.



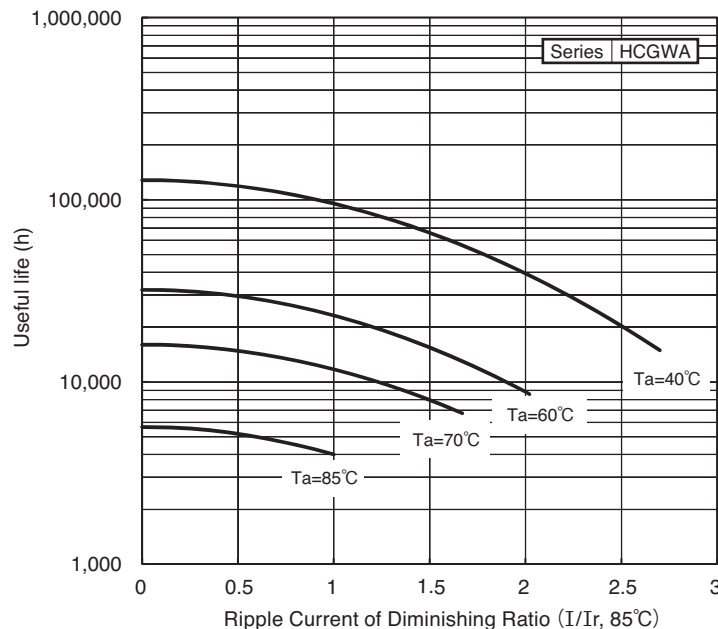
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	13,000	77×155	0.70	12.8	25	26	26	HCGWA2V133YE155PH
	17,000	90×157	0.70	15.6	19	20	26	HCGWA2V173YF157PH
	18,000	77×195	0.70	16.6	18	20	26	HCGWA2V183YE195PH
	22,000	77×235	0.70	19.8	17	18	26	HCGWA2V223YE235PH
	25,000	90×196	0.70	20.7	15	16	26	HCGWA2V253YF196PH
	31,000	90×236	0.70	24.9	12	13	26	HCGWA2V313YF236PH
		101×195	0.70	23.9	12	13	36	HCGWA2V313YG195PH
	36,000	90×283	0.70	29.0	11	13	26	HCGWA2V363YF283PH
	39,000	101×237	0.70	29.0	10	12	36	HCGWA2V393YG237PH
	44,000	101×283	0.70	33.2	9	11	36	HCGWA2V443YG283PH
57,000	121×283	0.70	40.7	7	8	36	HCGWA2V573XK283	
400	11,000	77×155	0.70	11.8	31	32	26	HCGWA2G113YE155PH
	14,000	77×195	0.70	14.6	24	25	26	HCGWA2G143YE195PH
	16,000	77×235	0.70	16.9	21	22	26	HCGWA2G163YE235PH
		90×157	0.70	15.2	21	22	26	HCGWA2G163YF157PH
	20,000	90×196	0.70	18.5	20	21	26	HCGWA2G203YF196PH
	25,000	90×236	0.70	22.4	16	18	26	HCGWA2G253YF236PH
		101×195	0.70	21.4	16	18	36	HCGWA2G253YG195PH
	32,000	90×283	0.70	27.3	12	13	26	HCGWA2G323YF283PH
		101×237	0.70	26.3	12	13	36	HCGWA2G323YG237PH
	38,000	101×283	0.70	30.8	10	11	36	HCGWA2G383YG283PH
50,000	121×283	0.70	38.1	9	11	36	HCGWA2G503XK283	
450	9,500	77×155	0.70	10.9	36	37	26	HCGWA2W952YE155PH
	12,000	77×195	0.70	13.5	28	29	26	HCGWA2W123YE195PH
	13,000	90×157	0.70	13.7	26	27	26	HCGWA2W133YF157PH
	15,000	77×235	0.70	16.4	24	27	26	HCGWA2W153YE235PH
	17,000	90×196	0.70	17.1	21	22	26	HCGWA2W173YF196PH
	22,000	90×236	0.70	21.0	18	19	26	HCGWA2W223YF236PH
		101×195	0.70	20.1	18	19	36	HCGWA2W223YG195PH
	27,000	90×283	0.70	25.1	15	17	26	HCGWA2W273YF283PH
		101×237	0.70	24.1	15	17	36	HCGWA2W273YG237PH
	33,000	101×283	0.70	28.7	13	15	36	HCGWA2W333YG283PH
42,000	121×283	0.70	34.9	10	12	36	HCGWA2W423XK283	
500	5,600	77×155	0.70	8.4	60	62	26	HCGWA2H562YE155PH
	8,200	77×195	0.70	11.2	41	43	26	HCGWA2H822YE195PH
		90×157	0.70	10.8	41	43	26	HCGWA2H822YF157PH
	9,500	77×235	0.70	13.0	36	37	26	HCGWA2H952YE235PH
	11,000	90×196	0.70	13.7	32	33	26	HCGWA2H113YF196PH
	14,000	90×236	0.70	16.7	29	30	26	HCGWA2H143YF236PH
		101×195	0.70	16.0	29	30	36	HCGWA2H143YG195PH
	16,000	90×283	0.70	19.3	25	27	26	HCGWA2H163YF283PH
101×237		0.70	18.6	25	26	36	HCGWA2H163YG237PH	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz

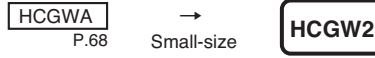


# HCGW2 Series Useful of 4,000 hours at 85°C

- Conform RoHS

## Features

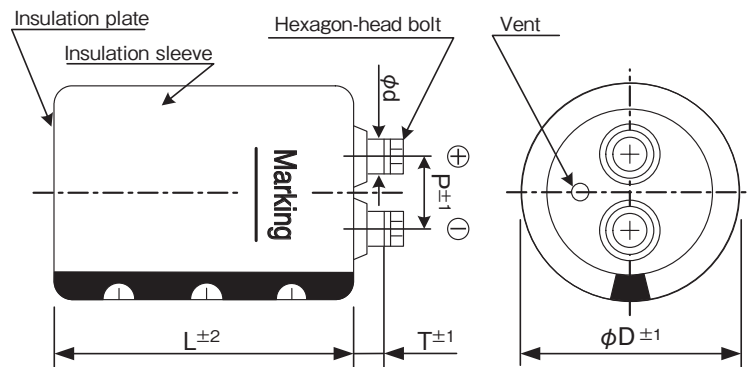
- Capacitance is increased by around 20%, of conventional HCGWA series through development of etched foil technology.



## Product Specifications

Items	Specifications
Temperature range	-10°C ~ +85°C
Rated voltage	400 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 7mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	70	85
Correction coefficient	2.2	1.9	1.6	1.0
Frequency (Hz)	120	300	1k	≥10k
Correction coefficient	1.0	1.1	1.3	1.4

Terminal allowance current : 100Arms for M6  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) HCGW2 Series 400V 18,000 µF ±20%

**HCGW2 2G 183 Y F 150 PH**

- Type of series
- Sealing code
- Case height code
- Case dia code
- Type of bracket code
- Capacitance code
- Rated voltage code

Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for type of bracket code.
- Bracket will be delivered separately.

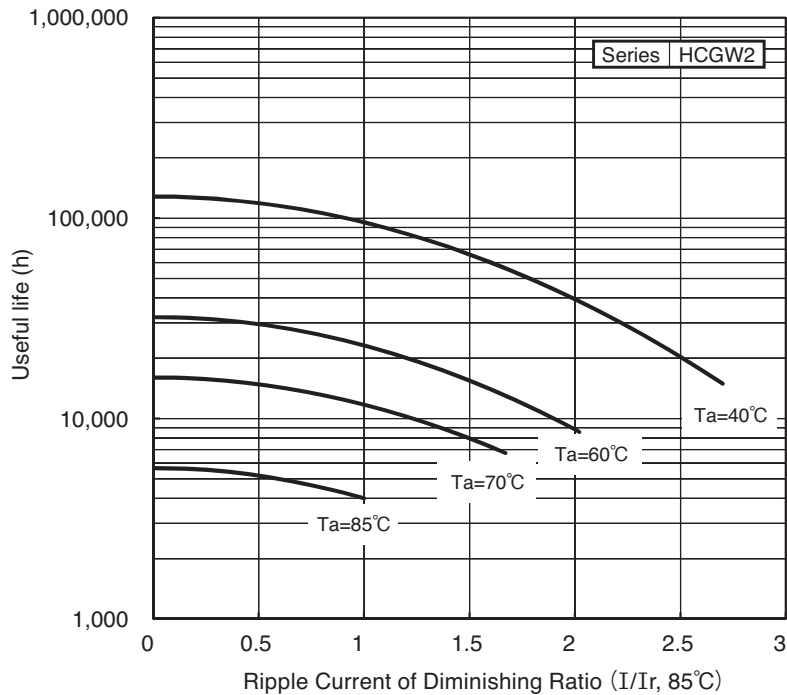
Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR (typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL (typ.) (nH)	Product name
400	13,000	77 $\times$ 148	0.70	13.0	26	27	24	HCGW22G133YE148PH
	16,000	77 $\times$ 188	0.70	15.5	21	22	24	HCGW22G163YE188PH
	18,000	90 $\times$ 150	0.70	16.4	19	20	24	HCGW22G183YF150PH
	20,000	77 $\times$ 228	0.70	18.8	17	18	24	HCGW22G203YE228PH
	23,000	90 $\times$ 190	0.70	19.8	15	16	24	HCGW22G233YF190PH
	29,000	90 $\times$ 230	0.70	23.9	12	13	24	HCGW22G293YF230PH
450	10,000	77 $\times$ 148	0.70	10.9	40	42	24	HCGW22W103YE148PH
	14,000	77 $\times$ 188	0.70	13.8	29	30	24	HCGW22W143YE188PH
	15,000	90 $\times$ 150	0.70	14.3	27	29	24	HCGW22W153YF150PH
	18,000	77 $\times$ 228	0.70	17.0	22	23	24	HCGW22W183YE228PH
	20,000	90 $\times$ 190	0.70	17.6	20	21	24	HCGW22W203YF190PH
	25,000	90 $\times$ 230	0.70	21.2	16	17	24	HCGW22W253YF230PH
500	7,500	77 $\times$ 148	0.70	9.5	47	48	24	HCGW22H752YE148PH
	10,000	77 $\times$ 188	0.70	11.7	36	38	24	HCGW22H103YE188PH
	11,000	90 $\times$ 150	0.70	12.2	33	34	24	HCGW22H113YF150PH
	13,000	77 $\times$ 228	0.70	14.5	28	29	24	HCGW22H133YE228PH
	15,000	90 $\times$ 190	0.70	15.3	24	25	24	HCGW22H153YF190PH
	18,000	90 $\times$ 230	0.70	18.1	20	21	24	HCGW22H183YF230PH

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz

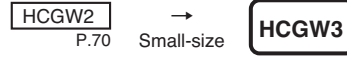


# HCGW3 Series Useful of 4,000 hours at 70°C

- Conform RoHS

## Features

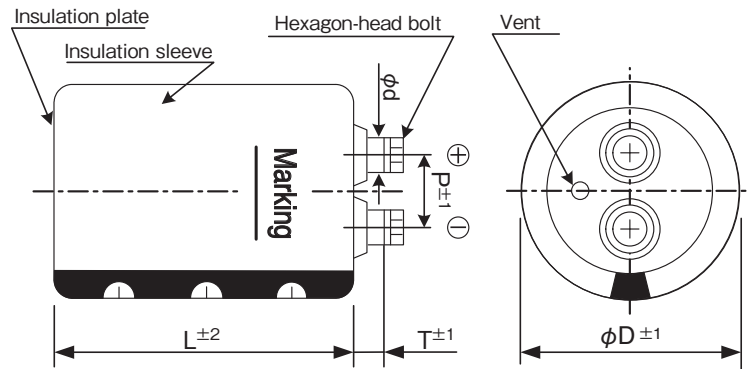
- Product primarily designed for circuits requiring large energy momentarily like those for the uninterruptible power supply (UPS) and X-ray power supply.
- Capacitance improved by 30%, comparison with the HCGW2 series (smallest series).



## Product Specifications

Items	Specifications
Temperature range	-10°C ~ +70°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 7mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (70°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 70°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 70°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	70	
Correction coefficient	2.2	1.7	1.0	
Frequency (Hz)	120	300	1k	≥10k
Correction coefficient	1.00	1.05	1.10	1.35

Terminal permissible currents : 100Arms for M6.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) HCGW3 Series 400V 16,000 µF±20%

**HCGW3 2G 163 Y E 148**

- HCGW3: Type of series
- 2G: Case height code
- 163: Case dia code
- Y: Type of bracket code
- E: Capacitance code
- 148: Rated voltage code

Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I ).
- If bracket are not necessary, enter "N" for type of bracket code.
- Bracket will be delivered separately.

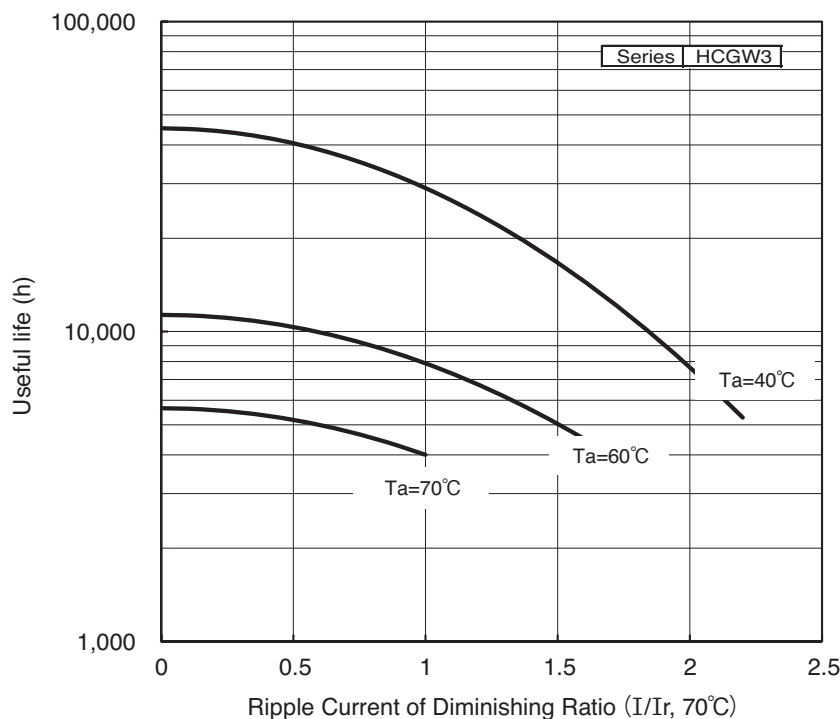
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 70°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	19,000	77×148	0.70	15.8	18	19	24	HCGW32V193YE148
	21,000	77×165	0.70	17.3	16	17	24	HCGW32V213YE165
	25,000	77×188	0.70	19.4	14	15	24	HCGW32V253YE188
	28,000	90×150	0.70	20.4	12	13	24	HCGW32V283YF150
	30,000	90×167	0.70	22.0	12	13	24	HCGW32V303YF167
	31,000	77×228	0.70	23.4	11	12	24	HCGW32V313YE228
	35,000	90×190	0.70	24.3	10	11	24	HCGW32V353YF190
	44,000	90×230	0.70	29.5	8	9	24	HCGW32V443YF230
400	16,000	77×148	0.70	14.5	21	22	24	HCGW32G163YE148
	17,000	77×165	0.70	15.6	20	21	24	HCGW32G173YE165
	20,000	77×188	0.70	17.4	17	18	24	HCGW32G203YE188
	22,000	90×150	0.70	18.2	16	17	24	HCGW32G223YF150
	24,000	90×167	0.70	19.7	14	15	24	HCGW32G243YF167
	25,000	77×228	0.70	21.0	14	15	24	HCGW32G253YE228
	29,000	90×190	0.70	22.1	12	13	24	HCGW32G293YF190
	36,000	90×230	0.70	26.8	10	11	24	HCGW32G363YF230
450	13,000	77×148	0.70	12.5	31	32	24	HCGW32W133YE148
	15,000	77×165	0.70	14.0	27	28	24	HCGW32W153YE165
	17,000	77×188	0.70	15.3	23	25	24	HCGW32W173YE188
	18,000	90×150	0.70	15.7	22	23	24	HCGW32W183YF150
	21,000	90×167	0.70	17.6	19	20	24	HCGW32W213YF167
	22,000	77×228	0.70	18.8	18	19	24	HCGW32W223YE228
	25,000	90×190	0.70	19.6	16	17	24	HCGW32W253YF190
	32,000	90×230	0.70	24.1	12	13	24	HCGW32W323YF230
500	10,000	77×148	0.70	11.0	36	37	24	HCGW32H103YE148
	12,000	77×165	0.70	12.5	30	31	24	HCGW32H123YE165
	14,000	77×188	0.70	13.9	26	27	24	HCGW32H143YE188
	15,000	90×150	0.70	14.3	24	25	24	HCGW32H153YF150
	17,000	77×228	0.70	16.5	21	22	24	HCGW32H173YE228
	17,000	90×167	0.70	15.9	21	22	24	HCGW32H173YF167
	20,000	90×190	0.70	17.6	18	19	24	HCGW32H203YF190
	25,000	90×230	0.70	21.4	15	15	24	HCGW32H253YF230

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I_r$  versus rated ripple current at 70°C, 120Hz



## FXW Series Useful of 8,000 hours at 85°C

- Conform RoHS

### Features

- Capacitance has been increased by 35% compared with FX2 series by special etched foil technology and new structure of element.
- High reliability series with the warranty of 5,000 hours realized through improvement of the HCGWA series into a longer-life type.

HCGWA  
P.68

→  
Long-life

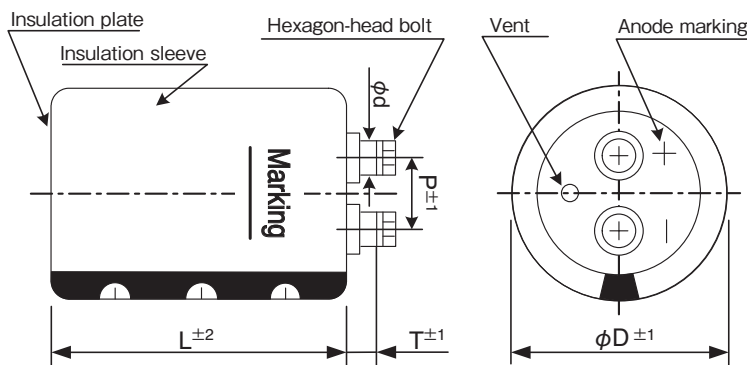
FXW



### Product Specifications

Items	Specifications
Temperature range	-10°C ~ +85°C
Rated voltage	350 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 7mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin
101	31.5	3.0	14.0	M6×12	Phenol resin

### Ripple current correction coefficient

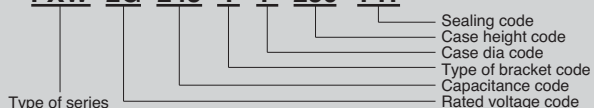
Temperature (°C)	40	60	70	85
Correction coefficient	2.2	1.9	1.6	1.00
Frequency (Hz)	120	300	1K	≥10K
Correction coefficient	1.0	1.1	1.3	1.4

Terminal allowance current : 60Arms for M5 ; 100Arms for M6  
Please use this type of capacitor at a terminal current below the permissible.

### Product code

(Example) FXW Series 400V 24,000 µF ±20%

**FXW 2G 243 Y F 236 PH**



Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

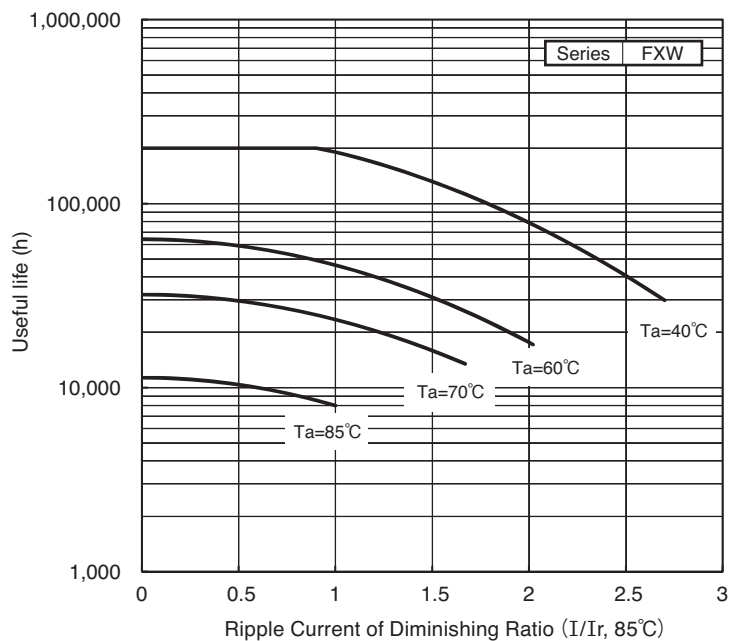
Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR (typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL (typ.) (nH)	Product name
350	13,000	77 $\times$ 155	0.70	12.8	25	26	26	FXW2V133YE155PH
	17,000	77 $\times$ 195	0.70	16.1	19	20	26	FXW2V173YE195PH
		90 $\times$ 157	0.70	15.6	19	20	26	FXW2V173YF157PH
	22,000	77 $\times$ 235	0.70	19.8	17	18	26	FXW2V223YE235PH
	24,000	90 $\times$ 196	0.70	20.3	16	18	26	FXW2V243YF196PH
	30,000	90 $\times$ 236	0.70	24.5	12	13	26	FXW2V303YF236PH
101 $\times$ 195		0.70	23.5	12	13	36	FXW2V303YG195PH	
400	11,000	77 $\times$ 155	0.70	11.8	31	32	26	FXW2G113YE155PH
	13,000	77 $\times$ 195	0.70	14.1	26	27	26	FXW2G133YE195PH
	15,000	90 $\times$ 157	0.70	14.7	23	24	26	FXW2G153YF157PH
	16,000	77 $\times$ 235	0.70	16.9	21	22	26	FXW2G163YE235PH
	19,000	90 $\times$ 196	0.70	18.1	21	22	26	FXW2G193YF196PH
		90 $\times$ 236	0.70	21.9	17	18	26	FXW2G243YF236PH
24,000	101 $\times$ 195	0.70	21.0	17	18	36	FXW2G243YG195PH	
30,000	101 $\times$ 237	0.70	25.4	13	14	36	FXW2G303YG237PH	
450	9,000	77 $\times$ 155	0.70	10.6	38	39	26	FXW2W902YE155PH
	11,000	77 $\times$ 195	0.70	12.9	31	32	26	FXW2W113YE195PH
	12,000	90 $\times$ 157	0.70	13.1	28	29	26	FXW2W123YF157PH
	14,000	77 $\times$ 235	0.70	15.8	25	27	26	FXW2W143YE235PH
	16,000	90 $\times$ 196	0.70	16.6	23	25	26	FXW2W163YF196PH
		90 $\times$ 236	0.70	20.0	19	20	26	FXW2W203YF236PH
	20,000	101 $\times$ 195	0.70	19.2	19	20	36	FXW2W203YG195PH
25,000		101 $\times$ 237	0.70	23.2	17	18	36	FXW2W253YG237PH

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz





**NEW!**

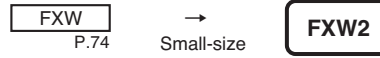
## FXW2 Series

Useful of 4,000 hours at 85°C

- Conform RoHS

### Features

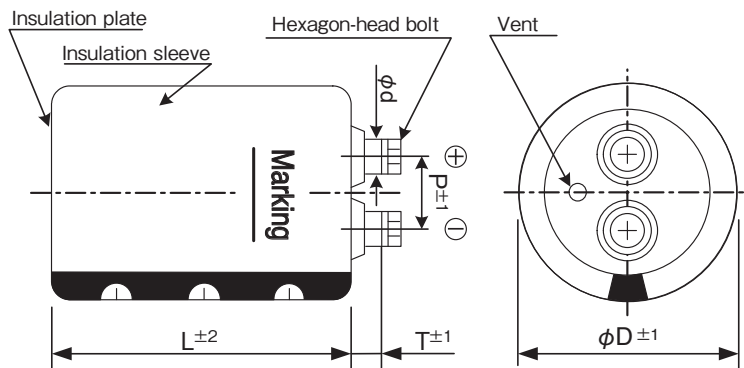
- Capacitance is increased by around 30%, from conventional FXW series through development of etched foil technology.



### Product Specifications

Items	Specifications
Temperature range	-10°C ~ +85°C
Rated voltage	400V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 7mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 5,000 hours: Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

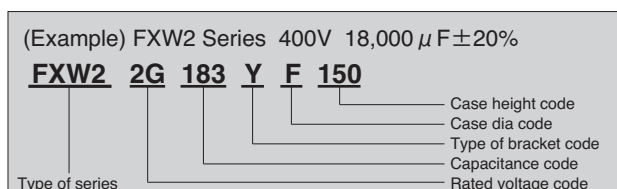
### Ripple current correction coefficient

Temperature (°C)	40	60	70	85
Correction coefficient	2.2	1.9	1.6	1.0
Frequency (Hz)	120	300	1k	≥10k
Correction coefficient	1.0	1.1	1.3	1.4

Terminal permissible currents : 100Arms for M6.

Please use this type of capacitor at a terminal current below the permissible.

### Product code



Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

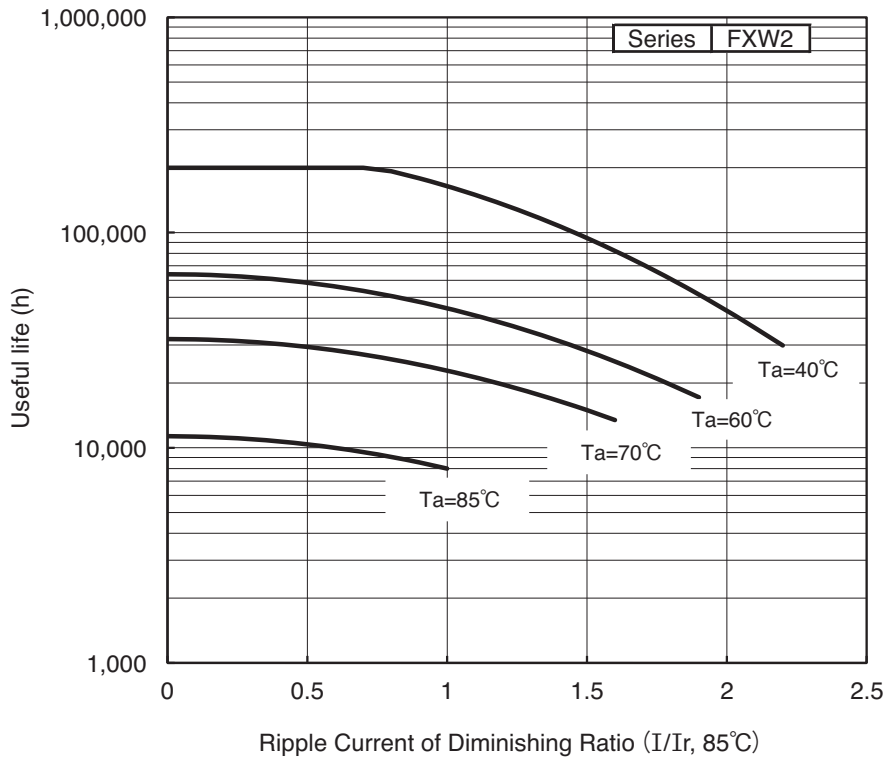


Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu F$ )	Case size $\phi D \times L$ (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
400	13,000	77×148	0.70	13.0	26	27	24	FXW22G133YE148
	17,000	77×188	0.70	16.0	20	21	24	FXW22G173YE188
	18,000	90×150	0.70	16.4	19	20	24	FXW22G183YF150
	21,000	77×228	0.70	19.3	17	18	24	FXW22G213YE228
	24,000	90×190	0.70	20.2	15	16	24	FXW22G243YF190
	30,000	90×230	0.70	24.3	12	13	24	FXW22G303YF230

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating condition  $I$  versus rated ripple current at 85°C, 120Hz



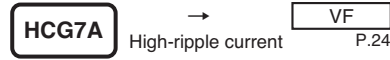
# HCG7A Series

Useful of 4,000 hours at 85°C

- Conform RoHS

## Features

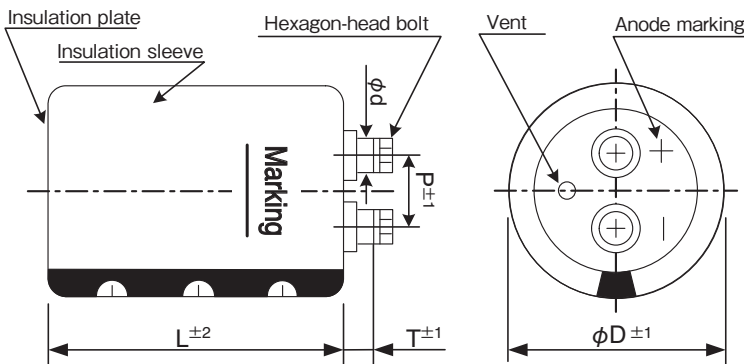
- Low voltage standard product.



## Product Specifications

Items	Specifications
Temperature range	-25°C ~ +85°C
Rated voltage	6.3 ~ 100V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (40°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
36	12.7	6.5	8.0	M5×10	Phenol resin
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin

## Ripple current correction coefficient

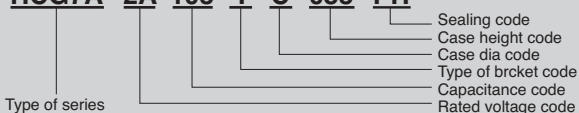
Temperature (°C)	40	60	70	85	
Correction coefficient	1.0	0.81	0.62	0.37	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.8	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) HCG7A Series 100V 10,000µF±20%

**HCG7A 2A 103 Y C 083 PH**



Refer to page 19 for product code.

## Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y (Type I for φ36 only), but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

## HCG7A Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 40°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
6.3	47,000	36×53	1.00	13.4	47	40	18	HCG7A0J473IA053PH
	68,000	36×65	1.20	14.8	33	30	18	HCG7A0J683IA065PH
	100,000	36×83	1.20	19.7	22	22	18	HCG7A0J104IA083PH
	150,000	51×83	1.40	25.6	15	16	21	HCG7A0J154YC083PH
	220,000	51×100	1.40	33.5	11	12	21	HCG7A0J224YC100PH
	330,000	64×100	1.50	43.6	8	9	22	HCG7A0J334YD100PH
	470,000	64×121	1.80	50.8	7	8	22	HCG7A0J474YD121PH
680,000	77×121	2.90	54.4	5	7	24	HCG7A0J684YE121PH	
10	33,000	36×53	0.90	11.9	25	26	18	HCG7A1A333IA053PH
	47,000	36×65	0.90	15.2	18	19	18	HCG7A1A473IA065PH
	68,000	36×83	1.20	20.3	13	14	18	HCG7A1A683IA083PH
	100,000	36×121	1.20	25.0	11	12	18	HCG7A1A104IA121PH
	150,000	51×83	1.40	27.6	7	7	21	HCG7A1A154YC083PH
	220,000	51×121	1.50	37.6	5	6	21	HCG7A1A224YC121PH
	330,000	64×121	1.80	46.5	5	6	22	HCG7A1A334YD121PH
470,000	77×121	2.30	52.0	4	6	24	HCG7A1A474YE121PH	
16	22,000	36×53	0.80	11.2	25	26	18	HCG7A1C223IA053PH
	33,000	36×65	0.80	14.8	17	18	18	HCG7A1C333IA065PH
	47,000	36×83	0.80	19.6	12	13	18	HCG7A1C473IA083PH
	68,000	36×121	1.10	27.7	11	12	18	HCG7A1C683IA121PH
	100,000	51×83	1.10	29.4	8	8	21	HCG7A1C104YC083PH
	150,000	51×121	1.20	34.0	5	6	21	HCG7A1C154YC121PH
	220,000	64×100	1.40	39.7	4	6	22	HCG7A1C224YD100PH
330,000	77×121	1.80	49.2	4	6	24	HCG7A1C334YE121PH	
25	22,000	36×65	0.50	12.1	22	23	18	HCG7A1E223IA065PH
	33,000	36×83	0.90	14.2	15	16	18	HCG7A1E333IA083PH
	47,000	36×121	0.90	19.8	10	11	18	HCG7A1E473IA121PH
	68,000	51×100	0.90	25.1	7	8	21	HCG7A1E683YC100PH
	100,000	51×121	0.90	28.5	6	6	21	HCG7A1E104YC121PH
	150,000	64×100	1.20	34.7	5	6	22	HCG7A1E154YD100PH
	220,000	64×144	1.20	48.9	4	5	22	HCG7A1E224YD144PH
330,000	77×144	1.40	52.7	4	5	24	HCG7A1E334YE144PH	
35	10,000	36×53	0.40	9.6	29	31	18	HCG7A1V103IA053PH
	15,000	36×65	0.45	10.7	19	20	18	HCG7A1V153IA065PH
	22,000	36×83	0.45	13.4	14	15	18	HCG7A1V223IA083PH
	33,000	36×121	0.50	19.4	12	13	18	HCG7A1V333IA121PH
	47,000	51×83	0.50	22.5	8	9	21	HCG7A1V473YC083PH
	68,000	51×100	0.70	27.6	7	8	21	HCG7A1V683YC100PH
	100,000	64×100	1.00	29.5	6	7	22	HCG7A1V104YD100PH
150,000	64×144	1.00	41.4	5	7	22	HCG7A1V154YD144PH	
220,000	77×144	1.20	46.8	5	7	24	HCG7A1V224YE144PH	
50	6,800	36×53	0.35	8.8	44	39	18	HCG7A1H682IA053PH
	10,000	36×65	0.35	11.6	30	28	18	HCG7A1H103IA065PH
	15,000	36×83	0.35	12.7	20	20	18	HCG7A1H153IA083PH
	22,000	36×121	0.40	18.2	14	15	18	HCG7A1H223IA121PH
	33,000	51×83	0.40	20.3	13	14	21	HCG7A1H333YC083PH
	47,000	51×100	0.50	25.9	11	12	21	HCG7A1H473YC100PH
	68,000	64×100	0.70	32.2	8	9	22	HCG7A1H683YD100PH
100,000	64×144	0.70	36.8	6	7	22	HCG7A1H104YD144PH	
150,000	77×144	0.90	37.8	5	7	24	HCG7A1H154YE144PH	
63	6,800	36×53	0.20	10.2	38	35	18	HCG7A1J682IA053PH
	10,000	36×83	0.30	12.8	28	28	18	HCG7A1J103IA083PH
	15,000	36×100	0.35	15.1	21	22	18	HCG7A1J153IA100PH
	22,000	51×83	0.40	20.9	13	14	21	HCG7A1J223YC083PH
	33,000	51×100	0.40	23.6	10	11	21	HCG7A1J333YC100PH
	47,000	64×100	0.40	32.1	8	9	22	HCG7A1J473YD100PH
	68,000	64×144	0.50	37.2	7	8	22	HCG7A1J683YD144PH
100,000	77×144	0.70	41.1	7	8	24	HCG7A1J104YE144PH	
80	4,700	36×53	0.15	10.4	32	30	18	HCG7A1K472IA053PH
	6,800	36×83	0.22	12.1	22	23	18	HCG7A1K682IA083PH
	10,000	36×100	0.22	16.0	15	16	18	HCG7A1K103IA100PH
	15,000	51×83	0.30	20.7	10	11	21	HCG7A1K153YC083PH
	22,000	51×100	0.30	23.5	9	10	21	HCG7A1K223YC100PH
	33,000	64×100	0.35	28.5	7	7	22	HCG7A1K333YD100PH
	47,000	64×144	0.35	39.0	6	7	22	HCG7A1K473YD144PH
68,000	77×144	0.40	45.3	4	7	24	HCG7A1K683YE144PH	

ALUMINUM ELECTROLYTIC CAPACITORS

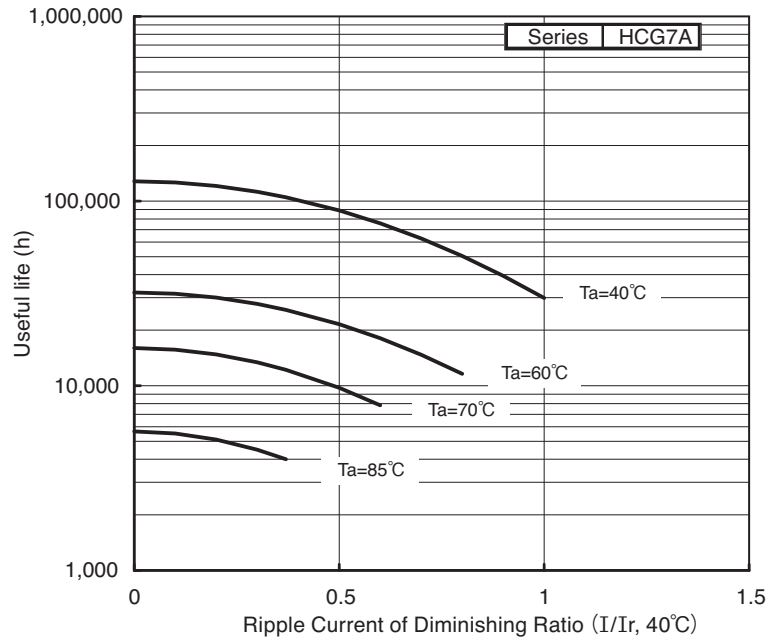
# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 40°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
100	3,300	36 $\times$ 53	0.15	8.7	34	32	18	HCG7A2A332IA053PH
	4,700	36 $\times$ 83	0.15	12.4	24	24	18	HCG7A2A472IA083PH
	6,800	36 $\times$ 100	0.20	13.2	19	20	18	HCG7A2A682IA100PH
	10,000	51 $\times$ 83	0.20	16.9	13	14	21	HCG7A2A103YC083PH
	15,000	51 $\times$ 121	0.20	24.1	11	12	21	HCG7A2A153YC121PH
	22,000	64 $\times$ 100	0.20	25.9	8	9	22	HCG7A2A223YD100PH
	33,000	64 $\times$ 144	0.25	33.0	6	7	22	HCG7A2A333YD144PH
	47,000	77 $\times$ 144	0.30	37.6	5	7	24	HCG7A2A473YE144PH

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 40°C, 120Hz





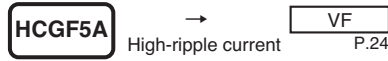
# HCGF5A Series

Useful of 4,000 hours at 85°C

- Conform RoHS

## Features

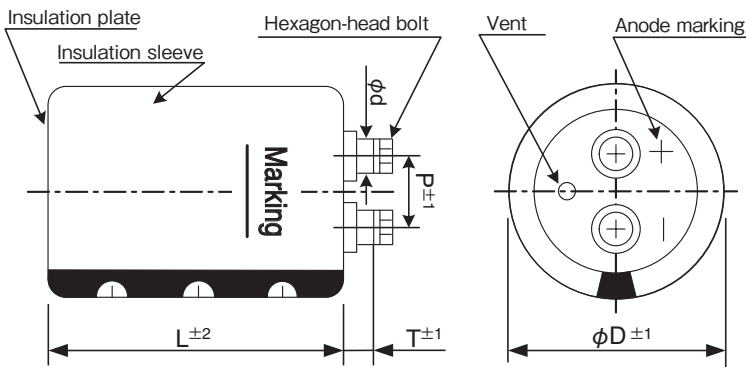
- Standard products.



## Product Specifications

Items	Specifications
Temperature range	-25°C ~ +85°C
Rated voltage	160 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (40°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
36	12.7	6.5	8.0	M5×10	Phenol resin
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	70	85	
Correction coefficient	1.0	0.75	0.62	0.37	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) HCG5A Series 400V 10,000µF±20%

**HCGF5A 2G 103 Y F 157 PH**

- H: Type of series
- C: Sealing code
- G: Case height code
- 2: Case dia code
- 103: Type of bracket code
- Y: Capacitance code
- F: Rated voltage code
- 157: Rated voltage code
- PH: Rated voltage code

Refer to page 19 for product code.

## Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y (Type I for φ36 only), but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 40°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
160	3,300	36×121	0.25	14.0	40	35	18	HCGF5A2C332IA121PH
	3,900	51×75	0.25	14.4	37	28	21	HCGF5A2C392YC075PH
	4,700	51×75	0.25	15.8	30	25	21	HCGF5A2C472YC075PH
	5,600	51×96	0.25	19.0	26	23	21	HCGF5A2C562YC096PH
	6,800	51×96	0.25	21.0	22	22	21	HCGF5A2C682YC096PH
	8,200	51×115	0.25	24.7	18	19	21	HCGF5A2C822YC115PH
	10,000	64×96	0.25	28.0	15	16	22	HCGF5A2C103YD096PH
	12,000	64×96	0.25	30.6	12	15	22	HCGF5A2C123YD096PH
	15,000	64×130	0.25	38.6	11	12	22	HCGF5A2C153YD130PH
	18,000	64×130	0.25	42.2	9	11	22	HCGF5A2C183YD130PH
	22,000	77×130	0.25	49.4	8	8	24	HCGF5A2C223YE130PH
	27,000	77×130	0.25	54.7	7	8	24	HCGF5A2C273YE130PH
	33,000	90×131	0.25	64.2	6	7	24	HCGF5A2C333YF131PH
39,000	90×157	0.25	75.3	5	7	24	HCGF5A2C393YF157PH	
200	2,200	36×100	0.25	10.6	68	60	18	HCGF5A2D222IA100PH
	2,700	36×121	0.25	12.7	48	39	18	HCGF5A2D272IA121PH
	3,300	51×75	0.25	13.3	45	35	21	HCGF5A2D332YC075PH
	3,900	51×75	0.25	14.4	37	30	21	HCGF5A2D392YC075PH
	4,700	51×96	0.25	17.4	30	27	21	HCGF5A2D472YC096PH
	5,600	51×115	0.25	20.4	26	25	21	HCGF5A2D562YC115PH
	6,800	51×130	0.25	23.7	21	20	21	HCGF5A2D682YC130PH
	8,200	64×96	0.25	25.4	17	18	22	HCGF5A2D822YD096PH
	10,000	64×96	0.25	28.0	14	14	22	HCGF5A2D103YD096PH
	12,000	77×96	0.25	32.6	12	14	24	HCGF5A2D123YE096PH
	15,000	77×96	0.25	39.0	10	13	24	HCGF5A2D153YE096PH
	18,000	77×130	0.25	44.6	8	12	24	HCGF5A2D183YE130PH
	22,000	77×155	0.25	53.0	7	7	24	HCGF5A2D223YE155PH
	27,000	90×131	0.25	58.2	6	7	24	HCGF5A2D273YF131PH
33,000	90×157	0.25	69.0	5	7	24	HCGF5A2D333YF157PH	
250	1,500	36×100	0.25	8.7	56	50	18	HCGF5A2E152IA100PH
	1,800	36×100	0.25	9.5	52	44	18	HCGF5A2E182IA100PH
	2,200	51×75	0.25	10.8	50	40	21	HCGF5A2E222YC075PH
	2,700	51×75	0.25	12.0	41	36	21	HCGF5A2E272YC075PH
	3,300	51×96	0.25	14.6	36	35	21	HCGF5A2E332YC096PH
	3,900	51×115	0.25	17.0	31	30	21	HCGF5A2E392YC115PH
	4,700	64×96	0.25	19.2	25	23	22	HCGF5A2E472YD096PH
	5,600	64×96	0.25	21.0	21	21	22	HCGF5A2E562YD096PH
	6,800	64×115	0.25	24.7	18	18	22	HCGF5A2E682YD115PH
	8,200	64×115	0.25	27.1	15	16	22	HCGF5A2E822YD115PH
	10,000	64×130	0.25	31.5	12	14	22	HCGF5A2E103YD130PH
	12,000	77×115	0.25	34.8	10	11	24	HCGF5A2E123YE115PH
	15,000	77×130	0.25	40.8	8	11	24	HCGF5A2E153YE130PH
	18,000	77×155	0.25	47.8	7	10	24	HCGF5A2E183YE155PH
22,000	90×157	0.25	56.5	6	8	24	HCGF5A2E223YF157PH	
350	390	36×53	0.20	4.5	287	296	18	HCGF5A2V391IA053PH
	470	36×83	0.20	5.8	238	245	18	HCGF5A2V471IA083PH
	560	36×83	0.20	6.4	216	222	18	HCGF5A2V561IA083PH
	680	36×83	0.20	7.0	192	197	18	HCGF5A2V681IA083PH
	820	36×100	0.20	8.3	170	174	18	HCGF5A2V821IA100PH
	1,000	36×100	0.20	9.2	131	135	18	HCGF5A2V102IA100PH
	1,200	51×75	0.20	10.3	117	120	21	HCGF5A2V122YC075PH
	1,500	51×75	0.20	11.5	93	100	21	HCGF5A2V152YC075PH
	1,800	51×96	0.20	13.9	78	80	21	HCGF5A2V182YC096PH
	2,200	51×96	0.20	15.4	64	70	21	HCGF5A2V222YC096PH
	2,700	51×130	0.20	19.3	53	58	21	HCGF5A2V272YC130PH
	3,300	51×130	0.20	21.4	48	51	21	HCGF5A2V332YC130PH
	3,900	64×115	0.20	24.2	43	47	22	HCGF5A2V392YD115PH
	4,700	64×130	0.20	27.9	36	40	22	HCGF5A2V472YD130PH
	5,600	77×115	0.20	30.7	34	35	24	HCGF5A2V562YE115PH
	6,800	77×130	0.20	35.4	28	29	24	HCGF5A2V682YE130PH
	8,200	77×155	0.20	41.7	23	25	24	HCGF5A2V822YE155PH
	10,000	90×157	0.20	49.0	19	23	24	HCGF5A2V103YF157PH
	12,000	90×157	0.20	54.1	16	21	24	HCGF5A2V123YF157PH
15,000	90×196	0.20	66.2	13	20	24	HCGF5A2V153YF196PH	
18,000	90×236	0.20	77.9	10	20	24	HCGF5A2V183YF236PH	

ALUMINUM ELECTROLYTIC CAPACITORS

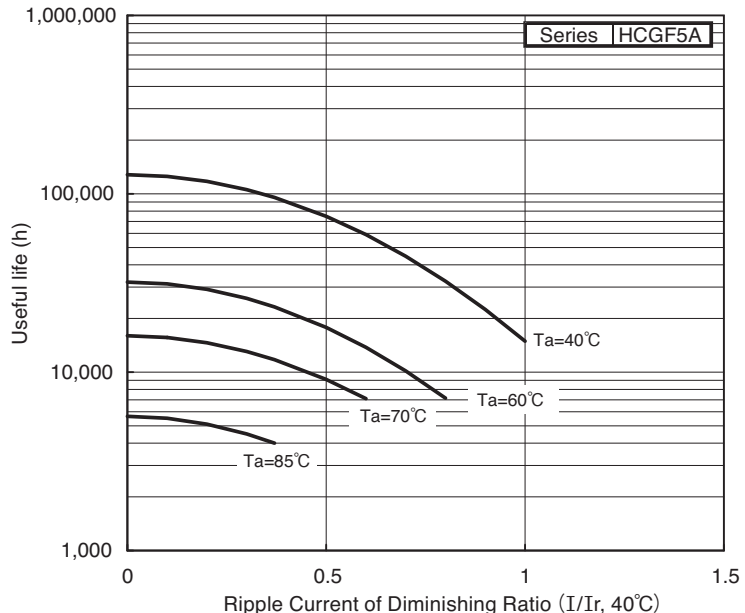
# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 40°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
400	330	36×53	0.20	4.1	428	440	18	HCGF5A2G331IA053PH
	390	36×83	0.20	5.3	362	372	18	HCGF5A2G391IA083PH
	470	36×83	0.20	5.8	301	310	18	HCGF5A2G471IA083PH
	560	36×83	0.20	6.4	253	260	18	HCGF5A2G561IA083PH
	680	36×100	0.20	7.6	209	214	18	HCGF5A2G681IA100PH
	820	36×100	0.20	8.3	173	177	18	HCGF5A2G821IA100PH
	1,000	51×75	0.20	9.4	140	150	21	HCGF5A2G102YC075PH
	1,200	51×75	0.20	10.3	117	125	21	HCGF5A2G122YC075PH
	1,500	51×96	0.20	12.7	100	108	21	HCGF5A2G152YC096PH
	1,800	51×96	0.20	13.9	88	90	21	HCGF5A2G182YC096PH
	2,200	51×130	0.20	17.4	68	75	21	HCGF5A2G222YC130PH
	2,700	64×96	0.20	18.8	59	66	22	HCGF5A2G272YD096PH
	3,300	64×115	0.20	22.2	48	53	22	HCGF5A2G332YD115PH
	3,900	64×130	0.20	25.4	43	48	22	HCGF5A2G392YD130PH
	4,700	77×115	0.20	28.2	36	41	24	HCGF5A2G472YE115PH
	5,600	77×130	0.20	32.2	32	37	24	HCGF5A2G562YE130PH
	6,800	77×155	0.20	38.0	26	30	24	HCGF5A2G682YF157PH
8,200	90×157	0.20	44.4	22	26	24	HCGF5A2G822YF157PH	
10,000	90×157	0.20	49.4	19	23	24	HCGF5A2G103YF157PH	
12,000	90×196	0.20	59.1	16	21	24	HCGF5A2G123YF196PH	
15,000	90×236	0.20	71.1	15	21	24	HCGF5A2G153YF236PH	
450	270	36×53	0.20	3.7	482	496	18	HCGF5A2W271IA053PH
	330	36×83	0.20	4.9	395	406	18	HCGF5A2W331IA083PH
	390	36×83	0.20	5.3	334	343	18	HCGF5A2W391IA083PH
	470	36×83	0.20	5.8	277	284	18	HCGF5A2W471IA083PH
	560	36×100	0.20	6.9	232	238	18	HCGF5A2W561IA100PH
	680	36×100	0.20	7.6	191	196	18	HCGF5A2W681IA100PH
	820	51×75	0.20	8.6	182	187	21	HCGF5A2W821YC075PH
	1,000	51×75	0.20	9.4	149	154	21	HCGF5A2W102YC075PH
	1,200	51×96	0.20	11.4	124	129	21	HCGF5A2W122YC096PH
	1,500	51×115	0.20	13.7	107	108	21	HCGF5A2W152YC115PH
	1,800	51×130	0.20	15.8	93	100	21	HCGF5A2W182YC130PH
	2,200	64×96	0.20	17.0	77	84	22	HCGF5A2W222YD096PH
	2,700	64×115	0.20	20.2	62	69	22	HCGF5A2W272YD115PH
	3,300	64×130	0.20	23.4	54	61	22	HCGF5A2W332YD130PH
	3,900	77×115	0.20	25.6	46	51	24	HCGF5A2W392YE115PH
	4,700	77×130	0.20	29.4	38	43	24	HCGF5A2W472YE130PH
	5,600	77×155	0.20	34.6	32	37	24	HCGF5A2W562YE155PH
6,800	90×157	0.20	40.5	28	33	24	HCGF5A2W682YF157PH	
8,200	90×157	0.20	44.6	25	30	24	HCGF5A2W822YF157PH	
10,000	90×196	0.20	53.9	20	25	24	HCGF5A2W103YF196PH	
12,000	90×236	0.20	63.8	16	22	24	HCGF5A2W123YF236PH	

Life time graph

Useful life depending on ambient temperature Ta and ripple current operating conditions I versus rated ripple current at 40°C, 120Hz





# MEMO

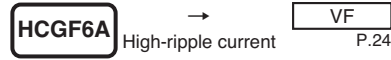
---

# HCGF6A Series Useful of 4,000 hours at 85°C

- Conform RoHS

## Features

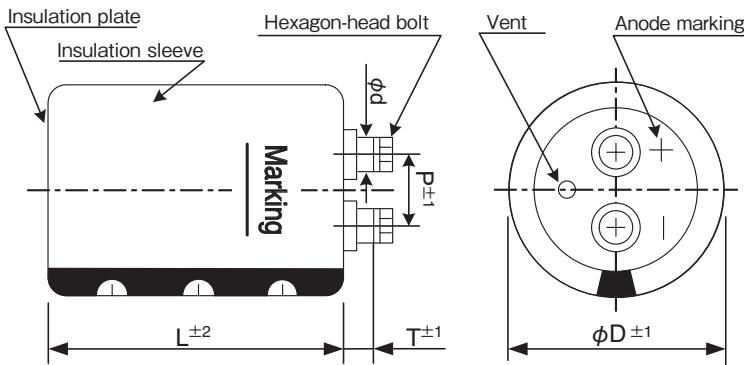
- The size is reduced by about 14% of the HCGF5A series and the rating 500 V is added in the series.



## Product Specifications

Items	Specifications
Temperature range	-25°C ~ +85°C
Rated voltage	400 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (40°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φ D	P	T	φ d	Hexagon-head bolt	Cap material
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin
101	31.5	3.0	14.0	M6×12	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	70	85	
Correction coefficient	1.0	0.75	0.62	0.37	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5 ; 100Arms for M6. Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) HCGF6A series 400V 12,000µF±20%

**HCGF6A 2G 123 Y F 157 PH**

- Type of series
- Rated voltage code
- Capacitance code
- Type of bracket code
- Case dia code
- Case height code
- Sealing code

Refer to page 19 for product code.

## Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

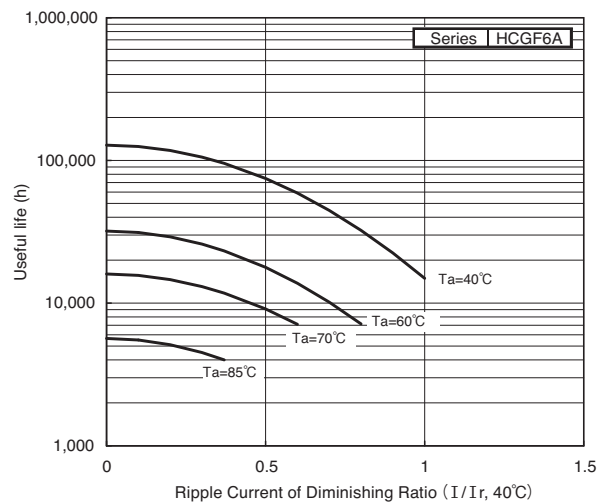
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 40°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
400	2,200	51×115	0.20	16.5	61	63	21	HCGF6A2G222YC115PH
	2,700	51×130	0.20	19.2	50	52	21	HCGF6A2G272YC130PH
		64×96	0.20	18.7	50	52	22	HCGF6A2G272YD096PH
	3,300	64×96	0.20	20.7	41	42	22	HCGF6A2G332YD096PH
	3,900	64×115	0.20	24.1	35	37	22	HCGF6A2G392YD115PH
	4,700	64×130	0.20	27.8	29	32	22	HCGF6A2G472YD130PH
	5,600	77×115	0.20	30.6	25	28	24	HCGF6A2G562YE115PH
	6,800	77×130	0.20	35.4	22	25	24	HCGF6A2G682YE130PH
	8,200	77×155	0.20	41.6	18	21	24	HCGF6A2G822YE155PH
	10,000	77×195	0.20	50.5	17	20	24	HCGF6A2G103YE195PH
		90×131	0.20	45.8	17	19	24	HCGF6A2G103YF131PH
	12,000	90×157	0.20	53.8	12	15	24	HCGF6A2G123YF157PH
	15,000	90×196	0.20	65.7	10	13	24	HCGF6A2G153YF196PH
18,000	90×236	0.20	77.7	9	12	24	HCGF6A2G183YF236PH	
	101×175	0.20	69.8	9	12	33	HCGF6A2G183YG175PH	
22,000	101×237	0.20	86.8	8	11	33	HCGF6A2G223YG237PH	
450	1,800	51×115	0.20	14.9	77	80	21	HCGF6A2W182YC115PH
	2,200	51×130	0.20	17.3	63	65	21	HCGF6A2W222YC130PH
		64×96	0.20	16.9	63	65	22	HCGF6A2W222YD096PH
	2,700	64×96	0.20	18.7	52	54	22	HCGF6A2W272YD096PH
	3,300	64×115	0.20	22.2	42	44	22	HCGF6A2W332YD115PH
	3,900	64×130	0.20	25.3	38	40	22	HCGF6A2W392YD130PH
	4,700	77×115	0.20	28.1	34	36	24	HCGF6A2W472YE115PH
	5,600	77×130	0.20	32.1	31	33	24	HCGF6A2W562YE130PH
	6,800	77×155	0.20	37.9	25	27	24	HCGF6A2W682YE155PH
	8,200	77×195	0.20	45.8	21	23	24	HCGF6A2W822YE195PH
		90×131	0.20	41.5	21	23	24	HCGF6A2W822YF131PH
	10,000	90×171	0.20	50.6	17	19	24	HCGF6A2W103YF171PH
	12,000	90×196	0.20	58.7	16	18	24	HCGF6A2W123YF196PH
		101×175	0.20	57.0	16	18	33	HCGF6A2W123YG175PH
	15,000	90×236	0.20	70.9	15	17	24	HCGF6A2W153YF236PH
101×195		0.20	66.5	15	17	33	HCGF6A2W153YG195PH	
18,000	101×237	0.20	78.5	14	16	33	HCGF6A2W183YG237PH	
500	1,200	51×115	0.20	12.2	112	120	21	HCGF6A2H122YC115PH
		64×96	0.20	12.5	112	120	22	HCGF6A2H122YD096PH
	1,500	51×130	0.20	14.3	90	96	21	HCGF6A2H152YC130PH
		64×96	0.20	13.9	90	96	22	HCGF6A2H152YD096PH
	1,800	64×115	0.20	16.4	75	80	22	HCGF6A2H182YD115PH
	2,200	64×130	0.20	19.0	61	65	22	HCGF6A2H222YD130PH
	2,700	77×115	0.20	21.3	50	53	24	HCGF6A2H272YE115PH
	3,300	77×130	0.20	24.6	45	48	24	HCGF6A2H332YE130PH
	3,900	77×155	0.20	28.7	38	41	24	HCGF6A2H392YE155PH
	4,700	77×171	0.20	32.9	34	37	24	HCGF6A2H472YE171PH
		90×131	0.20	31.4	34	37	24	HCGF6A2H472YF131PH
	5,600	77×195	0.20	37.8	28	31	24	HCGF6A2H562YE195PH
		90×157	0.20	36.7	28	31	24	HCGF6A2H562YF157PH
	6,800	90×171	0.20	41.8	23	25	24	HCGF6A2H682YF171PH
		90×196	0.20	48.5	21	23	24	HCGF6A2H822YF196PH
	8,200	101×175	0.20	47.1	21	23	33	HCGF6A2H822YG175PH
		90×236	0.20	57.9	17	19	24	HCGF6A2H103YF236PH
	10,000	101×195	0.20	54.3	17	19	33	HCGF6A2H103YG195PH
101×237		0.20	64.1	16	18	33	HCGF6A2H123YG237PH	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 40°C, 120Hz

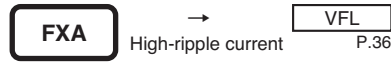


# FXA Series Useful of 8,000 hours at 85°C

- Conform RoHS

## Features

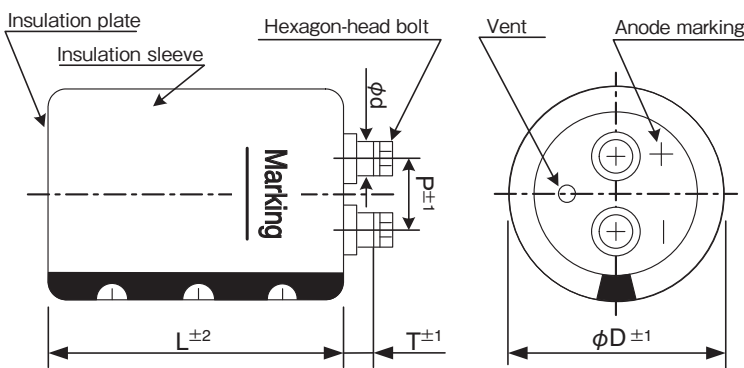
- Long-life and high-ripple series for inverter realized through adoption of high-reliability organic acid type electrolyte liquid and improvement of etched foil technology for high voltage and manufacturing process.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	350 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be met when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	85		
Correction coefficient	1.89	1.67	1.00		
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) FXA Series 400V 4,700 µF ±20%

**FXA 2G 472 Y D 155 PH**

- FXA: Type of series
- 2G: Sealing code
- 472: Case height code
- Y: Case dia code
- D: Type of bracket code
- 155: Capacitance code
- PH: Rated voltage code

Refer to page 19 for product code.

## Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

**FXA Series**

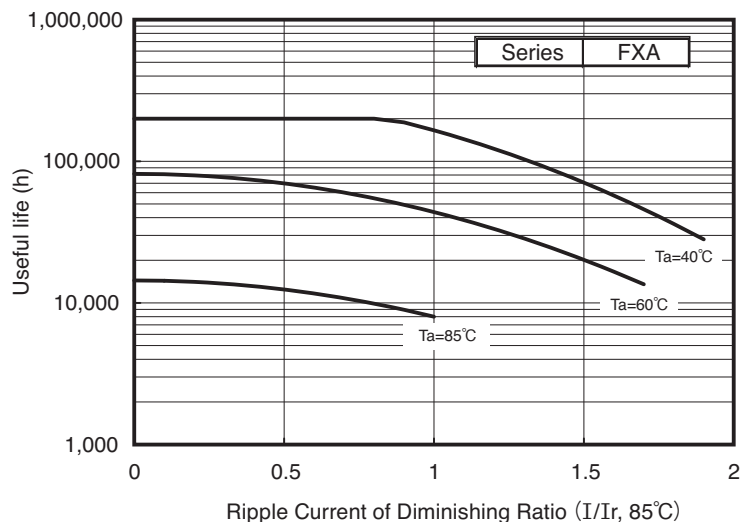
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	1,200	51×75	0.15	5.5	85	88	21	FXA2V122YC075PH
	1,500	51×75	0.15	6.1	68	70	21	FXA2V152YC075PH
	1,800	51×96	0.15	7.4	57	59	21	FXA2V182YC096PH
	2,200	51×96	0.15	8.2	46	48	21	FXA2V222YC096PH
	2,700	51×130	0.15	10.2	38	40	21	FXA2V272YC130PH
	3,300	51×130	0.15	11.3	30	32	21	FXA2V332YC130PH
	3,900	64×115	0.15	12.8	26	28	22	FXA2V392YD115PH
	4,700	64×130	0.15	14.8	21	22	22	FXA2V472YD130PH
	5,600	64×155	0.15	17.3	18	19	22	FXA2V562YD155PH
			77×115	0.15	16.3	18	19	24
	6,800	64×195	0.15	21.1	15	15	22	FXA2V682YD195PH
			77×130	0.15	18.8	15	15	24
	8,200	77×155	0.15	22.1	12	15	24	FXA2V822YE155PH
	10,000	90×157	0.15	25.9	10	15	24	FXA2V103YF157PH
	12,000	90×157	0.15	28.4	8	13	24	FXA2V123YF157PH
15,000	90×196	0.15	34.6	7	10	24	FXA2V153YF196PH	
18,000	90×236	0.15	41.1	7	10	24	FXA2V183YF236PH	
400	1,000	51×75	0.15	5.0	102	105	21	FXA2G102YC075PH
	1,200	51×75	0.15	5.5	85	88	21	FXA2G122YC075PH
	1,500	51×96	0.15	6.7	68	70	21	FXA2G152YC096PH
	1,800	51×96	0.15	7.4	57	58	21	FXA2G182YC096PH
	2,200	51×130	0.15	9.2	46	48	21	FXA2G222YC130PH
	2,700	64×96	0.15	9.9	38	40	22	FXA2G272YD096PH
	3,300	64×115	0.15	11.8	30	32	22	FXA2G332YD115PH
	3,900	64×130	0.15	13.5	26	28	22	FXA2G392YD130PH
	4,700	64×155	0.15	15.9	21	22	22	FXA2G472YD155PH
			77×115	0.15	14.9	21	22	24
	5,600	64×195	0.15	19.1	18	19	22	FXA2G562YD195PH
			77×130	0.15	17.0	18	19	24
	6,800	77×155	0.15	20.2	15	15	24	FXA2G682YE155PH
	8,200	90×157	0.15	23.5	12	15	24	FXA2G822YF157PH
	10,000	90×157	0.15	25.9	10	15	24	FXA2G103YF157PH
12,000	90×196	0.15	31.0	8	13	24	FXA2G123YF196PH	
15,000	90×236	0.15	37.5	8	10	24	FXA2G153YF236PH	
450	1,000	51×75	0.15	5.0	102	105	21	FXA2W102YC075PH
	1,200	51×96	0.15	6.0	85	88	21	FXA2W122YC096PH
	1,500	51×115	0.15	7.2	68	70	21	FXA2W152YC115PH
	1,800	51×130	0.15	8.3	56	58	21	FXA2W182YC130PH
	2,200	64×96	0.15	9.0	46	48	22	FXA2W222YD096PH
	2,700	64×115	0.15	10.7	38	40	22	FXA2W272YD115PH
	3,300	64×130	0.15	12.4	30	35	22	FXA2W332YD130PH
	3,900	64×155	0.15	14.5	27	32	22	FXA2W392YD155PH
			77×115	0.15	13.6	27	32	24
	4,700	64×195	0.15	17.5	21	21	22	FXA2W472YD195PH
			77×130	0.15	15.6	21	21	24
	5,600	77×155	0.15	18.3	20	20	24	FXA2W562YE155PH
	6,800	90×157	0.15	21.4	18	18	24	FXA2W682YF157PH
	8,200	90×157	0.15	23.5	15	15	24	FXA2W822YF157PH
	10,000	90×196	0.15	28.3	12	15	24	FXA2W103YF196PH
12,000	90×236	0.15	33.6	9	12	24	FXA2W123YF236PH	

ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz

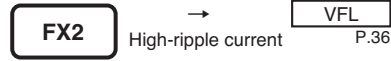


# FX2 Series Useful of 8,000 hours at 85°C

- Conform RoHS

## Features

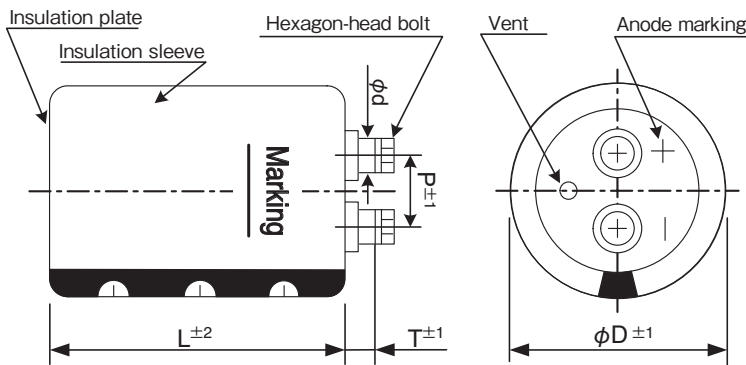
- Developed specially for the demand of higher voltage with compact size.
- The size is reduced by around 14% of conventional FXA series through development of electrolyte liquid.
- 600V added in the series.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C (400 ~ 550V.DC) -25°C ~ +85°C (600V.DC)
Rated voltage	400 ~ 600V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (μA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (μF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin
101	41.5	11.0	14.0	M8×16	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	85		
Correction coefficient	1.89	1.67	1.00		
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5 ; 120Arms for M8.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) FX2 Series 400V 10,000μF±20%

**FX2 2G 103 Y E 195**

- Type of series
- Case height code
- Case dia code
- Type of bracket code
- Capacitance code
- Rated voltage code

Refer to page 19 for product code.

## Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I ).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

Standard Products Table

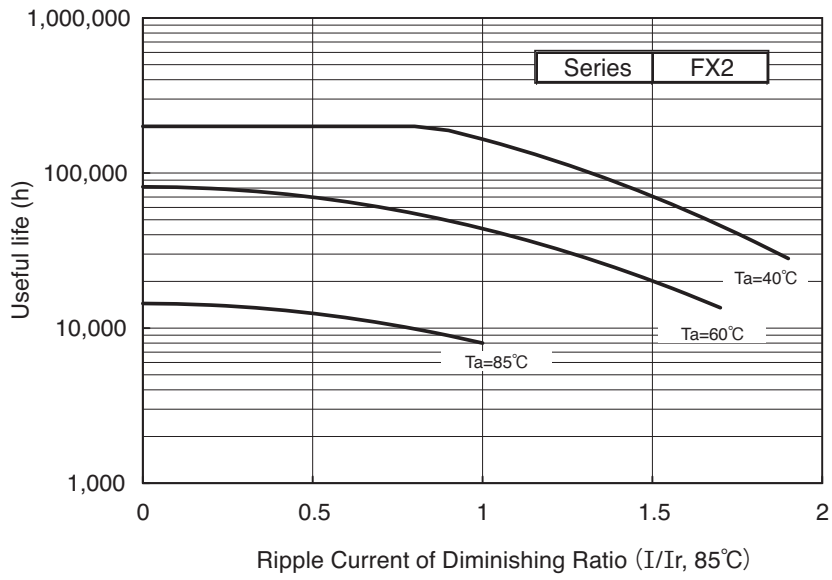
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
400	2,200	51×115	0.15	8.8	46	48	21	FX22G222YC115
	2,700	51×130	0.15	10.2	38	40	21	FX22G272YC130
	3,300	64×96	0.15	11.0	30	32	22	FX22G332YD096
	3,900	64×115	0.15	12.8	26	28	22	FX22G392YD115
	4,700	64×130	0.15	14.8	21	22	22	FX22G472YD130
	5,600	77×115	0.15	16.2	18	19	24	FX22G562YE115
	6,800	77×130	0.15	18.7	15	15	24	FX22G682YE130
	8,200	77×155	0.15	22.0	12	15	24	FX22G822YE155
	10,000	77×195	0.15	26.7	10	15	24	FX22G103YE195
		90×131	0.15	24.2	10	15	24	FX22G103YF131
	12,000	90×157	0.15	28.5	8	13	24	FX22G123YF157
	15,000	90×196	0.15	34.8	8	10	24	FX22G153YF196
18,000	90×236	0.15	41.2	6	9	24	FX22G183YF236	
22,000	101×237	0.15	47.0	6	8	33	FX22G223YG237	
450	1,800	51×115	0.15	7.6	56	58	21	FX22W182YC115
	2,200	51×130	0.15	8.8	46	48	21	FX22W222YC130
	2,700	64×96	0.15	9.5	38	40	22	FX22W272YD096
	3,300	64×115	0.15	11.2	30	35	22	FX22W332YD115
	3,900	64×130	0.15	12.8	27	32	22	FX22W392YD130
	4,700	77×115	0.15	14.1	21	21	24	FX22W472YE115
	5,600	77×130	0.15	16.2	20	20	24	FX22W562YE130
	6,800	77×155	0.15	19.1	15	18	24	FX22W682YE155
	8,200	77×195	0.15	23.0	14	16	24	FX22W822YE195
		90×131	0.15	21.0	14	17	24	FX22W822YF131
	10,000	90×171	0.15	25.7	10	15	24	FX22W103YF171
	12,000	90×196	0.15	29.7	9	12	24	FX22W123YF196
		101×175	0.15	29.3	9	12	33	FX22W123YG175
	15,000	90×236	0.15	35.9	7	10	24	FX22W153YF236
101×195		0.15	34.2	7	10	33	FX22W153YG195	
18,000	101×237	0.15	40.5	6	10	33	FX22W183YG237	
500	1,200	51×115	0.20	6.2	93	100	21	FX22H122YC115
		64×96	0.20	6.3	93	100	22	FX22H122YD096
	1,500	51×130	0.20	7.3	74	80	21	FX22H152YC130
		64×96	0.20	7.1	74	80	22	FX22H152YD096
	1,800	64×115	0.20	8.3	53	50	22	FX22H182YD115
	2,200	64×130	0.20	9.6	40	35	22	FX22H222YD130
	2,700	77×115	0.20	10.7	37	33	24	FX22H272YE115
	3,300	77×130	0.20	12.4	36	32	24	FX22H332YE130
	3,900	77×155	0.20	14.4	27	29	24	FX22H392YE155
	4,700	77×171	0.20	16.5	25	25	24	FX22H472YE171
		90×131	0.20	15.8	25	25	24	FX22H472YF131
	5,600	77×195	0.20	19.0	23	21	24	FX22H562YE195
		90×157	0.20	18.6	23	21	24	FX22H562YF157
	6,800	90×171	0.20	21.2	20	18	24	FX22H682YF171
	8,200	90×196	0.20	24.5	17	16	24	FX22H822YF196
		101×175	0.20	24.2	17	16	33	FX22H822YG175
	10,000	90×236	0.20	29.3	14	12	24	FX22H103YF236
		101×195	0.20	27.9	14	14	33	FX22H103YG195
12,000	101×237	0.20	33.1	12	12	33	FX22H123YG237	
550	1,000	51×130	0.20	5.9	112	120	21	FX22L102YC130
	1,200	64×115	0.20	6.8	93	100	22	FX22L122YD115
	1,500	64×130	0.20	8.0	74	80	22	FX22L152YD130
	1,800	77×115	0.20	8.7	61	50	24	FX22L182YE115
	2,200	77×130	0.20	10.1	53	50	24	FX22L222YE130
	2,700	77×155	0.20	12.0	40	35	24	FX22L272YE155
	3,300	77×155	0.20	13.3	38	32	24	FX22L332YE155
	3,900	90×157	0.20	15.5	30	27	24	FX22L392YF157
	4,700	90×171	0.20	17.6	25	20	24	FX22L472YF171
	5,600	90×196	0.20	20.3	20	17	24	FX22L562YF196
	6,800	90×236	0.20	24.1	17	17	24	FX22L682YF236
8,200	101×237	0.20	27.3	15	15	33	FX22L822YG237	
600	1,000	64×96	0.20	4.2	129	133	22	FX2600V102YD096
	1,200	64×115	0.20	4.9	122	125	22	FX2600V122YD115
	1,500	77×96	0.20	5.5	111	114	24	FX2600V152YE096
	1,800	77×115	0.20	6.4	99	102	24	FX2600V182YE115
	2,200	77×130	0.20	7.4	85	87	24	FX2600V222YE130
	2,700	77×155	0.20	8.8	66	68	24	FX2600V272YE155
	3,300	90×131	0.20	9.8	44	45	24	FX2600V332YF131
3,900	90×157	0.20	11.4	22	22	24	FX2600V392YF157	

ALUMINUM ELECTROLYTIC CAPACITORS

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at  $85^\circ\text{C}$ , 120Hz





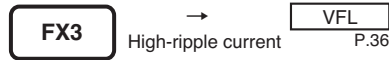


# FX3 Series Useful of 8,000 hours at 85°C

- Conform RoHS

## Features

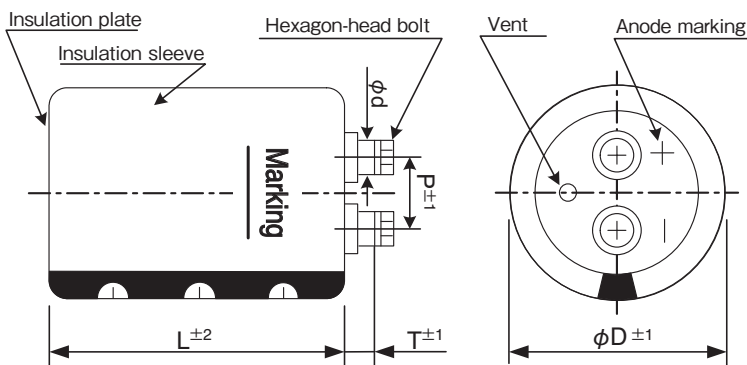
- FX3 series is the product developed for the purpose of the miniaturization as a capacitor for primary side filters of an inverter, DC servo, and a chopper control circuit.
- FX3 series has smaller case size (ave. 16%) compared with FX2 series.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	400 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	85		
Correction coefficient	1.89	1.67	1.00		
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) FX3 Series 400V 8,200µF±20%

**FX3 2G 822 Y E 130**

- FX3: Type of series
- 2G: Case height code
- 822: Case dia code
- Y: Type of bracket code
- E: Capacitance code
- 130: Rated voltage code

Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I ).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

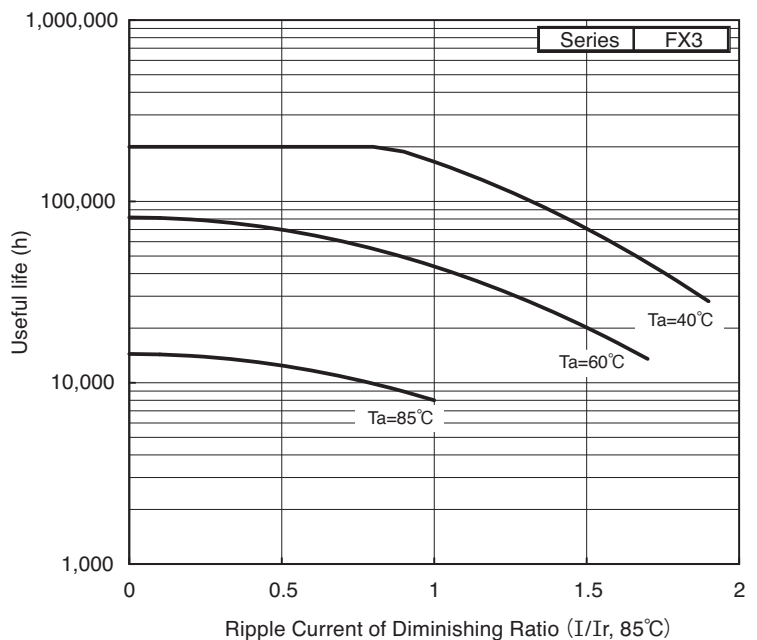
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
400	2,200	51×96	0.20	8.4	46	48	21	FX32G222YC096
	2,700	51×115	0.20	10.0	38	40	21	FX32G272YC115
	3,300	51×130	0.20	11.6	30	32	21	FX32G332YC130
	3,900	64×96	0.20	12.3	26	28	22	FX32G392YD096
	4,700	64×115	0.20	14.5	21	22	22	FX32G472YD115
	5,600	64×130	0.20	16.6	18	19	22	FX32G562YD130
	6,800	64×155	0.20	19.7	15	15	22	FX32G682YD155
		77×115	0.20	18.5	15	15	24	FX32G682YE115
	8,200	77×130	0.20	21.2	12	15	24	FX32G822YE130
	10,000	77×155	0.20	25.1	10	15	24	FX32G103YE155
	12,000	77×195	0.20	30.3	8	13	24	FX32G123YE195
	15,000	90×171	0.20	34.0	8	10	24	FX32G153YF171
18,000	90×196	0.20	39.4	6	9	24	FX32G183YF196	
22,000	90×236	0.20	47.0	6	8	24	FX32G223YF236	
450	1,800	51×96	0.20	7.2	71	73	21	FX32W182YC096
	2,200	51×115	0.20	8.6	58	60	21	FX32W222YC115
	2,700	51×130	0.20	10.1	47	49	21	FX32W272YC130
	3,300	64×96	0.20	10.8	39	41	22	FX32W332YD096
	3,900	64×115	0.20	12.6	33	35	22	FX32W392YD115
	4,700	64×130	0.20	14.6	27	29	22	FX32W472YD130
	5,600	64×155	0.20	17.1	23	25	22	FX32W562YD155
		77×115	0.20	16.0	23	25	24	FX32W562YE115
	6,800	77×130	0.20	18.5	19	21	24	FX32W682YE130
	8,200	77×155	0.20	21.8	16	18	24	FX32W822YE155
		77×171	0.20	22.7	16	18	24	FX32W822YF171
	10,000	90×157	0.20	25.7	13	15	24	FX32W103YF157
	12,000	90×171	0.20	29.1	11	13	24	FX32W123YF171
	15,000	90×196	0.20	34.4	9	11	24	FX32W153YF196
18,000	90×236	0.20	40.7	8	10	24	FX32W183YF236	
500	1,200	51×96	0.20	6.3	92	100	21	FX32H122YC096
	1,500	51×115	0.20	7.6	74	80	21	FX32H152YC115
	1,800	51×130	0.20	8.7	53	50	21	FX32H182YC130
	2,200	64×96	0.20	9.4	40	35	22	FX32H222YD096
	2,700	64×130	0.20	11.7	37	33	22	FX32H272YD130
	3,300	64×155	0.20	13.9	36	32	22	FX32H332YD155
		77×115	0.20	13.1	36	32	24	FX32H332YE115
	3,900	77×130	0.20	14.9	27	29	24	FX32H392YE130
	4,700	77×155	0.20	17.5	25	25	24	FX32H472YE155
	5,600	77×171	0.20	19.9	23	21	24	FX32H562YE171
		90×131	0.20	19.1	23	21	24	FX32H562YF131
	6,800	77×195	0.20	23.2	20	18	24	FX32H682YE195
		90×157	0.20	22.5	20	18	24	FX32H682YF157
	8,200	90×171	0.20	25.6	17	16	24	FX32H822YF171
	10,000	90×196	0.20	29.9	15	14	24	FX32H103YF196
12,000	90×236	0.20	35.3	13	12	24	FX32H123YF236	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz

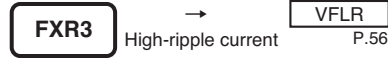


# FXR3 Series Useful of 8,000 hours at 85°C

- Conform RoHS

## Features

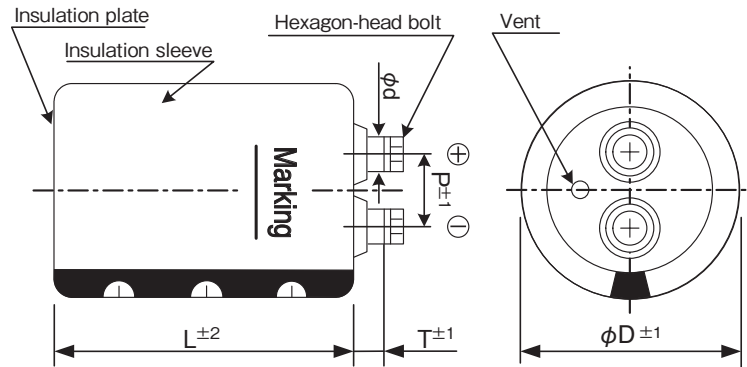
- FXR3 series has smaller case size (ave.10%) and higher ripple current (ave.20%) compared with FX2 series. These features are accomplished by new heat radiation structure and low ESR material.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	400 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µA), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	85		
Correction coefficient	1.89	1.67	1.00		
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4
Forced wind (m/s)	<0.5	0.5≤			
Correction coefficient	1.0	1.1			

Terminal permissible currents: 60Arms for M5 ; 100Arms for M6.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) FXR3 Series 400V 12,000 µF ±20%

**FXR3 2G 123 Y F 150 PH**

- Type of series
- Sealing code
- Case height code
- Case dia code
- Type of bracket code
- Capacitance code
- Rated voltage code

Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I ).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

**FXR3 Series**

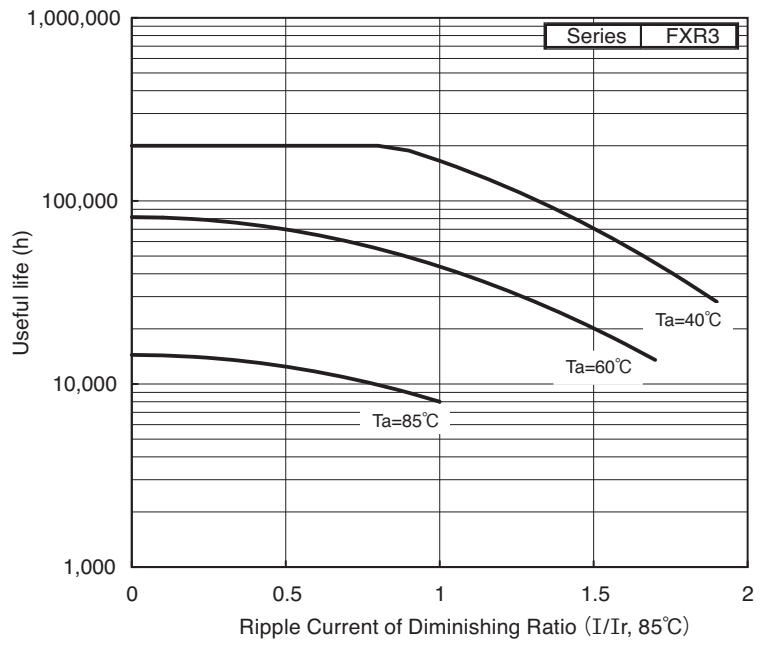
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
400	3,900	64×94	0.20	15.6	26	28	22	FXR32G392YD094PH
	4,700	64×107	0.20	17.2	21	22	22	FXR32G472YD107PH
	5,600	64×147	0.20	20.6	18	19	22	FXR32G562YD147PH
		77×95	0.20	19.9	18	19	23	FXR32G562YE095PH
	6,800	64×164	0.20	23.8	15	16	22	FXR32G682YD164PH
		77×108	0.20	22.0	15	16	23	FXR32G682YE108PH
	8,200	64×187	0.20	26.7	12	12	22	FXR32G822YD187PH
		77×148	0.20	26.3	12	12	23	FXR32G822YE148PH
		90×97	0.20	25.9	12	12	23	FXR32G822YF097PH
	10,000	77×165	0.20	30.3	10	10	23	FXR32G103YE165PH
		90×126	0.20	30.1	10	10	23	FXR32G103YF126PH
	12,000	77×188	0.20	34.1	8	10	23	FXR32G123YE188PH
		90×150	0.20	34.0	8	10	23	FXR32G123YF150PH
	15,000	77×228	0.20	41.4	8	10	23	FXR32G153YE228PH
90×167		0.20	39.6	8	10	23	FXR32G153YF167PH	
18,000	90×190	0.20	44.4	6	9	23	FXR32G183YF190PH	
22,000	90×230	0.20	53.7	6	8	23	FXR32G223YF230PH	
450	2,700	64×94	0.20	12.7	38	40	22	FXR32W272YD094PH
	3,300	64×107	0.20	14.2	31	33	22	FXR32W332YD107PH
	3,900	64×123	0.20	16.2	26	28	22	FXR32W392YD123PH
		77×95	0.20	16.3	26	28	23	FXR32W392YE095PH
	4,700	64×147	0.20	18.5	21	22	22	FXR32W472YD147PH
		77×108	0.20	17.9	21	22	23	FXR32W472YE108PH
	5,600	64×164	0.20	21.1	18	19	22	FXR32W562YD164PH
		77×124	0.20	20.6	18	19	23	FXR32W562YE124PH
		90×97	0.20	21.0	18	19	23	FXR32W562YF097PH
	6,800	64×187	0.20	23.9	15	16	22	FXR32W682YD187PH
		77×148	0.20	23.5	15	16	23	FXR32W682YE148PH
		90×110	0.20	23.2	15	16	23	FXR32W682YF110PH
	8,200	77×165	0.20	27.0	12	12	23	FXR32W822YE165PH
		90×126	0.20	26.8	12	12	23	FXR32W822YF126PH
	10,000	77×188	0.20	30.6	10	10	23	FXR32W103YE188PH
		90×150	0.20	30.5	10	10	23	FXR32W103YF150PH
	12,000	77×228	0.20	36.2	8	10	23	FXR32W123YE228PH
		90×167	0.20	34.7	8	10	23	FXR32W123YF167PH
15,000	90×190	0.20	40.1	8	10	23	FXR32W153YF190PH	
18,000	90×230	0.20	47.1	6	9	23	FXR32W183YF230PH	
500	1,800	64×94	0.20	10.3	53	50	22	FXR32H182YD094PH
	2,200	64×107	0.20	11.4	40	35	22	FXR32H222YD107PH
	2,700	64×123	0.20	13.3	37	33	22	FXR32H272YD123PH
		77×95	0.20	13.4	37	33	24	FXR32H272YE095PH
	3,300	64×147	0.20	15.3	36	32	22	FXR32H332YD147PH
		77×108	0.20	14.8	36	32	24	FXR32H332YE108PH
	3,900	64×164	0.20	17.4	27	29	22	FXR32H392YD164PH
		77×124	0.20	17.0	27	29	24	FXR32H392YE124PH
		90×97	0.20	17.3	27	29	24	FXR32H392YF097PH
	4,700	64×187	0.20	19.7	25	25	22	FXR32H472YD187PH
		77×148	0.20	19.3	25	25	24	FXR32H472YE148PH
		90×110	0.20	19.1	25	25	24	FXR32H472YF110PH
	5,600	77×165	0.20	22.0	23	21	24	FXR32H562YE165PH
		90×126	0.20	21.9	23	21	24	FXR32H562YF126PH
	6,800	77×188	0.20	24.9	20	18	24	FXR32H682YE188PH
		90×150	0.20	24.8	20	18	24	FXR32H682YF150PH
	8,200	77×228	0.20	29.7	17	16	24	FXR32H822YE228PH
		90×167	0.20	28.4	17	16	24	FXR32H822YF167PH
10,000	90×190	0.20	32.0	15	14	24	FXR32H103YF190PH	
12,000	90×230	0.20	38.1	13	12	24	FXR32H123YF230PH	

ALUMINUM ELECTROLYTIC CAPACITORS

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz



# MEMO

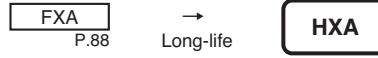
---

# HXA Series Useful of 20,000 hours at 85°C

- Conform RoHS

## Features

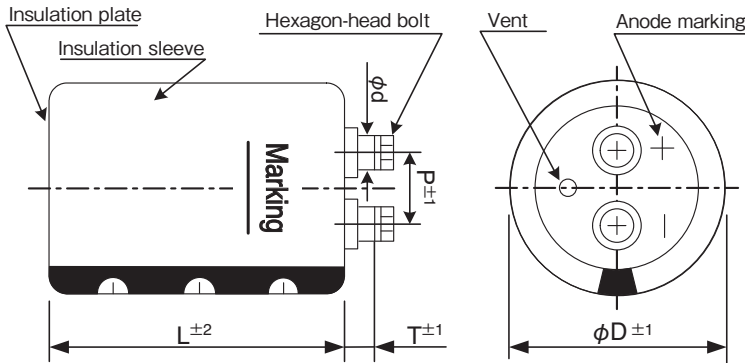
- High-reliability series with the warranty of 20,000 hours realized through improvement of the FXA series into a longer-life series



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	350 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (μA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (μF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 20,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin

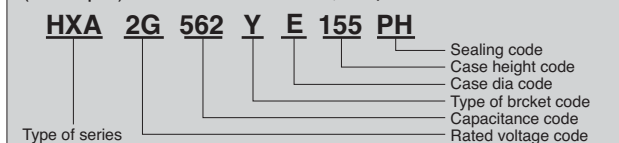
## Ripple current correction coefficient

Temperature (°C)	40	60	85		
Correction coefficient	2.44	2.16	1.00		
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) HXA Series 400V 5,600μF±20%



Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I ).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.



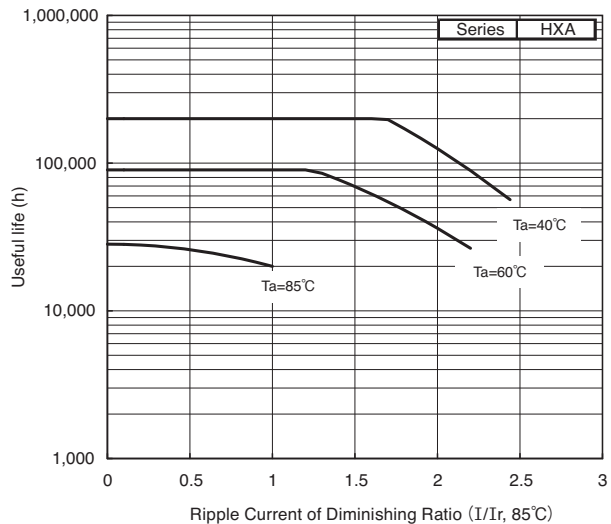
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name	
350	1,000	51×75	0.15	3.8	100	103	21	HXA2V102YC075PH	
	1,200	51×75	0.15	4.2	84	87	21	HXA2V122YC075PH	
	1,500	51×96	0.15	5.2	67	69	21	HXA2V152YC096PH	
	1,800	51×96	0.15	5.6	55	57	21	HXA2V182YC096PH	
	2,200	51×130	0.15	7.1	45	47	21	HXA2V222YC130PH	
	2,700	64×96	0.15	7.6	37	39	22	HXA2V272YD096PH	
	3,300	64×115	0.15	9.0	29	31	22	HXA2V332YD115PH	
	3,900	64×130	0.15	10.3	25	27	22	HXA2V392YD130PH	
	4,700	4,700	64×155	0.15	12.2	20	21	22	HXA2V472YD155PH
			77×115	0.15	11.5	20	21	24	HXA2V472YE115PH
	5,600	5,600	64×195	0.15	14.6	17	20	22	HXA2V562YD195PH
			77×130	0.15	13.1	17	20	24	HXA2V562YE130PH
	6,800	77×155	0.15	15.5	14	18	24	HXA2V682YE155PH	
	8,200	90×157	0.15	18.1	12	15	24	HXA2V822YF157PH	
	10,000	90×157	0.15	19.9	10	15	24	HXA2V103YF157PH	
12,000	90×196	0.15	23.8	8	13	24	HXA2V123YF196PH		
15,000	90×236	0.15	28.8	7	10	24	HXA2V153YF236PH		
400	1,000	51×75	0.15	3.8	102	105	21	HXA2G102YC075PH	
	1,200	51×96	0.15	4.6	85	88	21	HXA2G122YC096PH	
	1,500	51×115	0.15	5.5	68	70	21	HXA2G152YC115PH	
	1,800	51×130	0.15	6.4	57	58	21	HXA2G182YC130PH	
	2,200	64×96	0.15	6.9	46	48	22	HXA2G222YD096PH	
	2,700	64×115	0.15	8.2	38	40	22	HXA2G272YD115PH	
	3,300	64×130	0.15	9.5	30	32	22	HXA2G332YD130PH	
	3,900	3,900	64×155	0.15	11.1	27	28	22	HXA2G392YD155PH
			77×115	0.15	10.4	27	28	24	HXA2G392YE115PH
	4,700	4,700	64×195	0.15	13.4	21	22	22	HXA2G472YD195PH
			77×130	0.15	12.0	21	22	24	HXA2G472YE130PH
	5,600	5,600	64×195	0.15	14.6	20	20	22	HXA2G562YD195PH
			77×155	0.15	14.4	20	20	24	HXA2G562YE155PH
	6,800	90×157	0.15	16.5	18	18	24	HXA2G682YF157PH	
	8,200	90×157	0.15	18.1	15	17	24	HXA2G822YF157PH	
10,000	90×196	0.15	21.7	12	15	24	HXA2G103YF196PH		
12,000	90×236	0.15	25.8	10	12	24	HXA2G123YF236PH		
450	1,000	51×96	0.15	4.2	102	105	21	HXA2W102YC096PH	
	1,200	51×115	0.15	5.0	85	88	21	HXA2W122YC115PH	
	1,500	51×130	0.15	5.8	68	70	21	HXA2W152YC130PH	
	1,800	64×96	0.15	6.2	57	58	22	HXA2W182YD096PH	
	2,200	64×115	0.15	7.4	46	48	22	HXA2W222YD115PH	
	2,700	2,700	64×130	0.15	8.6	40	42	22	HXA2W272YD130PH
			77×115	0.15	8.7	40	42	24	HXA2W272YE115PH
	3,300	3,300	64×155	0.15	10.2	30	35	22	HXA2W332YD155PH
			77×130	0.15	10.0	30	35	24	HXA2W332YE130PH
	3,900	64×195	0.15	12.2	27	32	22	HXA2W392YD195PH	
	4,700	77×155	0.15	12.9	24	27	24	HXA2W472YE155PH	
	5,600	5,600	77×195	0.15	15.4	22	23	24	HXA2W562YE195PH
			90×157	0.15	14.9	22	23	24	HXA2W562YF157PH
	6,800	90×196	0.15	18.0	20	20	24	HXA2W682YF196PH	
	8,200	90×196	0.15	19.8	18	18	24	HXA2W822YF196PH	
10,000	90×236	0.15	23.5	15	15	24	HXA2W103YF236PH		

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz



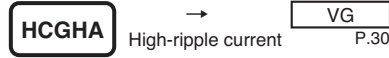
# HCGHA Series

Useful of 4,000 hours at 105°C

- Conform RoHS

## Features

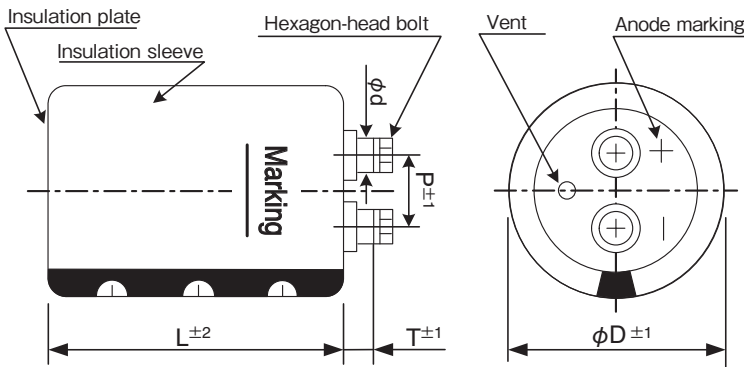
- Useful life of 4,000 hours at 105°C through improvement of electrolyte liquid



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	25 ~ 400V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (μA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (μF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φ D	P	T	φ d	Hexagon-head bolt	Cap material
36	12.7	6.5	8.0	M5×10	Phenol resin
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	55	70	85	105	
Correction coefficient	25 ~ 250V.DC	4.9	3.9	3.0	1.8	1.0
	400V.DC	3.8	3.3	2.5	2.0	1.0
Frequency (Hz)	50/60	120	300	1K	≥10K	
Correction coefficient	0.8	1.0	1.1	1.3	1.4	

Terminal permissible currents: 60Arms for M5.  
Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) HCGHA series 400V 5,600μF±20%

**HCGHA 2G 562 Y D 195 PH**

- HCGHA: Type of series
- 2G: Sealing code
- 562: Case height code
- Y: Case dia code
- D: Type of bracket code
- 195: Capacitance code
- PH: Rated voltage code

Refer to page 19 for product code.

## Bracket

- See page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y (Type I for φ36 only), but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

## HCGHA Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
25	10,000	36×53	0.35	2.9	32	30	18	HCGHA1E103IA053PH
	15,000	36×83	0.35	4.2	27	27	18	HCGHA1E153IA083PH
	22,000	36×83	0.35	5.1	22	23	18	HCGHA1E223IA083PH
	33,000	36×100	0.40	6.3	15	16	18	HCGHA1E333IA100PH
	47,000	51×75	0.40	8.0	10	11	21	HCGHA1E473YC075PH
	68,000	51×115	0.50	10.0	7	8	21	HCGHA1E683YC115PH
	100,000	64×96	0.60	11.3	6	7	22	HCGHA1E104YD096PH
	150,000	64×115	0.80	12.9	6	7	22	HCGHA1E154YD115PH
	220,000	77×115	1.00	14.8	4	5	24	HCGHA1E224YE115PH
330,000	90×131	1.00	19.9	4	5	24	HCGHA1E334YF131PH	
35	6,800	36×53	0.30	2.6	42	37	18	HCGHA1V682IA053PH
	10,000	36×83	0.30	3.7	29	31	18	HCGHA1V103IA083PH
	15,000	36×83	0.30	4.5	19	20	18	HCGHA1V153IA083PH
	22,000	36×100	0.35	5.5	14	15	18	HCGHA1V223IA100PH
	33,000	51×75	0.40	6.7	12	13	21	HCGHA1V333YC075PH
	47,000	51×96	0.45	8.1	8	9	21	HCGHA1V473YC096PH
	68,000	51×115	0.50	10.0	7	8	21	HCGHA1V683YC115PH
	100,000	64×115	0.60	12.1	6	7	22	HCGHA1V104YD115PH
	150,000	77×115	0.70	13.8	5	7	24	HCGHA1V154YE115PH
220,000	90×131	0.70	17.6	5	7	24	HCGHA1V224YF131PH	
50	3,300	36×53	0.20	2.2	90	80	18	HCGHA1H332IA053PH
	4,700	36×53	0.25	3.3	64	58	18	HCGHA1H472IA053PH
	6,800	36×83	0.25	3.4	44	39	18	HCGHA1H682IA083PH
	10,000	36×83	0.25	4.1	30	28	18	HCGHA1H103IA083PH
	15,000	36×100	0.30	4.9	20	20	18	HCGHA1H153IA100PH
	22,000	51×75	0.35	5.9	14	15	21	HCGHA1H223YC075PH
	33,000	51×115	0.40	7.8	13	14	21	HCGHA1H333YC115PH
	47,000	64×96	0.40	9.5	11	12	22	HCGHA1H473YD096PH
	68,000	64×115	0.45	11.6	8	9	22	HCGHA1H683YD115PH
100,000	77×115	0.50	14.1	6	7	24	HCGHA1H104YE115PH	
150,000	90×131	0.50	18.9	5	7	24	HCGHA1H154YF131PH	
63	2,200	36×53	0.15	2.1	95	87	18	HCGHA1J222IA053PH
	3,300	36×53	0.20	2.2	63	58	18	HCGHA1J332IA053PH
	4,700	36×83	0.20	3.1	54	50	18	HCGHA1J472IA083PH
	6,800	36×83	0.20	3.7	38	35	18	HCGHA1J682IA083PH
	10,000	36×100	0.25	4.4	28	28	18	HCGHA1J103IA100PH
	15,000	51×75	0.25	5.7	21	22	21	HCGHA1J153YC075PH
	22,000	51×96	0.30	6.8	13	14	21	HCGHA1J223YC096PH
	33,000	64×96	0.30	9.2	10	11	22	HCGHA1J333YD096PH
	47,000	64×115	0.35	10.9	8	9	22	HCGHA1J473YD115PH
68,000	77×115	0.40	13.0	7	8	24	HCGHA1J683YE115PH	
100,000	90×131	0.40	17.2	7	8	24	HCGHA1J104YF131PH	
80	2,200	36×53	0.15	2.1	68	63	18	HCGHA1K222IA053PH
	3,300	36×83	0.15	3.0	45	42	18	HCGHA1K332IA083PH
	4,700	36×83	0.15	3.6	32	30	18	HCGHA1K472IA083PH
	6,800	36×100	0.20	4.0	22	23	18	HCGHA1K682IA100PH
	10,000	51×75	0.20	5.2	15	16	21	HCGHA1K103YC075PH
	15,000	51×96	0.25	6.2	10	11	21	HCGHA1K153YC096PH
	22,000	64×96	0.25	8.2	9	10	22	HCGHA1K223YD096PH
	33,000	77×96	0.30	9.7	7	7	24	HCGHA1K333YE096PH
	47,000	77×115	0.30	12.5	6	7	24	HCGHA1K473YE115PH
68,000	90×131	0.30	16.4	4	7	24	HCGHA1K683YF131PH	
100	1,000	36×53	0.15	1.4	112	100	18	HCGHA2A102IA053PH
	1,500	36×53	0.15	1.7	75	67	18	HCGHA2A152IA053PH
	2,200	36×83	0.15	2.5	51	47	18	HCGHA2A222IA083PH
	3,300	36×83	0.15	3.0	34	32	18	HCGHA2A332IA083PH
	4,700	36×100	0.15	3.9	24	24	18	HCGHA2A472IA100PH
	6,800	51×75	0.15	5.0	19	20	21	HCGHA2A682YC075PH
	10,000	51×96	0.15	6.5	13	14	21	HCGHA2A103YC096PH
	15,000	64×96	0.20	7.6	11	12	22	HCGHA2A153YD096PH
	22,000	77×96	0.20	9.7	8	9	24	HCGHA2A223YE096PH
33,000	77×130	0.25	11.8	6	7	24	HCGHA2A333YE130PH	
47,000	90×131	0.25	15.0	5	7	24	HCGHA2A473YF131PH	

ALUMINUM ELECTROLYTIC CAPACITORS

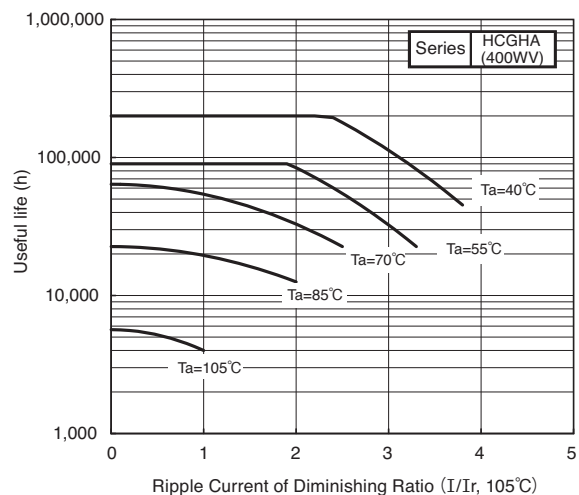
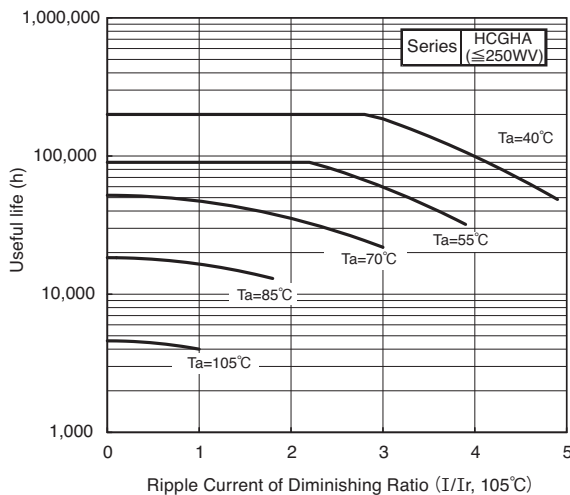
# SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
160	470	36×53	0.15	1.0	277	261	18	HCGHA2C471IA053PH
	680	36×53	0.15	1.1	191	180	18	HCGHA2C681IA053PH
	1,000	36×83	0.15	1.7	130	120	18	HCGHA2C102IA083PH
	1,500	36×83	0.15	2.0	87	80	18	HCGHA2C152IA083PH
	2,200	36×100	0.15	2.7	59	53	18	HCGHA2C222IA100PH
	3,300	51×75	0.15	3.5	40	35	21	HCGHA2C332YC075PH
	4,700	51×96	0.15	4.4	30	25	21	HCGHA2C472YC096PH
	6,800	64×96	0.15	5.9	22	23	22	HCGHA2C682YD096PH
	10,000	77×96	0.15	7.6	15	16	24	HCGHA2C103YE096PH
	15,000	77×130	0.15	10.3	14	14	24	HCGHA2C153YE130PH
22,000	90×131	0.15	13.2	10	10	24	HCGHA2C223YF131PH	
200	330	36×53	0.15	0.8	395	372	18	HCGHA2D331IA053PH
	470	36×53	0.15	1.0	277	261	18	HCGHA2D471IA053PH
	680	36×53	0.15	1.1	191	180	18	HCGHA2D681IA053PH
	1,000	36×83	0.15	1.7	120	100	18	HCGHA2D102IA083PH
	1,500	36×100	0.15	2.2	100	85	18	HCGHA2D152IA100PH
	2,200	51×75	0.15	2.8	68	60	21	HCGHA2D222YC075PH
	3,300	51×96	0.15	3.7	45	35	21	HCGHA2D332YC096PH
	4,700	64×96	0.15	4.9	31	27	22	HCGHA2D472YD096PH
	6,800	64×115	0.15	6.3	21	20	22	HCGHA2D682YD115PH
	10,000	77×115	0.15	8.1	14	14	24	HCGHA2D103YE115PH
15,000	90×131	0.15	10.9	10	10	24	HCGHA2D153YF131PH	
250	330	36×53	0.15	0.8	285	268	18	HCGHA2E331IA053PH
	470	36×53	0.15	1.0	200	187	18	HCGHA2E471IA053PH
	680	36×83	0.15	1.4	138	131	18	HCGHA2E681IA083PH
	1,000	36×100	0.15	1.9	84	70	18	HCGHA2E102IA100PH
	1,500	51×75	0.15	2.3	56	50	21	HCGHA2E152YC075PH
	2,200	51×96	0.15	3.1	50	45	21	HCGHA2E222YC096PH
	3,300	64×96	0.15	4.2	36	35	22	HCGHA2E332YD096PH
	4,700	64×115	0.15	5.4	25	23	22	HCGHA2E472YD115PH
	6,800	77×115	0.15	6.9	18	18	24	HCGHA2E682YE115PH
	10,000	77×155	0.15	9.3	13	13	24	HCGHA2E103YE155PH
15,000	90×157	0.15	12.2	9	9	24	HCGHA2E153YF157PH	
400	1,000	51×75	0.15	2.5	102	105	21	HCGHA2G102YC075PH
	1,200	51×96	0.15	3.0	85	88	21	HCGHA2G122YC096PH
	1,500	51×115	0.15	3.6	68	70	21	HCGHA2G152YC115PH
	1,800	51×130	0.15	4.1	57	58	21	HCGHA2G182YC130PH
	2,200	64×96	0.15	4.5	46	48	22	HCGHA2G222YD096PH
	2,700	64×115	0.15	5.3	38	40	22	HCGHA2G272YD115PH
	3,300	64×130	0.15	6.2	30	32	22	HCGHA2G332YD130PH
	3,900	64×155	0.15	7.2	26	28	22	HCGHA2G392YD155PH
		77×115	0.15	6.8	26	28	24	HCGHA2G392YE115PH
	4,700	64×195	0.15	8.7	21	22	22	HCGHA2G472YD195PH
		77×130	0.15	7.8	21	22	24	HCGHA2G472YE130PH
	5,600	64×195	0.15	9.6	18	19	22	HCGHA2G562YD195PH
		77×155	0.15	9.2	18	19	24	HCGHA2G562YE155PH
	6,800	90×157	0.15	10.7	15	15	24	HCGHA2G682YF157PH
8,200	90×157	0.15	11.8	12	15	24	HCGHA2G822YF157PH	
10,000	90×196	0.15	14.1	10	15	24	HCGHA2G103YF196PH	

Life time graph

Useful life depending on ambient temperature Ta and ripple current operating conditions I versus rated ripple current at 105°C, 120Hz



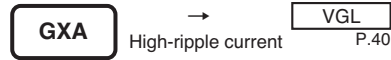


## GXA Series Useful of 8,000 hours at 105°C

- Conform RoHS

### Features

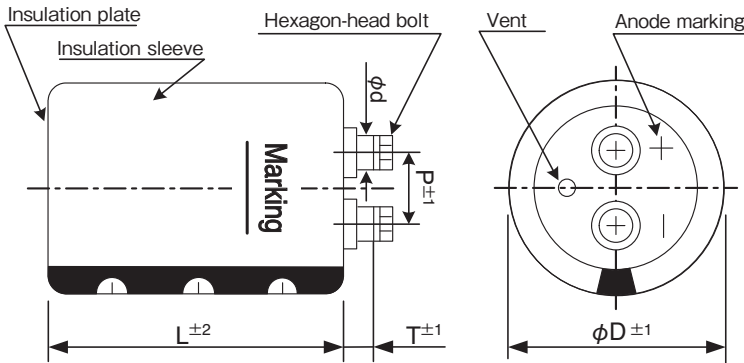
- Leading product with heat resistance and long life at 105°C to meet the requirement for high temperature and long life in the inverter circuit.



### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	350 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin

### Ripple current correction coefficient

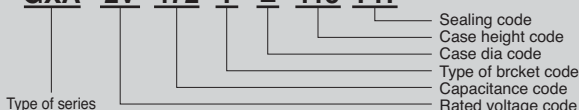
Temperature (°C)	40	60	85	105	
Correction coefficient	2.44	2.16	2.00	1.00	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5.  
Please use this type of capacitor at a terminal current below the permissible.

### Product code

(Example) GXA Series 350V 4,700µF±20%

**GXA 2V 472 Y E 115 PH**



Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I ).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

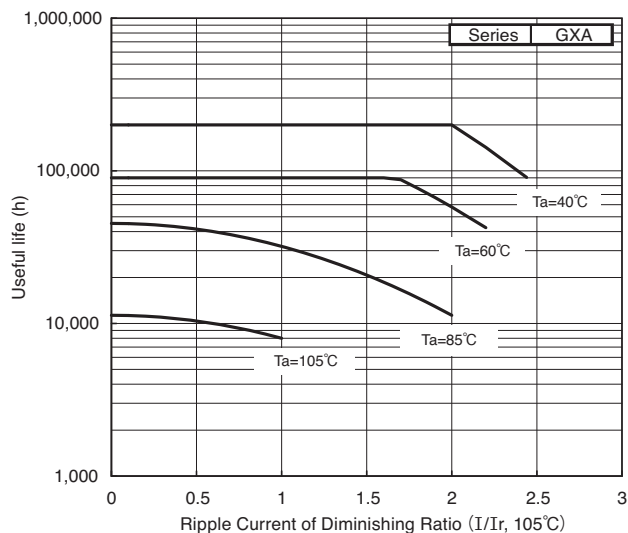
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name	
350	1,000	51×75	0.15	3.9	100	103	21	GXA2V102YC075PH	
	1,200	51×75	0.15	4.2	84	87	21	GXA2V122YC075PH	
	1,500	51×96	0.15	5.2	67	69	21	GXA2V152YC096PH	
	1,800	51×96	0.15	5.7	55	57	21	GXA2V182YC096PH	
	2,200	51×130	0.15	7.1	45	47	21	GXA2V222YC130PH	
	2,700	64×96	0.15	7.7	37	39	22	GXA2V272YD096PH	
	3,300	64×115	0.15	9.1	29	31	22	GXA2V332YD115PH	
	3,900	64×130	0.15	10.4	25	27	22	GXA2V392YD130PH	
	4,700	4,700	64×155	0.15	12.2	20	21	22	GXA2V472YD155PH
			77×115	0.15	11.5	20	21	24	GXA2V472YE115PH
	5,600	5,600	64×195	0.15	14.6	17	20	22	GXA2V562YD195PH
			77×130	0.15	13.1	17	20	24	GXA2V562YE130PH
	6,800	77×155	0.15	15.5	14	18	24	GXA2V682YE155PH	
	8,200	90×157	0.15	18.1	12	15	24	GXA2V822YF157PH	
	10,000	90×157	0.15	19.9	10	15	24	GXA2V103YF157PH	
12,000	90×196	0.15	23.8	8	13	24	GXA2V123YF196PH		
15,000	90×236	0.15	28.8	7	10	24	GXA2V153YF236PH		
400	1,000	51×75	0.15	3.9	102	105	21	GXA2G102YC075PH	
	1,200	51×96	0.15	4.6	85	88	21	GXA2G122YC096PH	
	1,500	51×115	0.15	5.6	68	70	21	GXA2G152YC115PH	
	1,800	51×130	0.15	6.4	57	58	21	GXA2G182YC130PH	
	2,200	64×96	0.15	6.9	46	48	22	GXA2G222YD096PH	
	2,700	64×115	0.15	8.2	38	40	22	GXA2G272YD115PH	
	3,300	64×130	0.15	9.5	30	32	22	GXA2G332YD130PH	
	3,900	3,900	64×155	0.15	11.1	27	28	22	GXA2G392YD155PH
			77×115	0.15	10.4	27	28	24	GXA2G392YE115PH
	4,700	4,700	64×195	0.15	13.4	21	22	22	GXA2G472YD195PH
			77×130	0.15	12.0	21	22	24	GXA2G472YE130PH
	5,600	5,600	64×195	0.15	14.6	20	20	22	GXA2G562YD195PH
			77×155	0.15	14.0	20	20	24	GXA2G562YE155PH
	6,800	90×157	0.15	16.5	18	18	24	GXA2G682YF157PH	
	8,200	90×157	0.15	18.1	15	17	24	GXA2G822YF157PH	
10,000	90×196	0.15	21.7	12	15	24	GXA2G103YF196PH		
12,000	90×236	0.15	25.8	10	12	24	GXA2G123YF236PH		
450	1,000	51×96	0.15	4.2	102	105	21	GXA2W102YC096PH	
	1,200	51×115	0.15	5.0	85	88	21	GXA2W122YC115PH	
	1,500	51×130	0.15	5.9	68	70	21	GXA2W152YC130PH	
	1,800	64×96	0.15	6.3	57	58	22	GXA2W182YD096PH	
	2,200	64×115	0.15	7.4	46	48	22	GXA2W222YD115PH	
	2,700	2,700	64×130	0.15	8.6	40	42	22	GXA2W272YD130PH
			77×115	0.15	8.7	40	42	24	GXA2W272YE115PH
	3,300	3,300	64×155	0.15	10.2	30	35	22	GXA2W332YD155PH
			77×130	0.15	10.1	30	35	24	GXA2W332YE130PH
	3,900	64×195	0.15	12.3	27	32	22	GXA2W392YD195PH	
	4,700	77×155	0.15	12.9	24	27	24	GXA2W472YE155PH	
	5,600	5,600	77×195	0.15	15.4	22	23	24	GXA2W562YE195PH
			90×157	0.15	14.9	22	23	24	GXA2W562YF157PH
	6,800	90×196	0.15	18.0	20	20	24	GXA2W682YF196PH	
	8,200	90×196	0.15	19.8	18	18	24	GXA2W822YF196PH	
10,000	90×236	0.15	23.6	15	15	24	GXA2W103YF236PH		

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz





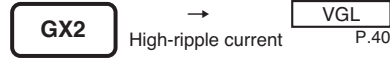
## GX2 Series

Useful of 8,000 hours at 105°C

- Conform RoHS

### Features

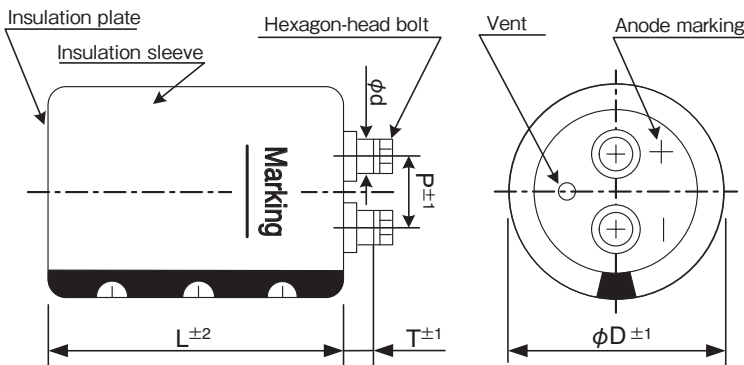
- Developed specially for the demand of higher voltage like Active Filters.
- Warranty life of 5,000 hours at 105°C with 500V through development of electrolyte liquid and forming technology.



### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	400 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin

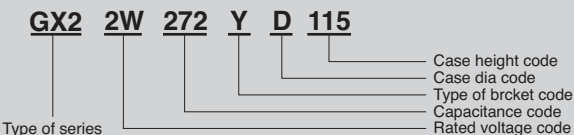
### Ripple current correction coefficient

Temperature (°C)	40	60	85	105	
Correction coefficient	2.44	2.16	2.00	1.00	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5.  
Please use this type of capacitor at a terminal current below the permissible.

### Product code

(Example) GX2 Series 450V 2,700µF±20%



Refer to page 19 for product code.

### Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I ).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.



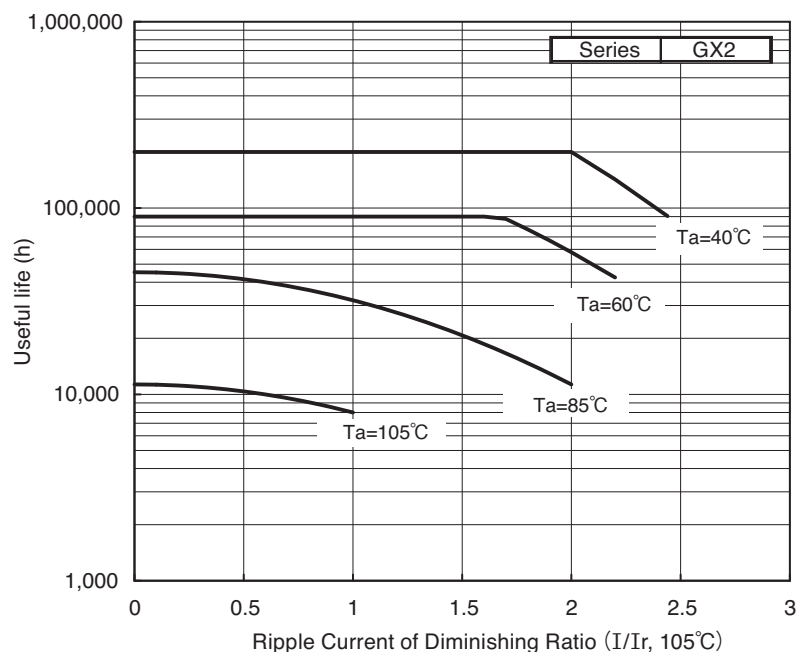
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
400	1,200	51×75	0.15	4.2	65	70	21	GX22G122YC075
	1,500	51×96	0.15	5.2	53	55	21	GX22G152YC096
	1,800	51×115	0.15	6.1	44	44	21	GX22G182YC115
	2,200	51×130	0.15	7.1	42	45	21	GX22G222YC130
	2,700	64×96	0.15	7.6	38	40	22	GX22G272YD096
	3,300	64×115	0.15	9.0	30	35	22	GX22G332YD115
	3,900	64×130	0.15	10.3	27	32	22	GX22G392YD130
	4,700	64×155	0.15	12.2	22	23	22	GX22G472YD155
		77×115	0.15	11.4	22	23	24	GX22G472YE115
	5,600	64×170	0.15	13.8	20	21	22	GX22G562YD170
		77×130	0.15	13.1	20	23	24	GX22G562YE130
	6,800	77×155	0.15	15.4	18	18	24	GX22G682YE155
		90×131	0.15	15.4	18	18	24	GX22G682YF131
8,200	77×195	0.15	18.6	15	17	24	GX22G822YE195	
10,000	90×171	0.15	20.5	12	15	24	GX22G103YF171	
450	1,000	51×75	0.15	3.8	70	75	21	GX22W102YC075
	1,200	51×96	0.15	4.6	65	70	21	GX22W122YC096
	1,500	51×115	0.15	5.5	53	55	21	GX22W152YC115
	1,800	51×130	0.15	6.4	44	45	21	GX22W182YC130
	2,200	64×96	0.15	6.9	42	42	22	GX22W222YD096
	2,700	64×115	0.15	8.2	42	42	22	GX22W272YD115
		77×96	0.15	8.1	42	42	24	GX22W272YE096
	3,300	77×115	0.15	9.6	35	40	24	GX22W332YE115
	3,900	64×170	0.15	11.6	27	32	22	GX22W392YD170
	4,700	64×195	0.15	13.4	24	27	22	GX22W472YD195
	5,600	77×171	0.15	14.6	24	23	24	GX22W562YE171
	6,800	90×157	0.15	16.5	20	20	24	GX22W682YF157
8,200	90×171	0.15	18.7	18	18	24	GX22W822YF171	
500	1,000	51×130	0.20	4.5	112	120	21	GX22H102YC130
	1,200	64×115	0.20	5.2	93	100	22	GX22H122YD115
	1,500	64×130	0.20	6.1	74	80	22	GX22H152YD130
	1,800	77×115	0.20	6.7	62	50	24	GX22H182YE115
	2,200	77×130	0.20	7.8	53	50	24	GX22H222YE130
	2,700	77×155	0.20	9.3	40	35	24	GX22H272YE155
	3,300	77×155	0.20	10.2	38	32	24	GX22H332YE155
	3,900	90×157	0.20	11.9	30	27	24	GX22H392YF157
	4,700	90×171	0.20	13.5	25	20	24	GX22H472YF171
	5,600	90×196	0.20	15.5	20	17	24	GX22H562YF196
6,800	90×236	0.20	18.5	17	17	24	GX22H682YF236	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz

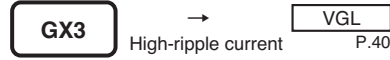


## GX3 Series Useful of 8,000 hours at 105°C

- Conform RoHS

### Features

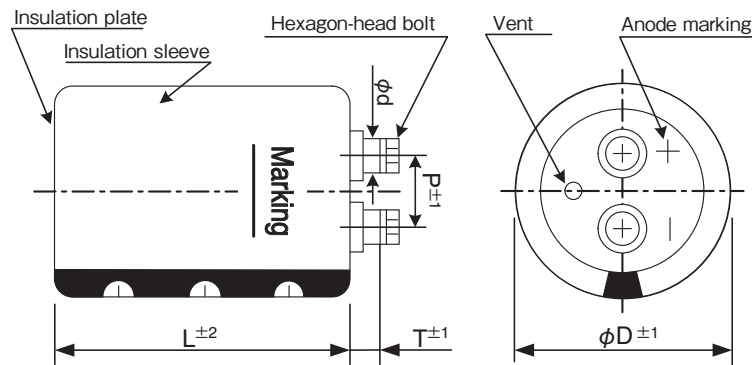
- GX3 series is the product developed for the purpose of the miniaturization as a capacitor for primary side filters of an inverter, DC servo, and a chopper control circuit.



### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	400, 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



(unit : mm)

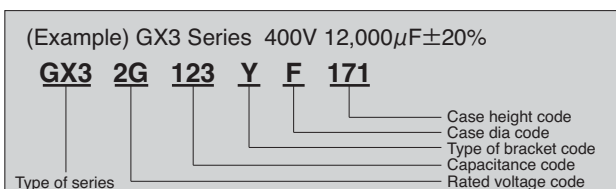
φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	5.5	10.0	M5×10	Phenol resin
64	28.6	5.5	10.0	M5×10	Phenol resin
77	31.5	5.0	10.0	M5×10	Phenol resin
90	31.5	5.0	10.0	M5×10	Phenol resin

### Ripple current correction coefficient

Temperature (°C)	40	60	85	105	
Correction coefficient	2.44	2.16	2.00	1.00	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

Terminal permissible currents: 60Arms for M5.  
Please use this type of capacitor at a terminal current below the permissible.

### Product code



Refer to page 19 for product code.

#### Bracket

- See page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

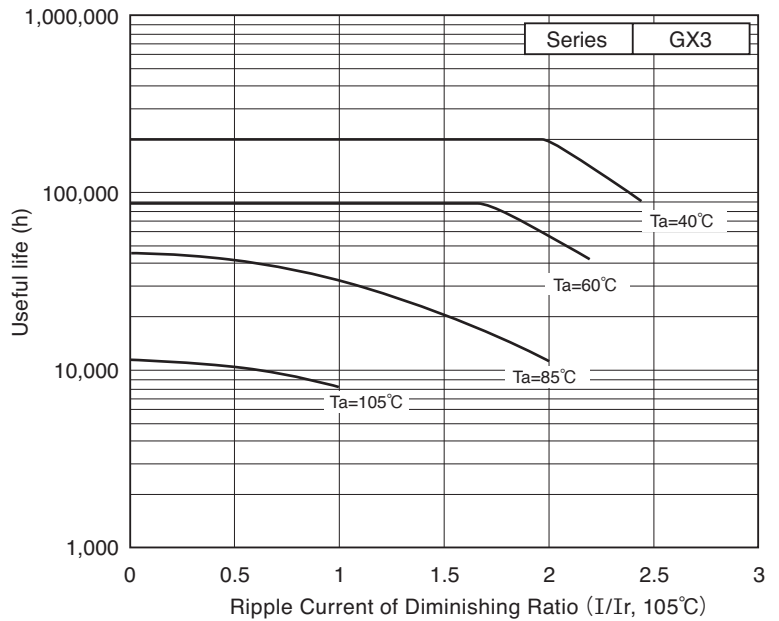
Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu F$ )	Case size $\phi D \times L$ (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m $\Omega$ ) 20°C, 100Hz	Z max (m $\Omega$ ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
400	1,800	51 × 96	0.20	6.5	44	44	21	GX32G182YC096
	2,200	51 × 115	0.20	7.7	42	44	21	GX32G222YC115
	2,700	51 × 130	0.20	9.0	38	40	21	GX32G272YC130
	3,300	51 × 155	0.20	10.7	30	35	21	GX32G332YC155
	3,900	64 × 115	0.20	11.3	27	32	22	GX32G392YD115
	4,700	64 × 130	0.20	13.0	22	23	22	GX32G472YD130
		77 × 96	0.20	12.3	22	23	24	GX32G472YE096
	5,600	77 × 115	0.20	14.4	20	21	24	GX32G562YE115
	6,800	77 × 130	0.20	16.6	18	18	24	GX32G682YE130
	8,200	77 × 171	0.20	20.3	15	17	24	GX32G822YE171
	10,000	90 × 157	0.20	23.0	12	15	24	GX32G103YF157
12,000	90 × 171	0.20	26.1	10	11	24	GX32G123YF171	
450	1,500	51 × 96	0.20	4.9	53	55	21	GX32W152YC096
	1,800	51 × 115	0.20	5.8	44	45	21	GX32W182YC115
	2,200	51 × 130	0.20	6.7	42	44	21	GX32W222YC130
	2,700	64 × 96	0.20	7.3	40	42	22	GX32W272YD096
	3,300	64 × 130	0.20	9.1	35	35	22	GX32W332YD130
	3,900	77 × 96	0.20	9.3	27	32	24	GX32W392YE096
	4,700	64 × 155	0.20	11.6	24	27	22	GX32W472YD155
	5,600	77 × 130	0.20	12.5	22	23	24	GX32W562YE130
		77 × 155	0.20	14.7	20	20	24	GX32W682YE155
	6,800	90 × 130	0.20	14.6	20	20	24	GX32W682YF130
		90 × 157	0.20	17.3	18	18	24	GX32W822YF157
	10,000	90 × 171	0.20	19.7	15	15	24	GX32W103YF171

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz



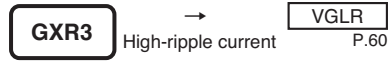
# GXR3 Series

Useful of 8,000 hours at 105°C

- Conform RoHS

## Features

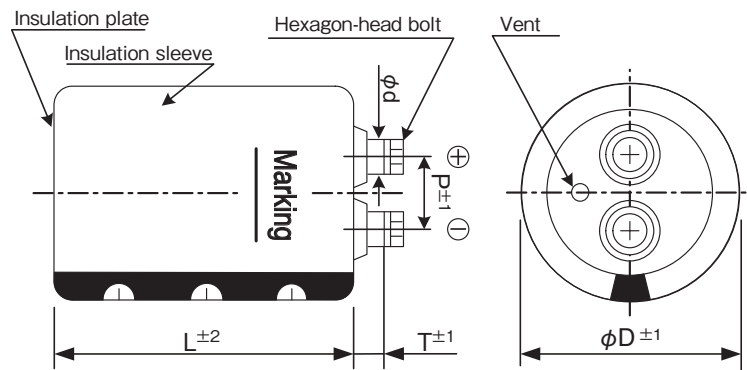
- GXR3 series has smaller case size (ave.10%) and higher ripple current (ave.17%) compared with GX2 series. These features are accomplished by new heat radiation structure and low ESR material.



## Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	400 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 5,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

## Dimensions



(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
64	28.6	8.0	11.0	M5×10	Phenol resin
77	31.5	9.0	12.0	M6×12	Phenol resin
90	31.5	8.0	12.0	M6×12	Phenol resin

## Ripple current correction coefficient

Temperature (°C)	40	60	85	105	
Correction coefficient	2.44	2.16	2.00	1.00	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4
Forced wind (m/s)	<0.5	0.5≤			
Correction coefficient	1.0	1.1			

Terminal permissible currents: 60Arms for M5 ; 100Arms for M6. Please use this type of capacitor at a terminal current below the permissible.

## Product code

(Example) GXR3 Series 400V 10,000 µF±20%

**GXR3 2G 103 Y F 126 PH**

- Type of series
- Case height code
- Case dia code
- Type of bracket code
- Capacitance code
- Rated voltage code
- Sealing code

Refer to page 19 for product code.

## Bracket

- Refer to page 20-21 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket Code = I ).
- If bracket are not necessary, enter "N" for the type of bracket code.
- Bracket will be delivered separately.

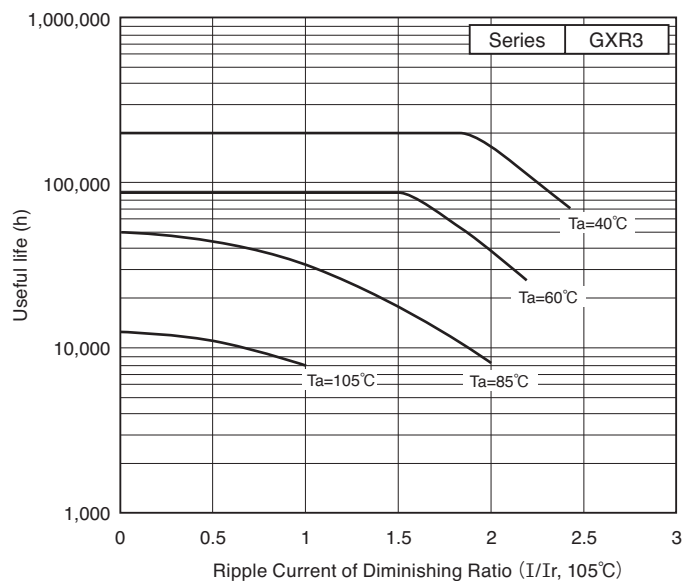
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L(mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Z max (mΩ) 20°C, 10kHz	ESL(typ.) (nH)	Product name
400	3,300	64×94	0.20	11.1	31	33	22	GXR32G332YD094PH
	3,900	64×107	0.20	12.1	26	28	22	GXR32G392YD107PH
	4,700	64×123	0.20	14.1	21	22	22	GXR32G472YD123PH
		77×95	0.20	14.1	21	22	23	GXR32G472YE095PH
	5,600	64×147	0.20	15.9	18	19	22	GXR32G562YD147PH
		77×108	0.20	15.4	18	19	23	GXR32G562YE108PH
	6,800	64×187	0.20	18.8	15	16	22	GXR32G682YD187PH
		77×124	0.20	17.9	15	16	23	GXR32G682YE124PH
		90×97	0.20	18.2	15	16	23	GXR32G682YF097PH
	8,200	77×148	0.20	20.3	12	12	23	GXR32G822YE148PH
		90×110	0.20	20.0	12	12	23	GXR32G822YF110PH
	10,000	77×188	0.20	24.1	10	10	23	GXR32G103YE188PH
		90×126	0.20	23.3	10	10	23	GXR32G103YF126PH
	12,000	77×228	0.20	28.6	8	10	23	GXR32G123YE228PH
90×150		0.20	26.3	8	10	23	GXR32G123YF150PH	
15,000	90×190	0.20	31.4	8	10	23	GXR32G153YF190PH	
18,000	90×230	0.20	37.0	6	9	23	GXR32G183YF230PH	
450	2,200	64×94	0.20	9.0	46	48	22	GXR32W222YD094PH
	2,700	64×107	0.20	10.0	38	40	22	GXR32W272YD107PH
	3,300	64×123	0.20	11.6	31	33	22	GXR32W332YD123PH
		77×95	0.20	11.6	31	33	23	GXR32W332YE095PH
	3,900	64×147	0.20	13.1	26	28	22	GXR32W392YD147PH
		77×108	0.20	12.7	26	28	23	GXR32W392YE108PH
	4,700	64×164	0.20	15.1	21	22	22	GXR32W472YD164PH
		77×124	0.20	14.7	21	22	23	GXR32W472YE124PH
		90×97	0.20	15.0	21	22	23	GXR32W472YF097PH
	5,600	64×187	0.20	17.0	18	19	22	GXR32W562YD187PH
		77×148	0.20	16.6	18	19	23	GXR32W562YE148PH
		90×110	0.20	16.4	18	19	23	GXR32W562YF110PH
	6,800	77×165	0.20	19.1	15	16	23	GXR32W682YE165PH
		90×126	0.20	19.0	15	16	23	GXR32W682YF126PH
	8,200	77×188	0.20	21.5	12	12	23	GXR32W822YE188PH
		90×150	0.20	21.4	12	12	23	GXR32W822YF150PH
	10,000	77×228	0.20	25.7	10	10	23	GXR32W103YE228PH
		90×167	0.20	24.6	10	10	23	GXR32W103YF167PH
	12,000	90×190	0.20	27.7	8	10	23	GXR32W123YF190PH
15,000	90×230	0.20	33.5	8	10	23	GXR32W153YF230PH	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

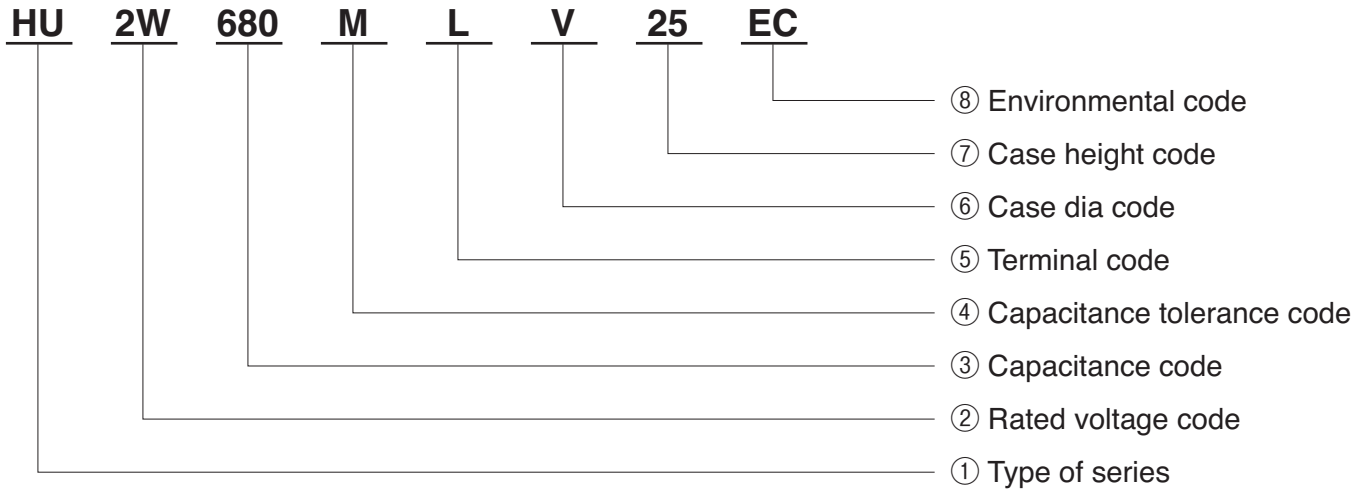
Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz



# MEMO

---

## HOW TO ORDER



### ① Type of series

Type of series
HU
HL

### ② Rated voltage code

Rated voltage code	Rated voltage (V)
2D	200
220V	220
2E	250
2V	350
2G	400
420V	420
2W	450

### ③ Capacitance code

Capacitance code	Capacitance ( $\mu\text{F}$ )	Capacitance code	Capacitance ( $\mu\text{F}$ )
8R2	8.2	820	82
100	10	101	100
150	15	121	120
220	22	151	150
270	27	181	180
330	33	221	220
390	39	331	330
470	47	471	470
560	56	561	560
680	68		

The first two digits are significant.

The last digit indicates the number of following zeros.

ex) 680=68( $\mu\text{F}$ )

### ④ Capacitance tolerance code

Capacitance tolerance code	Capacitance tolerance (%)
M	$\pm 20$
Q	$-10 \sim +30$

The standard is [M].

### ⑤ Terminal code

Terminal code	Terminal
L	Lead terminal

### ⑥ Case dia code

Case dia code	Case dia (mm)
R	10
S	12.5
U	16
V	18

### ⑦ Case height code

Case height code	Case height (mm)	Case height code	Case height (mm)
16	16	355	35.5
20	20	40	40
25	25	45	45
315	31.5	50	50

### ⑧ Environmental code

Environmental code	Content
EC	Lead-free, PVC-free

## HU Series

Useful of 2,000 hours at 105°C

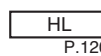
- Conform RoHS

### Features

- The HU type is the radial type products of 2,000 hours.



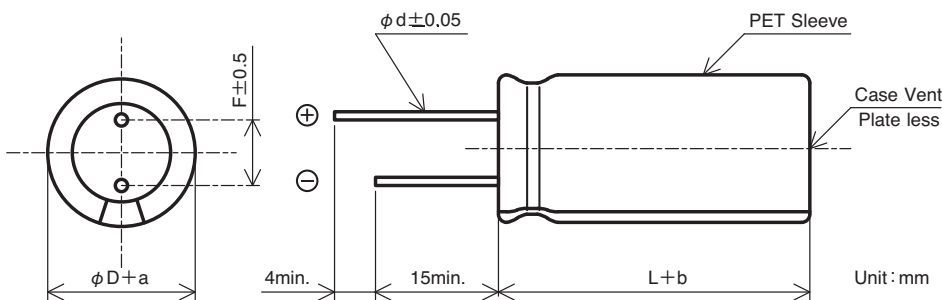
→  
Long-life



### Product Specifications

Items	Specifications
Temperature range	-25°C ~ +105°C
Rated voltage	200 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	Not more than 0.04CV + 100 (μA) (20°C, after 2 minutes) [C = nominal capacitance (μF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 2,000 hours : Capacitance change : Within ±20% of the initial value measured. Dissipation factor : 200% or less than the initial value specified. Leakage current : Less than or equal to the initial value specified.
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 1,000 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±20% of the initial value measured. Dissipation factor : 200% or less than the initial value specified. Leakage current : 200% or less than the initial value specified.
Others	JIS C 5101-4

### Dimensions



φ D	φ d	F	a	b
10	0.6	5.0	0.5MAX	2.0MAX
12.5	0.6	5.0	0.5MAX	2.0MAX
16	0.8	7.5	0.5MAX	2.0MAX
18	0.8	7.5	0.5MAX	2.0MAX

### Ripple current correction coefficient

Frequency (Hz)	50/60	120	1K	10K	≥100K
Correction coefficient	0.80	1.00	1.55	1.85	2.00

### Product code

(Example) HU series 450V 68μF ±20%

**HU 2W 680 M L V 25 EC**

- Environmental code
- Case height code
- Case dia code
- Terminal code
- Capacitance tolerance code
- Capacitance code
- Rated voltage code

Type of series

Refer to page 115 for other terminal shape available on request.



Standard Products Table

Rated Voltage (V.DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L (mm)	$\tan \delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	Product name
200	100	12.5 $\times$ 25	0.20	0.62	HU2D101MLS25EC
	220	16 $\times$ 31.5	0.20	1.05	HU2D221MLU315EC
	330	16 $\times$ 40	0.20	1.43	HU2D331MLU40EC
		18 $\times$ 31.5	0.20	1.43	HU2D331MLV315EC
	470	16 $\times$ 50	0.20	1.75	HU2D471MLU50EC
		18 $\times$ 40	0.20	1.75	HU2D471MLV40EC
220	560	18 $\times$ 50	0.20	1.93	HU2D561MLV50EC
	100	16 $\times$ 20	0.20	0.63	HU220V101MLU20EC
	220	16 $\times$ 31.5	0.20	1.10	HU220V221MLU315EC
	330	16 $\times$ 45	0.20	1.45	HU220V331MLU45EC
		18 $\times$ 35.5	0.20	1.45	HU220V331MLV355EC
250	470	18 $\times$ 45	0.20	1.78	HU220V471MLV45EC
	100	16 $\times$ 25	0.20	0.66	HU2E101MLU25EC
	220	16 $\times$ 35.5	0.20	1.15	HU2E221MLU355EC
		18 $\times$ 31.5	0.20	1.15	HU2E221MLV315EC
	330	16 $\times$ 50	0.20	1.48	HU2E331MLU50EC
		18 $\times$ 40	0.20	1.48	HU2E331MLV40EC
350	470	18 $\times$ 50	0.20	1.83	HU2E471MLV50EC
	33	12.5 $\times$ 20	0.24	0.33	HU2V330MLS20EC
	47	12.5 $\times$ 25	0.24	0.41	HU2V470MLS25EC
	100	16 $\times$ 31.5	0.24	0.77	HU2V101MLU315EC
		18 $\times$ 25	0.24	0.77	HU2V101MLV25EC
	220	16 $\times$ 50	0.24	1.22	HU2V221MLU50EC
18 $\times$ 40		0.24	1.22	HU2V221MLV40EC	
400	10	10 $\times$ 16	0.24	0.12	HU2G100MLR16EC
	15	10 $\times$ 20	0.24	0.15	HU2G150MLR20EC
	27	12.5 $\times$ 20	0.24	0.26	HU2G270MLS20EC
	33	12.5 $\times$ 25	0.24	0.30	HU2G330MLS25EC
	47	16 $\times$ 20	0.24	0.45	HU2G470MLU20EC
		16 $\times$ 25	0.24	0.50	HU2G560MLU25EC
	56	18 $\times$ 20	0.24	0.50	HU2G560MLV20EC
		16 $\times$ 25	0.24	0.59	HU2G680MLU25EC
	82	16 $\times$ 31.5	0.24	0.67	HU2G820MLU315EC
		18 $\times$ 25	0.24	0.67	HU2G820MLV25EC
	100	16 $\times$ 35.5	0.24	0.78	HU2G101MLU355EC
		18 $\times$ 31.5	0.24	0.78	HU2G101MLV315EC
	120	16 $\times$ 40	0.24	0.85	HU2G121MLU40EC
		18 $\times$ 31.5	0.24	0.85	HU2G121MLV315EC
	150	16 $\times$ 45	0.24	0.98	HU2G151MLU45EC
		18 $\times$ 35.5	0.24	0.98	HU2G151MLV355EC
	180	16 $\times$ 50	0.24	1.08	HU2G181MLU50EC
		18 $\times$ 40	0.24	1.08	HU2G181MLV40EC
220	18 $\times$ 50	0.24	1.22	HU2G221MLV50EC	

# RADIAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V.DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D×L(mm)	$\tan \delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	Product name
420	10	10×16	0.24	0.13	HU420V100MLR16EC
	15	10×20	0.24	0.18	HU420V150MLR20EC
	22	12.5×20	0.24	0.27	HU420V220MLS20EC
	27	12.5×25	0.24	0.30	HU420V270MLS25EC
	33	12.5×25	0.24	0.37	HU420V330MLS25EC
	39	16×20	0.24	0.40	HU420V390MLU20EC
	47	16×20	0.24	0.47	HU420V470MLU20EC
	56	16×25	0.24	0.65	HU420V560MLU25EC
		18×20	0.24	0.65	HU420V560MLV20EC
	68	16×25	0.24	0.72	HU420V680MLU25EC
	82	16×31.5	0.24	0.72	HU420V820MLU315EC
		18×25	0.24	0.72	HU420V820MLV25EC
	100	16×35.5	0.24	0.83	HU420V101MLU355EC
		18×31.5	0.24	0.83	HU420V101MLV315EC
	120	16×40	0.24	0.93	HU420V121MLU40EC
		18×35.5	0.24	0.93	HU420V121MLV355EC
150	16×45	0.24	1.05	HU420V151MLU45EC	
	18×40	0.24	1.05	HU420V151MLV40EC	
180	18×45	0.24	1.15	HU420V181MLV45EC	
450	8.2	10×16	0.24	0.12	HU2W8R2MLR16EC
	10	10×20	0.24	0.13	HU2W100MLR20EC
	22	12.5×20	0.24	0.25	HU2W220MLS20EC
	27	12.5×25	0.24	0.29	HU2W270MLS25EC
	33	12.5×25	0.24	0.39	HU2W330MLS25EC
	47	18×20	0.24	0.51	HU2W470MLV20EC
	56	16×25	0.24	0.57	HU2W560MLU25EC
		18×20	0.24	0.57	HU2W560MLV20EC
	68	18×25	0.24	0.67	HU2W680MLV25EC
	82	16×31.5	0.24	0.75	HU2W820MLU315EC
	100	16×35.5	0.24	0.84	HU2W101MLU355EC
		18×31.5	0.24	0.84	HU2W101MLV315EC
	120	16×45	0.24	0.94	HU2W121MLU45EC
	150	16×50	0.24	1.05	HU2W151MLU50EC
		18×40	0.24	1.05	HU2W151MLV40EC
	180	18×45	0.24	1.10	HU2W181MLV45EC



## HL Series Useful of 5,000 hours at 105°C

- Conform RoHS

### Features

- The HL type is the radial type products of 5,000 hours.

HU  
P.116

→  
Long-life

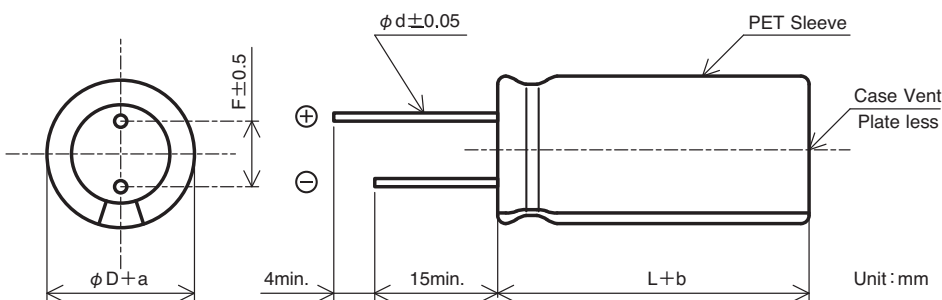
HL



### Product Specifications

Items	Specifications
Temperature range	-25°C ~ +105°C
Rated voltage	200 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	Not more than 0.04CV + 100 (µA) (20°C, after 2 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 5,000 hours : Capacitance change : Within ±20% of the initial value measured. Dissipation factor : 200% or less than the initial value specified. Leakage current : Less than or equal to the initial value specified.
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 1,000 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±20% of the initial value measured. Dissipation factor : 200% or less than the initial value specified. Leakage current : 200% or less than the initial value specified.
Others	JIS C 5101-4

### Dimensions



φD	φd	F	a	b
10	0.6	5.0	0.5MAX	2.0MAX
12.5	0.6	5.0	0.5MAX	2.0MAX
16	0.8	7.5	0.5MAX	2.0MAX
18	0.8	7.5	0.5MAX	2.0MAX

### Ripple current correction coefficient

Frequency (Hz)	50/60	120	1K	10K	≥100K
Correction coefficient	0.80	1.00	1.55	1.85	2.00

### Product code

(Example) HL series 450V 68µF ±20%

**HL 2W 680 M L V 25 EC**

- HL: Type of series
- 2W: Rated voltage code
- 680: Capacitance code
- M: Capacitance tolerance code
- L: Case dia code
- V: Case height code
- 25: Environmental code
- EC: Environmental code

Refer to page 115 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V.DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L (mm)	$\tan \delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	Product name
200	220	16 $\times$ 31.5	0.20	1.05	HL2D221MLU315EC
	330	16 $\times$ 40	0.20	1.43	HL2D331MLU40EC
		18 $\times$ 31.5	0.20	1.43	HL2D331MLV315EC
	470	18 $\times$ 45	0.20	1.75	HL2D471MLV45EC
	560	18 $\times$ 50	0.20	1.93	HL2D561MLV50EC
220	100	16 $\times$ 20	0.20	0.63	HL220V101MLU20EC
	220	16 $\times$ 31.5	0.20	1.10	HL220V221MLU315EC
	330	16 $\times$ 45	0.20	1.45	HL220V331MLU45EC
		18 $\times$ 35.5	0.20	1.45	HL220V331MLV355EC
	470	18 $\times$ 45	0.20	1.78	HL220V471MLV45EC
250	100	16 $\times$ 25	0.20	0.66	HL2E101MLU25EC
	220	16 $\times$ 35.5	0.20	1.15	HL2E221MLU355EC
		18 $\times$ 31.5	0.20	1.15	HL2E221MLV315EC
	330	16 $\times$ 50	0.20	1.48	HL2E331MLU50EC
		18 $\times$ 40	0.20	1.48	HL2E331MLV40EC
350	33	12.5 $\times$ 20	0.24	0.33	HL2V330MLS20EC
	100	16 $\times$ 31.5	0.24	0.77	HL2V101MLU315EC
		18 $\times$ 25	0.24	0.77	HL2V101MLV25EC
	220	18 $\times$ 40	0.24	1.22	HL2V221MLV40EC
400	10	10 $\times$ 16	0.24	0.12	HL2G100MLR16EC
	15	10 $\times$ 20	0.24	0.15	HL2G150MLR20EC
	27	12.5 $\times$ 20	0.24	0.26	HL2G270MLS20EC
	33	12.5 $\times$ 25	0.24	0.30	HL2G330MLS25EC
	39	12.5 $\times$ 25	0.24	0.34	HL2G390MLS25EC
	47	16 $\times$ 20	0.24	0.45	HL2G470MLU20EC
	56	16 $\times$ 25	0.24	0.50	HL2G560MLU25EC
		18 $\times$ 20	0.24	0.50	HL2G560MLV20EC
	68	16 $\times$ 25	0.24	0.59	HL2G680MLU25EC
	82	16 $\times$ 31.5	0.24	0.67	HL2G820MLU315EC
		18 $\times$ 25	0.24	0.67	HL2G820MLV25EC
	100	16 $\times$ 35.5	0.24	0.78	HL2G101MLU355EC
		18 $\times$ 31.5	0.24	0.78	HL2G101MLV315EC
	120	16 $\times$ 40	0.24	0.85	HL2G121MLU40EC
		18 $\times$ 31.5	0.24	0.85	HL2G121MLV315EC
	150	16 $\times$ 45	0.24	0.98	HL2G151MLU45EC
		18 $\times$ 40	0.24	0.98	HL2G151MLV40EC
	180	16 $\times$ 50	0.24	1.08	HL2G181MLU50EC
18 $\times$ 45		0.24	1.08	HL2G181MLV45EC	
220	18 $\times$ 50	0.24	1.22	HL2G221MLV50EC	

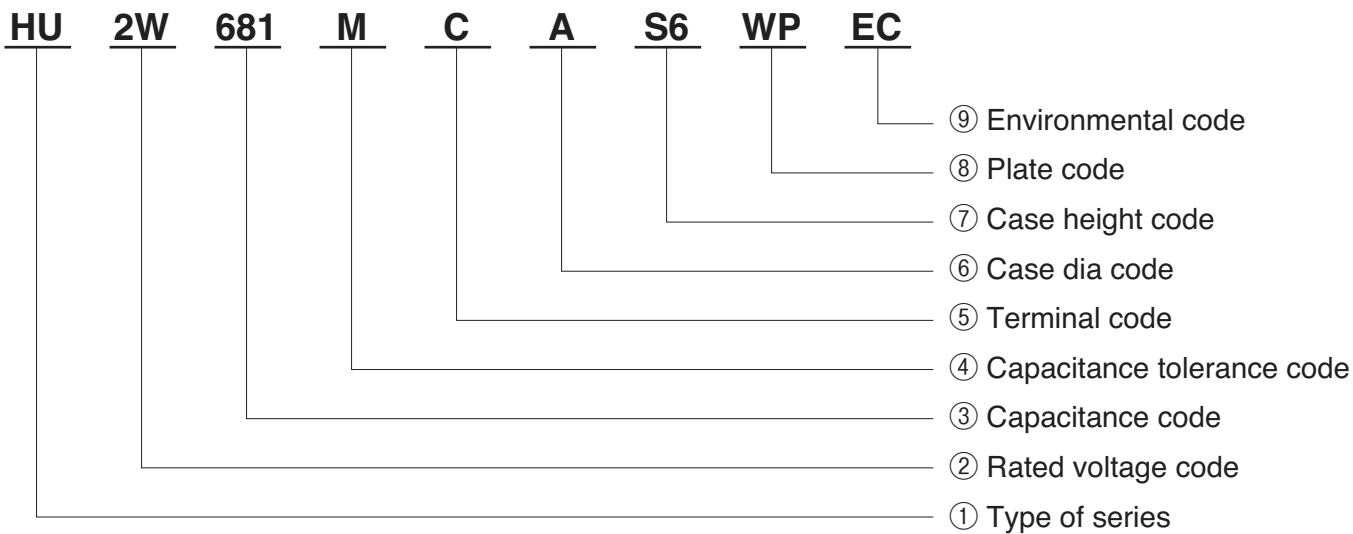
# RADIAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V.DC)	Capacitance ( $\mu$ F)	Case size $\phi$ D $\times$ L(mm)	$\tan \delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	Product name
420	10	10 $\times$ 16	0.24	0.13	HL420V100MLR16EC
	15	10 $\times$ 20	0.24	0.18	HL420V150MLR20EC
	22	12.5 $\times$ 20	0.24	0.27	HL420V220MLS20EC
	27	12.5 $\times$ 25	0.24	0.30	HL420V270MLS25EC
	33	12.5 $\times$ 25	0.24	0.37	HL420V330MLS25EC
	39	16 $\times$ 20	0.24	0.40	HL420V390MLU20EC
	47	16 $\times$ 25	0.24	0.47	HL420V470MLU25EC
	56	16 $\times$ 25	0.24	0.65	HL420V560MLU25EC
		18 $\times$ 20	0.24	0.65	HL420V560MLV20EC
	68	16 $\times$ 31.5	0.24	0.72	HL420V680MLU315EC
	82	16 $\times$ 31.5	0.24	0.72	HL420V820MLU315EC
		18 $\times$ 25	0.24	0.72	HL420V820MLV25EC
	100	16 $\times$ 35.5	0.24	0.83	HL420V101MLU355EC
		18 $\times$ 31.5	0.24	0.83	HL420V101MLV315EC
	120	16 $\times$ 40	0.24	0.93	HL420V121MLU40EC
		18 $\times$ 35.5	0.24	0.93	HL420V121MLV355EC
150	16 $\times$ 50	0.24	1.05	HL420V151MLU50EC	
	18 $\times$ 40	0.24	1.05	HL420V151MLV40EC	
180	18 $\times$ 45	0.24	1.15	HL420V181MLV45EC	
450	8.2	10 $\times$ 16	0.24	0.12	HL2W8R2MLR16EC
	10	10 $\times$ 20	0.24	0.13	HL2W100MLR20EC
	22	12.5 $\times$ 20	0.24	0.25	HL2W220MLS20EC
	27	12.5 $\times$ 25	0.24	0.29	HL2W270MLS25EC
	33	12.5 $\times$ 25	0.24	0.39	HL2W330MLS25EC
	47	18 $\times$ 20	0.24	0.51	HL2W470MLV20EC
	56	16 $\times$ 25	0.24	0.57	HL2W560MLU25EC
		18 $\times$ 25	0.24	0.57	HL2W560MLV25EC
	68	18 $\times$ 25	0.24	0.67	HL2W680MLV25EC
	82	16 $\times$ 35.5	0.24	0.75	HL2W820MLU355EC
	100	16 $\times$ 40	0.24	0.84	HL2W101MLU40EC
		18 $\times$ 31.5	0.24	0.84	HL2W101MLV315EC
	120	16 $\times$ 45	0.24	0.94	HL2W121MLU45EC
	150	16 $\times$ 50	0.24	1.05	HL2W151MLU50EC
		18 $\times$ 45	0.24	1.05	HL2W151MLV45EC
	180	18 $\times$ 45	0.24	1.10	HL2W181MLV45EC

ALUMINUM ELECTROLYTIC CAPACITORS

## HOW TO ORDER



### ① Type of series

Type of series
HP3
HU3
HU
ZL
HL
YL
XL1
CU
ZLR
DH

### ② Rated voltage code

Rated voltage code	Rated voltage (V)	Rated voltage code	Rated voltage (V)
1C	16	2E	250
1E	25	2F	315
1V	35	2V	350
1H	50	2G	400
1J	63	420V	420
1K	80	2W	450
2A	100	475V	475
2C	160	2H	500
2P	180	2L	550
2D	200	600V	600

### ③ Capacitance code

Capacitance code	Capacitance (μF)	Capacitance code	Capacitance (μF)
390	39	681	680
470	47	821	820
560	56	102	1,000
680	68	122	1,200
820	82	152	1,500
101	100	182	1,800
121	120	222	2,200
151	150	272	2,700
181	180	332	3,300
221	220	472	4,700
271	270	682	6,800
331	330	103	10,000
391	390	153	15,000
471	470	223	22,000
561	560	333	33,000

The first two digits are significant.  
The last digit indicates the number of following zeros.

