

Capacitors All Guide

2024-2025



AIC tech Inc.

C O N T E N T S

Aluminum electrolytic capacitors (screw terminal type)



Aluminum electrolytic capacitors (snap mount type)



Radial type Aluminum electrolytic capacitors



Plastic film capacitors (Power electronics use)



Series	See page	Description
●VF	<i>UPGRADE!!</i> 26	Standard
●VG	<i>UPGRADE!!</i> 32	Standard
●VFL	<i>UPGRADE!!</i> 38	Standard
●VGL	<i>UPGRADE!!</i> 42	Standard
●VFH	<i>UPGRADE!!</i> 46	Standard
●VFR	<i>UPGRADE!!</i> 50	High-ripple current
●VGR	<i>UPGRADE!!</i> 54	High-ripple current
●VFLR	<i>UPGRADE!!</i> 58	High-ripple current
●VGLR	<i>UPGRADE!!</i> 62	High-ripple current
●VFHR	<i>UPGRADE!!</i> 66	High-ripple current
●HCGWA	70	Ultra small
●HCGW2	<i>UPGRADE!!</i> 72	Ultra small
●HCGW3	<i>UPGRADE!!</i> 74	Ultra small
●FXW	<i>UPGRADE!!</i> 76	Ultra small
●FXW2	<i>UPGRADE!!</i> 78	Ultra small

●HP3	84	Standard
●HU3	88	Standard
●HU	<i>UPGRADE!</i> 92	Standard
●ZL	<i>UPGRADE!</i> 96	Standard
●HL	<i>UPGRADE!</i> 100	Standard
●YL	104	Standard
●XL1	106	Standard
●UW	108	Ultra small
●CU	110	High-ripple current
●ZR2	<i>NEW!</i> 112	High-ripple current
●ZR	114	High-ripple current
●PS2	<i>NEW!</i> 116	High-ripple current & large capacitance product
●US2	<i>NEW!</i> 120	High-ripple current & large capacitance product
●DH	124	Special application
●HW	126	Small
●HS	128	Standard

● HU	132	Standard
● HL	136	Standard

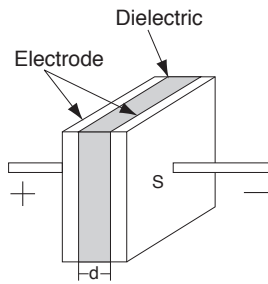
● MLC	148	Metallized polypropylene
● MLC2	154	Metallized polypropylene
● MLCA	158	Metallized polypropylene
● MKCP4	162	Metallized polypropylene
● MKCP4T	164	Metallized polypropylene
● MKCA NEW!	166	Metallized polypropylene

Description		Operating voltage (V.DC)	Capacitance range (μF)
Long-life	Useful of 4,000hours at 85°C	6.3 ~ 600	560 ~ 680,000
	Useful of 4,000hours at 105°C	25 ~ 500	680 ~ 330,000
	Useful of 8,000hours at 85°C	350 ~ 550	680 ~ 27,000
	Useful of 8,000hours at 105°C	350 ~ 500	680 ~ 27,000
	Useful of 20,000hours at 85°C	350 ~ 500	680 ~ 27,000
	Useful of 4,000hours at 85°C	350 ~ 500	820 ~ 27,000
	Useful of 4,000hours at 105°C	350 ~ 500	680 ~ 22,000
	Useful of 8,000hours at 85°C	350 ~ 500	820 ~ 27,000
	Useful of 8,000hours at 105°C	350 ~ 500	680 ~ 22,000
	Useful of 20,000hours at 85°C	350 ~ 500	680 ~ 22,000
Large-capacitance	Useful of 4,000hours at 85°C	350 ~ 500	5,600 ~ 57,000
	Useful of 4,000hours at 85°C	400 ~ 500	7,500 ~ 33,000
	Useful of 4,000hours at 70°C	350 ~ 500	10,000 ~ 51,000
	Useful of 8,000hours at 85°C	350 ~ 450	9,000 ~ 45,000
	Useful of 8,000hours at 85°C	350 ~ 500	7,900 ~ 42,000
Small-sized	Useful of 4,000hours at 85°C	16 ~ 450	120 ~ 33,000
	Useful of 4,000hours at 105°C	16 ~ 450	68 ~ 33,000
	Useful of 4,000hours at 105°C	200 ~ 550	82 ~ 2,200
	Useful of 5,000hours at 105°C	200 ~ 550	82 ~ 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	56 ~ 1,800
	Useful of 2,000hours at 105°C	450	210 ~ 1,150
	Useful of 4,000hours at 105°C	400 ~ 500	120 ~ 1,200
	Useful of 5,000hours at 105°C	400, 450	180 ~ 1,500
	Useful of 5,000hours at 105°C	400, 450	150 ~ 680
	Useful of 4,000hours at 85°C	200 ~ 600	180 ~ 4,700
	Useful of 4,000hours at 105°C	200 ~ 450	330 ~ 4,700
	Useful of 5,000hours at 105°C	400, 450	82 ~ 680
	For flash application	330 ~ 450	320 ~ 3,800
	For flash application	330 ~ 450	300 ~ 3,100
Long-life	Useful of 2,000hours at 105°C	200 ~ 450	8.2 ~ 560
	Useful of 5,000hours at 105°C	200 ~ 450	8.2 ~ 560
Aluminum encased type	Standard product	900 ~ 1,500	70 ~ 2,300
Aluminum encased type	Large capacity	800, 900	230 ~ 3,800
Aluminum encased type	High-ripple current	600 ~ 2,200	90 ~ 5,000
Resin encased type	Standard product	700 ~ 1,100	7 ~ 100
Resin encased type	High resistance	700 ~ 1,100	6 ~ 70
Resin encased type	Wide range of rated voltage	450 ~ 1,200	1 ~ 80

Contents

Basic Of Capacitors	P.3
Minimum Order Quantity	P.4
Eco-Products	P.5
Aluminum Electrolytic Capacitors	P.7 ~ 138
Contents	P.7
Product Line Chart	P.8 ~ 9
Series Table	P.10
Standardization	P.11
Technical Report	P.12 ~ 20
Screw Terminal Type Aluminum Electrolytic Capacitors	P.21 ~ 80
How To Order	P.21
Assembling Method	P.22 ~ 23
Series Specifications	P.24 ~ 80
Snap Mount Type Aluminum Electrolytic Capacitors	P.81 ~ 129
How To Order	P.81
Outline Of Drawing And Dimensions	P.82 ~ 83
Series Specifications	P.84 ~ 129
Radial Type Aluminum Electrolytic Capacitors	P.131 ~ 138
How To Order	P.131
Series Specifications	P.132 ~ 138
Plastic Film Capacitors	P.140 ~ 169
Contents	P.139
Product Line Chart	P.140
Series Table	P.141
Technical Report	P.142 ~ 145
Glossary	P.146
Series Specifications	P.148 ~ 169

1. Capacitance of capacitors



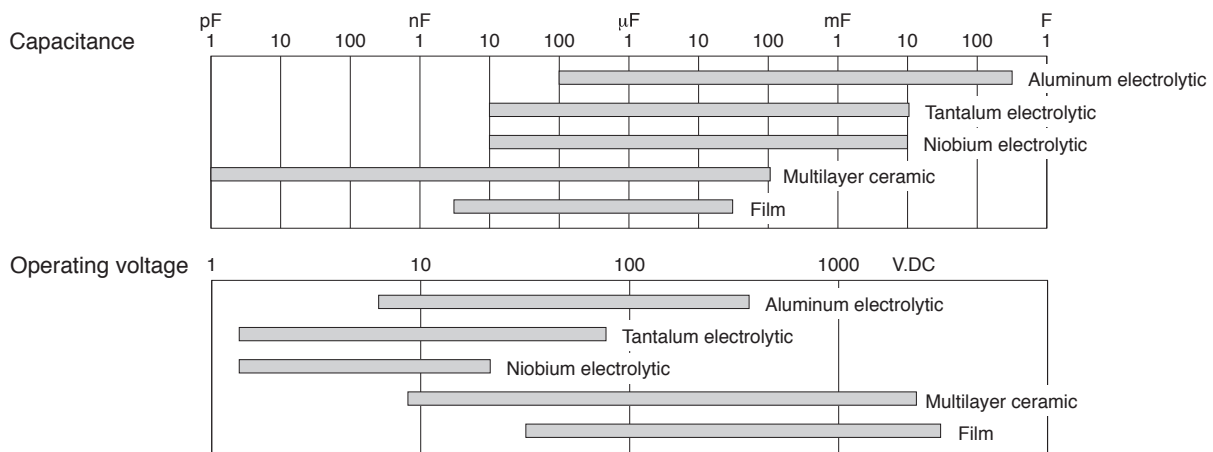
A capacitor is so designed that a dielectric is sandwiched between two electrodes as shown in Fig. 1. The capacitance (C) is expressed as:

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

ϵ_r : specific dielectric constant. ϵ_o : dielectric constant of vacuum ($8.85 \times 10^{-12} \text{F/m}$)
 d : distance between electrodes (m). S : electrode surface (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 (Al ₂ O ₃)	Polyester, polypropylene, etc.	Tantalum pentoxide (Ta ₂ O ₅)	Niobium pentoxide (Nb ₂ 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	- Cheap - Small-size and large-capacity	- Good characteristics - Can be made for low- to high-voltage applications - High reliability	- Small and comparatively large capacitance - Semi-permanent service life	- Small and comparatively large capacitance - Semi-permanent service life	- Small-size (particularly multilayer types) - No polarity
Disadvantages	- Short service life in hot environment - Large capacitance tolerance - Polarity	Large outside dimensions	- To be used with some voltage leeway - Polarity	- To be used with some voltage leeway - Polarity	Great changes in capacitance due to changes in temperature and DC voltage

MINIMUM ORDER QUANTITY

*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
MLCA		10
MKCP4		100
MKCP4T		
MKCA		100

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

AIC tech, 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 (2011 / 65 / EU & 2015 / 863 / EU), such as Pb free, PVC free from molding materials.

Type		RoHS Status	RoHS Directive 10 restricted substances	PVC free	See page
			Pb, Hg, Cd Cr ⁶⁺ , PBB, PBDE, DEHP, BBP, DBP, DIBP		
Aluminum electrolytic capacitors	Screw terminal type	compliant	no include	possible sleeve : polyolefin plate : PET	26 ~
	VF, VG, VFL, VGL, VFH, VFR, VGR, VFLR, VGLR, VFHR, HCGWA, HCGW2, HCGW3, FXW, FXW2				
	Snap mount type, Radial type	compliant	no include	possible sleeve : PET (standard product) polyolefin plate : less (standard product)	84 ~
	HP3, HU3, HU, ZL, HL, YL, XL1, UW, CU, ZR, ZLR, DH, HW, HS, HU, HL				
Plastic film capacitors	Metal case type	compliant	no include	no include	148 ~
	MLC, MLC2, MLCA				
	Resin encased type	compliant	no include	no include	162 ~
	MKCP4, MKCP4T, MKCA				

※ 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 Dec. 2023.

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

Product Line Chart	P.8 ~ 9
Series Table	P.10
Standardization	P.11
Technical Report	P.12 ~ 20
Series Specifications	
Screw Terminal Type	P.21 ~ 80
Snap Mount Type	P.81 ~ 129
Radial Type	P.131 ~ 138

Product line chart of screw terminal type

All series Conform RoHS

Standard product

[85°C-4kh]

HCG7A ※

-25~+85°C
6.3~100V.DC
Useful of 4,000 hours

WEB

High-voltage

HCGF5A ※

-25~+85°C
160~450V.DC
Useful of 4,000 hours

WEB

Small-sized

HCGF6A ※

-25~+85°C
400~500V.DC
Useful of 4,000 hours

WEB

High-ripple current

UPGRADE!

VF

-40~+85°C
6.3~600V.DC
Useful of 4,000 hours

P.26~31

[105°C-4kh]

HCGHA ※

-40~+105°C
25~250, 400V.DC
Useful of 4,000 hours

WEB

High-ripple current

UPGRADE!

VG

-40~+105°C
25~500V.DC
Useful of 4,000 hours

P.32~37

[85°C-8kh]

FXA ※

-40~+85°C
350~450V.DC
Useful of 8,000 hours

WEB

Small-sized

FX2 ※

-40 (-25) ~+85°C
400~600V.DC
Useful of 8,000 hours

WEB

High-ripple current

UPGRADE!

VFL

-40~+85°C
350~550V.DC
Useful of 8,000 hours

P.38~41

Small-sized

FX3 ※

-40~+85°C
400~500V.DC
Useful of 8,000 hours

WEB

High-ripple current

[105°C-8kh]

GXA ※

-40~+105°C
350~450V.DC
Useful of 8,000 hours

WEB

Small-sized

GX2 ※

-40~+105°C
400~500V.DC
Useful of 8,000 hours

WEB

High-ripple current

UPGRADE!

VGL

-40~+105°C
350~500V.DC
Useful of 8,000 hours

P.42~44

Small-sized

GX3 ※

-40~+105°C
400~450V.DC
Useful of 8,000 hours

WEB

High-ripple current

[85°C-20kh]

HXA ※

-40~+85°C
350~450V.DC
Useful of 20,000 hours

WEB

High-ripple current

UPGRADE!

VFH

-40~+85°C
350~500V.DC
Useful of 20,000 hours

P.46~48

High-ripple current product

[85°C-4kh]

UPGRADE!

VFR

-40~+85°C
350~500V.DC
Useful of 4,000 hours

P.50~52

[105°C-4kh]

UPGRADE!

VGR

-40~+85°C
350~500V.DC
Useful of 4,000 hours

P.54~56

[85°C-8kh]

FXR3 ※

-40~+85°C
400~500V.DC
Useful of 8,000 hours

WEB

High-ripple current

UPGRADE!