### ④ Capacitance tolerance code

Capacitance tolerance code	Capacitance tolerance (%)
M	±20
Q	-10~+30

The standard is [M].

### ⑤ Terminal code

Terminal code	Terminal
C	2-claw short Terminal
R	2-claw Terminal
S	4-claw Terminal
X	4-claw short Terminal
T	T-type Terminal
E	3-claw short Terminal

The standard is [C].

### ⑥ Case dia code

Case dia code	Case dia (mm)
W	20
X	22
Y	25
Z	30
A	35
B	40

### ⑦ Case height code

Case height code	Case height (mm)
S1	20
S2	25
S3	30
S4	35
S5	40
S6	45
S7	50
S8	55 (56)
S9	60 (61)
S12	75 (76)
S17	100 (101)

### ⑧ Plate code

Plate code	Presence
WP	Without plate

The standard is [WP].

### ⑨ Environmental code

Environmental code	Content
EC	Lead-free, PVC-free
PF	Lead-free

The standard is [EC].

## OUTLINE OF DRAWINGS AND DIMENSIONS

### 2-claw short terminal

Standard terminal

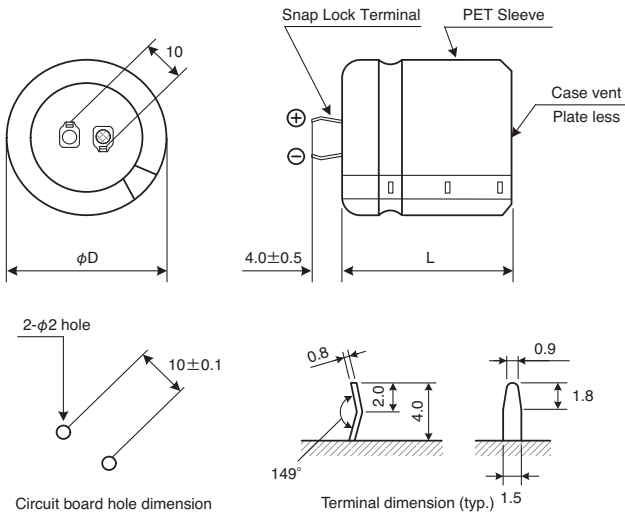
Terminal code : C

Case dia (D) :  $\phi 20 \sim \phi 35$

Case height (L) :  $\sim 75L$

(When fixing with the snap mount type capacitors had two claw terminal and the length of the capacitor more than 55 mm to PCB, use adhesive glue. )

(Unit : mm)



### 2-claw terminal

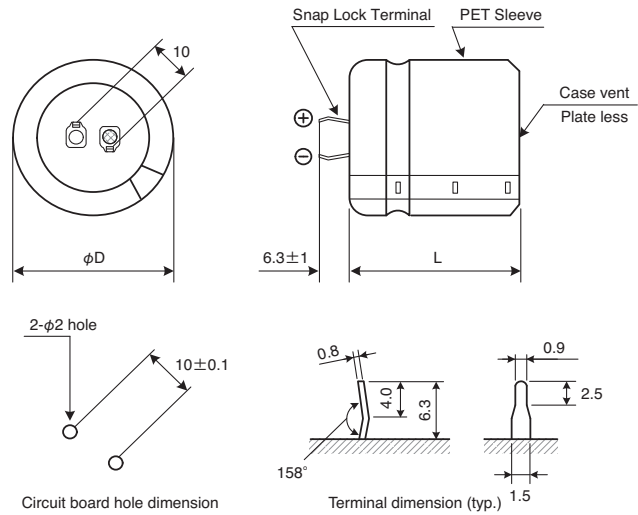
Terminal code : R

Case dia (D) :  $\phi 20 \sim \phi 35$

Case height (L) :  $\sim 75L$

(When fixing with the snap mount type capacitors had two claw terminal and the length of the capacitor more than 55 mm to PCB, use adhesive glue. )

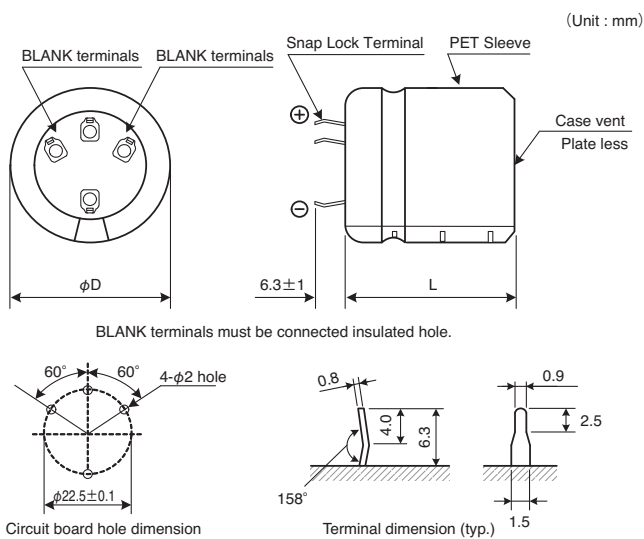
(Unit : mm)



### 4-claw terminal

Terminal code : S

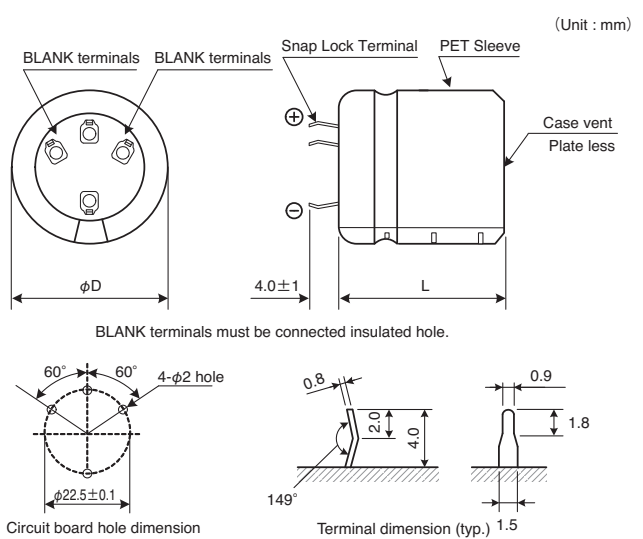
Case dia (D) :  $\phi 35 \sim \phi 40$



### 4-claw short terminal

Terminal code : X

Case dia (D) :  $\phi 35 \sim \phi 40$

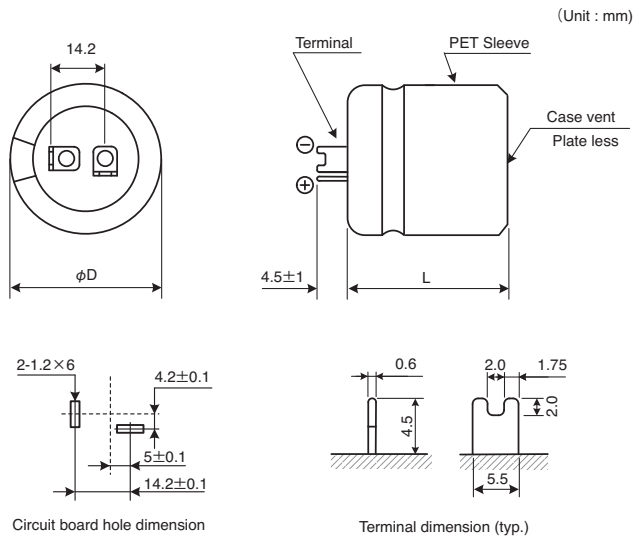




## ■ T-type terminal

Terminal code : T

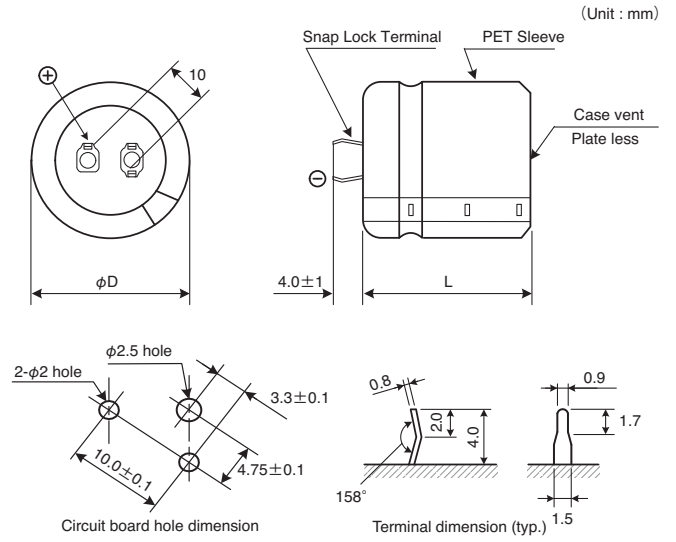
Case dia (D) :  $\phi 30 \sim \phi 40$



## ■ 3-claw short terminal

Terminal code : E

Case dia (D) :  $\phi 22 \sim \phi 35$



## HP3 Series Useful of 4,000 hours at 85°C

- Conform RoHS

### Features

- The HP3 series is the standard products of 85°C .



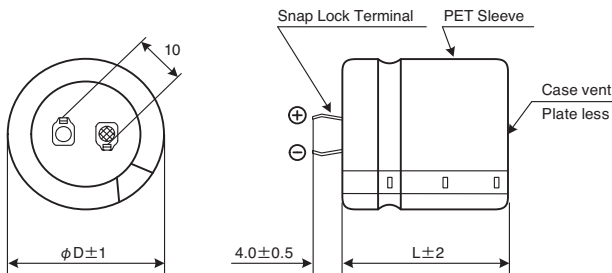
### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	16 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller or lesss (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (85°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 85°C for 2,000 hours : 16 ~ 350V.DC / Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified  400 ~ 450V.DC/ Capacitance change : Within ±20% of the initial value measured Dissipation factor : 200% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 85°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions

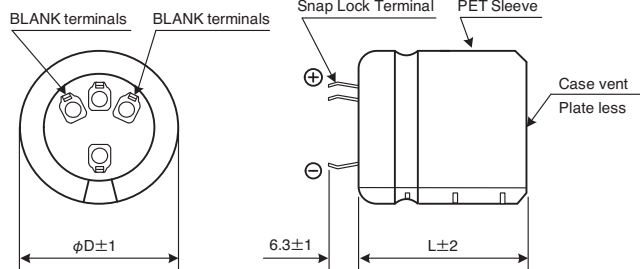
2-claw short terminal (Terminal code : C)

(Unit : mim)



4-claw terminal (Terminal code : S)

(Unit : mim)



### Ripple current correction coefficient

Temperature (°C)	60	70	85			
Correction coefficient	1.4	1.2	1.0			
Frequency (Hz)	50/60	120	300	1K	≥10K	
Correction coefficient	16~100V.DC	0.7	1.0	1.1	1.2	1.2
	160~450V.DC	0.7	1.0	1.1	1.3	1.4

A continuous load should be avoided over 10 Arms at the terminal in accordance with the permissible current. Please consult us when the ripple voltage exceeds 70Vp-p .

### Product code

(Example) HP3 Series 16V 10,000µF ±20%

**HP3 1C 103 M C X S3 WP EC**

- HP3: Type of series
- 1C: Rated voltage code
- 103: Capacitance code
- M: Capacitance tolerance code
- C: Case dia code
- X: Case height code
- S3: Plate code
- WP: Environmental code
- EC: Environmental code

Refer to page 124-125 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name	
16	6,800	22×25	0.50	1.78	51	HP31C682MCXS2WPEC	
		22×30	0.50	1.94	41	HP31C103MCXS3WPEC	
	10,000	25×25	0.50	1.92	41	HP31C103MCYS2WPEC	
		22×40	0.50	2.65	28	HP31C153MCXS5WPEC	
	15,000	25×30	0.50	2.52	28	HP31C153MCYS3WPEC	
		30×25	0.50	2.52	28	HP31C153MCZS2WPEC	
		25×45	0.50	3.52	22	HP31C223MCYS6WPEC	
	22,000	30×30	0.50	3.23	22	HP31C223MCZS3WPEC	
		35×25	0.50	3.23	22	HP31C223MCAS2WPEC	
		30×45	0.50	4.28	17	HP31C333MCZS6WPEC	
		35×35	0.50	4.12	17	HP31C333MCAS4WPEC	
	25	4,700	22×25	0.40	1.48	88	HP31E472MCXS2WPEC
6,800		22×30	0.40	1.89	70	HP31E682MCXS3WPEC	
		25×25	0.40	1.87	70	HP31E682MCYS2WPEC	
10,000		22×35	0.40	2.06	48	HP31E103MCXS4WPEC	
		25×30	0.40	2.06	48	HP31E103MCYS3WPEC	
		30×25	0.40	2.06	48	HP31E103MCZS2WPEC	
		22×45	0.40	2.78	32	HP31E153MCXS6WPEC	
15,000		25×35	0.40	2.67	32	HP31E153MCYS4WPEC	
		30×30	0.40	2.67	32	HP31E153MCZS3WPEC	
		35×25	0.40	2.67	32	HP31E153MCAS2WPEC	
22,000		25×45	0.40	3.52	22	HP31E223MCYS6WPEC	
		30×35	0.40	3.41	22	HP31E223MCZS4WPEC	
		35×30	0.40	3.41	22	HP31E223MCAS3WPEC	
33,000		30×50	0.40	4.45	17	HP31E333MCZS7WPEC	
		35×40	0.40	4.31	17	HP31E333MCAS5WPEC	
		35	3,300	22×25	0.35	1.38	165
4,700			22×30	0.35	1.57	115	HP31V472MCXS3WPEC
			25×25	0.35	1.56	115	HP31V472MCYS2WPEC
6,800	22×35		0.35	2.01	80	HP31V682MCXS4WPEC	
	25×30		0.35	2.01	80	HP31V682MCYS3WPEC	
	30×25		0.35	2.01	80	HP31V682MCZS2WPEC	
10,000	22×45		0.35	2.27	55	HP31V103MCXS6WPEC	
	25×35		0.35	2.18	55	HP31V103MCYS4WPEC	
	30×30		0.35	2.18	55	HP31V103MCZS3WPEC	
	35×25		0.35	2.18	55	HP31V103MCAS2WPEC	
	25×50		0.35	3.03	35	HP31V153MCYS7WPEC	
15,000	30×35		0.35	2.82	35	HP31V153MCZS4WPEC	
	35×30		0.35	2.82	35	HP31V153MCAS3WPEC	
	30×45		0.35	3.73	25	HP31V223MCZS6WPEC	
22,000	35×40		0.35	3.76	25	HP31V223MCAS5WPEC	
	33,000		35×50	0.40	4.67	20	HP31V333MCAS7WPEC
50	2,200		22×25	0.30	1.13	108	HP31H222MCXS2WPEC
	3,300		22×30	0.30	1.47	72	HP31H332MCXS3WPEC
		25×25	0.30	1.46	72	HP31H332MCYS2WPEC	
	4,700	22×35	0.30	1.67	50	HP31H472MCXS4WPEC	
		25×30	0.30	1.67	50	HP31H472MCYS3WPEC	
		30×25	0.30	1.67	50	HP31H472MCZS2WPEC	
	6,800	22×50	0.30	2.31	35	HP31H682MCXS7WPEC	
		25×40	0.30	2.21	35	HP31H682MCYS5WPEC	
		30×30	0.30	2.13	35	HP31H682MCZS3WPEC	
		35×25	0.30	2.13	35	HP31H682MCAS2WPEC	
		25×50	0.35	2.48	32	HP31H103MCYS7WPEC	
	10,000	30×35	0.35	2.30	32	HP31H103MCZS4WPEC	
		35×30	0.35	2.30	32	HP31H103MCAS3WPEC	
		30×50	0.35	3.21	25	HP31H153MCZS7WPEC	
	15,000	35×40	0.35	3.10	25	HP31H153MCAS5WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name	
63	1,500	22×25	0.25	1.08	159	HP31J152MCXS2WPEC	
		22×30	0.25	1.20	108	HP31J222MCXS3WPEC	
	2,200	25×25	0.25	1.19	108	HP31J222MCYS2WPEC	
		22×35	0.25	1.56	80	HP31J332MCXS4WPEC	
	3,300	25×30	0.25	1.56	80	HP31J332MCYS3WPEC	
		30×25	0.25	1.56	80	HP31J332MCZS2WPEC	
		22×45	0.25	1.84	60	HP31J472MCXS6WPEC	
	4,700	25×35	0.25	1.77	60	HP31J472MCYS4WPEC	
		30×30	0.25	1.77	60	HP31J472MCZS3WPEC	
		35×25	0.25	1.77	60	HP31J472MCAS2WPEC	
		25×50	0.25	2.42	40	HP31J682MCYS7WPEC	
	6,800	30×35	0.25	2.25	40	HP31J682MCZS4WPEC	
		35×30	0.25	2.25	40	HP31J682MCAS3WPEC	
	10,000	30×45	0.35	2.52	35	HP31J103MCZS6WPEC	
		35×40	0.35	2.53	35	HP31J103MCAS5WPEC	
15,000	35×50	0.35	3.36	30	HP31J153MCAS7WPEC		
80	1,000	22×25	0.20	0.88	230	HP31K102MCXS2WPEC	
		22×30	0.20	1.15	155	HP31K152MCXS3WPEC	
	1,500	25×25	0.20	1.13	155	HP31K152MCYS2WPEC	
		22×40	0.20	1.34	105	HP31K222MCXS5WPEC	
	2,200	25×30	0.20	1.28	105	HP31K222MCYS3WPEC	
		30×25	0.20	1.28	105	HP31K222MCZS2WPEC	
		22×50	0.25	1.80	70	HP31K332MCXS7WPEC	
	3,300	25×40	0.25	1.72	70	HP31K332MCYS5WPEC	
		30×30	0.25	1.65	70	HP31K332MCZS3WPEC	
		35×25	0.25	1.65	70	HP31K332MCAS2WPEC	
		25×50	0.25	2.01	50	HP31K472MCYS7WPEC	
	4,700	30×40	0.25	1.96	50	HP31K472MCZS5WPEC	
		35×30	0.25	1.87	50	HP31K472MCAS3WPEC	
	6,800	30×50	0.25	2.56	35	HP31K682MCZS7WPEC	
		35×40	0.25	2.47	35	HP31K682MCAS5WPEC	
	100	1,000	22×30	0.20	0.94	180	HP32A102MCXS3WPEC
			25×25	0.20	0.93	180	HP32A102MCYS2WPEC
		1,500	22×35	0.20	1.22	120	HP32A152MCXS4WPEC
25×30			0.20	1.22	120	HP32A152MCYS3WPEC	
30×25			0.20	1.22	120	HP32A152MCZS2WPEC	
2,200		22×50	0.20	1.47	82	HP32A222MCXS7WPEC	
		25×40	0.20	1.41	82	HP32A222MCYS5WPEC	
		30×30	0.20	1.35	82	HP32A222MCZS3WPEC	
		35×25	0.20	1.35	82	HP32A222MCAS2WPEC	
		25×50	0.20	1.88	60	HP32A332MCYS7WPEC	
3,300		30×40	0.20	1.83	60	HP32A332MCZS5WPEC	
		35×30	0.20	1.75	60	HP32A332MCAS3WPEC	
4,700		30×50	0.25	2.12	45	HP32A472MCZS7WPEC	
		35×40	0.25	2.05	45	HP32A472MCAS5WPEC	
6,800		35×50	0.25	2.68	35	HP32A682MCAS7WPEC	
160	390	22×25	0.15	1.50	365	HP32C391MCXS2WPEC	
		22×30	0.15	1.76	305	HP32C471MCXS3WPEC	
	470	25×25	0.15	1.74	305	HP32C471MCYS2WPEC	
		22×35	0.15	2.03	255	HP32C561MCXS4WPEC	
	560	25×30	0.15	2.02	255	HP32C561MCYS3WPEC	
		22×40	0.15	2.36	210	HP32C681MCXS5WPEC	
	680	25×30	0.15	2.24	210	HP32C681MCYS3WPEC	
		30×25	0.15	2.24	210	HP32C681MCZS2WPEC	
	820	22×45	0.15	2.72	175	HP32C821MCXS6WPEC	
		25×35	0.15	2.61	175	HP32C821MCYS4WPEC	
		30×30	0.15	2.61	175	HP32C821MCZS3WPEC	
	1,000	22×50	0.15	3.13	145	HP32C102MCXS7WPEC	
		25×40	0.15	3.00	145	HP32C102MCYS5WPEC	
		30×30	0.15	2.88	145	HP32C102MCZS3WPEC	
		35×25	0.15	2.88	145	HP32C102MCAS2WPEC	
	1,200	25×45	0.15	3.44	120	HP32C122MCYS6WPEC	
		30×35	0.15	3.34	120	HP32C122MCZS4WPEC	
	1,500	35×30	0.15	3.34	120	HP32C122MCAS3WPEC	
		30×40	0.15	3.91	95	HP32C152MCZS5WPEC	
	1,800	35×35	0.15	3.96	95	HP32C152MCAS4WPEC	
		30×45	0.15	4.47	80	HP32C182MCZS6WPEC	
			35×35	0.15	4.34	80	HP32C182MCAS4WPEC

ALUMINUM ELECTROLYTIC CAPACITORS

# SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
180	330	22 × 25	0.15	1.38	375	HP32P331MCXS2WPEC
		22 × 30	0.15	1.60	320	HP32P391MCXS3WPEC
	390	25 × 25	0.15	1.58	320	HP32P391MCYS2WPEC
		22 × 30	0.15	1.76	265	HP32P471MCXS3WPEC
	470	25 × 25	0.15	1.74	265	HP32P471MCYS2WPEC
		22 × 35	0.15	2.03	225	HP32P561MCXS4WPEC
	560	25 × 30	0.15	2.03	225	HP32P561MCYS3WPEC
		30 × 25	0.15	2.03	225	HP32P561MCZS2WPEC
	680	22 × 40	0.15	2.36	185	HP32P681MCXS5WPEC
		25 × 35	0.15	2.35	185	HP32P681MCYS4WPEC
		30 × 25	0.15	2.24	185	HP32P681MCZS2WPEC
	820	22 × 45	0.15	2.72	155	HP32P821MCXS6WPEC
		25 × 35	0.15	2.59	155	HP32P821MCYS5WPEC
		30 × 30	0.15	2.61	155	HP32P821MCZS3WPEC
		35 × 25	0.15	2.61	155	HP32P821MCAS2WPEC
	1,000	25 × 45	0.15	3.14	125	HP32P102MCYS6WPEC
		30 × 35	0.15	3.04	125	HP32P102MCZS4WPEC
		35 × 25	0.15	2.88	125	HP32P102MCAS2WPEC
	1,200	25 × 50	0.15	3.59	105	HP32P122MCYS7WPEC
		30 × 40	0.15	3.49	105	HP32P122MCZS5WPEC
35 × 30		0.15	3.34	105	HP32P122MCAS3WPEC	
1,500	30 × 45	0.15	4.08	85	HP32P152MCZS6WPEC	
	35 × 35	0.15	3.96	85	HP32P152MCAS4WPEC	
1,800	35 × 40	0.15	4.50	70	HP32P182MCAS5WPEC	
200	330	22 × 25	0.15	1.53	325	HP32D331MCXS2WPEC
		22 × 30	0.15	1.92	275	HP32D391MCXS3WPEC
	390	22 × 30	0.15	1.94	230	HP32D471MCXS3WPEC
		25 × 25	0.15	1.92	230	HP32D471MCYS2WPEC
	470	22 × 35	0.15	2.25	190	HP32D561MCXS4WPEC
		25 × 30	0.15	2.23	190	HP32D561MCYS3WPEC
	560	22 × 40	0.15	2.61	160	HP32D681MCXS5WPEC
		25 × 35	0.15	2.86	160	HP32D681MCYS4WPEC
		30 × 25	0.15	2.45	160	HP32D681MCZS2WPEC
	680	25 × 40	0.15	3.26	130	HP32D821MCYS5WPEC
		30 × 30	0.15	3.13	130	HP32D821MCZS3WPEC
		35 × 25	0.15	3.13	130	HP32D821MCAS2WPEC
	820	25 × 45	0.15	3.46	110	HP32D102MCYS6WPEC
		30 × 35	0.15	3.64	110	HP32D102MCZS4WPEC
		35 × 30	0.15	3.66	110	HP32D102MCAS3WPEC
	1,000	30 × 40	0.15	4.19	90	HP32D122MCZS5WPEC
		35 × 30	0.15	3.67	90	HP32D122MCAS3WPEC
		35 × 35	0.15	4.31	75	HP32D152MCAS4WPEC
	1,500	35 × 35	0.15	4.31	75	HP32D152MCAS4WPEC
	1,800	35 × 45	0.15	5.15	70	HP32D182MCAS6WPEC

Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
250	270	22 × 25	0.15	1.38	395	HP32E271MCXS2WPEC
		22 × 30	0.15	1.63	325	HP32E331MCXS3WPEC
	330	25 × 25	0.15	1.60	325	HP32E331MCYS2WPEC
		22 × 35	0.15	2.04	275	HP32E391MCXS4WPEC
	390	25 × 30	0.15	2.04	275	HP32E391MCYS3WPEC
		22 × 40	0.15	2.35	230	HP32E471MCXS5WPEC
	470	25 × 30	0.15	2.04	230	HP32E471MCYS3WPEC
		30 × 25	0.15	2.24	230	HP32E471MCZS2WPEC
		22 × 45	0.15	2.48	190	HP32E561MCXS6WPEC
	560	25 × 35	0.15	2.35	190	HP32E561MCYS4WPEC
		30 × 30	0.15	2.59	190	HP32E561MCZS3WPEC
		25 × 40	0.15	2.73	160	HP32E681MCYS5WPEC
	680	30 × 30	0.15	2.60	160	HP32E681MCZS3WPEC
		35 × 25	0.15	2.61	160	HP32E681MCAS2WPEC
		25 × 45	0.15	3.13	130	HP32E821MCYS6WPEC
	820	30 × 35	0.15	3.01	130	HP32E821MCZS4WPEC
		35 × 30	0.15	3.31	130	HP32E821MCAS3WPEC
		30 × 40	0.15	3.49	110	HP32E102MCZS5WPEC
	1,000	35 × 35	0.15	3.88	110	HP32E102MCAS4WPEC
		30 × 45	0.15	3.99	90	HP32E122MCZS6WPEC
1,200	35 × 40	0.15	4.40	90	HP32E122MCAS5WPEC	
	35 × 45	0.15	4.70	75	HP32E152MCAS6WPEC	
350	120	22 × 25	0.15	0.84	885	HP32V121MCXS2WPEC
		22 × 30	0.15	0.99	710	HP32V151MCXS3WPEC
	150	22 × 30	0.15	1.09	590	HP32V181MCXS3WPEC
		25 × 25	0.15	1.08	590	HP32V181MCYS2WPEC
	180	22 × 35	0.15	1.28	485	HP32V221MCXS4WPEC
		25 × 30	0.15	1.27	485	HP32V221MCYS3WPEC
		22 × 45	0.15	1.57	395	HP32V271MCXS6WPEC
	220	25 × 35	0.15	1.49	395	HP32V271MCYS4WPEC
		30 × 25	0.15	1.41	395	HP32V271MCZS2WPEC
		25 × 40	0.15	1.79	325	HP32V331MCYS5WPEC
	270	30 × 30	0.15	1.65	325	HP32V331MCZS3WPEC
		35 × 25	0.15	1.65	325	HP32V331MCAS2WPEC
		25 × 45	0.15	1.96	275	HP32V391MCYS6WPEC
	330	30 × 35	0.15	1.89	275	HP32V391MCZS4WPEC
		35 × 30	0.15	1.90	275	HP32V391MCAS3WPEC
		30 × 35	0.15	2.07	230	HP32V471MCZS4WPEC
	390	35 × 30	0.15	2.09	230	HP32V471MCAS3WPEC
		30 × 45	0.15	2.48	190	HP32V561MCZS6WPEC
	470	35 × 35	0.15	2.39	190	HP32V561MCAS4WPEC
		35 × 40	0.15	2.76	165	HP32V681MCAS5WPEC

### Standard Products Table

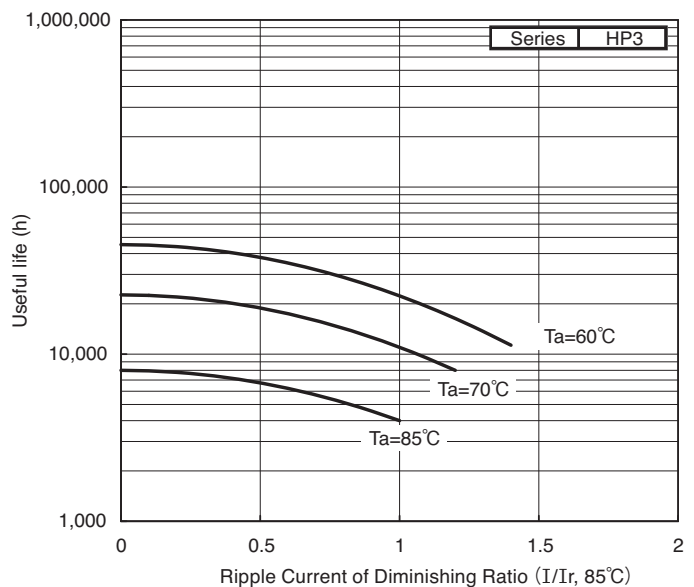
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
180	22×30	22×30	0.20	1.31	600	HP32G181MCXS3WPEC
		25×25	0.20	1.29	600	HP32G181MCYS2WPEC
220	22×35	22×35	0.20	1.54	490	HP32G221MCXS4WPEC
		25×30	0.20	1.52	490	HP32G221MCYS3WPEC
270	22×40	22×40	0.20	1.79	400	HP32G271MCXS5WPEC
		25×35	0.20	1.78	400	HP32G271MCYS4WPEC
		30×25	0.20	1.69	400	HP32G271MCZS2WPEC
330	22×50	22×50	0.20	2.17	330	HP32G331MCXS7WPEC
		25×40	0.20	2.07	330	HP32G331MCYS5WPEC
		30×30	0.20	1.98	330	HP32G331MCZS3WPEC
390	25×45	25×45	0.20	2.36	280	HP32G391MCYS6WPEC
		30×35	0.20	2.27	280	HP32G391MCZS4WPEC
		35×25	0.20	2.16	280	HP32G391MCAS2WPEC
470	25×50	25×50	0.20	2.70	230	HP32G471MCYS7WPEC
		30×40	0.20	2.61	230	HP32G471MCZS5WPEC
		35×30	0.20	2.50	230	HP32G471MCAS3WPEC
560	30×45	30×45	0.20	2.98	200	HP32G561MCZS6WPEC
		35×35	0.20	2.87	200	HP32G561MCAS4WPEC
680	30×50	30×50	0.20	3.41	160	HP32G681MCZS7WPEC
		35×40	0.20	3.31	160	HP32G681MCAS5WPEC
820	30×60	30×60	0.20	3.45	140	HP32G821MCZS9WPEC
		35×45	0.20	3.79	140	HP32G821MCAS6WPEC
1,000	35×50	0.20	4.35	110	HP32G102MCAS7WPEC	
1,200	35×75	35×75	0.20	4.42	100	HP32G122MSAS12WPEC
		40×56	0.20	4.28	100	HP32G122MSBS8WPEC
1,500	35×100	35×100	0.20	5.57	80	HP32G152MSAS17WPEC
		40×76	0.20	5.13	80	HP32G152MSBS12WPEC
1,800	40×101	0.20	6.32	70	HP32G182MSBS17WPEC	
420	120	22×25	0.20	1.00	920	HP3420V121MCXS2WPEC
		22×30	0.20	1.20	740	HP3420V151MCXS3WPEC
150	25×25	25×25	0.20	1.18	740	HP3420V151MCYS2WPEC
		22×35	0.20	1.39	620	HP3420V181MCXS4WPEC
180	25×30	25×30	0.20	1.38	620	HP3420V181MCYS3WPEC
		22×40	0.20	1.62	500	HP3420V221MCXS5WPEC
220	25×35	25×35	0.20	1.61	500	HP3420V221MCYS4WPEC
		30×25	0.20	1.52	500	HP3420V221MCZS2WPEC
		22×45	0.20	1.88	410	HP3420V271MCXS6WPEC
270	25×40	25×40	0.20	1.87	410	HP3420V271MCYS5WPEC
		30×30	0.20	1.79	410	HP3420V271MCZS3WPEC
		25×45	0.20	2.17	340	HP3420V331MCYS6WPEC
330	35×25	35×25	0.20	1.98	340	HP3420V331MCAS2WPEC
		25×50	0.20	2.46	290	HP3420V391MCYS7WPEC
390	30×35	30×35	0.20	2.27	290	HP3420V391MCZS4WPEC
		35×30	0.20	2.28	290	HP3420V391MCAS3WPEC
		30×40	0.20	2.61	240	HP3420V471MCZS5WPEC
470	35×35	35×35	0.20	2.63	240	HP3420V471MCAS4WPEC
		30×50	0.20	3.10	200	HP3420V561MCZS7WPEC
560	35×40	35×40	0.20	3.01	200	HP3420V561MCAS5WPEC
		30×60	0.20	3.35	170	HP3420V681MCZS9WPEC
680	35×45	35×45	0.20	3.45	170	HP3420V681MCAS6WPEC
		35×50	0.20	3.94	140	HP3420V821MCAS7WPEC
1,000	35×75	35×75	0.20	4.04	120	HP3420V102MSAS12WPEC
		40×56	0.20	3.91	120	HP3420V102MSBS8WPEC
1,200	35×100	35×100	0.20	4.99	100	HP3420V122MSAS17WPEC
		40×76	0.20	4.59	100	HP3420V122MSBS12WPEC
1,800	40×101	0.20	6.32	70	HP3420V182MSBS17WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
150	22×30	22×30	0.20	1.20	740	HP32W151MCXS3WPEC
		25×25	0.20	1.18	740	HP32W151MCYS2WPEC
180	22×35	22×35	0.20	1.39	620	HP32W181MCXS4WPEC
		25×30	0.20	1.38	620	HP32W181MCYS3WPEC
220	22×40	22×40	0.20	1.62	500	HP32W221MCXS5WPEC
		25×35	0.20	1.61	500	HP32W221MCYS4WPEC
		30×25	0.20	1.52	500	HP32W221MCZS2WPEC
270	22×45	22×45	0.20	1.88	410	HP32W271MCXS6WPEC
		25×40	0.20	1.87	410	HP32W271MCYS5WPEC
		30×30	0.20	1.79	410	HP32W271MCZS3WPEC
330	25×45	25×45	0.20	2.17	340	HP32W331MCYS6WPEC
		35×25	0.20	1.98	340	HP32W331MCAS2WPEC
		25×50	0.20	2.46	290	HP32W391MCYS7WPEC
390	30×35	30×35	0.20	2.27	290	HP32W391MCZS4WPEC
		35×30	0.20	2.28	290	HP32W391MCAS3WPEC
		30×40	0.20	2.61	240	HP32W471MCZS5WPEC
470	35×35	35×35	0.20	2.63	240	HP32W471MCAS4WPEC
		30×50	0.20	3.10	200	HP32W561MCZS7WPEC
560	35×40	35×40	0.20	3.01	200	HP32W561MCAS5WPEC
		30×60	0.20	3.12	170	HP32W681MCZS9WPEC
680	35×45	35×45	0.20	3.45	170	HP32W681MCAS6WPEC
		35×50	0.20	3.94	140	HP32W821MCAS7WPEC
1,000	35×75	35×75	0.20	4.04	120	HP32W102MSAS12WPEC
		40×61	0.20	4.04	120	HP32W102MSBS9WPEC
1,200	35×100	35×100	0.20	4.99	100	HP32W122MSAS17WPEC
		40×76	0.20	4.59	100	HP32W122MSBS12WPEC
1,500	40×101	0.20	5.76	80	HP32W152MSBS17WPEC	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 85°C, 120Hz

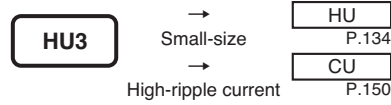


## HU3 Series Useful of 4,000 hours at 105°C

- Conform RoHS

### Features

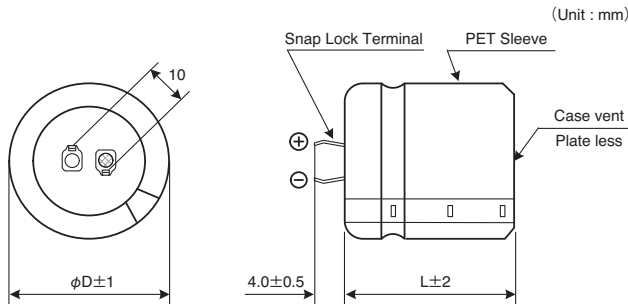
- The HU3 series is the standard products.



### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	16 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 2,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions

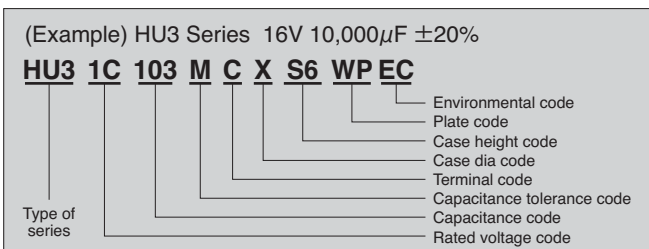


### Ripple current correction coefficient

Temperature (°C)	60	70	85	105		
Correction coefficient	2.2	2.0	1.8	1.0		
Frequency (Hz)	50/60	120	300	1K	≥10K	
Correction coefficient	16~100V.DC	0.7	1.0	1.1	1.2	1.2
	160~450V.DC	0.7	1.0	1.1	1.3	1.4

A continuous load should be avoided over 10 Arms at the terminal in accordance with the permissible current. Please consult us when the ripple voltage exceeds 70Vp-p.

### Product code



Refer to page 124-125 for other terminal shape available on request.



Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR (typ.) (mΩ) 20°C, 100Hz	Product name	
16	4,700	22×25	0.50	0.93	67	HU31C472MCXS2WPEC	
		22×35	0.50	1.27	46	HU31C682MCXS4WPEC	
	6,800	25×30	0.50	1.26	46	HU31C682MCYS3WPEC	
		22×45	0.50	1.43	38	HU31C103MCXS6WPEC	
	10,000	25×35	0.50	1.36	38	HU31C103MCYS4WPEC	
		30×25	0.50	1.30	38	HU31C103MCZS2WPEC	
		25×45	0.50	1.84	25	HU31C153MCYS6WPEC	
	15,000	30×35	0.50	1.77	25	HU31C153MCZS4WPEC	
		35×30	0.50	1.78	25	HU31C153MCAS3WPEC	
		30×45	0.50	2.36	20	HU31C223MCZS6WPEC	
	22,000	35×35	0.50	2.27	20	HU31C223MCAS4WPEC	
		33,000	35×50	0.50	2.95	15	HU31C333MCAS7WPEC
25	3,300	22×25	0.40	0.87	116	HU31E332MCXS2WPEC	
		22×30	0.40	1.00	81	HU31E472MCXS3WPEC	
	4,700	25×25	0.40	0.98	81	HU31E472MCYS2WPEC	
		22×35	0.40	1.27	65	HU31E682MCXS4WPEC	
	6,800	25×30	0.40	1.27	65	HU31E682MCYS3WPEC	
		30×25	0.40	1.27	65	HU31E682MCZS2WPEC	
		22×45	0.40	1.43	45	HU31E103MCXS6WPEC	
	10,000	25×35	0.40	1.38	45	HU31E103MCYS4WPEC	
		30×30	0.40	1.38	45	HU31E103MCZS3WPEC	
		35×25	0.40	1.38	45	HU31E103MCAS2WPEC	
		25×45	0.40	1.84	30	HU31E153MCYS6WPEC	
	15,000	30×35	0.40	1.78	30	HU31E153MCZS4WPEC	
		35×30	0.40	1.78	30	HU31E153MCAS3WPEC	
		30×45	0.40	2.36	20	HU31E223MCZS6WPEC	
	22,000	35×40	0.40	2.38	20	HU31E223MCAS5WPEC	
		33,000	35×50	0.40	2.95	15	HU31E333MCAS7WPEC
	35	2,200	22×25	0.35	0.71	108	HU31V222MCXS2WPEC
			22×30	0.35	0.93	72	HU31V332MCXS3WPEC
		3,300	25×25	0.35	0.92	72	HU31V332MCYS2WPEC
			22×35	0.35	1.05	61	HU31V472MCXS4WPEC
4,700		25×30	0.35	1.05	61	HU31V472MCYS3WPEC	
		30×25	0.35	1.05	61	HU31V472MCZS2WPEC	
		22×50	0.35	1.46	55	HU31V682MCXS7WPEC	
6,800		25×40	0.35	1.40	55	HU31V682MCYS5WPEC	
		30×30	0.35	1.34	55	HU31V682MCZS3WPEC	
		35×25	0.35	1.34	55	HU31V682MCAS2WPEC	
		25×50	0.35	1.57	35	HU31V103MCYS7WPEC	
10,000		30×35	0.35	1.46	35	HU31V103MCZS4WPEC	
		35×30	0.35	1.46	35	HU31V103MCAS3WPEC	
		30×50	0.35	2.03	25	HU31V153MCZS7WPEC	
15,000		35×40	0.35	1.96	25	HU31V153MCAS5WPEC	
		1,500	22×25	0.30	0.68	159	HU31H152MCXS2WPEC
22×30			0.30	0.76	108	HU31H222MCXS3WPEC	
2,200			25×25	0.30	0.75	108	HU31H222MCYS2WPEC
	22×35		0.30	0.99	72	HU31H332MCXS4WPEC	
3,300	25×30	0.30	0.98	72	HU31H332MCYS3WPEC		
	30×25	0.30	0.99	72	HU31H332MCZS2WPEC		
	22×45	0.30	1.16	50	HU31H472MCXS6WPEC		
4,700	25×35	0.30	1.11	50	HU31H472MCYS4WPEC		
	30×30	0.30	1.12	50	HU31H472MCZS3WPEC		
	35×25	0.30	1.12	50	HU31H472MCAS2WPEC		
	25×50	0.30	1.53	35	HU31H682MCYS7WPEC		
6,800	30×35	0.30	1.42	35	HU31H682MCZS4WPEC		
	35×30	0.30	1.42	35	HU31H682MCAS3WPEC		
	30×45	0.35	1.59	31	HU31H103MCZS6WPEC		
10,000	35×40	0.35	1.60	31	HU31H103MCAS5WPEC		
	15,000	35×50	0.35	2.13	25	HU31H153MCAS7WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR (typ.) (mΩ) 20°C, 100Hz	Product name	
63	1,000	22×25	0.25	0.56	238	HU31J102MCXS2WPEC	
		22×30	0.25	0.73	159	HU31J152MCXS3WPEC	
	1,500	25×25	0.25	0.72	159	HU31J152MCYS2WPEC	
		22×35	0.25	0.81	108	HU31J222MCXS4WPEC	
	2,200	25×30	0.25	0.80	108	HU31J222MCYS3WPEC	
		30×25	0.25	0.81	108	HU31J222MCZS2WPEC	
		22×45	0.25	1.09	80	HU31J332MCXS6WPEC	
	3,300	25×40	0.25	1.09	80	HU31J332MCYS5WPEC	
		30×30	0.25	1.05	80	HU31J332MCZS3WPEC	
		35×25	0.25	1.05	80	HU31J332MCAS2WPEC	
	4,700	25×50	0.25	1.27	60	HU31J472MCYS7WPEC	
		30×35	0.25	1.18	60	HU31J472MCZS4WPEC	
6,800	35×30	0.25	1.18	60	HU31J472MCAS3WPEC		
	30×45	0.25	1.55	40	HU31J682MCZS6WPEC		
10,000	35×40	0.25	1.56	40	HU31J682MCAS5WPEC		
10,000	35×50	0.35	1.74	30	HU31J103MCAS7WPEC		
80	1,000	22×30	0.20	0.59	230	HU31K102MCXS3WPEC	
		25×25	0.20	0.59	230	HU31K102MCYS2WPEC	
	1,500	22×35	0.20	0.77	155	HU31K152MCXS4WPEC	
		25×30	0.20	0.77	155	HU31K152MCYS3WPEC	
		30×25	0.20	0.77	155	HU31K152MCZS2WPEC	
	2,200	22×50	0.20	0.93	105	HU31K222MCXS7WPEC	
		25×40	0.20	0.89	105	HU31K222MCYS5WPEC	
		30×30	0.20	0.85	105	HU31K222MCZS3WPEC	
		35×25	0.20	0.85	105	HU31K222MCAS2WPEC	
	3,300	25×50	0.20	1.19	70	HU31K332MCYS7WPEC	
		30×40	0.20	1.16	70	HU31K332MCZS5WPEC	
		35×30	0.20	1.11	70	HU31K332MCAS3WPEC	
4,700	30×50	0.25	1.34	50	HU31K472MCZS7WPEC		
	35×40	0.25	1.30	50	HU31K472MCAS5WPEC		
6,800	35×50	0.25	1.69	35	HU31K682MCAS7WPEC		
100	1,000	22×30	0.20	0.59	180	HU32A102MCXS3WPEC	
		25×25	0.20	0.59	180	HU32A102MCYS2WPEC	
	1,500	22×40	0.20	0.81	120	HU32A152MCXS5WPEC	
		25×35	0.20	0.81	120	HU32A152MCYS4WPEC	
		30×25	0.20	0.77	120	HU32A152MCZS2WPEC	
	2,200	25×45	0.20	0.93	82	HU32A222MCYS6WPEC	
		30×35	0.20	0.90	82	HU32A222MCZS4WPEC	
	3,300	30×45	0.20	1.21	60	HU32A332MCZS6WPEC	
		35×35	0.20	1.16	60	HU32A332MCAS4WPEC	
	4,700	35×45	0.25	1.35	45	HU32A472MCAS6WPEC	
	160	330	22×25	0.15	0.98	430	HU32C331MCXS2WPEC
			22×30	0.15	1.10	365	HU32C391MCXS3WPEC
390		25×25	0.15	1.09	365	HU32C391MCYS2WPEC	
		22×30	0.15	1.21	305	HU32C471MCXS3WPEC	
470		25×25	0.15	1.19	305	HU32C471MCYS2WPEC	
		22×35	0.15	1.40	255	HU32C561MCXS4WPEC	
		25×30	0.15	1.40	255	HU32C561MCYS3WPEC	
560		30×25	0.15	1.40	255	HU32C561MCZS2WPEC	
		22×40	0.15	1.62	210	HU32C681MCXS5WPEC	
		25×35	0.15	1.61	210	HU32C681MCYS4WPEC	
680		30×25	0.15	1.54	210	HU32C681MCZS2WPEC	
		22×45	0.15	1.86	175	HU32C821MCXS6WPEC	
	25×40	0.15	1.86	175	HU32C821MCYS5WPEC		
820	30×30	0.15	1.79	175	HU32C821MCZS3WPEC		
	35×25	0.15	1.79	175	HU32C821MCAS2WPEC		
	25×45	0.15	2.15	145	HU32C102MCYS6WPEC		
1,000	30×35	0.15	2.09	145	HU32C102MCZS4WPEC		
	35×25	0.15	1.98	145	HU32C102MCAS2WPEC		
1,200	25×50	0.15	2.46	120	HU32C122MCYS7WPEC		
	30×35	0.15	2.29	120	HU32C122MCZS4WPEC		
	35×30	0.15	2.29	120	HU32C122MCAS3WPEC		
1,500	30×45	0.15	2.80	95	HU32C152MCZS6WPEC		
	35×35	0.15	2.72	95	HU32C152MCAS4WPEC		
1,800	35×40	0.15	3.09	80	HU32C182MCAS5WPEC		

ALUMINUM ELECTROLYTIC CAPACITORS

# SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
180	330	22 × 25	0.15	0.94	375	HU32P331MCXS2WPEC
		25 × 25	0.15	1.00	375	HU32P331MCYS2WPEC
	390	22 × 30	0.15	1.10	320	HU32P391MCXS3WPEC
		25 × 25	0.15	1.09	320	HU32P391MCYS2WPEC
	470	22 × 30	0.15	1.20	265	HU32P471MCXS3WPEC
		25 × 25	0.15	1.19	265	HU32P471MCYS2WPEC
		30 × 25	0.15	1.28	265	HU32P471MCZS2WPEC
	560	22 × 35	0.15	1.39	225	HU32P561MCXS4WPEC
		25 × 30	0.15	1.40	225	HU32P561MCYS3WPEC
		30 × 25	0.15	1.40	225	HU32P561MCZS2WPEC
	680	22 × 40	0.15	1.61	185	HU32P681MCXS5WPEC
		25 × 35	0.15	1.63	185	HU32P681MCYS4WPEC
		30 × 25	0.15	1.54	185	HU32P681MCZS2WPEC
	820	35 × 25	0.15	1.63	185	HU32P681MCAS2WPEC
		22 × 45	0.15	1.86	155	HU32P821MCXS6WPEC
		25 × 40	0.15	1.87	155	HU32P821MCYS5WPEC
	820	30 × 30	0.15	1.79	155	HU32P821MCZS3WPEC
		35 × 25	0.15	1.79	155	HU32P821MCAS2WPEC
		25 × 45	0.15	2.15	125	HU32P102MCYS6WPEC
	1,000	30 × 35	0.15	2.09	125	HU32P102MCZS4WPEC
		35 × 30	0.15	2.09	125	HU32P102MCAS3WPEC
		30 × 40	0.15	2.39	105	HU32P122MCZS5WPEC
	1,200	35 × 30	0.15	2.29	105	HU32P122MCAS3WPEC
		30 × 45	0.15	2.79	85	HU32P152MCZS6WPEC
35 × 35		0.15	2.72	85	HU32P152MCAS4WPEC	
1,800	35 × 40	0.15	3.09	70	HU32P182MCAS5WPEC	
200	330	22 × 25	0.15	1.04	325	HU32D331MCXS2WPEC
	390	22 × 30	0.15	1.20	275	HU32D391MCXS3WPEC
	470	22 × 35	0.15	1.40	230	HU32D471MCXS4WPEC
		25 × 25	0.15	1.31	230	HU32D471MCYS2WPEC
	560	22 × 40	0.15	1.61	190	HU32D561MCXS5WPEC
		25 × 30	0.15	1.52	190	HU32D561MCYS3WPEC
		30 × 25	0.15	1.53	190	HU32D561MCZS2WPEC
	680	22 × 40	0.15	1.77	160	HU32D681MCXS5WPEC
		25 × 35	0.15	1.78	160	HU32D681MCYS4WPEC
		30 × 25	0.15	1.69	160	HU32D681MCZS2WPEC
	820	25 × 40	0.15	2.05	130	HU32D821MCYS5WPEC
		30 × 30	0.15	1.97	130	HU32D821MCZS3WPEC
		35 × 25	0.15	1.96	130	HU32D821MCAS2WPEC
	1,000	25 × 45	0.15	2.37	110	HU32D102MCYS6WPEC
		30 × 35	0.15	2.29	110	HU32D102MCZS4WPEC
		35 × 30	0.15	2.29	110	HU32D102MCAS3WPEC
	1,200	30 × 40	0.15	2.63	90	HU32D122MCZS5WPEC
		35 × 30	0.15	2.51	90	HU32D122MCAS3WPEC
	1,500	35 × 40	0.15	3.09	75	HU32D152MCAS5WPEC
	1,800	35 × 45	0.15	3.53	70	HU32D182MCAS6WPEC

Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
250	220	22 × 25	0.15	0.85	445	HU32E221MCXS2WPEC
	270	22 × 30	0.15	1.00	360	HU32E271MCXS3WPEC
	330	22 × 30	0.15	1.11	295	HU32E331MCXS3WPEC
		25 × 25	0.15	1.10	295	HU32E331MCYS2WPEC
	390	22 × 35	0.15	1.28	250	HU32E391MCXS4WPEC
		25 × 30	0.15	1.27	250	HU32E391MCYS3WPEC
	470	22 × 45	0.15	1.55	210	HU32E471MCXS6WPEC
		25 × 35	0.15	1.48	210	HU32E471MCYS4WPEC
		30 × 25	0.15	1.40	210	HU32E471MCZS2WPEC
	560	25 × 40	0.15	1.69	175	HU32E561MCYS5WPEC
		30 × 30	0.15	1.63	175	HU32E561MCZS3WPEC
	680	25 × 45	0.15	1.95	145	HU32E681MCYS6WPEC
		30 × 35	0.15	1.89	145	HU32E681MCZS4WPEC
		35 × 25	0.15	1.79	145	HU32E681MCAS2WPEC
	820	30 × 40	0.15	2.18	120	HU32E821MCZS5WPEC
		35 × 30	0.15	2.08	120	HU32E821MCAS3WPEC
	1,000	35 × 35	0.15	2.41	100	HU32E102MCAS4WPEC
	1,200	35 × 40	0.15	2.76	85	HU32E122MCAS5WPEC
1,500	35 × 45	0.15	3.22	65	HU32E152MCAS6WPEC	
350	120	22 × 25	0.15	0.57	770	HU32V121MCXS2WPEC
		25 × 25	0.15	0.60	770	HU32V121MCYS2WPEC
	150	22 × 30	0.15	0.68	615	HU32V151MCXS3WPEC
		25 × 25	0.15	0.67	615	HU32V151MCYS2WPEC
		30 × 25	0.15	0.72	615	HU32V151MCZS2WPEC
	180	22 × 35	0.15	0.79	520	HU32V181MCXS4WPEC
		25 × 30	0.15	0.79	520	HU32V181MCYS3WPEC
		30 × 25	0.15	0.79	520	HU32V181MCZS2WPEC
	220	22 × 45	0.15	0.96	450	HU32V221MCXS6WPEC
		25 × 35	0.15	0.92	450	HU32V221MCYS4WPEC
		30 × 25	0.15	0.87	450	HU32V221MCZS2WPEC
		35 × 25	0.15	0.93	450	HU32V221MCAS2WPEC
	270	25 × 40	0.15	1.07	366	HU32V271MCYS5WPEC
		30 × 30	0.15	1.03	366	HU32V271MCZS3WPEC
		35 × 25	0.15	1.02	366	HU32V271MCAS2WPEC
	330	25 × 45	0.15	1.24	299	HU32V331MCYS6WPEC
		30 × 35	0.15	1.20	299	HU32V331MCZS4WPEC
		35 × 25	0.15	1.13	299	HU32V331MCAS2WPEC
390	30 × 40	0.15	1.36	253	HU32V391MCZS5WPEC	
	35 × 30	0.15	1.30	253	HU32V391MCAS3WPEC	
470	35 × 35	0.15	1.50	210	HU32V471MCAS4WPEC	
560	35 × 40	0.15	1.72	181	HU32V561MCAS5WPEC	



Standard Products Table

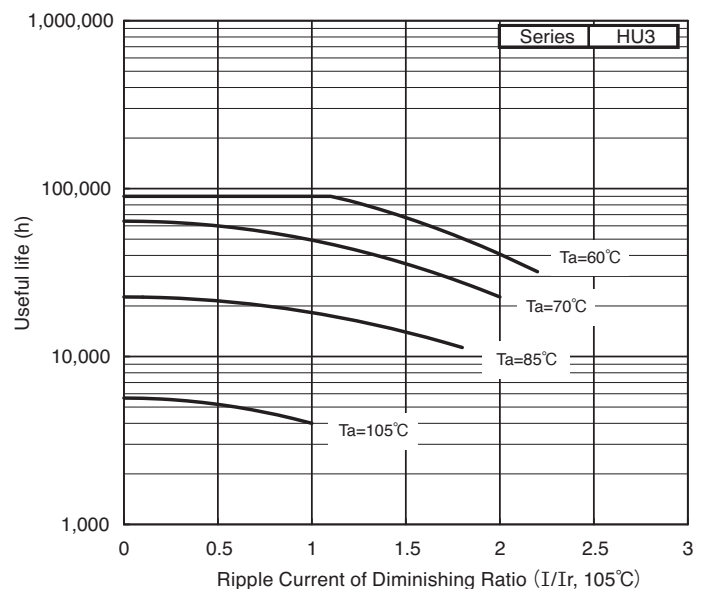
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms)		Product name
				105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	
400	100	22×25	0.15	0.57	924	HU32G101MCXS2WPEC
		22×30	0.15	0.67	770	HU32G121MCXS3WPEC
	120	25×25	0.15	0.66	770	HU32G121MCYS2WPEC
		22×35	0.15	0.79	615	HU32G151MCXS4WPEC
		25×30	0.15	0.79	615	HU32G151MCYS3WPEC
	150	30×25	0.15	0.79	615	HU32G151MCZS2WPEC
		22×40	0.15	0.91	520	HU32G181MCXS5WPEC
		25×35	0.15	0.91	520	HU32G181MCYS4WPEC
	180	30×25	0.15	0.87	520	HU32G181MCZS2WPEC
		25×40	0.15	1.06	450	HU32G221MCYS5WPEC
		30×30	0.15	1.02	450	HU32G221MCZS3WPEC
	220	35×25	0.15	1.02	450	HU32G221MCAS2WPEC
		25×45	0.15	1.23	366	HU32G271MCYS6WPEC
		30×35	0.15	1.19	366	HU32G271MCZS4WPEC
	270	35×25	0.15	1.13	366	HU32G271MCAS2WPEC
		30×40	0.15	1.38	299	HU32G331MCZS5WPEC
		35×30	0.15	1.32	299	HU32G331MCAS3WPEC
	390	35×35	0.15	1.51	253	HU32G391MCAS4WPEC
470	35×45	0.15	1.80	210	HU32G471MCAS6WPEC	
560	35×45	0.15	1.97	181	HU32G561MCAS6WPEC	
420	82	22×25	0.15	0.52	1,242	HU3420V820MCXS2WPEC
		25×25	0.15	0.54	1,242	HU3420V820MCYS2WPEC
	100	22×30	0.15	0.61	1,019	HU3420V101MCXS3WPEC
		25×25	0.15	0.61	1,019	HU3420V101MCYS2WPEC
	120	22×35	0.15	0.71	850	HU3420V121MCXS4WPEC
		25×25	0.15	0.66	850	HU3420V121MCYS2WPEC
		30×25	0.15	0.70	850	HU3420V121MCZS2WPEC
	150	22×40	0.15	0.83	679	HU3420V151MCXS5WPEC
		25×30	0.15	0.79	679	HU3420V151MCYS3WPEC
		30×25	0.15	0.79	679	HU3420V151MCZS2WPEC
	180	25×35	0.15	0.91	566	HU3420V181MCYS4WPEC
		30×25	0.15	0.87	566	HU3420V181MCZS2WPEC
		35×25	0.15	0.90	566	HU3420V181MCAS2WPEC
	220	25×45	0.15	1.11	463	HU3420V221MCYS6WPEC
		30×30	0.15	1.02	463	HU3420V221MCZS3WPEC
		35×25	0.15	1.02	463	HU3420V221MCAS2WPEC
	270	30×35	0.15	1.19	377	HU3420V271MCZS4WPEC
		35×30	0.15	1.19	377	HU3420V271MCAS3WPEC
	330	30×45	0.15	1.44	309	HU3420V331MCZS6WPEC
		35×35	0.15	1.39	309	HU3420V331MCAS4WPEC
	390	35×40	0.15	1.58	261	HU3420V391MCAS5WPEC
	470	35×45	0.15	1.80	218	HU3420V471MCAS6WPEC

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms)		Product name
				105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	
450	68	22×25	0.15	0.47	1,499	HU32W680MCXS2WPEC
		22×30	0.15	0.55	1,242	HU32W820MCXS3WPEC
	82	25×25	0.15	0.55	1,242	HU32W820MCYS2WPEC
		22×35	0.15	0.65	1,019	HU32W101MCXS4WPEC
	100	25×30	0.15	0.64	1,019	HU32W101MCYS3WPEC
		22×40	0.15	0.75	850	HU32W121MCXS5WPEC
	120	25×30	0.15	0.71	850	HU32W121MCYS3WPEC
		30×25	0.15	0.71	850	HU32W121MCZS2WPEC
		25×40	0.15	0.88	679	HU32W151MCYS5WPEC
	150	30×30	0.15	0.84	679	HU32W151MCZS3WPEC
		35×25	0.15	0.84	679	HU32W151MCAS2WPEC
		25×45	0.15	1.01	566	HU32W181MCYS6WPEC
	180	30×30	0.15	0.92	566	HU32W181MCZS3WPEC
		35×25	0.15	0.92	566	HU32W181MCAS2WPEC
		30×35	0.15	1.07	463	HU32W221MCZS4WPEC
	220	35×30	0.15	1.08	463	HU32W221MCAS3WPEC
		30×45	0.15	1.30	377	HU32W271MCZS6WPEC
	270	35×35	0.15	1.25	377	HU32W271MCAS4WPEC
35×40		0.15	1.45	309	HU32W331MCAS5WPEC	
390	35×45	0.15	1.64	261	HU32W391MCAS6WPEC	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature Ta and ripple current operating conditions I versus rated ripple current at 105°C, 120Hz



**UPGRADE!**

## HU Series Useful of 4,000 hours at 105°C

• Conform RoHS

### Features

• The HU series is the miniaturization products of 4,000 hours.



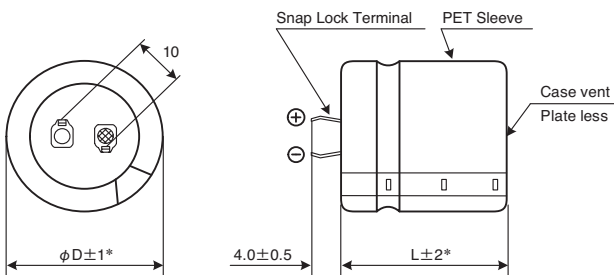
### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C (200, 250V.DC) -25°C ~ +105°C (400 ~ 550V.DC)
Rated voltage	200 ~ 550V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 2000 hours : Capacitance change : Within ±20% of the initial value measured Dissipation factor : 200% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions

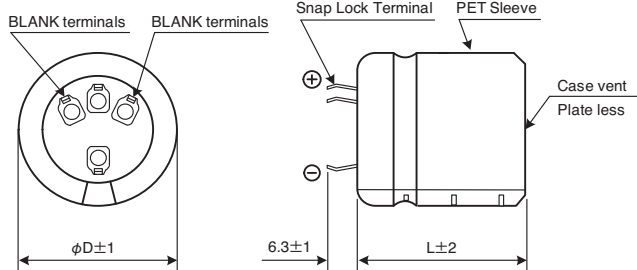
2-claw short terminal (Terminal code : C)

(Unit : mm)



4-claw terminal (Terminal code : S)

(Unit : mm)



\* Products marked with "\*" in the standard products table :  $\phi D \pm 1.5$ ,  $L \pm 2.5$   
(For details of product specifications please request specification sheet.)

### Ripple current correction coefficient

Temperature (°C)	60	70	85	105	
Correction coefficient	200~500V.DC	1.9	1.7	1.4	1.0
	550V.DC	1.7	1.5	1.3	1.0
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

A continuous load should be avoided over 10 Arms at the terminal in accordance with the permissible current. Please consult us when the ripple voltage exceeds 70Vp-p.

### Product code

(Example) HU Series 400V 330µF ±20%

**HU 2G 331 M C A S2 WPEC**

- Environmental code
- Plate code
- Case height code
- Case dia code
- Terminal code
- Capacitance tolerance code
- Capacitance code
- Rated voltage code

Type of series

Refer to page 124-125 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
200	330	22×25	0.15	1.07	330	HU2D331MCXS2WPEC
	390	22×30	0.15	1.24	280	HU2D391MCXS3WPEC
	470	25×25	0.15	1.31	240	HU2D471MCYS2WPEC
	560	22×35	0.15	1.58	200	HU2D561MCXS4WPEC
		25×30	0.15	1.52	200	HU2D561MCYS3WPEC
	680	22×40	0.15	1.83	160	HU2D681MCXS5WPEC
		25×35	0.15	1.77	160	HU2D681MCYS4WPEC
		30×25	0.15	1.60	160	HU2D681MCZS2WPEC
	820	22×50	0.15	2.20	140	HU2D821MCXS7WPEC
		25×40	0.15	2.05	140	HU2D821MCYS5WPEC
		30×30	0.15	1.86	140	HU2D821MCZS3WPEC
		35×25	0.15	1.52	140	HU2D821MCAS2WPEC
	1,000	25×45	0.15	2.37	110	HU2D102MCYS6WPEC
		30×35	0.15	2.17	110	HU2D102MCZS4WPEC
	1,200	25×50	0.15	2.70	100	HU2D122MCYS7WPEC
		30×40	0.15	2.49	100	HU2D122MCZS5WPEC
		35×30	0.15	1.94	100	HU2D122MCAS3WPEC
	1,500	30×45	0.15	2.91	80	HU2D152MCZS6WPEC
		35×35	0.15	2.29	80	HU2D152MCAS4WPEC
	1,800	30×50	0.15	3.32	70	HU2D182MCZS7WPEC
35×40		0.15	2.62	70	HU2D182MCAS5WPEC	
2,200	35×45	0.15	3.02	50	HU2D222MCAS6WPEC	
250	220	22×25	0.15	0.95	440	HU2E221MCXS2WPEC
	330	22×30	0.15	1.24	290	HU2E331MCXS3WPEC
		25×25	0.15	1.19	290	HU2E331MCYS2WPEC
	390	22×35	0.15	1.42	250	HU2E391MCXS4WPEC
		25×30	0.15	1.37	250	HU2E391MCYS3WPEC
	470	22×40	0.15	1.65	210	HU2E471MCXS5WPEC
		30×25	0.15	1.42	210	HU2E471MCZS2WPEC
	560	22×45	0.15	1.88	180	HU2E561MCXS6WPEC
		25×35	0.15	1.74	180	HU2E561MCYS4WPEC
	680	25×45	0.15	2.11	150	HU2E681MCYS6WPEC
		30×30	0.15	1.82	150	HU2E681MCZS3WPEC
		35×25	0.15	1.52	150	HU2E681MCAS2WPEC
		25×50	0.15	2.41	120	HU2E821MCYS7WPEC
	820	30×35	0.15	2.10	120	HU2E821MCZS4WPEC
		35×30	0.15	1.76	120	HU2E821MCAS3WPEC
	1,000	30×40	0.15	2.43	100	HU2E102MCZS5WPEC
		35×35	0.15	2.04	100	HU2E102MCAS4WPEC
	1,200	30×50	0.15	2.89	80	HU2E122MCZS7WPEC
		35×40	0.15	2.34	80	HU2E122MCAS5WPEC
	1,500	35×45	0.15	2.73	70	HU2E152MCAS6WPEC
1,800	35×50	0.15	3.11	60	HU2E182MCAS7WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
400	120	22×25	0.20	0.77	800	HU2G121MCXS2WPEC
	150	22×25*	0.20	0.87	640	HU2G151MCXS2WPEC
		22×30*	0.20	1.01	540	HU2G181MCXS3WPEC
	180	25×25	0.20	0.99	540	HU2G181MCYS2WPEC
		22×30*	0.20	1.11	440	HU2G221MCXS3WPEC
	220	22×35	0.20	1.17	440	HU2G221MCXS4WPEC
		25×25*	0.20	1.10	440	HU2G221MCYS2WPEC
		25×30	0.20	1.16	440	HU2G221MCYS3WPEC
	270	22×35*	0.20	1.29	360	HU2G271MCXS4WPEC
		25×30*	0.20	1.28	360	HU2G271MCYS3WPEC
		25×35	0.20	1.35	360	HU2G271MCYS4WPEC
		30×25	0.20	1.28	360	HU2G271MCZS2WPEC
	330	22×45*	0.20	1.54	290	HU2G331MCXS7WPEC
		22×50	0.20	1.59	290	HU2G331MCXS7WPEC
		25×35*	0.20	1.49	290	HU2G331MCYS4WPEC
		25×40	0.20	1.55	290	HU2G331MCYS5WPEC
		30×25*	0.20	1.41	290	HU2G331MCZS2WPEC
	390	30×30	0.20	1.49	290	HU2G331MCZS3WPEC
		35×25	0.20	1.46	290	HU2G331MCAS2WPEC
		22×50*	0.20	1.73	250	HU2G391MCXS7WPEC
		25×40*	0.20	1.68	250	HU2G391MCYS5WPEC
		25×45	0.20	1.74	250	HU2G391MCYS6WPEC
		30×30*	0.20	1.62	250	HU2G391MCZS3WPEC
	470	30×35	0.20	1.70	250	HU2G391MCZS4WPEC
		35×25*	0.20	1.59	250	HU2G391MCAS2WPEC
		25×45*	0.20	1.92	210	HU2G471MCYS6WPEC
		25×50*	0.20	1.98	210	HU2G471MCYS7WPEC
		30×35*	0.20	1.86	210	HU2G471MCZS4WPEC
	560	30×40	0.20	1.94	210	HU2G471MCZS5WPEC
		35×30	0.20	1.84	210	HU2G471MCYS6WPEC
		25×50*	0.20	2.16	180	HU2G561MCYS7WPEC
		30×40*	0.20	2.11	180	HU2G561MCZS5WPEC
		30×45	0.20	2.19	180	HU2G561MCZS6WPEC
		35×30*	0.20	2.01	180	HU2G561MCAS3WPEC
	680	35×35	0.20	2.09	180	HU2G561MCAS4WPEC
		25×60*	0.20	2.51	150	HU2G681MCYS9WPEC
		30×45*	0.20	2.41	150	HU2G681MCZS6WPEC
		30×50	0.20	2.48	150	HU2G681MCZS7WPEC
		35×35*	0.20	2.31	150	HU2G681MCAS4WPEC
	820	35×40	0.20	2.40	150	HU2G681MCAS5WPEC
30×50*		0.20	2.65	120	HU2G821MCZS7WPEC	
35×40*		0.20	2.63	120	HU2G821MCAS5WPEC	
35×45		0.20	2.72	120	HU2G821MCAS6WPEC	
1,000	30×60*	0.20	3.17	100	HU2G102MCZS9WPEC	
	35×50*	0.20	3.09	100	HU2G102MCAS7WPEC	
1,200	35×55*	0.20	3.56	80	HU2G122MCAS8WPEC	
1,500	35×100	0.20	3.93	70	HU2G152MSAS17WPEC	
	40×76	0.20	3.99	70	HU2G152MSBS12WPEC	
1,800	40×101	0.20	4.47	60	HU2G182MSBS17WPEC	

ALUMINUM ELECTROLYTIC CAPACITORS

# SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

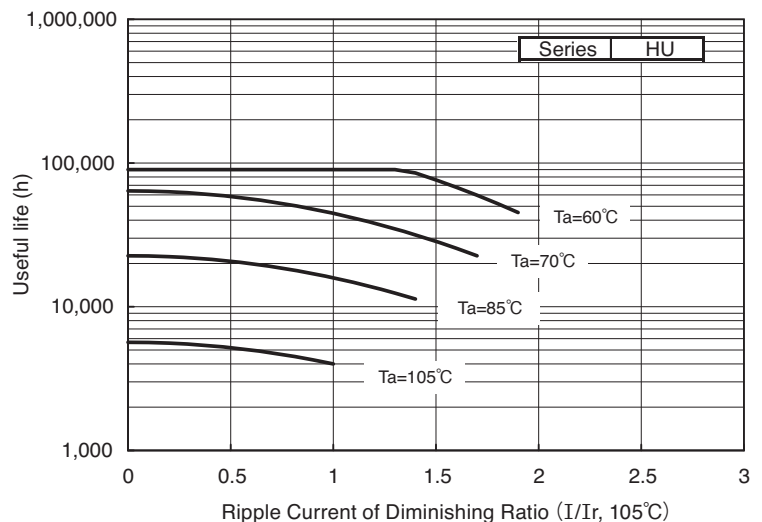
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
420	120	22×25	0.20	0.77	850	HU420V121MCXS2WPEC
		22×25*	0.20	0.87	680	HU420V151MCXS2WPEC
	150	22×30	0.20	0.92	680	HU420V151MCXS3WPEC
		25×25	0.20	0.90	680	HU420V151MCYS2WPEC
	180	22×30*	0.20	1.01	570	HU420V181MCXS3WPEC
		22×35	0.20	1.05	570	HU420V181MCXS4WPEC
		25×25*	0.20	0.99	570	HU420V181MCYS2WPEC
	220	22×35*	0.20	1.17	470	HU420V221MCXS4WPEC
		22×40	0.20	1.22	470	HU420V221MCXS5WPEC
		25×30*	0.20	1.16	470	HU420V221MCYS3WPEC
		30×25	0.20	1.15	470	HU420V221MCZS2WPEC
	270	22×40*	0.20	1.35	380	HU420V271MCXS5WPEC
		22×45	0.20	1.40	380	HU420V271MCYS6WPEC
		25×30*	0.20	1.25	380	HU420V271MCYS3WPEC
		25×35*	0.20	1.35	380	HU420V271MCYS4WPEC
	330	30×25*	0.20	1.28	380	HU420V271MCZS2WPEC
		22×45*	0.20	1.54	310	HU420V331MCXS6WPEC
		25×35*	0.20	1.45	310	HU420V331MCYS4WPEC
	390	30×30*	0.20	1.49	310	HU420V331MCZS3WPEC
		25×40*	0.20	1.64	270	HU420V391MCYS5WPEC
		30×30*	0.20	1.62	270	HU420V391MCZS3WPEC
		30×35	0.20	1.70	270	HU420V391MCZS4WPEC
	470	35×25*	0.20	1.59	270	HU420V391MCAS2WPEC
		35×30	0.20	1.67	270	HU420V391MCAS3WPEC
		25×50*	0.20	1.98	220	HU420V471MCYS7WPEC
		30×35*	0.20	1.86	220	HU420V471MCZS4WPEC
	560	30×40	0.20	1.94	220	HU420V471MCZS5WPEC
		35×30*	0.20	1.84	220	HU420V471MCAS3WPEC
		35×35	0.20	1.92	220	HU420V471MCAS4WPEC
		25×55*	0.20	2.16	190	HU420V561MCYS8WPEC
	680	30×40*	0.20	2.11	190	HU420V561MCZS5WPEC
		35×35*	0.20	2.09	190	HU420V561MCAS4WPEC
		35×40	0.20	2.18	190	HU420V561MCAS5WPEC
	820	30×50*	0.20	2.48	150	HU420V681MCZS7WPEC
		35×40*	0.20	2.40	150	HU420V681MCAS5WPEC
		35×45	0.20	2.48	150	HU420V681MCAS6WPEC
	1,000	30×55*	0.20	2.81	130	HU420V821MCZS8WPEC
		35×45*	0.20	2.72	130	HU420V821MCAS6WPEC
		35×50	0.20	2.80	130	HU420V821MCAS7WPEC
	1,200	35×55*	0.20	3.18	110	HU420V102MCAS8WPEC
		35×60	0.20	3.25	110	HU420V102MCAS9WPEC
	1,500	40×56	0.20	3.30	110	HU420V102MSBS8WPEC
35×100		0.20	3.51	90	HU420V122MSAS17WPEC	
	40×76	0.20	3.57	90	HU420V122MSBS12WPEC	
	40×101	0.20	4.07	70	HU420V152MSBS17WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
450	120	22×25*	0.20	0.77	850	HU2W121MCXS2WPEC
		22×30*	0.20	0.92	680	HU2W151MCXS3WPEC
	150	25×25	0.20	0.90	680	HU2W151MCYS2WPEC
		22×30*	0.20	1.01	570	HU2W181MCXS3WPEC
		22×35	0.20	1.05	570	HU2W181MCXS4WPEC
	180	25×25*	0.20	0.99	570	HU2W181MCYS2WPEC
		25×30	0.20	1.05	570	HU2W181MCYS3WPEC
		25×30*	0.20	1.05	570	HU2W181MCYS4WPEC
	220	22×35*	0.20	1.17	470	HU2W221MCXS4WPEC
		25×30*	0.20	1.16	470	HU2W221MCYS3WPEC
		25×35	0.20	1.21	470	HU2W221MCYS4WPEC
		30×25	0.20	1.15	470	HU2W221MCZS2WPEC
	270	22×40*	0.20	1.31	380	HU2W271MCXS5WPEC
		25×35*	0.20	1.35	380	HU2W271MCYS4WPEC
		25×40	0.20	1.40	380	HU2W271MCYS5WPEC
		30×25*	0.20	1.28	380	HU2W271MCZS2WPEC
	330	30×30	0.20	1.35	380	HU2W271MCZS3WPEC
		35×25	0.20	1.32	380	HU2W271MCAS2WPEC
		22×50*	0.20	1.59	310	HU2W331MCXS7WPEC
		25×40*	0.20	1.55	310	HU2W331MCYS5WPEC
	390	25×45	0.20	1.61	310	HU2W331MCYS6WPEC
		30×30*	0.20	1.49	310	HU2W331MCZS3WPEC
		35×25*	0.20	1.46	310	HU2W331MCAS2WPEC
		25×45*	0.20	1.74	270	HU2W391MCYS6WPEC
	470	25×50*	0.20	1.80	270	HU2W391MCYS7WPEC
		30×35*	0.20	1.70	270	HU2W391MCZS4WPEC
		35×30	0.20	1.67	270	HU2W391MCAS3WPEC
	560	25×50*	0.20	1.92	220	HU2W471MCYS7WPEC
		30×40*	0.20	1.94	220	HU2W471MCZS5WPEC
		35×30*	0.20	1.84	220	HU2W471MCAS3WPEC
		35×35	0.20	1.92	220	HU2W471MCAS4WPEC
	680	25×60*	0.20	2.27	190	HU2W561MCYS9WPEC
		30×45*	0.20	2.19	190	HU2W561MCZS6WPEC
		30×50	0.20	2.25	190	HU2W561MCZS7WPEC
	820	35×35*	0.20	2.09	190	HU2W561MCAS4WPEC
		35×40	0.20	2.18	190	HU2W561MCAS5WPEC
		30×50*	0.20	2.48	150	HU2W681MCZS7WPEC
	1,000	35×40*	0.20	2.40	150	HU2W681MCAS5WPEC
		35×45	0.20	2.48	150	HU2W681MCAS6WPEC
		30×60*	0.20	2.87	130	HU2W821MCZS9WPEC
	1,200	35×45*	0.20	2.64	130	HU2W821MCAS6WPEC
		35×50*	0.20	2.80	130	HU2W821MCAS7WPEC
1,500	35×55*	0.20	3.18	110	HU2W102MCAS8WPEC	
	35×100	0.20	3.51	90	HU2W122MSAS17WPEC	
	40×76	0.20	3.57	90	HU2W122MSBS12WPEC	
	40×101	0.20	4.07	70	HU2W152MSBS17WPEC	

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz



# SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

HU Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
475	82	22×25	0.20	0.64	1,170	HU475V820MCXS2WPEC
		22×25*	0.20	0.69	960	HU475V101MCXS2WPEC
	100	22×30	0.20	0.75	960	HU475V101MCXS3WPEC
		25×25	0.20	0.74	960	HU475V101MCYS2WPEC
		22×30*	0.20	0.82	800	HU475V121MCXS3WPEC
	120	22×35	0.20	0.86	800	HU475V121MCXS4WPEC
		25×25	0.20	0.81	800	HU475V121MCYS2WPEC
		22×35*	0.20	0.96	640	HU475V151MCXS4WPEC
	150	25×30	0.20	0.96	640	HU475V151MCYS3WPEC
		30×25	0.20	0.95	640	HU475V151MCZS2WPEC
		22×40*	0.20	1.07	540	HU475V181MCXS5WPEC
	180	22×45	0.20	1.14	540	HU475V181MCXS6WPEC
		25×30*	0.20	1.02	540	HU475V181MCXS3WPEC
		25×35	0.20	1.10	540	HU475V181MCYS4WPEC
		30×25	0.20	1.04	540	HU475V181MCZS2WPEC
		30×30	0.20	1.10	540	HU475V181MCZS3WPEC
		35×25	0.20	1.01	540	HU475V181MCAS2WPEC
	220	22×45*	0.20	1.22	440	HU475V221MCXS6WPEC
		22×50	0.20	1.30	440	HU475V221MCXS7WPEC
		25×35*	0.20	1.18	440	HU475V221MCYS4WPEC
		25×40	0.20	1.27	440	HU475V221MCYS5WPEC
		30×30	0.20	1.22	440	HU475V221MCZS3WPEC
		35×25	0.20	1.12	440	HU475V221MCAS2WPEC
	270	25×40*	0.20	1.36	360	HU475V271MCYS5WPEC
		25×45	0.20	1.45	360	HU475V271MCYS6WPEC
		30×30*	0.20	1.31	360	HU475V271MCZS3WPEC
		30×35	0.20	1.41	360	HU475V271MCZS4WPEC
		35×25*	0.20	1.28	360	HU475V271MCAS2WPEC
		35×30	0.20	1.31	360	HU475V271MCAS3WPEC
	330	25×50*	0.20	1.61	290	HU475V331MCYS7WPEC
		25×55	0.20	1.71	290	HU475V331MCYS8WPEC
		30×35*	0.20	1.51	290	HU475V331MCZS4WPEC
		30×40	0.20	1.62	290	HU475V331MCZS5WPEC
		35×30*	0.20	1.49	290	HU475V331MCAS3WPEC
		35×35	0.20	1.51	290	HU475V331MCAS4WPEC
	390	25×55*	0.20	1.80	250	HU475V391MCYS8WPEC
		30×40*	0.20	1.71	250	HU475V391MCZS5WPEC
		30×45	0.20	1.82	250	HU475V391MCZS6WPEC
		35×35	0.20	1.64	250	HU475V391MCAS4WPEC
	470	30×45*	0.20	1.94	210	HU475V471MCZS6WPEC
		30×50	0.20	2.06	210	HU475V471MCZS7WPEC
		35×35*	0.20	1.86	210	HU475V471MCAS4WPEC
		35×40	0.20	1.87	210	HU475V471MCAS5WPEC
	560	30×55*	0.20	2.25	180	HU475V561MCZS8WPEC
		30×60	0.20	2.37	180	HU475V561MCZS9WPEC
		35×40*	0.20	2.11	180	HU475V561MCAS5WPEC
	680	35×50*	0.20	2.48	150	HU475V681MCAS7WPEC
		35×55	0.20	2.45	150	HU475V681MCAS8WPEC
	820	35×55*	0.20	2.80	120	HU475V821MCAS8WPEC

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name	
500	82	22×25*	0.20	0.52	1,170	HU2H820MCXS2WPEC	
		22×30	0.20	0.53	1,170	HU2H820MCXS3WPEC	
		25×25	0.20	0.54	1,170	HU2H820MCYS2WPEC	
	100	22×30*	0.20	0.62	960	HU2H101MCXS3WPEC	
		22×35	0.20	0.62	960	HU2H101MCXS4WPEC	
		25×25*	0.20	0.63	960	HU2H101MCYS2WPEC	
		25×30	0.20	0.64	960	HU2H101MCYS3WPEC	
	120	22×35*	0.20	0.72	800	HU2H121MCXS4WPEC	
		22×40	0.20	0.72	800	HU2H121MCXS5WPEC	
		25×30*	0.20	0.71	800	HU2H121MCYS3WPEC	
		25×35	0.20	0.74	800	HU2H121MCYS4WPEC	
		30×25	0.20	0.75	800	HU2H121MCZS2WPEC	
	150	22×40*	0.20	0.82	640	HU2H151MCYS5WPEC	
		25×30*	0.20	0.84	640	HU2H151MCYS3WPEC	
		30×25*	0.20	0.85	640	HU2H151MCZS2WPEC	
		30×30	0.20	0.90	640	HU2H151MCZS3WPEC	
		35×25	0.20	0.94	640	HU2H151MCAS2WPEC	
	180	22×45*	0.20	0.98	540	HU2H181MCXS6WPEC	
		25×35*	0.20	0.98	540	HU2H181MCYS4WPEC	
		30×30*	0.20	0.99	540	HU2H181MCZS3WPEC	
		30×35	0.20	1.04	540	HU2H181MCZS4WPEC	
		35×25*	0.20	1.04	540	HU2H181MCAS2WPEC	
	220	25×45*	0.20	1.17	440	HU2H221MCYS6WPEC	
		25×50	0.20	1.17	440	HU2H221MCYS7WPEC	
		30×30*	0.20	1.09	440	HU2H221MCZS3WPEC	
		35×25*	0.20	1.07	440	HU2H221MCAS2WPEC	
		35×30	0.20	1.22	440	HU2H221MCAS3WPEC	
	270	25×50*	0.20	1.34	360	HU2H271MCYS7WPEC	
		30×35*	0.20	1.26	360	HU2H271MCZS4WPEC	
		35×30*	0.20	1.37	360	HU2H271MCZS5WPEC	
		35×35	0.20	1.44	360	HU2H271MCAS4WPEC	
	330	30×45*	0.20	1.58	290	HU2H331MCZS6WPEC	
		30×50	0.20	1.63	290	HU2H331MCZS7WPEC	
		35×35*	0.20	1.61	290	HU2H331MCAS4WPEC	
		35×40	0.20	1.67	290	HU2H331MCAS5WPEC	
	390	30×50*	0.20	1.79	250	HU2H391MCZS7WPEC	
		35×40*	0.20	1.84	250	HU2H391MCAS5WPEC	
		35×45	0.20	1.90	250	HU2H391MCAS6WPEC	
	470	30×60*	0.20	2.10	210	HU2H471MCZS9WPEC	
		35×45*	0.20	2.12	210	HU2H471MCAS6WPEC	
		35×50	0.20	2.18	210	HU2H471MCAS7WPEC	
	560	35×50*	0.20	2.07	180	HU2H561MCAS7WPEC	
		35×60	0.20	2.53	180	HU2H561MCAS9WPEC	
	680	35×60*	0.20	2.40	150	HU2H681MCAS9WPEC	
	550	82	30×25	0.25	0.59	2,920	HU2L820MCZS2WPEC
			30×30	0.25	0.77	1,990	HU2L121MCZS3WPEC
		120	35×25	0.25	0.80	1,990	HU2L121MCAS2WPEC
			30×35	0.25	0.91	1,600	HU2L151MCZS4WPEC
		150	35×30	0.25	0.96	1,600	HU2L151MCAS3WPEC
			30×40	0.25	1.05	1,330	HU2L181MCZS5WPEC
		180	35×35	0.25	1.11	1,330	HU2L181MCAS4WPEC
			30×50	0.25	1.26	1,090	HU2L221MCZS7WPEC
220		35×40	0.25	1.29	1,090	HU2L221MCAS5WPEC	
		35×45	0.25	1.50	890	HU2L271MCAS6WPEC	
330	35×50	0.25	1.73	730	HU2L331MCAS7WPEC		
390	35×60	0.25	2.00	620	HU2L391MCAS9WPEC		

ALUMINUM ELECTROLYTIC CAPACITORS



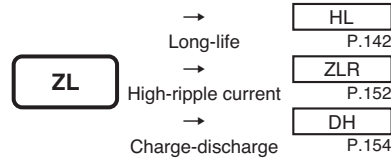
**UPGRADE!**

## ZL Series Useful of 5,000 hours at 105°C

- Conform RoHS

### Features

- The ZL series is the miniaturization products of 5,000 hours.

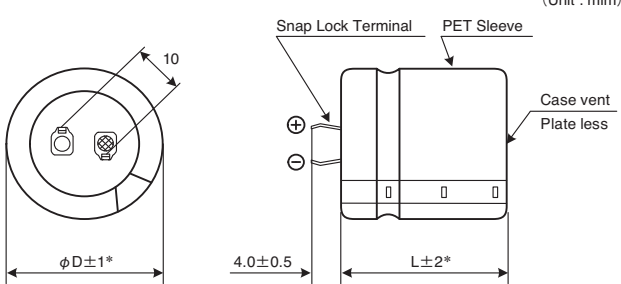


### Product Specifications

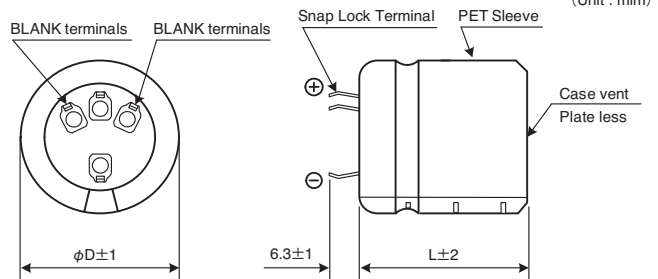
Items	Specifications
Temperature range	-40°C ~ +105°C (200V.DC ~ 250V.DC) -25°C ~ +105°C (315V.DC ~ 550V.DC)
Rated voltage	200 ~ 550V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 3000 hours : Capacitance change : Within ±20% of the initial value measured Dissipation factor : 200% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions

2-claw short terminal (Terminal code : C)



4-claw terminal (Terminal code : S)



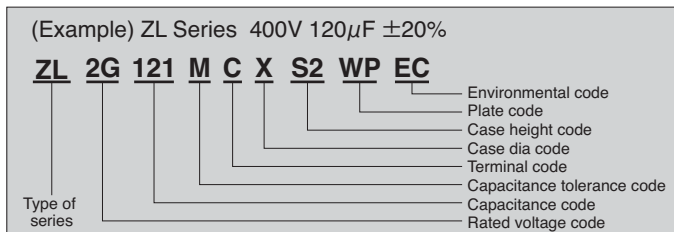
\* Products marked with "\*" in the standard products table :  $\phi D \pm 1.5$ ,  $L \pm 2.5$   
(For details of product specifications please request specification sheet.)

### Ripple current correction coefficient

Temperature (°C)	60	70	85	105	
Correction coefficient	200~500V.DC	1.9	1.7	1.4	1.0
	550V.DC	1.7	1.5	1.3	1.0
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

A continuous load should be avoided over 10 Arms at the terminal in accordance with the permissible current. Please consult us when the ripple voltage exceeds 70Vp-p.

### Product code



Refer to page 124-125 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name	
							200
	470	22×30	0.15	1.37	240	ZL2D471MCXS3WPEC	
		25×25	0.15	1.36	240	ZL2D471MCYS2WPEC	
	560	22×35	0.15	1.57	200	ZL2D561MCXS4WPEC	
		25×30	0.15	1.57	200	ZL2D561MCYS3WPEC	
	680	22×40	0.15	1.81	160	ZL2D681MCXS5WPEC	
		30×25	0.15	1.75	160	ZL2D681MCZS2WPEC	
	820	22×45	0.15	2.06	140	ZL2D821MCXS6WPEC	
		25×35	0.15	1.99	140	ZL2D821MCYS4WPEC	
	1,000	25×45	0.15	2.37	110	ZL2D102MCYS6WPEC	
		30×30	0.15	2.24	110	ZL2D102MCZS3WPEC	
		35×25	0.15	1.94	110	ZL2D102MCAS2WPEC	
	1,200	25×50	0.15	2.67	100	ZL2D122MCYS7WPEC	
		30×35	0.15	2.56	100	ZL2D122MCZS4WPEC	
		35×30	0.15	2.23	100	ZL2D122MCAS3WPEC	
	1,500	30×45	0.15	3.08	80	ZL2D152MCZS6WPEC	
		35×35	0.15	2.61	80	ZL2D152MCAS4WPEC	
	1,800	30×50	0.15	3.49	70	ZL2D182MCZS7WPEC	
		35×40	0.15	2.97	70	ZL2D182MCAS5WPEC	
	2,200	35×45	0.15	3.39	50	ZL2D222MCAS6WPEC	
	2,700	35×50	0.15	3.86	50	ZL2D272MCAS7WPEC	
250	270	22×25	0.15	0.98	360	ZL2E271MCXS2WPEC	
	330	22×30	0.15	1.15	290	ZL2E331MCXS3WPEC	
		25×25	0.15	1.14	290	ZL2E331MCYS2WPEC	
	390	22×35	0.15	1.31	250	ZL2E391MCXS4WPEC	
	470	22×40	0.15	1.50	210	ZL2E471MCXS5WPEC	
		25×30	0.15	1.43	210	ZL2E471MCYS3WPEC	
		560	30×25	0.15	1.45	210	ZL2E471MCZS2WPEC
			22×45	0.15	1.70	180	ZL2E561MCXS6WPEC
	680	25×35	0.15	1.64	180	ZL2E561MCYS4WPEC	
		22×50	0.15	1.95	150	ZL2E681MCXS7WPEC	
		25×40	0.15	1.88	150	ZL2E681MCYS5WPEC	
	820	30×30	0.15	1.85	150	ZL2E681MCZS3WPEC	
		35×25	0.15	1.60	150	ZL2E681MCAS2WPEC	
		25×45	0.15	2.14	120	ZL2E821MCYS6WPEC	
	1,000	30×35	0.15	2.12	120	ZL2E821MCZS4WPEC	
		35×30	0.15	1.84	120	ZL2E821MCAS3WPEC	
	1,200	30×40	0.15	2.44	100	ZL2E102MCZS5WPEC	
	1,500	30×45	0.15	2.76	80	ZL2E122MCZS6WPEC	
35×35		0.15	2.33	80	ZL2E122MCAS4WPEC		
1,800	35×45	0.15	2.80	70	ZL2E152MCAS6WPEC		
	1,800	35×50	0.15	3.16	60	ZL2E182MCAS7WPEC	
315	180	22×25	0.20	0.95	710	ZL2F181MCXS2WPEC	
	220	22×30	0.20	1.10	580	ZL2F221MCXS3WPEC	
		25×25	0.20	1.10	580	ZL2F221MCYS2WPEC	
	270	22×35	0.20	1.24	480	ZL2F271MCXS4WPEC	
		25×30	0.20	1.25	480	ZL2F271MCYS3WPEC	
	330	22×40	0.20	1.40	390	ZL2F331MCXS5WPEC	
		30×25	0.20	1.43	390	ZL2F331MCZS2WPEC	
	390	22×45	0.20	1.56	330	ZL2F391MCXS6WPEC	
		25×35	0.20	1.57	330	ZL2F391MCYS4WPEC	
	470	25×40	0.20	1.76	280	ZL2F471MCYS5WPEC	
		30×30	0.20	1.73	280	ZL2F471MCZS3WPEC	
		35×25	0.20	1.48	280	ZL2F471MCAS2WPEC	
	560	25×50	0.20	1.99	230	ZL2F561MCYS7WPEC	
		30×35	0.20	1.93	230	ZL2F561MCZS4WPEC	
	680	35×30	0.20	1.70	230	ZL2F561MCAS3WPEC	
		30×40	0.20	2.19	190	ZL2F681MCZS5WPEC	
	820	35×35	0.20	1.96	190	ZL2F681MCAS4WPEC	
		30×45	0.20	2.47	160	ZL2F821MCZS6WPEC	
	1,000	35×40	0.20	2.23	160	ZL2F821MCAS5WPEC	
	1,200	35×45	0.20	2.55	130	ZL2F102MCAS6WPEC	
		1,200	35×50	0.20	2.87	110	ZL2F122MCAS7WPEC

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
	150	22×25*	0.20	0.87	640	ZL2G151MCXS2WPEC
		22×30*	0.20	1.01	540	ZL2G181MCXS3WPEC
	180	25×25	0.20	0.99	540	ZL2G181MCYS2WPEC
		22×30*	0.20	1.11	440	ZL2G221MCXS3WPEC
	220	22×35	0.20	1.17	440	ZL2G221MCXS4WPEC
		25×25*	0.20	1.10	440	ZL2G221MCYS2WPEC
		25×30	0.20	1.16	440	ZL2G221MCYS3WPEC
	270	22×35*	0.20	1.29	360	ZL2G271MCXS4WPEC
		25×30*	0.20	1.28	360	ZL2G271MCYS3WPEC
		25×35	0.20	1.35	360	ZL2G271MCYS4WPEC
		30×25	0.20	1.28	360	ZL2G271MCZS2WPEC
	330	22×45*	0.20	1.54	290	ZL2G331MCXS6WPEC
		22×50	0.20	1.59	290	ZL2G331MCXS7WPEC
		25×35*	0.20	1.49	290	ZL2G331MCYS4WPEC
		25×40	0.20	1.55	290	ZL2G331MCYS5WPEC
	390	30×25*	0.20	1.41	290	ZL2G331MCZS2WPEC
		30×30	0.20	1.49	290	ZL2G331MCZS3WPEC
		35×25	0.20	1.46	290	ZL2G331MCAS2WPEC
		22×50*	0.20	1.73	250	ZL2G391MCXS7WPEC
	470	25×40*	0.20	1.68	250	ZL2G391MCYS5WPEC
		25×45	0.20	1.74	250	ZL2G391MCYS6WPEC
		30×30*	0.20	1.62	250	ZL2G391MCZS3WPEC
		30×35	0.20	1.70	250	ZL2G391MCZS4WPEC
	560	35×25*	0.20	1.59	250	ZL2G391MCAS2WPEC
		25×45*	0.20	1.92	210	ZL2G471MCYS6WPEC
		25×50*	0.20	1.98	210	ZL2G471MCYS7WPEC
		30×35*	0.20	1.86	210	ZL2G471MCZS4WPEC
	680	30×40	0.20	1.94	210	ZL2G471MCZS5WPEC
		35×30	0.20	1.84	210	ZL2G471MCAS2WPEC
		25×50*	0.20	2.16	180	ZL2G561MCYS7WPEC
		30×40*	0.20	2.11	180	ZL2G561MCZS5WPEC
	820	30×45	0.20	2.19	180	ZL2G561MCZS6WPEC
		35×30*	0.20	2.01	180	ZL2G561MCAS3WPEC
		35×35	0.20	2.09	180	ZL2G561MCAS4WPEC
		25×60*	0.20	2.51	150	ZL2G681MCYS9WPEC
	1,000	30×45*	0.20	2.41	150	ZL2G681MCZS6WPEC
		30×50	0.20	2.48	150	ZL2G681MCZS7WPEC
		35×35*	0.20	2.31	150	ZL2G681MCAS4WPEC
		35×40	0.20	2.40	150	ZL2G681MCAS5WPEC
	1,200	30×50*	0.20	2.65	120	ZL2G821MCZS7WPEC
		35×40*	0.20	2.63	120	ZL2G821MCAS5WPEC
		35×45	0.20	2.72	120	ZL2G821MCAS6WPEC
		30×60*	0.20	3.17	100	ZL2G102MCZS9WPEC
	1,500	35×50*	0.20	3.09	100	ZL2G102MCAS7WPEC
		35×55*	0.20	3.56	80	ZL2G122MCAS8WPEC
	1,800	40×76	0.20	3.93	70	ZL2G152MSAS17WPEC
	1,800	40×101	0.20	4.47	60	ZL2G182MSBS17WPEC

ALUMINUM ELECTROLYTIC CAPACITORS

# SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

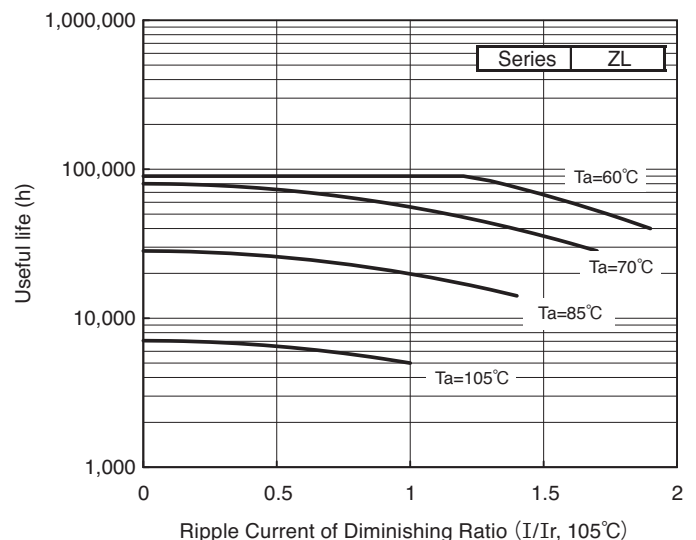
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
420	120	22×25	0.20	0.77	850	ZL420V121MCXS2WPEC
		22×25*	0.20	0.87	680	ZL420V151MCXS2WPEC
	150	22×30	0.20	0.92	680	ZL420V151MCXS3WPEC
		25×25	0.20	0.90	680	ZL420V151MCYS2WPEC
	180	22×30*	0.20	1.01	570	ZL420V181MCXS3WPEC
		22×35	0.20	1.05	570	ZL420V181MCXS4WPEC
		25×25*	0.20	0.99	570	ZL420V181MCYS2WPEC
	220	22×35*	0.20	1.17	470	ZL420V221MCXS4WPEC
		22×40	0.20	1.22	470	ZL420V221MCXS5WPEC
		25×30*	0.20	1.16	470	ZL420V221MCYS3WPEC
		30×25	0.20	1.15	470	ZL420V221MCZS2WPEC
	270	22×40*	0.20	1.35	380	ZL420V271MCXS5WPEC
		22×45	0.20	1.40	380	ZL420V271MCXS6WPEC
		25×30*	0.20	1.25	380	ZL420V271MCYS3WPEC
		25×35*	0.20	1.35	380	ZL420V271MCYS4WPEC
	330	30×25*	0.20	1.28	380	ZL420V271MCZS2WPEC
		22×45*	0.20	1.54	310	ZL420V331MCXS6WPEC
		25×35*	0.20	1.45	310	ZL420V331MCYS4WPEC
	390	30×30*	0.20	1.49	310	ZL420V331MCZS3WPEC
		25×40*	0.20	1.64	270	ZL420V391MCYS5WPEC
		30×30*	0.20	1.62	270	ZL420V391MCZS3WPEC
	470	30×35	0.20	1.70	270	ZL420V391MCZS4WPEC
		35×25*	0.20	1.59	270	ZL420V391MCAS2WPEC
		35×30	0.20	1.67	270	ZL420V391MCAS3WPEC
	560	25×50*	0.20	1.98	220	ZL420V471MCYS7WPEC
		30×35*	0.20	1.86	220	ZL420V471MCZS4WPEC
		30×40	0.20	1.94	220	ZL420V471MCZS5WPEC
		35×30*	0.20	1.84	220	ZL420V471MCAS3WPEC
	680	35×35	0.20	1.92	220	ZL420V471MCAS4WPEC
		25×55*	0.20	2.16	190	ZL420V561MCYS8WPEC
		30×40*	0.20	2.11	190	ZL420V561MCZS5WPEC
	820	35×35*	0.20	2.09	190	ZL420V561MCAS4WPEC
		35×40	0.20	2.18	190	ZL420V561MCAS5WPEC
		30×50*	0.20	2.48	150	ZL420V681MCZS7WPEC
	1,000	35×40*	0.20	2.48	150	ZL420V681MCAS5WPEC
		35×45	0.20	2.48	150	ZL420V681MCAS6WPEC
		30×55*	0.20	2.81	130	ZL420V821MCZS8WPEC
	1,200	35×45*	0.20	2.72	130	ZL420V821MCAS6WPEC
		35×50	0.20	2.80	130	ZL420V821MCAS7WPEC
		35×55*	0.20	3.18	110	ZL420V102MCAS8WPEC
	1,500	35×60	0.20	3.25	110	ZL420V102MCAS9WPEC
		40×56	0.20	3.30	110	ZL420V102MSBS8WPEC
1,500	35×100	0.20	3.51	90	ZL420V122MSAS17WPEC	
	40×76	0.20	3.57	90	ZL420V122MSBS12WPEC	
1,500	40×101	0.20	4.07	70	ZL420V152MSBS17WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
450	120	22×25*	0.20	0.77	850	ZL2W121MCXS2WPEC
		22×30*	0.20	0.92	680	ZL2W151MCXS3WPEC
	150	25×25	0.20	0.90	680	ZL2W151MCYS2WPEC
		22×30*	0.20	1.01	570	ZL2W181MCXS3WPEC
		22×35	0.20	1.05	570	ZL2W181MCXS4WPEC
	180	25×25*	0.20	0.99	570	ZL2W181MCYS2WPEC
		25×30	0.20	1.05	570	ZL2W181MCYS3WPEC
		25×30*	0.20	1.05	570	ZL2W181MCYS4WPEC
	220	22×35*	0.20	1.17	470	ZL2W221MCXS4WPEC
		25×30*	0.20	1.16	470	ZL2W221MCYS3WPEC
		25×35	0.20	1.21	470	ZL2W221MCYS4WPEC
		30×25	0.20	1.15	470	ZL2W221MCZS2WPEC
	270	22×40*	0.20	1.31	380	ZL2W271MCXS5WPEC
		25×35*	0.20	1.35	380	ZL2W271MCYS4WPEC
		25×40	0.20	1.40	380	ZL2W271MCYS5WPEC
		30×25*	0.20	1.28	380	ZL2W271MCZS2WPEC
	330	30×30	0.20	1.35	380	ZL2W271MCZS3WPEC
		35×25	0.20	1.32	380	ZL2W271MCAS2WPEC
		22×50*	0.20	1.59	310	ZL2W331MCXS7WPEC
		25×40*	0.20	1.55	310	ZL2W331MCYS5WPEC
	390	25×45	0.20	1.61	310	ZL2W331MCYS6WPEC
		30×30*	0.20	1.49	310	ZL2W331MCZS3WPEC
		35×25*	0.20	1.46	310	ZL2W331MCAS2WPEC
		25×45*	0.20	1.74	270	ZL2W391MCYS6WPEC
	470	25×50*	0.20	1.80	270	ZL2W391MCYS7WPEC
		30×35*	0.20	1.70	270	ZL2W391MCZS4WPEC
		35×30	0.20	1.67	270	ZL2W391MCAS3WPEC
	560	25×50*	0.20	1.92	220	ZL2W471MCYS7WPEC
		30×40*	0.20	1.94	220	ZL2W471MCZS5WPEC
		35×30*	0.20	1.84	220	ZL2W471MCAS3WPEC
		35×35	0.20	1.92	220	ZL2W471MCAS4WPEC
	680	25×60*	0.20	2.27	190	ZL2W561MCYS9WPEC
		30×45*	0.20	2.19	190	ZL2W561MCZS6WPEC
		30×50	0.20	2.25	190	ZL2W561MCZS7WPEC
	820	35×35*	0.20	2.09	190	ZL2W561MCAS4WPEC
		35×40	0.20	2.18	190	ZL2W561MCAS5WPEC
		30×50*	0.20	2.48	150	ZL2W681MCZS7WPEC
	1,000	35×40*	0.20	2.40	150	ZL2W681MCAS5WPEC
		35×45	0.20	2.48	150	ZL2W681MCAS6WPEC
		30×60*	0.20	2.87	130	ZL2W821MCZS9WPEC
	1,200	35×45*	0.20	2.64	130	ZL2W821MCAS6WPEC
		35×50*	0.20	2.80	130	ZL2W821MCAS7WPEC
1,500	35×55*	0.20	3.18	110	ZL2W102MCAS8WPEC	
1,500	35×100	0.20	3.51	90	ZL2W122MSAS17WPEC	
	40×76	0.20	3.57	90	ZL2W122MSBS12WPEC	
1,500	40×101	0.20	4.07	70	ZL2W152MSBS17WPEC	

## Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz.





Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
475	82	22×25	0.20	0.64	1,170	ZL475V820MCXS2WPEC
		22×25*	0.20	0.69	960	ZL475V101MCXS2WPEC
	100	22×30	0.20	0.75	960	ZL475V101MCXS3WPEC
		25×25	0.20	0.74	960	ZL475V101MCYS2WPEC
		22×30*	0.20	0.82	800	ZL475V121MCXS3WPEC
	120	22×35	0.20	0.86	800	ZL475V121MCXS4WPEC
		25×25	0.20	0.81	800	ZL475V121MCYS2WPEC
		22×35*	0.20	0.96	640	ZL475V151MCXS4WPEC
	150	25×30	0.20	0.96	640	ZL475V151MCYS3WPEC
		30×25	0.20	0.95	640	ZL475V151MCZS2WPEC
		22×40*	0.20	1.07	540	ZL475V181MCXS5WPEC
	180	22×45	0.20	1.14	540	ZL475V181MCXS6WPEC
		25×30*	0.20	1.02	540	ZL475V181MCYS3WPEC
		25×35	0.20	1.10	540	ZL475V181MCYS4WPEC
		30×25	0.20	1.04	540	ZL475V181MCZS2WPEC
		30×30	0.20	1.10	540	ZL475V181MCZS3WPEC
		35×25	0.20	1.01	540	ZL475V181MCAS2WPEC
	220	22×45*	0.20	1.22	440	ZL475V221MCXS6WPEC
		22×50	0.20	1.30	440	ZL475V221MCXS7WPEC
		25×35*	0.20	1.18	440	ZL475V221MCYS4WPEC
		25×40	0.20	1.27	440	ZL475V221MCYS5WPEC
		30×30	0.20	1.22	440	ZL475V221MCZS3WPEC
		35×25	0.20	1.12	440	ZL475V221MCAS2WPEC
	270	25×40*	0.20	1.36	360	ZL475V271MCYS5WPEC
		25×45	0.20	1.45	360	ZL475V271MCYS6WPEC
		30×30*	0.20	1.31	360	ZL475V271MCZS3WPEC
		30×35	0.20	1.41	360	ZL475V271MCZS4WPEC
		35×25*	0.20	1.28	360	ZL475V271MCAS2WPEC
		35×30	0.20	1.31	360	ZL475V271MCAS3WPEC
	330	25×50*	0.20	1.61	290	ZL475V331MCYS7WPEC
		25×55	0.20	1.71	290	ZL475V331MCYS8WPEC
		30×35*	0.20	1.51	290	ZL475V331MCZS4WPEC
		30×40	0.20	1.62	290	ZL475V331MCZS5WPEC
		35×30*	0.20	1.49	290	ZL475V331MCAS3WPEC
	390	35×35	0.20	1.51	290	ZL475V331MCAS4WPEC
		25×55*	0.20	1.80	250	ZL475V391MCYS8WPEC
		30×40*	0.20	1.71	250	ZL475V391MCZS5WPEC
		30×45	0.20	1.82	250	ZL475V391MCZS6WPEC
	470	35×35	0.20	1.64	250	ZL475V391MCAS4WPEC
		30×45*	0.20	1.94	210	ZL475V471MCZS6WPEC
		30×50	0.20	2.06	210	ZL475V471MCZS7WPEC
		35×35*	0.20	1.86	210	ZL475V471MCAS4WPEC
	560	35×40	0.20	1.87	210	ZL475V471MCAS5WPEC
		30×55*	0.20	2.25	180	ZL475V561MCZS8WPEC
		30×60	0.20	2.37	180	ZL475V561MCZS9WPEC
		35×40*	0.20	2.11	180	ZL475V561MCAS5WPEC
	680	35×45	0.20	2.11	180	ZL475V561MCAS6WPEC
		35×50*	0.20	2.48	150	ZL475V681MCAS7WPEC
820	35×55	0.20	2.45	150	ZL475V681MCAS8WPEC	
	35×55*	0.20	2.80	120	ZL475V821MCAS8WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name	
500	82	22×25*	0.20	0.52	1,170	ZL2H820MCXS2WPEC	
		22×30	0.20	0.53	1,170	ZL2H820MCXS3WPEC	
		25×25	0.20	0.54	1,170	ZL2H820MCYS2WPEC	
	100	22×30*	0.20	0.62	960	ZL2H101MCXS3WPEC	
		22×35	0.20	0.62	960	ZL2H101MCXS4WPEC	
		25×25*	0.20	0.63	960	ZL2H101MCYS2WPEC	
		25×30	0.20	0.64	960	ZL2H101MCYS3WPEC	
	120	22×35*	0.20	0.72	800	ZL2H121MCXS4WPEC	
		22×40	0.20	0.72	800	ZL2H121MCXS5WPEC	
		25×30*	0.20	0.71	800	ZL2H121MCYS3WPEC	
		25×35	0.20	0.74	800	ZL2H121MCYS4WPEC	
		30×25	0.20	0.75	800	ZL2H121MCZS2WPEC	
	150	22×40*	0.20	0.82	640	ZL2H151MCXS5WPEC	
		25×30*	0.20	0.84	640	ZL2H151MCYS3WPEC	
		30×25*	0.20	0.85	640	ZL2H151MCZS2WPEC	
		30×30	0.20	0.90	640	ZL2H151MCZS3WPEC	
		35×25	0.20	0.94	640	ZL2H151MCAS2WPEC	
		22×45*	0.20	0.98	540	ZL2H181MCXS6WPEC	
	180	25×35*	0.20	0.98	540	ZL2H181MCYS4WPEC	
		30×30*	0.20	0.99	540	ZL2H181MCZS3WPEC	
		30×35	0.20	1.04	540	ZL2H181MCZS4WPEC	
		35×25*	0.20	1.04	540	ZL2H181MCAS2WPEC	
		25×45*	0.20	1.17	440	ZL2H221MCYS6WPEC	
	220	25×50	0.20	1.17	440	ZL2H221MCYS7WPEC	
		30×30*	0.20	1.09	440	ZL2H221MCZS3WPEC	
		35×25*	0.20	1.07	440	ZL2H221MCAS2WPEC	
		35×30	0.20	1.22	440	ZL2H221MCAS3WPEC	
	270	25×50*	0.20	1.34	360	ZL2H271MCYS7WPEC	
		30×35*	0.20	1.26	360	ZL2H271MCZS4WPEC	
		35×30*	0.20	1.37	360	ZL2H271MCZS7WPEC	
		35×35	0.20	1.44	360	ZL2H271MCAS4WPEC	
	330	30×45*	0.20	1.58	290	ZL2H331MCZS6WPEC	
		30×50	0.20	1.63	290	ZL2H331MCZS7WPEC	
		35×35*	0.20	1.61	290	ZL2H331MCAS4WPEC	
		35×40	0.20	1.67	290	ZL2H331MCAS5WPEC	
	390	30×50*	0.20	1.79	250	ZL2H391MCZS7WPEC	
		35×40*	0.20	1.84	250	ZL2H391MCAS5WPEC	
		35×45	0.20	1.90	250	ZL2H391MCAS6WPEC	
	470	30×60*	0.20	2.10	210	ZL2H471MCZS9WPEC	
		35×45*	0.20	2.12	210	ZL2H471MCAS6WPEC	
		35×50	0.20	2.18	210	ZL2H471MCAS7WPEC	
	560	35×50*	0.20	2.07	180	ZL2H561MCAS7WPEC	
		35×60	0.20	2.53	180	ZL2H561MCAS9WPEC	
	680	35×60*	0.20	2.40	150	ZL2H681MCAS9WPEC	
	550	82	30×25	0.25	0.59	2,920	ZL2L820MCZS2WPEC
		120	30×30	0.25	0.77	1,990	ZL2L121MCZS3WPEC
			35×25	0.25	0.80	1,990	ZL2L121MCAS2WPEC
		150	30×35	0.25	0.91	1,600	ZL2L151MCZS4WPEC
35×30			0.25	0.96	1,600	ZL2L151MCAS3WPEC	
180		30×40	0.25	1.05	1,330	ZL2L181MCZS5WPEC	
		35×35	0.25	1.11	1,330	ZL2L181MCAS4WPEC	
220		30×50	0.25	1.26	1,090	ZL2L221MCZS7WPEC	
		35×40	0.25	1.29	1,090	ZL2L221MCAS5WPEC	
270		35×45	0.25	1.50	890	ZL2L271MCAS6WPEC	
330		35×50	0.25	1.73	730	ZL2L331MCAS7WPEC	
390	35×60	0.25	2.00	620	ZL2L391MCAS9WPEC		

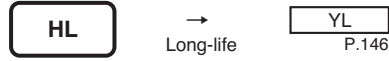
ALUMINUM ELECTROLYTIC CAPACITORS

## HL Series Useful of 8,000 hours at 105°C

- Conform RoHS

### Features

- The HL series is the miniaturization products of 8,000 hours.

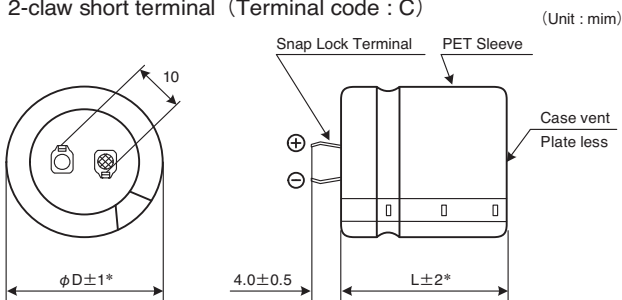


### Product Specifications

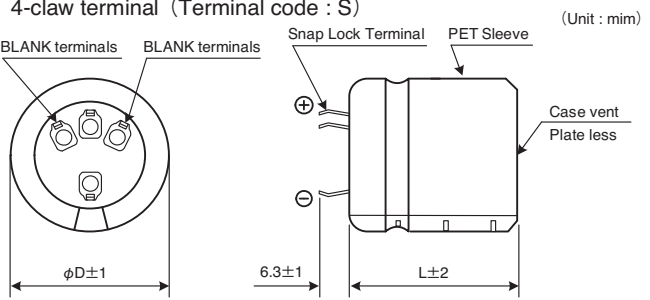
Items	Specifications
Temperature range	-40°C ~ +105°C (200, 250V.DC) -25°C ~ +105°C (315 ~ 500V.DC)
Rated voltage	200 ~ 550V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard products table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 5000 hours : Capacitance change : Within ±20% of the initial value measured Dissipation factor : 200% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions

2-claw short terminal (Terminal code : C)



4-claw terminal (Terminal code : S)



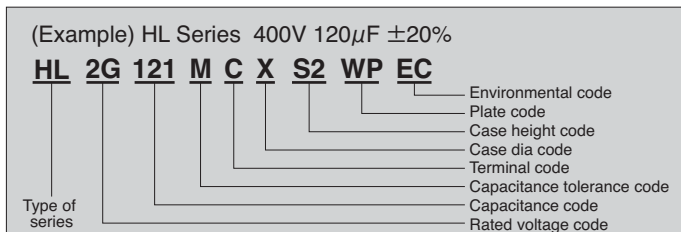
\* Products marked with "\*" in the standard products table :  $\phi D \pm 1.5, L \pm 2.5$   
(For details of product specifications please request specification sheet.)

### Ripple current correction coefficient

Temperature (°C)	60	70	85	105	
Correction coefficient	1.9	1.7	1.4	1.0	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

A continuous load should be avoided over 10 Arms at the terminal in accordance with the permissible current.  
Please consult us when the ripple voltage exceeds 70Vp-p.

### Product code



Refer to page 124-125 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name	
							200
	470	22×30	0.15	1.37	240	HL2D471MCXS3WPEC	
		25×25	0.15	1.36	240	HL2D471MCYS2WPEC	
	560	22×35	0.15	1.57	200	HL2D561MCXS4WPEC	
		25×30	0.15	1.57	200	HL2D561MCYS3WPEC	
	680	22×40	0.15	1.81	160	HL2D681MCXS5WPEC	
		30×25	0.15	1.75	160	HL2D681MCZS2WPEC	
	820	22×45	0.15	2.06	140	HL2D821MCXS6WPEC	
		25×35	0.15	1.99	140	HL2D821MCYS4WPEC	
	1,000	25×45	0.15	2.37	110	HL2D102MCYS6WPEC	
		30×30	0.15	2.24	110	HL2D102MCZS3WPEC	
		35×25	0.15	1.94	110	HL2D102MCAS2WPEC	
	1,200	25×50	0.15	2.67	100	HL2D122MCYS7WPEC	
		30×35	0.15	2.56	100	HL2D122MCZS4WPEC	
		35×30	0.15	2.23	100	HL2D122MCAS3WPEC	
	1,500	30×45	0.15	3.08	80	HL2D152MCZS6WPEC	
		35×35	0.15	2.61	80	HL2D152MCAS4WPEC	
		30×50	0.15	3.49	70	HL2D182MCZS7WPEC	
	1,800	35×40	0.15	2.97	70	HL2D182MCAS5WPEC	
		35×45	0.15	3.39	50	HL2D222MCAS6WPEC	
	2,700	35×50	0.15	3.86	50	HL2D272MCAS7WPEC	
250	270	22×25	0.15	0.98	360	HL2E271MCXS2WPEC	
	330	22×30	0.15	1.15	290	HL2E331MCXS3WPEC	
		25×25	0.15	1.14	290	HL2E331MCYS2WPEC	
	390	22×35	0.15	1.31	250	HL2E391MCXS4WPEC	
	470	22×40	0.15	1.50	210	HL2E471MCXS5WPEC	
		25×30	0.15	1.43	210	HL2E471MCYS3WPEC	
		30×25	0.15	1.45	210	HL2E471MCZS2WPEC	
	560	22×45	0.15	1.70	180	HL2E561MCXS6WPEC	
		25×35	0.15	1.64	180	HL2E561MCYS4WPEC	
	680	22×50	0.15	1.94	150	HL2E681MCXS7WPEC	
		25×40	0.15	1.88	150	HL2E681MCYS5WPEC	
		30×30	0.15	1.85	150	HL2E681MCZS3WPEC	
		820	35×25	0.15	1.60	150	HL2E681MCAS2WPEC
			25×45	0.15	2.14	120	HL2E821MCYS6WPEC
			30×35	0.15	2.12	120	HL2E821MCZS4WPEC
		1,000	35×30	0.15	1.84	120	HL2E821MCAS3WPEC
			30×40	0.15	2.44	100	HL2E102MCZS5WPEC
		1,200	30×45	0.15	2.76	80	HL2E122MCZS6WPEC
35×35			0.15	2.33	80	HL2E122MCAS4WPEC	
	1,500	35×45	0.15	2.80	70	HL2E152MCAS6WPEC	
	1,800	35×50	0.15	3.16	60	HL2E182MCAS7WPEC	
315	150	22×25	0.20	0.86	850	HL2F151MCXS2WPEC	
	220	22×30	0.20	1.10	580	HL2F221MCXS3WPEC	
		25×25	0.20	1.10	580	HL2F221MCYS2WPEC	
	270	22×35	0.20	1.24	480	HL2F271MCXS4WPEC	
		25×30	0.20	1.25	480	HL2F271MCYS3WPEC	
	330	22×40	0.20	1.40	390	HL2F331MCXS5WPEC	
		25×35	0.20	1.44	390	HL2F331MCYS4WPEC	
		390	30×25	0.20	1.43	390	HL2F331MCZS2WPEC
			22×45	0.20	1.56	330	HL2F391MCXS6WPEC
		470	25×40	0.20	1.60	330	HL2F391MCYS5WPEC
			30×30	0.20	1.56	330	HL2F391MCZS3WPEC
	560	820	25×45	0.20	1.79	280	HL2F471MCYS6WPEC
			35×25	0.20	1.48	280	HL2F471MCAS2WPEC
			25×50	0.20	1.99	230	HL2F561MCYS7WPEC
		1,000	30×35	0.20	1.93	230	HL2F561MCZS4WPEC
			35×30	0.20	1.70	230	HL2F561MCAS3WPEC
		1,200	30×40	0.20	2.19	190	HL2F681MCZS5WPEC
			35×35	0.20	1.96	190	HL2F681MCAS4WPEC
		1,500	30×50	0.20	2.51	160	HL2F821MCZS7WPEC
			35×40	0.20	2.23	160	HL2F821MCAS5WPEC
		1,800	35×45	0.20	2.55	130	HL2F102MCAS6WPEC
		2,200	35×50	0.20	2.87	110	HL2F122MCAS7WPEC

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
	150	22×25*	0.20	0.87	640	HL2G151MCXS2WPEC
		22×30	0.20	0.92	640	HL2G151MCXS3WPEC
	180	25×25	0.20	0.90	640	HL2G151MCYS2WPEC
		22×30*	0.20	1.01	540	HL2G181MCXS3WPEC
	220	22×35	0.20	1.05	540	HL2G181MCXS4WPEC
		25×25*	0.20	0.99	540	HL2G181MCYS2WPEC
		25×30	0.20	1.05	540	HL2G181MCYS3WPEC
	270	22×35*	0.20	1.17	440	HL2G221MCXS4WPEC
		22×40	0.20	1.22	440	HL2G221MCXS5WPEC
		25×30	0.20	1.16	440	HL2G221MCYS3WPEC
	330	25×35	0.20	1.21	440	HL2G221MCYS4WPEC
		30×25	0.20	1.17	440	HL2G221MCZS2WPEC
		22×40*	0.20	1.35	360	HL2G271MCXS5WPEC
	390	22×45	0.20	1.40	360	HL2G271MCXS6WPEC
		25×35	0.20	1.35	360	HL2G271MCYS4WPEC
		25×40	0.20	1.40	360	HL2G271MCYS5WPEC
	470	30×25*	0.20	1.28	360	HL2G271MCZS2WPEC
		22×45*	0.20	1.54	290	HL2G331MCXS6WPEC
		22×50*	0.20	1.59	290	HL2G331MCXS7WPEC
	560	25×40	0.20	1.55	290	HL2G331MCYS5WPEC
		25×45	0.20	1.61	290	HL2G331MCYS6WPEC
		30×30	0.20	1.49	290	HL2G331MCZS3WPEC
	680	35×25	0.20	1.52	290	HL2G331MCAS2WPEC
		25×45*	0.20	1.74	250	HL2G391MCYS6WPEC
		25×50	0.20	1.80	250	HL2G391MCYS7WPEC
	820	30×30*	0.20	1.62	250	HL2G391MCZS3WPEC
		30×35	0.20	1.70	250	HL2G391MCZS4WPEC
		35×25*	0.20	1.59	250	HL2G391MCAS2WPEC
	1,000	35×30	0.20	1.68	250	HL2G391MCAS3WPEC
		25×50*	0.20	1.98	210	HL2G471MCYS7WPEC
		30×35*	0.20	1.86	210	HL2G471MCZS4WPEC
	1,200	30×40	0.20	1.94	210	HL2G471MCZS5WPEC
		35×30*	0.20	1.84	210	HL2G471MCAS3WPEC
		35×35	0.20	1.92	210	HL2G471MCAS4WPEC
	1,500	30×40*	0.20	2.11	180	HL2G561MCZS5WPEC
		30×45	0.20	2.19	180	HL2G561MCZS6WPEC
		35×35	0.20	2.09	180	HL2G561MCAS4WPEC
	1,800	35×40	0.20	2.18	180	HL2G561MCAS5WPEC
		30×50*	0.20	2.48	150	HL2G681MCZS7WPEC
		35×40*	0.20	2.40	150	HL2G681MCAS5WPEC
	2,200	35×45	0.20	2.48	150	HL2G681MCAS6WPEC
		35×45*	0.20	2.72	120	HL2G821MCAS6WPEC
	2,700	35×50	0.20	2.80	120	HL2G821MCAS7WPEC
	3,300	35×50*	0.20	3.09	100	HL2G102MCAS7WPEC

ALUMINUM ELECTROLYTIC CAPACITORS

# SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
420	100	22×25	0.20	0.71	1,020	HL420V101MCXS2WPEC
		22×25*	0.20	0.77	850	HL420V121MCXS2WPEC
	120	22×30	0.20	0.82	850	HL420V121MCXS3WPEC
		22×30	0.20	0.92	680	HL420V151MCXS3WPEC
	150	22×35	0.20	0.96	680	HL420V151MCXS4WPEC
		25×25	0.20	0.90	680	HL420V151MCYS2WPEC
		22×35	0.20	1.05	570	HL420V181MCXS4WPEC
	180	22×40	0.20	1.10	570	HL420V181MCXS5WPEC
		25×25*	0.20	0.99	570	HL420V181MCYS2WPEC
		25×30	0.20	1.05	570	HL420V181MCYS3WPEC
		22×40	0.20	1.22	470	HL420V221MCXS5WPEC
	220	22×45	0.20	1.26	470	HL420V221MCXS6WPEC
		25×30*	0.20	1.16	470	HL420V221MCYS3WPEC
		25×35	0.20	1.21	470	HL420V221MCYS4WPEC
		30×25	0.20	1.15	470	HL420V221MCZS2WPEC
	270	22×45*	0.20	1.40	380	HL420V271MCXS6WPEC
		22×50	0.20	1.44	380	HL420V271MCXS7WPEC
		25×35*	0.20	1.35	380	HL420V271MCYS4WPEC
		25×40	0.20	1.40	380	HL420V271MCYS5WPEC
		30×25*	0.20	1.28	380	HL420V271MCZS2WPEC
	330	30×30	0.20	1.35	380	HL420V271MCZS3WPEC
		35×25	0.20	1.38	380	HL420V271MCAS2WPEC
		22×50*	0.20	1.59	310	HL420V331MCXS7WPEC
		25×40*	0.20	1.55	310	HL420V331MCYS5WPEC
		25×45	0.20	1.61	310	HL420V331MCYS6WPEC
		30×30*	0.20	1.49	310	HL420V331MCZS3WPEC
		30×35	0.20	1.56	310	HL420V331MCZS4WPEC
	390	35×25*	0.20	1.46	310	HL420V331MCAS2WPEC
		25×45*	0.20	1.74	270	HL420V391MCYS6WPEC
		25×50	0.20	1.80	270	HL420V391MCYS7WPEC
		30×35*	0.20	1.70	270	HL420V391MCZS4WPEC
		30×40	0.20	1.76	270	HL420V391MCZS5WPEC
	470	35×30	0.20	1.67	270	HL420V391MCAS3WPEC
		25×50*	0.20	1.98	220	HL420V471MCYS7WPEC
		30×40*	0.20	1.94	220	HL420V471MCZS5WPEC
		30×45	0.20	2.00	220	HL420V471MCZS6WPEC
		35×30*	0.20	1.84	220	HL420V471MCAS3WPEC
	560	35×35	0.20	1.92	220	HL420V471MCAS4WPEC
		30×45*	0.20	2.19	190	HL420V561MCZS6WPEC
		30×50	0.20	2.25	190	HL420V561MCZS7WPEC
		35×35*	0.20	2.09	190	HL420V561MCAS4WPEC
	680	35×40	0.20	2.18	190	HL420V561MCAS5WPEC
		30×50*	0.20	2.48	150	HL420V681MCZS7WPEC
		35×40*	0.20	2.40	150	HL420V681MCAS5WPEC
	820	35×45	0.20	2.48	150	HL420V681MCAS6WPEC
		35×45*	0.20	2.72	130	HL420V821MCAS6WPEC

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
450	82	22×25	0.20	0.64	1,250	HL2W820MCXS2WPEC
	100	22×25*	0.20	0.71	1,020	HL2W101MCXS2WPEC
		22×30	0.20	0.82	850	HL2W121MCXS3WPEC
	120	25×25	0.20	0.81	850	HL2W121MCYS2WPEC
		22×30*	0.20	0.92	680	HL2W151MCXS3WPEC
	150	22×35	0.20	0.96	680	HL2W151MCXS4WPEC
		25×25*	0.20	0.90	680	HL2W151MCYS2WPEC
		25×30	0.20	0.96	680	HL2W151MCYS3WPEC
	180	22×35*	0.20	1.05	570	HL2W181MCXS4WPEC
		22×40	0.20	1.10	570	HL2W181MCXS5WPEC
		25×30*	0.20	1.05	570	HL2W181MCYS3WPEC
		25×35	0.20	1.10	570	HL2W181MCYS4WPEC
	220	30×25	0.20	1.06	570	HL2W181MCZS2WPEC
		22×40*	0.20	1.22	470	HL2W221MCXS5WPEC
		22×45*	0.20	1.26	470	HL2W221MCXS6WPEC
		25×35*	0.20	1.21	470	HL2W221MCYS4WPEC
	270	25×40	0.20	1.27	470	HL2W221MCYS5WPEC
		30×25*	0.20	1.15	470	HL2W221MCZS2WPEC
		30×30	0.20	1.22	470	HL2W221MCZS3WPEC
		35×25	0.20	1.24	470	HL2W221MCAS2WPEC
		22×50*	0.20	1.44	380	HL2W271MCXS7WPEC
	330	25×40*	0.20	1.40	380	HL2W271MCYS5WPEC
		25×45	0.20	1.45	380	HL2W271MCYS6WPEC
		30×30*	0.20	1.35	380	HL2W271MCZS3WPEC
		30×35	0.20	1.41	380	HL2W271MCZS4WPEC
	390	35×25*	0.20	1.32	380	HL2W271MCAS2WPEC
		25×45*	0.20	1.61	310	HL2W331MCYS6WPEC
		25×50	0.20	1.66	310	HL2W331MCYS7WPEC
		30×35*	0.20	1.56	310	HL2W331MCZS4WPEC
		30×40	0.20	1.62	310	HL2W331MCZS5WPEC
	470	35×30	0.20	1.54	310	HL2W331MCAS3WPEC
		30×40*	0.20	1.76	270	HL2W391MCZS5WPEC
		30×45	0.20	1.82	270	HL2W391MCZS6WPEC
		35×30*	0.20	1.67	270	HL2W391MCAS3WPEC
	560	35×35	0.20	1.75	270	HL2W391MCAS4WPEC
		30×45*	0.20	2.00	220	HL2W471MCZS6WPEC
		30×50	0.20	2.07	220	HL2W471MCZS7WPEC
		35×35*	0.20	1.92	220	HL2W471MCAS4WPEC
	680	35×40	0.20	1.99	220	HL2W471MCAS5WPEC
		30×50*	0.20	2.25	190	HL2W561MCZS7WPEC
		35×40*	0.20	2.18	190	HL2W561MCAS5WPEC
	820	35×45	0.20	2.25	190	HL2W561MCAS6WPEC
		35×45*	0.20	2.48	150	HL2W681MCAS6WPEC
	35×50	0.20	2.55	150	HL2W681MCAS7WPEC	

ALUMINUM ELECTROLYTIC CAPACITORS

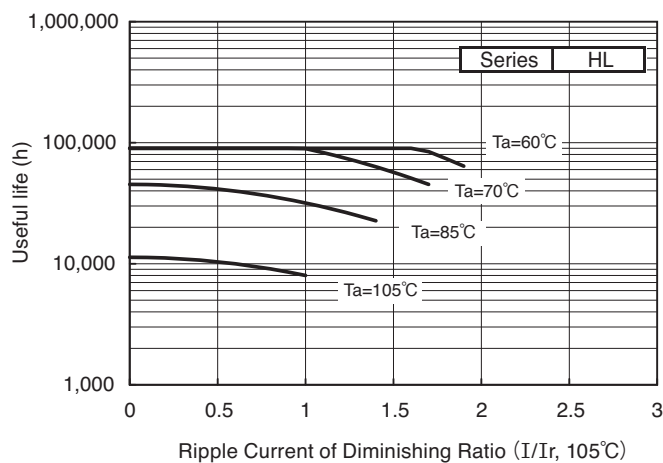
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current	ESR(typ.)	Product name
				(Arms) 105°C, 120Hz	(mΩ) 20°C, 100Hz	
500	56	22×25	0.20	0.40	1,710	HL2H560MCXS2WPEC
		22×25*	0.20	0.45	1,410	HL2H680MCXS2WPEC
	68	22×30	0.20	0.48	1,410	HL2H680MCXS3WPEC
		25×25	0.20	0.49	1,410	HL2H680MCYS2WPEC
	82	22×30*	0.20	0.54	1,170	HL2H820MCXS3WPEC
		22×35	0.20	0.56	1,170	HL2H820MCXS4WPEC
		25×25*	0.20	0.55	1,170	HL2H820MCYS2WPEC
		25×30	0.20	0.57	1,170	HL2H820MCYS3WPEC
	100	22×35*	0.20	0.62	960	HL2H101MCXS4WPEC
		22×40	0.20	0.65	960	HL2H101MCXS5WPEC
		25×30	0.20	0.64	960	HL2H101MCYS3WPEC
		25×35	0.20	0.67	960	HL2H101MCYS4WPEC
		30×25	0.20	0.68	960	HL2H101MCZS2WPEC
	120	22×40*	0.20	0.72	800	HL2H121MCXS5WPEC
		22×45	0.20	0.75	800	HL2H121MCXS6WPEC
		25×35	0.20	0.74	800	HL2H121MCYS4WPEC
		25×40	0.20	0.77	800	HL2H121MCYS5WPEC
		30×25*	0.20	0.75	800	HL2H121MCZS2WPEC
	150	30×30	0.20	0.79	800	HL2H121MCZS3WPEC
		22×45*	0.20	0.85	640	HL2H151MCXS6WPEC
		25×40*	0.20	0.88	640	HL2H151MCYS5WPEC
		25×45	0.20	0.91	640	HL2H151MCYS6WPEC
		30×30	0.20	0.90	640	HL2H151MCZS3WPEC
	180	30×35	0.20	0.94	640	HL2H151MCZS4WPEC
		35×25	0.20	0.94	640	HL2H151MCAS2WPEC
		25×45*	0.20	1.01	540	HL2H181MCYS6WPEC
		25×50	0.20	1.04	540	HL2H181MCYS7WPEC
		30×35	0.20	1.04	540	HL2H181MCZS4WPEC
	220	30×40	0.20	1.08	540	HL2H181MCZS5WPEC
		35×25*	0.20	1.04	540	HL2H181MCAS2WPEC
		35×30	0.20	1.09	540	HL2H181MCAS3WPEC
		25×50*	0.20	1.17	440	HL2H221MCYS7WPEC
		30×40	0.20	1.21	440	HL2H221MCZS5WPEC
	270	30×45	0.20	1.26	440	HL2H221MCZS6WPEC
		35×30*	0.20	1.22	440	HL2H221MCAS3WPEC
		35×35	0.20	1.28	440	HL2H221MCAS4WPEC
		30×45*	0.20	1.41	360	HL2H271MCZS6WPEC
		30×50	0.20	1.45	360	HL2H271MCZS7WPEC
	330	35×35*	0.20	1.44	360	HL2H271MCAS4WPEC
		35×40	0.20	1.49	360	HL2H271MCAS5WPEC
		30×50*	0.20	1.63	290	HL2H331MCZS7WPEC
		35×40*	0.20	1.67	290	HL2H331MCAS5WPEC
	390	35×45	0.20	1.73	290	HL2H331MCAS6WPEC
		30×60*	0.20	1.89	250	HL2H391MCZS9WPEC
		35×45*	0.20	1.90	250	HL2H391MCAS6WPEC
	470	35×50	0.20	1.96	250	HL2H391MCAS7WPEC
		35×50*	0.20	2.18	210	HL2H471MCAS7WPEC
	560	35×60*	0.20	2.53	180	HL2H561MCAS9WPEC

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature Ta and ripple current operating conditions I versus rated ripple current at 105°C, 120Hz.





## YL Series Useful of 10,000 hours at 105°C

- Conform RoHS

### Features

- The YL series is the miniaturization products of 10,000 hours.
- 500V added in the series.

YL

→  
Long-life

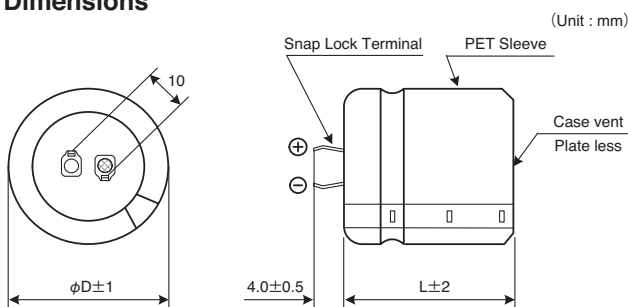
XL1  
P.148



### Product Specifications

Items	Specifications
Temperature range	-25°C ~ +105°C
Rated voltage	400 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 7,000 hours : Capacitance change : Within ±20% of the initial value measured Dissipation factor : 200% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions

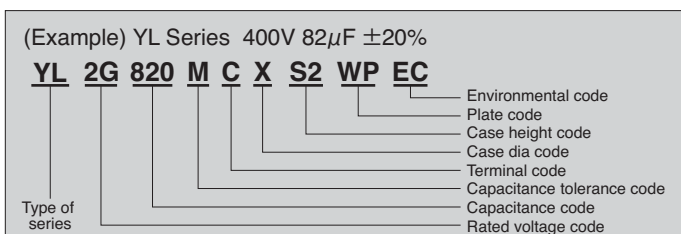


### Ripple current correction coefficient

Temperature (°C)	60	70	85	105	
Correction coefficient	1.9	1.7	1.4	1.0	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

A continuous load should be avoided over 10 Arms at the terminal in accordance with the permissible current.  
Please consult us when the ripple voltage exceeds 70Vp-p.

### Product code



Refer to page 124-125 for other terminal shape available on request.

Standard Products Table

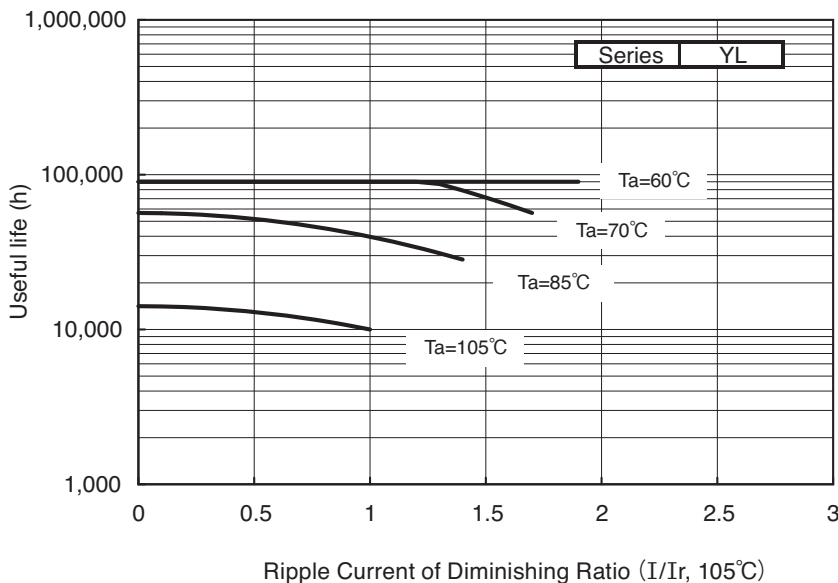
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
400	82	22×25	0.20	0.59	1,170	YL2G820MCXS2WPEC
		22×30	0.20	0.76	800	YL2G121MCXS3WPEC
	120	25×25	0.20	0.75	800	YL2G121MCYS2WPEC
		22×35	0.20	0.89	640	YL2G151MCXS4WPEC
	150	25×30	0.20	0.88	640	YL2G151MCYS3WPEC
		22×40	0.20	1.01	540	YL2G181MCXS5WPEC
	180	25×35	0.20	1.01	540	YL2G181MCYS4WPEC
		30×25	0.20	0.96	540	YL2G181MCZS2WPEC
	220	22×50	0.20	1.20	440	YL2G221MCXS7WPEC
		25×40	0.20	1.17	440	YL2G221MCYS5WPEC
		30×30	0.20	1.12	440	YL2G221MCZS3WPEC
		35×25	0.20	1.10	440	YL2G221MCAS2WPEC
	270	25×45	0.20	1.34	360	YL2G271MCYS6WPEC
		30×35	0.20	1.30	360	YL2G271MCZS4WPEC
	330	25×50	0.20	1.53	290	YL2G331MCYS7WPEC
		35×30	0.20	1.42	290	YL2G331MCAS3WPEC
	390	30×40	0.20	1.63	250	YL2G391MCZS5WPEC
		35×35	0.20	1.61	250	YL2G391MCAS4WPEC
470	30×50	0.20	1.91	210	YL2G471MCZS7WPEC	
	35×40	0.20	1.84	210	YL2G471MCAS5WPEC	
560	35×45	0.20	2.08	180	YL2G561MCAS6WPEC	
680	35×50	0.20	2.36	150	YL2G681MCAS7WPEC	
420	100	22×30	0.20	0.69	1,020	YL420V101MCXS3WPEC
		25×25	0.20	0.68	1,020	YL420V101MCYS2WPEC
	120	22×35	0.20	0.79	850	YL420V121MCXS4WPEC
		25×30	0.20	0.79	850	YL420V121MCYS3WPEC
	150	22×40	0.20	0.93	680	YL420V151MCXS5WPEC
		25×35	0.20	0.93	680	YL420V151MCYS4WPEC
	180	30×25	0.20	0.88	680	YL420V151MCZS2WPEC
		22×50	0.20	1.09	570	YL420V181MCXS7WPEC
	180	25×40	0.20	1.06	570	YL420V181MCYS5WPEC
		30×30	0.20	1.02	570	YL420V181MCZS3WPEC
	220	35×25	0.20	1.00	570	YL420V181MCAS2WPEC
		25×45	0.20	1.21	470	YL420V221MCYS6WPEC
	220	30×35	0.20	1.18	470	YL420V221MCZS4WPEC
		25×50	0.20	1.38	380	YL420V271MCYS7WPEC
	270	30×40	0.20	1.35	380	YL420V271MCZS5WPEC
		35×30	0.20	1.28	380	YL420V271MCAS3WPEC
	330	30×45	0.20	1.55	310	YL420V331MCZS6WPEC
		35×35	0.20	1.48	310	YL420V331MCAS4WPEC
390	30×50	0.20	1.74	270	YL420V391MCZS7WPEC	
	35×40	0.20	1.67	270	YL420V391MCAS5WPEC	
470	35×45	0.20	1.90	220	YL420V471MCAS6WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
450	82	22×30	0.20	0.63	1,250	YL2W820MCXS3WPEC
	100	25×25	0.20	0.68	1,020	YL2W101MCYS2WPEC
		22×35	0.20	0.79	850	YL2W121MCXS4WPEC
	120	25×30	0.20	0.79	850	YL2W121MCYS3WPEC
		22×45	0.20	0.96	680	YL2W151MCXS6WPEC
	150	25×35	0.20	0.93	680	YL2W151MCYS4WPEC
		30×25	0.20	0.88	680	YL2W151MCZS2WPEC
	180	22×50	0.20	1.09	570	YL2W181MCXS7WPEC
		25×40	0.20	1.06	570	YL2W181MCYS5WPEC
		30×30	0.20	1.02	570	YL2W181MCZS3WPEC
		35×25	0.20	1.00	570	YL2W181MCAS2WPEC
	220	25×45	0.20	1.21	470	YL2W221MCYS6WPEC
		30×35	0.20	1.18	470	YL2W221MCZS4WPEC
	220	35×30	0.20	1.16	470	YL2W221MCAS3WPEC
		30×40	0.20	1.35	380	YL2W271MCZS5WPEC
	270	35×35	0.20	1.34	380	YL2W271MCAS4WPEC
		30×45	0.20	1.55	310	YL2W331MCZS6WPEC
	330	30×50	0.20	1.74	270	YL2W391MCZS7WPEC
35×40		0.20	1.67	270	YL2W391MCAS5WPEC	
470	35×50	0.20	1.96	220	YL2W471MCAS7WPEC	
	100	25×35	0.20	0.67	960	YL2H101MCYS4WPEC
100		30×25	0.20	0.64	960	YL2H101MCZS2WPEC
	120	25×40	0.20	0.77	800	YL2H121MCYS5WPEC
120		30×30	0.20	0.74	800	YL2H121MCZS3WPEC
	120	35×25	0.20	0.72	800	YL2H121MCAS2WPEC
150		25×50	0.20	0.92	640	YL2H151MCYS7WPEC
	150	30×35	0.20	0.86	640	YL2H151MCZS4WPEC
150		35×30	0.20	0.85	640	YL2H151MCAS3WPEC
	180	30×40	0.20	0.98	540	YL2H181MCZS5WPEC
180		35×35	0.20	0.97	540	YL2H181MCAS4WPEC
	220	30×45	0.20	1.13	440	YL2H221MCZS6WPEC
220		35×40	0.20	1.12	440	YL2H221MCAS5WPEC
	270	35×45	0.20	1.28	360	YL2H271MCAS6WPEC
330		35×50	0.20	1.46	290	YL2H331MCAS7WPEC

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature Ta and ripple current operating conditions I versus rated ripple current at 105°C, 120Hz.



## XL1 Series

Useful of 15,000 hours at 105°C

- Conform RoHS

### Features

- Useful of 15,000 hours at 105°C through improvement of electrolyte liquid and etched foil technology.

YL  
P.146

→  
Long-life

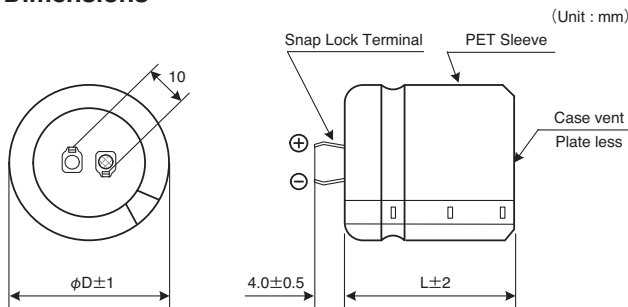
XL1



### Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	200 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 10,000 hours : Capacitance change : Within ±15% of the initial value measured Dissipation factor : 200% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions



### Ripple current correction coefficient

Temperature (°C)	60	70	85	105	
Correction coefficient	2.2	2.0	1.8	1.0	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

A continuous load should be avoided over 10 Arms at the terminal in accordance with the permissible current.

Please consult us when the ripple voltage exceeds 70Vp-p .

### Product code

(Example) XL1 series 450V 100µF±20%

<b>XL1</b>	<b>2W</b>	<b>101</b>	<b>M</b>	<b>C</b>	<b>X</b>	<b>S5</b>	<b>WP</b>	<b>EC</b>
Type of series	Rated voltage code	Capacitance code	Capacitance tolerance code	Terminal code	Case dia code	Case height code	Plate code	Environmental code

Refer to page 124-125 for other terminal shape available on request.