VFLR

-40~+85°C
350~500V.DC
Useful of 8,000 hours

P.58~60

[105°C-8kh]

GXR3 ※

-40~+105°C
400~450V.DC
Useful of 8,000 hours

WEB

High-ripple current

UPGRADE!

VGLR

-40~+105°C
350~500V.DC
Useful of 8,000 hours

P.62~64

[85°C-20kh]

UPGRADE!

VFHR

-40~+85°C
350~500V.DC
Useful of 20,000 hours

P.66~68

Ultra small, large-capacitance product

[85°C]

HCGWA

-10~+85°C
350~500V.DC
Useful of 4,000 hours

Long-life P.70,71

UPGRADE!

HCGW2

-10~+85°C
400~500V.DC
Useful of 4,000 hours

Small-sized P.72,73

UPGRADE!

FXW

-10~+85°C
350~450V.DC
Useful of 8,000 hours

Small-sized P.76,77

UPGRADE!

HCGW3

-10~+70°C
350~500V.DC
Useful of 4,000 hours

P.74,75

UPGRADE!

FXW2

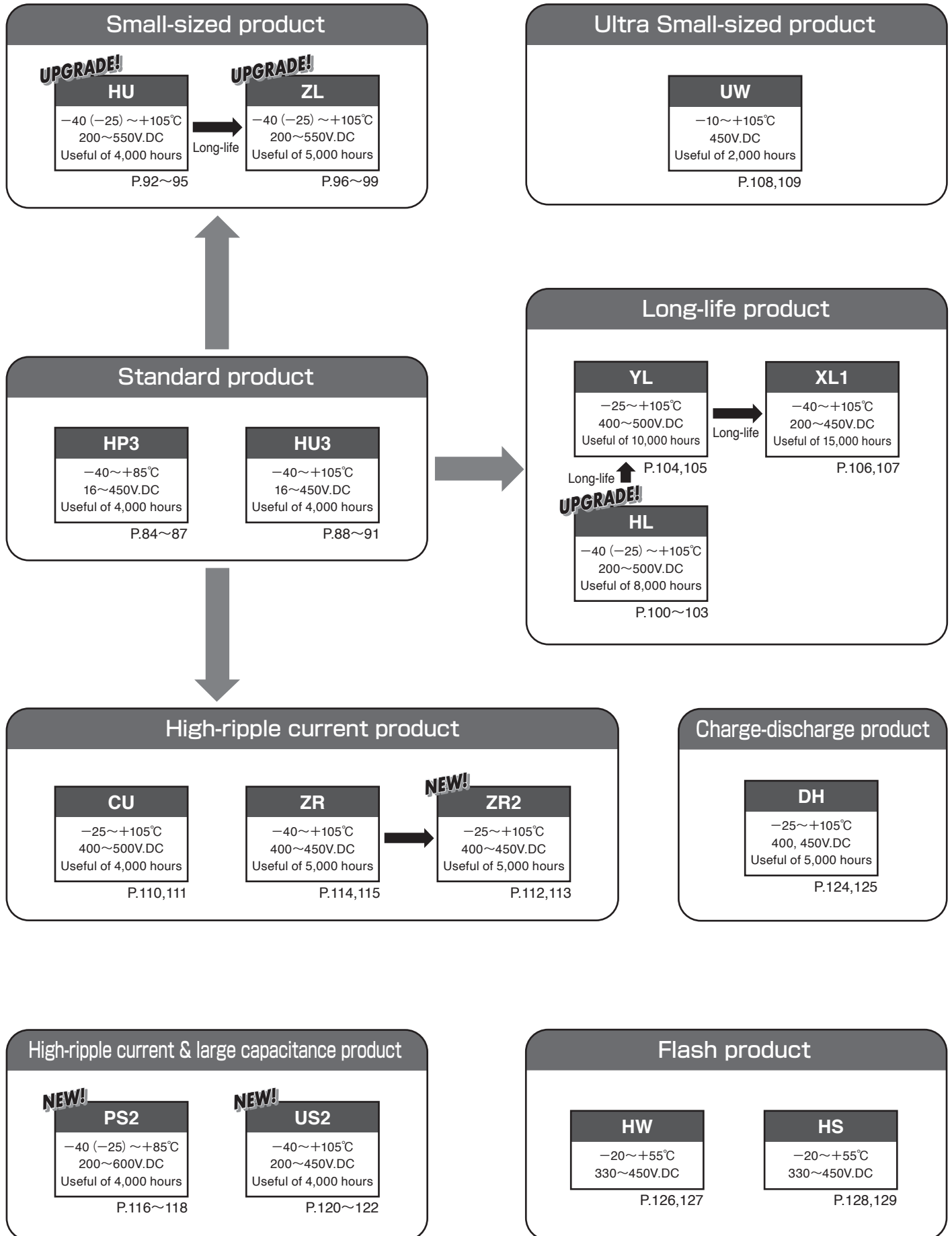
-10~+85°C
350~500V.DC
Useful of 8,000 hours

P.78,79

※Please visit our website for old series products.

Product line chart of snap mount 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 [μF]	Page
Standard	VF UPGRADE!	Standard	4,000	-40~+85	○			6.3~600	560~680,000	26
	VG UPGRADE!	105°C, Standard	4,000	-40~+105	○			25~500	680~330,000	32
	VFL UPGRADE!	Long-life, Standard	8,000	-40~+85	○			350~550	680~27,000	38
	VGL UPGRADE!	105°C, Long-life, Standard	8,000	-40~+105	○			350~500	680~27,000	42
	VFH UPGRADE!	Long-life	20,000	-40~+85	○		○	350~500	680~27,000	46
High-ripple current	VFR UPGRADE!	Small-sized, High-ripple current	4,000	-40~+85	○		○	350~500	820~27,000	50
	VGR UPGRADE!	Small-sized, High-ripple current	4,000	-40~+105	○		○	350~500	680~22,000	54
	VFLR UPGRADE!	Small-sized, High-ripple current	8,000	-40~+85	○		○	350~500	820~27,000	58
	VGLR UPGRADE!	Small-sized, High-ripple current	8,000	-40~+105	○		○	350~500	680~22,000	62
	VFHR UPGRADE!	High-ripple current, Long-Life	20,000	-40~+85	○		○	350~500	680~22,000	66
Large-capacitance	HCGWA	Ultra small	4,000	-10~+85	○	○		350~500	5,600~57,000	70
	HCGW2 UPGRADE!	Ultra small	4,000	-10~+85		◎		400~500	7,500~33,000	72
	HCGW3 UPGRADE!	Ultra small	4,000	-10~+70		◎		350~500	10,000~51,000	74
	FXW UPGRADE!	Ultra small, Long-life	8,000	-10~+85		○	○	350~450	9,000~45,000	76
	FXW2 UPGRADE!	Ultra small, Long-life	8,000	-10~+85		◎	○	350~500	7,900~42,000	78

Option Service : To our regular series, we can add Water Cooling function or Charge-Discharge function. Please see page 24 or 80.



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 [μF]	Page
Standard	HP3	Standard	4,000	-40~+85	○			16~450	120~33,000	84
	HU3	105°C, Standard	4,000	-40~+105	○			16~450	68~33,000	88
	HU UPGRADE!	105°C, Small-sized	4,000	-40(-25)~+105		◎		200~550	82~2,200	92
	ZL UPGRADE!	105°C, Small-sized	5,000	-40(-25)~+105		○		200~550	82~2,700	96
Long-life	HL UPGRADE!	105°C, Small-sized	8,000	-40(-25)~+105		○	○	200~500	56~2,700	100
	YL	105°C, Small-sized	10,000	-25~+105		○	○	400~500	82~680	104
	XL1	105°C	15,000	-40~+105	○		○	200~450	56~1,800	106
Special application	UW	Ultra small	2,000	-10~+105		◎		450	210~1,150	108
	CU	105°C, side-vent type, High-ripple current	4,000	-25~+105			○	400~500	120~1,200	110
	ZR2 NEW!	High-ripple current	5,000	-25~+105			○	400, 450	180~1,500	112
	ZR	High-ripple current	5,000	-40~+105		○	○	400, 450	150~680	114
	PS2 NEW!	High-ripple current, large capacitance	4,000	-40(-25)~+85			○	200~600	180~4,700	116
	US2 NEW!	High-ripple current, large capacitance	4,000	-40~+105			○	200~450	330~4,700	120
	DH	Charge-Discharge	5,000	-25~+105			◎	400, 450	82~680	124
	HW	Flash	—	-20~+55		◎		330~450	320~3,800	126
	HS	Flash	—	-20~+55		○		330~450	300~3,100	128



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 [μF]	Page
Standard	HU	Standard	2,000	-25~+105	○			200~450	8.2~560	132
	HL	Standard, Long-life	5,000	-25~+105	○			200~450	8.2~560	136

■ 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	Obsoleted Type • Series	New Type • Series	Page
Screw Terminal Type	85°C 4kh standard type	HCG2~7	VF	26
		HCGFA, HCGF2A~6A		
		PH		
	85°C 8kh standard type	FXA	VFL	38
		FX2		
		FX3		
	85°C 8kh High ripple current type	FXR	VFLR	58
		FXR3		
	85°C 20kh standard type	HXA	VFH	46
	105°C 4kh standard type	HCGHA	VG	32
Snap Mount Type	85°C 8kh standard type	GXA	VGL	42
		GX2		
		GX3		
	105°C 8kh High ripple current type	GXR	VGLR	62
		GXR3		
		GXH		
	Charge-discharge type	HF	This products stopped production	—
	85°C 1kh standard type	HPW	HP3	84
		HPF		
	85°C 2kh standard type	HP1		
		HF1		
		HPR		
		HFR		
		HF2		
	105°C 1kh standard type	HPU	①16~180V → HU3 ②200~500V → HU	88
		HFU		
	105°C 4kh standard type	HU1		92
		HU4		
		HU5		
		HV1		
		HUR		
		HVR		
	105°C 5kh standard type	HV2		
		ZL1	ZL	96
	105°C 5kh High ripple current type	ZLR	ZR, ZR2	112, 114
	105°C 8kh standard type	HUL	HL	100
		HVL		
		HL1		
		HL2		
	Overvoltage-ploof product	SS2	This products stopped production	—
		SS3		
For Photo Flash	Lead wire, Radial type	SR7	This products stopped production	—
	Lug terminal type	HD6	HW, HS	126, 128

I. STRUCTURE, CHARACTERISTICS AND FAILURES OF ALUMINUM ELECTROLYTIC CAPACITORS

1 . Diagram of internal structure of aluminum electrolytic capacitors

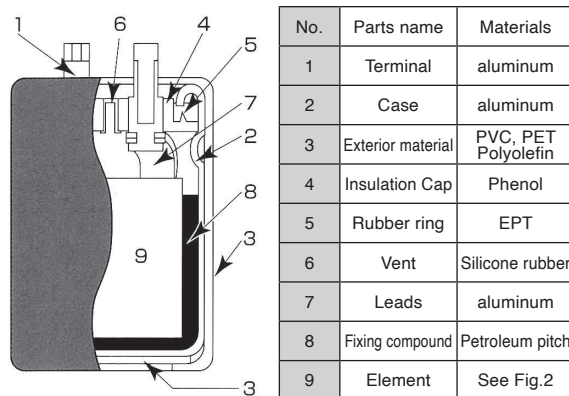


Fig.1 Diagram of Internal Structure (Screw terminal type)

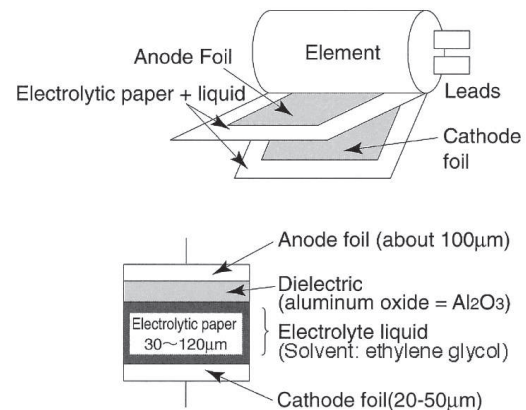


Fig.2 Diagram of Device and Basic Structure

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 δ))

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 δ is called dielectric loss. $\tan \delta$ is obtained by the following formula.

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

ω : $2\pi f$ [f = frequency (Hz)]

C : electrolytic capacitance (F)

R : Equivalent Series Resistance (Ω)

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 (Ω)

C : electrolytic capacitance (F)

L : inductance (H)

ω : $2\pi f$ [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.

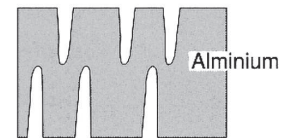


Fig.3 Diagram of etching model

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 $14\text{\AA}/\text{V}$.

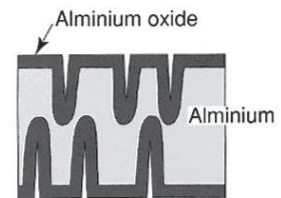


Fig.4 Diagram of formation model

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.