Standard Products Table

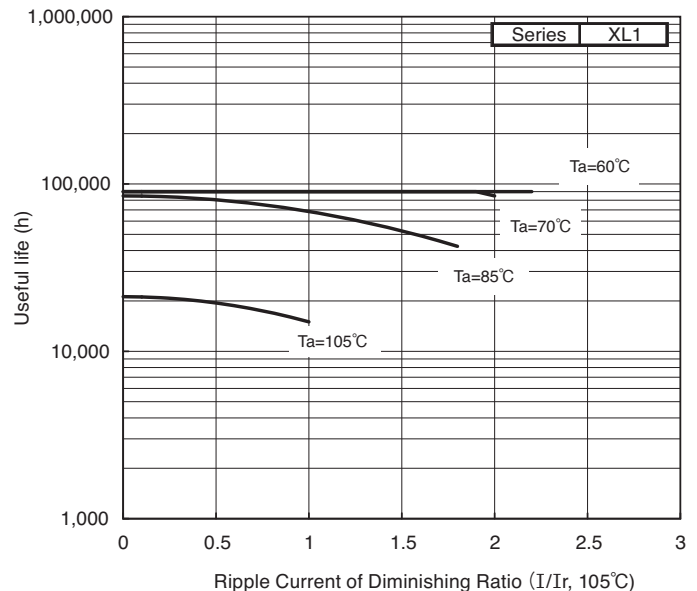
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
200	270	22×25	0.15	0.86	325	XL12D271MCXS2WPEC
		22×30	0.15	1.03	265	XL12D331MCXS3WPEC
	330	25×25	0.15	0.97	265	XL12D331MCYS2WPEC
		22×35	0.15	1.19	225	XL12D391MCXS4WPEC
	470	22×40	0.15	1.39	187	XL12D471MCXS5WPEC
		25×30	0.15	1.24	187	XL12D471MCYS3WPEC
	560	22×45	0.15	1.60	156	XL12D561MCXS6WPEC
		25×35	0.15	1.45	156	XL12D561MCYS4WPEC
		30×25	0.15	1.35	156	XL12D561MCZS2WPEC
	680	22×50	0.15	1.84	129	XL12D681MCXS7WPEC
		25×40	0.15	1.69	129	XL12D681MCYS5WPEC
		30×30	0.15	1.60	129	XL12D681MCZS3WPEC
		35×25	0.15	1.56	129	XL12D681MCAS2WPEC
	820	25×45	0.15	1.95	107	XL12D821MCYS6WPEC
		30×35	0.15	1.87	107	XL12D821MCZS4WPEC
		35×30	0.15	1.83	107	XL12D821MCAS3WPEC
	1,000	30×40	0.15	2.18	88	XL12D102MCZS5WPEC
		35×35	0.15	2.15	88	XL12D102MCAS4WPEC
	1,200	30×45	0.15	2.51	73	XL12D122MCZS6WPEC
		35×40	0.15	2.48	73	XL12D122MCAS5WPEC
1,500	35×45	0.15	2.92	59	XL12D152MCAS6WPEC	
1,800	35×50	0.15	3.34	50	XL12D182MCAS7WPEC	
250	180	22×25	0.15	0.70	487	XL12E181MCXS2WPEC
		22×30	0.15	0.84	398	XL12E221MCXS3WPEC
	220	25×25	0.15	0.79	398	XL12E221MCYS2WPEC
		22×35	0.15	0.99	325	XL12E271MCXS4WPEC
	330	22×40	0.15	1.16	265	XL12E331MCXS5WPEC
		25×30	0.15	1.04	265	XL12E331MCYS3WPEC
	390	22×45	0.15	1.33	225	XL12E391MCXS6WPEC
		25×35	0.15	1.21	225	XL12E391MCYS4WPEC
		30×25	0.15	1.13	225	XL12E391MCZS2WPEC
	470	22×50	0.15	1.53	187	XL12E471MCXS7WPEC
		25×40	0.15	1.40	187	XL12E471MCYS5WPEC
		30×30	0.15	1.33	187	XL12E471MCZS3WPEC
		35×25	0.15	1.29	187	XL12E471MCAS2WPEC
	560	25×45	0.15	1.61	156	XL12E561MCYS6WPEC
		30×35	0.15	1.55	156	XL12E561MCZS4WPEC
		35×30	0.15	1.51	156	XL12E561MCAS3WPEC
	680	30×40	0.15	1.80	129	XL12E681MCZS5WPEC
		35×35	0.15	1.77	129	XL12E681MCAS4WPEC
	820	30×45	0.15	2.08	107	XL12E821MCZS6WPEC
		35×40	0.15	2.06	107	XL12E821MCAS5WPEC
1,000	30×50	0.15	2.40	88	XL12E102MCZS7WPEC	
	35×45	0.15	2.38	88	XL12E102MCAS6WPEC	
1,200	35×50	0.15	2.73	74	XL12E122MCAS7WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
400	68	22×25	0.25	0.43	1,300	XL12G680MCXS2WPEC
		22×30	0.25	0.57	924	XL12G101MCXS3WPEC
	100	25×25	0.25	0.53	924	XL12G101MCYS2WPEC
		22×35	0.25	0.66	770	XL12G121MCXS4WPEC
	120	25×30	0.25	0.63	770	XL12G121MCYS3WPEC
		22×40	0.25	0.78	615	XL12G151MCXS5WPEC
	150	30×25	0.25	0.70	615	XL12G151MCZS2WPEC
		22×45	0.25	0.90	520	XL12G181MCXS6WPEC
	180	25×35	0.25	0.82	520	XL12G181MCYS4WPEC
		35×25	0.25	0.80	520	XL12G181MCAS2WPEC
	220	25×45	0.25	1.01	434	XL12G221MCYS6WPEC
		30×30	0.25	0.91	434	XL12G221MCZS3WPEC
	270	25×50	0.25	1.17	354	XL12G271MCXS7WPEC
		30×35	0.25	1.07	354	XL12G271MCZS4WPEC
		35×30	0.25	1.05	354	XL12G271MCAS3WPEC
	330	30×40	0.25	1.25	290	XL12G331MCZS5WPEC
		35×35	0.25	1.24	290	XL12G331MCAS4WPEC
	390	30×50	0.25	1.50	245	XL12G391MCZS7WPEC
		35×40	0.25	1.42	245	XL12G391MCAS5WPEC
	470	35×45	0.25	1.63	203	XL12G471MCAS6WPEC
35×50		0.25	1.86	171	XL12G561MCAS7WPEC	
450	56	22×25	0.25	0.39	1,678	XL12W560MCXS2WPEC
		22×30	0.25	0.47	1,382	XL12W680MCXS3WPEC
	68	25×25	0.25	0.44	1,382	XL12W680MCYS2WPEC
		22×35	0.25	0.55	1,146	XL12W820MCXS4WPEC
	100	22×40	0.25	0.64	939	XL12W101MCXS5WPEC
		25×30	0.25	0.57	939	XL12W101MCYS3WPEC
		30×25	0.25	0.57	939	XL12W101MCZS2WPEC
	120	22×45	0.25	0.74	783	XL12W121MCXS6WPEC
		25×35	0.25	0.67	783	XL12W121MCYS4WPEC
		35×25	0.25	0.65	783	XL12W121MCAS2WPEC
	150	25×45	0.25	0.84	626	XL12W151MCYS6WPEC
		30×30	0.25	0.75	626	XL12W151MCZS3WPEC
	180	25×50	0.25	0.96	522	XL12W181MCYS7WPEC
		30×35	0.25	0.88	522	XL12W181MCZS4WPEC
	220	35×30	0.25	0.86	522	XL12W181MCAS3WPEC
		30×40	0.25	1.02	434	XL12W221MCZS5WPEC
		35×35	0.25	1.01	434	XL12W221MCAS4WPEC
	270	30×50	0.25	1.25	354	XL12W271MCZS7WPEC
		35×40	0.25	1.18	354	XL12W271MCAS5WPEC
	330	35×45	0.25	1.37	290	XL12W331MCAS6WPEC
35×50		0.25	1.56	246	XL12W391MCAS7WPEC	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz

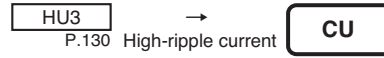


## CU Series Useful of 4,000 hours at 105°C

- Conform RoHS

### Features

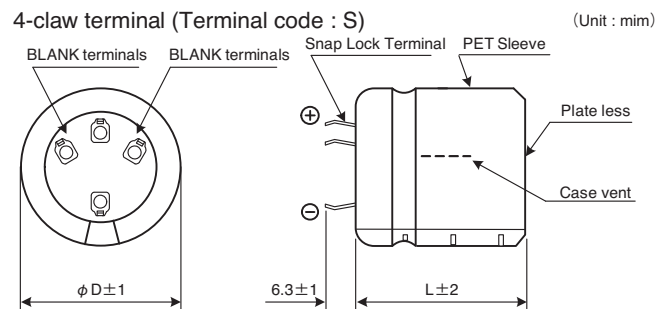
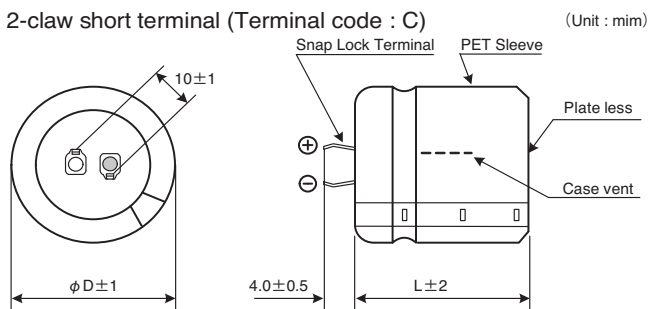
- CU series has higher ripple current (ave 30%) compared with HU3 series. These features are accomplished by new heat radiation.
- The vent is located in the side of the case.



### Product Specifications

Items	Specifications
Temperature range	-25°C ~ +105°C
Rated voltage	400 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 2,000 hours : Capacitance change : Within ±20% of the initial value measured Dissipation factor : 200% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be met when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4
Notes to users	The vent position is not fixed. Please do not set up an obstacle to circumference less than 1mm.

### Dimensions

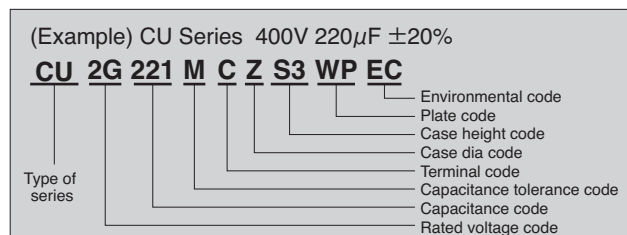


### Ripple current correction coefficient

Temperature (°C)	60	70	85	105
Correction coefficient	1.9	1.7	1.4	1.0
Frequency (Hz)	120	300	1K	≥10K
Correction coefficient	1.0	1.1	1.3	1.4
Forced wind (m / s)	<0.5	0.5 ≤		
Correction coefficient	1.0	1.1		

A continuous load should be avoided over 10 Arms at the terminal in accordance with the permissible current. Please consult us when the ripple voltage exceeds 70Vp-p .

### Product code



Refer to page 124-125 for other terminal shape available on request.

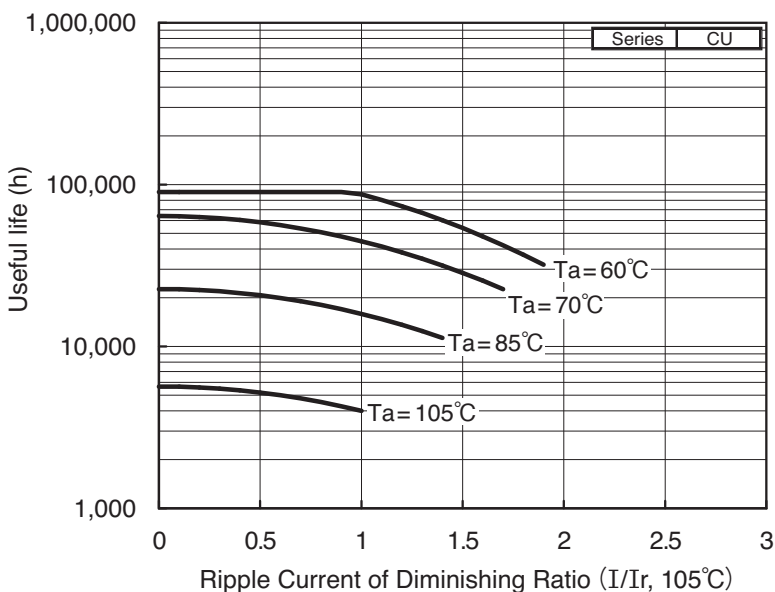
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms)	ESR(typ.) (mΩ)	Product name
				105°C, 120Hz	20°C, 100Hz	
400	220	30×30	0.20	1.57	320	CU2G221MCZS3WPEC
		30×35	0.20	1.79	260	CU2G271MCZS4WPEC
	270	35×31	0.20	1.85	260	CU2G271MCAS3WPEC
		30×40	0.20	2.03	210	CU2G331MCZS5WPEC
	330	35×36	0.20	2.10	210	CU2G331MCAS4WPEC
		30×50	0.20	2.28	190	CU2G391MCZS7WPEC
	390	35×41	0.20	2.33	190	CU2G391MCAS5WPEC
		30×60	0.20	2.57	160	CU2G471MCZS9WPEC
	470	35×46	0.20	2.61	160	CU2G471MCAS6WPEC
		35×51	0.20	2.89	130	CU2G561MCAS7WPEC
	560	40×40	0.20	2.64	130	CU2G561MSBS5WPEC
		35×61	0.20	3.25	110	CU2G681MCAS9WPEC
	680	40×45	0.20	2.95	110	CU2G681MSBS6WPEC
		35×81	0.20	3.62	90	CU2G821MSAS13WPEC
820	40×61	0.20	3.35	90	CU2G821MSBS9WPEC	
	1,200	40×83	0.20	4.08	90	CU2G122MSBS13WPEC
450	150	30×30	0.20	1.30	490	CU2W151MCZS3WPEC
	180	30×35	0.20	1.46	420	CU2W181MCZS4WPEC
	220	30×40	0.20	1.66	340	CU2W221MCZS5WPEC
		35×31	0.20	1.67	340	CU2W221MCAS3WPEC
	270	35×36	0.20	1.90	280	CU2W271MCAS4WPEC
	330	30×50	0.20	2.10	230	CU2W331MCZS7WPEC
		35×41	0.20	2.15	230	CU2W331MCAS5WPEC
	390	30×60	0.20	2.34	200	CU2W391MCZS9WPEC
		35×46	0.20	2.37	200	CU2W391MCAS6WPEC
	470	35×51	0.20	2.64	160	CU2W471MCAS7WPEC
		40×40	0.20	2.42	160	CU2W471MSBS5WPEC
	560	35×61	0.20	2.95	140	CU2W561MCAS9WPEC
		40×45	0.20	2.68	140	CU2W561MSBS6WPEC
	680	35×81	0.20	3.30	110	CU2W681MSAS13WPEC
		40×50	0.20	2.98	110	CU2W681MSBS7WPEC
	1,000	40×83	0.20	3.72	90	CU2W102MSBS13WPEC
500	120	30×30	0.20	1.05	460	CU2H121MCZS3WPEC
	150	30×35	0.20	1.21	460	CU2H151MCZS4WPEC
	180	30×40	0.20	1.36	390	CU2H181MCZS5WPEC
		35×31	0.20	1.40	390	CU2H181MCAS3WPEC
	220	30×50	0.20	1.56	320	CU2H221MCZS7WPEC
		35×36	0.20	1.59	320	CU2H221MCAS4WPEC
	270	30×60	0.20	1.78	260	CU2H271MCZS9WPEC
		35×41	0.20	1.80	260	CU2H271MCAS5WPEC
	330	35×46	0.20	2.03	210	CU2H331MCAS6WPEC
	390	35×51	0.20	2.25	180	CU2H391MCAS7WPEC
	470	35×61	0.20	2.52	160	CU2H471MCAS9WPEC

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz



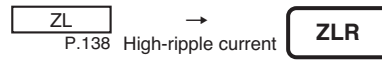
**UPGRADE!**

## ZLR Series Useful of 5,000 hours at 105°C

- Conform RoHS

### Features

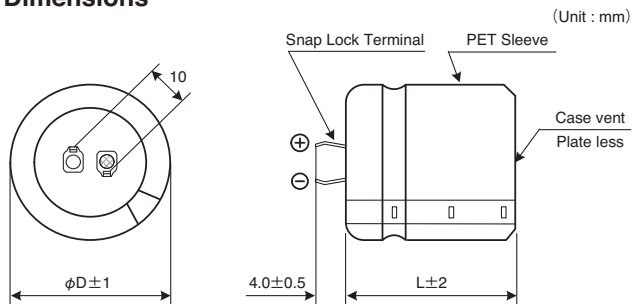
- ZLR series has higher ripple current (ave 30%) compared with ZL series. These features are accomplished by low ESR material.



### Product Specifications

Items	Specifications
Temperature range	-25°C ~ +105°C
Rated voltage	400 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 3,000 hours : Capacitance change : Within ±20% of the initial value Dissipation factor : Not more than 200% of initial value specified Leakage current : Not more than initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±20% of the initial value measured Dissipation factor : Not more than 175% of initial value specified Leakage current : Not more than initial value specified
Others	JIS C 5101-4

### Dimensions



### Ripple current correction coefficient

Temperature (°C)	60	70	85	105	
Correction coefficient	1.9	1.7	1.4	1.0	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.3	1.5	1.6

A continuous load should be avoided over 10 Arms at the terminal in accordance with the permissible current. Please consult us when the ripple voltage exceeds 70Vp-p.

### Product code

(Example) ZLR Series 400V 220µF ±20%

**ZLR 2G 221 M C X S6 WP EC**

- ZLR: Type of series
- 2G: Rated voltage code
- 221: Capacitance code
- M: Capacitance tolerance code
- C: Terminal code
- X: Case dia code
- S6: Case height code
- WP: Plate code
- EC: Environmental code

Refer to page 124-125 for other terminal shape available on request.

Standard Products Table

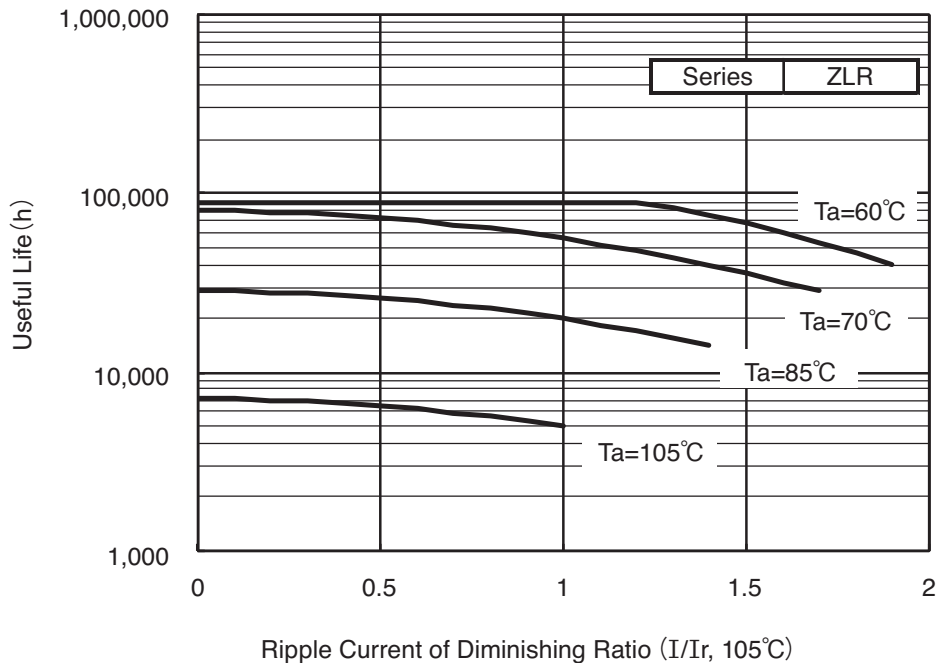
Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
400	100	22×25	0.20	0.83	770	ZLR2G101MCXS2WPEC
		22×30	0.20	0.94	640	ZLR2G121MCXS3WPEC
	120	25×25	0.20	0.95	640	ZLR2G121MCYS2WPEC
		22×35	0.20	1.09	520	ZLR2G151MCXS4WPEC
	150	22×40	0.20	1.22	440	ZLR2G181MCXS5WPEC
		25×30	0.20	1.21	440	ZLR2G181MCYS3WPEC
		30×25	0.20	1.26	330	ZLR2G181MCZS2WPEC
	180	22×45	0.20	1.37	360	ZLR2G221MCXS6WPEC
		25×35	0.20	1.38	360	ZLR2G221MCYS4WPEC
		30×30	0.20	1.44	270	ZLR2G221MCZS3WPEC
	220	22×50	0.20	1.54	290	ZLR2G271MCXS7WPEC
		25×40	0.20	1.56	290	ZLR2G271MCYS5WPEC
		30×35	0.20	1.65	220	ZLR2G271MCZS4WPEC
		35×25	0.20	1.61	220	ZLR2G271MCAS2WPEC
	270	25×50	0.20	1.77	240	ZLR2G331MCYS7WPEC
		30×40	0.20	1.85	180	ZLR2G331MCZS5WPEC
		35×30	0.20	1.83	180	ZLR2G331MCAS3WPEC
	330	30×45	0.20	2.05	150	ZLR2G391MCZS6WPEC
		35×35	0.20	2.05	150	ZLR2G391MCAS4WPEC
	390	30×50	0.20	2.27	130	ZLR2G471MCZS7WPEC
35×40		0.20	2.29	130	ZLR2G471MCAS5WPEC	
470	35×45	0.20	2.54	110	ZLR2G561MCAS6WPEC	
560	35×50	0.20	2.82	90	ZLR2G681MCAS7WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
450	68	22×25	0.20	0.66	1,200	ZLR2W820MCXS2WPEC
		22×30	0.20	0.83	820	ZLR2W101MCXS3WPEC
	100	25×25	0.20	0.84	820	ZLR2W101MCYS2WPEC
		22×35	0.20	0.94	680	ZLR2W121MCXS4WPEC
	120	25×30	0.20	0.95	680	ZLR2W121MCYS3WPEC
		22×40	0.20	1.07	550	ZLR2W151MCXS5WPEC
	150	25×35	0.20	1.10	550	ZLR2W151MCYS4WPEC
		30×25	0.20	1.11	410	ZLR2W151MCZS2WPEC
	180	22×45	0.20	1.19	460	ZLR2W181MCXS6WPEC
		25×40	0.20	1.23	460	ZLR2W181MCYS5WPEC
		30×30	0.20	1.26	350	ZLR2W181MCZS3WPEC
	220	22×50	0.20	1.34	380	ZLR2W221MCXS7WPEC
		25×45	0.20	1.38	380	ZLR2W221MCYS6WPEC
		30×35	0.20	1.43	290	ZLR2W221MCZS4WPEC
		35×25	0.20	1.42	290	ZLR2W221MCAS2WPEC
	270	25×50	0.20	1.54	310	ZLR2W271MCYS7WPEC
		30×40	0.20	1.62	230	ZLR2W271MCZS5WPEC
	330	35×30	0.20	1.63	230	ZLR2W271MCAS3WPEC
		30×45	0.20	1.81	190	ZLR2W331MCZS6WPEC
	390	35×35	0.20	1.84	190	ZLR2W331MCAS4WPEC
30×50		0.20	1.99	170	ZLR2W391MCZS7WPEC	
470	35×40	0.20	2.04	170	ZLR2W391MCAS5WPEC	
	35×45	0.20	2.27	140	ZLR2W471MCAS6WPEC	
560	35×50	0.20	2.50	120	ZLR2W561MCAS7WPEC	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz.

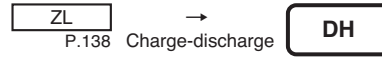


## DH Series Useful of 5,000 hours at 105°C

- Conform RoHS

### Features

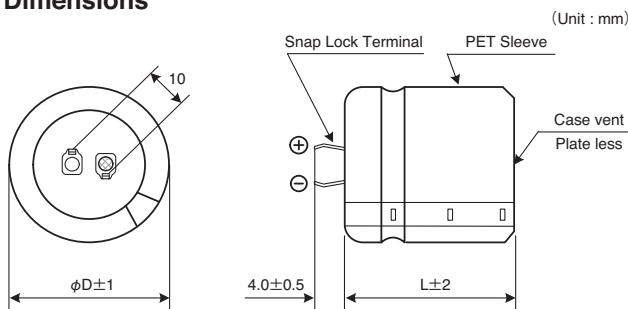
- Suited to high frequency Charge-Discharge use for AC servomotor, general inverter.



### Product Specifications

Items	Specifications
Temperature range	-25°C ~ +105°C
Rated voltage	400 ~ 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (µA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Permissible ripple current	As specified in the standard product table. (105°C, 120Hz)
Endurance	After the rated voltage with specified ripple current is applied at 105°C for 3,000 hours : Capacitance change : Within ±20% of the initial value measured Dissipation factor : 200% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Shelf life	The following specification shall be meet when the capacitor are restored to 20°C after storage of 500 hours at 105°C with no voltage applied. Before the measurement, the capacitor shall be preconditioned by applying the voltage treatment according to Item 4.1 of JIS C 5101-4. Capacitance change : Within ±15% of the initial value measured Dissipation factor : 175% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Endurance of charge-discharge behavior	After an application of charge-discharge voltage for 100 million times (charge-discharge (ΔV) = 150V, cycle 6Hz) at 40°C, following requirements must be met. Capacitance change : Within ±20% of the initial value measured Dissipation factor : 200% or less than the initial value specified Leakage current : Less than or equal to the initial value specified
Others	JIS C 5101-4

### Dimensions

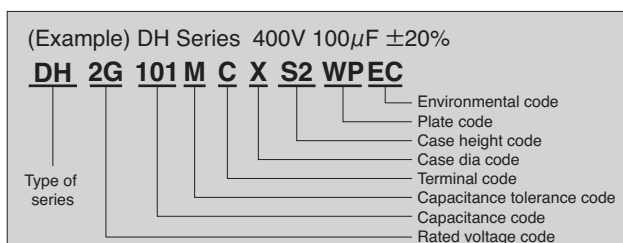


### Ripple current correction coefficient

Temperature (°C)	60	70	85	105	
Correction coefficient	1.9	1.7	1.4	1.0	
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

A continuous load should be avoided over 10 A at the terminal in accordance with the permissible current.

### Product code



Refer to page 124-125 for other terminal shape available on request.



Standard Products Table

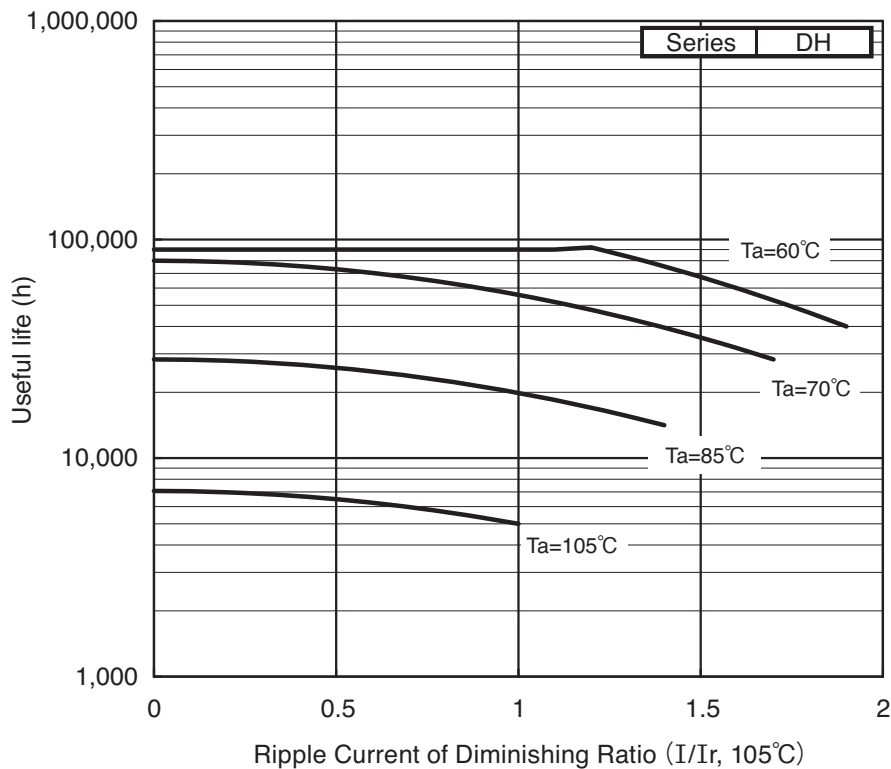
Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
400	100	22 × 25	0.20	0.70	1,100	DH2G101MCXS2WPEC
		22 × 30	0.20	0.82	920	DH2G121MCXS3WPEC
	120	25 × 25	0.20	0.81	920	DH2G121MCYS2WPEC
		22 × 35	0.20	0.96	730	DH2G151MCXS4WPEC
	150	22 × 40	0.20	1.09	610	DH2G181MCXS5WPEC
		25 × 30	0.20	1.04	610	DH2G181MCYS3WPEC
	180	22 × 45	0.20	1.25	500	DH2G221MCXS6WPEC
		25 × 35	0.20	1.21	500	DH2G221MCYS4WPEC
	220	30 × 25	0.20	1.15	500	DH2G221MCZS2WPEC
		22 × 50	0.20	1.44	410	DH2G271MCXS7WPEC
	270	25 × 40	0.20	1.39	410	DH2G271MCYS5WPEC
		30 × 30	0.20	1.34	410	DH2G271MCZS3WPEC
		35 × 25	0.20	1.32	410	DH2G271MCAS2WPEC
	330	25 × 45	0.20	1.60	330	DH2G331MCYS6WPEC
		30 × 35	0.20	1.55	330	DH2G331MCZS4WPEC
	390	30 × 40	0.20	1.76	280	DH2G391MCZS5WPEC
		35 × 30	0.20	1.67	280	DH2G391MCAS3WPEC
	470	30 × 45	0.20	2.00	230	DH2G471MCZS6WPEC
		35 × 35	0.20	1.91	230	DH2G471MCAS4WPEC
	560	30 × 50	0.20	2.25	200	DH2G561MCZS7WPEC
35 × 40		0.20	2.17	200	DH2G561MCAS5WPEC	
680	35 × 45	0.20	2.47	160	DH2G681MCAS6WPEC	

Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
450	82	22 × 25	0.20	0.64	1,220	DH2W820MCXS2WPEC
	100	22 × 30	0.20	0.75	1,000	DH2W101MCXS3WPEC
		25 × 25	0.20	0.74	1,000	DH2W101MCYS2WPEC
	120	22 × 35	0.20	0.86	830	DH2W121MCXS4WPEC
		25 × 30	0.20	0.85	830	DH2W121MCYS3WPEC
	150	22 × 40	0.20	1.00	660	DH2W151MCXS5WPEC
		25 × 35	0.20	1.00	660	DH2W151MCYS4WPEC
		30 × 25	0.20	0.95	660	DH2W151MCZS2WPEC
	180	22 × 45	0.20	1.13	550	DH2W181MCXS6WPEC
		25 × 35	0.20	1.09	550	DH2W181MCYS4WPEC
	220	25 × 45	0.20	1.30	450	DH2W221MCYS6WPEC
		30 × 30	0.20	1.21	450	DH2W221MCZS3WPEC
		35 × 25	0.20	1.19	450	DH2W221MCAS2WPEC
	270	25 × 50	0.20	1.49	370	DH2W271MCYS7WPEC
		30 × 35	0.20	1.41	370	DH2W271MCZS4WPEC
		35 × 30	0.20	1.39	370	DH2W271MCAS3WPEC
	330	30 × 40	0.20	1.62	300	DH2W331MCZS5WPEC
		35 × 35	0.20	1.60	300	DH2W331MCAS4WPEC
	390	30 × 50	0.20	1.88	260	DH2W391MCZS7WPEC
		35 × 40	0.20	1.81	260	DH2W391MCAS5WPEC
470	35 × 45	0.20	2.05	210	DH2W471MCAS6WPEC	
560	35 × 50	0.20	2.31	180	DH2W561MCAS7WPEC	

ALUMINUM ELECTROLYTIC CAPACITORS

### Life time graph

Useful life depending on ambient temperature  $T_a$  and ripple current operating conditions  $I$  versus rated ripple current at 105°C, 120Hz



## HW Series

- Conform RoHS

### Features

- Best fit for applications requiring fast energy discharge like aesthetic equipment, medical laser, portable X-ray generator, and photo flash.



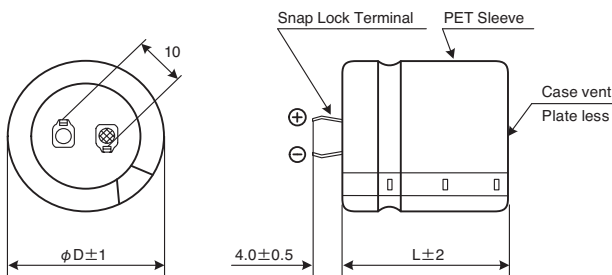
### Product Specifications

Items	Specifications		
Temperature range	-20°C ~ +55°C		
Rated voltage	330WV.DC	360WV.DC	400WV.DC
Withstanding voltage	350SV.DC	380SV.DC	420SV.DC
Capacitance tolerance	-10°C ~ +20% (20°C, 120Hz)		
Leakage current	Less than or equal to 1×C (µA) or 3mA, whichever is higher (20°C, after 5 minutes) [C = nominal capacitance (µF)]		
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)		
Endurance of charge-discharge behavior	A resistance of about 1 ohm is connected in series with the capacitor under normal ambient temperature. Then the capacitor is charged / discharged at rated voltage for 5,000 times at intervals of 15 seconds. A lapse of 8 hours after the test, the capacitor shall satisfy the following characteristics. Capacitance change : Within ±15% of the initial value measured Dissipation factor : Not more than 150% of initial value specified Leakage current : Not more than 150% of initial value specified		
Others	EIAJ-RC2365, JIS C 5101-4		

### Dimensions

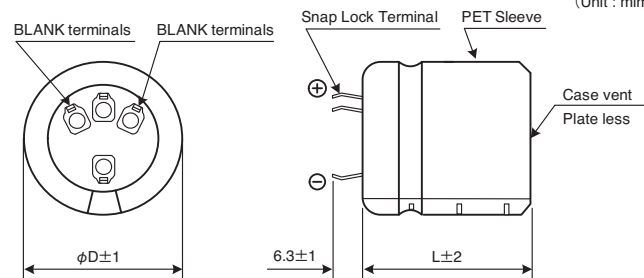
2-claw short terminal (Terminal code : C)

(Unit : mm)



4-claw terminal (Terminal code : S)

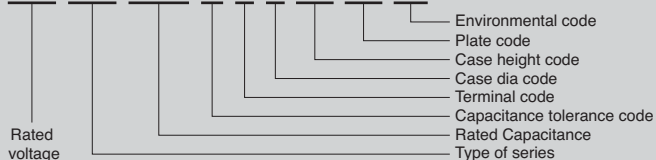
(Unit : mm)



### Product code

(Example) HW Series 330V 1,700µF (-10%~+20%)

**330 HW 1700 S C A S7 WP EC**



Refer to page 124-125 for other terminal shape available on request.



Standard Products Table

Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Product name
330	700	30 × 30	0.15	330HW700SCZS3WPEC
	870	30 × 35	0.15	330HW870SCZS4WPEC
	920	35 × 30	0.15	330HW920SCAS3WPEC
	1,000	30 × 40	0.15	330HW1000SCZS5WPEC
		35 × 35	0.15	330HW1000SCAS4WPEC
	1,100	30 × 45	0.15	330HW1100SCZS6WPEC
	1,200	30 × 50	0.15	330HW1200SCZS7WPEC
		35 × 40	0.15	330HW1200SCAS5WPEC
	1,300	30 × 55	0.15	330HW1300SCZS8WPEC
	1,400	30 × 60	0.15	330HW1400SCZS9WPEC
	1,500	35 × 45	0.15	330HW1500SCAS6WPEC
	1,700	35 × 50	0.15	330HW1700SCAS7WPEC
	1,900	35 × 55	0.15	330HW1900SCAS8WPEC
	2,000	35 × 60	0.15	330HW2000SCAS9WPEC
	2,700	35 × 100	0.15	330HW2700SSAS17WPEC
	2,800	40 × 76	0.15	330HW2800SSBS12WPEC
	3,800	40 × 101	0.15	330HW3800SSBS17WPEC
360	500	30 × 30	0.15	360HW500SCZS3WPEC
	610	30 × 35	0.15	360HW610SCZS4WPEC
	650	35 × 30	0.15	360HW650SCAS3WPEC
	730	30 × 40	0.15	360HW730SCZS5WPEC
	810	35 × 35	0.15	360HW810SCAS4WPEC
	850	30 × 45	0.15	360HW850SCZS6WPEC
	950	30 × 50	0.15	360HW950SCZS7WPEC
	970	35 × 40	0.15	360HW970SCAS5WPEC
	1,000	30 × 55	0.15	360HW1000SCZS8WPEC
	1,100	30 × 60	0.15	360HW1100SCZS9WPEC
		35 × 45	0.15	360HW1100SCAS6WPEC
	1,300	35 × 50	0.15	360HW1300SCAS7WPEC
	1,400	35 × 55	0.15	360HW1400SCAS8WPEC
	1,500	35 × 60	0.15	360HW1500SCAS9WPEC
	2,300	35 × 100	0.15	360HW2300SSAS17WPEC
	2,400	40 × 76	0.15	360HW2400SSBS12WPEC
	3,200	40 × 101	0.15	360HW3200SSBS17WPEC

Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Product name
400	370	30 × 30	0.15	400HW370SCZS3WPEC
	460	30 × 35	0.15	400HW460SCZS4WPEC
	490	35 × 30	0.15	400HW490SCAS3WPEC
	550	30 × 40	0.15	400HW550SCZS5WPEC
	610	35 × 35	0.15	400HW610SCAS4WPEC
	640	30 × 45	0.15	400HW640SCZS6WPEC
	730	30 × 50	0.15	400HW730SCZS7WPEC
	740	35 × 40	0.15	400HW740SCAS5WPEC
	820	30 × 55	0.15	400HW820SCZS8WPEC
	860	35 × 45	0.15	400HW860SCAS6WPEC
	870	30 × 60	0.15	400HW870SCZS9WPEC
	980	35 × 50	0.15	400HW980SCAS7WPEC
	1,100	35 × 55	0.15	400HW1100SCAS8WPEC
	1,200	35 × 60	0.15	400HW1200SCAS9WPEC
	1,700	35 × 100	0.15	400HW1700SSAS17WPEC
	1,800	40 × 76	0.15	400HW1800SSBS12WPEC
	2,400	40 × 101	0.15	400HW2400SSBS17WPEC

ALUMINUM ELECTROLYTIC CAPACITORS

**NEW!**

## HS Series

- Conform RoHS

### Features

- Best fit for applications requiring fast energy discharge like aesthetic equipment, medical laser, portable X-ray generator, and photo flash.



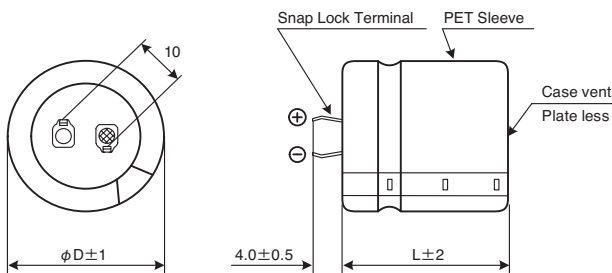
### Product Specifications

Items	Specifications
Temperature range	-20°C ~ +55°C
Rated voltage	450VV.DC
Withstanding voltage	470SV.DC
Capacitance tolerance	-10°C ~ +20% (20°C, 120Hz)
Leakage current	Less than or equal to 1×C (µA) or 3mA, whichever is higher (20°C, after 5 minutes) [C = nominal capacitance (µF)]
Dissipation factor	Less than the value specified in the standard products table. (20°C, 120Hz)
Endurance of charge-discharge behavior	A resistance of about 1 ohm is connected in series with the capacitor under normal ambient temperature. Then the capacitor is charged / discharged at rated voltage for 5,000 times at intervals of 15 seconds. A lapse of 8 hours after the test, the capacitor shall satisfy the following characteristics. Capacitance change : Within ±15% of the initial value measured Dissipation factor : Not more than 150% of initial value specified Leakage current : Not more than 150% of initial value specified
Others	EIAJ-RC2365, JIS C 5101-4

### Dimensions

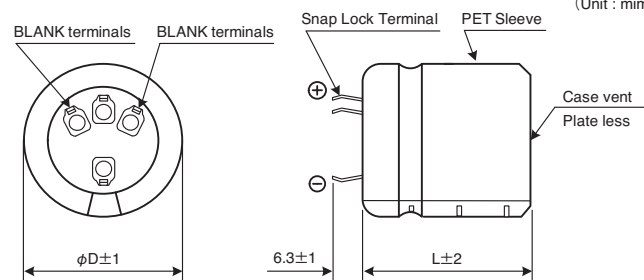
2-claw short terminal (Terminal code : C)

(Unit : mm)



4-claw terminal (Terminal code : S)

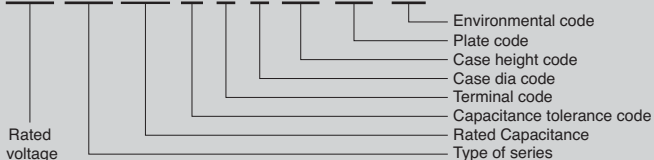
(Unit : mm)



### Product code

(Example) HS Series 450V 810µF (-10%~+20%)

**450 HS 810 S C A S7 WP EC**



Refer to page 124-125 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V. DC)	Capacitance ( $\mu F$ )	Case size $\phi D \times L$ (mm)	$\tan\delta$ 20°C, 120Hz	Product name
450	300	30 × 30	0.15	450HS300SCZS3WPEC
	370	30 × 35	0.15	450HS370SCZS4WPEC
	400	35 × 30	0.15	450HS400SCAS3WPEC
	450	30 × 40	0.15	450HS450SCZS5WPEC
	510	35 × 35	0.15	450HS510SCAS4WPEC
	520	30 × 45	0.15	450HS520SCZS6WPEC
	590	30 × 50	0.15	450HS590SCZS7WPEC
	610	35 × 40	0.15	450HS610SCAS5WPEC
	650	30 × 55	0.15	450HS650SCZS8WPEC
	680	30 × 60	0.15	450HS680SCZS9WPEC
	710	35 × 45	0.15	450HS710SCAS6WPEC
	810	35 × 50	0.15	450HS810SCAS7WPEC
	900	35 × 55	0.15	450HS900SCAS8WPEC
	970	35 × 60	0.15	450HS970SCAS9WPEC
	1,400	35 × 100	0.15	450HS1400SSAS17WPEC
		40 × 76	0.15	450HS1400SSBS12WPEC
1,900	40 × 101	0.15	450HS1900SSBS17WPEC	

# MEMO

---

A series of horizontal dashed lines for writing.

---

# PLASTIC FILM CAPACITORS



PLASTIC FILM CAPACITORS

## Contents

Plastic film capacitors - Product Line Chart, Features Table

Precautions on use

Series specifications

---

## Product Line Chart

•For power electronics

### Cylindrical type (DC)

### Cylindrical type (AC)

<b>E66</b>
High humidity resistance Aluminium case
600 ~ 1,500V.DC 160 ~ 4,530 $\mu$ F

↑ P.190~192  
High humidity  
resistance

<b>MLC</b>
Standard
900 ~ 1,500V.DC 70 ~ 2,300 $\mu$ F

→ Large  
Capacitance

<b>MLC2</b>
Large capacitance
800 ~ 900V.DC 230 ~ 3,800 $\mu$ F

P.176~178

↓ P.170~174  
Low  
Inductance

<b>E51</b>
Low inductance Plastic case
1,300 ~ 50,000V.DC 0.2 ~ 700 $\mu$ F

→ Radial  
Thread

<b>E53H</b>
Low inductance Plastic case
500 ~ 2,000V.DC 22 ~ 400 $\mu$ F

↓ P.192,193  
Low  
Inductance

↓ P.184,185  
Low  
Inductance

<b>E55</b>
Low inductance Plastic case
800 ~ 5,000V.DC 10 ~ 250 $\mu$ F

P.194,195

<b>E61</b>
Low inductance Plastic case
500 ~ 4,000V.DC 4.5 ~ 190 $\mu$ F

P.200,201

<b>E62(AC)</b>
Standard Aluminium case
420 ~ 4,000V.AC 0.2 ~ 2,000 $\mu$ F

→ Tab-  
Terminal

<b>E62-TAB(AC)</b>
Tab-terminal Aluminium case
420 ~ 4,000V.AC 0.2 ~ 2,000 $\mu$ F

P.210~216

↓ P.202~208  
Low  
Inductance

<b>E51(AC)</b>
Low inductance Plastic case
2000 ~ 35,000V.AC 0.13 ~ 5 $\mu$ F

↓ P.184,186  
Low  
Inductance

<b>E53(AC)</b>
Low inductance Plastic case
280 ~ 2,450V.AC 0.22 ~ 310 $\mu$ F

P.188~190

<b>E62-3HF(AC)</b>
For three phase Aluminium case
640 ~ 1,200V.AC 3 $\times$ 8 ~ 3 $\times$ 140 $\mu$ F

P.218~220

### PCB mount type

### Box type

<b>MKCP4</b>
Standard Plastic case
700 ~ 1,100V.DC 7 ~ 100 $\mu$ F

↓ P.180,181  
Humidity  
resistance

<b>MKCP4T</b>
Humidity resistance Plastic case
700 ~ 1,100V.DC 6 ~ 80 $\mu$ F

P.182,183

<b>E59</b>
Custom design Metal case
500 ~ 25,000V.DC 200 ~ 17,000V.AC

P.196~198

Product Table

Table of plastic film capacitor types

Series	Features	Operating temperature range	Standard product	Small-sized product	High-reliability product	Rated voltage V	Capacitance range $\mu$ F	Page
MLC	Standard, For DC, Aluminium encased type	-40 ~ +85°C	○		○	900~1,500	70~2,300	170
MLC2	Large capacitance, For DC, Aluminium encased type	-40 ~ +85°C		○	○	800, 900	230~3,800	176
MKCP4	Standard, For DC, Resin encased type	-40 ~ +85°C (105°C)	○	○	○	700~1,100	7~100	180
MKCP4T	Humidity resistance, For DC, Resin encased type	-40 ~ +85°C (105°C)	○	○	○	700~1,100	6~80	182
E51	Standard, For DC, Resin encased type	-25 ~ +70°C	○		○	1,300~50,000	0.2~700	184
E51 (AC)	Standard, For AC, Resin encased type	-25 ~ +70°C	○		○	2,000~35,000	0.13~500	184
E53 (AC)	Low inductance, For AC, Resin encased type	-40 ~ +85°C	○		○	280~2,450	0.22~310	188
E53H	Low inductance, For DC, Resin encased type	-25 ~ +85°C	○		○	500~2,000	22~400	192
E55	Low inductance, For DC, Resin encased type	-40 ~ +85°C	○		○	800~5,000	10~250	194
E59	Custom design, Metal case	-55 ~ +85°C			○	—	—	196
E61	Low inductance, For DC, Resin encased type	-25 ~ +85°C	○		○	500~4,000	4.5~190	200
E62 (AC)	Standard, For AC, Aluminium encased type	-40 ~ +85°C	○		○	420~4,000	0.2~2,000	202
E62-TAB (AC)	Standard, For AC, Aluminium encased type	-40 ~ +85°C	○		○	420~4,000	0.2~2,000	210
E62-3HF (AC)	Standard, For three phase, Aluminium encased type	-50 ~ +85°C	○		○	640~1,200	3×8~3×140	218
E66 <b>NEW!</b>	Humidity resistance, For DC, Aluminium encased type	-50 ~ +85°C			○	600~1,500	160~4,530	222

PLASTIC FILM CAPACITORS

## 1. Environment

- (1) Water, salt water, oil, and other electro conductive liquid adhered to the capacitors may cause capacitor failure. Capacitors wetted with liquid must never not be operated.
- (2) Capacitors must never be stored or operated in corrosive atmospheres, particularly not where chlorides, sulfides, acids, alkalis, salts, organic solvents or similar substances are present.
- (3) Capacitors must not be operated in ozone or where ultra violet radiation or radio active rays are irradiating.
- (4) In dust and dirt-prone environments, regular checks and maintenance (particularly of the terminals and insulators) are absolutely necessary to prevent creation of creepage distances between live parts and / or the protective conductor / ground. Dust and dirt shall be cleaned with paper or towel wetted with ethanol, not detergent.
- (5) Excessive vibration and/or shock may cause capacitor failure.

## 2. Mounting Location

### 2-1. Precaution

- (1) Mechanically or electrically damaged, leaky or otherwise damaged capacitors may not be used or continue to be used.
- (2) Do not place the capacitors directly above or nest to heat sources such as detuning or tuning reactors, bus bars, etc.
- (3) Enough creepage distances and air clearance have to be kept when connecting capacitors, bus bars and housings.

### 2-2. Mounting

- (1) Keep the torque described in catalog or data sheet. Toothed washer has to be used for fixing stud bolt.
- (2) Stud bolt

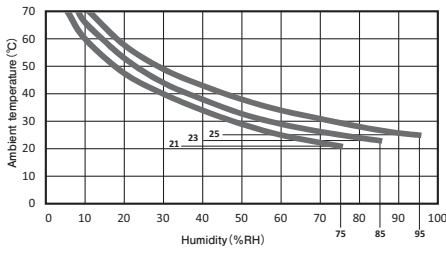
Series	Stud bolt	Torque
MLC/MLC2	M12	$7 \pm 1\text{Nm}$
Others	M8	$5 \pm 1\text{Nm}$
	M12	$15 \pm 1\text{Nm}$

- (3) Three terminal type capacitors are equipped with Torx (T20). Use of improper screwdrivers may damage the screws and impair reliable fixation.
- (4) Improper connection may cause local heat generation, and rupture and ignite. Don't apply excessive stress to terminals and stud bolt.
- (5) The useful life of a capacitor may be reduced dramatically if exposed at excessive heat.
- (6) The permitted max temperature of the capacitor must not be exceeded even under the most critical ambient circumstances.
- (7) The inner temperature of capacitors must be verified not to exceed the maximum operating temperature specified in data sheet at the worst operating condition.  
Capacitors with thermo sensor (PT100) are available depending of requests. Under force cooled condition, current over value specified in data sheet could be applied to capacitor. Please contact us when bus bars have high temperature and / or capacitors are placed with narrow space between them. They may cause increase in temperature of capacitors.
- (8) It should be noted that the internal heat balance of large capacitors is only reached after a couple of hours when verifying inner temperature rise of capacitors.
- (9) Capacitors with liquid or viscous filling shall be installed upright with terminals facing upwards. Capacitors with gas or solid resin filling can be mounted in any position without restriction.



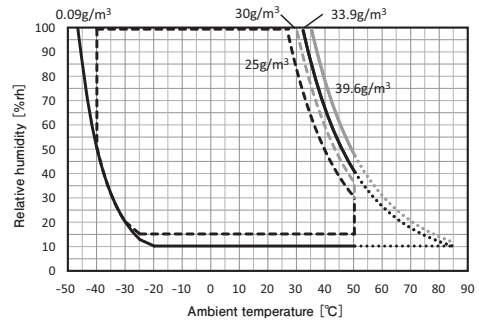
## 3. Humidity

Capacitors may not be stored or operated outside the specified humidity ranges.



MLC/MLC2 series

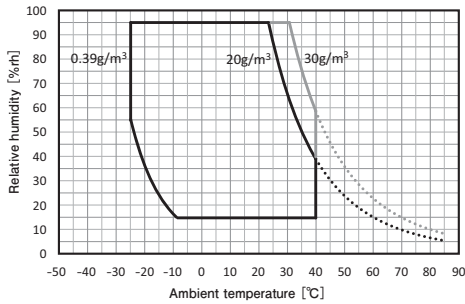
max. relative humidity : 75% annual means  
 : 95% 30 days/year  
 condensation : not permitted



E59/E62 (except terminal B, D, E, G)/E62-3HF/E66 series

### Max. relative humidity

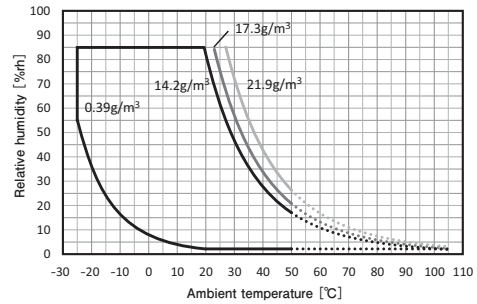
75%RH annual average, 75~95%RH 30 days/year continuously, 95~100%RH all other days occasionally, occasional condensation permitted.



E51/E53H/E61/E62 (terminal B, D, E, G) series

### Max. relative humidity

75%RH max. annual average, 85%RH occasional, 95%RH 30 days/year, condensation not permitted.



E53(AC)/E55 series

### Max. relative humidity

65%RH max. annual average, 75%RH occasional, 85%RH 60 days/year, condensation not permitted.

## 4. Use condition

### 4-1. Ambient temperature / Current

- (1) Capacitors must be operated according to the specification in catalog and / or data sheets.
- (2) Overvoltage or thermal overload may cause rupture, ignition, and internal faults. When the highest temperature in capacitor is higher than 70°C, voltage derating has to be applied. For MLC and MLC2 series, permissible ripple current can be calculated from ambient temperature, operating voltage and information in data sheet or catalog. Even if operating current is lower than permissible value, the current over permissible terminal current may cause excessive terminal heat generation.
- (3) Ambient temperature is measured at point a point approximately 0.1m away from the capacitor housing and at two-third of the height from its base.
- (4) It has to be noted that capacitors themselves generate heat.
- (5) Permissible current decrease with the increase of ambient temperature. Therefore, It should be considered that capacitors must be selected by considering the operation at maximum ambient temperature.
- (6) Frequency may affect electric load. Capacitors have to be selected by considering the effect of frequency.
- (7) It should be noted that resonance by inductance of external circuit may affect capacitor's performance.
- (8) It should be noted that parallel connection may cause current unbalance because of the difference of circuit impedance.
- (9) Harmonics current may cause excessive heat generation because of dielectric loss at low frequency, or skin effect at high frequency. When harmonics current includes frequencies under 50Hz and/or over 10kHz components, the inner temperature of capacitors must be verified.

We recommend to check the following characteristics before proceeding evaluation.

Please consult us for individual support if any of the following conditions apply.

- a. Total current harmonic distortion based on the data computed exceed 200%
- b. Ratio between total current power losses and total dielectric power losses exceed 150%

Capacitors with thermo sensor are not for endurance test, just for testing inner temperature rise. After the test, please scrap them.

The internal temperature should be measured after the inner temperature reaches saturation (approx. five hours).

## 4-2. Cooling

- (1) Give at least 40mm for MLC / MLC2 series or 20mm for the others of clearance between the capacitors for natural or forced ventilation for effective heat dissipation of capacitors.

## 4-3. Voltage / Other use condition

- (1) Dielectric breakdown may cause severe internal fault such as short circuit, ignition and rupture. Capacitors must be operated inside the specified range specified in catalog and/or data sheets. For overvoltage within short period may not shorten service life time of capacitors.
- (2) Capacitors must be operated under rated voltage. Surge voltage specified in data sheet is just for capacitor evaluation, and does not guarantee the continuous operation of capacitors.
- (3) Inrush current may cause internal faults.
- (4) Film capacitors have finite service life.
- (5) DC capacitors must not be operated under AC condition. When ripple voltage over 20% of rated voltage is applied to DC capacitors, it may cause capacitor failure. In this case, please contact us.

## 5. Vibration / Shock

- (1) Vibration and shock mainly affect fixing materials and terminals. It is important to measure the degree of vibration and shock at mounting location.
- (2) The capacitors comply with test standard (IEC60068-2-6) as follows.

series	capacitor weight	test duration	frequency range	max. acceleration	max. displacement amplitude
MLC, MLC2 MKCP4, MKCP4T	< 3kg	10 cycles per each axes	10 to 55Hz	50m/s <sup>2</sup>	±0.35mm
	3kg ≤	information available on request			
Others	< 0.5kg	10 cycles per each axes	10 to 500Hz	50m/s <sup>2</sup>	±0.35mm
	0.5kg ≤, < 3kg	10 cycles per each axes	10 to 500Hz	10m/s <sup>2</sup>	±0.075mm
	3kg ≤	information available on request			

## 6. Capacitors with over pressure disconnecter

In the event of an increasing number of self-healing breakdowns, the pressure inside the capacitor may rise.

To prevent it from bursting, the capacitors of series E62, E63 and E65 are fitted with an obligatory break-action mechanism.

With rising pressure the case begins to expand and pushing the lid upwards. As a result, the prepared connecting wire is separated at the attenuated spot, and the current path is interrupted irreversibly.

- Sufficient clearance (min35mm) for expansion of the capacitor case must be accommodated above the terminals.
- The capacitors shall only be connected with flexible cables or elastic copper bands.
- The capacitor lid must not be pressed.
- The terminals must not be damaged.
- Do not hit the border crimping and the connecting terminals with heavy or sharp objects or tools.

## 7. Safety of self-healing type film capacitors

In the event of a voltage breakdown the metal layers around the breakdown channel are evaporated by the temperature of the electric arc that forms between the electrodes. An insulation area is formed which is reliably resistive and voltage proof for all operating requirements of the capacitor. The capacitor remains fully functional during and after the breakdown.

Surge voltages and surge currents within rated values induced by switching or faults of the system or any part of it are also permitted.

## 8. Mind hazards of explosion and fire

- (1) Capacitors consist mainly of polypropylene, i.e. their energy content is relatively high. They may rupture and ignite as a result of internal faults or external overload (e.g. temperature, overvoltage, harmonic distortion) .
- (2) It must therefore be ensured, by appropriate measures, that they do not form any hazard to their environment in the event of failure or malfunction of the safety device.

## 9. Discharge

In any event, the poles of the capacitors must be discharged with 1kOhm or larger resistance before being touched.

Note that capacitors with nominal voltages above 750Vac or 2,000Vdc in particular may regenerate new voltage at their terminals after having been short-circuited just for short periods. This condition will be avoided by storing them permanently short circuited.

## 10. Earthing

Capacitors with a metal case must be earthed at the metal part or by means of a separate metal strap or clamp.

## 11. Environmental Compatibility

- (1) Our capacitors do not contain PCB, solvents or any other toxic or banned materials.
- (2) Our capacitors comply with RoHS directive.

## 12. Storage

☆ Storage environment

- Ambient temperature :  $-40^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$
- Humidity : max. RH75%
- Others : indoor without direct sunlight, without condensation

☆ Storage limitation

- 2 years without any verifications

When storage term is over two years, please confirm before usage that electric characteristics are within specifications, capacitor case is not covered with stains, and terminals are not covered with oxide layer.

## 13. Fumigation treatment

Fumigation treatment may be performed during transportation for insect proofing.

Halide such as methyl bromide may cause corrosion inside capacitors, and lead to failure.

Insecticide also may cause capacitor failure.

## 14. Disposal

- (1) We recommend disposing of the capacitors through professional recycling centers for electric / electronic waste.
- (2) After incineration of capacitors, metal parts such as terminal, aluminum case, lid and internal wirings will be remained.
- (3) Please consider that disposed capacitors should not put on the market.

## 15. Others

- (1) In case of fire, dried powder, carbon dioxide or foam fire extinguishing agent has to be used.
- (2) Please comply with transportation and exporting regulation in each nation.
- (3) Capacitors usually have design life of approx. 15 to 20 years under proper operating condition. In order to maintain the reliability of equipment, it is recommend to replace the capacitors after ten years operation.

## 16. Important notice before use

Hitachi AIC does not accept responsibility for whatever damage may arise out of a non-observance, or caused by capacitors without agreement on detail of use condition, evaluation condition etc.

## Service life of plastic film capacitor for power electronics

### 17. Formula for estimating service life (MLC, MLC2)

- (1) Estimating from the core temperature of the capacitor and applied voltage Formula for calculating the service life of our capacitors in mid-to-high voltage applications (filters).

$$L = L_0 \times 2^{\frac{T_0 - T}{A}} \times \left( \frac{V_0}{V} \right)^N$$

Where,

To : Maximum core temperature setting when subjected to the maximum allowable ripple load at the maximum operating temperature

Lo : Standard service life when core temperature is T<sub>0</sub> and rated voltage is (WV)

L : Estimated service life when core temperature is T and applied voltage is (V)  
If V/WV < 0.6, use V/WV = 0.6.

A, N : Acceleration coefficients (contact us for details)

- (2) Estimating core temperature of a capacitor from load ripple current

We recommend that you estimate service life by measuring the core temperature of the capacitor with a thermocouple. We can manufacture samples with inserted thermocouples according to customer requests.

If for some reason it is impossible to measure the core temperature, you can estimate the service life by making a rough estimate of the core temperature of the capacitor from the load ripple current. As shown below, assuming the rise in temperature and the square of load current to be nearly proportionate, obtain the core temperature of the capacitor that occurs when the capacitor is loaded with a ripple current.

$$T = T_a + I^2 \cdot ESR \cdot R_{th}$$

Where,

T : Core temperature of the capacitor when ripple current I is loaded (°C)

T<sub>a</sub> : Ambient temperature (°C)

I : Ripple current (Arms)

ESR : Equivalent series resistance of capacitor (mΩ)

R<sub>th</sub> : Thermal resistance (K/W)

※ Ripple current (I) is limited by maximum current (I<sub>max</sub>) specified for each capacitor.

## Glossary

### Rated capacitance $C_N$

Capacitance value rated at 20°C / rated frequency.

### Rated Voltage $U_N$

The maximum or peak voltage of either polarity of a reversing or nonreversing type wave form for which the capacitor has been designed and rated (unlike other standards for AC capacitors, the rated voltage is not the rms value).

### Non repetitive peak (surge) voltage $U_S$

Voltages beyond the rated voltage induced by switching or faults of the system or any part of it. Maximum count 1000 times with a duration of not more than 50 ms each.

### rms voltage $U_{rms}$

Root mean square of the max. permissible value of sinusoidal AC voltage in continuous operation.

### Ripple voltage $U_r$

The peak-to-peak alternating component of the unidirectional voltage.

### Voltage test between terminals $U_{TT}$

Routine test of all capacitors conducted at room temperature, prior to delivery.

A further test with 80% of the test voltage stated in the data sheet may be carried out once at the user's location.

### Voltage test between terminals and case $U_{TC}$

Routine test of all capacitors between short-circuited terminals and case, conducted at room temperature. May be repeated at the user's location.

### Maximum current $I_{max}$

Maximum rms value of permissible current in continuous operation. The values given in the data sheets are related to either the specified maximum power dissipation or the current limits of the connection terminals.

### Peak current $\hat{I}$

Maximum permitted repetitive current amplitude during continuous operation.

### Non-repetitive peak current (surge) $I_S$

Maximum current that may occur non-repetitively and briefly in the event of a fault.

Maximum count 1000 times with a duration of not more than 50 ms each.

### Equivalent series resistance $R_S$

Equivalent resistance representing the sum of all Ohmic resistances occurring inside the capacitor. Essential for calculation of the current dependent losses.

### Self-inductance $L_e$

Represents the sum of all inductive elements which are – for mechanical and construction reasons – contained in any capacitor.

### Resonant frequency $f_{res}$

The capacitance and self-inductance of any capacitor form a series resonant circuit.

Above the resonant frequency, the inductive part of this LC-circuit prevails.

The capacitor would then behave as an inductor.

### Dielectric dissipation factor $\tan \delta_0$

Constant dissipation factor of the dielectric material for all capacitors in their rated frequency.

### Thermal resistance $R_{th}$

The thermal resistance indicates by how many degrees the capacitor temperature at the hotspot rises in relation to the dissipation losses.

### Maximum power dissipation $P_{max}$

Maximum permitted power dissipation for the capacitor's operation at a certain ambient temperature.

### Ambient temperature $\theta_U$

Temperature of the surrounding air, measured 10 cm away and at 2/3 of the case height of the capacitor.

### Lower category temperature $\theta_{min}$

Lowest permissible ambient temperature at which a capacitor may be used.

### Upper category temperature $\theta_{max}$

Highest permissible capacitor temperature during operation, i.e. temperature at the hottest point of the case.

### Hotspot temperature $\theta_{HOTSPOT}$

Temperature at the hottest spot inside the capacitor.

### Rated energy contents $E_N$

Energy stored in the capacitor when charged at rated voltage.

### Clearance in air L

The shortest distance between conducting parts of the terminals or between terminals and case.

### Creepage distance K

The shortest distance along an insulated surface between conducting parts of the terminals or between terminals and case.

# MLC Series (Cylindrically-Shaped Metallized Polypropylene Film Capacitors)

## Features

- Cylindrically-shaped capacitor with big capacitance for wind & solar power inverters, other inverters, chopper control and charge-discharge.
- High reliability of withstanding voltage due to using of our original segmented metallized film.
- UL 810 standard option compliant. (Series : MLCU)

## Specifications

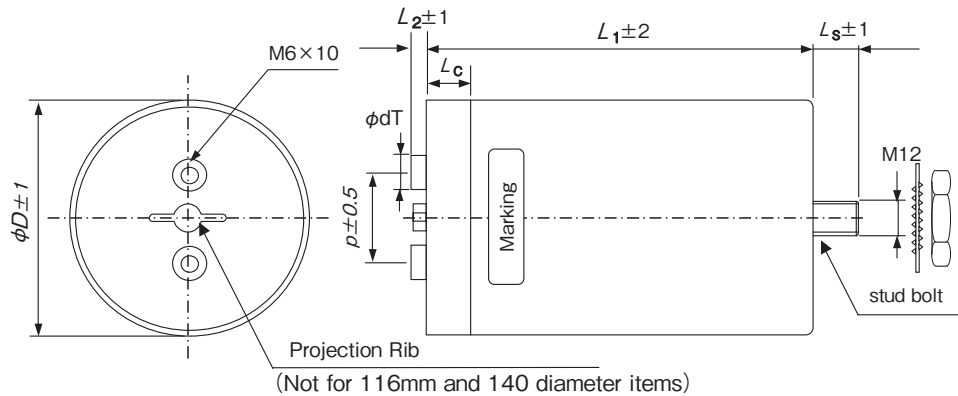
Items	Characteristics
Operating Temperature range *	-40 ~ +85°C at 0.7 $U_N$
	-40 ~ +80°C at 0.8 $U_N$
	-40 ~ +75°C at 0.9 $U_N$
	-40 ~ +70°C at 1.0 $U_N$
Rated Voltage $U_N$	900 ~ 1,500Vdc
Voltage test between terminals $U_{TT}$	$1.5 \times U_N / 10s$
Voltage test terminals to case $U_{TC}$	3,200Vac / 10s
Terminals (permitted Torque)	M6 × 10 (4 ±0.5Nm)
Stud Bolt (permitted Torque)	M12 × 16 / 18 (7 ±1Nm)
Life Time Test / Standard	IEC 61071 : 2007
Dielectric	Polypropylene
Electrode	Segmented Metal with Fuse Function
Cap	PBT UL94V-0 listed
impregnants	Epoxy / Urethane Resin UL94V-0 listed
Case material	Aluminium
Humidity	ClassF : 75% annual average, 95% 30days / year

		$\phi D$				
		$\phi 85$	$\phi 88.5$	$\phi 100$	$\phi 116$	$\phi 140$
Dimensions (mm)	$P$	32	32	32	50	50
	$\phi d_T$	$\phi 12$	$\phi 12$	$\phi 12$	$\phi 14$	$\phi 19$
	$L_2$	5	5	5	5	5
	$L_C$	15	15	15	20	20
	$L_S$	16	16	16	18	18
Clearance distance (mm)		20	20	20	36	31
Creepage distance (mm)		28	28	28	36	31
Terminal allowance current		60Arms	60Arms	60Arms	80Arms	100Arms

## Imax Multiplier (1kHz ~ 10kHz)

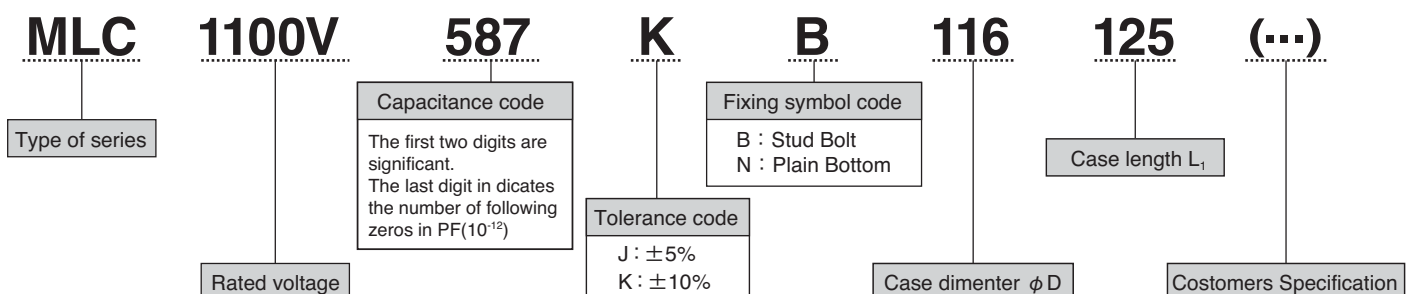
		$0.7 \times U_N$	$0.8 \times U_N$	$0.9 \times U_N$	$1.0 \times U_N$
$T_a$ Ambient Temperature	50°C	1.32	1.22	1.11	1.00
	60°C	1.11	1.00	0.86	0.70
	70°C	0.86	0.70	0.50	0.00
	75°C	0.70	0.50	0.00	
	80°C	0.50	0.00		
	85°C	0.00			

## Outline of drawings and dimensions



## Part number

Example : MLC, 1100V, 580  $\mu F$ ,  $\pm 10\%$ ,  $D = \phi 116$ ,  $L = 125$ , with stud bolt  
MLC1100V587KB116125



PLASTIC FILM CAPACITORS

Standard Products Table

Rated d.c voltage $U_N$ : 900Vdc	Max.ripple voltage $U_r$ : 200V Non repetitive surge voltage $U_s$ : 1,350V Voltage test between terminals $U_{TT}$ : 1,350Vdc/10s Voltage test terminals to case. $U_{TC}$ : 3,200Vac/10s								Part number
	Dimensions		Maximum ripple current (Arms) $I_{max}^*$ [Arms / at50°C, 1k ~ 10kHz]	Maximum peak current $\hat{i}$ [kA]	Maximum Surge current $I_s$ [kA]	Equivalent Series Resistance $ESR$ [mΩ]	Equivalent Series Inductance $ESL$ [nH]	Thermal resistance $R_{th}$ [K/W]	
	Diameter $\phi D$ [mm]	Length of the case $L_1$ [mm]							
180	85	70	28	4	12	2.9	60	8.4	MLC900V187KB8570
200	85	75	28	4	12	3.1	65	7.9	MLC900V207KB8575
210	88.5	70	31	5	15	2.6	60	7.8	MLC900V217KB88570
230	85	80	28	4	12	3.3	65	7.4	MLC900V237KB8580
	88.5	75	30	5	15	2.8	65	7.7	MLC900V237KB88575
250	88.5	80	30	4	12	3.1	65	7.0	MLC900V257KB88580
260	85	87	28	4	12	3.7	75	6.8	MLC900V267KB8587
270	100	70	37	6	18	2.2	60	6.5	MLC900V277KB10070
280	88.5	87	28	4	12	3.4	75	6.8	MLC900V287KB88587
290	85	95	27	4	12	4.1	80	6.4	MLC900V297KB8595
300	100	75	37	6	18	2.3	65	6.1	MLC900V307KB10075
320	88.5	95	29	4	12	3.8	80	6.1	MLC900V327KB88595
	85	106	27	4	12	4.8	90	5.6	MLC900V337KB85106
330	100	80	36	6	18	2.5	65	5.9	MLC900V337KB10080
	88.5	106	28	4	12	4.4	90	5.7	MLC900V327KB885106
370	85	125	52	8	24	1.5	40	4.8	MLC900V377KB85125
	100	87	36	6	18	2.8	75	5.4	MLC900V377KB10087
380	116	70	43	8	24	1.7	60	6.0	MLC900V387KB11670
390	85	120	26	4	12	5.5	100	5.2	MLC900V397KB85120
410	85	135	52	8	24	1.6	40	4.5	MLC900V417KB85135
	116	75	43	8	24	1.9	65	5.6	MLC900V417KB11675
420	88.5	125	56	9	27	1.4	40	4.5	MLC900V427KB885125
	100	95	34	6	18	3.1	80	5.4	MLC900V427KB10095
430	88.5	120	28	5	15	5.1	100	4.9	MLC900V437KB885120
	85	145	52	8	24	1.7	45	4.1	MLC900V467KB85145
460	88.5	135	56	9	27	1.5	40	4.2	MLC900V467KB885135
	116	80	43	8	24	2.0	65	5.2	MLC900V467KB11680
480	100	106	34	6	18	3.5	90	4.7	MLC900V487KB100106
510	88.5	145	55	9	27	1.6	45	4.0	MLC900V517KB885145
520	85	159	52	8	24	1.9	50	3.8	MLC900V527KB85159
	116	87	42	8	24	2.2	75	5.0	MLC900V527KB11687
540	100	125	60	12	36	1.1	40	3.9	MLC900V547KB100125
560	100	120	33	6	18	4.1	100	4.3	MLC900V567KB100120
570	88.5	159	55	9	27	1.8	50	3.6	MLC900V577KB885159
	140	70	46	12	36	1.4	60	6.6	MLC900V577KB14070
590	85	175	52	8	24	2.1	55	3.4	MLC900V597KB85175
	116	95	42	8	24	2.4	80	4.5	MLC900V597KB11695
600	100	135	60	12	36	1.2	40	3.6	MLC900V607KB100135
630	140	75	46	12	36	1.4	65	6.6	MLC900V637KB14075
650	88.5	175	55	9	27	2.0	55	3.2	MLC900V657KB885175
660	85	197	51	8	24	2.5	60	3.0	MLC900V667KB85197
	116	106	41	8	24	2.8	90	4.2	MLC900V667KB116106
670	100	145	60	12	36	1.3	45	3.5	MLC900V677KB100145
700	140	80	46	12	36	1.6	65	5.8	MLC900V707KB14080
730	88.5	197	54	9	27	2.3	60	2.9	MLC900V737KB885197
750	100	159	60	12	36	1.5	50	3.2	MLC900V757KB100159
760	116	125	77	16	48	0.9	40	3.5	MLC900V767KB116125
	85	225	50	8	24	2.9	70	2.7	MLC900V787KB85225
780	116	120	41	8	24	3.2	100	3.6	MLC900V787KB116120
	140	87	46	12	36	1.7	75	5.4	MLC900V787KB14087
830	116	135	77	16	48	1.0	40	3.3	MLC900V837KB116135
850	100	175	60	12	36	1.6	55	2.8	MLC900V857KB100175
870	88.5	225	54	9	27	2.6	70	2.6	MLC900V877KB885225
890	140	95	45	12	36	1.9	80	5.1	MLC900V897KB14095
930	116	145	77	16	48	1.1	45	3.1	MLC900V937KB116145
960	100	197	60	12	36	1.9	60	2.5	MLC900V967KB100197
1,000	116	159	76	16	48	1.2	50	2.8	MLC900V108KB116159
	140	106	44	12	36	2.1	90	4.8	MLC900V108KB140106
1,100	100	225	60	11	33	2.2	70	2.2	MLC900V118KB100225
	116	175	75	15	45	1.4	55	2.5	MLC900V118KB116175
	140	120	43	11	33	2.5	100	4.2	MLC900V118KB140120
	140	125	80	24	72	0.8	40	3.8	MLC900V118KB140125
1,200	140	135	80	23	69	0.8	40	3.8	MLC900V128KB140135
1,300	116	197	75	16	48	1.5	60	2.3	MLC900V138KB116197
1,400	140	145	81	24	72	0.8	45	3.7	MLC900V148KB140145
1,500	116	225	74	16	48	1.8	70	2.0	MLC900V158KB116225
	140	159	80	23	69	0.9	50	3.4	MLC900V158KB140159
1,700	140	175	79	23	69	1.0	55	3.2	MLC900V178KB140175
2,000	140	197	80	24	72	1.2	60	2.6	MLC900V208KB140197
2,300	140	225	79	24	72	1.3	70	2.3	MLC900V238KB140225

PLASTIC FILM CAPACITORS

\* • Please inquire us in case low frequency (commercial frequency) or frequency above 10kHz is included in ripple current.  
 • Maximum permissible ripple current is calculated by the value in this table with frequency and temperature correction factors.  
 Also the maximum current must be controlled below the permissible terminal current .  
 Please refer useful life graph based on ambient temperature and voltage.

$$\theta_{HOTSPOT} = T_a + I^2 \times ESR \times R_{th}$$



# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

Standard Products Table

Rated d.c voltage $U_N : 1,100Vdc$	Max.ripple voltage $U_r : 250V$ Non repetitive surge voltage $U_s : 1,650V$ Voltage test between terminals $U_{TT} : 1,650Vdc/10s$ Voltage test terminals to case. $U_{TC} : 3,200Vac/10s$								
	Nominal Capacitance $C_N$ [ $\mu F$ ]	Dimensions		Maximum ripple current (Arms) $I_{max}^*$ [Arms / at50°C, 1k ~ 10kHz]	Maximum peak current $\hat{I}$ [kA]	Maximum Surge current $I_s$ [kA]	Equivalent Series Resistance $ESR$ [m $\Omega$ ]	Equivalent Series Inductance $ESL$ [nH]	Thermal resistance $R_{th}$ [K/W]
	Diameter $\phi D$ [mm]	Length of the case $L_1$ [mm]							
140	85	70	26	3	9	3.3	60	8.6	MLC1100V147KB8570
160	85	75	27	4	12	3.5	65	7.6	MLC1100V167KB8575
170	88.5	70	29	4	12	2.8	60	8.3	MLC1100V177KB88570
180	85	80	27	4	12	3.7	65	7.1	MLC1100V187KB8580
	88.5	75	29	4	12	3.1	65	7.5	MLC1100V187KB88575
200	85	87	26	4	12	4.2	75	6.9	MLC1100V207KB8587
	88.5	80	28	4	12	3.4	65	7.3	MLC1100V207KB88580
210	100	70	34	5	15	2.4	60	6.9	MLC1100V217KB10070
230	85	95	26	4	12	4.6	80	6.2	MLC1100V237KB8595
	88.5	87	28	4	12	3.7	75	6.7	MLC1100V237KB88587
	100	75	34	5	15	2.6	65	6.4	MLC1100V237KB10075
260	85	106	25	4	12	5.3	90	5.8	MLC1100V267KB85106
	88.5	95	28	4	12	4.1	80	6.1	MLC1100V267KB88595
	100	80	33	5	15	2.8	65	6.3	MLC1100V267KB10080
290	85	125	50	7	21	1.7	40	4.7	MLC1100V297KB85125
	88.5	106	27	4	12	4.8	90	5.6	MLC1100V297KB885106
	100	87	33	5	15	3.1	75	5.8	MLC1100V297KB10087
310	116	70	41	7	21	1.9	60	6.0	MLC1100V297KB11670
	85	120	25	4	12	6.1	100	5.1	MLC1100V317KB85120
320	85	135	50	7	21	1.8	40	4.3	MLC1100V327KB85135
	116	75	41	7	21	2.1	65	5.6	MLC1100V327KB11675
330	88.5	125	53	8	24	1.5	40	4.6	MLC1100V337KB885125
	100	95	33	5	15	3.4	80	5.2	MLC1100V337KB10095
350	88.5	120	27	4	12	5.5	100	4.9	MLC1100V357KB885120
360	85	145	49	7	21	1.9	45	4.2	MLC1100V367KB85145
	116	80	41	7	21	2.2	65	5.2	MLC1100V367KB11680
370	88.5	135	54	8	24	1.6	40	4.2	MLC1100V377KB885135
380	100	106	32	5	15	3.9	90	4.8	MLC1100V387KB100106
400	85	159	49	7	21	2.2	50	3.7	MLC1100V407KB85159
	116	87	40	7	21	2.4	75	5.0	MLC1100V407KB11687
410	88.5	145	53	8	24	1.7	45	4.1	MLC1100V417KB885145
440	100	125	60	10	30	1.2	40	3.9	MLC1100V447KB100125
450	100	120	32	5	15	4.5	100	4.2	MLC1100V457KB100120
460	85	175	49	7	21	2.4	55	3.4	MLC1100V467KB85175
	88.5	159	53	8	24	1.9	50	3.7	MLC1100V467KB885159
	116	95	40	7	21	2.7	80	4.5	MLC1100V467KB11695
	140	70	45	11	33	1.4	60	6.9	MLC1100V467KB14070
470	100	135	60	10	30	1.4	40	3.6	MLC1100V477KB100135
500	140	75	45	11	33	1.6	65	6.0	MLC1100V507KB14075
520	100	145	60	10	30	1.5	45	3.4	MLC1100V527KB100145
530	85	197	48	7	21	2.7	60	3.1	MLC1100V537KB85197
	88.5	175	53	8	24	2.1	55	3.3	MLC1100V537KB885175
	116	106	40	7	21	3.0	90	4.0	MLC1100V537KB116106
560	140	80	44	11	33	1.7	65	5.9	MLC1100V567KB14080
580	100	159	60	10	30	1.6	50	3.1	MLC1100V587KB100159
	116	125	73	14	42	1.0	40	3.6	MLC1100V587KB116125
590	88.5	197	52	8	24	2.5	60	2.9	MLC1100V597KB885197
620	85	225	48	7	21	3.2	70	2.7	MLC1100V627KB85225
	116	120	39	7	21	3.5	100	3.6	MLC1100V627KB116120
630	140	87	44	11	33	1.8	75	5.6	MLC1100V637KB14087
650	116	135	74	14	42	1.1	40	3.3	MLC1100V657KB116135
690	100	175	60	10	30	1.7	55	2.9	MLC1100V697KB100175
700	88.5	225	51	8	24	2.9	70	2.6	MLC1100V707KB885225
720	116	145	74	14	42	1.2	45	3.0	MLC1100V727KB116145
	140	95	44	11	33	2.0	80	5.0	MLC1100V727KB14095
760	100	197	60	10	30	2.0	60	2.5	MLC1100V767KB100197
810	116	159	73	14	42	1.3	50	2.8	MLC1100V817KB116159
	140	106	43	11	33	2.3	90	4.6	MLC1100V817KB140106
900	100	225	60	10	30	2.4	70	2.2	MLC1100V907KB100225
920	116	175	73	14	42	1.4	55	2.6	MLC1100V927KB116175
	140	125	79	22	66	0.8	40	3.9	MLC1100V927KB140125
950	140	120	43	11	33	2.6	100	4.1	MLC1100V957KB140120
1,000	116	197	71	14	42	1.7	60	2.3	MLC1100V108KB116197
	140	135	79	22	66	0.8	40	3.9	MLC1100V108KB140135
1,100	140	145	78	22	66	0.9	45	3.6	MLC1100V118KB140145
1,200	116	225	71	14	42	1.9	70	2.0	MLC1100V128KB116225
	140	159	77	21	63	1.0	50	3.3	MLC1100V128KB140159
1,400	140	175	78	21	63	1.1	55	2.9	MLC1100V148KB140175
1,600	140	197	77	22	66	1.2	60	2.8	MLC1100V168KB140197
1,900	140	225	77	22	66	1.4	70	2.4	MLC1100V198KB140225

\* • Please inquire us in case low frequency (commercial frequency) or frequency above 10kHz is included in ripple current.  
 • Maximum permissible ripple current is calculated by the value in this table with frequency and temperature correction factors.  
 Also the maximum current must be controlled below the permissible terminal current .  
 Please refer useful life graph based on ambient temperature and voltage.

$$\theta_{HOTSPOT} = T_a + I^2 \times ESR \times R_{th}$$



Standard Products Table

Rated d.c voltage $U_N : 1,300Vdc$	Max.ripple voltage $U_r : 300V$ Non repetitive surge voltage $U_s : 1,950V$ Voltage test between terminals $U_{TT} : 1,950Vdc/10s$ Voltage test terminals to case. $U_{TC} : 3,200Vac/10s$								
	Dimensions		Maximum ripple current (Arms) $I_{max}^*$ [Arms / at50°C, 1k ~ 10kHz]	Maximum peak current $\hat{i}$ [kA]	Maximum Surge current $I_s$ [kA]	Equivalent Series Resistance $ESR$ [mΩ]	Equivalent Series Inductance $ESL$ [nH]	Thermal resistance $R_{th}$ [K/W]	Part number
	Diameter $\phi D$ [mm]	Length of the case $L_1$ [mm]							
100	85	70	25	3	9	3.8	60	8.1	MLC1300V107KB8570
110	85	75	25	3	9	4.1	65	7.6	MLC1300V117KB8575
	88.5	70	26	3	9	3.5	60	8.2	MLC1300V117KB88570
120	88.5	75	26	3	9	3.8	65	7.6	MLC1300V127KB88575
130	85	80	25	3	9	4.2	65	7.3	MLC1300V137KB8580
140	85	87	24	3	9	4.8	75	7.0	MLC1300V147KB8587
	88.5	80	26	3	9	4.0	65	7.2	MLC1300V147KB88580
150	100	70	32	4	12	2.7	60	6.9	MLC1300V157KB10070
160	85	95	24	3	9	5.4	80	6.3	MLC1300V167KB8595
	88.5	87	26	3	9	4.3	75	6.7	MLC1300V167KB88587
170	100	75	32	4	12	2.9	65	6.5	MLC1300V177KB10075
180	88.5	95	26	3	9	4.8	80	6.0	MLC1300V187KB88595
	100	80	31	4	12	3.3	65	6.2	MLC1300V187KB10080
190	85	106	24	3	9	6.0	90	5.6	MLC1300V197KB85106
200	88.5	106	25	3	9	5.7	90	5.5	MLC1300V207KB885106
210	85	125	47	6	18	1.9	40	4.7	MLC1300V217KB85125
	100	87	31	4	12	3.5	75	5.8	MLC1300V217KB10087
	116	70	39	6	18	2.1	60	5.9	MLC1300V217KB11670
220	85	120	23	3	9	7.0	100	5.2	MLC1300V227KB85120
230	85	135	47	6	18	2.0	40	4.3	MLC1300V237KB85135
	88.5	125	50	7	21	1.7	40	4.6	MLC1300V237KB885125
	116	75	39	6	18	2.3	65	5.5	MLC1300V237KB11675
240	88.5	120	25	3	9	6.5	100	4.8	MLC1300V247KB885120
	100	95	31	4	12	3.8	80	5.2	MLC1300V247KB10095
250	88.5	135	49	7	21	1.9	40	4.3	MLC1300V257KB885135
260	85	145	47	6	18	2.2	45	4.0	MLC1300V267KB85145
270	116	80	39	6	18	2.5	65	5.2	MLC1300V267KB11680
	100	106	30	4	12	4.4	90	4.8	MLC1300V277KB100106
280	88.5	145	49	7	21	2.0	45	4.1	MLC1300V287KB885145
290	85	159	46	6	18	2.4	50	3.8	MLC1300V297KB85159
	116	87	38	6	18	2.7	75	4.9	MLC1300V297KB11687
300	100	125	59	9	27	1.4	40	3.9	MLC1300V307KB100125
310	140	70	42	9	27	1.7	60	6.5	MLC1300V317KB14070
320	88.5	159	49	7	21	2.2	50	3.7	MLC1300V327KB885159
	100	120	30	4	12	5.1	100	4.2	MLC1300V327KB100120
330	85	175	46	6	18	2.7	55	3.4	MLC1300V337KB85175
	100	135	59	9	27	1.5	40	3.6	MLC1300V337KB100135
	116	95	38	6	18	3.0	80	4.5	MLC1300V337KB11695
350	140	75	43	9	27	1.7	65	6.2	MLC1300V357KB14075
360	88.5	175	49	7	21	2.5	55	3.3	MLC1300V367KB885175
370	100	145	59	9	27	1.7	45	3.3	MLC1300V377KB100145
380	85	197	46	6	18	3.1	60	3.0	MLC1300V387KB85197
	116	106	38	6	18	3.4	90	3.9	MLC1300V387KB116106
	140	80	42	9	27	1.9	65	5.8	MLC1300V387KB14080
410	88.5	197	48	7	21	2.9	60	2.9	MLC1300V417KB885197
420	100	159	59	9	27	1.8	50	3.1	MLC1300V427KB100159
	116	125	70	12	36	1.1	40	3.5	MLC1300V427KB116125
430	140	87	42	9	27	2.1	75	5.3	MLC1300V437KB14087
450	85	225	45	6	18	3.5	70	2.7	MLC1300V457KB85225
	116	120	37	6	18	3.9	100	3.6	MLC1300V457KB116120
460	116	135	70	12	36	1.2	40	3.3	MLC1300V467KB116135
470	100	175	57	9	27	2.0	55	2.9	MLC1300V477KB100175
480	88.5	225	47	7	21	3.3	70	2.7	MLC1300V487KB885225
490	140	95	41	9	27	2.3	80	5.1	MLC1300V497KB14095
520	116	145	70	12	36	1.3	45	3.0	MLC1300V527KB116145
550	100	197	57	9	27	2.3	60	2.6	MLC1300V557KB100197
	140	106	40	9	27	2.6	90	4.7	MLC1300V557KB140106
580	116	159	70	12	36	1.4	50	2.8	MLC1300V587KB116159
630	140	125	75	18	54	0.9	40	3.9	MLC1300V637KB140125
650	100	225	57	9	27	2.6	70	2.3	MLC1300V657KB100225
	140	120	40	9	27	3.0	100	4.1	MLC1300V657KB140120
660	116	175	69	12	36	1.6	55	2.6	MLC1300V667KB116175
700	140	135	75	18	54	0.9	40	3.9	MLC1300V707KB140135
760	116	197	69	12	36	1.8	60	2.3	MLC1300V767KB116197
770	140	145	74	18	54	1.0	45	3.6	MLC1300V777KB140145
870	140	159	74	18	54	1.1	50	3.3	MLC1300V877KB140159
900	116	225	69	13	39	2.1	70	2.0	MLC1300V907KB116225
990	140	175	74	18	54	1.2	55	3.0	MLC1300V997KB140175
1,100	140	197	73	18	54	1.4	60	2.6	MLC1300V118KB140197
1,300	140	225	72	18	54	1.6	70	2.4	MLC1300V138KB140225

PLASTIC FILM CAPACITORS

\* • Please inquire us in case low frequency (commercial frequency) or frequency above 10kHz is included in ripple current.  
 • Maximum permissible ripple current is calculated by the value in this table with frequency and temperature correction factors.  
 Also the maximum current must be controlled below the permissible terminal current .  
 Please refer useful life graph based on ambient temperature and voltage.

$$\theta_{HOTSPOT} = T_a + I^2 \times ESR \times R_{th}$$

# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

Standard Products Table

Rated d.c voltage $U_N : 1,500Vdc$		Max.ripple voltage $U_r : 350V$ Non repetitive surge voltage $U_s : 2,250V$ Voltage test between terminals $U_{TT} : 2,250Vdc/10s$ Voltage test terminals to case. $U_{TC} : 3,200Vac/10s$							
Nominal Capacitance $C_N$ [ $\mu F$ ]	Dimensions		Maximum ripple current (Arms) $I_{max}^*$ [Arms / at50°C, 1k ~ 10kHz]	Maximum peak current $\hat{I}$ [kA]	Maximum Surge current $I_s$ [kA]	Equivalent Series Resistance $ESR$ [m $\Omega$ ]	Equivalent Series Inductance $ESL$ [nH]	Thermal resistance $R_{th}$ [K/W]	Part number
	Diameter $\phi D$ [mm]	Length of the case $L_1$ [mm]							
70	85	70	23	2	6	4.6	60	8.0	MLC1500V706KB8570
80	85	75	23	2	6	4.8	65	7.7	MLC1500V806KB8575
	88.5	70	25	3	9	4.0	60	7.8	MLC1500V806KB88570
90	85	80	23	3	9	5.1	65	7.1	MLC1500V906KB8580
	88.5	75	25	3	9	4.3	65	7.2	MLC1500V906KB88575
100	85	87	22	2	6	5.7	75	7.0	MLC1500V107KB8587
	88.5	80	24	3	9	4.7	65	7.2	MLC1500V107KB88580
110	85	95	22	2	6	6.5	80	6.1	MLC1500V117KB8595
	88.5	87	24	3	9	5.2	75	6.5	MLC1500V117KB88587
	100	70	30	4	12	3.1	60	6.9	MLC1500V117KB10070
120	100	75	30	4	12	3.4	65	6.3	MLC1500V127KB10075
130	85	106	22	3	9	7.3	90	5.5	MLC1500V137KB85106
	88.5	95	24	3	9	5.6	80	6.0	MLC1500V137KB88595
	100	80	29	4	12	3.8	65	6.1	MLC1500V137KB10080
150	88.5	106	24	3	9	6.4	90	5.3	MLC1500V157KB885106
	100	87	29	4	12	4.0	75	5.7	MLC1500V157KB10087
	116	70	37	5	15	2.5	60	5.7	MLC1500V157KB11670
160	85	120	22	3	9	8.1	100	4.9	MLC1500V167KB85120
	116	75	36	5	15	2.7	65	5.5	MLC1500V167KB11675
170	88.5	120	23	3	9	7.7	100	4.8	MLC1500V177KB885120
	100	95	29	4	12	4.5	80	5.1	MLC1500V177KB10095
180	116	80	36	5	15	2.9	65	5.1	MLC1500V187KB11680
190	100	106	28	4	12	5.2	90	4.7	MLC1500V197KB100106
200	85	159	42	5	15	2.9	50	3.8	MLC1500V207KB85159
	116	87	34	5	15	3.2	75	5.2	MLC1500V207KB11687
230	85	175	42	5	15	3.2	55	3.4	MLC1500V237KB85175
	88.5	159	46	6	18	2.6	50	3.6	MLC1500V237KB885159
	100	120	28	4	12	5.9	100	4.2	MLC1500V237KB100120
	116	95	34	5	15	3.5	80	4.7	MLC1500V237KB11695
	140	70	40	8	24	1.8	60	6.8	MLC1500V237KB14070
250	140	75	40	8	24	2.0	65	6.2	MLC1500V257KB14075
260	88.5	175	45	6	18	2.9	55	3.3	MLC1500V267KB885175
	85	197	42	5	15	3.6	60	3.0	MLC1500V277KB85197
270	116	106	34	5	15	3.9	90	4.3	MLC1500V277KB116106
	140	80	40	8	24	2.1	65	5.8	MLC1500V287KB14080
300	88.5	197	45	6	18	3.3	60	2.9	MLC1500V307KB885197
	100	159	54	7	21	2.1	50	3.2	MLC1500V307KB100159
	85	225	42	5	15	4.2	70	2.6	MLC1500V327KB85225
320	116	120	34	5	15	4.5	100	3.7	MLC1500V327KB116120
	140	87	40	8	24	2.3	75	5.3	MLC1500V327KB14087
	116	135	66	10	30	1.4	40	3.2	MLC1500V337KB116135
340	100	175	53	7	21	2.3	55	3.0	MLC1500V347KB100175
350	88.5	225	44	6	18	3.8	70	2.7	MLC1500V357KB885225
360	140	95	39	8	24	2.5	80	5.1	MLC1500V367KB14095
390	100	197	53	8	24	2.7	60	2.6	MLC1500V397KB100197
400	140	106	38	8	24	2.9	90	4.7	MLC1500V407KB140106
410	116	159	65	10	30	1.7	50	2.8	MLC1500V417KB116159
460	100	225	52	8	24	3.1	70	2.3	MLC1500V467KB100225
470	116	175	65	10	30	1.8	55	2.5	MLC1500V477KB116175
480	140	120	38	8	24	3.3	100	4.1	MLC1500V487KB140120
540	116	197	64	10	30	2.1	60	2.3	MLC1500V547KB116197
640	116	225	64	10	30	2.4	70	2.0	MLC1500V647KB116225
	140	159	71	16	48	1.2	50	3.2	MLC1500V647KB140159
720	140	175	70	16	48	1.3	55	3.1	MLC1500V727KB140175
810	140	197	69	16	48	1.5	60	2.8	MLC1500V817KB140197
960	140	225	69	16	48	1.8	70	2.3	MLC1500V967KB140225

- \* Please inquire us in case low frequency (commercial frequency) or frequency above 10kHz is included in ripple current.  
 • Maximum permissible ripple current is calculated by the value in this table with frequency and temperature correction factors.  
 Also the maximum current must be controlled below the permissible terminal current .  
 Please refer useful life graph based on ambient temperature and voltage.

$$\theta_{HOTSPOT} = T_a + I^2 \times ESR \times R_{th}$$

PLASTIC FILM CAPACITORS



# MLC2 Series (Cylindrically-Shaped Metallized Polypropylene Film Capacitors)

## Features

- Approx. 15% smaller than MLC series in volume.
- Cylindrically-shaped capacitor with big capacitance for wind & solar power inverters, other inverters, chopper control and charge-discharge.
- High reliability of withstanding voltage due to using of our original segmented metallized film.

## Specifications

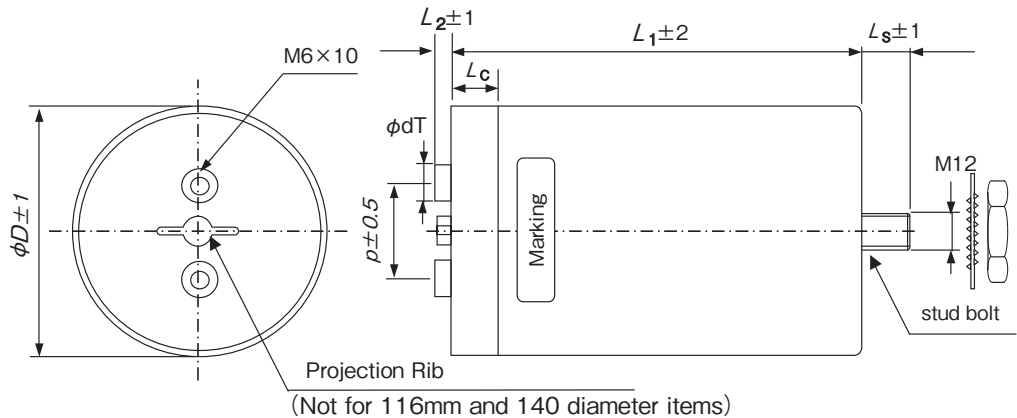
Items	Characteristics
Operating Temperature range *	-40 ~ +85°C at 0.7 $U_N$
	-40 ~ +80°C at 0.8 $U_N$
	-40 ~ +75°C at 0.9 $U_N$
	-40 ~ +70°C at 1.0 $U_N$
Rated Voltage $U_N$	800 ~ 900Vdc
Voltage test between terminals $U_{TT}$	$1.5 \times U_N / 10s$
Voltage test terminals to case $U_{TC}$	3,200Vac / 10s
Terminals (permitted Torque)	M6 × 10 (4 ±0.5Nm)
Stud Bolt (permitted Torque)	M12 × 16 / 18 (7 ±1Nm)
Life Time Test / Standard	IEC 61071 : 2007
Dielectric	Polypropylene
Electrode	Segmented Metal with Fuse Function
Cap	PBT UL94V-0 listed
impregnants	Epoxy / Urethane Resin UL94V-0 listed
Case material	Aluminium
Humidity	ClassF : 75% annual average, 95% 30days / year

		$\phi D$				
		$\phi 85$	$\phi 88.5$	$\phi 100$	$\phi 116$	$\phi 140$
Dimensions (mm)	$P$	32	32	32	50	50
	$\phi dT$	$\phi 12$	$\phi 12$	$\phi 12$	$\phi 14$	$\phi 19$
	$L_2$	5	5	5	5	5
	$L_c$	15	15	15	20	20
	$L_s$	16	16	16	18	18
Clearance distance (mm)		20	20	20	36	31
Creepage distance (mm)		28	28	28	36	31
Terminal allowance current		60Arms	60Arms	60Arms	80Arms	100Arms

## Imax Multiplier (1kHz ~ 10kHz)

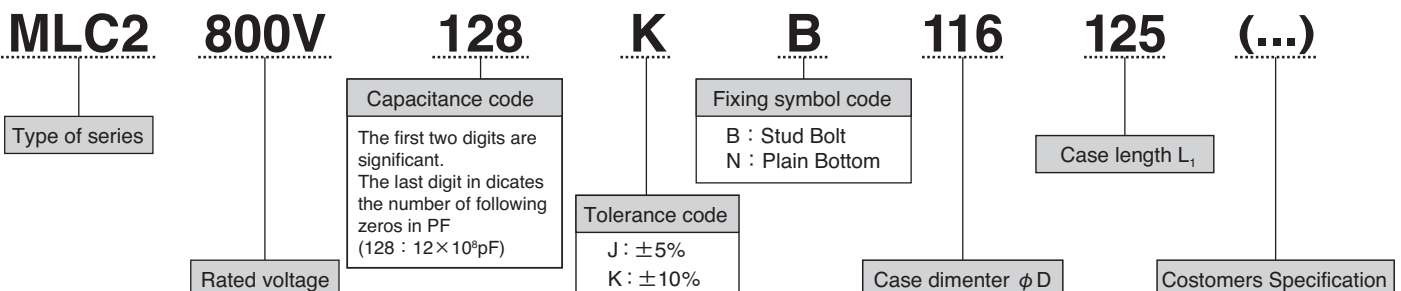
		$0.7 \times U_N$	$0.8 \times U_N$	$0.9 \times U_N$	$1.0 \times U_N$
$T_a$ Ambient Temperature	50°C	1.32	1.22	1.11	1.00
	60°C	1.11	1.00	0.86	0.70
	70°C	0.86	0.70	0.50	0.00
	75°C	0.70	0.50		
	80°C	0.50	0.00		
	85°C	0.00			

## Outline of drawings and dimensions



## Part number

Example : MLC2, 800V, 1200  $\mu F$ ,  $\pm 10\%$ ,  $D = \phi 116$ ,  $L = 125$ , with stud bolt  
MLC2800V128KB116125



PLASTIC FILM CAPACITORS

Standard Products Table

Rated d.c voltage $U_N$ : 800Vdc	Max.ripple voltage $U_r$ : 200V Non repetitive surge voltage $U_s$ : 1,200V Voltage test between terminals $U_{TT}$ : 1,200Vdc/10s Voltage test terminals to case. $U_{TC}$ : 3,200Vac/10s								Part number
	Dimensions		Maximum ripple current (Arms) $I_{max}^*$ [Arms / at50°C, 1k ~ 10kHz]	Maximum peak current $\hat{i}$ [kA]	Maximum Surge current $I_s$ [kA]	Equivalent Series Resistance $ESR$ [mΩ]	Equivalent Series Inductance $ESL$ [nH]	Thermal resistance $R_{th}$ [K/W]	
	Diameter $\phi D$ [mm]	Length of the case $L_1$ [mm]							
300	85	70	31	5	15	2.4	60	8.4	MLC2800V307KB8570
330	85	75	31	5	15	2.6	65	7.8	MLC2800V337KB8575
340	88.5	70	33	6	18	2.2	60	8.1	MLC2800V347KB88570
370	85	80	31	5	15	2.8	65	7.2	MLC2800V377KB8580
	88.5	75	33	6	18	2.4	65	7.5	MLC2800V377KB88575
410	88.5	80	33	6	18	2.6	65	6.9	MLC2800V417KB88580
440	100	70	40	7	21	1.8	60	6.8	MLC2800V447KB10070
450	85	87	31	5	15	3.0	75	6.8	MLC2800V457KB8587
470	88.5	87	33	6	18	2.8	75	6.4	MLC2800V477KB88587
480	85	95	30	5	15	3.4	80	6.4	MLC2800V487KB8595
490	100	75	40	7	21	1.9	65	6.4	MLC2800V497KB10075
530	88.5	95	32	6	18	3.1	80	6.1	MLC2800V537KB88595
540	85	106	30	5	15	3.9	90	5.6	MLC2800V547KB85106
	100	80	39	7	21	2.1	65	6.1	MLC2800V547KB10080
600	88.5	106	31	6	18	3.6	90	5.6	MLC2800V607KB885106
610	85	125	57	10	30	1.2	40	5.0	MLC2800V617KB85125
	100	87	39	7	21	2.3	75	5.6	MLC2800V617KB10087
620	116	70	47	10	30	1.5	60	5.9	MLC2800V627KB11670
630	85	120	29	5	15	4.6	100	5.1	MLC2800V637KB85120
670	85	135	57	10	30	1.3	40	4.6	MLC2800V677KB85135
680	88.5	125	62	11	33	1.1	40	4.6	MLC2800V687KB885125
	116	75	47	10	30	1.6	65	5.5	MLC2800V687KB11675
690	100	95	39	7	21	2.6	80	4.9	MLC2800V697KB10095
700	88.5	120	31	6	18	4.2	100	4.9	MLC2800V707KB885120
750	85	145	57	10	30	1.4	45	4.3	MLC2800V757KB85145
760	88.5	135	62	11	33	1.2	40	4.2	MLC2800V767KB885135
780	116	80	46	10	30	1.7	65	5.4	MLC2800V767KB11680
780	100	106	38	7	21	3.0	90	4.5	MLC2800V787KB100106
830	88.5	145	61	11	33	1.3	45	4.1	MLC2800V837KB885145
840	85	159	57	10	30	1.6	50	3.8	MLC2800V847KB85159
850	116	87	46	10	30	1.9	75	4.9	MLC2800V857KB11687
890	100	125	71	15	45	1.0	40	3.9	MLC2800V897KB100125
920	100	120	37	7	21	3.4	100	4.2	MLC2800V927KB100120
930	140	70	49	15	45	1.2	60	6.8	MLC2800V937KB14070
940	88.5	159	61	12	36	1.5	50	3.5	MLC2800V947KB885159
960	85	175	56	10	30	1.8	55	3.5	MLC2800V967KB85175
970	116	95	45	10	30	2.1	80	4.6	MLC2800V977KB11695
980	100	135	71	15	45	1.0	40	3.9	MLC2800V987KB100135
1,000	85	197	54	10	30	2.2	60	3.1	MLC2800V108KB85197
	88.5	175	59	11	33	1.7	55	3.3	MLC2800V108KB885175
	100	145	69	14	42	1.2	45	3.4	MLC2800V108KB100145
	116	106	44	10	30	2.5	90	4.0	MLC2800V108KB116106
	140	75	49	15	45	1.3	65	6.2	MLC2800V108KB14075
1,100	140	80	49	15	45	1.4	65	5.8	MLC2800V118KB14080
1,200	85	225	54	10	30	2.5	70	2.7	MLC2800V128KB85225
	88.5	197	60	12	36	1.9	60	2.9	MLC2800V128KB885197
	100	159	70	15	45	1.2	50	3.3	MLC2800V128KB100159
	116	120	43	10	30	2.8	100	3.8	MLC2800V128KB116120
	116	125	83	20	60	0.8	40	3.6	MLC2800V128KB116125
1,300	140	87	48	15	45	1.5	75	5.6	MLC2800V128KB14087
	100	175	69	14	42	1.4	55	3.0	MLC2800V138KB100175
	116	135	83	20	60	0.9	40	3.2	MLC2800V138KB116135
1,400	88.5	225	59	11	33	2.2	70	2.6	MLC2800V148KB885225
	140	95	48	15	45	1.7	80	5.0	MLC2800V148KB14095
1,500	100	197	68	14	42	1.6	60	2.7	MLC2800V158KB100197
1,600	116	145	83	20	60	0.9	45	3.2	MLC2800V158KB116145
1,600	140	106	47	15	45	1.9	90	4.7	MLC2800V168KB140106
1,700	116	159	83	21	63	1.0	50	2.9	MLC2800V178KB116159
1,800	100	225	68	15	45	1.8	70	2.4	MLC2800V188KB100225
	140	125	86	30	90	0.7	40	3.8	MLC2800V188KB140125
1,900	116	175	83	20	60	1.1	55	2.6	MLC2800V198KB116175
	140	120	47	15	45	2.1	100	4.2	MLC2800V198KB140120
2,000	140	135	86	30	90	0.7	40	3.8	MLC2800V208KB140135
2,100	116	197	80	20	60	1.3	60	2.4	MLC2800V218KB116197
2,300	140	145	87	31	93	0.8	45	3.2	MLC2800V238KB140145
2,500	116	225	80	20	60	1.5	70	2.1	MLC2800V258KB116225
	140	159	86	30	90	0.8	50	3.3	MLC2800V258KB140159
2,900	140	175	86	31	93	0.9	55	3.0	MLC2800V298KB140175
3,300	140	197	86	31	93	1.0	60	2.7	MLC2800V338KB140197
3,800	140	225	85	30	90	1.2	70	2.3	MLC2800V388KB140225

PLASTIC FILM CAPACITORS

\* • Please inquire us in case low frequency (commercial frequency) or frequency above 10kHz is included in ripple current.  
 • Maximum permissible ripple current is calculated by the value in this table with frequency and temperature correction factors.  
 Also the maximum current must be controlled below the permissible terminal current .  
 Please refer useful life graph based on ambient temperature and voltage.

$$\theta_{HOTSPOT} = T_a + I^2 \times ESR \times R_{th}$$

# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

Standard Products Table

Rated d.c voltage $U_N$ : 900Vdc									
Max.ripple voltage $U_r$ : 200V Non repetitive surge voltage $U_s$ : 1,350V									
Voltage test between terminals $U_{TT}$ : 1,350Vdc/10s Voltage test terminals to case. $U_{TC}$ : 3,200Vac/10s									
Nominal Capacitance $C_N$ ( $\mu$ F)	Dimensions		Maximum ripple current (Arms) $I_{max}^*$ [Arms / at50°C, 1k ~ 10kHz]	Maximum peak current $\hat{i}$ [kA]	Maximum Surge current $I_s$ [kA]	Equivalent Series Resistance $ESR$ [m $\Omega$ ]	Equivalent Series Inductance $ESL$ [nH]	Thermal resistance $R_{th}$ [K/W]	Part number
	Diameter $\phi D$ [mm]	Length of the case $L_1$ [mm]							
230	85	70	30	4	12	2.6	60	8.3	MLC2900V237KB8570
250	85	75	29	4	12	2.9	65	8.0	MLC2900V257KB8575
	88.5	70	31	5	15	2.5	60	8.1	MLC2900V257KB88570
280	85	80	29	4	12	3.1	65	7.5	MLC2900V287KB8580
	88.5	75	31	5	15	2.6	65	7.8	MLC2900V287KB88575
310	88.5	80	31	5	15	2.9	65	7.0	MLC2900V317KB88580
320	85	87	29	5	15	3.4	75	6.8	MLC2900V327KB8587
350	88.5	87	31	5	15	3.2	75	6.3	MLC2900V357KB88587
	100	70	39	7	21	2.0	60	6.5	MLC2900V357KB10070
360	85	95	28	4	12	3.8	80	6.5	MLC2900V367KB8595
390	100	75	38	7	21	2.1	65	6.4	MLC2900V397KB10075
400	88.5	95	30	5	15	3.5	80	6.2	MLC2900V407KB88595
410	85	106	28	5	15	4.4	90	5.7	MLC2900V417KB85106
430	100	80	38	7	21	2.3	65	6.0	MLC2900V437KB10080
450	88.5	106	30	5	15	4.1	90	5.3	MLC2900V457KB885106
460	85	125	55	9	27	1.4	40	4.6	MLC2900V467KB85125
	100	87	37	7	21	2.6	75	5.6	MLC2900V477KB10087
470	116	70	45	9	27	1.6	60	6.0	MLC2900V477KB11670
	85	120	27	4	12	5.1	100	5.3	MLC2900V487KB85120
510	85	135	55	9	27	1.5	40	4.3	MLC2900V517KB85135
	88.5	125	59	10	30	1.3	40	4.3	MLC2900V517KB885125
	116	75	45	9	27	1.7	65	5.7	MLC2900V517KB11675
530	88.5	120	29	5	15	4.7	100	4.9	MLC2900V537KB885120
540	100	95	37	7	21	2.8	80	5.1	MLC2900V547KB10095
570	85	145	54	9	27	1.6	45	4.2	MLC2900V577KB85145
	88.5	135	59	10	30	1.4	40	4.0	MLC2900V577KB885135
	116	80	44	9	27	1.9	65	5.3	MLC2900V577KB11680
590	100	106	36	6	18	3.3	90	4.6	MLC2900V597KB100106
630	88.5	145	57	10	30	1.5	45	4.0	MLC2900V637KB885145
640	85	159	54	9	27	1.8	50	3.7	MLC2900V647KB85159
650	116	87	44	9	27	2.0	75	5.0	MLC2900V657KB11687
690	100	120	34	6	18	3.8	100	4.4	MLC2900V697KB100120
	100	125	69	13	39	1.0	40	4.0	MLC2900V697KB100125
710	88.5	159	57	10	30	1.6	50	3.8	MLC2900V717KB885159
	140	70	48	14	42	1.3	60	6.5	MLC2900V717KB14070
730	85	175	54	9	27	2.0	55	3.4	MLC2900V737KB85175
	116	95	43	9	27	2.3	80	4.6	MLC2900V737KB11695
780	100	135	69	13	39	1.1	40	3.7	MLC2900V787KB100135
	140	75	48	14	42	1.4	65	6.0	MLC2900V787KB14075
810	88.5	175	57	10	30	1.8	55	3.4	MLC2900V817KB885175
820	85	197	53	9	27	2.3	60	3.0	MLC2900V827KB85197
830	116	106	43	9	27	2.6	90	4.1	MLC2900V837KB116106
860	100	145	68	13	39	1.2	45	3.5	MLC2900V867KB100145
870	140	80	47	14	42	1.5	65	5.9	MLC2900V877KB14080
910	88.5	197	56	10	30	2.1	60	3.0	MLC2900V917KB885197
930	100	159	68	13	39	1.4	50	3.0	MLC2900V937KB100159
940	116	125	80	18	54	0.9	40	3.4	MLC2900V947KB116125
960	85	225	52	9	27	2.7	70	2.7	MLC2900V967KB85225
970	116	120	42	9	27	3.0	100	3.7	MLC2900V977KB116120
980	140	87	47	14	42	1.6	75	5.5	MLC2900V987KB14087
	88.5	225	54	9	27	2.6	70	2.6	MLC2900V108KB885225
1,000	100	175	66	12	36	1.6	55	2.8	MLC2900V108KB100175
	116	135	79	17	51	0.9	40	3.5	MLC2900V108KB116135
	100	197	64	13	39	1.8	60	2.7	MLC2900V118KB100197
1,100	116	145	78	17	51	1.0	45	3.2	MLC2900V118KB116145
	140	95	46	13	39	1.8	80	5.1	MLC2900V118KB14095
1,200	140	106	45	13	39	2.0	90	4.8	MLC2900V128KB140106
1,300	116	159	79	18	54	1.1	50	2.9	MLC2900V138KB116159
	100	225	66	13	39	2.0	70	2.3	MLC2900V148KB100225
1,400	116	175	78	17	51	1.3	55	2.5	MLC2900V148KB116175
	140	120	45	13	39	2.4	100	4.0	MLC2900V148KB140120
	140	125	84	27	81	0.7	40	4.0	MLC2900V148KB140125
1,500	140	135	83	26	78	0.8	40	3.6	MLC2900V158KB140135
1,600	116	197	77	17	51	1.4	60	2.4	MLC2900V168KB116197
1,700	140	145	83	26	78	0.8	45	3.6	MLC2900V178KB140145
	116	225	77	18	54	1.6	70	2.1	MLC2900V198KB116225
1,900	140	159	84	26	78	0.9	50	3.1	MLC2900V198KB140159
	140	175	84	27	81	1.0	55	2.8	MLC2900V228KB140175
2,200	140	197	83	27	81	1.1	60	2.6	MLC2900V258KB140197
2,900	140	225	81	27	81	1.3	70	2.3	MLC2900V298KB140225

\* • Please inquire us in case low frequency (commercial frequency) or frequency above 10kHz is included in ripple current.  
 • Maximum permissible ripple current is calculated by the value in this table with frequency and temperature correction factors.  
 Also the maximum current must be controlled below the permissible terminal current .  
 Please refer useful life graph based on ambient temperature and voltage.

$$\theta_{HOTSPOT} = T_a + I^2 \times ESR \times R_{th}$$

PLASTIC FILM CAPACITORS





# MKCP4 Series (Resin-encased Metallized polypropylene film capacitors)

## Features

- Suitable for DC link circuit.
- Plastic case and filling resin materials conform to UL94V-0.

## Specifications

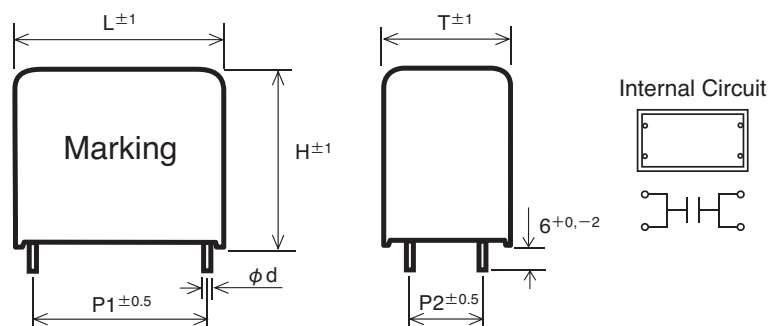
Items	Description
Operating Temperature range *	-40 ~ +105°C (voltage derating is required at $\geq +85^\circ\text{C}$ )
Rated Voltage $U_N$	700, 900, 1,100V.DC
Voltage test between terminals	$1.5 \times U_N / 10\text{s}$
Terminals	Tinned wire leads
Reference standard	IEC 61071 : 2007
Dielectric	Polypropylene
Electrode	no internal safety device (optional : segmented metallization design)
Case	UL94V-0
Filling material	UL94V-0
Environmental regulation	Comply with RoHS

\* Temperature in table is value at hot spot on capacitor case.

## Dimension

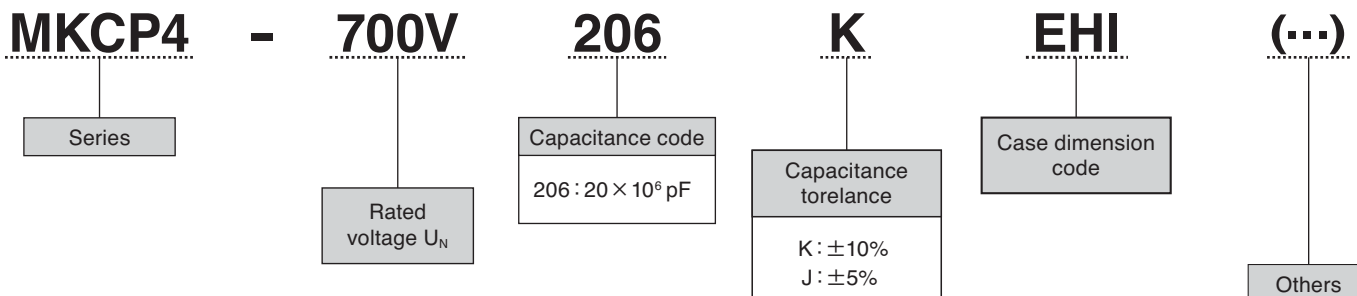
Case (mm)			Terminal (mm)			Case dimension code
T	H	L	P1	P2	$\phi d$	
21.5	38.5	43.0	37.5	10.2	1.0	EHI
24.0	44.0	42.0	37.5	10.2	1.0	EII
30.0	45.0	42.0	37.5	20.3	1.0	GJI
30.0	55.0	42.0	37.5	20.3	1.0	GLI
25.0	45.0	57.5	52.5	10.2	1.2	FJL
30.0	45.0	57.5	52.5	20.3	1.2	GJL
35.0	50.0	57.5	52.5	20.3	1.2	HKL
35.0	60.0	57.5	52.5	20.3	1.2	HML
35.0	65.0	57.5	52.5	20.3	1.2	HNL
45.0	57.0	57.5	52.5	20.3	1.2	JLL
60.0	45.0	57.5	52.5	20.3	1.2	MJL
35.0	80.0	57.5	52.5	20.3	1.2	HQL
45.0	65.0	57.5	52.5	20.3	1.2	JNL

## Outline of drawings and dimensions



## Part number

Example : MKCP4 series 700V.dc 20  $\mu\text{F}$   $\pm 10\%$





Standard Products Table

Nominal Capacitance $C_N$ ( $\mu F$ )	Dimensions [mm]						$dv/dt$ (V/us)	Maximum peak current $\hat{i}$ (A <sub>p</sub> )	Maximum ripple current $I_{max}$ (Arms) (at 85°C, 10kHz)	ESR (typ.) (mΩ)	ESL (typ.) (nH)	$R_{th}$ (K/W)	Part number
	T	H	L	P1	P2	φd							
Rated voltage $U_N$ : 700Vdc (70°C : 800Vdc, 85°C : 700Vdc, 105°C : 500Vdc)								Voltage test between terminals $U_{TT}$ : 1,050Vdc/10s					
20	21.5	38.5	43.0	37.5	10.2	1.0	40	800	12.0	6.0	18	13.0	MKCP4-700V206KEHI
22	24.0	44.0	42.0	37.5	10.2	1.0	40	880	13.5	5.5	19	12.0	MKCP4-700V226KEII
30	30.0	45.0	42.0	37.5	20.3	1.0	40	1,200	17.0	4.0	19	9.5	MKCP4-700V306KGJI
30	25.0	45.0	57.5	52.5	10.2	1.2	20	600	12.0	8.0	19	11.0	MKCP4-700V306KFJL
35	30.0	45.0	42.0	37.5	20.3	1.0	40	1,400	18.5	3.5	19	9.5	MKCP4-700V356KGJI
35	25.0	45.0	57.5	52.5	10.2	1.2	20	700	12.5	7.0	19	11.0	MKCP4-700V356KFJL
40	25.0	45.0	57.5	52.5	10.2	1.2	20	800	13.5	6.0	19	11.0	MKCP4-700V406KFJL
45	30.0	45.0	57.5	52.5	20.3	1.2	20	900	15.0	5.5	19	9.5	MKCP4-700V456KGJL
55	35.0	50.0	57.5	52.5	20.3	1.2	20	1,100	18.0	4.5	20	8.0	MKCP4-700V556KHKL
60	35.0	50.0	57.5	52.5	20.3	1.2	20	1,200	19.0	4.0	20	8.0	MKCP4-700V606KHKL
65	35.0	50.0	57.5	52.5	20.3	1.2	20	1,300	20.5	3.5	20	8.0	MKCP4-700V656KHKL
70	35.0	60.0	57.5	52.5	20.3	1.2	20	1,400	20.5	3.5	21	8.0	MKCP4-700V706KHML
80	35.0	60.0	57.5	52.5	20.3	1.2	20	1,600	21.5	3.0	21	8.0	MKCP4-700V806KHML
85	35.0	65.0	57.5	52.5	20.3	1.2	20	1,700	22.0	3.0	22	8.0	MKCP4-700V856KHNL
90	45.0	57.0	57.5	52.5	20.3	1.2	20	1,800	22.0	3.0	21	7.5	MKCP4-700V906KJLL
100	60.0	45.0	57.5	52.5	20.3	1.2	20	2,000	22.0	2.5	19	6.0	MKCP4-700V107KMJL
100	35.0	80.0	57.5	52.5	20.3	1.2	20	2,000	22.0	2.5	28	8.0	MKCP4-700V107KHQL
100	45.0	65.0	57.5	52.5	20.3	1.2	20	2,000	22.0	2.5	22	7.5	MKCP4-700V107KJNL
Rated voltage $U_N$ : 900Vdc (70°C : 1,100Vdc, 85°C : 900Vdc, 105°C : 650Vdc)								Voltage test between terminals $U_{TT}$ : 1,350Vdc/10s					
10	21.5	38.5	43.0	37.5	10.2	1.0	40	400	9.0	11.0	18	13.0	MKCP4-900V106KEHI
12	21.5	38.5	43.0	37.5	10.2	1.0	40	480	10.0	9.0	18	13.0	MKCP4-900V126KEHI
15	24.0	44.0	42.0	37.5	10.2	1.0	40	600	12.0	7.0	19	12.0	MKCP4-900V156KEII
15	25.0	45.0	57.5	52.5	10.2	1.2	20	300	9.5	12.0	19	11.0	MKCP4-900V156KFJL
20	30.0	45.0	42.0	37.5	20.3	1.0	40	800	15.5	5.0	19	9.5	MKCP4-900V206KGJI
20	25.0	45.0	57.5	52.5	10.2	1.2	20	400	10.0	11.0	19	11.0	MKCP4-900V206KFJL
25	30.0	45.0	57.5	52.5	20.3	1.2	20	500	11.5	9.0	19	9.5	MKCP4-900V256KGJL
35	35.0	50.0	57.5	52.5	20.3	1.2	20	700	15.5	6.0	20	8.0	MKCP4-900V356KHKL
40	35.0	50.0	57.5	52.5	20.3	1.2	20	800	17.0	5.0	20	8.0	MKCP4-900V406KHKL
45	35.0	60.0	57.5	52.5	20.3	1.2	20	900	17.5	5.0	21	8.0	MKCP4-900V456KHML
50	35.0	60.0	57.5	52.5	20.3	1.2	20	1,000	18.5	4.0	21	8.0	MKCP4-900V506KHML
55	35.0	65.0	57.5	52.5	20.3	1.2	20	1,100	19.0	4.0	22	8.0	MKCP4-900V556KHNL
55	45.0	57.0	57.5	52.5	20.3	1.2	20	1,100	19.6	4.0	21	7.5	MKCP4-900V556KJLL
60	60.0	45.0	57.5	52.5	20.3	1.2	20	1,200	22.0	3.5	19	6.0	MKCP4-900V606KMJL
60	35.0	80.0	57.5	52.5	20.3	1.2	20	1,200	20.5	3.5	28	8.0	MKCP4-900V606KHQL
65	45.0	65.0	57.5	52.5	20.3	1.2	20	1,300	22.0	3.0	22	7.5	MKCP4-900V656KJNL
Rated voltage $U_N$ : 1,100Vdc (70°C : 1,300Vdc, 85°C : 1,100Vdc, 105°C : 800Vdc)								Voltage test between terminals $U_{TT}$ : 1,650Vdc/10s					
7	21.5	38.5	43.0	37.5	10.2	1.0	45	310	8.5	11.5	18	13.0	MKCP4-1100V705KEHI
8	21.5	38.5	43.0	37.5	10.2	1.0	45	360	9.5	10.0	18	13.0	MKCP4-1100V805KEHI
10	24.0	44.0	42.0	37.5	10.2	1.0	45	450	11.0	8.0	19	12.0	MKCP4-1100V106KEII
10	25.0	45.0	57.5	52.5	10.2	1.2	23	230	8.5	16.0	19	11.0	MKCP4-1100V106KFJL
12	30.0	45.0	42.0	37.5	20.3	1.0	45	540	13.5	6.5	19	9.5	MKCP4-1100V126KGJI
15	30.0	55.0	42.0	37.5	20.3	1.0	45	670	15.0	5.5	21	9.5	MKCP4-1100V156KGLI
15	25.0	45.0	57.5	52.5	10.2	1.2	23	340	10.5	10.5	19	11.0	MKCP4-1100V156KFJL
20	30.0	45.0	57.5	52.5	20.3	1.2	23	460	12.5	8.0	19	9.5	MKCP4-1100V206KGJL
22	35.0	50.0	57.5	52.5	20.3	1.2	23	500	14.5	7.0	20	8.0	MKCP4-1100V226KHKL
25	35.0	50.0	57.5	52.5	20.3	1.2	23	550	15.0	6.5	20	8.0	MKCP4-1100V256KHKL
30	35.0	60.0	57.5	52.5	20.3	1.2	23	690	16.5	5.0	21	8.0	MKCP4-1100V306KHML
35	35.0	65.0	57.5	52.5	20.3	1.2	23	800	18.0	4.5	22	8.0	MKCP4-1100V356KHNL
35	45.0	57.0	57.5	52.5	20.3	1.2	23	800	18.0	4.5	21	7.5	MKCP4-1100V356KJLL
40	60.0	45.0	57.5	52.5	20.3	1.2	23	920	22.0	4.0	19	6.0	MKCP4-1100V406KMJL
40	35.0	80.0	57.5	52.5	20.3	1.2	23	920	19.0	4.0	28	8.0	MKCP4-1100V406KHQL
45	45.0	65.0	57.5	52.5	20.3	1.2	23	1,000	19.5	4.0	22	7.5	MKCP4-1100V456KJNL

PLASTIC FILM CAPACITORS

# MKCP4T Series (Resin-encased Metallized polypropylene film capacitors)

## Features

- Suitable for a DC link circuit in the high humidity environment.
- 85°C, 85%RH, 1kh.
- Plastic case and filling resin materials conform to UL94V-0.

## Specifications

Items	Description
Operating Temperature range *	-40 ~ +105°C (voltage derating is required at $\geq +85^\circ\text{C}$ )
Rated Voltage $U_N$	700, 900, 1,100V.DC
Voltage test between terminals	$1.5 \times U_N / 10\text{s}$
Terminals	Tinned wire leads
Reference standard	IEC 61071 : 2007
Dielectric	Polypropylene
Electrode	no internal safety device (optional : segmented metallization design)
Case	UL94V-0
Filling material	UL94V-0
Environmental regulation	Comply with RoHS

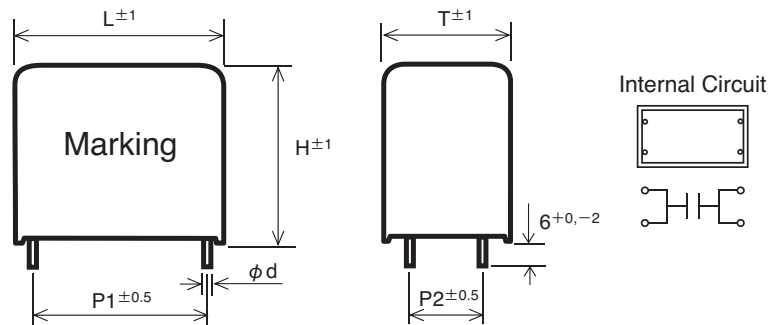
## Dimension

Case (mm)			Terminal (mm)			Case dimension code
T	H	L	P1	P2	$\phi d$	
21.5	38.5	43.0	37.5	10.2	1.0	EHI
24.0	44.0	42.0	37.5	10.2	1.0	EII
30.0	45.0	42.0	37.5	20.3	1.0	GJI
30.0	55.0	42.0	37.5	20.3	1.0	GLI
25.0	45.0	57.5	52.5	10.2	1.2	FJL
30.0	45.0	57.5	52.5	20.3	1.2	GJL
35.0	50.0	57.5	52.5	20.3	1.2	HKL
35.0	60.0	57.5	52.5	20.3	1.2	HML

\* Temperature in table is value at hot spot on capacitor case.

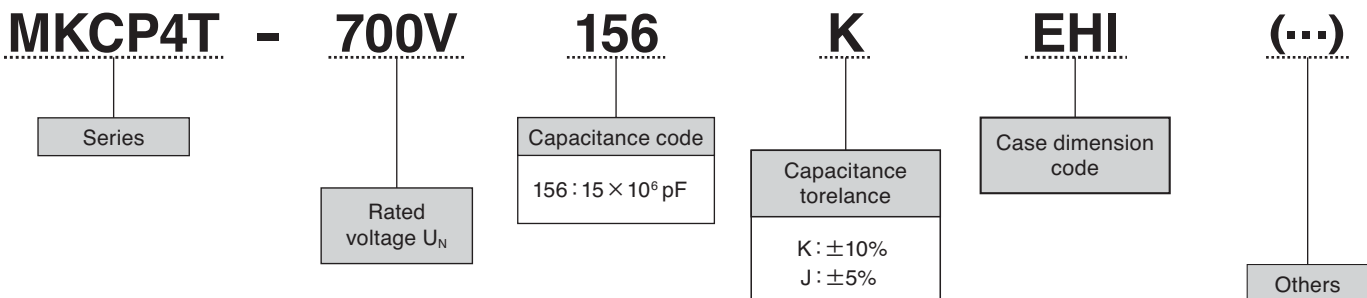
PLASTIC FILM CAPACITORS

## Outline of drawings and dimensions



## Part number

Example : MKCP4T series 700V.dc 15  $\mu$ F  $\pm 10\%$



Standard Products Table

Nominal Capacitance $C_N$ [ $\mu F$ ]	Dimensions [mm]						$dv/dt$ [V/us]	Maximum peak current $\hat{i}$ [A <sub>p</sub> ]	Maximum ripple current $I_{max}$ [Arms] (at 85°C, 10kHz)	ESR (typ.) [m $\Omega$ ]	ESL (typ.) [nH]	R <sub>th</sub> [K/W]	Part number
	T	H	L	P1	P2	$\phi d$							
Rated voltage $U_N$ : 700Vdc (70°C : 800Vdc, 85°C : 700Vdc, 105°C : 500Vdc)									Voltage test between terminals $U_{TT}$ : 1,050Vdc/10s				
15	21.5	38.5	43.0	37.5	10.2	1.0	40	600	10.5	8.0	18	13.0	MKCP4T-700V156KEHI
20	24.0	44.0	42.0	37.5	10.2	1.0	40	800	12.5	6.0	19	12.0	MKCP4T-700V206KEII
25	30.0	45.0	42.0	37.5	20.3	1.0	40	1,000	15.0	5.0	19	9.5	MKCP4T-700V256KGJI
30	30.0	55.0	42.0	37.5	20.3	1.0	40	1,200	17.0	4.0	21	9.5	MKCP4T-700V306KGLI
30	25.0	45.0	57.5	52.5	10.2	1.2	20	600	12.0	8.0	19	11.0	MKCP4T-700V306KFJL
40	30.0	45.0	57.5	52.5	20.3	1.2	20	800	15.0	6.0	19	9.5	MKCP4T-700V406KGJL
50	35.0	50.0	57.5	52.5	20.3	1.2	20	1,000	17.0	5.0	20	8.0	MKCP4T-700V506KHKL
55	35.0	50.0	57.5	52.5	20.3	1.2	20	1,100	18.0	4.5	20	8.0	MKCP4T-700V556KHKL
70	35.0	60.0	57.5	52.5	20.3	1.2	20	1,400	20.5	3.5	21	8.0	MKCP4T-700V706KHML
Rated voltage $U_N$ : 900Vdc (70°C : 1,100Vdc, 85°C : 900Vdc, 105°C : 650Vdc)									Voltage test between terminals $U_{TT}$ : 1,350Vdc/10s				
9	21.5	38.5	43.0	37.5	10.2	1.0	40	360	8.5	12.5	18	13.0	MKCP4T-900V905KEHI
12	24.0	44.0	42.0	37.5	10.2	1.0	40	480	10.0	9.0	19	12.0	MKCP4T-900V126KEII
17	30.0	45.0	42.0	37.5	20.3	1.0	40	680	14.0	6.0	19	9.5	MKCP4T-900V176KGJI
20	30.0	55.0	42.0	37.5	20.3	1.0	40	800	15.5	5.0	21	9.5	MKCP4T-900V206KGLI
20	25.0	45.0	57.5	52.5	10.2	1.2	20	400	10.0	11.0	19	11.0	MKCP4T-900V206KFJL
25	30.0	45.0	57.5	52.5	20.3	1.2	20	500	11.5	9.0	19	9.5	MKCP4T-900V256KGJL
30	35.0	50.0	57.5	52.5	20.3	1.2	20	600	14.0	7.0	20	8.0	MKCP4T-900V306KHKL
35	35.0	50.0	57.5	52.5	20.3	1.2	20	700	15.5	6.0	20	8.0	MKCP4T-900V356KHKL
40	35.0	60.0	57.5	52.5	20.3	1.2	20	800	16.5	5.0	21	8.0	MKCP4T-900V406KHML
Rated voltage $U_N$ : 1,100Vdc (70°C : 1,300Vdc, 85°C : 1,100Vdc, 105°C : 800Vdc)									Voltage test between terminals $U_{TT}$ : 1,650Vdc/10s				
6	21.5	38.5	43.0	37.5	10.2	1.0	45	270	8.0	13.5	18	13.0	MKCP4T-1100V605KEHI
8	24.0	44.0	42.0	37.5	10.2	1.0	45	360	10.0	10.0	19	12.0	MKCP4T-1100V805KEII
12	30.0	45.0	42.0	37.5	20.3	1.0	45	540	13.5	6.5	19	9.5	MKCP4T-1100V126KGJI
14	30.0	55.0	42.0	37.5	20.3	1.0	45	630	14.0	6.0	21	9.5	MKCP4T-1100V146KGLI
14	25.0	45.0	57.5	52.5	10.2	1.2	23	320	9.5	11.5	19	11.0	MKCP4T-1100V146KFJL
18	30.0	45.0	57.5	52.5	20.3	1.2	23	410	11.5	9.0	19	9.5	MKCP4T-1100V186KGJL
22	35.0	50.0	57.5	52.5	20.3	1.2	23	500	14.5	7.0	20	8.0	MKCP4T-1100V226KHKL
25	35.0	50.0	57.5	52.5	20.3	1.2	23	570	15.0	6.5	20	8.0	MKCP4T-1100V256KHKL
30	35.0	60.0	57.5	52.5	20.3	1.2	23	690	16.5	5.0	21	8.0	MKCP4T-1100V306KHML

PLASTIC FILM CAPACITORS

# E51 (DC) / E51 (AC) Series (Cylindrical Metallized Polypropylene Film Capacitors)

## Features

- High voltage range and low inductance capacitors.
- E51 series are made in dry technology.
- Capacitors both for AC/DC application are available.

## Specifications

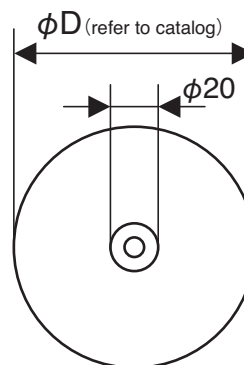
E51 (DC) Series (for DC)

Item	Specification
Category temperature range	-25 ~ +70°C (Includes self temperature rise)
Storage temperature	-40 ~ +85°C
Rated voltage (UN)	1,300 ~ 50,000Vdc
Terminal (torque)	M8 × 12 (7Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	±10% (optional ±5%)
Safety devices	-
Impregnant	Solid resin based on vegetable oil, Non PCB
Material of case	Plastic (UL94V-0)
Environmental regulations	Comply with RoHS



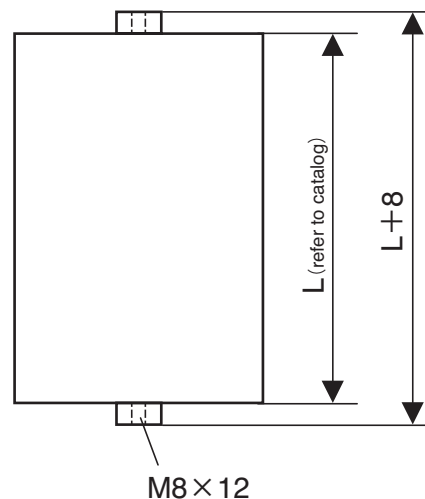
E51 (AC) Series (for AC)

Item	Specification
Category temperature range	-25 ~ +70°C (Includes self temperature rise)
Storage temperature	-40 ~ +85°C
Rated voltage (UN)	2,700 ~ 20,000Vac (4,400 ~ 50,000Vdc)
Terminal (torque)	M8 × 12 (7Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	±10% (optional ±5%)
Safety devices	-
Impregnant	Solid resin based on vegetable oil, Non PCB
Material of case	Plastic (UL94V-0)
Environmental regulations	Comply with RoHS

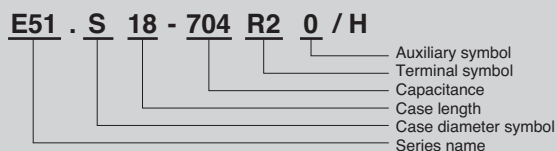


## Dimensions

Item	Specification
Terminal code	R2
Can material	Plastic (UL94V-0)
Terminal	Axial thread M8 × 12
	Torque : 7Nm
	I <sub>max</sub> (terminal) : 100A
Degree of protection	IP00
Clearance in air	L + φD - 20mm
Creepage distance	L + φD - 20mm



Numbering system: e.g. E51, 1,300VDC, 700 μF, φ 140 × 175Lmm, R2 terminal



Standard Value and Case Size (E51Series(DC))

Rated DC Voltage $U_N(DC)$ [Vdc]	Rated Capacitance $C_N$ [μF]	Case size		Rated ripple voltage $U_r$ [V]	Surge voltage $U_s$ [V]	Series resistance (reference) $R_s$ [mΩ]	$R_{th}$ [K/W]	Max current $I_{max}$ [Arms]	Max peak current $\hat{i}$ [kA]	Max surge current $I_s$ [kA]	$ESL$ [nH]	Weight [kg]	MOQ [pcs]	Part number
		$\phi D$ [mm]	$L$ [mm]											
<b>Rated DC voltage <math>U_N(DC)</math> : 1,300 ~ 2,700Vdc</b>														
1,300	700	140	175	300	1,950	0.39	3	80	9.3	28.0	30	2.8	30	E51.S18-704R20/H
2,300	80	64	355	400	4,100	1.3	3.6	50	4.0	13.0	80	1.2	70	E51.L35-803R20/H
2,300	170	90	355	400	4,100	0.6	2.4	90	6.0	17.0	100	2.4	25	E51.P35-174R20/H
2,500	25	90	130	800	3,750	0.96	6.4	70	3.1	9.3	30	0.9	250	E51.P13-253R20/H
2,500	50	90	170	800	3,750	1.3	4.9	70	3.1	9.3	50	1.1	100	E51.P17-503R20/H
2,700	40	140	125	500	4,050	0.85	2.55	40	5.0	15.0	20	2.0	52	E51.S12-403R20/H
<b>Rated DC voltage <math>U_N(DC)</math> : 3,000 ~ 3,600Vdc</b>														
3,000	18	90	150	600	4,500	0.62	5.5	65	2.8	8.4	50	1.1	90	E51.P15-183R20/H
3,000	80	90	255	700	4,500	1.9	3.2	60	3.2	9.6	60	1.7	45	E51.P25-803R20/H
3,000	350	140	355	600	4,500	1.5	1.5	75	8.4	25.2	100	5.7	22	E51.S35-354R20/H
3,000	400	140	460	600	4,500	0.85	1.2	100	15.4	46.2	120	7.4	30	E51.S46-404R20/H
3,100	86	90	355	500	5,600	1.5	2.4	65	4.5	13	100	2.4	25	E51.P35-863R20/H
3,200	15	64	200	700	4,800	2.3	5.8	35	1.0	3.0	50	0.7	130	E51.L20-153R20/H
3,200	33	90	200	700	4,800	0.7	4.1	70	2.5	7.5	50	1.3	65	E51.P20-333R20/H
3,500	500	140	710	600	5,250	1.2	0.75	100	13.9	41.7	200	11.5	12	E51.S71-504R20/H
3,600	80	116	245	600	5,400	0.71	2.6	90	6.0	18.0	40	2.1	27	E51.R24-803R20/H
3,600	220	140	300	800	5,400	0.6	1.1	40	4.4	13.2	40	5.0	10	E51.S30-224R20/H
<b>Rated DC voltage <math>U_N(DC)</math> : 4,000 ~ 5,600Vdc</b>														
4,000	8	116	170	2,850	6,000	1.40	3.8	25	2.1	6.3	100	1.9	36	E51.R17-802R20/H
4,000	16	140	170	2,850	6,000	1.10	3.1	30	3.8	11.4	100	2.7	28	E51.S17-163R20/H
4,000	215	140	565	800	6,000	0.70	0.95	100	11.9	35.7	60	9.0	12	E51.S56-224R20/H
4,200	8	64	138	800	6,300	4.30	8.3	15	0.69	2.07	60	0.5	220	E51.L14-802R20/H
4,200	45	90	355	800	6,300	1.60	2.4	50	4.2	12.6	80	2.4	35	E51.P35-453R20/H
4,400	8	64	180	950	6,600	4.20	6.5	20	0.85	2.55	60	0.6	160	E51.L18-802R20/H
4,400	8	90	130	950	6,600	1.40	6.4	20	1.7	5.1	50	0.9	260	E51.P13-802R20/H
4,500	300	140	710	850	6,750	1.10	0.75	100	16.5	49.5	200	11.5	12	E51.S71-304R20/H
4,700	187.5	140	430	1,000	7,050	3.20	0.7	50	4.25	12.75	40	7.0	10	E51.S43-194R20/H
5,000	4.55	64	150	1,000	7,500	6.50	7.8	15	0.47	1.41	60	0.5	290	E51.L15-462R20/H
5,600	1	64	120	1,100	8,400	4.60	9.7	20	0.70	2.2	20	1.0	320	E51.L12-102R20/H
<b>Rated DC voltage <math>U_N(DC)</math> : 6,000 ~ 9,300Vdc</b>														
6,000	30	116	200	700	9,000	2.3	3.2	30	2.10	6.3	80	2.2	33	E51.R20-303R20/H
6,200	6.8	64	255	1,200	9,300	10	4.6	20	0.60	2.0	50	0.9	30	E51.L25-682R20/H
6,200	15	90	255	1,200	9,300	4.6	3.2	35	1.50	4.5	50	1.7	25	E51.P25-153R20/H
6,300	20	90	355	1,200	9,450	6.8	2.4	25	1.80	8.0	100	2.4	30	E51.P35-203R20/H
6,300	51.25	140	355	1,200	9,450	2.7	1.5	40	4.30	20.0	80	5.7	23	E51.S35-513R20/H
8,000	5	90	220	1,400	12,000	1.7	3.76	50	1.80	5.0	80	1.5	55	E51.P22-502R20/H
8,000	10	90	320	1,400	12,000	2.3	2.59	50	1.90	6.0	100	2.2	35	E51.P32-103R20/H
8,000	40	140	355	1,400	12,000	3.5	1.5	40	2.70	8.1	100	5.7	22	E51.S35-403R20/H
8,500	0.22	64	165	1,400	12,750	6.9	7.1	20	0.90	2.9	50	0.6	210	E51.L16-221R20/H
8,500	0.5	64	165	3,950	12,750	3.9	7.1	20	0.54	1.62	60	0.6	30	E51.L16-501R20/H
8,500	1	90	165	1,400	12,750	2.5	5	25	1.70	5.1	50	1.1	265	E51.P16-102R20/H
9,300	9	90	355	1,500	13,950	8	2.3	20	1.00	4.0	100	2.4	25	E51.P35-902R20/H
9,300	25	140	355	1,500	13,950	2.7	1.5	40	4.00	11.0	100	5.7	8	E51.S35-253R20/H
<b>Rated DC voltage <math>U_N(DC)</math> : 10,000 ~ 50,000Vdc</b>														
10,000	0.25	64	165	2,000	15,000	15.2	7.1	10	1.1	3.3	80	0.6	230	E51.L16-251R20/H
10,000	4	116	320	2,000	15,000	3.5	2	50	1.5	4.5	60	3.5	24	E51.R32-402R20/H
10,000	4.5	140	480	3,000	15,000	1.8	1.1	50	8.8	26.4	100	8.0	16	E51.S48-452R20/H
10,000	10	90	355	2,500	15,000	7	2.3	25	1.3	3.9	100	2.4	30	E51.P35-103R20/H
12,000	24	140	565	2,100	18,000	4.2	0.95	25	4.2	12.6	60	9.0	12	E51.S56-243R20/H
12,500	0.22	64	200	2,100	18,750	14	5.8	20	0.5	1.4	80	0.7	160	E51.L20-221R20/H
12,500	0.25	64	200	2,100	18,750	14	5.8	20	0.5	1.5	80	0.7	160	E51.L20-251R20/H
12,500	1	116	200	2,100	18,750	3.6	3.2	35	2	6	80	2.2	39	E51.R20-102R20/H
13,000	0.25	64	285	3,000	19,500	17.7	4.1	10	0.6	1.7	100	1.0	140	E51.L28-251R20/H
14,000	5	116	355	2,400	21,000	3.6	1.8	30	2.5	7.5	100	4.0	24	E51.R35-502R20/H
14,000	10	140	355	2,400	21,000	2.4	1.5	40	4.3	12.9	120	5.7	12	E51.S35-103R20/H
15,000	1	64	285	3,600	22,500	15.1	4.1	15	0.49	1.47	100	1.0	100	E51.L28-102R20/H
15,000	2	90	285	3,600	22,500	7.2	2.9	20	1.1	3.3	200	1.9	40	E51.P28-202R20/H
15,000	10	140	385	3,600	22,500	2.7	1.4	40	3.8	11.4	120	6.2	28	E51.S38-103R20/H
15,000	15	140	460	3,600	22,500	2.8	1.2	40	4.6	13.8	120	7.4	8	E51.S46-153R20/H
15,000	20	140	565	3,600	22,500	3.7	0.94	40	3.8	11.4	120	9.1	16	E51.S56-203R20/H
20,000	1.25	90	355	4,000	30,000	11.7	2.3	20	0.9	2.7	100	2.4	35	E51.P35-132R20/H
20,000	1.5	90	355	4,000	30,000	10.4	2.3	34	1.8	5.4	100	2.4	30	E51.P35-152R20/H
25,000	10	140	710	4,600	37,500	3.9	0.75	35	4.3	12.9	200	11.5	8	E51.S71-103R20/H
30,000	1	90	435	4,800	45,000	11	1.9	20	1	3	80	2.9	24	E51.P44-102R20/H
30,000	5	140	710	4,800	45,000	7	0.75	35	2.8	8.4	200	11.5	12	E51.S71-502R20/H
35,000	0.2	90	435	5,600	52,500	13.4	1.9	20	1	3	80	2.9	30	E51.P44-201R20/H
35,000	5	140	785	4,800	52,500	5.5	0.7	25	3.2	9.6	200	12.7	8	E51.S78-502R20/H
40,000	2.2	140	630	8,700	60,000	5.3	0.84	35	2.8	8.4	180	10.2	16	E51.S63-222R20/H

PLASTIC FILM CAPACITORS

# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

## Standard Value and Case Size (E51series (AC))

Rated AC Voltage $U_N(AC)$ [Vdc]	Rated Capacitance $C_N$ [ $\mu$ F]	Case size		Rated ripple voltage $U_r$ [V]	Surge voltage $U_s$ [V]	Series resistance (reference) $R_S$ [m $\Omega$ ]	$R_{th}$ [K/W]	Max current $I_{max}$ [Arms]	Max peak current $\hat{i}$ [kA]	Max surge current $I_s$ [kA]	$ESL$ [nH]	Weight [kg]	MOQ [pcs]	Part number
		$\phi D$ [mm]	$L$ [mm]											
<b>Rated AC voltage <math>U_N(AC)</math> : 2,000 ~ 3,250Vac <math>U_{rms}</math> : 1,650 ~ 2,300V<sub>rms</sub></b>														
2,350	1.5	64	150	1,650	6,750	5.4	7.8	20	0.7	2	20	0.5	280	E51.L15-152R20/H
2,350	3	64	250	1,650	3,525	3	4.7	15	1.1	3.3	60	1.0	220	E51.L25-302R20/H
2,550	1	64	120	1,800	4,800	1.8	9.7	40	2	5	40	0.4	380	E51.L12-102R21/H
2,700	4	116	110	1,910	6,600	0.62	5.8	90	2.2	7	15	1.5	90	E51.R11-402R20/H
2,900	3	116	110	2,050	7,500	0.74	5.8	80	2	6	15	1.2	102	E51.R11-302R20/H
3,000	0.47	64	100	2,100	6,450	3.2	11.6	15	1.1	3.3	60	0.3	500	E51.L10-471R20/H
3,000	5	116	260	2,200	7,000	3.8	2.5	10	2	6	80	2.9	30	E51.R26-502R20/H
3,250	0.75	64	165	2,300	4,875	4.9	7.1	20	0.9	2.8	100	0.6	250	E51.L16-751R20/H
3,200	0.5	64	130	2,260	10,920	5	9	25	0.62	1.86	60	0.4	270	E51.L13-501R20/H
<b>Rated AC voltage <math>U_N(AC)</math> : 3,500Vac <math>U_{rms}</math> : 2,500V<sub>rms</sub></b>														
3,500	0.22	64	120	2,500	9,000	4.8	9.7	20	0.7	2.1	60	0.4	500	E51.L12-221R20/H
3,500	0.25	64	120	2,500	9,000	5.4	9.7	15	0.8	2.4	60	0.4	370	E51.L12-251R20/H
3,500	0.33	64	120	2,500	9,000	3	9.7	20	1	2.9	60	0.4	370	E51.L12-331R20/H
3,500	0.5	64	120	2,500	9,000	5.6	9.7	20	1	3	60	0.4	360	E51.L12-501R20/H
3,200	0.68	64	120	2,250	9,000	4.6	9.7	20	1	2.9	60	0.4	380	E51.L12-681R20/H
3,500	0.75	90	100	2,500	9,000	1.6	8.3	40	1.8	5.4	60	0.6	150	E51.P10-751R20/H
3,500	1.25	90	130	2,500	9,000	2.2	6.4	45	1.4	4.2	60	0.9	110	E51.P13-132R20/H
3,500	1.5	90	130	2,500	9,000	2.1	6.4	45	1.5	4.4	60	0.9	140	E51.P13-152R20/H
2,450	2	90	140	1,700	9,000	2.8	5.9	45	1.5	4.4	60	1.0	90	E51.P14-202R20/H
<b>Rated AC voltage <math>U_N(AC)</math> : 3,850 ~ 4,300Vac <math>U_{rms}</math> : 2,700 ~ 3,050V<sub>rms</sub></b>														
3,850	2.5	90	285	2,700	5,775	4.1	2.9	25	2	6	100	1.9	45	E51.P28-252R20/H
4,200	1.1	90	150	3,000	6,300	2.7	5.5	20	1.6	4.8	50	1.0	80	E51.P15-112R20/H
4,300	0.5	64	165	3,050	6,450	5.3	7.1	15	0.8	2.3	100	0.6	200	E51.L16-501R21/H
4,300	0.8	64	200	3,050	6,450	7.5	5.8	15	0.9	2.7	100	0.7	260	E51.L20-801R20/H
<b>Rated AC voltage <math>U_N(AC)</math> : 4,550Vac <math>U_{rms}</math> : 3,200V<sub>rms</sub></b>														
4,550	0.22	64	130	3,200	10,920	8.9	9	15	0.34	1.02	60	0.5	500	E51.L13-221R20/H
4,550	0.33	64	130	3,200	10,920	6.7	9	20	0.46	1.38	60	0.5	370	E51.L13-331R20/H
3,150	0.75	90	130	2,200	10,920	3	6.4	40	1	3	60	0.9	110	E51.P13-751R20/H
2,800	1.25	90	140	2,000	10,920	4.5	6.4	40	1.2	3.6	60	1.0	100	E51.P14-132R20/H
2,500	1	90	130	1,770	9,000	3.2	6.4	28	0.98	2.94	30	0.9	170	E51.P13-102R20/H
4,550	1.1	90	275	3,200	6,825	3.6	3	20	2.4	7.2	80	1.9	45	E51.P27-112R20/H
4,550	1.5	116	130	3,200	10,920	2	4.9	50	2.1	6.3	60	1.1	54	E51.R13-152R20/H
4,550	2	116	130	3,200	10,920	1.8	4.9	55	2.4	7.2	60	1.1	60	E51.R13-202R20/H
<b>Rated AC voltage <math>U_N(AC)</math> : 4,700 ~ 5,850Vac <math>U_{rms}</math> : 3,300 ~ 4,150V<sub>rms</sub></b>														
4,700	0.75	64	250	3,300	7,050	7.5	4.7	15	0.9	2.7	60	1.0	220	E51.L25-751R20/H
5,000	0.47	64	210	3,500	10,750	5.8	5.5	16	1	3	40	0.8	180	E51.L21-471R20/H
5,000	0.5	90	200	3,540	15,000	5.7	4.1	1	3	50	50	1.3	85	E51.P20-501R20/H
5,000	1	90	255	3,540	7,500	5.8	3.25	25	1.2	3.6	50	1.7	55	E51.P25-102R20/H
5,100	1.6	116	355	3,600	9,500	4	1.8	25	5	15	120	3.9	21	E51.R35-162R20/H
5,100	2.4	90	200	3,600	10,965	3	4.1	35	1.4	4.2	60	1.3	70	E51.P20-242R21/H
5,100	2.6	116	460	3,600	9,500	3.8	1.4	25	5	15	120	4.9	12	E51.R46-262R20/H
5,200	1.1	90	200	3,700	7,800	3.1	4.1	20	5.1	3.1	60	1.3	75	E51.P20-112R20/H
5,850	0.47	90	165	4,150	12,580	3.5	5	20	2.2	6.6	60	1.2	80	E51.P16-471R20/H
<b>Rated AC voltage <math>U_N(AC)</math> : 6,000 ~ 9,620Vac <math>U_{rms}</math> : 4,600 ~ 6,800V<sub>rms</sub></b>														
6,300	0.13	64	165	4,450	13,500	5.5	7.1	20	0.8	2.4	100	0.6	250	E51.L16-131R20/H
6,300	0.14	64	200	4,450	13,500	17.6	5.8	14	0.3	0.9	50	0.7	290	E51.L20-141R20/H
6,500	4	140	355	4,600	9,500	1.7	1.5	12	7	21	150	5.7	12	E51.S35-402R20/H
7,500	1.33	140	355	5,300	11,250	3.9	1.5	10	2.5	7.5	100	5.7	14	E51.S35-132R20/H
8,900	0.24	90	210	6,300	13,350	5	3.94	20	2	6	60	1.4	70	E51.P21-241R20/H
9,200	0.5	90	275	6,510	13,800	3.9	3	10	1.7	5.1	80	1.9	45	E51.P27-501R20/H
9,620	0.5	116	250	6,800	14,430	3	2.6	40	3.7	11.1	60	2.9	21	E51.R25-501R20/H
<b>Rated AC voltage <math>U_N(AC)</math> : 10,000 ~ 35,000Vac <math>U_{rms}</math> : 7,100 ~ 25,000V<sub>rms</sub></b>														
10,000	1	116	390	7,100	15,000	3.4	1.7	25	3.7	11.1	100	4.0	12	E51.R39-102R20/H
10,000	1.9	140	390	7,100	15,000	2.1	1.4	25	6.2	18.6	100	6.0	20	E51.S39-192R20/H
12,750	0.2	90	355	9,000	27,400	7	2.3	20	2.3	6.9	100	2.4	45	E51.P35-201R20/H
10,000	0.5	90	355	7,070	15,000	7.2	1.44	10	1	3	100	2.4	35	E51.P35-501R20/H
20,000	0.3	116	355	14,000	30,000	3.1	1.8	10	8	20	100	3.9	21	E51.R35-301R20/H
20,000	1	140	710	14,140	45,000	5.7	0.7	10	4.9	14.7	200	11.5	16	E51.S71-102R20/H

PLASTIC FILM CAPACITORS



# E53 (AC) Series (AC Cylindrical Metallized Polypropylene Film Capacitors)

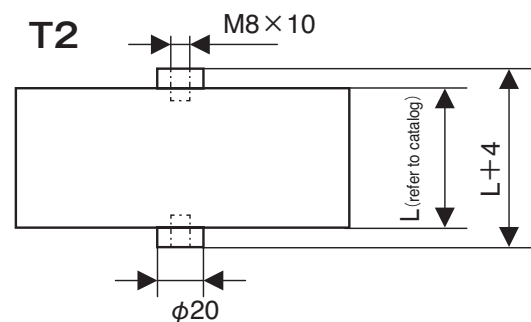
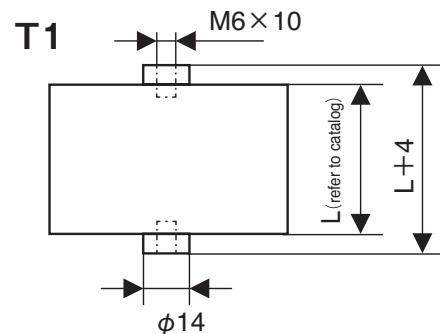
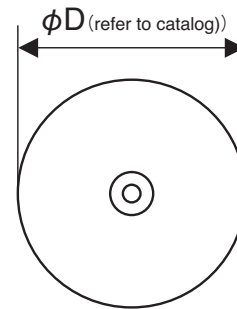
## Features

- High voltage range and ultra low inductance capacitors.
- Made in dry technology.
- For AC application.