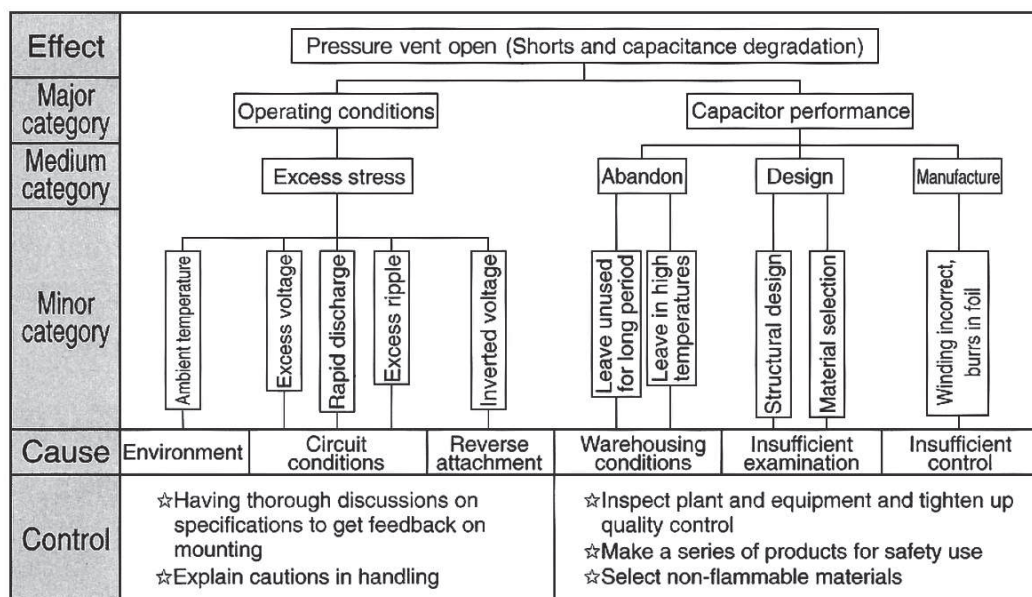
⑨ Inspection of all parts

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.
 - (11) The circuits described as examples in this catalog and the "delivery specifications" are featured in order to show the operations and usage of our products, however, this fact does not guarantee that the circuits are available to function in your equipment systems. We are not in any case responsible for any failures or damage caused by the use of information contained herein. You should examine our products, of which the characteristics are described in the "delivery specifications" and other documents, and determine whether or not our products suit your requirements according to the specifications of your equipment systems. Therefore, you bear final responsibility regarding the use of our products. Please make sure that you take appropriate safety measures such as use of redundant design and malfunction prevention measures in order to prevent fatal accidents and/or fires in the event any of our products malfunction.

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
ϕ 10 ~ 16	2mm or more
ϕ 18 ~ 35	3mm or more
ϕ 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 21 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) Recommended a bar hole diameter for M5, M6, M8 terminals are listed below. 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.

Terminal	A bar hole diameter
M5	ϕ 5.5
M6	ϕ 6.6
M8	ϕ 9

- (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

L₀ : Standard service life when allowable ripple current load or rated voltage is applied at the maximum operating temperature

T₀ : 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

ΔT_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

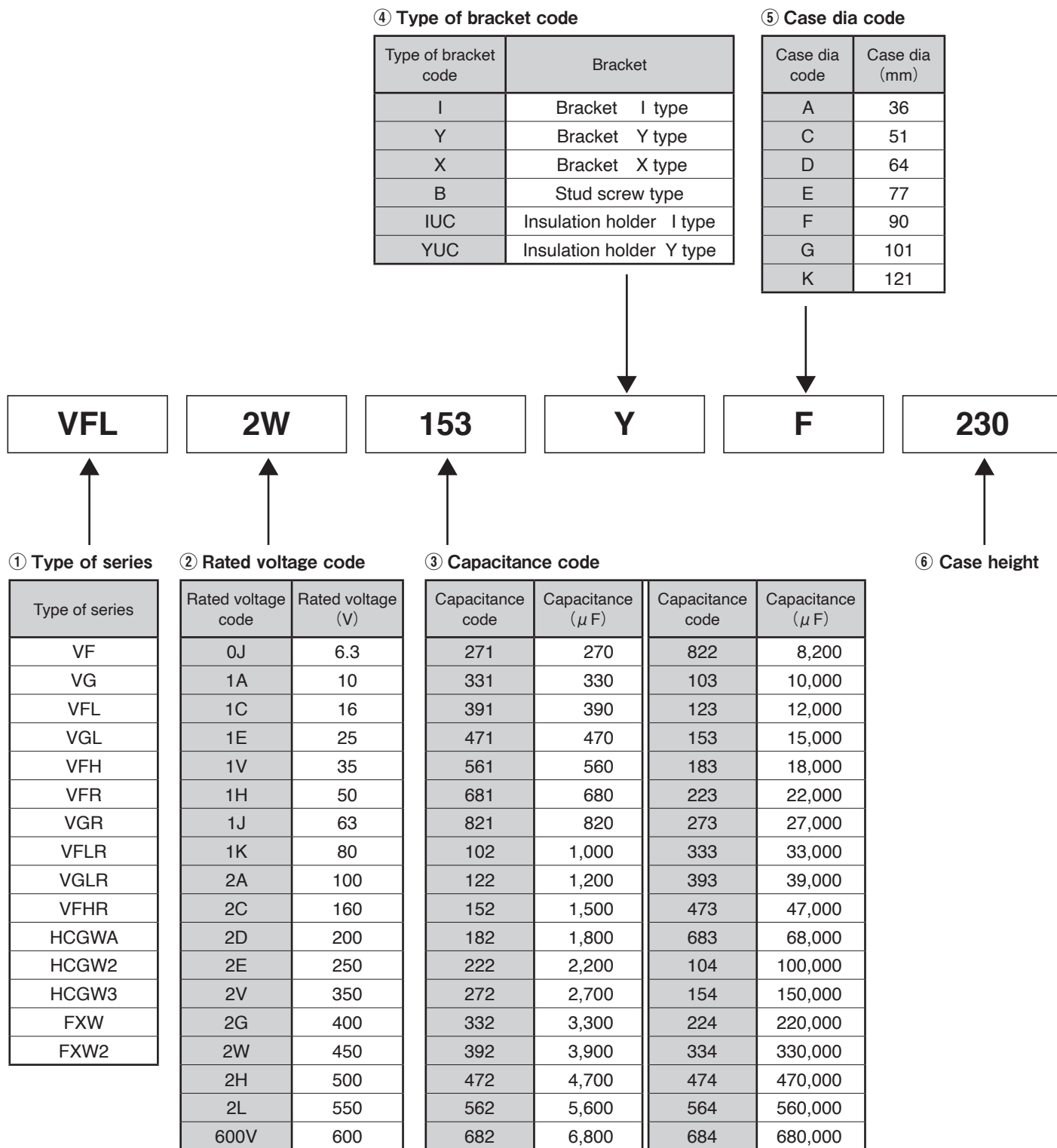
For PVC-free Snap mount type and Radial type Aluminum Electrolytic Capacitors, the capacitors are covered with PET insulating sleeve, and The bottoms not covered.

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



The first two digits are significant.

The last digit indicates the number of following zeros.

SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Assembling method

Bracket(1) is used as the standard.

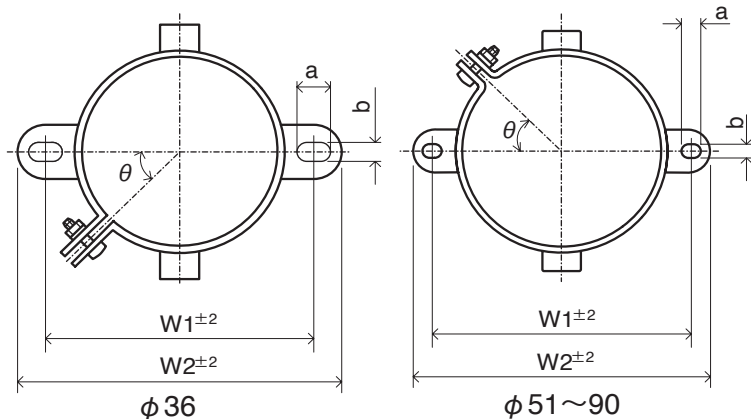
(Except the external deter of case of $\phi 51 \sim 101$, the Y-type bracket is used as the standard.)

(1) Bracket

I type

Type of bracket code : I

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



ϕD (mm)	a (mm)	b (mm)	θ (°)	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

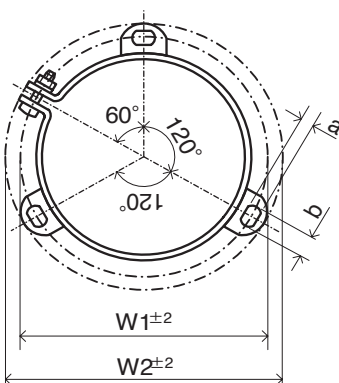
Clamping value of the bracket

ϕD (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 $\phi 51 \sim 101$



ϕD (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

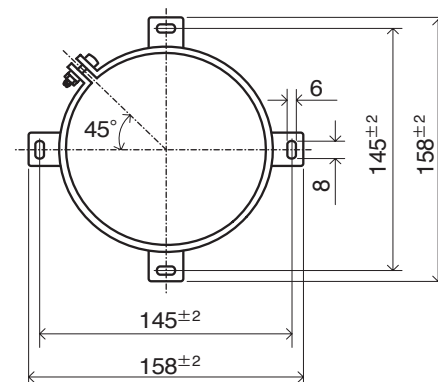
Clamping value of the bracket

ϕD (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

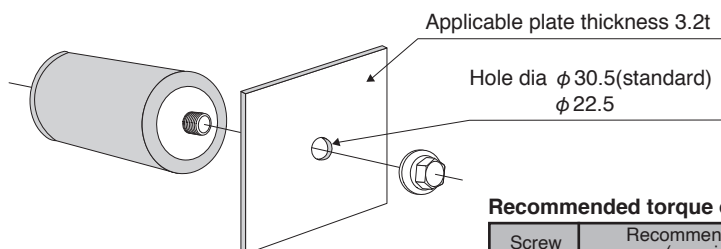
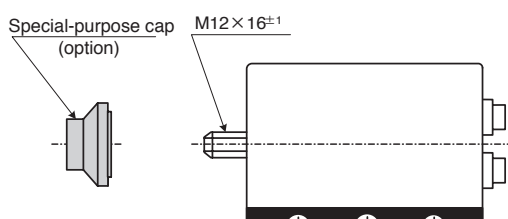
ϕD (mm)	Screw size	Recommended torque (permissible) (N·m)
121	M5	1.8 (1.5 ~ 2.0)

(2) Stud screw type

B type

Type of bracket code : B

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

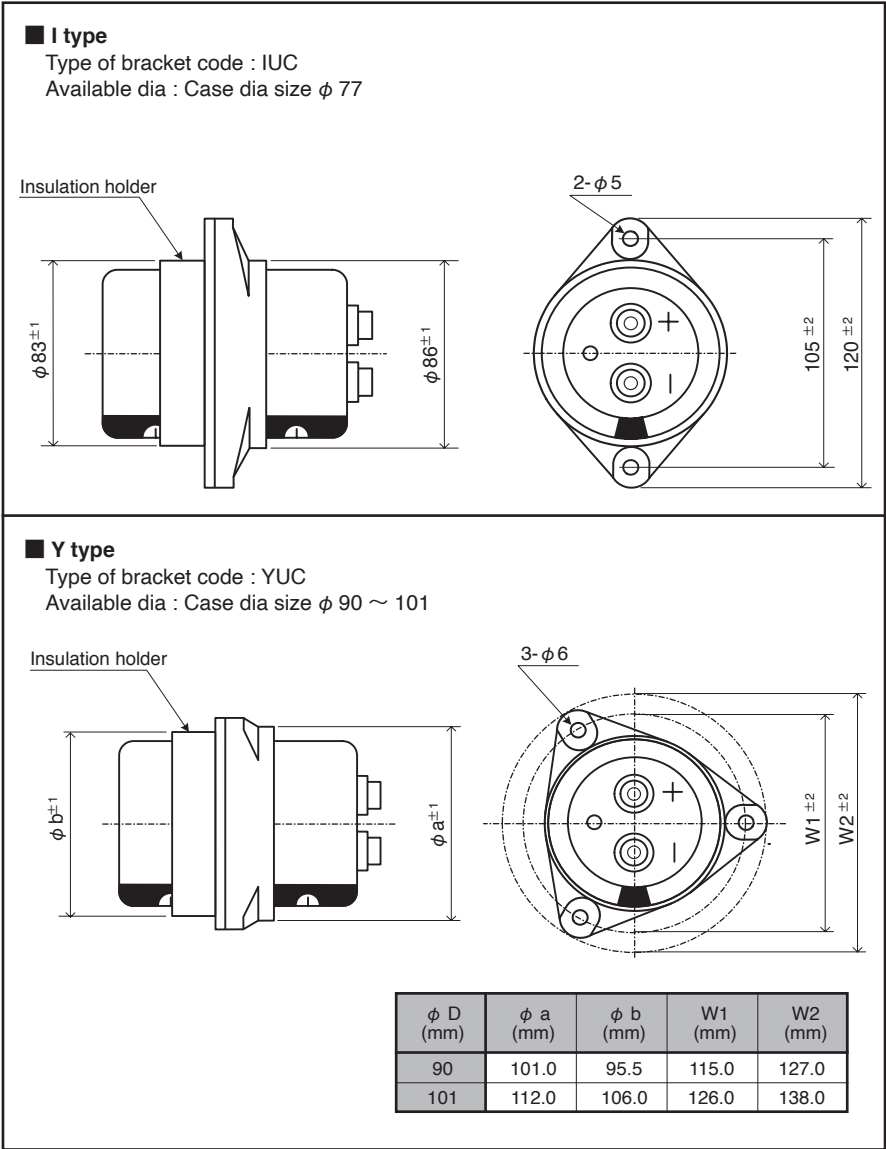
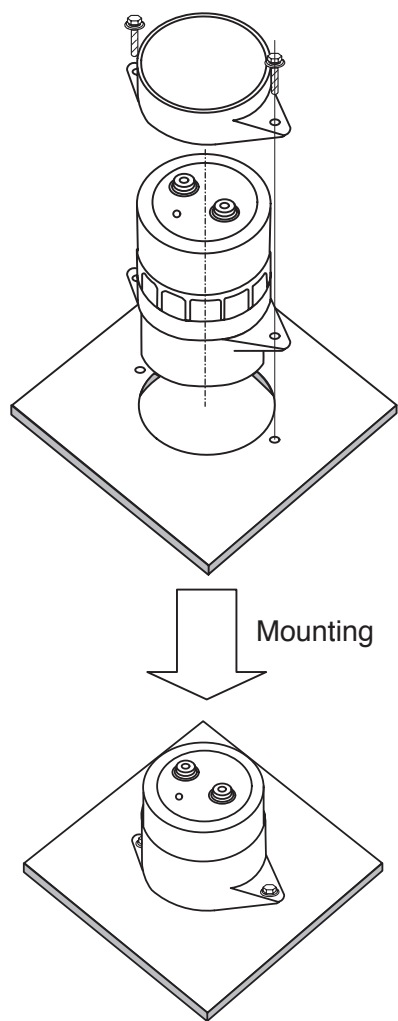


Recommended torque of stud screw

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

(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.