## Specifications

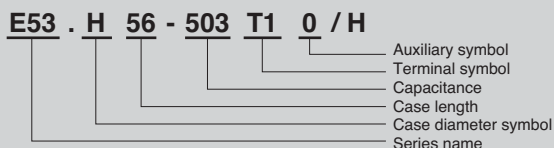
Item	Specification
Category temperature range	-40 ~ +70°C (+85°C / Includes self temperature rise)
Storage temperature	-40 ~ +85°C
Rated voltage (UN)	280 ~ 700Vac (700 ~ 1,700Vdc)
Terminal (torque)	M6 × 10 (4Nm) / M8 × 10 (7Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	±10% (optional ±5%)
Safety devices	—
Impregnant	Solid resin based on vegetable oil, Non PCB
Material of case	Plastic (UL94V-0)
Environmental regulations	Comply with RoHS

## Dimensions



Item	Specification	
Terminal code	T1 / T2	
Can material	Plastic (UL94V-0)	
Terminal	T1	Axial thread M6 × 10
		Torque : 4Nm
		I <sub>max</sub> (terminal) : 60A
	T2	Axial thread M8 × 10
	Torque : 7Nm	
	I <sub>max</sub> (terminal) : 100A	
Degree of protection	IP00	

Numbering system: e.g. E53, 280VAC, 50 μF, φ55×56Lmm, T1terminal



PLASTIC FILM CAPACITORS



Standard Value and Case Size

Rated Capacitance $C_N$ [ $\mu$ F]	Case size		Series resistance (reference) $R_s$ [m $\Omega$ ]	$R_{th}$ [K/W]	Max current $I_{max}$ [Arms]	Max peak current $\hat{I}$ [kA]	Max surge current $I_s$ [kA]	$ESL$ [nH]	Terminal	Clearance in air $L$ [mm]	Creepage distance $K$ [mm]	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]												
<b>Rated voltage <math>U_N</math> : 550Vdc / 280Vac <math>U_{rms}</math> : 200V<sub>rms</sub> <math>U_s</math> : 825V <math>U_{TT}</math> : 825Vdc</b>														
50	55	56	0.8	8.5	60	0.83	2.5	15	T1	97	97	0.18	915	E53.H56-503T10/H
100	75	56	0.4	6.3	80	1.7	5	15	T2	111	111	0.33	450	E53.M56-104T20/H
200	95	56	0.2	4.9	80	3.3	9.9	15	T2	131	131	0.52	220	E53.P56-204T20/H
270	115	56	0.15	4.1	100	3.3	10	15	T2	151	151	0.77	156	E53.R56-274T20/H
380	115	100	0.31	2.3	100	3	10	15	T2	195	195	1.37	84	E53.R10-384T20/H
<b>Rated voltage <math>U_N</math> : 700Vdc / 350Vac <math>U_{rms}</math> : 250V<sub>rms</sub> <math>U_s</math> : 1,050V <math>U_{TT}</math> : 1,050Vdc</b>														
33	55	56	0.95	8.5	55	0.68	2.1	15	T1	97	97	0.18	945	E53.H56-333T10/H
68	75	56	0.5	6.3	80	1.4	4.2	15	T2	111	111	0.33	360	E53.M56-683T20/H
120	95	56	0.3	4.9	80	2.5	7.4	15	T2	131	131	0.52	260	E53.P56-124T20/H
150	105	56	0.25	4.5	100	3.1	9.3	15	T2	141	141	0.64	160	E53.Q56-154T20/H
200	115	56	0.2	4.1	100	3.1	10	15	T2	151	151	0.77	144	E53.R56-204T20/H
310	115	100	0.3	2.3	100	3	10	15	T2	195	195	1.37	66	E53.R10-314T20/H
<b>Rated voltage <math>U_N</math> : 900Vdc / 350Vac <math>U_{rms}</math> : 250V<sub>rms</sub> <math>U_s</math> : 1,350V <math>U_{TT}</math> : 1,350Vdc</b>														
30	55	56	0.85	8.5	60	0.68	2.1	15	T1	97	97	0.18	840	E53.H56-303T10/H
60	75	56	0.5	6.3	80	1.4	4.1	15	T2	111	111	0.33	390	E53.M56-603T20/H
100	95	56	0.35	4.9	80	2.3	6.8	15	T2	131	131	0.52	220	E53.P56-104T20/H
120	105	56	0.2	4.5	100	2.8	9	15	T2	141	141	0.64	190	E53.Q56-124T20/H
140	115	56	0.2	4.1	100	3.1	10	15	T2	151	151	0.77	156	E53.R56-144T20/H
265	115	100	0.35	2.3	110	3	9	15	T2	195	195	1.37	54	E53.R10-274T20/H
<b>Rated voltage <math>U_N</math> : 1,100Vdc / 350Vac <math>U_{rms}</math> : 250V<sub>rms</sub> <math>U_s</math> : 1,650V <math>U_{TT}</math> : 1,650Vdc</b>														
12	55	56	1.7	8.5	40	0.4	1.2	15	T1	97	97	0.18	60	E53.H56-123T10/H
15	55	56	1.1	8.5	40	0.5	1.5	15	T1	97	97	0.18	60	E53.H56-153T10/H
25	75	56	0.71	6.3	70	0.83	2.5	15	T2	111	111	0.33	50	E53.M56-253T20/H
50	95	56	0.34	4.9	80	1.7	5	15	T2	131	131	0.52	50	E53.P56-503T20/H
60	105	56	0.35	4.5	100	2.0	6	15	T2	141	141	0.64	50	E53.Q56-603T20/H
80	115	56	0.21	4.1	100	3.0	10	15	T2	151	151	0.77	60	E53.R56-803T20/H
175	115	100	0.41	2.3	100	2.6	8	15	T2	195	195	1.37	78	E53.R10-184T20/H
<b>Rated voltage <math>U_N</math> : 1,400Vdc / 350Vac <math>U_{rms}</math> : 250V<sub>rms</sub> <math>U_s</math> : 2,100V <math>U_{TT}</math> : 2,100Vdc</b>														
8	55	56	2	8.5	38	0.33	1	15	T1	97	97	0.18	50	E53.H56-802T10/H
16	75	56	1	6.3	80	0.66	2	15	T2	111	111	0.33	50	E53.M56-163T20/H
30	95	56	0.55	4.9	80	1.2	3.7	15	T2	131	131	0.52	50	E53.P56-303T20/H
40	105	56	0.4	4.5	100	1.7	5	15	T2	141	141	0.64	50	E53.Q56-403T20/H
50	115	56	0.3	4.1	100	2.2	10	15	T2	151	151	0.77	60	E53.R56-503T20/H
110	115	100	0.52	2.3	100	2	6	15	T2	195	195	1.37	66	E53.R10-114T20/H
<b>Rated voltage <math>U_N</math> : 1,700Vdc / 700Vac <math>U_{rms}</math> : 500V<sub>rms</sub> <math>U_s</math> : 2,550V <math>U_{TT}</math> : 2,550Vdc</b>														
4.7	55	56	1.3	8.5	45	0.5	1.6	15	T1	97	97	0.18	825	E53.H56-472T10/H
10	75	56	0.6	6.3	80	1.1	3.5	15	T2	111	111	0.33	410	E53.M56-103T20/H
16	95	56	0.37	4.9	80	1.8	5.5	15	T2	131	131	0.52	240	E53.P56-163T20/H
22	105	56	0.27	4.5	100	2.5	7.5	15	T2	141	141	0.64	180	E53.Q56-223T20/H
33	115	56	0.2	4.1	100	3.5	10	15	T2	151	151	0.77	132	E53.R56-333T20/H
68	115	100	0.35	2.3	100	3.1	9.3	15	T2	195	195	1.37	54	E53.R10-683T20/H
<b>Rated voltage <math>U_N</math> : 2,000Vdc / 700Vac <math>U_{rms}</math> : 500V<sub>rms</sub> <math>U_s</math> : 3,000V <math>U_{TT}</math> : 3,000Vdc</b>														
3.3	55	56	1.6	8.5	40	0.42	1.2	15	T1	97	97	0.18	1,020	E53.H56-332T10/H
8	75	56	0.65	6.3	80	1	3	15	T2	111	111	0.33	400	E53.M56-802T20/H
14	95	56	0.35	4.9	80	1.8	5.5	15	T2	131	131	0.52	230	E53.P56-143T20/H
18	105	56	0.3	4.5	100	2.3	7	15	T2	141	141	0.64	180	E53.Q56-183T20/H
24	115	56	0.2	4.1	100	3	10	15	T2	151	151	0.77	132	E53.R56-243T20/H
52.5	115	100	0.39	2.3	100	2.8	8	15	T2	195	195	1.37	54	E53.R10-533T20/H
<b>Rated voltage <math>U_N</math> : 2,250Vdc / 700Vac <math>U_{rms}</math> : 500V<sub>rms</sub> <math>U_s</math> : 3,375V <math>U_{TT}</math> : 3,375Vdc</b>														
2.5	55	56	1.8	8.5	40	0.37	1.1	15	T1	97	97	0.18	960	E53.H56-252T10/H
6	75	56	0.76	6.3	70	0.88	2.6	15	T1	111	111	0.33	400	E53.M56-602T20/H
10	95	56	0.46	4.9	80	1.5	4.5	15	T2	131	131	0.52	240	E53.P56-103T20/H
15	105	56	0.27	4.5	100	2.1	6.2	15	T2	141	141	0.64	150	E53.Q56-153T20/H
18	115	56	0.25	4.1	100	2.6	10	15	T2	151	151	0.77	132	E53.R56-183T20/H
40	115	100	0.45	2.3	100	2.4	7	15	T2	195	195	1.37	54	E53.R10-403T20/H
<b>Rated voltage <math>U_N</math> : 2,800Vdc / 700Vac <math>U_{rms}</math> : 500V<sub>rms</sub> <math>U_s</math> : 4,200V <math>U_{TT}</math> : 4,200Vdc</b>														
1.5	55	56	2.4	8.5	32	0.27	1.35	15	T1	97	97	0.18	930	E53.H56-152T10/H
3.3	75	56	1.1	6.3	60	0.6	3	15	T2	111	111	0.33	420	E53.M56-332T20/H
7.5	95	56	0.5	4.9	80	1.5	7.5	15	T2	131	131	0.52	190	E53.P56-752T20/H
10	105	56	0.4	4.5	100	1.8	9	15	T2	141	141	0.64	150	E53.Q56-103T20/H
12	115	56	0.3	4.1	100	2.2	12	15	T2	151	151	0.77	120	E53.R56-123T20/H
25	115	100	0.57	2.3	100	1.9	6	15	T2	195	195	1.37	66	E53.R10-253T20/H
<b>Rated voltage <math>U_N</math> : 3,200Vdc / 1,050Vac <math>U_{rms}</math> : 750V<sub>rms</sub> <math>U_s</math> : 4,800V <math>U_{TT}</math> : 4,800Vdc</b>														
1	55	56	1.6	8.5	40	0.35	1.75	15	T1	97	97	0.18	60	E53.H56-102T10/H
2.5	75	56	0.65	6.3	75	0.9	4.5	15	T2	111	111	0.33	530	E53.M56-252T20/H
4	95	56	0.4	4.9	80	1.5	7.5	15	T2	131	131	0.52	50	E53.P56-402T20/H
6	105	56	0.28	4.5	100	2.2	11	15	T2	141	141	0.64	50	E53.Q56-602T20/H
7	115	56	0.25	4.1	100	3	12	15	T2	151	151	0.77	60	E53.R56-702T20/H

PLASTIC FILM CAPACITORS

## Standard Value and Case Size

Rated Capacitance $C_N$ [ $\mu$ F]	Case size		Series resistance (reference) $R_S$ [m $\Omega$ ]	$R_{th}$ [K/W]	Max current $I_{max}$ [Arms]	Max peak current $\hat{i}$ [kA]	Max surge current $I_S$ [kA]	$ESL$ [nH]	Terminal	Clearance in air $L$ [mm]	Creepage distance $K$ [mm]	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]												
<b>Rated voltage <math>U_N</math> : 2,450Vdc / 1,400Vac    <math>U_{rms}</math> : 1,000V<sub>rms</sub>    <math>U_S</math> : 3,675V    <math>U_{TT}</math> : 3,675Vdc</b>														
1.16	55	56	1.2	8.5	20	0.7	2.2	15	T1	97	97	0.18	1,050	E53.H56-122T10/H
2.4	75	56	0.56	6.3	60	1.5	5	15	T2	111	111	0.33	400	E53.M56-242T20/H
4.2	95	56	0.32	4.9	80	2.6	8	15	T2	131	131	0.52	290	E53.P56-422T20/H
5.2	105	56	0.26	4.5	100	3	10	15	T2	141	141	0.64	160	E53.Q56-522T20/H
6.4	115	56	0.21	4.1	100	4	12	15	T2	151	151	0.77	132	E53.R56-642T20/H
<b>Rated voltage <math>U_N</math> : 3,600Vdc / 1,400Vac    <math>U_{rms}</math> : 1,000V<sub>rms</sub>    <math>U_S</math> : 5,400V    <math>U_{TT}</math> : 5,400Vdc</b>														
8	115	100	0.52	2.3	100	2.3	6.9	15	T2	195	195	1.37	66	E53.R10-802T20/H
10	115	100	0.94	2.3	100	2.5	7.5	15	T2	195	195	1.37	78	E53.R10-103T20/H
<b>Rated voltage <math>U_N</math> : 3,750Vdc / 2,100Vac    <math>U_{rms}</math> : 1,500V<sub>rms</sub>    <math>U_S</math> : 5,625V    <math>U_{TT}</math> : 5,625Vdc</b>														
0.47	55	56	2.9	8.5	20	0.7	2.1	15	T1	97	97	0.18	1,110	E53.H56-471T10/H
1.1	75	56	1.2	6.3	60	1.6	5	15	T2	111	111	0.33	470	E53.M56-112T20/H
1.7	95	56	0.8	4.9	80	2.5	8	15	T2	131	131	0.52	300	E53.P56-172T20/H
2.15	105	56	0.64	4.5	100	3	10	15	T2	141	141	0.64	230	E53.Q56-222T20/H
2.7	115	56	0.51	4.1	100	4	12	15	T2	151	151	0.77	192	E53.R56-272T20/H
<b>Rated voltage <math>U_N</math> : 5,000Vdc / 2,100Vac    <math>U_{rms}</math> : 1,500V<sub>rms</sub>    <math>U_S</math> : 7,500V    <math>U_{TT}</math> : 7,500Vdc</b>														
3	115	100	1.2	2.3	125	2.1	6.3	15	T2	195	195	1.37	54	E53.R10-302T21/H
4	115	100	1	2.3	125	2.5	7.5	15	T2	195	195	1.37	96	E53.R10-402T21/H
<b>Rated voltage <math>U_N</math> : 5,600Vdc / 2,450Vac    <math>U_{rms}</math> : 1,750V<sub>rms</sub>    <math>U_S</math> : 8,400V    <math>U_{TT}</math> : 8,400Vdc</b>														
0.22	55	97	13.7	4.9	25	0.2	0.7	15	T1	138	138	0.31	720	E53.H97-221T10/H
0.25	55	97	12.1	4.9	25	0.3	0.8	15	T1	138	138	0.32	540	E53.H97-251T10/H
0.5	55	97	8	4.9	25	0.4	1.3	15	T1	138	138	0.33	504	E53.H97-501T10/H
<b>Rated voltage <math>U_N</math> : 7,200Vdc / 2,450Vac    <math>U_{rms}</math> : 1,750V<sub>rms</sub>    <math>U_S</math> : 10,800V    <math>U_{TT}</math> : 10,800Vdc</b>														
0.22	55	97	13.7	4.9	25	0.2	0.7	15	T1	138	138	0.31	504	E53.H97-221T11/H
0.25	55	97	12.1	4.9	25	0.3	0.8	15	T1	138	138	0.32	630	E53.H97-251T11/H

PLASTIC FILM CAPACITORS



# E53H (DC) Series

(DC Cylindrical Metallized Polypropylene Film Capacitors)

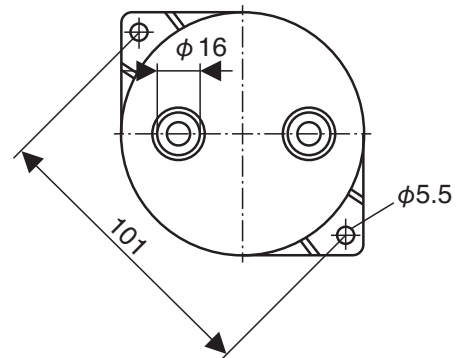
## Features

- High voltage range and ultra low inductance capacitors.
- Made in dry technology.
- Robust studs with M8 thread allows for radial connection.

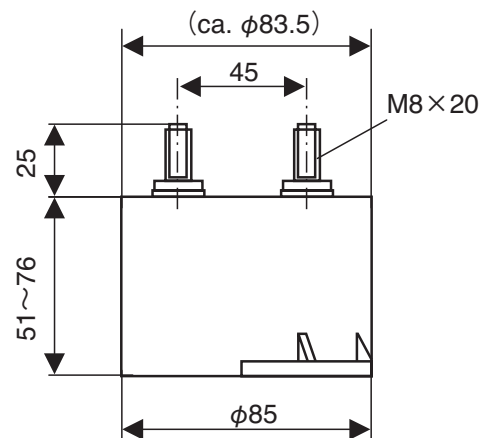
## Specifications

Item	Specification
Category temperature range	-25 ~ +70°C (+85°C / Includes self temperature rise)
Storage temperature	-40 ~ +85°C
Rated voltage ( $U_N$ )	600 ~ 2,200Vdc
Terminal (torque)	M8 × 20 (4Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor ( $\tan \delta_0$ )	$2 \times 10^{-4}$
Capacitance tolerance	±10% (optional ±5%)
Safety devices	-
Impregnant	Solid resin based on vegetable oil, Non PCB
Material of case	Plastic (UL94V-0)
Environmental regulations	Comply with RoHS

## Dimensions



Item	Specification
Terminal code	H1
Can material	Plastic (UL94V-0)
Terminal	Radial thread M8 × 20
	Torque : 4Nm
	$I_{max}$ (terminal) : 100A
Degree of protection	IP00



Numbering system: e.g. E53H, 600VDC, 200 μF, φ85×51Lmm, H1terminal

**E53 . N 51 - 204 H1 1 / H**



Standard Value and Case Size

Rated Capacitance $C_N$ [ $\mu$ F]	Case size		Rated ripple voltage $U_r$ [V]	Surge voltage $U_s$ [V]	Series resistance (reference) $R_s$ [m $\Omega$ ]	Max current $I_{max}$ [Arms]	Max peak current $I$ [kA]	Max surge current $I_s$ [kA]	$ESL$ [nH]	Clearance in air $L$ [mm]	Creepage distance $K$ [mm]	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]												
<b>Rated voltage <math>U_N</math> : 600Vdc    <math>U_s</math> : 900V    <math>U_{TT}</math> : 900Vdc</b>														
200	85	51	100	0.75	6.1	60	3.3	9.9	30	29	33	0.36	328	E53.N51-204H11/H
280	85	64	100	0.84	4.8	60	3.5	10.5	35	29	33	0.45	280	E53.N64-284H10/H
400	85	76	100	1.1	4.1	60	3.3	9.9	40	29	29	0.53	176	E53.N76-404H11/H
<b>Rated voltage <math>U_N</math> : 700Vdc    <math>U_s</math> : 1,050V    <math>U_{TT}</math> : 1,050Vdc</b>														
150	85	51	160	0.7	6.1	60	2.9	8.7	30	29	33	0.36	328	E53.N51-154H11/H
200	85	64	160	0.92	4.8	60	2.9	8.7	35	29	33	0.45	256	E53.N64-204H10/H
300	85	76	160	1.2	4.1	60	2.9	8.7	40	29	29	0.53	176	E53.N76-304H11/H
<b>Rated voltage <math>U_N</math> : 900Vdc    <math>U_s</math> : 1,350V    <math>U_{TT}</math> : 1,350Vdc</b>														
120	85	51	200	0.84	6.1	60	2.6	7.9	30	29	33	0.36	344	E53.N51-124H11/H
150	85	64	200	1	4.8	60	2.5	7.5	35	29	33	0.45	272	E53.N64-154H11/H
240	85	76	200	1.3	4.1	60	2.6	7.8	40	29	29	0.53	56	E53.N76-244H11/H
<b>Rated voltage <math>U_N</math> : 1,100Vdc    <math>U_s</math> : 1,650V    <math>U_{TT}</math> : 1,650Vdc</b>														
75	85	51	250	1.0	6.1	60	2.0	6	30	29	33	0.36	360	E53.N51-753H11/H
100	85	64	250	0.9	4.8	60	2.0	6.2	35	29	33	0.45	288	E53.N64-104H10/H
150	85	76	250	1.5	4.1	75	2.0	6.1	40	29	29	0.53	200	E53.N76-154H11/H
<b>Rated voltage <math>U_N</math> : 1,300Vdc    <math>U_s</math> : 1,950V    <math>U_{TT}</math> : 1,950Vdc</b>														
50	85	51	300	1.1	6.1	70	1.6	4.8	30	29	33	0.36	360	E53.N51-503H11/H
68	85	64	300	1.3	4.8	70	1.7	5.1	35	29	33	0.45	256	E53.N64-683H10/H
100	85	76	300	1.5	4.1	60	1.6	4.8	40	29	29	0.53	208	E53.N76-104H11/H
<b>Rated voltage <math>U_N</math> : 1,500Vdc    <math>U_s</math> : 2,250V    <math>U_{TT}</math> : 2,250Vdc</b>														
37.5	85	51	300	1.2	6.1	60	1.4	4	30	29	33	0.36	344	E53.N51-383H11/H
50	85	64	300	1.5	4.8	60	1.4	4.2	35	29	33	0.45	256	E53.N64-503H10/H
75	85	76	300	2	4.1	60	1.4	4.2	40	29	29	0.53	200	E53.N76-753H11/H
<b>Rated voltage <math>U_N</math> : 1,800Vdc    <math>U_s</math> : 2,700V    <math>U_{TT}</math> : 2,700Vdc</b>														
30	85	51	400	0.73	6.1	60	1.3	3.9	30	29	33	0.36	328	E53.N51-303H11/H
40	85	64	400	1.6	4.8	60	1.3	3.9	35	29	33	0.45	256	E53.N64-403H10/H
60	85	76	400	2.1	4.1	50	1.3	3.9	40	29	29	0.53	176	E53.N76-603H11/H
<b>Rated voltage <math>U_N</math> : 2,000Vdc    <math>U_s</math> : 3,000V    <math>U_{TT}</math> : 3,000Vdc</b>														
13	85	51	400	1.6	6.1	55	0.64	1.92	30	29	33	0.36	312	E53.N51-133H10/H
30	85	64	400	1.3	4.8	55	1.1	3.3	35	29	33	0.45	272	E53.N64-303H10/H
43	85	76	400	1.8	4.1	50	1	3	40	29	29	0.53	173	E53.N76-433H10/H
<b>Rated voltage <math>U_N</math> : 2,200Vdc    <math>U_s</math> : 3,300V    <math>U_{TT}</math> : 3,300Vdc</b>														
24.5	85	64	600	1.4	4.8	55	0.99	2.97	35	29	33	0.45	248	E53.N64-253H10/H
35	85	76	600	1.9	4.1	50	0.94	2.82	40	29	29	0.53	192	E53.N76-353H10/H

PLASTIC FILM CAPACITORS

# E55 (DC) Series (DC Cylindrical Metallized Polypropylene Film Capacitors)

## Features

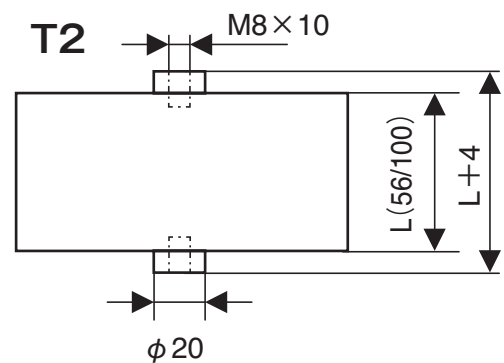
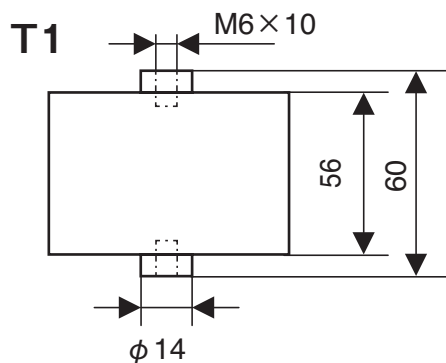
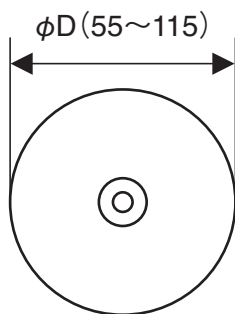
- High voltage range and ultra low inductance capacitors.
- E55 series are made in dry technology.
- For DC application.

## Specifications

Item	Specification
Category temperature range	-40 ~ +70°C (+85°C / Includes self temperature rise)
Storage temperature	-40 ~ +85°C
Rated voltage (UN)	900 ~ 5,000Vdc
Terminal (torque)	M6 × 10 (4Nm) / M8 × 10 (7Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	±10% (optional ±5%)
Safety devices	—
Impregnant	Solid resin based on vegetable oil, Non PCB
Material of case	Plastic (UL94V-0)
Environmental regulations	Comply with RoHS

## Dimensions

Item	Specification	
Terminal code	T1 / T2	
Can material	Plastic (UL94V-0)	
Terminal	T1	Axial thread M6 × 10
		Torque : 4Nm
	T2	Axial thread M8 × 10
		Torque : 7Nm
Degree of protection	IP00	



Numbering system: e.g. E55, 900VDC, 47 µF, φ55 × 56Lmm, T1terminal

**E55 . H 56 - 473 T1 0 / H**

- Auxiliary symbol
- Terminal symbol
- Capacitance
- Case length
- Case diameter symbol
- Series name

PLASTIC FILM CAPACITORS

Standard Value and Case Size

Rated Capacitance $C_N$ [ $\mu$ F]	Case size		Rated ripple voltage $U_r$ [V]	Series resistance (reference) $R_s$ [m $\Omega$ ]	Thermal resistance (reference) $R_{th}$ [K/W]	Max current $I_{max}$ [Arms]	Max peak current $\hat{I}$ [kA]	Max surge current $I_s$ [kA]	Self inductance (reference) $ESL$ [nH]	Terminal	Clearance in air $L$ [mm]	Creepage distance $K$ [mm]	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]													
<b>Rated voltage <math>U_N</math>: 900Vdc <math>U_s</math>: 1,350V <math>U_{TT}</math>: 1,350Vdc</b>															
47	55	56	200	0.58	8.5	45	0.8	2.3	15	T1	97	97	0.18	885	E55.H56-473T10/H
250	105	56	280	0.35	4.5	100	8.3	24.9	15	T2	141	141	0.64	170	E55.Q56-254T20/H
<b>Rated voltage <math>U_N</math>: 1,300Vdc <math>U_s</math>: 1,950V <math>U_{TT}</math>: 1,950Vdc</b>															
50	75	56	400	0.98	6.3	65	2.4	7.2	15	T2	111	111	0.33	400	E55.M56-503T20/H
90	95	56	400	0.55	4.9	80	4.3	12.9	15	T2	131	131	0.52	220	E55.P56-903T20/H
<b>Rated voltage <math>U_N</math>: 1,800Vdc <math>U_s</math>: 2,700V <math>U_{TT}</math>: 2,700Vdc</b>															
22	75	56	600	1.5	6.3	40	1.6	4.8	15	T2	111	111	0.33	380	E55.M56-223T20/H
80	115	56	600	0.45	4.1	100	5.2	15.6	15	T2	151	151	0.77	132	E55.R56-803T20/H
<b>Rated voltage <math>U_N</math>: 2,000Vdc <math>U_s</math>: 3,000V <math>U_{TT}</math>: 3,000Vdc</b>															
50	115	56	650	0.55	4.1	100	4.1	12.3	15	T2	151	151	0.77	132	E55.R56-503T20/H
<b>Rated voltage <math>U_N</math>: 2,400Vdc <math>U_s</math>: 3,600V <math>U_{TT}</math>: 3,600Vdc</b>															
30	115	56	700	0.34	4.1	100	3	10	15	T2	151	151	0.77	120	E55.R56-303T20/H
<b>Rated voltage <math>U_N</math>: 2,800Vdc <math>U_s</math>: 4,200V <math>U_{TT}</math>: 4,200Vdc</b>															
18	105	56	800	0.6	4.5	90	4.5	13.5	15	T2	141	141	0.64	170	E55.Q56-183T20/H
<b>Rated voltage <math>U_N</math>: 3,200Vdc <math>U_s</math>: 4,800V <math>U_{TT}</math>: 4,800Vdc</b>															
10	115	56	1,000	0.71	4.1	100	2.8	8.4	15	T2	151	151	0.77	108	E55.R56-103T20/H
<b>Rated voltage <math>U_N</math>: 5,000Vdc <math>U_s</math>: 7,500V <math>U_{TT}</math>: 7,500Vdc</b>															
10	115	100	1,500	1.3	2.3	100	1.9	1.6	15	T2	195	195	1.37	66	E55.R10-103T20/H

# E59 Series (Custom Designed AC/DC Capacitors in Rectangular Case)

## Features

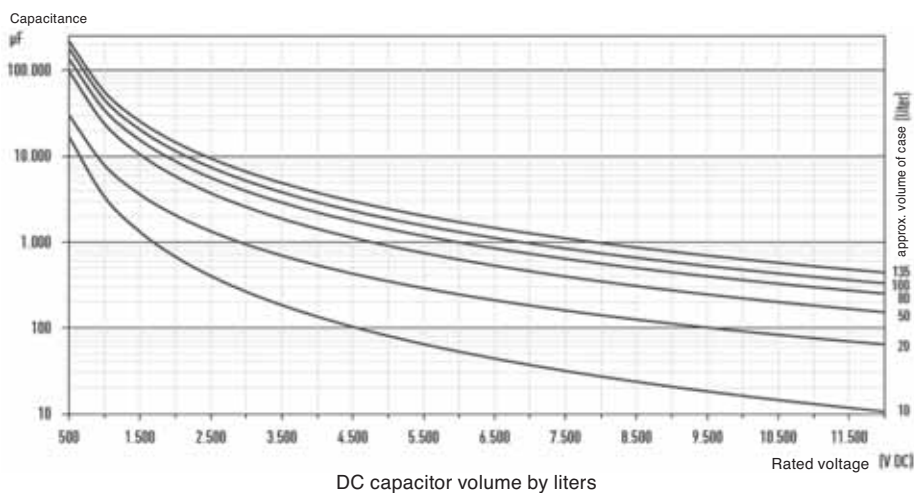
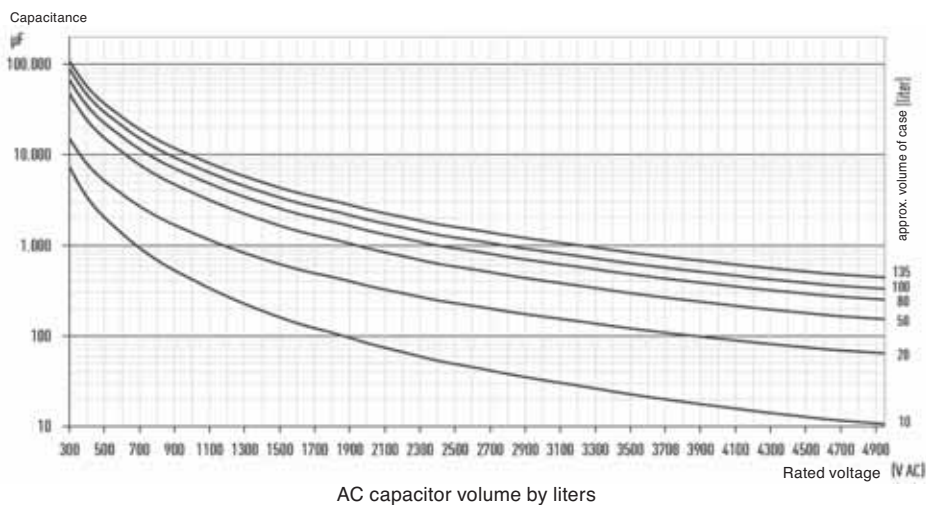
- Custom designed AC/DC capacitor in rectangular case.
- An irreversible pressure switch can be used for external monitoring of the internal pressure. (optional)

## Specifications

Item	Specification
Category temperature range	-55 ~ +70°C (+85°C / Includes self temperature rise)
Storage temperature	-55 ~ +85°C
Rated voltage (UN)	500 ~ 25,000V DC / 200 ~ 17,000V AC
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	±10% (optional ±5%)
Safety devices	Optional pressure switch for external monitoring of the internal pressure (hermetical construction only)
Impregnant	Solid polyurethane
Material of case	Aluminum or Stainless steel
Environmental regulations	Comply with RoHS



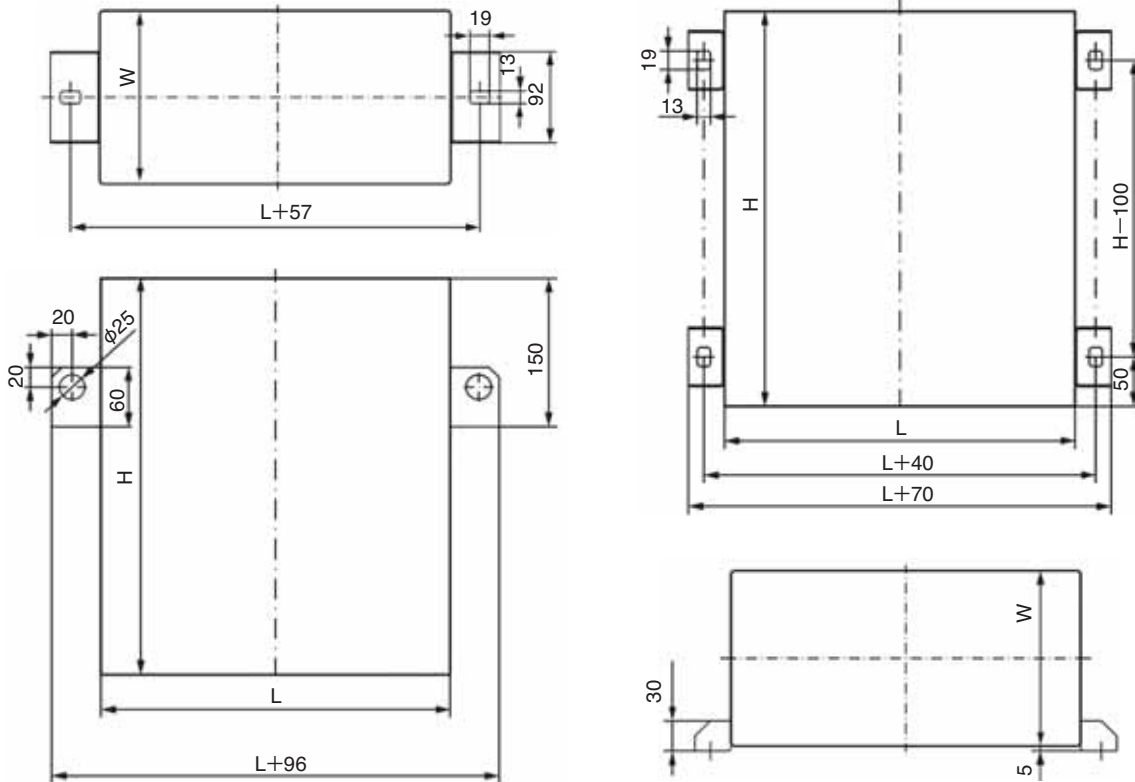
## Volume by liters per capacitance and rated voltage



Other values and designs on request.



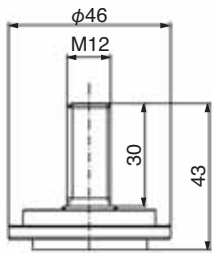
Standard fixing brackets



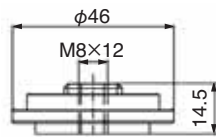
Standard terminal dimensions

F1 terminals

Clearance in air : 17mm  
Creepage distance : 26mm



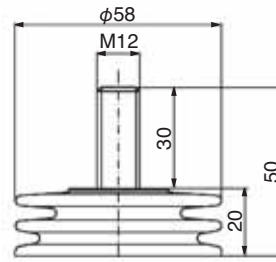
F1 M12x30



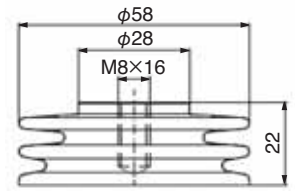
F1 iM8x12

F4 terminals

Clearance in air : 32mm  
Creepage distance : 60mm



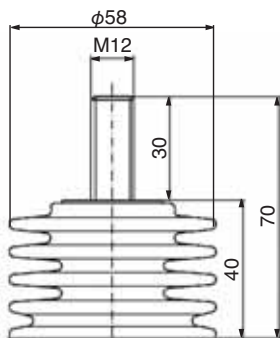
F4 M12x30



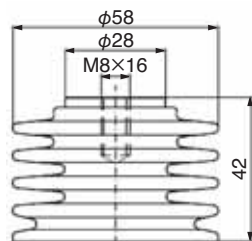
F4 iM8x16

F5 terminals

Clearance in air : 51mm  
Creepage distance : 129mm



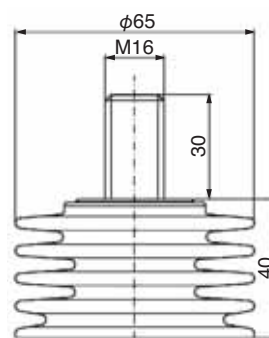
F5 M12x30



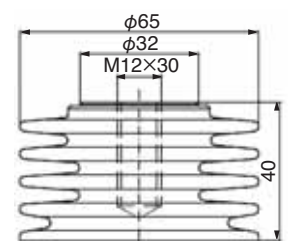
F5 iM8x16

F6 terminals

Clearance in air : 51mm  
Creepage distance : 140mm



F6 M16x30



F6 iM12x30

## Irreversible Pressure Switch

### Type

Mechanical pressure switch with a diaphragm of EPDM or stainless steel, and a change-over contact for converting pressure into an electrical switching signal, RoHS-compliant.

### Contacts

Cable-plugs 6.3mm x 0.8mm; we recommend using insulated cable plugs if operating the switch without protective cap.  
Recommended cable size:  $\geq 0.75\text{mm}^2$

### Functions

The pressure switch just provides a signal for information about the rising pressure inside the capacitor.

The pressure switch does NOT have the following functions.

- provide detailed data about the exact pressure inside the capacitor
- interrupt the current path and disconnect the capacitor from its supply

Table. The switch can be used for the following signal currents :

Type of load	Type of current	Maximum voltage	Maximum current
Inductive	AC	250V rms	2A
	DC	24V	1A
Ohmic	AC	250V rms	4A
	DC	24V	2A



Fig. Pressure switch

Our pressure switch is designed as an SPDT (Single Pole, Double Throw) device. It can therefore be used for the following options.

Table. Options for the pressure switches :

Option	Advantage	Disadvantage
Opening switch	Monitoring of the conductor	power losses by permanent current risk of electrochemical corrosion
Closing switch	No current, no power losses No electrochemical corrosion	No conductor monitoring, risk of monitoring failure going unnoticed
Change-over switch	Additional verification of the switching contact, minimization of false alarms	Risk of incorrect cable connection during assembly process

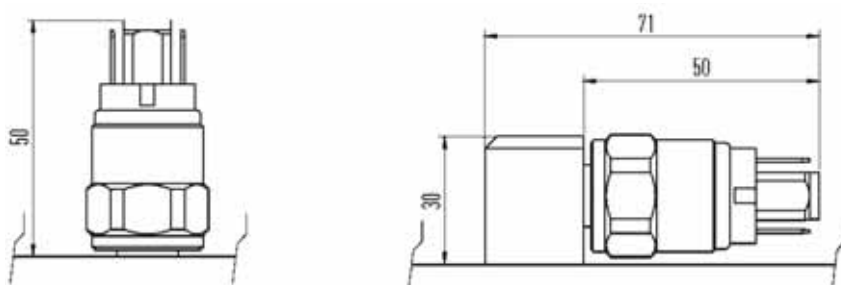


Fig. Dimension of pressure switch

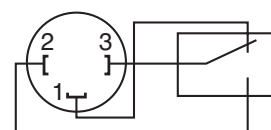


Fig. Circuitry of pressure switch

### Protective cap (optional, IP54)

A protection cap made of NBT can be ordered as an accessory. The cap can be used for additional protection of the pressure switch from environmental impact, for insulation and protection from accidental contact.

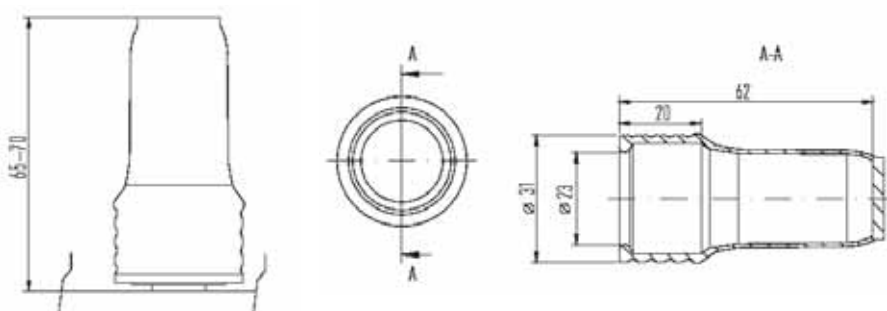


Fig. dimension of protective cap



Photo. Appearance of protective cap



# E61 (DC) Series (DC Cylindrical Metallized Polypropylene Film Capacitors)

## Features

- High voltage range and ultra low inductance capacitors.
- Made in dry technology.
- For DC application.

## Specifications

Item	Specification
Category temperature range	- 25 ~ + 85°C (Includes self temperature rise)
Storage temperature	- 40 ~ + 85°C
Rated voltage (U <sub>N</sub> )	500 ~ 4,000Vdc
Terminal (torque)	M6 × 5 (4Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	± 10% (optional ± 5%)
Safety devices	-
Impregnant	Solid resin based on vegetable oil, Non PCB
Material of case	Plastic (UL94V-0)
Environmental regulations	Comply with RoHS

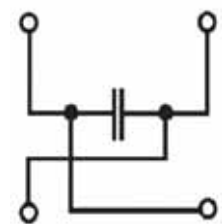
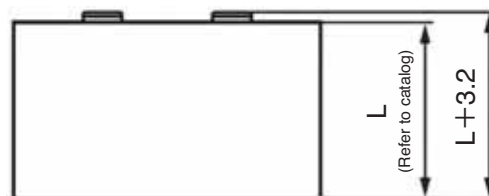
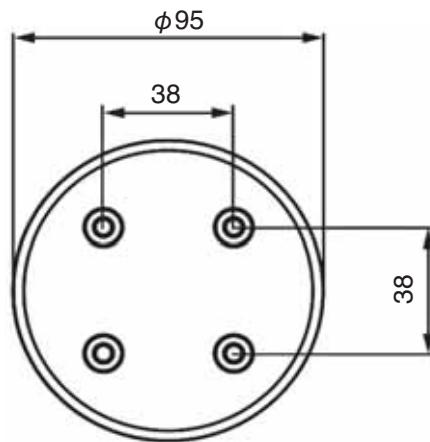
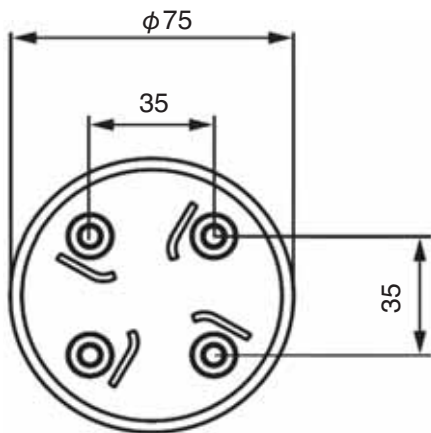
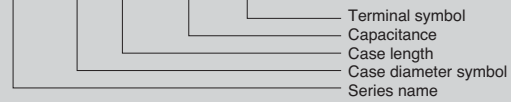


## Dimensions

Item	Specification
Terminal code	P57
Can material	Plastic (UL94V-0)
Terminal	Internal threads M6 × 5
	Torque : 4Nm
	I <sub>max</sub> (terminal) : 40A
Degree of protection	IP00
Clearance in air	26mm
Creepage distance	26mm

Numbering system: e.g. E61, 500VDC, 190 μF, φ 75 × 56Lmm, P57 terminal

**E61 . M 56 - 194 P57 / H**



Circuitry

Standard Value and Case Size

Rated Capacitance $C_N$ [μF]	Case size		Series resistance (reference) $R_s$ [mΩ]	Thermal resistance (reference) $R_{th}$ [K/W]	Max current $I_{max}$ [Arms]	Max peak current $\hat{I}$ [kA]	Max surge current $I_s$ [kA]	Self inductance (reference) $ESL$ [nH]	Weight [kg]	Part number
	$\phi D$ [mm]	$L$ [mm]								
<b>Rated voltage <math>U_N</math>: 500Vdc Us: 750V Ur: 170V <math>U_{TT}</math>: 750Vdc</b>										
208	75	56	0.79	7.5	50	2.6	8	15	0.3	E61.M56-214P57/H
358	95	56	0.64	4.7	70	4	13	20	0.48	E61.P56-364P57/H
542	95	83	0.57	3.1	80	8	26	25	0.7	E61.P83-544P57/H
645	95	83	0.84	3.1	70	4	13	25	0.7	E61.P83-654P57/H
<b>Rated voltage <math>U_N</math>: 700Vdc Us: 1,050V Ur: 200V <math>U_{TT}</math>: 1,050Vdc</b>										
154	75	56	0.85	7.5	50	2.2	7	15	0.3	E61.M56-154P57/H
265	95	56	0.67	4.7	65	4	11	20	0.48	E61.P56-274P57/H
402	95	83	0.58	3.1	80	8	22	25	0.7	E61.P83-404P57/H
480	95	83	0.89	3.1	70	4	11	25	0.7	E61.P83-484P57/H
<b>Rated voltage <math>U_N</math>: 900Vdc Us: 1,350V Ur: 260V <math>U_{TT}</math>: 1,350Vdc</b>										
131	75	56	0.85	7.5	45	2.1	6.2	15	0.3	E61.M56-134P57/H
226	95	56	0.69	4.7	65	3.6	10.7	20	0.5	E61.P56-234P57/H
358	95	83	0.56	3.1	80	7.1	21.4	25	0.7	E61.P83-364P57/H
409	95	83	0.94	3.1	70	3.6	10.7	25	0.7	E61.P83-414P57/H
<b>Rated voltage <math>U_N</math>: 1,100Vdc Us: 1,650V Ur: 300V <math>U_{TT}</math>: 1,650Vdc</b>										
83.5	75	56	1.01	7.5	40	1.6	5	15	0.3	E61.M56-843P57/H
144	95	56	0.76	4.7	60	2.8	8	20	0.48	E61.P56-144P57/H
218	95	83	0.62	3.1	80	5.6	16	25	0.7	E61.P83-224P57/H
260	95	83	1.05	3.1	65	2.8	8	25	0.7	E61.P83-264P57/H
<b>Rated voltage <math>U_N</math>: 1,300Vdc Us: 1,950V Ur: 300V <math>U_{TT}</math>: 1,950Vdc</b>										
56	75	56	1.13	7.5	40	1.3	4	15	0.3	E61.M56-563P57/H
96	95	56	0.84	4.7	60	2.3	7	20	0.48	E61.P56-963P57/H
145	95	83	0.65	3.1	75	4.6	14	25	0.7	E61.P83-154P57/H
173	95	83	1.17	3.1	60	2.3	7	25	0.7	E61.P83-174P57/H
<b>Rated voltage <math>U_N</math>: 2,000Vdc Us: 3,000V Ur: 400V <math>U_{TT}</math>: 3,000Vdc</b>										
24	75	56	1.42	7.5	35	0.9	2.8	15	0.3	E61.M56-243P57/H
41.5	95	56	1.0	4.7	50	1.6	5	20	0.48	E61.P56-423P57/H
63	95	83	0.71	3.1	75	3.2	10	25	0.7	E61.P83-633P57/H
72	95	83	1.48	3.1	55	1.5	5	25	0.7	E61.P83-723P57/H
<b>Rated voltage <math>U_N</math>: 2,200Vdc Us: 3,300V Ur: 400V <math>U_{TT}</math>: 3,300Vdc</b>										
18	75	56	1.62	7.5	35	0.8	2.3	15	0.3	E61.M56-183P57/H
31	95	56	1.12	4.7	50	1.3	4	20	0.48	E61.P56-313P57/H
50	95	83	0.73	3.1	70	3	10	25	0.7	E61.P83-503P57/H
58	95	83	1.68	3.1	50	1.4	4	25	0.7	E61.P83-583P57/H
<b>Rated voltage <math>U_N</math>: 2,600Vdc Us: 3,900V Ur: 500V <math>U_{TT}</math>: 3,900Vdc</b>										
12	75	56	1.24	7.5	35	1.3	4	15	0.3	E61.M56-123P57/H
21	95	56	0.89	4.7	50	2.2	7	20	0.48	E61.P56-213P57/H
<b>Rated voltage <math>U_N</math>: 3,300Vdc Us: 4,950V Ur: 700V <math>U_{TT}</math>: 4,950Vdc</b>										
7	75	56	1.42	7.5	30	1	3	15	0.3	E61.M56-702P57/H
12.5	95	56	0.98	4.7	45	1.8	5	20	0.48	E61.P56-133P57/H
24	95	83	1.39	3.1	50	1.8	5	25	0.7	E61.P83-243P57/H
<b>Rated voltage <math>U_N</math>: 3,600Vdc Us: 5,400V Ur: 800V <math>U_{TT}</math>: 5,400Vdc</b>										
6	75	56	1.52	7.5	25	0.9	2.8	15	0.3	E61.M56-602P57/H
10	95	56	1.09	4.7	40	1.5	5	20	0.48	E61.P56-103P57/H
20.5	95	83	1.48	3.1	45	1.6	5	25	0.7	E61.P83-213P57/H
<b>Rated voltage <math>U_N</math>: 4,000Vdc Us: 6,000V Ur: 800V <math>U_{TT}</math>: 6,000Vdc</b>										
3.5	75	56	1.92	7.5	25	0.7	2	15	0.3	E61.M56-352P57/H
6.5	95	56	1.24	4.7	40	1.3	4	20	0.48	E61.P56-652P57/H

PLASTIC FILM CAPACITORS

# E62 (AC) Series (AC Cylindrical Metallized Polypropylene Film Capacitors)

## Features

- Perfect for non-sinusoidal voltages and pulsed currents.
- Housed in a hermetically sealed aluminum can which is filled with environmentally friendly plant oil.
- The integrated overpressure disconnecter ensure safe operation and controlled disconnection overload or failure at the end of operating life

## Specifications

Item	Specification
Category temperature range	-40 ~ +70°C (+85°C / Includes self temperature rise)
Storage temperature	-40 ~ +85°C
Rated voltage (UN)	420 ~ 4,000Vac
Stud bolt (torque)	M12×16 / 18 (15 ±1Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	±10% (optional ±5%)
Safety devices	Overpressure disconnecter
Impregnant	Liquid, based on vegetable oil, Non PCB
Material of case	Aluminum
Environmental regulations	Comply with RoHS



Numbering system: e.g. E62, 420VAC, 60 µF, φ50×85Lmm, G1terminal

**E62 . G 85 - 603 G1 0 / H**

- Auxiliary symbol
- Terminal symbol
- Capacitance
- Case length
- Case diameter symbol
- Series name

## Standard Value and Case Size

Rated Capacitance <i>C<sub>N</sub></i> [µF]	Case size		Max current (rms) <i>I<sub>max</sub></i> [Arms]	Max peak current <i>I<sub>̂</sub></i> [kA]	Max surge current <i>I<sub>S</sub></i> [kA]	Series resistance (reference) <i>R<sub>S</sub></i> [mΩ]	Self inductance (reference) <i>ESL</i> [nH]	Thermal resistance (reference) <i>R<sub>th</sub></i> [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	<i>φD</i> [mm]	<i>L</i> [mm]										
Rated AC voltage <i>U<sub>N</sub></i> (AC) : 420Vac			<i>U<sub>rms</sub></i> : 300V <i>U<sub>S</sub></i> : 1,050V Test voltage (T-T) <i>U<sub>TT</sub></i> : 1,050Vdc Test voltage (T-C) <i>U<sub>Tc</sub></i> : 3,000Vac									
42.5	60	80	20	0.8	2.5	2.3	90	9.3	Z1	0.3	720	E62.K80-433Z10/H
60	50	85	32	0.7	2.1	3.3	100	10.5	G1	0.2	105	E62.G85-603G10/H
75	60	105	40	0.8	2.5	2.1	110	7.1	C68	0.3	350	E62.K10-753C68/H
95	65	105	30	1.0	3.0	2.3	110	6.5	Z1	0.4	250	E62.L10-953Z10/H
100	65	95	40	1.15	3.45	3.1	100	7.2	G1	0.3	100	E62.L95-104G10/H
120	75	105	50	1.4	4.2	1.0	140	5.7	C6	0.5	30	E62.M10-124C60/H
130	65	109	40	1.2	3.6	3.4	110	6.3	G1	0.4	240	E62.L10-134G10/H
130	75	105	45	1.4	4.0	1.6	110	5.7	S2	0.5	32	E62.M10-134S20/H
150	65	135	35	1.2	3.6	4.4	110	5.1	G1	0.5	100	E62.L13-154G10/H
167	85	112	56	1.8	5.0	1.2	110	4.7	S2	0.7	170	E62.N11-174S20/H
170	85	105	50	2.0	6.0	0.82	140	5	C6	0.6	30	E62.N10-174C60/H
200	65	145	30	1.2	3.6	4.4	140	4.7	G1	0.5	150	E62.L14-204G10/H
217	95	112	56	2.4	7.0	1.1	110	4.2	S2	0.9	30	E62.P11-224S20/H
220	95	105	50	2.5	7.5	1.3	140	4.5	C6	0.8	30	E62.P10-224C60/H
250	85	176	80	3.0	10.0	1.2	160	3	C6	1.2	100	E62.N17-254C60/H
340	85	169	56	1.8	3.0	1.8	110	3.1	S2	1.0	75	E62.N16-344S20/H
400	85	245	80	4.5	13.5	0.68	160	2.1	C6	1.5	30	E62.N24-404C60/H
434	95	179	56	5.0	14.0	1.0	120	2.6	S2	1.3	63	E62.P17-434S20/H
470	95	176	80	5.3	15.9	0.53	160	2.7	C6	1.3	30	E62.P17-474C60/H
500	100	176	80	5.7	17.1	0.57	160	2.5	C6	1.5	30	E62.Q17-504C60/H
540	95	245	80	6.0	18.0	0.9	170	1.9	C6	2.2	39	E62.P24-544C60/H
2,000	136	320	100	15	20	0.6	190	1	C6	4.9	30	E62.S32-205C60/H

Standard Value and Case Size

Rated Capacitance $C_N$ [μF]	Case size		Max current (rms) $I_{max}$ [Arms]	Max peak current $\hat{I}$ [kA]	Max surge current $I_S$ [kA]	Series resistance (reference) $R_S$ [mΩ]	Self inductance (reference) $ESL$ [nH]	Thermal resistance (reference) $R_{th}$ [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]										
Rated AC voltage $U_N$ (AC) : 500Vac			$U_{rms}$ : 360V $U_S$ : 1,260V Test voltage (T-T) $U_{TT}$ : 1,260Vdc Test voltage (T-C) $U_{TC}$ : 3,000Vac									
30	60	80	20	0.7	2.2	2.4	90	9.3	Z1	0.3	600	E62.K80-303Z10/H
40	50	85	30	0.6	1.7	3.6	100	10.5	G1	0.2	525	E62.G85-403G10/H
50	55	85	25	0.7	2.1	4.4	110	9.5	G1	0.2	432	E62.H85-503G10/H
55	60	105	40	0.7	2.2	2.2	110	7.1	C68	0.3	350	E62.K10-553C68/H
70	65	105	30	0.9	2.8	2.4	110	6.5	Z1	0.4	250	E62.L10-703Z10/H
75	65	95	40	1.0	3.0	2.3	100	7.2	G1	0.3	300	E62.L95-753G10/H
100	65	135	40	0.9	2.7	4.3	120	5.1	G1	0.5	180	E62.L13-104G10/H
150	85	124	56	1.6	5.0	1.4	110	4.2	S2	0.8	145	E62.N12-154S20/H
200	75	176	56	2.8	8.4	1.5	130	3.4	S2	0.8	110	E62.M17-204S20/H
250	85	169	56	1.6	5.0	1.9	110	3.1	S2	1.0	85	E62.N16-254S20/H
300	95	176	80	4.1	12.3	1.1	160	2.7	C6	1.3	63	E62.P17-304C60/H
320	95	179	56	4.0	13	1.0	120	2.6	S2	1.3	63	E62.P17-324S20/H
620	116	245	100	9.0	15	0.58	160	1.6	C6	2.7	24	E62.R24-624C60/H
750	116	245	100	10	20	0.57	170	1.6	C6	2.7	30	E62.R24-754C60/H
1,000	136	245	100	14	20	0.56	170	1.3	C6	3.7	22	E62.S24-105C60/H
1,500	136	320	100	15	20	0.5	190	1	C6	4.9	14	E62.S32-155C60/H
Rated AC voltage $U_N$ (AC) : 640Vac			$U_{rms}$ : 450V $U_S$ : 1,500V Test voltage (T-T) $U_{TT}$ : 1,500Vdc Test voltage (T-C) $U_{TC}$ : 3,000Vac									
15	50	62	25	0.24	0.7	2.9	100	14.4	G1	0.1	105	E62.G62-153G10/H
23	60	80	20	0.7	2.0	2.5	90	9.3	Z1	0.3	30	E62.K80-233Z10/H
30	50	85	33	0.5	1.4	3.9	100	10.5	G1	0.2	105	E62.G85-303G10/H
41	60	105	40	0.6	1.9	2.4	110	7.1	C68	0.3	30	E62.K10-413C68/H
50	65	95	40	0.8	2.4	3.4	100	7.2	G1	0.3	100	E62.L95-503G10/H
52	65	105	30	0.8	2.4	2.5	110	6.5	Z1	0.4	30	E62.L10-523Z10/H
68	65	109	30	0.9	2.7	3.7	100	6.3	G1	0.4	100	E62.L10-683G10/H
75	75	105	45	1.2	3.6	1.5	110	5.7	S2	0.5	32	E62.M10-753S20/H
80	85	105	45	1.3	3.8	1.5	110	5.0	S2	0.6	30	E62.N10-803S20/H
100	85	120	80	3.0	9.0	0.53	100	4.4	C6	0.9	30	E62.N12-104C60/H
120	95	105	50	1.9	5.8	1.20	110	4.5	S2	0.8	30	E62.P10-124S20/H
140	85	164	100	4.0	12	0.81	160	3.2	C6	1.0	30	E62.N16-144C60/H
155	85	149	56	1.4	4.0	1.8	110	3.5	S2	0.9	100	E62.N14-164S20/H
200	95	176	80	3.5	10.5	0.7	160	2.7	C6	1.3	30	E62.P17-204C60/H
220	95	159	56	1.8	5.0	1.7	130	2.9	S2	1.2	75	E62.P15-224S20/H
250	100	176	80	4.0	12.0	0.63	160	2.5	C6	1.5	30	E62.Q17-254C60/H
250	95	176	56	4.0	12.0	1.40	130	2.7	S2	1.3	30	E62.P17-254S20/H
350	116	176	80	5.6	16.8	0.57	160	2.2	C6	2.0	30	E62.R17-354C60/H
500	116	245	100	7.8	20.0	0.6	170	1.6	C6	2.7	30	E62.R24-504C60/H
750	116	320	100	12.0	20.0	0.64	190	1.2	C6	3.5	30	E62.R32-754C60/H
800	136	245	100	12.8	20.0	0.63	170	1.3	C6	3.7	20	E62.S24-804C60/H
1,000	136	320	100	15.6	20.0	0.62	190	1.0	C6	4.9	30	E62.S32-105C60/H
Rated AC voltage $U_N$ (AC) : 680Vac			$U_{rms}$ : 480V $U_S$ : 1,680V Test voltage (T-T) $U_{TT}$ : 1,680Vdc Test voltage (T-C) $U_{TC}$ : 3,000Vac									
17.5	60	80	20	0.6	1.7	2.6	90	9.3	Z1	0.3	600	E62.K80-183Z10/H
31	60	105	40	0.6	1.7	2.6	110	7.1	C68	0.3	30	E62.K10-313C68/H
39	65	105	30	0.7	2.1	2.7	110	6.5	Z1	0.4	250	E62.L10-393Z10/H
60	75	105	43	1.1	3.3	1.6	110	5.7	S2	0.5	32	E62.M10-603S20/H
68	85	105	45	1.2	3.6	1.5	110	5.0	S2	0.6	180	E62.N10-683S20/H
86	85	124	56	1.3	4.0	1.6	110	4.2	S2	0.8	145	E62.N12-863S20/H
100	100	105	56	1.8	5.5	1.3	110	4.2	S2	0.9	30	E62.Q10-104S20/H
100	95	120	80	3.0	10.0	1.1	150	3.9	C6	0.9	30	E62.P12-104C60/H
150	116	124	80	5.0	14.0	0.95	150	3.2	C6	1.3	30	E62.R12-154C60/H
152	95	149	56	1.6	5.0	1.7	110	3.1	S2	1.1	75	E62.P14-154S20/H
180	95	176	56	4.0	11.0	1.4	130	2.7	S2	1.3	30	E62.P17-184S20/H
200	100	176	80	3.7	11.1	0.66	160	2.5	C6	1.5	30	E62.Q17-204C60/H
280	116	176	80	5.1	15.3	0.6	160	2.2	C6	2.0	30	E62.R17-284C60/H
400	116	245	100	7.3	20.0	0.6	170	1.6	C6	2.7	30	E62.R24-404C60/H
600	136	245	100	10.7	20.0	0.56	170	1.3	C6	3.7	30	E62.S24-604C60/H
800	136	320	100	14.8	20.0	0.63	190	1.0	C6	4.9	30	E62.S32-804C60/H

PLASTIC FILM CAPACITORS



# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

## Standard Value and Case Size

Rated Capacitance $C_N$ [ $\mu\text{F}$ ]	Case size		Max current (rms) $I_{max}$ [Arms]	Max peak current $I$ [kA]	Max surge current $I_S$ [kA]	Series resistance (reference) $R_S$ [m $\Omega$ ]	Self inductance (reference) $ESL$ [nH]	Thermal resistance (reference) $R_{th}$ [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]										
Rated AC voltage $U_N$ (AC) : 750Vac			$U_{rms} : 530V$ $U_S : 1,900V$ Test voltage (T-T) $U_{TT} : 1,890Vdc$ Test voltage (T-C) $U_{TC} : 3,000Vac$									
10	50	62	20	0.4	1.2	3.1	110	14.4	G1	0.1	105	E62.G62-103G10/H
13	60	80	20	0.5	1.4	2.8	90	9.3	Z1	0.3	600	E62.K80-133Z10/H
20	50	85	27	0.4	1.2	4.2	100	10.5	G1	0.2	105	E62.G85-203G10/H
24	60	105	40	0.5	1.4	2.9	110	7.1	C68	0.3	350	E62.K10-243C68/H
30	65	105	30	0.6	1.8	3.2	110	6.5	Z1	0.4	30	E62.L10-303Z10/H
33	65	95	37	0.7	2.0	3.6	100	7.2	G1	0.3	100	E62.L95-333G10/H
40	65	109	30	0.7	2.0	5.6	120	6.3	G1	0.4	240	E62.L10-403G10/H
47	75	105	43	1.0	2.9	1.9	110	5.7	S2	0.5	208	E62.M10-473S20/H
60	65	145	35	0.7	2.0	6.2	140	4.7	G1	0.5	140	E62.L14-603G10/H
60	85	105	45	1.2	3.7	1.5	110	5.0	S2	0.6	160	E62.N10-603S20/H
65	85	124	56	1.1	3.0	1.8	110	4.2	S2	0.8	150	E62.N12-653S20/H
75	95	105	56	1.5	4.6	1.4	110	4.5	S2	0.8	30	E62.P10-753S20/H
80	100	105	43	4.6	5.0	1.3	110	4.2	S2	0.9	30	E62.Q10-803S20/H
116	95	149	56	1.4	4.0	1.8	110	3.1	S2	1.1	84	E62.P14-124S20/H
150	95	176	56	3.1	9.3	1.4	130	2.7	S2	1.3	63	E62.P17-154S20/H
150	100	176	80	3.1	9.3	0.7	160	2.5	C6	1.5	30	E62.Q17-154C60/H
220	116	176	80	4.5	13.5	0.61	160	2.2	C6	2.0	30	E62.R17-224C60/H
330	116	245	100	6.8	20.0	0.61	170	1.6	C6	2.7	30	E62.R24-334C60/H
350	116	245	100	6.8	20.0	0.59	160	1.6	C6	2.7	27	E62.R24-354C60/H
500	136	245	100	10.1	20.0	0.56	170	1.3	C6	3.7	20	E62.S24-504C60/H
600	136	320	100	12.4	20.0	0.64	190	1.0	C6	4.9	30	E62.S32-604C60/H
Rated AC voltage $U_N$ (AC) : 850Vac			$U_{rms} : 600V$ $U_S : 2,100V$ Test voltage (T-T) $U_{TT} : 2,100Vdc$ Test voltage (T-C) $U_{TC} : 3,000Vac$									
10.5	60	80	20	0.4	1.3	2.9	90	9.3	Z1	0.3	600	E62.K80-113Z10/H
15	50	85	25	0.3	0.9	4.6	80	10.5	G1	0.2	483	E62.G85-153G10/H
16	50	85	30	0.4	1.1	4.5	100	10.5	G1	0.2	483	E62.G85-163G10/H
19	60	105	40	0.4	1.3	3.1	110	7.1	C68	0.3	350	E62.K10-193C68/H
24.5	65	105	30	0.6	1.7	3.4	110	6.5	Z1	0.4	300	E62.L10-253Z10/H
25	65	95	40	0.6	1.7	3.9	100	7.2	G1	0.3	280	E62.L95-253G10/H
30	65	109	30	0.6	1.7	4.4	110	6.3	G1	0.4	250	E62.L10-303G10/H
33	75	105	40	0.8	2.3	1.9	110	5.7	S2	0.5	224	E62.M10-333S20/H
47	85	105	45	1.1	3.2	1.6	110	5.0	S2	0.6	150	E62.N10-473S20/H
50	65	145	25	1	2	6	120	5	G1	0.5	130	E62.L14-503G10/H
60	95	105	50	1	4	1	110	5	S2	0.8	120	E62.P10-603S20/H
80	85	176	80	2	5	2	160	3	C6	1.2	95	E62.N17-803C60/H
94	95	149	56	1	4	2	110	3	S2	1.1	84	E62.P14-943S20/H
120	95	176	80	3	8	1	160	3	C6	1.3	30	E62.P17-124C60/H
130	100	176	80	3	9	1	160	3	C6	1.5	60	E62.Q17-134C60/H
180	116	176	80	4	12	1	160	2	C6	2.0	39	E62.R17-184C60/H
270	116	245	100	6	19	1	170	2	C6	2.7	24	E62.R24-274C60/H
400	136	245	100	9	20	1	170	1	C6	3.7	34	E62.S24-404C60/H
500	136	320	100	11	20	0	190	1	C6	4.9	14	E62.S32-504C60/H
Rated AC voltage $U_N$ (AC) : 1,000Vac			$U_{rms} : 720V$ $U_S : 2,500V$ Test voltage (T-T) $U_{TT} : 2,520Vdc$ Test voltage (T-C) $U_{TC} : 3,500Vac$									
4.7	50	62	25	0.5	1.4	3.6	110	14.4	G1	0.1	945	E62.G62-472G10/H
6.8	60	80	20	0.7	2.2	2.4	90	9.3	Z1	0.3	680	E62.K80-682Z10/H
8	50	85	26	0.5	1.4	4.0	120	10.5	G1	0.2	105	E62.G85-802G10/H
10	50	85	26	0.6	1.7	3.6	100	10.5	G1	0.2	105	E62.G85-103G10/H
12	55	85	30	0.7	2.1	3.0	110	9.5	G1	0.2	108	E62.H85-123G10/H
13	60	105	40	0.7	2.2	2.3	110	7.1	C68	0.3	250	E62.K10-133C68/H
16	65	95	40	1.0	2.9	3.3	110	7.2	G1	0.3	100	E62.L95-163G10/H
18	65	95	40	1.0	3.0	3.2	100	7.2	G1	0.3	100	E62.L95-183G10/H
20	75	105	50	1.2	3.5	1.2	140	5.7	C6	0.5	30	E62.M10-203C60/H
28	85	105	50	1.6	4.9	0.94	140	5.0	C6	0.6	30	E62.N10-283C60/H
33	95	105	50	1.9	5.7	0.85	140	4.5	C6	0.8	30	E62.P10-333C60/H
36	85	124	56	1.6	5.0	1.4	110	4.2	S2	0.8	145	E62.N12-363S20/H
64	95	149	56	2.1	6.0	1.5	110	3.1	S2	1.1	75	E62.P14-643S20/H
68	95	176	80	3.9	11.7	0.65	160	2.7	C6	1.3	30	E62.P17-683C60/H
80	100	176	80	4.6	13.8	0.61	160	2.5	C6	1.5	30	E62.Q17-803C60/H
120	116	176	80	7.0	20.0	0.54	160	2.2	C6	2.0	30	E62.R17-124C60/H
180	116	245	100	10.4	20.0	0.57	170	1.6	C6	2.7	30	E62.R24-184C60/H
220	116	320	100	14.2	20.0	0.64	180	1.2	C6	3.5	30	E62.R32-224C60/H
250	136	245	100	14.5	20.0	0.54	170	1.3	C6	3.7	30	E62.S24-254C60/H
330	136	320	100	15.0	20.0	0.61	190	1.0	C6	4.9	28	E62.S32-334C60/H

PLASTIC FILM CAPACITORS



Standard Value and Case Size

Rated Capacitance $C_N$ [μF]	Case size		Max current (rms) $I_{max}$ [Arms]	Max peak current $\hat{I}$ [kA]	Max surge current $I_S$ [kA]	Series resistance (reference) $R_S$ [mΩ]	Self inductance (reference) $ESL$ [nH]	Thermal resistance (reference) $R_{th}$ [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]										
Rated AC voltage $U_N$ (AC) : 1,200Vac			$U_{rms} : 850V$ $U_S : 3,000V$ Test voltage (T-T) $U_{TT} : 3,000Vdc$ Test voltage (T-C) $U_{TC} : 4,000Vac$									
5	60	80	20	0.6	1.9	2.6	90	9.3	Z1	0.3	600	E62.K80-502Z10/H
6.8	50	85	33	0.5	1.5	3.7	100	10.5	G1	0.2	483	E62.G85-682G10/H
9.5	60	105	40	0.6	1.9	2.5	110	7.1	C68	0.3	350	E62.K10-952C68/H
10	65	95	40	0.7	2.1	3.7	100	7.2	G1	0.3	100	E62.L95-103G10/H
12	65	105	30	0.8	2.4	2.9	110	6.5	Z1	0.4	250	E62.L10-123Z10/H
15	65	109	40	0.8	2.4	3.9	120	6.3	G1	0.4	250	E62.L10-153G10/H
20	65	135	30	0.8	2.4	4.7	120	5.1	G11	0.5	180	E62.L13-203G11/H
26.5	85	124	56	1.4	4.0	1.6	110	4.2	S2	0.8	145	E62.N12-273S20/H
30	65	160	40	1.0	3.0	5.3	130	4.3	G1	0.6	130	E62.L16-303G10/H
32	100	105	50	2.0	6.0	0.79	140	4.2	C6	0.9	108	E62.Q10-323C60/H
33	85	140	56	1.3	4.0	2.2	140	3.7	S2	0.9	105	E62.N14-333S20/H
33	85	176	80	2.2	7.0	1.3	160	3.0	C6	1.2	105	E62.N17-333C60/H
40	85	176	80	2.7	8.1	0.76	160	3.0	C6	1.2	85	E62.N17-403C60/H
47	95	149	56	1.8	5.0	1.6	110	3.1	S2	1.1	78	E62.P14-473S20/H
53	85	245	80	4.0	11.0	1.0	160	2.1	C6	1.7	65	E62.N24-533C60/H
68	85	280	80	3.6	10.8	0.81	160	1.9	C6	1.8	55	E62.N28-683C60/H
80	95	245	80	5.0	15.0	1.0	170	1.9	C6	1.8	42	E62.P24-803C60/H
100	116	176	80	3.2	9.6	1.0	150	2.2	C6	2.0	30	E62.R17-104C60/H
150	116	280	100	8.0	20.0	1.4	180	1.4	C6	3.1	30	E62.R28-154C60/H
Rated AC voltage $U_N$ (AC) : 1,350Vac			$U_{rms} : 960V$ $U_S : 3,300V$ Test voltage (T-T) $U_{TT} : 3,375Vdc$ Test voltage (T-C) $U_{TC} : 4,200Vac$									
4	50	85	26	0.3	1.0	5.0	120	10.5	G1	0.2	105	E62.G85-402G10/H
5	50	85	25	0.4	1.2	4.4	100	10.5	G1	0.2	105	E62.G85-502G10/H
6.8	55	85	25	0.5	1.6	4.0	110	9.5	G1	0.2	108	E62.H85-682G10/H
10	75	105	45	0.8	2.3	1.6	140	5.7	C6	0.5	30	E62.M10-103C60/H
15	85	105	50	1.1	3.3	1.2	120	5.0	C6	0.6	30	E62.N10-153C60/H
16	85	105	50	1.2	3.7	1.1	140	5.0	C6	0.6	30	E62.N10-163C60/H
20	95	105	50	1.5	4.6	0.96	140	4.5	C6	0.8	30	E62.P10-203C60/H
22	75	176	80	1.9	5.7	0.97	160	3.4	C6	0.8	30	E62.M17-223C60/H
40	95	176	80	3.1	9.3	0.71	160	2.7	C6	1.3	30	E62.P17-403C60/H
47	100	176	80	3.6	10.8	0.67	160	2.5	C6	1.5	30	E62.Q17-473C60/H
68	100	245	80	5.0	15.0	1.0	160	1.8	C6	2.0	30	E62.Q24-683C60/H
68	116	176	80	5.3	15.9	0.59	160	2.2	C6	2.0	30	E62.R17-683C60/H
100	116	245	100	7.7	20.0	0.6	170	1.6	C6	2.7	30	E62.R24-104C60/H
150	136	245	100	11.6	20.0	0.56	170	1.3	C6	3.7	30	E62.S24-154C60/H
200	136	320	100	15.0	20.0	0.62	190	1.0	C6	4.9	26	E62.S32-204C60/H
Rated AC voltage $U_N$ (AC) : 1,700Vac			$U_{rms} : 1,200V$ $U_S : 4,200V$ Test voltage (T-T) $U_{TT} : 4,200Vdc$ Test voltage (T-C) $U_{TC} : 5,000Vac$									
4	75	105	48	0.8	1.8	2.8	140	5.7	C6	0.5	420	E62.M10-402C60/H
6.8	75	105	46	0.7	2.0	1.8	140	5.7	C6	0.5	240	E62.M10-682C60/H
10	85	105	50	1.0	2.9	1.3	140	5.0	C6	0.6	170	E62.N10-103C60/H
12	95	105	50	1.2	3.5	1.2	140	4.5	C6	0.8	132	E62.P10-123C60/H
12	75	176	80	1.9	5.7	1.4	160	3.4	C6	0.8	135	E62.M17-123C60/H
25	95	176	80	2.4	7.3	0.8	160	2.7	C6	1.3	66	E62.P17-253C60/H
30	100	176	80	2.9	8.7	0.73	160	2.5	C6	1.5	54	E62.Q17-303C60/H
40	116	176	80	3.9	11.7	0.65	160	2.2	C6	2.0	42	E62.R17-403C60/H
60	116	245	100	5.8	17.4	0.64	170	1.6	C6	2.7	24	E62.R24-603C60/H
90	136	245	100	8.7	20.0	0.58	170	1.3	C6	3.7	18	E62.S24-903C60/H
100	136	280	100	8.0	20.0	0.94	190	1.2	C6	4.3	16	E62.S28-104C60/H
125	136	320	100	12.1	20.0	0.64	190	1.0	C6	4.9	26	E62.S32-134C60/H
Rated AC voltage $U_N$ (AC) : 2,000Vac			$U_{rms} : 1,400V$ $U_S : 5,100V$ Test voltage (T-T) $U_{TT} : 5,100Vdc$ Test voltage (T-C) $U_{TC} : 5,800Vac$									
10	75	176	40	1.2	3.5	2.1	170	3.4	C6	0.8	30	E62.M17-103C60/H
15	95	176	40	1.0	3.1	1.6	170	2.7	C6	1.3	72	E62.P17-153C60/H
20	100	176	50	2.3	7.0	1.3	160	2.5	C6	1.5	30	E62.Q17-203C60/H
30	116	176	50	3.6	10.8	1.0	160	2.2	C6	2.0	30	E62.R17-303C60/H
40	116	320	80	4.6	13.8	1.1	190	1.2	C6	3.5	21	E62.R32-403C60/H
50	136	245	100	9.0	20.0	0.88	170	1.3	C6	3.7	22	E62.S24-503C60/H
54	116	320	80	5.9	17.7	1.1	180	1.2	C6	3.5	30	E62.R32-543C60/H
60	116	320	100	6.0	18.0	1.0	180	1.2	C6	3.5	39	E62.R32-603C60/H
90	136	320	100	9.7	20.0	1.0	190	1.0	C6	4.9	26	E62.S32-903C60/H