NEW!

Option Service: Water Cooling

Features

- By cooling the bottom of capacitor, it can be used with a higher ripple current.



Water Cooling option available series

Type of series	VF	VFR	VFL	VFLR	VFH	VFHR	VG	VGR	VGL	VGLR
Temperature range	-40°C ~ +85°C						-40°C ~ +105°C			
Useful life	4,000h		8,000h		20,000h		4,000h		8,000h	
Reference page	P.26	P.50	P.38	P.58	P.46	P.66	P.32	P.54	P.42	P.62

*Available dia is $\phi 77,90$

Product code

To figure this option, add "WC" at the end of the product name.
Please refer to the Reference page of Water Cooling option available series.

Standard products table

Please refer to the Reference page of Water Cooling option available series.

Water Cooling correction coefficient

Aspect ratio*	1.10	1.25	1.40	1.55	1.70	2.00	2.50	3.00
Correction coefficient	2.0	1.9	1.7	1.6	1.5	1.4	1.2	1.1

*Aspect ratio: Product height/dia

Notis

- Please select and apply a coefficient from the table above that exceeds the aspect ratio of the target capacitor.
Example: For a case size of $\phi 77 \times 108L$, $108/77 = 1.402...$
➡ From the table above, apply an aspect ratio of 1.55 and a correction factor of 1.6
- The heatsink and thermal pad are to be provided by the customer.
- Always use a thermal pad (Recommend; $\geq 1.8K/m \cdot K$, Thickness 1.0mm or less) when attaching to a heatsink.
- The bottom of the capacitor must be sufficiently covered by the thermal pad.
- The T-C withstand voltage depends on the specifications (withstand voltage and dimensions) of the thermal pad used.
- If the bottom of the capacitor is not sufficiently covered by the thermal pad, please pay attention to the withstand voltage.
- Please keep ambient cooling water temperature below 85°C.
- Please refer to the Reference page of Water Cooling option available series for the ripple current correction coefficient.
- For the temperature correction coefficient, apply the higher temperature out of the ambient temperature and cooling water temperature.

SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

UPGRADE!

VF Series

Useful of 4,000 hours at 85°C

Standard

- Conform RoHS

Features

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

HCG7A

HCGF5A

HCGF6A

High-ripple current

VF

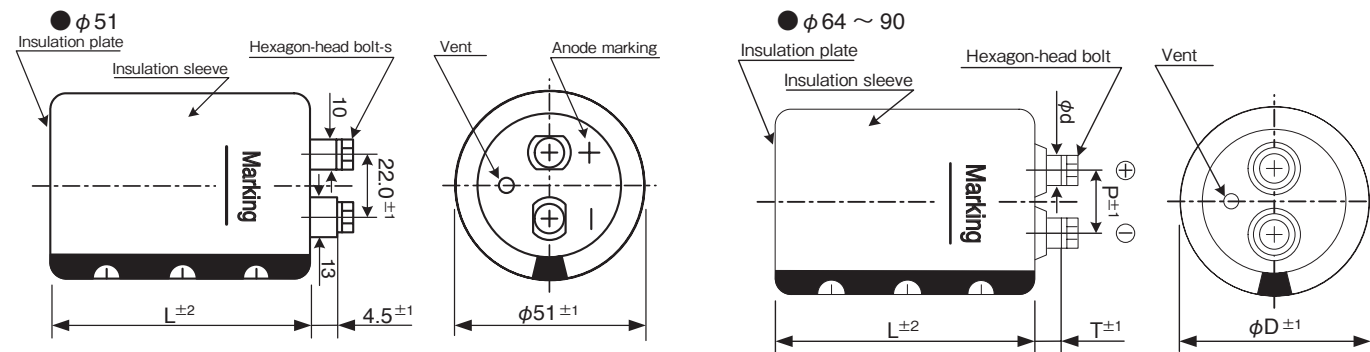
Obsoleted series



Product Specifications

Items	Specifications
Temperature range	− 40°C ~ + 85°C
Rated voltage	6.3 ~ 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 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



Ripple current correction coefficient

Temperature correction coefficient

Temperature(°C)	60	85
Correction coefficient		
6.3 ~ 100V.DC	2.19	1.00
160 ~ 250V.DC	2.02	1.00
350 ~ 600V.DC	1.67	1.00

Frequency · Forced wind correction coefficient

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		

(unit : mm)

φ D	P	T	φ d	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5×10	Phenol resin
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

Product code

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

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

Terminal permissible current is limited to 60Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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 (μ F)	Case size ϕ D×L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
6.3	220,000	51×96	1.40	10.0	13	14	21	VF0J224YC096
	270,000	51×109	1.40	12.8	10	11	21	VF0J274YC109
	330,000	64×94	1.50	16.1	8	9	22	VF0J334YD094
	470,000	64×107	1.80	18.6	7	8	22	VF0J474YD107
	560,000	64×123	2.40	19.7	6	7	22	VF0J564YD123
		77×95	2.40	18.3	6	7	24	VF0J564YE095
10	680,000	77×108	2.90	20.1	5	7	24	VF0J684YE108
	220,000	51×96	1.50	10.8	9	10	21	VF1A224YC096
	270,000	51×109	1.50	13.3	7	8	21	VF1A274YC109
	330,000	64×94	1.80	17.2	5	6	22	VF1A334YD094
	390,000	64×107	2.00	18.7	4	6	22	VF1A394YD107
	470,000	64×123	2.30	21.1	4	6	22	VF1A474YD123
		77×95	2.30	19.4	4	6	24	VF1A474YE095
	560,000	77×108	3.00	21.0	3	5	24	VF1A564YE108
	680,000	77×124	3.70	23.8	3	5	24	VF1A684YE124
		90×97	3.70	22.9	3	5	24	VF1A684YF097
16	180,000	51×109	1.20	11.4	7	10	21	VF1C184YC109
	220,000	51×125	1.40	14.1	5	8	21	VF1C224YC125
	270,000	64×94	1.60	16.2	4	6	22	VF1C274YD094
	330,000	64×123	1.80	18.3	4	6	22	VF1C334YD123
		77×95	1.80	18.0	4	6	24	VF1C334YE095
	390,000	77×108	2.40	19.5	4	5	24	VF1C394YE108
	470,000	77×124	2.90	22.0	3	5	24	VF1C474YE124
		90×97	2.90	21.9	3	5	24	VF1C474YF097
	560,000	90×110	3.20	23.7	3	5	24	VF1C564YF110
25	120,000	51×96	1.00	9.2	8	10	21	VF1E124YC096
	150,000	51×109	1.20	10.1	6	8	21	VF1E154YC109
	180,000	64×94	1.20	13.7	5	6	22	VF1E184YD094
	220,000	64×107	1.20	15.1	4	5	22	VF1E224YD107
	270,000	64×123	1.40	17.2	4	5	22	VF1E274YD123
		77×95	1.40	19.2	4	5	24	VF1E334YE095
	390,000	77×108	2.10	20.8	4	5	24	VF1E394YE108
	470,000	77×124	2.30	23.4	3	5	24	VF1E474YE124
		90×97	2.30	22.9	3	5	24	VF1E474YF097
35	560,000	90×110	2.30	24.8	3	4	24	VF1E564YF110
	82,000	51×96	0.80	8.8	8	11	21	VF1V823YC096
	100,000	51×109	1.00	10.6	6	9	21	VF1V104YC109
	120,000	64×94	1.00	12.9	5	7	22	VF1V124YD094
	150,000	64×107	1.00	14.4	5	7	22	VF1V154YD107
	180,000	64×123	1.20	16.3	5	7	22	VF1V184YD123
		77×95	1.20	15.2	5	7	24	VF1V184YE095
	220,000	77×108	1.20	16.8	5	7	24	VF1V224YE108
	270,000	77×124	1.80	19.0	4	6	24	VF1V274YE124
		90×97	1.80	18.8	4	6	24	VF1V274YF097
50	330,000	90×110	2.00	20.7	4	6	24	VF1V334YF110
	56,000	51×96	0.50	7.9	11	13	21	VF1H563YC096
	68,000	51×109	0.70	9.9	9	10	21	VF1H683YC109
	82,000	64×94	0.70	12.1	7	8	22	VF1H823YD094
	100,000	64×107	0.70	13.4	6	7	22	VF1H104YD107
	150,000	64×123	0.90	16.8	5	7	22	VF1H154YD123
		77×95	0.90	13.9	5	7	24	VF1H154YE095
	180,000	77×108	1.40	15.2	5	6	24	VF1H184YE108
	220,000	77×124	1.50	17.2	4	6	24	VF1H224YE124
		90×97	1.50	16.5	4	6	24	VF1H224YF097
63	270,000	90×110	1.50	18.2	3	5	24	VF1H274YF110
	39,000	51×96	0.40	8.2	13	14	21	VF1J393YC096
	47,000	51×109	0.40	9.1	10	11	21	VF1J473YC109
	56,000	64×94	0.50	13.3	8	9	22	VF1J563YD094
	68,000	64×107	0.50	14.6	7	8	22	VF1J683YD107
	82,000	64×123	0.70	16.5	7	8	22	VF1J823YD123
	100,000	77×95	0.70	15.5	7	8	24	VF1J104YE095
	120,000	77×108	1.10	16.9	6	7	24	VF1J124YE108
	150,000	77×124	1.20	19.3	6	7	24	VF1J154YE124
		90×97	1.20	18.3	6	7	24	VF1J154YF097
63	180,000	90×110	1.20	19.9	5	6	24	VF1J184YF110

ALUMINUM ELECTROLYTIC CAPACITORS

SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
80	22,000	51 $\times$ 96	0.30	8.1	12	14	21	VF1K223YC096
	33,000	51 $\times$ 125	0.35	9.6	8	9	21	VF1K333YC125
	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
	82,000	77 $\times$ 124	0.60	18.9	3	6	24	VF1K823YE124
		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	15,000	51 $\times$ 96	0.20	6.7	12	14	21	VF2A153YC096
	18,000	51 $\times$ 109	0.20	8.6	10	11	21	VF2A183YC109
	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
	56,000	77 $\times$ 124	0.45	15.6	4	6	24	VF2A563YE124
		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	8,200	51 $\times$ 96	0.25	8.5	19	22	21	VF2C822YC096
	10,000	51 $\times$ 125	0.25	10.4	15	18	21	VF2C103YC125
	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
	18,000	64 $\times$ 123	0.25	15.4	9	11	22	VF2C183YD123
		77 $\times$ 95	0.25	17.4	9	11	24	VF2C183YE095
	22,000	64 $\times$ 147	0.25	16.8	8	8	22	VF2C223YD147
		77 $\times$ 108	0.25	19.1	8	8	24	VF2C223YE108
	27,000	77 $\times$ 124	0.25	21.7	7	8	24	VF2C273YE124
		90 $\times$ 97	0.25	24.6	7	8	24	VF2C273YF097
	33,000	77 $\times$ 148	0.25	23.5	6	7	24	VF2C333YE148
		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	6,800	51 $\times$ 109	0.25	8.1	22	26	21	VF2D682YC109
	8,200	51 $\times$ 125	0.25	9.5	18	21	21	VF2D822YC125
	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	4,700	51 $\times$ 109	0.25	6.8	27	29	21	VF2E472YC109
	5,600	51 $\times$ 125	0.25	7.8	22	24	21	VF2E562YC125
	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
	12,000	64 $\times$ 147	0.25	12.4	10	11	22	VF2E123YD147
		77 $\times$ 95	0.25	14.2	10	11	24	VF2E123YE095
	15,000	77 $\times$ 124	0.25	16.2	8	11	24	VF2E153YE124
		90 $\times$ 97	0.25	18.3	8	11	24	VF2E153YF097
	18,000	77 $\times$ 148	0.25	17.4	7	10	24	VF2E183YE148
		90 $\times$ 110	0.25	19.9	7	10	24	VF2E183YF110
	22,000	90 $\times$ 126	0.25	21.8	6	8	24	VF2E223YF126

SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VF Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	1,800	51 $\times$ 75	0.20	7.4	55	58	21	VF2V182YC075
	2,200	51 $\times$ 96	0.20	8.5	45	47	21	VF2V222YC096
	2,700	51 $\times$ 109	0.20	9.8	37	39	21	VF2V272YC109
	3,300	51 $\times$ 125	0.20	11.2	30	32	21	VF2V332YC125
	4,700	64 $\times$ 94	0.20	15.1	21	22	22	VF2V472YD094
	5,600	64 $\times$ 107	0.20	16.4	18	19	22	VF2V562YD107
	6,800	64 $\times$ 123	0.20	18.6	15	15	22	VF2V682YD123
		77 $\times$ 95	0.20	20.9	15	15	24	VF2V682YE095
	8,200	64 $\times$ 147	0.20	20.1	12	15	22	VF2V822YD147
		77 $\times$ 108	0.20	22.9	12	15	24	VF2V822YE108
	10,000	64 $\times$ 187	0.20	22.9	10	15	22	VF2V103YD187
		77 $\times$ 124	0.20	25.9	10	15	24	VF2V103YE124
		90 $\times$ 97	0.20	29.3	10	15	24	VF2V103YF097
	12,000	77 $\times$ 148	0.20	27.8	8	13	24	VF2V123YE148
		90 $\times$ 126	0.20	31.7	8	13	24	VF2V123YF126
	15,000	77 $\times$ 188	0.20	31.9	7	10	24	VF2V153YE188
		90 $\times$ 150	0.20	35.2	7	10	24	VF2V153YF150
	18,000	77 $\times$ 228	0.20	36.0	7	10	24	VF2V183YE228
		90 $\times$ 167	0.20	37.9	7	10	24	VF2V183YF167
400	22,000	90 $\times$ 230	0.20	41.1	6	9	24	VF2V223YF230
	27,000	90 $\times$ 268	0.20	43.0	5	7	24	VF2V273YF268
400	1,500	51 $\times$ 75	0.20	6.8	68	73	21	VF2G152YC075
	2,200	51 $\times$ 96	0.20	8.5	47	50	21	VF2G222YC096
	2,700	51 $\times$ 109	0.20	9.8	38	41	21	VF2G272YC109
	3,300	51 $\times$ 125	0.20	11.2	31	34	21	VF2G332YC125
	3,900	64 $\times$ 94	0.20	13.7	26	28	22	VF2G392YD094
	4,700	64 $\times$ 107	0.20	15.0	21	22	22	VF2G472YD107
	5,600	64 $\times$ 123	0.20	16.9	18	19	22	VF2G562YD123
	6,800	77 $\times$ 95	0.20	19.0	18	19	24	VF2G562YE095
		64 $\times$ 147	0.20	18.3	15	15	22	VF2G682YD147
	8,200	77 $\times$ 108	0.20	20.8	15	15	24	VF2G682YE108
		64 $\times$ 187	0.20	20.8	12	15	22	VF2G822YD187
		77 $\times$ 124	0.20	23.5	12	15	24	VF2G822YE124
	10,000	90 $\times$ 97	0.20	26.6	12	15	24	VF2G822YF097
		77 $\times$ 148	0.20	25.4	10	15	24	VF2G103YE148
		90 $\times$ 110	0.20	29.1	10	15	24	VF2G103YF110
	12,000	77 $\times$ 188	0.20	28.5	8	13	24	VF2G123YE188
		90 $\times$ 126	0.20	31.7	8	13	24	VF2G123YF126
	15,000	77 $\times$ 228	0.20	32.9	8	10	24	VF2G153YE228
		90 $\times$ 167	0.20	34.6	8	10	24	VF2G153YF167
	18,000	90 $\times$ 190	0.20	38.2	6	9	24	VF2G183YF190
	22,000	90 $\times$ 230	0.20	41.1	5	7	24	VF2G223YF230
	27,000	90 $\times$ 268	0.20	43.0	4	6	24	VF2G273YF268
450	1,200	51 $\times$ 75	0.20	6.3	86	90	21	VF2W122YC075
	1,500	51 $\times$ 96	0.20	7.5	69	72	21	VF2W152YC096
	1,800	51 $\times$ 109	0.20	8.4	57	60	21	VF2W182YC109
	2,200	51 $\times$ 125	0.20	9.4	47	50	21	VF2W222YC125
	2,700	64 $\times$ 94	0.20	11.7	38	40	22	VF2W272YD094
	3,300	64 $\times$ 107	0.20	12.9	30	35	22	VF2W332YD107
	3,900	64 $\times$ 123	0.20	14.4	27	32	22	VF2W392YD123
		77 $\times$ 95	0.20	16.2	27	32	24	VF2W392YE095
	4,700	77 $\times$ 108	0.20	17.8	21	21	24	VF2W472YE108
	5,600	64 $\times$ 147	0.20	17.0	20	20	22	VF2W562YD147
		77 $\times$ 124	0.20	19.9	20	20	24	VF2W562YE124
		90 $\times$ 97	0.20	22.5	20	20	24	VF2W562YF097
	6,800	64 $\times$ 187	0.20	19.4	15	18	22	VF2W682YD187
		77 $\times$ 148	0.20	21.4	15	18	24	VF2W682YE148
		90 $\times$ 110	0.20	24.6	15	18	24	VF2W682YF110
	8,200	77 $\times$ 165	0.20	24.0	14	16	24	VF2W822YE165
		90 $\times$ 126	0.20	26.8	14	16	24	VF2W822YF126
	10,000	77 $\times$ 188	0.20	26.7	10	15	24	VF2W103YE188
		90 $\times$ 150	0.20	29.4	10	15	24	VF2W103YF150
	12,000	77 $\times$ 228	0.20	30.2	9	12	24	VF2W123YE228
		90 $\times$ 167	0.20	31.7	9	12	24	VF2W123YF167
	15,000	90 $\times$ 190	0.20	35.7	7	10	24	VF2W153YF190
	18,000	90 $\times$ 230	0.20	38.1	6	9	24	VF2W183YF230
	22,000	90 $\times$ 268	0.20	39.8	5	7	24	VF2W223YF268

ALUMINUM ELECTROLYTIC CAPACITORS

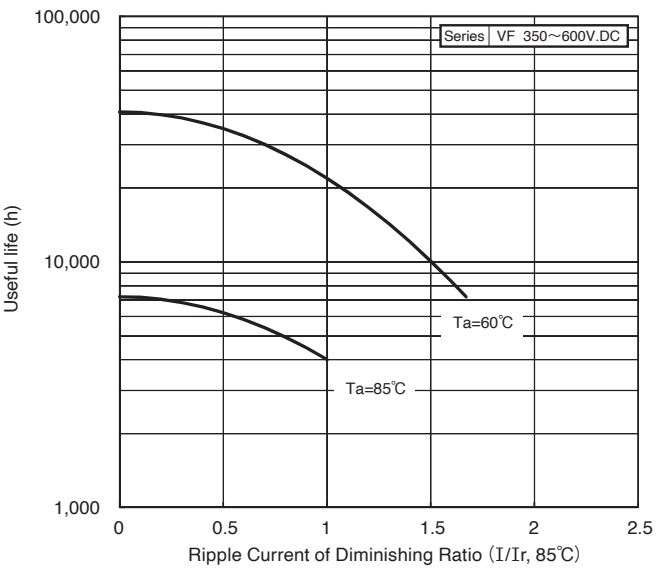
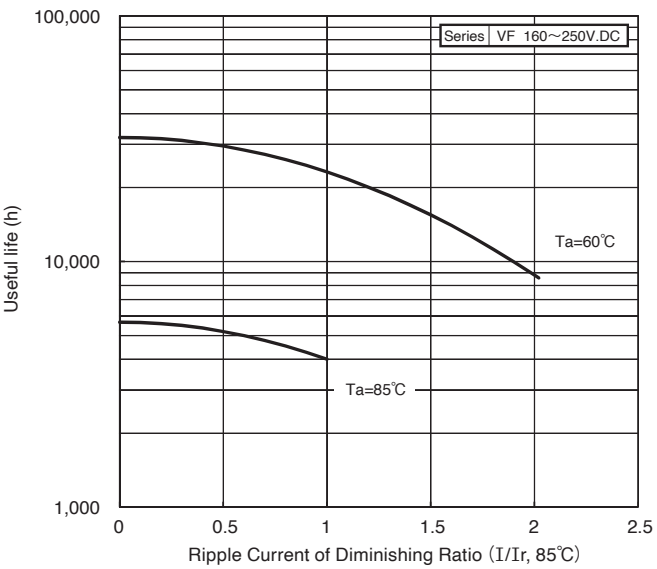
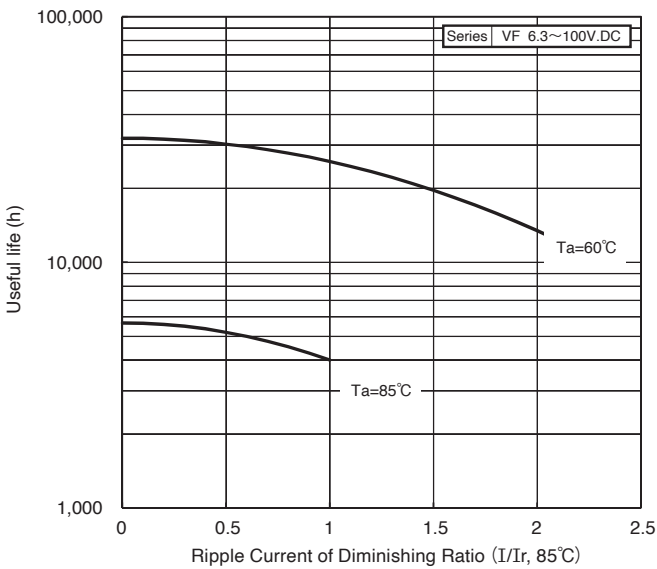
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
500	820	51 $\times$ 75	0.20	4.7	117	110	21	VF2H821YC075
	1,000	51 $\times$ 96	0.20	5.6	96	90	21	VF2H102YC096
	1,200	51 $\times$ 109	0.20	6.3	80	75	21	VF2H122YC109
	1,500	51 $\times$ 125	0.20	7.2	64	60	21	VF2H152YC125
	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
	3,900	64 $\times$ 164	0.20	13.9	27	29	22	VF2H392YD164
		77 $\times$ 124	0.20	15.8	27	29	24	VF2H392YE124
		90 $\times$ 97	0.20	17.9	27	29	24	VF2H392YF097
	4,700	64 $\times$ 187	0.20	15.4	25	25	22	VF2H472YD187
		77 $\times$ 148	0.20	17.0	25	25	24	VF2H472YE148
		90 $\times$ 110	0.20	19.5	25	25	24	VF2H472YF110
	5,600	77 $\times$ 165	0.20	18.9	23	21	24	VF2H562YE165
		90 $\times$ 126	0.20	21.1	23	21	24	VF2H562YF126
	6,800	77 $\times$ 188	0.20	20.9	20	18	24	VF2H682YE188
		90 $\times$ 150	0.20	23.1	20	18	24	VF2H682YF150
	8,200	77 $\times$ 228	0.20	23.8	17	16	24	VF2H822YE228
		90 $\times$ 167	0.20	25.0	17	16	24	VF2H822YF167
550	680	51 $\times$ 75	0.20	4.2	165	177	21	VF2L681YC075
	820	51 $\times$ 96	0.20	5.0	137	147	21	VF2L821YC096
	1,000	51 $\times$ 109	0.20	5.6	112	120	21	VF2L102YC109
	1,200	51 $\times$ 125	0.20	6.4	93	100	21	VF2L122YC125
	1,500	64 $\times$ 94	0.20	8.1	74	80	22	VF2L152YD094
	1,800	64 $\times$ 107	0.20	8.9	61	50	22	VF2L182YD107
	2,200	64 $\times$ 123	0.20	10.1	53	50	22	VF2L222YD123
		77 $\times$ 95	0.20	11.4	53	50	24	VF2L222YE095
	2,700	64 $\times$ 147	0.20	11.0	40	35	22	VF2L272YD147
		77 $\times$ 108	0.20	12.5	40	35	24	VF2L272YE108
	3,300	64 $\times$ 164	0.20	12.5	38	32	22	VF2L332YD164
		90 $\times$ 97	0.20	16.1	38	32	24	VF2L332YF097
	3,900	64 $\times$ 187	0.20	13.7	30	27	22	VF2L392YD187
		77 $\times$ 124	0.20	15.4	30	27	24	VF2L392YE124
		90 $\times$ 110	0.20	17.4	30	27	24	VF2L392YF110
	4,700	77 $\times$ 165	0.20	16.9	25	20	24	VF2L472YE165
		90 $\times$ 126	0.20	18.9	25	20	24	VF2L472YF126
	5,600	77 $\times$ 188	0.20	18.6	20	17	24	VF2L562YE188
		90 $\times$ 150	0.20	20.5	20	17	24	VF2L562YF150
	6,800	77 $\times$ 228	0.20	21.2	17	17	24	VF2L682YE228
		90 $\times$ 167	0.20	22.2	17	17	24	VF2L682YF167
	8,200	90 $\times$ 190	0.20	24.6	14	14	24	VF2L822YF190
	10,000	90 $\times$ 230	0.20	26.5	12	12	24	VF2L103YF230
	12,000	90 $\times$ 268	0.20	27.4	10	10	24	VF2L123YF268
600	560	51 $\times$ 75	0.20	2.9	225	169	21	VF600V561YC075
	680	51 $\times$ 96	0.20	3.4	186	139	21	VF600V681YC096
	820	51 $\times$ 109	0.20	3.9	154	116	21	VF600V821YC109
	1,000	51 $\times$ 125	0.20	4.4	126	95	21	VF600V102YC125
	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

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



UPGRADE!

VG Series

Useful of 4,000 hours at 105°C

Standard

• Conform RoHS

Features

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

HCGHA

→ High-ripple current

VG

Obsoleted series

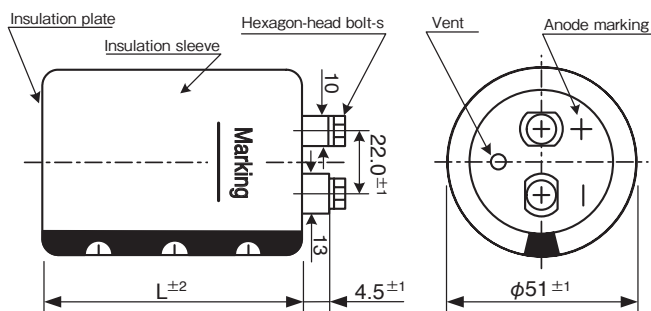


Product Specifications

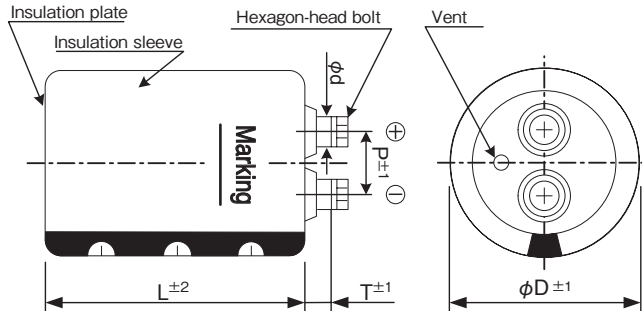
Items	Specifications
Temperature range	−40°C ~ +105°C
Rated voltage	25 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (μA) or 5mA, whichever is smaller or less (20°C, after 5minutes) [C = nominal capacitance (μF), V = rated voltage (V)]
Dissipation factor	Less than the value 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

● φ51



● φ64 ~ 90



Ripple current correction coefficient

Temperature correction coefficient

Temperature(°C)	60	85	105
Correction coefficient	3.60	1.80	1.00
	2.16	2.00	1.00

Frequency · Forced wind correction coefficient

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		

(unit : mm)

φ D	P	T	φ d	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5 × 10	Phenol resin
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

Product code

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

VG 2G 153 Y F 190

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

Terminal permissible current is limited to 60Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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 (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR (typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL (typ.) (nH)	Product name
25	100,000	51 $\times$ 96	0.60	10.2	10	11	21	VG1E104YC096
	120,000	51 $\times$ 109	0.60	13.4	8	9	21	VG1E124YC109
	150,000	64 $\times$ 94	0.80	12.9	6	7	22	VG1E154YD094
	180,000	64 $\times$ 107	0.90	14.1	5	6	22	VG1E184YD107
	220,000	64 $\times$ 123	1.00	16.0	4	5	22	VG1E224YD123
		77 $\times$ 95	1.00	14.9	4	5	24	VG1E224YE095
	270,000	77 $\times$ 108	1.00	16.4	4	5	24	VG1E274YE108
		90 $\times$ 97	1.00	18.2	4	5	24	VG1E274YF097
330,000	90 $\times$ 110	1.00	20.0	4	5	24	VG1E334YF110	
35	68,000	51 $\times$ 96	0.50	11.6	10	11	21	VG1V683YC096
	82,000	51 $\times$ 125	0.50	14.1	8	9	21	VG1V823YC125
	100,000	64 $\times$ 94	0.60	12.3	6	7	22	VG1V104YD094
	120,000	64 $\times$ 107	0.70	13.4	6	7	22	VG1V124YD107
	150,000	64 $\times$ 123	0.70	15.4	5	7	22	VG1V154YD123
		77 $\times$ 95	0.70	14.0	5	7	24	VG1V154YE095
	180,000	77 $\times$ 108	0.70	15.2	5	7	24	VG1V184YE108
		90 $\times$ 97	0.70	16.3	5	7	24	VG1V184YF097
	220,000	77 $\times$ 124	0.70	17.2	5	7	24	VG1V224YE124
90 $\times$ 110		0.70	17.9	5	7	24	VG1V224YF110	
50	47,000	51 $\times$ 96	0.40	15.2	12	14	21	VG1H473YC096
	56,000	51 $\times$ 109	0.45	13.5	10	11	21	VG1H563YC109
	68,000	64 $\times$ 94	0.45	11.2	8	9	22	VG1H683YD094
	82,000	64 $\times$ 107	0.50	12.3	8	8	22	VG1H823YD107
	100,000	64 $\times$ 123	0.50	13.9	6	7	22	VG1H104YD123
		77 $\times$ 95	0.50	14.2	6	7	24	VG1H104YE095
	120,000	77 $\times$ 108	0.50	15.5	5	7	24	VG1H124YE108
	150,000	77 $\times$ 124	0.50	17.7	5	7	24	VG1H154YE124
		90 $\times$ 97	0.50	19.2	5	7	24	VG1H154YF097
180,000	90 $\times$ 110	0.50	20.9	4	6	24	VG1H184YF110	
63	27,000	51 $\times$ 96	0.30	9.2	15	16	21	VG1J273YC096
	33,000	51 $\times$ 109	0.30	12.7	12	13	21	VG1J333YC109
	47,000	64 $\times$ 94	0.35	10.5	8	9	22	VG1J473YD094
	56,000	64 $\times$ 107	0.40	11.5	8	9	22	VG1J563YD107
	68,000	64 $\times$ 123	0.40	13.0	7	8	22	VG1J683YD123
		77 $\times$ 95	0.40	12.9	7	8	24	VG1J683YE095
	82,000	77 $\times$ 108	0.40	14.1	7	8	24	VG1J823YE108
		90 $\times$ 97	0.40	15.5	7	8	24	VG1J823YF097
	100,000	77 $\times$ 124	0.40	16.0	7	8	24	VG1J104YE124
90 $\times$ 110		0.40	17.0	7	8	24	VG1J104YF110	
80	18,000	51 $\times$ 96	0.25	8.8	13	14	21	VG1K183YC096
	22,000	51 $\times$ 109	0.25	10.4	10	11	21	VG1K223YC109
	27,000	64 $\times$ 94	0.30	8.6	8	9	22	VG1K273YD094
	33,000	64 $\times$ 107	0.30	9.5	7	7	22	VG1K333YD107
	47,000	64 $\times$ 123	0.30	11.7	6	7	22	VG1K473YD123
		77 $\times$ 95	0.30	12.2	6	7	24	VG1K473YE095
	56,000	77 $\times$ 108	0.30	13.2	5	7	24	VG1K563YE108
		90 $\times$ 97	0.30	15.3	5	7	24	VG1K563YF097
	68,000	77 $\times$ 124	0.30	14.9	4	7	24	VG1K683YE124
90 $\times$ 110		0.30	16.8	4	7	24	VG1K683YF110	

SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
100	12,000	51 $\times$ 96	0.15	7.3	14	15	21	VG2A123YC096
	15,000	51 $\times$ 109	0.20	8.6	11	12	21	VG2A153YC109
	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	5,600	51 $\times$ 96	0.25	5.0	27	28	21	VG2C562YC096
	6,800	51 $\times$ 109	0.25	5.8	22	23	21	VG2C682YC109
	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	4,700	51 $\times$ 96	0.25	4.6	31	29	21	VG2D472YC096
	5,600	51 $\times$ 109	0.25	5.2	26	24	21	VG2D562YC109
	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
		90 $\times$ 97	0.25	10.5	10	10	24	VG2D153YF097
	18,000	77 $\times$ 124	0.25	10.2	8	8	24	VG2D183YE124
		90 $\times$ 110	0.25	11.4	8	8	24	VG2D183YF110
250	3,300	51 $\times$ 96	0.25	3.8	37	33	21	VG2E332YC096
	3,900	51 $\times$ 109	0.25	4.4	31	28	21	VG2E392YC109
	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

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	1,800	51 $\times$ 75	0.20	5.6	59	70	21	VG2V182YC075
	2,200	51 $\times$ 96	0.20	6.5	48	57	21	VG2V222YC096
	2,700	51 $\times$ 109	0.20	7.5	39	47	21	VG2V272YC109
	3,300	51 $\times$ 125	0.20	8.6	32	38	21	VG2V332YC125
	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
	27,000	90 $\times$ 268	0.20	33.0	4	6	24	VG2V273YF268
400	1,500	51 $\times$ 75	0.20	5.2	66	77	21	VG2G152YC075
	1,800	51 $\times$ 96	0.20	6.0	55	65	21	VG2G182YC096
	2,200	51 $\times$ 109	0.20	7.0	45	53	21	VG2G222YC109
	2,700	51 $\times$ 125	0.20	8.0	37	43	21	VG2G272YC125
	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
	22,000	90 $\times$ 268	0.20	29.8	6	7	24	VG2G223YF268

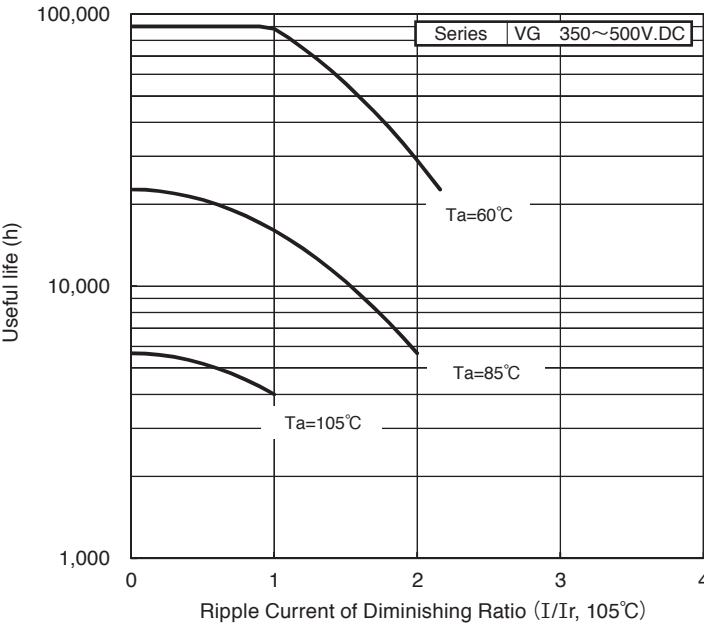
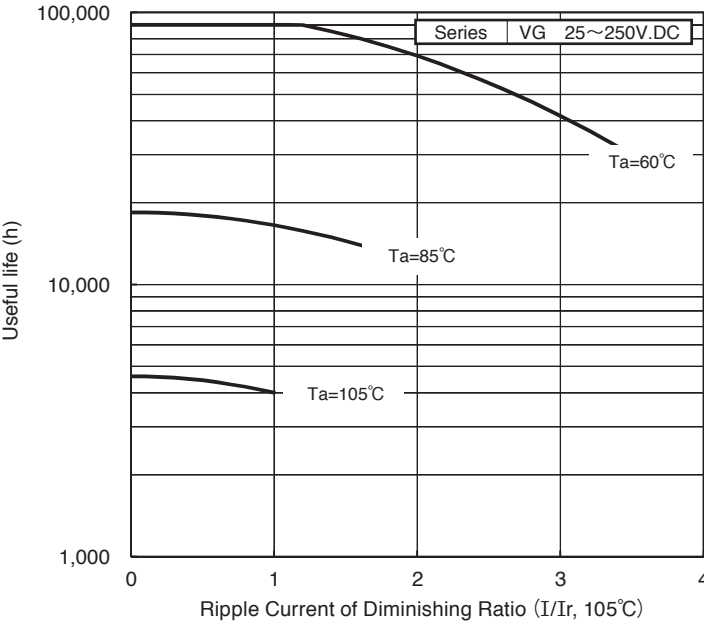
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
450	1,000	51 $\times$ 75	0.20	4.5	114	114	21	VG2W102YC075
	1,200	51 $\times$ 96	0.20	5.2	95	95	21	VG2W122YC096
	1,500	51 $\times$ 109	0.20	5.9	76	76	21	VG2W152YC109
	1,800	51 $\times$ 125	0.20	6.6	63	63	21	VG2W182YC125
	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
	18,000	90 $\times$ 268	0.20	27.7	8	8	24	VG2W183YF268
500	680	51 $\times$ 75	0.20	3.3	164	177	21	VG2H681YC075
	820	51 $\times$ 96	0.20	3.9	136	147	21	VG2H821YC096
	1,000	51 $\times$ 109	0.20	4.4	111	120	21	VG2H102YC109
	1,200	51 $\times$ 125	0.20	5.0	93	100	21	VG2H122YC125
	1,800	64 $\times$ 107	0.20	7.1	62	50	22	VG2H182YD107
	2,200	64 $\times$ 123	0.20	7.9	53	50	22	VG2H222YD123
		77 $\times$ 95	0.20	8.9	53	50	24	VG2H222YE095
	2,700	64 $\times$ 147	0.20	8.6	40	35	22	VG2H272YD147
		77 $\times$ 108	0.20	9.8	40	35	24	VG2H272YE108
	3,300	64 $\times$ 164	0.20	9.8	38	32	22	VG2H332YD164
		90 $\times$ 97	0.20	12.6	38	32	24	VG2H332YF097
	3,900	64 $\times$ 187	0.20	10.7	30	27	22	VG2H392YD187
		77 $\times$ 124	0.20	12.1	30	27	24	VG2H392YE124
		90 $\times$ 110	0.20	13.6	30	27	24	VG2H392YF110
	4,700	77 $\times$ 148	0.20	13.0	25	20	24	VG2H472YE148
		90 $\times$ 126	0.20	14.8	25	20	24	VG2H472YF126
	5,600	77 $\times$ 165	0.20	14.5	20	17	24	VG2H562YE165
		90 $\times$ 150	0.20	16.1	20	17	24	VG2H562YF150
	6,800	77 $\times$ 188	0.20	16.1	17	17	24	VG2H682YE188
		90 $\times$ 167	0.20	17.4	17	17	24	VG2H682YF167
	8,200	90 $\times$ 190	0.20	19.3	14	14	24	VG2H822YF190
	10,000	90 $\times$ 230	0.20	20.7	12	12	24	VG2H103YF230
	15,000	90 $\times$ 268	0.20	24.0	8	8	24	VG2H153YF268

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



SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

UPGRADE!

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.