PLASTIC FILM CAPACITORS

# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

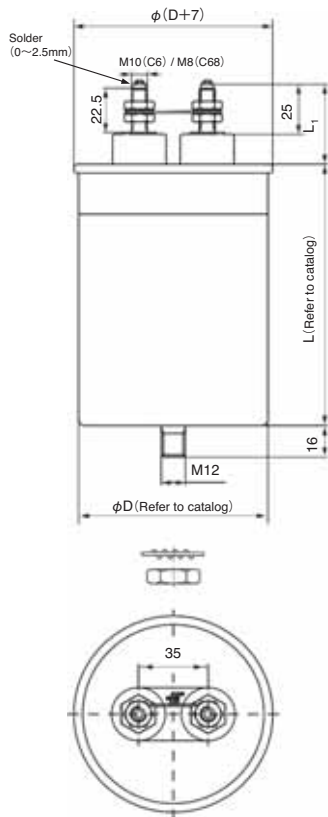
## Standard Value and Case Size

Rated Capacitance $C_N$ [ $\mu$ F]	Case size		Max current (rms) $I_{max}$ [Arms]	Max peak current $I$ [kA]	Max surge current $I_S$ [kA]	Series resistance (reference) $R_S$ [m $\Omega$ ]	Self inductance (reference) $ESL$ [nH]	Thermal resistance (reference) $R_{th}$ [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]										
Rated AC voltage $U_N$ (AC) : 2,100Vac			U <sub>rms</sub> : 1,500V U <sub>S</sub> : 5,400V Test voltage (T-T) U <sub>TT</sub> : 5,400Vdc Test voltage (T-C) U <sub>Tc</sub> : 6,200Vac									
13	95	176	80	2.6	8.0	1.3	160	2.7	C6	1.3	72	E62.P17-133C60/H
33	116	205	80	3.3	9.9	1.2	150	1.9	CR	2.4	39	E62.R20-333C60/H
40	116	320	100	5.4	16.2	1.1	180	1.2	CR	3.5	21	E62.R32-403CR0/H
60	136	320	100	7.9	20.0	1.0	190	1.0	CR	4.9	28	E62.S32-603CR0/H
70	136	320	100	8.0	20.0	1.1	190	1.0	CR	4.9	30	E62.S32-703CR0/H
Rated AC voltage $U_N$ (AC) : 2,400Vac			U <sub>rms</sub> : 1,700V U <sub>S</sub> : 6,000V Test voltage (T-T) U <sub>TT</sub> : 6,000Vdc Test voltage (T-C) U <sub>Tc</sub> : 6,800Vac									
6.8	75	176	40	0.9	2.8	2.5	160	3.4	C6	0.8	120	E62.M17-682C60/H
10	85	176	40	1.4	4.2	1.9	170	3.0	C6	1.2	80	E62.N17-103C60/H
20	116	176	50	2.7	8.0	1.6	160	2.2	C6	2.0	42	E62.R17-203C61/H
22	116	176	50	2.8	8.7	1.1	160	2.2	CR	2.0	39	E62.R17-223CR0/H
25	136	176	80	5.6	16.8	0.59	160	1.9	CR	2.6	30	E62.S17-253CR0/H
33	136	245	100	7.5	20.0	0.6	160	1.3	CR	3.7	22	E62.S24-333CR0/H
Rated AC voltage $U_N$ (AC) : 4,000Vac			U <sub>rms</sub> : 2,800V U <sub>S</sub> : 7,500V Test voltage (T-T) U <sub>TT</sub> : 7,500Vdc Test voltage (T-C) U <sub>Tc</sub> : 8,200Vac									
0.2	75	105	16	0.7	2.2	5.1	150	5.7	CR	0.6	340	E62.M10-201CR0/H
1.0	75	120	40	0.8	2.4	3.9	150	5.0	CR	0.6	240	E62.M12-102CR0/H
1.8	85	120	40	1.4	4.0	2.7	150	4.4	CR	0.9	180	E62.N12-182CR0/H
1.9	95	120	40	1.4	4.0	2.6	150	3.9	CR	0.9	174	E62.P12-192CR0/H
2.2	95	120	40	1.7	5.1	2.0	150	3.9	CR	0.9	120	E62.P12-222CR0/H
4.7	95	205	40	3.7	11.1	1.2	170	2.3	CR	1.6	57	E62.P20-472CR0/H
6.0	116	205	80	4.7	14.1	0.8	160	1.9	CR	2.7	45	E62.R20-602CR0/H
10	116	280	50	6.0	18.0	2.6	180	1.4	CR	3.1	27	E62.R28-103CR0/H

PLASTIC FILM CAPACITORS

Dimensions (E62 series)

**C6 / C68 terminal**  
(Can diameter :  $\phi 60 \sim 136\text{mm}$ )



**CR terminal**  
(Can diameter :  $\phi 75 \sim 136\text{mm}$ )

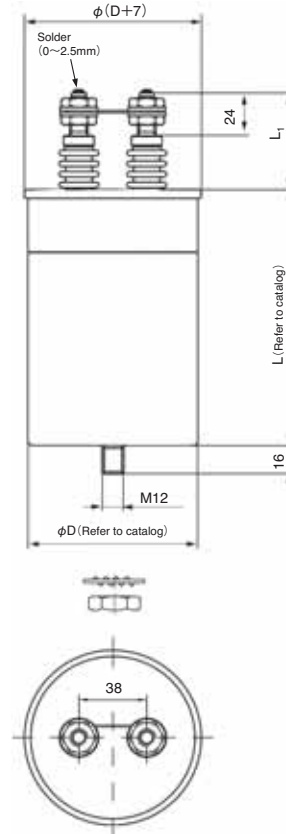


Table. Common Specification

Item	Specification
Terminal code	C6 / C68
Can material	Aluminum
Stud bolt	M12
Lid	Aluminum
Terminal	M10 bolt terminal, Plastic bushing
	Torque : 9Nm
	$I_{\max}$ (terminal) : 100A
	M8 bolt terminal, Plastic bushing
Terminal	Torque : 4Nm
	$I_{\max}$ (terminal) : 50A
Degree of protection	IP00

Table. Common Specification

Item	Specification
Terminal code	CR
Can material	Aluminum
Stud bolt	M12
Lid	Aluminum
Terminal	M10 bolt terminal, Celamic bushing
	Torque : 9Nm
	$I_{\max}$ (terminal) : 100A
Degree of protection	IP00

Table. Dimensions

Unit : mm

$\phi D$	L	Insulation distance	
		in Air	Creepage
60	41	19	23
65	41	19	23
75	41	15	25
85	41	15	25
95	41	15	25
100	41	15	25
116	37	15	25
136	36	15	25

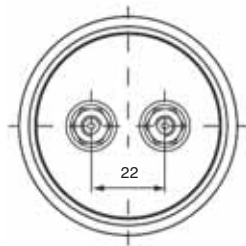
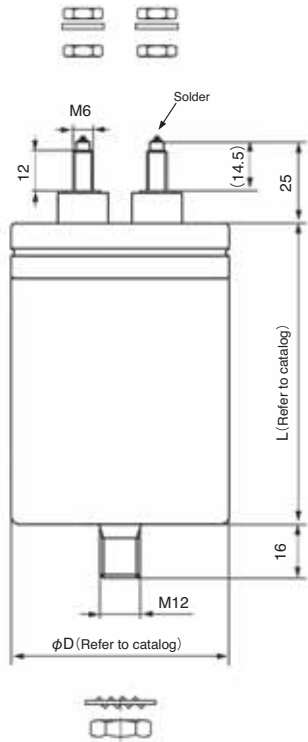
Table. Dimensions

Unit : mm

$\phi D$	L	Insulation distance	
		in Air	Creepage
75	56	17	54
85	56	17	54
95	56	17	54
100	56	17	54
116	54	17	54
136	51	17	54

## Dimensions (E62 series)

**G1 terminal**  
(Can diameter :  $\phi 50/55/65\text{mm}$ )



**Z1 / S2 terminal**  
(Can diameter :  $\phi 60 \sim 136\text{mm}$ )

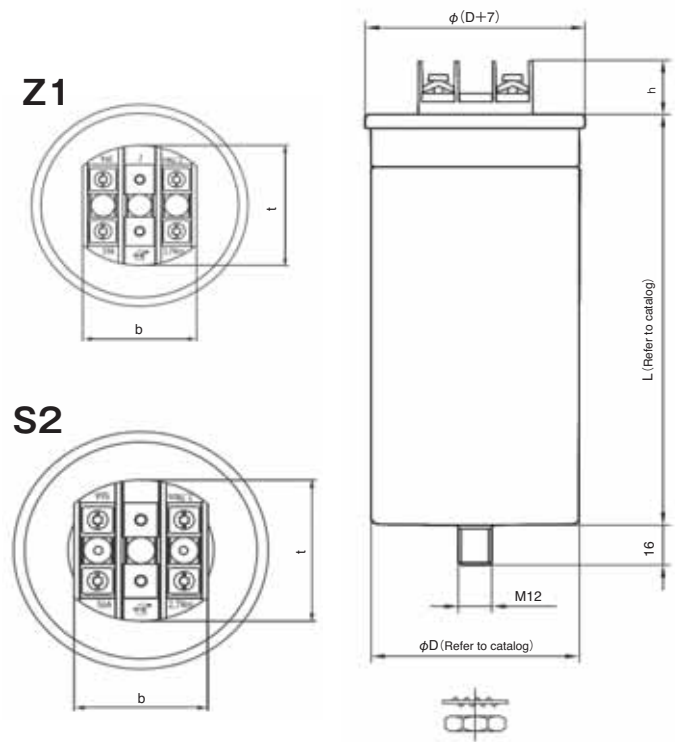


Table. Common Specification

Item	Specification
Terminal code	G1
Can material	Aluminum
Stud bolt	M12
Lid	Plastic, Rubber
Terminal	M6 bolt terminal, Plastic bushing
	Torque : 2Nm $I_{\max}$ (terminal) : 40A
Degree of protection	IP00

Table. Dimensions

Unit : mm

$\phi D$	Insulation distance	
	in Air	Creepage
50	10	15
55	10	16
65	10	21

Table. Common Specification

Item	Specification
Terminal code	Z1 / S2
Can material	Aluminum
Stud bolt	M12
Lid	Aluminum
Terminal	Z1
	Wire size : 10mm <sup>2</sup>
	Connection : Fork type lug (Width<11mm)
	Screw : Torx T20, M4, Torque : 2.7Nm
	$I_{\max}$ (terminal) : 39A
	Clearance in air: 16mm Creepage distance: 16mm
S2	Wire size : 16mm <sup>2</sup>
	Connection : Fork type lug (Width<12mm)
	Screw : Torx T20, M4, Torque : 2.7Nm
	$I_{\max}$ (terminal) : 56A Clearance in air: 14mm Creepage distance: 15mm
Degree of protection	IP00

Table. Dimensions

Symbol	Z1	S2	
		$D \leq 100\text{mm}$	$D \geq 116\text{mm}$
h	22	23	18
b	41	47	47
t	43.5	53	53



# E62-TAB (AC) Series

(AC Cylindrical Metallized Polypropylene Film Capacitors)

## Features

- AC capacitors for general use.
- Filled with environmentally friendly plant oil.
- The integrated overpressure disconnecter ensure safe operation and controlled disconnection in the event of overload or failure at the end of operating life.

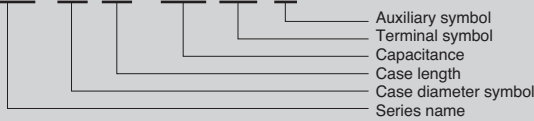
## Specifications

Item	Specification
Category temperature range	-40 ~ +70°C (+85°C/ Includes self temperature rise)
Storage temperature	-40 ~ +85°C
Rated voltage (U <sub>N</sub> )	420 ~ 1,350Vac
Terminal (torque)	M8 × 10 (5Nm) / M12 × 16 (15Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	±10% (optional ±5%)
Safety devices	Overpressure disconnecter
Impregnant	Liquid, based on vegetable oil, Non PCB
Material of case	Plastic (UL94V-0)
Environmental regulations	Comply with RoHS



Numbering system: e.g. E62, 420VAC, 15 μF, φ35 × 58Lmm, D1terminal

**E62 . D 58 - 153 D1 0 / H**



## Standard Value and Case Size

Rated Capacitance C <sub>N</sub> [μF]	Case size		Max current I <sub>max</sub> [Arms]	Max peak current i [kA]	Max surge current I <sub>s</sub> [kA]	Series resistance (reference) R <sub>s</sub> [mΩ]	Self inductance (reference) ESL [nH]	Thermal resistance (reference) R <sub>th</sub> [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	φD [mm]	L [mm]										
Rated AC voltage U <sub>N</sub> (AC) : 420Vac			U <sub>rms</sub> : 300V U <sub>s</sub> : 1,050V Test voltage (T-T) U <sub>TT</sub> : 1,050Vdc Test voltage (T-C) U <sub>TC</sub> : 3,000Vac									
15	35	58	16	0.3	0.9	3.1	60	21.9	D1	0.07	1,950	E62.D58-153D10/H
20	40	58	16	0.5	1.5	2.6	60	19.2	D1	0.08	1,404	E62.E58-203D10/H
22	35	81	10	0.3	0.9	5.4	80	15.7	E2	0.10	100	E62.D81-223E20/H
24	35	81	10	0.3	0.9	5.0	80	15.7	E2	0.10	100	E62.D81-243E20/H
24	35	81	10	0.3	0.9	5.7	80	15.7	D1	0.12	100	E62.D81-243D10/H
35	40	81	16	0.4	1.2	4.0	80	13.9	D1	0.1	108	E62.E81-353D10/H
50	45	81	16	0.6	1.7	3.3	80	12.2	D1	0.1	128	E62.F81-503D10/H
75	55	85	16	0.8	2.6	2.7	80	9.5	D1	0.2	108	E62.H85-753D10/H
80	55	85	16	0.9	2.7	4.7	80	9.5	D1	0.2	108	E62.H85-803D10/H
90	60	85	16	1.0	3.0	2.5	80	8.7	D1	0.25	108	E62.K85-903D10/H
220	65	160	16	1.2	3.6	4.5	130	4.3	D2	0.6	130	E62.L16-224D20/H
300	75	160	16	1.6	4.8	4.1	90	3.7	D2	0.7	112	E62.M16-304D20/H
Rated AC voltage U <sub>N</sub> (AC) : 500Vac			U <sub>rms</sub> : 360V U <sub>s</sub> : 1,260V Test voltage (T-T) U <sub>TT</sub> : 1,260Vdc Test voltage (T-C) U <sub>TC</sub> : 3,000Vac									
1	25	48	6	0.1	0.3	18.6	60	37.1	E1	0.03	10,878	E62.B48-102E10/H
20	40	81	16	0.3	0.8	5.4	80	13.8	D1	0.11	1,116	E62.E81-203D10/H
25	40	81	16	0.4	1.1	4.3	80	13.8	D1	0.11	828	E62.E81-253D10/H
33	45	81	16	0.5	1.4	3.7	80	12.2	D1	0.14	640	E62.F81-333D10/H
50	55	85	16	0.7	2.1	3.0	80	9.5	D1	0.21	432	E62.H85-503D10/H
60	60	85	16	0.8	2.5	2.8	80	8.7	D1	0.25	378	E62.K85-603D10/H
160	65	160	16	1.0	3.0	4.2	100	4.3	D2	0.6	130	E62.L16-164D20/H
200	75	160	16	1.3	3.9	3.9	140	3.7	D2	0.7	96	E62.M16-204D20/H

Standard Value and Case Size

Rated Capacitance $C_N$ [ $\mu$ F]	Case size		Max current $I_{max}$ [Arms]	Max peak current $I$ [kA]	Max surge current $I_S$ [kA]	Series resistance (reference) $R_S$ [m $\Omega$ ]	Self inductance (reference) $ESL$ [nH]	Thermal resistance (reference) $R_{th}$ [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	L [mm]										
Rated AC voltage $U_N$ (AC) : 640Vac			$U_{rms} : 450V$ $U_S : 1,500V$ Test voltage (T-T) $U_{TT} : 1,500Vdc$ Test voltage (T-C) $U_{TC} : 3,000Vac$									
0.47	25	48	8	0.10	0.3	7.4	60	37.1	E1	0.04	6,272	E62.B48-471E10/H
4	30	58	10	0.2	0.6	5.9	60	25.6	E1	0.05	3,096	E62.C58-402E10/H
4.7	30	58	10	0.2	0.7	5.4	60	25.6	E1	0.05	144	E62.C58-472E10/H
5	30	58	10	0.3	0.8	4.9	60	25.6	E1	0.05	144	E62.C58-502E10/H
6	35	58	16	0.4	1.0	4.5	60	21.9	E2	0.07	100	E62.D58-602E20/H
6.8	35	58	16	0.4	1.0	4.1	60	21.9	E2	0.1	100	E62.D58-682E20/H
10	40	58	16	0.4	1.2	3.2	60	19.2	D1	0.1	108	E62.E58-103D10/H
15	40	81	16	0.2	0.7	5.5	80	13.8	D1	0.1	108	E62.E81-153D10/H
18	40	81	16	0.3	1	4.8	80	13.8	D1	0.1	108	E62.E81-183D10/H
22	45	81	16	0.4	1.1	4.3	80	12.2	D1	0.14	128	E62.F81-223D10/H
25	45	81	16	0.4	1.2	4.0	80	12.2	D1	0.1	128	E62.F81-253D10/H
40	55	85	16	0.6	1.9	3.4	80	9.5	D1	0.2	108	E62.H85-403D10/H
47	60	85	16	0.8	2.3	2.9	80	8.7	D1	0.25	108	E62.K85-473D10/H
50	60	98	16	0.6	1.9	3.9	120	7.6	D1	0.4	306	E62.K98-503D10/H
60	60	98	16	1.0	3.0	3.2	120	7.6	D1	0.4	108	E62.K98-603D10/H
100	60	148	16	0.8	2.4	5.1	120	5.0	D1	0.45	144	E62.K14-104D10/H
120	65	160	16	0.9	2.7	5.0	130	4.3	D2	0.6	140	E62.L16-124D20/H
150	75	160	16	1.1	3.3	4.6	110	3.7	D2	0.7	112	E62.M16-154D20/H
Rated AC voltage $U_N$ (AC) : 680Vac			$U_{rms} : 480V$ $U_S : 1,680V$ Test voltage (T-T) $U_{TT} : 1,680Vdc$ Test voltage (T-C) $U_{TC} : 3,000Vac$									
3.3	30	58	15	0.2	0.5	6.5	60	25.6	E1	0.05	144	E62.C58-332E10/H
12	40	81	16	0.2	0.7	5.8	80	13.8	D1	0.11	108	E62.E81-123D10/H
15	40	81	16	0.3	0.8	5.4	80	13.8	D1	0.11	108	E62.E81-153D10/H
20	45	81	16	0.4	1.1	4.2	80	12.2	D1	0.14	128	E62.F81-203D10/H
30	55	85	16	0.5	1.6	3.3	80	9.5	D1	0.21	108	E62.H85-303D10/H
33	60	85	16	0.6	1.8	3.2	80	8.7	D1	0.3	108	E62.K85-333D10/H
40	65	95	16	0.7	2.1	3.3	120	7.2	D2	0.3	100	E62.L95-403D20/H
50	55	124	16	0.5	1.6	5.2	100	6.5	D1	0.3	252	E62.H12-503D10/H
50	65	109	16	0.7	2.2	3.7	120	6.3	D2	0.4	230	E62.L10-503D20/H
60	60	124	16	0.6	1.9	5.0	140	6.0	D1	0.4	198	E62.K12-603D10/H
70	60	148	16	0.6	1.9	6.0	140	5.0	D1	0.5	162	E62.K14-703D10/H
90	65	160	16	0.8	2.4	4.8	110	4.3	D2	0.6	140	E62.L16-903D20/H
100	75	160	16	0.9	2.6	5.1	100	3.7	D2	0.7	128	E62.M16-104D20/H
Rated AC voltage $U_N$ (AC) : 750Vac			$U_{rms} : 530V$ $U_S : 1,900V$ Test voltage (T-T) $U_{TT} : 1,890Vdc$ Test voltage (T-C) $U_{TC} : 3,000Vac$									
4.7	30	81	10	0.2	0.7	11.1	60	18.3	E1	0.07	144	E62.C81-472E10/H
6.8	40	85	16	0.2	0.6	3.8	60	19.2	D1	0.08	1,368	E62.E58-682D10/H
10	40	81	16	0.5	1.4	6.1	110	13.8	D1	0.11	108	E62.E81-103D10/H
10	50	62	16	0.4	1.2	3.0	100	14.4	D1	0.14	861	E62.G62-103D10/H
15	45	85	16	0.3	0.9	5.9	110	11.6	B2	0.1	42	E62.F85-153B20/H
16	50	85	16	0.3	1.0	5.1	80	10.5	D1	0.18	105	E62.G85-163D10/H
22	60	85	16	0.5	1.5	3.5	120	8.7	D1	0.3	342	E62.K85-223D10/H
26	60	85	16	0.5	1.5	3.4	120	8.7	D1	0.3	108	E62.K85-263D10/H
29	60	85	16	0.6	1.8	3.2	120	8.7	D1	0.3	108	E62.K85-293D10/H
33	50	148	16	0.4	1.0	11.4	120	6.0	D1	0.3	294	E62.G14-333D10/H
70	65	160	16	0.7	2.0	5.6	140	4.3	D2	0.6	140	E62.L16-703D20/H
80	75	160	20	0.8	2.3	5.3	130	3.7	D2	0.7	120	E62.M16-803D20/H
Rated AC voltage $U_N$ (AC) : 850Vac			$U_{rms} : 600V$ $U_S : 2,100V$ Test voltage (T-T) $U_{TT} : 2,100Vdc$ Test voltage (T-C) $U_{TC} : 3,000Vac$									
2	30	58	10	0.2	0.5	8.1	60	25.6	E1	0.05	144	E62.C58-202E10/H
2	30	58	10	0.2	0.5	8.1	60	25.6	E4	0.07	100	E62.C58-202E40/H
2.2	30	58	10	0.2	0.6	7.5	60	25.6	E1	0.05	144	E62.C58-222E10/H
2.2	30	58	10	0.2	0.6	7.5	60	25.6	E4	0.07	2,952	E62.C58-222E40/H
3.3	30	81	10	0.1	0.3	13.8	80	18.3	E1	0.07	2,304	E62.C81-332E10/H
3.3	35	58	16	0.1	0.4	5.6	60	21.9	D1	0.07	2,100	E62.D58-332D10/H
4	30	81	10	0.2	0.5	11.7	80	18.3	E1	0.1	1,872	E62.C81-402E10/H
4	30	81	10	0.2	0.5	11.7	80	18.3	E4	0.1	1,850	E62.C81-402E40/H
12	45	85	16	0.3	0.8	6.2	110	12	B2	0.1	630	E62.F85-123B20/H
15	50	85	16	0.3	1.0	4.3	80	10	D1	0.18	504	E62.G85-153D10/H
25	65	95	16	0.6	1.7	3.6	120	7.0	D2	0.3	290	E62.L95-253D20/H
55	65	160	16	0.6	1.8	6.0	130	4.3	D2	0.6	140	E62.L16-553D20/H
68	75	160	16	0.7	2.2	5.4	100	3.7	D2	0.7	112	E62.M16-683D20/H

PLASTIC FILM CAPACITORS



# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

## Standard Value and Case Size

Rated Capacitance $C_N$ [μF]	Case size		Max current $I_{max}$ [Arms]	Max peak current $\hat{I}$ [kA]	Max surge current $I_s$ [kA]	Series resistance (reference) $R_s$ [mΩ]	Self inductance (reference) $ESL$ [nH]	Thermal resistance (reference) $R_{th}$ [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]										
Rated AC voltage $U_N$ (AC) : 1,000Vac			$U_{rms} : 720V$ $U_s : 2,500V$ Test voltage (T-T) $U_{TT} : 2,520Vdc$ Test voltage (T-C) $U_{TC} : 3,500Vac$									
1.5	30	58	10	0.3	0.9	5.0	60	25.6	E1	0.1	3,168	E62.C58-152E10/H
1.5	30	58	10	0.3	0.9	5.0	60	25.6	E4	0.1	3,100	E62.C58-152E40/H
2.2	35	58	16	0.3	0.8	3.8	60	21.9	E2	0.1	1,900	E62.D58-222E20/H
3	30	81	10	0.4	1.1	7.2	80	18.3	E1	0.1	144	E62.C81-302E10/H
3	30	81	10	0.4	1.1	7.2	80	18.3	E4	0.1	100	E62.C81-302E40/H
4	35	81	10	0.5	1.4	5.8	80	15.7	E2	0.1	100	E62.D81-402E20/H
5	40	81	16	0.6	1.8	5.0	80	14.0	D1	0.1	108	E62.E81-502D10/H
6.8	45	81	16	0.8	2.4	4.1	80	12.2	D1	0.1	128	E62.F81-682D10/H
8	45	81	16	0.5	1.4	3.7	80	12.2	D1	0.1	128	E62.F81-802D10/H
8	45	85	16	0.5	1.4	5.0	110	11.6	B2	0.1	42	E62.F85-802B20/H
15	60	85	16	0.9	2.6	2.7	110	8.7	D1	0.3	108	E62.K85-153D10/H
20	65	95	16	1.7	5.1	2.8	120	7.2	D2	0.3	100	E62.L95-203D20/H
38	65	160	20	1.0	3.0	4.8	140	4.3	D2	0.6	140	E62.L16-383D20/H
53	75	160	20	1.4	4.2	4.3	130	3.7	D2	0.7	96	E62.M16-533D20/H
Rated AC voltage $U_N$ (AC) : 1,200Vac			$U_{rms} : 850V$ $U_s : 3,000V$ Test voltage (T-T) $U_{TT} : 3,000Vdc$ Test voltage (T-C) $U_{TC} : 4,000Vac$									
0.1	25	58	8	0.1	0.3	15.0	60	30.7	E1	0.1	5,684	E62.B58-101E10/H
0.1	30	58	8	0.1	0.3	12.7	60	25.6	E1	0.1	4,104	E62.C58-101E10/H
0.15	30	58	8	0.1	0.3	10.4	60	25.6	E1	0.1	4,032	E62.C58-151E10/H
0.22	30	58	10	0.2	0.6	7.5	60	25.6	E1	0.1	2,736	E62.C58-221E10/H
0.33	30	58	10	0.2	0.6	6.5	60	25.6	E1	0.1	144	E62.C58-331E10/H
0.47	30	58	10	0.2	0.6	8.2	60	25.6	E1	0.1	3,240	E62.C58-471E10/H
0.5	30	58	10	0.2	0.5	5.9	60	25.6	E1	0.1	3,600	E62.C58-501E10/H
0.5	30	58	10	0.2	0.5	5.9	60	25.6	E4	0.1	3,550	E62.C58-501E40/H
0.68	30	58	10	0.2	0.7	6.6	60	25.6	E1	0.1	2,664	E62.C58-681E10/H
1	30	58	10	0.3	0.8	6.0	60	25.6	E1	0.1	3,240	E62.C58-102E10/H
1	30	58	10	0.3	0.8	6.0	60	25.6	E4	0.1	3,200	E62.C58-102E40/H
1.2	30	58	10	0.3	0.8	5.6	60	25.6	E1	0.1	2,952	E62.C58-122E10/H
1.5	30	81	10	0.2	0.7	9.9	60	18.3	E1	0.1	144	E62.C81-152E10/H
2	30	81	10	0.3	0.8	8.7	60	18.3	E1	0.1	1,728	E62.C81-202E10/H
2	30	81	10	0.3	0.8	8.7	60	18.3	E4	0.1	1,700	E62.C81-202E40/H
2.2	30	93	10	0.2	0.6	11.1	90	16.0	E1	0.1	1,656	E62.C93-222E10/H
2.2	30	93	10	0.2	0.6	11.1	90	16.0	E4	0.1	1,700	E62.C93-222E40/H
3.3	50	62	16	0.8	2.4	4.0	80	14.4	B2	0.2	1,008	E62.G62-332B20/H
4	40	81	16	0.3	0.9	5.2	80	13.8	D1	0.1	864	E62.E81-402D10/H
4.7	40	81	16	0.4	1.3	4.7	60	13.8	D1	0.1	648	E62.E81-472D10/H
5	45	81	16	0.4	1.1	4.5	80	12.2	D1	0.1	640	E62.F81-502D10/H
5.75	50	85	16	0.5	1.5	3.8	80	10.5	D1	0.2	105	E62.G85-582D10/H
6.8	50	85	16	0.5	1.5	3.7	80	10.5	D1	0.2	504	E62.G85-682D10/H
10	60	85	16	0.7	2.1	3.1	80	8.7	D1	0.3	342	E62.K85-103D10/H
15	55	124	16	0.6	1.8	4.7	100	6.5	D1	0.3	234	E62.H12-153D10/H
22	60	151	16	1.2	3.6	5.4	100	4.9	D1	0.4	162	E62.K15-223D10/H
30	65	160	16	1.0	3.0	4.5	130	4.3	D2	0.6	130	E62.L16-303D20/H
33	75	160	16	0.9	2.8	4.8	120	3.7	D2	0.7	120	E62.M16-333D20/H
40	75	160	16	1.2	3.6	4.5	130	3.7	D2	0.7	96	E62.M16-403D20/H
Rated AC voltage $U_N$ (AC) : 1,350Vac			$U_{rms} : 960V$ $U_s : 3,300V$ Test voltage (T-T) $U_{TT} : 3,375Vdc$ Test voltage (T-C) $U_{TC} : 4,200Vac$									
1.5	30	81	10	0.2	0.7	9.9	80	18.3	E4	0.09	100	E62.C81-152E40/H
4	45	85	16	0.3	1.0	6.0	130	11.6	B2	0.14	42	E62.F85-402B20/H
Rated AC voltage $U_N$ (AC) : 1,700Vac			$U_{rms} : 1,200V$ $U_s : 4,200V$ Test voltage (T-T) $U_{TT} : 4,200Vdc$ Test voltage (T-C) $U_{TC} : 5,000Vac$									
0.33	30	58	10	0.2	0.6	6.5	60	25.6	E4	0.1	3,800	E62.C58-331E40/H
0.47	30	58	10	0.2	0.6	8.2	60	25.6	E4	0.1	3,250	E62.C58-471E40/H
0.68	30	81	10	0.2	0.6	16.1	80	18.3	E4	0.1	2,376	E62.C81-681E40/H
1	30	81	10	0.2	0.6	11.5	80	18.3	E4	0.1	1,650	E62.C81-102E40/H
1	45	62	16	0.4	1.2	5.8	150	16.0	B2	0.1	1,491	E62.F62-102B20/H
1.5	45	85	16	0.5	1.5	6.4	120	11.6	B2	0.1	798	E62.F85-152B20/H
2.2	45	85	10	0.2	0.6	7.3	80	11.6	B2	0.1	756	E62.F85-222B20/H
2.5	45	85	16	0.2	0.7	6.8	120	11.6	B2	0.1	630	E62.F85-252B20/H
3.3	50	85	16	0.3	1.0	5.9	120	10.5	B2	0.2	483	E62.G85-332B20/H
4.7	55	85	16	0.5	1.4	5.0	120	9.5	B2	0.2	360	E62.H85-472B20/H
8.2	55	151	16	0.4	1.1	8.9	190	5.4	B2	0.4	204	E62.H15-822B20/H
Rated AC voltage $U_N$ (AC) : 2,100Vac			$U_{rms} : 1,500V$ $U_s : 5,400V$ Test voltage (T-T) $U_{TT} : 5,400Vdc$ Test voltage (T-C) $U_{TC} : 6,200Vac$									
0.1	30	58	9	0.1	0.3	12.7	60	25.6	E4	0.1	3,950	E62.C58-101E40/H
0.15	30	58	9	0.1	0.3	10.4	60	25.6	E4	0.1	3,900	E62.C58-151E40/H
0.22	30	58	10	0.2	0.6	7.5	60	25.6	E4	0.1	3,300	E62.C58-221E40/H
0.22	45	62	16	0.2	0.5	6.8	100	16.0	B2	0.1	1,197	E62.F62-221B20/H
0.47	45	62	16	0.4	1.2	5.7	100	16.0	B2	0.1	1,176	E62.F62-471B21/H
0.68	50	62	16	0.5	1.5	4.7	100	14.4	B2	0.2	819	E62.G62-681B20/H
1	45	105	16	0.8	2.4	7.4	140	9.4	B2	0.2	588	E62.F10-102B21/H
1.5	55	105	16	1.2	3.6	5.7	120	7.7	B2	0.3	288	E62.H10-152B20/H
2	45	105	16	0.8	2.3	5.9	120	9.4	B2	0.2	504	E62.F10-202B20/H

PLASTIC FILM CAPACITORS

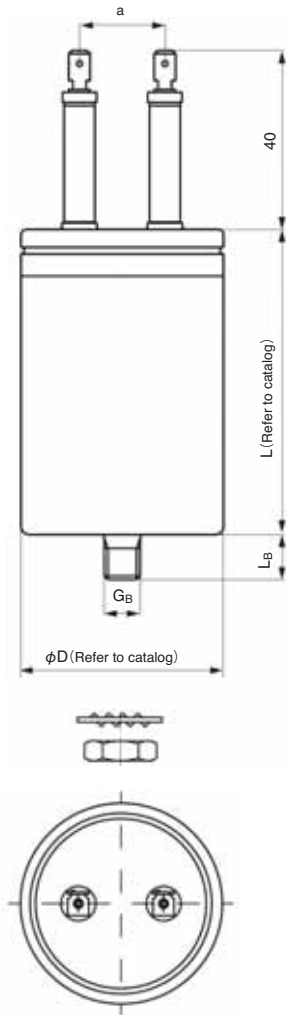


Standard Value and Case Size

Rated Capacitance $C_N$ [ $\mu$ F]	Case size		Max current $I_{max}$ [Arms]	Max peak current $\hat{i}$ [kA]	Max surge current $I_S$ [kA]	Series resistance (reference) $R_S$ [m $\Omega$ ]	Self inductance (reference) $ESL$ [nH]	Thermal resistance (reference) $R_{th}$ [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]										
Rated AC voltage $U_N$ (AC) : 2,400Vac			$U_{rms} : 1,700V$ $U_S : 6,000V$ Test voltage (T-T) $U_{TT} : 6,000Vdc$ Test voltage (T-C) $U_{TC} : 6,800Vac$									
2	50	105	16	0.5	1.5	5.6	120	8.5	B2	0.2	399	E62.G10-202B20/H
2.2	55	105	16	0.5	1.5	5.0	120	7.4	B2	0.3	360	E62.H10-222B20/H
4	55	151	16	0.6	1.8	7.5	190	5.4	B2	0.4	204	E62.H15-402B20/H
Rated AC voltage $U_N$ (AC) : 4,000Vac			$U_{rms} : 2,800V$ $U_S : 7,500V$ Test voltage (T-T) $U_{TT} : 7,500Vdc$ Test voltage (T-C) $U_{TC} : 8,200Vac$									
0.1	45	81	16	0.4	1.2	9.6	100	12.2	B2	0.1	1,260	E62.F81-101B20/H
0.15	45	81	16	0.5	1.5	7.0	90	12.2	B2	0.1	819	E62.F81-151B20/H
0.22	45	105	16	0.4	1.3	14.5	140	9.4	B2	0.2	672	E62.F10-221B21/H
0.22	60	105	16	0.7	2.1	6.9	140	7.1	CD	0.3	580	E62.K10-221CD0/H
0.33	45	105	16	0.3	0.9	14.0	140	9.4	B2	0.2	987	E62.F10-331B20/H
0.39	45	105	16	0.3	0.9	12.3	140	9.4	B2	0.2	483	E62.F10-391B20/H
0.47	45	105	16	0.4	1.1	10.8	140	9.4	B2	0.2	630	E62.F10-471B20/H
0.5	45	105	16	0.5	1.5	10.4	140	9.4	B2	0.2	630	E62.F10-501B20/H
0.68	55	105	16	0.5	1.5	8.5	120	7.7	B2	0.3	342	E62.H10-681B20/H
1.5	75	140	16	1.4	4.2	5.2	140	4.2	CD	0.6	160	E62.M14-152CD0/H
2	85	140	16	1.4	4.2	5.1	140	3.7	CD	0.80	115	E62.N14-202CD0/H
Rated AC voltage $U_N$ (AC) : 5,000Vac			$U_{rms} : 3,500V$ $U_S : 7,500V$ Test voltage (T-T) $U_{TT} : 8,750Vdc$									
0.1	45	105	16	0.4	1.1	14.9	140	9.4	B2	0.2	756	E62.F10-101B20/H
0.15	45	105	16	0.4	1.4	12.9	140	9.4	B2	0.2	735	E62.F10-151B20/H
0.22	45	105	16	0.4	1.4	14.5	140	9.4	B2	0.2	672	E62.F10-221B20/H
0.33	60	120	16	0.7	2.2	8.7	140	6.2	CD	0.3	490	E62.K12-331CD0/H
0.47	60	120	16	0.9	2.8	7.1	140	6.2	CD	0.3	380	E62.K12-471CD0/H
0.68	60	140	16	0.9	2.8	8.9	140	5.3	CD	0.4	264	E62.K14-681CD0/H
1	75	140	16	1.4	4.2	6.5	140	4.2	CD	0.6	180	E62.M14-102CD0/H

## Dimensions (E62-TAB series)

**B2 terminal**  
(Can diameter :  $\phi 45 \sim 55\text{mm}$ )



**CD terminal**  
(Can diameter :  $\phi 60 \sim 95\text{mm}$ )

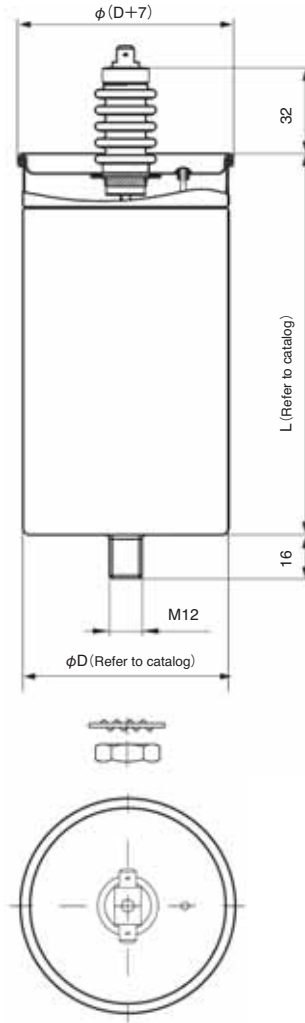


Table. Common Specification

Item	Specification
Terminal code	B2
Can material	Aluminium
Stud bolt	M8 / M12
Lid	Brass with rubber sealing
Terminal	Single tab connector, ceramic bushing $I_{\text{max}}$ (terminal) : 16A
Degree of protection	IP00

Table. Common Specification

Item	Specification
Terminal code	CD
Can material	Aluminium
Stud bolt	M12
Lid	Copper
Terminal	Dual tab terminal $I_{\text{max}}$ (terminal) : 16A Clearance in air : 35mm Creepage distance : 54mm
Degree of protection	IP00

Table. Dimensions

Unit : mm

$\phi D$	$L_B$	$G_B$	a	Clearance	
				in Air	Creepage
45	10	M8	19	9	20
50	16	M12	26	16	20
55	16	M12	26	16	20

Dimensions (E62-TAB series)

D1 / D2 terminal  
(Can diameter :  $\phi 35 \sim 75\text{mm}$ )



E4 terminal

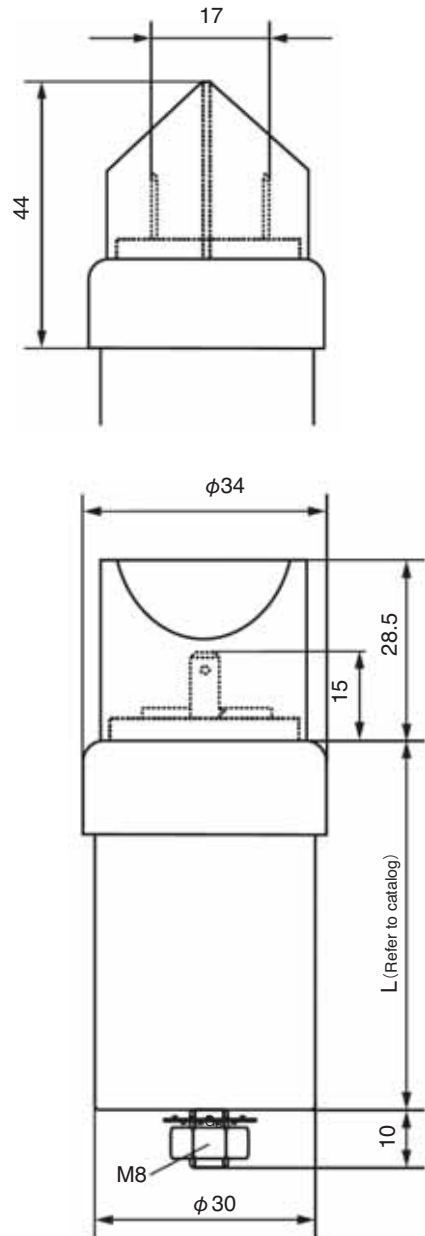
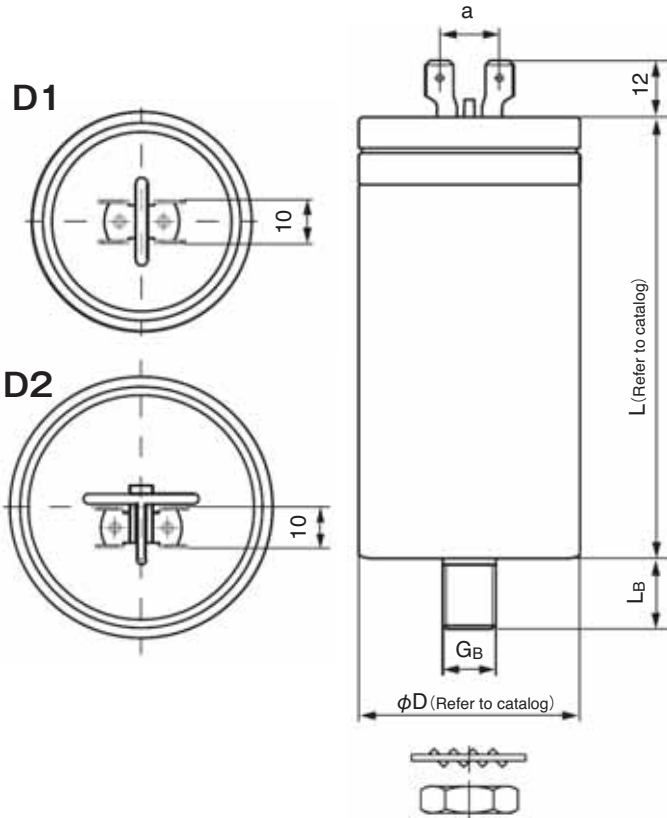


Table. Common Specification

Item	Specification
Terminal code	D1 / D2
Can material	Aluminium
Stud bolt	M8 / M12
Lid	Plastic with rubber sealing
Terminal	Dual tab connectors
	$I_{\text{max}}$ (terminal) : 16A
Degree of protection	IP00

Table. Dimensions

Unit : mm

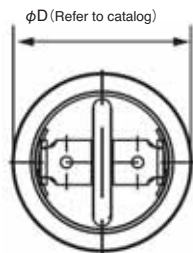
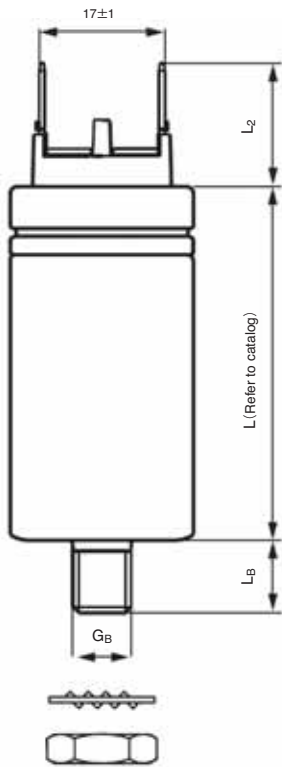
$\phi D$	Terminal	$L_B$	$G_B$	a	Clearance	
					in Air	Creepage
35	D1	10	M8	13.5	6.5	6.5
40	D1	10	M8	13.5	6.5	9
45	D1	10	M8	13.5	6.5	10
50	D1	16	M12	13.5	6.5	10
55	D1	16	M12	13.5	6.5	10
60	D1	16	M12	13.5	6.5	10
65	D2	16	M12	16.5	8	10
75	D2	16	M12	16.5	8	10

Table. Common Specification

Item	Specification
Terminal code	E4
Can material	Aluminium
Stud bolt	M8
Lid	Plastic with rubber sealing
Terminal	Tab connector (6.3 × 0.8mm)
	$I_{\text{max}}$ (terminal) : 16A
Degree of protection	IP00

## Dimensions (E62-TAB series)

**E1 terminal**  
(Can diameter :  $\phi 25 \sim 30\text{mm}$ )



**E2 terminal**  
(Can diameter :  $\phi 35 \sim 65\text{mm}$ )

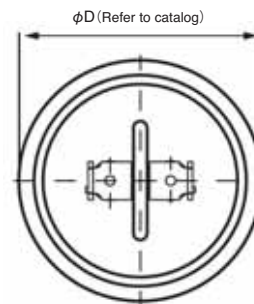
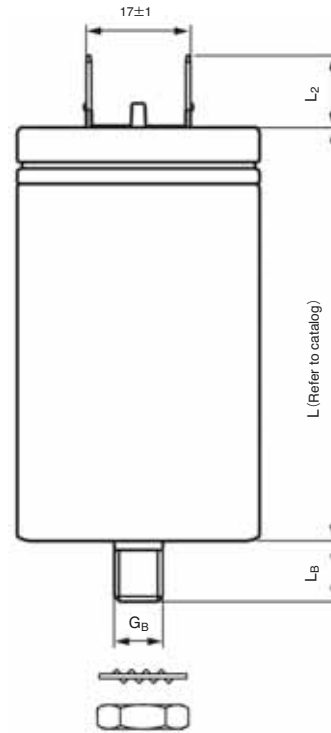


Table. Common Specification

Item	Specification
Terminal code	E1 / E2
Can material	Aluminium
Stud bolt	M8 / M12
Lid	Plastic
Terminal	Tab connector (6.3 × 0.8mm)
	$I_{max}$ (terminal) : 16A
Degree of protection	IP00

Table. Dimensions

Unit : mm

$\phi D$	$L_2$	$L_B$	$G_B$	Clearance	
				in Air	Creepage
25	16	10	M8	7.5	7.5
30	15	10	M8	7.5	9
35 ~ 45	11	10	M8	7.5	9
50 ~ 65	11	16	M12	7.5	9



# E62-3HF (AC) Series

(Three Phase Type Cylindrical Metallized Polypropylene Film Capacitors)

## Features

- The three capacitor elements are connected in delta internally.
- Designed especially for heavy duty operation in extreme or sophisticated operating conditions.
- The integrated overpressure disconnecter ensure safe operation and controlled disconnection in the event of overload or failure at the end of operating life.

## Specifications

Item	Specification
Category temperature range	- 50 ~ + 70°C (+ 85°C / Includes self temperature rise)
Storage temperature	- 50 ~ + 85°C
Rated voltage (U <sub>N</sub> )	640 ~ 1,400Vac
Stud bolt (torque)	M12 × 16 / 18 (15 ± 1Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	±5%
Circuitry	Delta
Safety devices	Overpressure disconnecter
Impregnant	Castor oil, Non PCB
Material of case	Aluminum
Environmental regulations	Comply with RoHS



PLASTIC FILM CAPACITORS

Numbering system: e.g. E62-3HF, 640VAC, 3 × 33 μF, φ 75 × 164Lmm, Z3terminal

**E62 . M 16 - 333 Z3 0 / H**

- Auxiliary symbol
- Terminal symbol
- Capacitance
- Case length
- Case diameter symbol
- Series name

## Standard Value and Case Size

Rated Capacitance C <sub>N</sub> (μF)	Case size		Max current (rms) I <sub>max</sub> [Arms]	Max peak current î [kA]	Max surge current I <sub>s</sub> [kA]	Series resistance (reference) R <sub>s</sub> [mΩ]	Self inductance (reference) ESL [nH]	Thermal resistance (reference) R <sub>th</sub> [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	φD [mm]	L [mm]										
Rated AC voltage U <sub>N</sub> (AC) : 640Vac			U <sub>rms</sub> : 450V U <sub>s</sub> : 1,350V Test voltage (T-T) U <sub>TT</sub> : 1,060Vdc Test voltage (T-C) U <sub>Tc</sub> : 3,600Vac									
3 × 33	75	164	3 × 39	0.9	2.7	3 × 0.9	110	4.7	S4	0.8	30	E62.M16-333S40/H
3 × 40	75	164	3 × 39	1.1	3.3	3 × 0.5	110	4.7	S4	0.8	30	E62.M16-403S40/H
3 × 46	85	164	3 × 56	1.3	3.9	3 × 0.5	120	4.1	S4	1.0	30	E62.N16-463S40/H
3 × 51	85	164	3 × 56	1.4	4.2	3 × 0.5	120	4.1	S4	1.0	30	E62.N16-513S40/H
3 × 68	95	164	3 × 56	2.0	6.0	3 × 0.5	120	3.7	S4	1.2	30	E62.P16-683S40/H
3 × 80	95	196	3 × 56	1.8	5.4	3 × 0.7	130	3.1	S4	1.5	60	E62.P19-803S40/H
3 × 100	116	164	3 × 56	2.8	8.4	3 × 0.4	100	3	S4	1.8	30	E62.R16-104S40/H
3 × 100	116	164	3 × 100	2.8	8.4	3 × 0.4	100	3	MB	1.8	39	E62.R16-104MB0/H
3 × 135	116	230	3 × 100	2.5	7.5	3 × 0.6	120	2.1	MB	2.5	30	E62.R23-134MB0/H
3 × 140	116	230	3 × 56	2.5	7.5	3 × 0.5	120	2.1	S4	2.6	27	E62.R23-144S40/H
3 × 200	136	230	3 × 100	3.4	10.2	3 × 0.5	120	1.8	MB	3.5	30	E62.S23-204MB0/H
Rated AC voltage U <sub>N</sub> (AC) : 750Vac			U <sub>rms</sub> : 530V U <sub>s</sub> : 1,600V Test voltage (T-T) U <sub>TT</sub> : 1,250Vdc Test voltage (T-C) U <sub>Tc</sub> : 3,600Vac									
3 × 16	65	164	3 × 39	0.6	1.8	3 × 0.9	100	5.4	Z3	0.6	30	E62.L16-163Z30/H
3 × 23	75	164	3 × 39	0.85	2.5	3 × 0.5	110	4.7	S4	0.8	120	E62.M16-233S40/H
3 × 30	85	164	3 × 56	1.1	3.3	3 × 0.7	120	4.1	S4	1.0	30	E62.N16-303S40/H
3 × 38.4	95	164	3 × 56	1.4	4.2	3 × 0.7	125	3.7	S4	1.2	30	E62.P16-383S40/H
3 × 48	100	164	3 × 56	1.7	5.1	3 × 0.5	130	3.5	S4	1.4	66	E62.Q16-483S40/H
3 × 75	116	196	3 × 56	2.2	6.6	3 × 0.6	130	2.5	S4	2.2	39	E62.R19-753S40/H
3 × 100	116	230	3 × 56	2.2	6.6	3 × 0.6	120	2.1	S4	2.5	30	E62.R23-104S40/H
3 × 100	116	230	3 × 100	2.2	6.6	3 × 0.6	120	2.1	MB	2.5	30	E62.R23-104MB0/H

Standard Value and Case Size

Rated Capacitance $C_N$ [μF]	Case size		Max current (rms) $I_{max}$ [Arms]	Max peak current $\hat{i}$ [kA]	Max surge current $I_s$ [kA]	Series resistance (reference) $R_s$ [mΩ]	Self inductance (reference) $ESL$ [nH]	Thermal resistance (reference) $R_{th}$ [K/W]	Terminal	Weight [kg]	MOQ [pcs]	Part number
	$\phi D$ [mm]	$L$ [mm]										
Rated AC voltage $U_N$ (AC) : 850Vac			$U_{rms}$ : 600V $U_s$ : 1,830V Test voltage (T-T) $U_{TT}$ : 1,420Vdc Test voltage (T-C) $U_{TC}$ : 4,800Vac									
3 × 9	60	164	3 × 39	0.8	2.4	3 × 0.8	100	5.8	Z3	0.5	200	E62.K16-902Z30/H
3 × 11	65	164	3 × 39	1.0	3.0	3 × 0.9	100	5.4	Z3	0.6	190	E62.L16-113Z30/H
3 × 12	65	164	3 × 39	1.1	3.3	3 × 0.9	100	5.4	Z3	0.6	30	E62.L16-123Z30/H
3 × 14	75	164	3 × 39	1.2	3.6	3 × 0.5	120	4.7	S4	0.8	30	E62.M16-143S40/H
3 × 19	85	164	3 × 56	1.7	5.1	3 × 0.5	120	4.1	S4	1.0	80	E62.N16-193S40/H
3 × 25	95	164	3 × 56	2.2	6.6	3 × 0.6	120	3.7	S4	1.2	78	E62.P16-253S40/H
3 × 30	100	164	3 × 56	2.6	7.8	3 × 0.5	120	3.5	S4	1.5	60	E62.Q16-303S40/H
3 × 37.5	100	196	3 × 56	2.7	8.0	3 × 0.4	130	2.9	S4	1.6	60	E62.Q19-373S40/H
3 × 50	116	196	3 × 56	3.4	10.2	3 × 0.5	130	2.5	S4	2.2	45	E62.R16-503S40/H
3 × 72.5	116	230	3 × 56	3.7	11.1	3 × 0.7	120	2.1	S4	2.6	33	E62.R23-723S40/H
3 × 100	136	230	3 × 100	5.0	15.0	3 × 0.5	130	1.8	MB	3.5	24	E62.S23-104MB0/H
Rated AC voltage $U_N$ (AC) : 1,080Vac			$U_{rms}$ : 760V $U_s$ : 2,320V Test voltage (T-T) $U_{TT}$ : 1,800Vdc Test voltage (T-C) $U_{TC}$ : 4,800Vac									
3 × 11	75	164	3 × 39	1.2	3.6	3 × 1	110	4.7	S4	0.8	140	E62.M16-113S40/H
3 × 18.4	95	164	3 × 56	1.9	5.7	3 × 0.5	125	3.7	S4	1.2	84	E62.P16-183S40/H
3 × 22	95	196	3 × 56	2.0	6.0	3 × 0.5	130	3.1	S4	1.5	60	E62.P19-223S40/H
3 × 27.6	116	164	3 × 56	3.1	9.3	3 × 0.4	120	3.0	S4	1.8	48	E62.R16-283S40/H
3 × 33.4	95	230	3 × 56	2.0	6.0	3 × 0.6	130	2.6	S4	1.7	51	E62.P23-333S40/H
3 × 49	116	230	3 × 56	3.2	9.6	3 × 0.55	120	2.1	S4	2.7	30	E62.R23-493S40/H
3 × 55.7	136	196	3 × 56	5.0	15.0	3 × 0.4	130	2.1	S4	3.0	28	E62.S19-563S40/H
3 × 55.7	136	196	3 × 100	5.0	15.0	3 × 0.4	130	2.1	MB	3.0	26	E62.S19-563MB0/H
3 × 75	136	230	3 × 100	4.5	13.5	3 × 0.5	130	1.8	MB	3.5	22	E62.S23-753MB0/H
Rated AC voltage $U_N$ (AC) : 1,130Vac			$U_{rms}$ : 800V $U_s$ : 2,430V Test voltage (T-T) $U_{TT}$ : 1,890Vdc Test voltage (T-C) $U_{TC}$ : 4,800Vac									
3 × 24.9	100	196	3 × 56	2.2	6.6	3 × 0.6	130	2.9	S4	1.6	51	E62.Q19-253S40/H
3 × 33.2	116	196	3 × 56	2.9	8.7	3 × 0.6	130	2.5	S4	2.2	36	E62.R19-333S40/H
3 × 41.4	136	196	3 × 56	4.1	12.3	3 × 0.5	130	2.1	S4	3.0	27	E62.S19-413S40/H
3 × 46	116	230	3 × 56	2.9	8.7	3 × 0.65	120	2.1	S4	2.6	30	E62.R23-463S40/H
Rated AC voltage $U_N$ (AC) : 1,200Vac			$U_{rms}$ : 850V $U_s$ : 2,580V Test voltage (T-T) $U_{TT}$ : 2,010Vdc Test voltage (T-C) $U_{TC}$ : 4,800Vac									
3 × 8	75	164	3 × 39	1.0	3.0	3 × 1	110	4.7	S4	0.8	125	E62.M16-802S40/H
3 × 25	116	164	3 × 56	3.2	9.6	3 × 0.4	130	3.0	S4	2.2	45	E62.R16-253S40/H
3 × 37.5	116	230	3 × 56	2.9	8.7	3 × 0.55	120	2.1	S4	2.6	30	E62.R23-373S40/H
3 × 41.5	116	230	3 × 56	3.0	9.0	3 × 0.55	120	2.1	S4	2.6	30	E62.R23-413S40/H
3 × 41.5	116	245	3 × 100	2.6	7.8	3 × 0.6	130	2.0	MB	2.7	27	E62.R24-413MB0/H
3 × 55.7	136	230	3 × 100	4.0	12.0	3 × 0.4	125	1.8	MB	3.5	30	E62.S23-563MB0/H
Rated AC voltage $U_N$ (AC) : 1,400Vac			$U_{rms}$ : 1,000V $U_s$ : 3,000V Test voltage (T-T) $U_{TT}$ : 2,370Vdc Test voltage (T-C) $U_{TC}$ : 4,800Vac									
3 × 33	136	230	3 × 100	3.0	9.0	3 × 0.4	120	1.8	MB	3.5	25	E62.S23-333MB0/H
3 × 40	136	280	3 × 100	2.8	8.4	3 × 0.55	150	1.5	MB	4.3	18	E62.S28-403MB0/H

PLASTIC FILM CAPACITORS

## Dimensions (E62-3HF series)

**Z3 / S4 terminal**  
(Can diameter :  $\phi 60 \sim 136\text{mm}$ )



**MB terminal**  
(Can diameter :  $\phi 116 / 136\text{mm}$ )

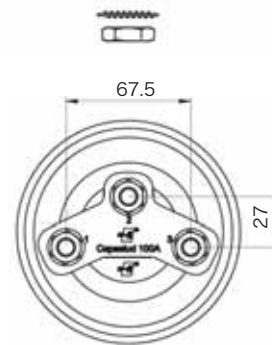
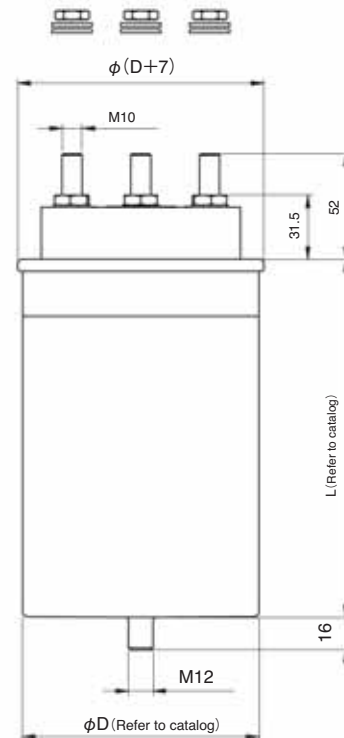
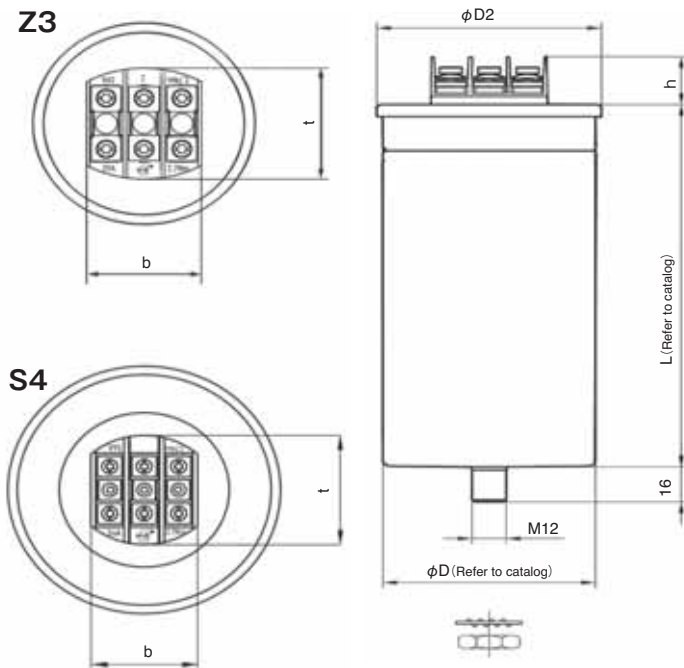


Table. Common Specification

Item	Specification
Terminal code	Z3 / S4
Can material	Aluminum
Stud bolt	M12
Lid	Aluminum
Terminal	Wire size : 10mm <sup>2</sup>
	Connection : Fork type lug (Width<11mm)
	Screw : Torx T20, M4, Torque : 2.7Nm
	I <sub>max</sub> (terminal) : 39A
	Clearance in air : 10mm
	Creepage distance : 10mm
Terminal	Wire size : 16mm <sup>2</sup>
	Connection : Fork type lug (Width<12mm)
	Screw : Torx T20, M4, Torque : 2.7Nm
	I <sub>max</sub> (terminal) : 56A
	Clearance in air : 11mm
	Creepage distance : 11mm
Degree of protection	IP00

Table. Common Specification

Item	Specification
Terminal code	MB
Can material	Aluminum
Stud bolt	M12
Lid	Aluminum
Terminal	M10 bolt terminal
	Torque : 10Nm
	I <sub>max</sub> (terminal) : 100A
	Clearance in air : 20mm
	Creepage distance : 25mm
Degree of protection	IP00

Table. Dimensions

Unit : mm

Item	Terminal	
	Z3	S4
h	22	$\phi 60 \sim 100$ 23 $\phi 116 \sim 136$ 18
b	41	47
t	43.5	53

$\phi D$		$\phi D2$	
60	95	64.8	99.7
65	100	69.7	104.5
75	116	79.3	120.5
85	136	89.3	142





**NEW!**

# E66 Series (DC Cylindrical Metallized Polypropylene Film Capacitors)

## Features

- For use under high temperature / high humidity environment.
- High rms current rating (up to 120Arms).
- Up to 20% less weight (than our existing series).

## Specifications

Item	Specification
Category temperature range	- 50 ~ + 85°C (Includes self temperature rise)
Storage temperature	- 50 ~ + 85°C
Rated voltage (UN)	600 ~ 1,500Vdc
Terminal (torque)	M6 × 10 (4Nm)
Standards	IEC 61071
Dielectric	Polypropylene
Dielectric dissipation factor (tan δ <sub>0</sub> )	2 × 10 <sup>-4</sup>
Capacitance tolerance	±10% (optional ±5%)
Safety devices	—
Impregnant	neutral insulation gas
Material of case	aluminium
Environmental regulations	Comply with RoHS

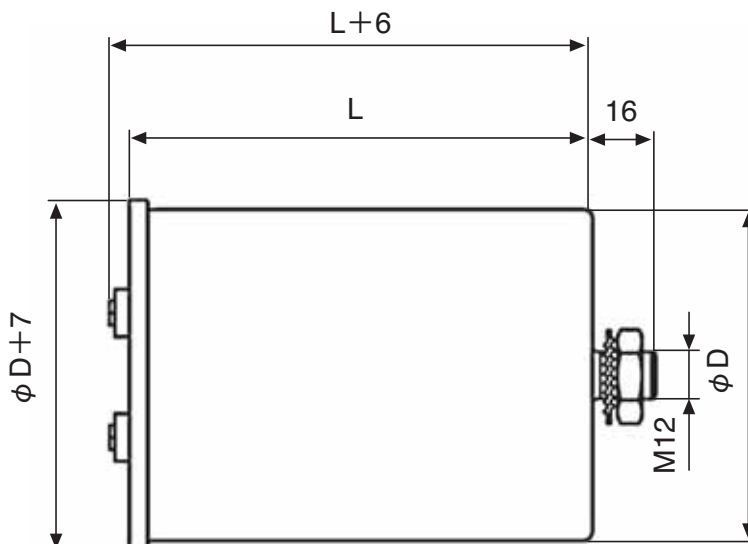
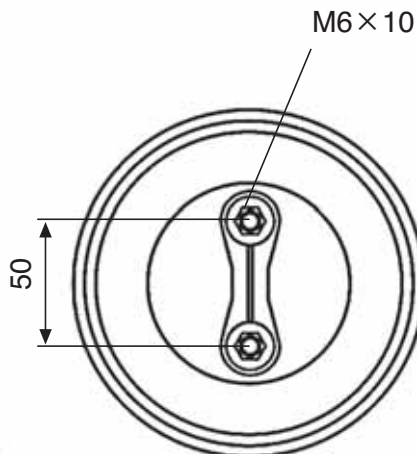
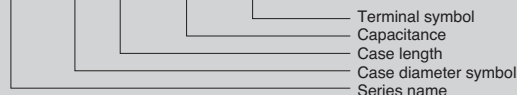


## Dimensions

Item	Specification
Terminal code	W2
Can material	aluminium
Terminal	Internal threads M6 × 10
	Torque : 4Nm
	I <sub>max</sub> (terminal) : 40A
Degree of protection	IP00
Clearance in air	20mm
Creepage distance	32mm

Numbering system: e.g. E66, 600VDC, 1,175μF, φ 116×113Lmm, W2 terminal

**E61 . R 11 - 125 W20 / H**



Standard Value and Case Size

Rated Capacitance $C_N$ [μF]	Case size		Series resistance (reference) $R_s$ [mΩ]	Thermal resistance (reference) $R_{th}$ [K/W]	Max current $I_{max}$ [Arms]	Max peak current $\hat{I}$ [kA]	Max surge current $I_s$ [kA]	Self inductance (reference) $ESL$ [nH]	Weight (kg)	Part number
	$\phi D$ [mm]	$L$ [mm]								
<b>Rated voltage <math>U_N</math>: 600Vdc <math>U_r</math>: 100V <math>U_s</math>: 900V <math>U_{TT}</math>: 900Vdc <math>U_{TC}</math>: 3,300Vac/2s</b>										
1,175	116	113	0.91	4	65	6.6	19.8	40	1.1	E66.R11-125W20/H
1,600	116	138	1	3.3	60	6.6	19.8	50	1.3	E66.R13-165W20/H
1,670	136	113	0.83	3.4	65	9.4	28.1	40	1.5	E66.S11-175W20/H
1,920	116	167	0.81	2.8	90	13.2	39.5	55	1.6	E66.R16-195W20/H
2,265	136	138	0.94	2.8	65	9.3	28	50	1.8	E66.S13-235W20/H
2,350	116	193	0.85	2.4	90	13.2	39.5	65	1.9	E66.R19-235W20/H
2,730	136	167	0.77	2.3	90	18.8	56.2	55	2.2	E66.S16-275W20/H
3,200	116	242	0.96	1.9	90	13.2	39.5	75	2.3	E66.R24-325W20/H
3,340	136	193	0.81	2	90	18.8	56.3	65	2.5	E66.S19-335W20/H
4,095	136	234	0.8	1.7	120	28.1	84.4	75	3.1	E66.S23-415W20/H
4,530	136	242	1.1	1.3	90	18.6	55.9	105	3.3	E66.R24-455W20/H
<b>Rated voltage <math>U_N</math>: 900Vdc <math>U_r</math>: 200V <math>U_s</math>: 1,350V <math>U_{TT}</math>: 1,350Vdc <math>U_{TC}</math>: 3,360Vac/2s</b>										
610	116	100	0.91	4.6	65	5.3	15.9	40	1	E66.R10-614W20/H
865	136	100	0.83	3.9	65	7.5	22.6	40	1.3	E66.S10-874W20/H
1,020	116	138	1.2	3.4	65	5.3	15.9	50	1.3	E66.R13-105W20/H
1,220	116	167	0.84	2.8	90	110.6	31.8	55	1.6	E66.R16-125W20/H
1,290	116	163	1.3	2.8	65	5.3	15.9	55	1.5	E66.R16-135W20/H
1,445	136	138	1	2.9	65	7.5	22.6	50	1.8	E66.S13-145W20/H
1,490	116	193	0.89	2.4	90	10.6	31.8	60	1.9	E66.R19-155W20/H
1,730	136	167	0.79	2.4	90	15.1	45.2	55	2.2	E66.S16-175W20/H
1,830	116	234	0.84	2	110	15.9	47.8	75	2.2	E66.R23-185W20/H
1,830	136	163	1.1	2.4	65	7.5	22.6	55	2.1	E66.S16-185W20/H
2,040	116	242	1	1.9	90	10.6	31.9	75	2.3	E66.R24-205W20/H
2,120	136	193	0.83	2	90	15.1	45.2	60	2.5	E66.S19-215W20/H
2,440	116	301	0.9	1.5	120	21.2	63.7	90	2.9	E66.R30-245W20/H
2,580	116	292	1.1	1.6	90	10.6	31.8	90	2.8	E66.R29-265W20/H
2,595	136	234	0.81	1.7	120	22.6	67.7	75	3.1	E66.S23-265W20/H
2,890	136	242	0.94	1.6	90	15.1	45.2	75	3.3	E66.S24-295W20/H
3,460	136	301	0.87	1.3	120	30.1	90.3	90	3.9	E66.S30-355W20/H
3,660	136	292	1	1.3	90	15	45.1	90	3.8	E66.S29-375W20/H
<b>Rated voltage <math>U_N</math>: 1,100Vdc <math>U_r</math>: 250V <math>U_s</math>: 1,650V <math>U_{TT}</math>: 1,650Vdc <math>U_{TC}</math>: 3,840Vac/2s</b>										
215	116	75	0.81	6.1	60	4.2	12.5	30	0.7	E66.R75-224W20/H
305	136	75	0.74	5.2	65	5.9	17.8	30	1	E66.S75-314W20/H
390	116	100	1	4.6	60	4.2	12.6	40	1	E66.R10-394W20/H
430	116	117	0.8	3.8	75	8.4	25.1	45	1.1	E66.R11-434W20/H
560	136	100	0.88	3.9	65	6	18.1	40	1.3	E66.S10-564W20/H
645	116	159	0.8	2.9	90	12.5	37.6	55	1.5	E66.R15-654W20/H
655	116	138	1.3	3.3	65	4.2	12.7	50	1.3	E66.R13-664W20/H
780	116	167	0.95	2.8	80	8.4	25.2	55	1.6	E66.R16-784W20/H
860	116	201	0.79	2.2	105	16.7	50.1	65	1.9	E66.R20-864W20/H
1,045	116	193	1.6	2.4	65	4.2	12.7	65	1.9	E66.R19-105W20/H
1,120	136	167	0.89	2.3	80	12.1	36.2	55	2.2	E66.S16-115W20/H
1,170	116	234	0.93	2	100	12.6	37.8	75	2.2	E66.R23-125W20/H
1,310	116	242	1.1	1.9	90	8.4	25.3	75	2.3	E66.R24-135W20/H
1,480	136	193	1.4	2	65	6	18	65	2.5	E66.S19-155W20/H
1,560	116	301	0.92	1.5	120	16.8	50.4	90	2.9	E66.R30-165W20/H
1,680	136	234	0.83	1.7	120	18.1	54.2	75	3.1	E66.S23-175W20/H
2,240	136	301	0.89	1.3	120	24.1	72.3	90	3.9	E66.S30-225W20/H
<b>Rated voltage <math>U_N</math>: 1,200Vdc <math>U_r</math>: 250V <math>U_s</math>: 1,800V <math>U_{TT}</math>: 1,800Vdc <math>U_{TC}</math>: 4,080Vac/2s</b>										
320	116	100	1.00	4.6	65	3.8	11.4	40	1	E66.R10-324W20/H
455	136	100	0.91	3.9	65	5.4	16.2	40	1.3	E66.S10-464W20/H
595	116	148	1.40	3.1	65	3.8	11.5	50	1.4	E66.R14-604W20/H
640	116	167	0.90	2.7	90	7.6	22.9	55	1.6	E66.R16-644W20/H
790	116	193	0.95	2.4	90	7.7	23.1	65	1.9	E66.R19-794W20/H
910	136	167	0.83	2.3	90	10.8	32.5	55	2.2	E66.S16-914W20/H
960	116	234	0.95	2	100	11.4	34.3	90	2.2	E66.R23-964W20/H
1,120	136	193	0.88	2	90	10.9	32.7	65	2.5	E66.S19-115W20/H
1,190	116	262	1.20	1.7	90	7.7	23	80	2.5	E66.R26-125W20/H
1,280	116	301	0.93	1.5	120	15.2	45.7	90	2.9	E66.R30-135W20/H
1,365	136	234	0.84	1.7	120	16.2	48.7	75	3.1	E66.S23-145W20/H
1,690	136	262	1.10	1.5	90	10.9	32.7	80	3.4	E66.S26-175W20/H
1,820	136	301	0.89	1.3	120	21.7	65	90	3.9	E66.S30-185NT0/H

PLASTIC FILM CAPACITORS

# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

## Standard Value and Case Size

Rated Capacitance $C_N$ [ $\mu F$ ]	Case size		Series resistance (reference) $R_s$ [m $\Omega$ ]	Thermal resistance (reference) $R_{th}$ [K/W]	Max current $I_{max}$ [Arms]	Max peak current $\hat{i}$ [kA]	Max surge current $I_s$ [kA]	Self inductance (reference) $ESL$ [nH]	Weight [kg]	Part number
	$\phi D$ [mm]	$L$ [mm]								
<b>Rated voltage <math>U_N</math> : 1,300Vdc <math>U_r</math> : 300V <math>U_s</math> : 1,950V <math>U_{TT}</math> : 1,950Vdc <math>U_{TC}</math> : 4,320Vac/2s</b>										
315	116	113	1.2	4	65	3.5	10.4	40	1.1	E66.R11-324W20/H
450	136	113	1	3.4	65	4.9	14.7	40	1.5	E66.S11-454W20/H
510	116	167	1	2.7	80	6.8	20.3	55	1.6	E66.R16-514W20/H
555	116	234	0.96	2	100	10.2	30.5	75	2.2	E66.R23-564W20/H
630	116	193	0.98	2.4	90	6.8	20.5	65	1.9	E66.R19-634W20/H
750	116	217	1.1	2.1	90	6.9	20.7	70	2.1	E66.R21-754W20/H
900	136	193	0.9	2	90	9.8	29.3	65	2.5	E66.S19-904W20/H
945	116	272	0.96	1.7	110	10.3	30.8	85	2.6	E66.R27-954W20/H
1,060	136	217	0.98	1.8	90	9.7	29.2	70	2.9	E66.S21-115W20/H
1,350	136	272	0.97	1.4	120	14.7	44	85	3.6	E66.S27-145W20/H
1,460	136	301	0.9	1.3	120	19.4	58.2	90	3.9	E66.S30-155W20/H
<b>Rated voltage <math>U_N</math> : 1,500Vdc <math>U_r</math> : 300V <math>U_s</math> : 2,250V <math>U_{TT}</math> : 2,250Vdc <math>U_{TC}</math> : 4,800Vac/2s</b>										
160	116	88	1	5.1	55	3.1	9.2	35	0.9	E66.R88-164W20/H
225	136	88	0.87	4.4	65	4.3	12.9	35	1.2	E66.S88-234W20/H
320	116	142	0.92	3.2	80	6.1	18.4	50	1.4	E66.R14-324W20/H
380	116	148	1.6	3.1	60	3.1	9.2	50	1.4	E66.R14-384W20/H
450	136	142	0.8	2.7	90	8.6	25.9	50	1.9	E66.S14-454W20/H
540	116	148	1.3	2.6	65	4.3	13	40	1.9	E66.S14-544W20/H
640	116	251	0.87	1.8	110	12.3	36.8	80	2.4	E66.R25-644W20/H
760	116	262	1.3	1.7	90	6.1	18.4	80	2.5	E66.R26-764W20/H
900	116	251	0.84	1.5	120	17.2	51.7	80	3.3	E66.S25-904W20/H
1,080	136	262	1.1	1.5	90	8.7	26.1	80	3.4	E66.S26-115W20/H





## ATTENTION

- The description in this catalogue is as of Jan. 2021 and is subject to change without prior notice for product improvement. Therefore, please confirm the specification before ordering products.
- The general characteristics, reliability data, etc., described in this catalogue should not be construed as guaranteed values; they are merely standard values.
- The capacitors in this catalogue are for use in ordinary equipment other than medical and disaster-preventing equipment. When you use the products for medical and disaster-preventing equipment which requires higher reliability, please ask us in advance.
- Before using the products, please read the notes in this catalogue carefully for proper use,

**Sales & Marketing**  
**AIC tech Inc.**

<https://aictech-inc.com>

**Head Office & Manufacturing Division**

1065, Kugeta, Moka-shi, Tochigi 321-4521, Japan

Tel : +81-285-74-1231      Fax : +81-285-74-1236

**Tokyo Sales Office**

TOWA Akihabara Building 7F, 1-8, Akihabara, Taito-ku, Tokyo 110-0006, Japan

Tel : +81-3-6384-0371      Fax : +81-3-6384-0372