Standard



FXA

FX2

FX3

High-ripple current

VFL

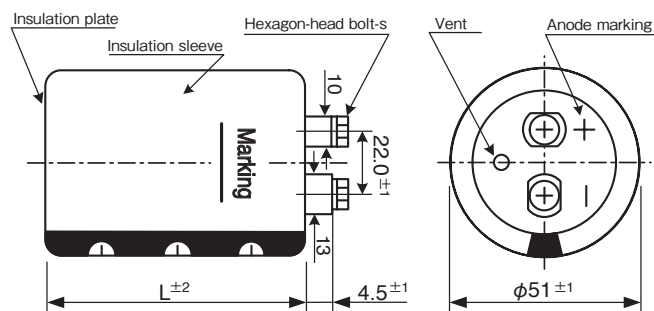
Obsoleted series

Product Specifications

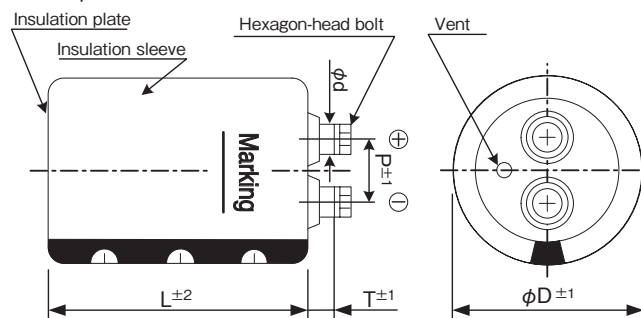
Items	Specifications
Temperature range	-40°C ~ +85°C
Rated voltage	350 ~ 550V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (μA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (μF), V = rated voltage (V)]
Dissipation factor	Less than the value 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

● φ51



● φ64 ~ 90



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		

(unit : mm)

φ D	P	T	φ d	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5×10	Phenol resin
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

Terminal permissible current is limited to 60Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

Product code

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

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

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	1,800	51 $\times$ 75	0.20	7.4	55	58	21	VFL2V182YC075
	2,200	51 $\times$ 96	0.20	8.5	45	47	21	VFL2V222YC096
	2,700	51 $\times$ 109	0.20	9.8	37	39	21	VFL2V272YC109
	3,300	51 $\times$ 125	0.20	11.2	30	32	21	VFL2V332YC125
	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
400	22,000	90 $\times$ 230	0.20	41.1	6	9	24	VFL2V223YF230
	27,000	90 $\times$ 268	0.20	43.0	5	7	24	VFL2V273YF268
400	1,500	51 $\times$ 75	0.20	6.8	68	73	21	VFL2G152YC075
	1,800	51 $\times$ 96	0.20	7.9	57	61	21	VFL2G182YC096
	2,200	51 $\times$ 109	0.20	9.1	47	50	21	VFL2G222YC109
	2,700	51 $\times$ 125	0.20	10.2	38	41	21	VFL2G272YC125
	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
450	18,000	90 $\times$ 230	0.20	37.2	6	9	24	VFL2G183YF230
	22,000	90 $\times$ 268	0.20	38.9	5	7	24	VFL2G223YF268
450	1,200	51 $\times$ 75	0.20	6.3	86	90	21	VFL2W122YC075
	1,500	51 $\times$ 96	0.20	7.5	69	72	21	VFL2W152YC096
	1,800	51 $\times$ 109	0.20	8.4	57	60	21	VFL2W182YC109
	2,200	51 $\times$ 125	0.20	9.4	47	50	21	VFL2W222YC125
	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
	18,000	90 $\times$ 268	0.20	36.0	6	8	24	VFL2W183YF268

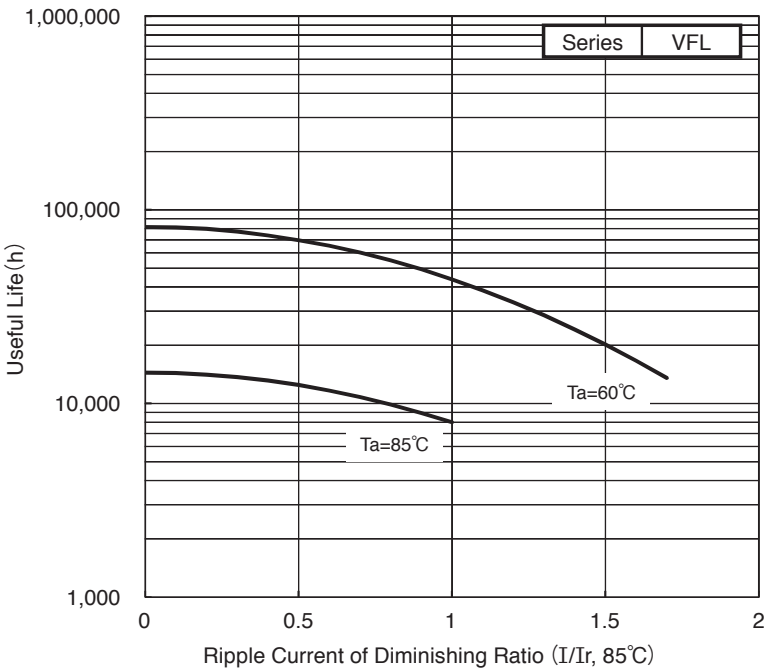
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
500	820	51 $\times$ 75	0.20	4.7	117	110	21	VFL2H821YC075
	1,000	51 $\times$ 96	0.20	5.6	96	90	21	VFL2H102YC096
	1,200	51 $\times$ 109	0.20	6.3	80	75	21	VFL2H122YC109
	1,500	51 $\times$ 125	0.20	7.2	64	60	21	VFL2H152YC125
	1,800	64 $\times$ 94	0.20	9.1	53	50	22	VFL2H182YD094
	2,200	64 $\times$ 107	0.20	10.3	40	35	22	VFL2H222YD107
	2,700	64 $\times$ 123	0.20	11.5	37	33	22	VFL2H272YD123
		77 $\times$ 95	0.20	12.9	37	33	24	VFL2H272YE095
	3,300	64 $\times$ 147	0.20	12.5	36	32	22	VFL2H332YD147
		77 $\times$ 108	0.20	14.2	36	32	24	VFL2H332YE108
	3,900	64 $\times$ 164	0.20	13.9	27	29	22	VFL2H392YD164
		77 $\times$ 124	0.20	15.8	27	29	24	VFL2H392YE124
		90 $\times$ 97	0.20	17.9	27	29	24	VFL2H392YF097
	4,700	64 $\times$ 187	0.20	15.4	25	25	22	VFL2H472YD187
		77 $\times$ 148	0.20	17.0	25	25	24	VFL2H472YE148
		90 $\times$ 110	0.20	19.5	25	25	24	VFL2H472YF110
	5,600	77 $\times$ 165	0.20	18.9	23	21	24	VFL2H562YE165
		90 $\times$ 126	0.20	21.1	23	21	24	VFL2H562YF126
	6,800	77 $\times$ 188	0.20	20.9	20	18	24	VFL2H682YE188
		90 $\times$ 150	0.20	23.1	20	18	24	VFL2H682YF150
	8,200	90 $\times$ 167	0.20	25.0	17	16	24	VFL2H822YF167
	10,000	90 $\times$ 190	0.20	27.8	14	12	24	VFL2H103YF190
	12,000	90 $\times$ 230	0.20	29.6	12	10	24	VFL2H123YF230
	15,000	90 $\times$ 268	0.20	31.4	10	8	24	VFL2H153YF268
550	680	51 $\times$ 75	0.20	4.2	165	177	21	VFL2L681YC075
	820	51 $\times$ 96	0.20	5.0	137	147	21	VFL2L821YC096
	1,000	51 $\times$ 109	0.20	5.6	112	120	21	VFL2L102YC109
	1,200	51 $\times$ 125	0.20	6.4	93	100	21	VFL2L122YC125
	1,500	64 $\times$ 94	0.20	8.1	74	80	22	VFL2L152YD094
	1,800	64 $\times$ 107	0.20	9.1	61	50	22	VFL2L182YD107
	2,200	64 $\times$ 123	0.20	10.1	53	50	22	VFL2L222YD123
		77 $\times$ 95	0.20	11.4	53	50	24	VFL2L222YE095
	2,700	64 $\times$ 147	0.20	11.0	40	35	22	VFL2L272YD147
		77 $\times$ 108	0.20	12.5	40	35	24	VFL2L272YE108
		64 $\times$ 164	0.20	12.5	38	32	22	VFL2L332YD164
	3,300	77 $\times$ 124	0.20	14.2	38	32	24	VFL2L332YE124
		90 $\times$ 97	0.20	16.1	38	32	24	VFL2L332YF097
		64 $\times$ 187	0.20	13.7	30	27	22	VFL2L392YD187
	3,900	77 $\times$ 148	0.20	15.1	30	27	24	VFL2L392YE148
		90 $\times$ 110	0.20	17.4	30	27	24	VFL2L392YF110
		77 $\times$ 165	0.20	16.9	25	20	24	VFL2L472YE165
	4,700	90 $\times$ 126	0.20	18.9	25	20	24	VFL2L472YF126
		77 $\times$ 188	0.20	18.6	20	17	24	VFL2L562YE188
	5,600	90 $\times$ 150	0.20	20.5	20	17	24	VFL2L562YF150
		680	0.20	22.2	17	15	24	VFL2L682YF167
	8,200	90 $\times$ 190	0.20	24.6	14	15	24	VFL2L822YF190
	10,000	90 $\times$ 230	0.20	26.5	12	12	24	VFL2L103YF230
	12,000	90 $\times$ 268	0.20	27.4	10	10	24	VFL2L123YF268

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



SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

UPGRADE!

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.

Standard



GXA

GX2

GX3

High-ripple current

VGL

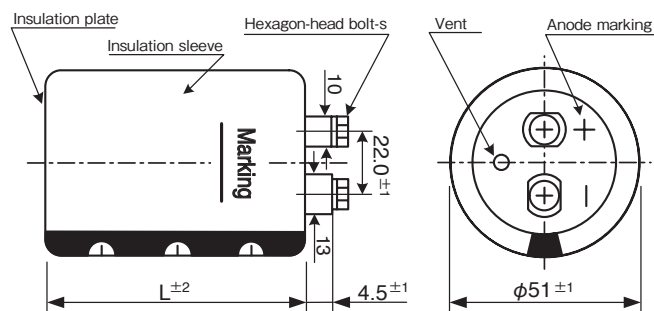
Obsoleted series

Product Specifications

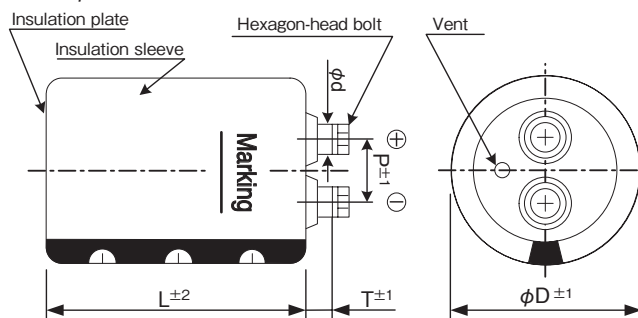
Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value 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

● φ51



● φ64 ~ 90



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		

(unit : mm)

φ D	P	T	φ d	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5×10	Phenol resin
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

Terminal permissible current is limited to 60Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

Product code

(Example) VGL Series 400V 8,200 µF ±20%

VGL 2G 822 Y F 126

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

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	1,800	51 $\times$ 75	0.20	5.6	59	70	21	VGL2V182YC075
	2,200	51 $\times$ 96	0.20	6.5	48	57	21	VGL2V222YC096
	2,700	51 $\times$ 109	0.20	7.5	39	47	21	VGL2V272YC109
	3,300	51 $\times$ 125	0.20	8.6	32	38	21	VGL2V332YC125
	3,900	64 $\times$ 94	0.20	10.5	27	32	22	VGL2V392YD094
	4,700	64 $\times$ 107	0.20	11.9	22	23	22	VGL2V472YD107
	5,600	64 $\times$ 123	0.20	13.0	20	21	22	VGL2V562YD123
		77 $\times$ 95	0.20	14.6	20	21	24	VGL2V562YE095
	6,800	64 $\times$ 147	0.20	14.1	18	18	22	VGL2V682YD147
		77 $\times$ 108	0.20	16.0	18	18	24	VGL2V682YE108
		90 $\times$ 97	0.20	18.5	18	18	24	VGL2V682YF097
	8,200	64 $\times$ 187	0.20	15.9	15	17	22	VGL2V822YD187
		77 $\times$ 124	0.20	18.0	15	17	24	VGL2V822YE124
		90 $\times$ 110	0.20	20.2	15	17	24	VGL2V822YF110
	10,000	77 $\times$ 148	0.20	19.5	12	15	24	VGL2V103YE148
		90 $\times$ 126	0.20	22.1	12	15	24	VGL2V103YF126
	12,000	77 $\times$ 188	0.20	21.8	10	13	24	VGL2V123YE188
		90 $\times$ 150	0.20	24.1	10	13	24	VGL2V123YF150
	15,000	77 $\times$ 228	0.20	25.2	8	11	24	VGL2V153YE228
		90 $\times$ 167	0.20	26.5	8	11	24	VGL2V153YF167
	18,000	90 $\times$ 190	0.20	29.3	6	9	24	VGL2V183YF190
	22,000	90 $\times$ 230	0.20	31.5	5	7	24	VGL2V223YF230
	27,000	90 $\times$ 268	0.20	33.0	4	6	24	VGL2V273YF268
400	1,200	51 $\times$ 75	0.20	4.7	83	97	21	VGL2G122YC075
	1,500	51 $\times$ 96	0.20	5.6	66	77	21	VGL2G152YC096
	1,800	51 $\times$ 109	0.20	6.2	55	65	21	VGL2G182YC109
	2,200	51 $\times$ 125	0.20	7.0	45	53	21	VGL2G222YC125
	3,300	64 $\times$ 94	0.20	9.7	30	35	22	VGL2G332YD094
	3,900	64 $\times$ 107	0.20	10.8	27	32	22	VGL2G392YD107
	4,700	64 $\times$ 123	0.20	11.9	22	23	22	VGL2G472YD123
		77 $\times$ 95	0.20	13.3	22	23	24	VGL2G472YE095
	5,600	64 $\times$ 147	0.20	12.8	20	21	22	VGL2G562YD147
		77 $\times$ 108	0.20	14.5	20	21	24	VGL2G562YE108
		90 $\times$ 97	0.20	16.8	20	21	24	VGL2G562YF097
	6,800	64 $\times$ 187	0.20	14.5	18	18	22	VGL2G682YD187
		77 $\times$ 124	0.20	16.4	18	18	24	VGL2G682YE124
		90 $\times$ 110	0.20	18.4	18	18	24	VGL2G682YF110
	8,200	77 $\times$ 165	0.20	18.0	15	17	24	VGL2G822YE165
		90 $\times$ 126	0.20	20.0	15	17	24	VGL2G822YF126
	10,000	77 $\times$ 188	0.20	19.9	12	15	24	VGL2G103YE188
		90 $\times$ 150	0.20	22.0	12	15	24	VGL2G103YF150
	12,000	90 $\times$ 167	0.20	23.7	10	13	24	VGL2G123YF167
	15,000	90 $\times$ 190	0.20	26.7	8	11	24	VGL2G153YF190
	18,000	90 $\times$ 230	0.20	28.5	7	9	24	VGL2G183YF230
	22,000	90 $\times$ 268	0.20	29.8	6	7	24	VGL2G223YF268
450	1,000	51 $\times$ 75	0.20	4.2	93	93	21	VGL2W102YC075
	1,200	51 $\times$ 96	0.20	5.0	77	77	21	VGL2W122YC096
	1,500	51 $\times$ 109	0.20	5.9	62	62	21	VGL2W152YC109
	1,800	51 $\times$ 125	0.20	6.6	52	52	21	VGL2W182YC125
	2,200	64 $\times$ 94	0.20	8.1	46	48	22	VGL2W222YD094
	2,700	64 $\times$ 107	0.20	9.2	40	42	22	VGL2W272YD107
	3,300	64 $\times$ 123	0.20	10.2	35	35	22	VGL2W332YD123
		77 $\times$ 95	0.20	11.4	35	35	24	VGL2W332YE095
	3,900	64 $\times$ 147	0.20	10.9	27	32	22	VGL2W392YD147
		77 $\times$ 108	0.20	12.4	27	32	24	VGL2W392YE108
	4,700	64 $\times$ 164	0.20	12.2	24	27	22	VGL2W472YD164
		77 $\times$ 124	0.20	13.9	24	27	24	VGL2W472YE124
		90 $\times$ 97	0.20	15.8	24	27	24	VGL2W472YF097
	5,600	64 $\times$ 187	0.20	13.5	22	23	22	VGL2W562YD187
		77 $\times$ 148	0.20	14.9	22	23	24	VGL2W562YE148
		90 $\times$ 110	0.20	17.1	22	23	24	VGL2W562YF110
	6,800	77 $\times$ 165	0.20	16.8	20	20	24	VGL2W682YE165
		90 $\times$ 126	0.20	18.7	20	20	24	VGL2W682YF126
	8,200	77 $\times$ 188	0.20	18.5	18	18	24	VGL2W822YE188
		90 $\times$ 150	0.20	20.4	18	18	24	VGL2W822YF150
	10,000	90 $\times$ 167	0.20	22.2	15	15	24	VGL2W103YF167
	12,000	90 $\times$ 190	0.20	24.5	13	12	24	VGL2W123YF190
	15,000	90 $\times$ 230	0.20	26.6	11	10	24	VGL2W153YF230
	18,000	90 $\times$ 268	0.20	27.7	9	8	24	VGL2W183YF268

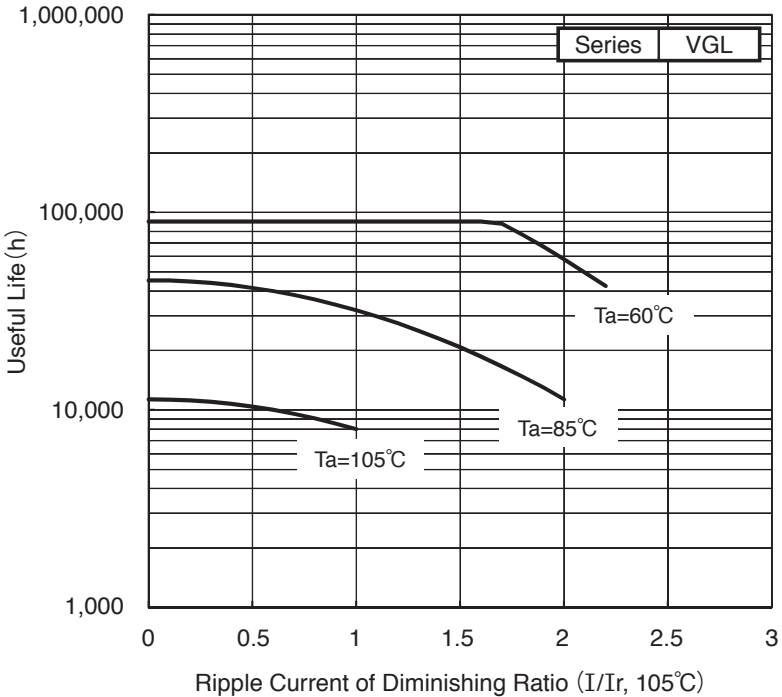
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D×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
500	680	51×75	0.20	3.3	164	177	21	VGL2H681YC075
	820	51×96	0.20	3.9	136	147	21	VGL2H821YC096
	1,000	51×109	0.20	4.4	111	120	21	VGL2H102YC109
	1,200	51×125	0.20	5.0	93	100	21	VGL2H122YC125
	1,800	64×107	0.20	7.1	62	50	22	VGL2H182YD107
	2,200	64×123	0.20	7.9	53	50	22	VGL2H222YD123
		77×95	0.20	8.9	53	50	24	VGL2H222YE095
	2,700	64×147	0.20	8.6	40	35	22	VGL2H272YD147
		77×108	0.20	9.8	40	35	24	VGL2H272YE108
	3,300	64×164	0.20	9.8	38	32	22	VGL2H332YD164
		90×97	0.20	12.6	38	32	24	VGL2H332YF097
	3,900	64×187	0.20	10.7	30	27	22	VGL2H392YD187
		77×124	0.20	12.1	30	27	24	VGL2H392YE124
		90×110	0.20	13.6	30	27	24	VGL2H392YF110
	4,700	77×148	0.20	13.0	25	20	24	VGL2H472YE148
		90×126	0.20	14.8	25	20	24	VGL2H472YF126
	5,600	77×165	0.20	14.5	20	17	24	VGL2H562YE165
		90×150	0.20	16.1	20	17	24	VGL2H562YF150
	6,800	77×188	0.20	16.1	17	17	24	VGL2H682YE188
		90×167	0.20	17.4	17	17	24	VGL2H682YF167
	8,200	90×190	0.20	19.3	14	14	24	VGL2H822YF190
	10,000	90×230	0.20	20.7	12	12	24	VGL2H103YF230
	12,000	90×268	0.20	21.5	10	10	24	VGL2H123YF268

Life time graph

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



SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

UPGRADE!

VFH Series

Useful of 20,000 hours at 85°C

Standard



• Conform RoHS

Features

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

VFL
P.38

→
Long-life

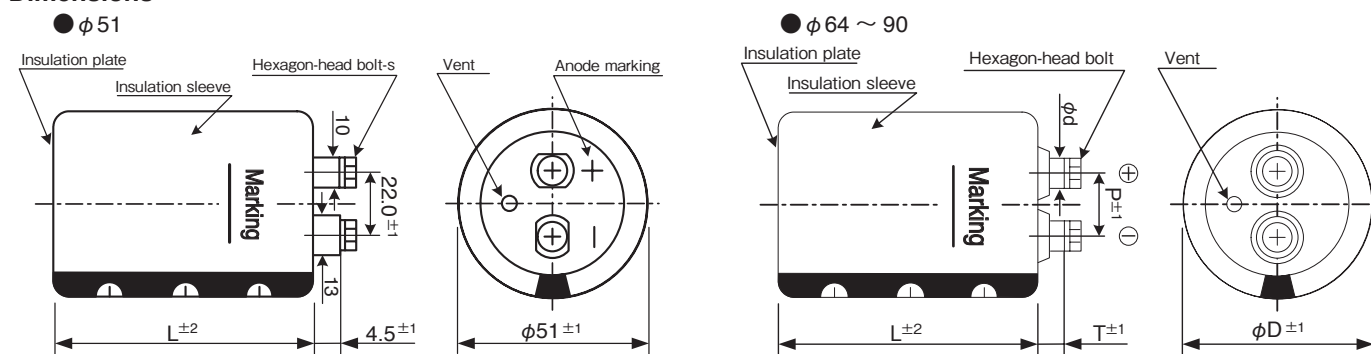
VFH



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 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



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		

(unit : mm)

φ D	P	T	φ d	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5×10	Phenol resin
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

Terminal permissible current is limited to 60Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

Product code

(Example) VFH type 400V 5,600 μF±20%

VFH 2G 562 Y F 097

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

SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

VFH Series

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D×L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	1,800	51×75	0.20	5.6	59	70	21	VFH2V182YC075
	2,200	51×96	0.20	6.5	48	57	21	VFH2V222YC096
	2,700	51×109	0.20	7.5	39	47	21	VFH2V272YC109
	3,300	51×125	0.20	8.6	32	38	21	VFH2V332YC125
	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
		64×147	0.20	14.1	18	18	22	VFH2V682YD147
	6,800	77×108	0.20	16.0	18	18	24	VFH2V682YE108
		90×97	0.20	18.5	18	18	24	VFH2V682YF097
		64×187	0.20	15.9	15	17	22	VFH2V822YD187
	8,200	77×124	0.20	18.0	15	17	24	VFH2V822YE124
		90×110	0.20	20.2	15	17	24	VFH2V822YF110
		77×148	0.20	19.5	12	15	24	VFH2V103YE148
	10,000	90×126	0.20	22.1	12	15	24	VFH2V103YF126
		77×188	0.20	21.8	10	13	24	VFH2V123YE188
	12,000	90×150	0.20	24.1	10	13	24	VFH2V123YF150
		77×228	0.20	25.2	8	11	24	VFH2V153YE228
	15,000	90×167	0.20	26.5	8	11	24	VFH2V153YF167
		90×190	0.20	29.3	6	9	24	VFH2V183YF190
	18,000	90×230	0.20	31.5	5	7	24	VFH2V223YF230
	22,000	90×230	0.20	31.5	5	7	24	VFH2V223YF230
	27,000	90×268	0.20	33.0	4	6	24	VFH2V273YF268
400	1,200	51×75	0.20	4.7	83	97	21	VFH2G122YC075
	1,500	51×96	0.20	5.6	66	77	21	VFH2G152YC096
	1,800	51×109	0.20	6.2	55	65	21	VFH2G182YC109
	2,200	51×125	0.20	7.0	45	53	21	VFH2G222YC125
	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
		64×147	0.20	12.8	20	21	22	VFH2G562YD147
	5,600	77×108	0.20	14.5	20	21	24	VFH2G562YE108
		90×97	0.20	16.8	20	21	24	VFH2G562YF097
		64×187	0.20	14.5	18	18	22	VFH2G682YD187
	6,800	77×124	0.20	16.4	18	18	24	VFH2G682YE124
		90×110	0.20	18.4	18	18	24	VFH2G682YF110
		77×165	0.20	18.0	15	17	24	VFH2G822YE165
	8,200	90×126	0.20	20.0	15	17	24	VFH2G822YF126
		77×188	0.20	19.9	12	15	24	VFH2G103YE188
	10,000	90×150	0.20	22.0	12	15	24	VFH2G103YF150
		90×167	0.20	23.7	10	13	24	VFH2G123YF167
	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
	22,000	90×268	0.20	29.8	6	7	24	VFH2G223YF268
450	1,000	51×75	0.20	4.2	102	106	21	VFH2W102YC075
	1,200	51×96	0.20	5.0	85	88	21	VFH2W122YC096
	1,500	51×109	0.20	5.9	68	71	21	VFH2W152YC109
	1,800	51×125	0.20	6.6	57	59	21	VFH2W182YC125
	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
	18,000	90×268	0.20	27.7	9	8	24	VFH2W183YF268

ALUMINUM ELECTROLYTIC CAPACITORS

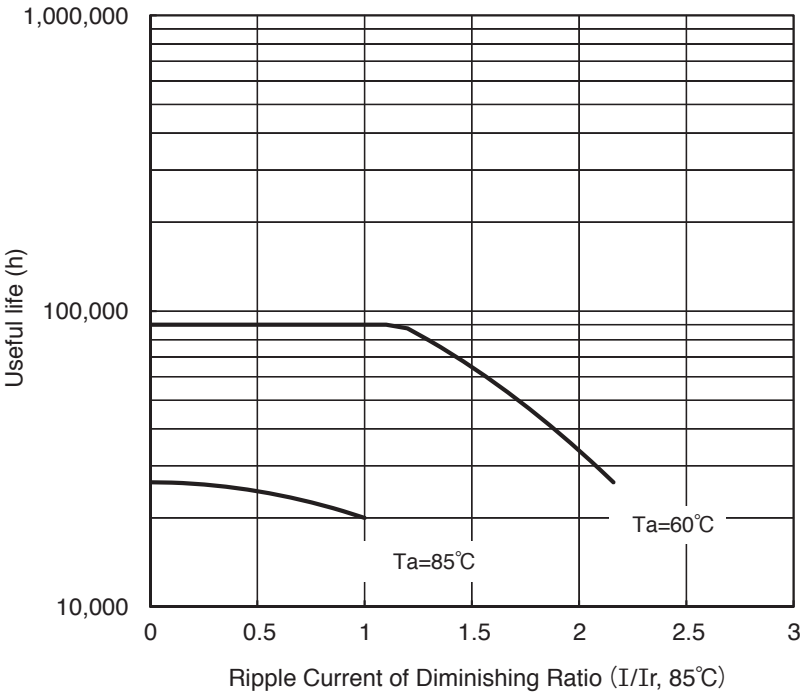
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D×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
500	680	51×75	0.20	3.3	164	177	21	VFH2H681YC075
	820	51×96	0.20	3.9	136	147	21	VFH2H821YC096
	1,000	51×109	0.20	4.4	111	120	21	VFH2H102YC109
	1,200	51×125	0.20	5.0	93	100	21	VFH2H122YC125
	1,800	64×107	0.20	7.1	62	50	22	VFH2H182YD107
	2,200	64×123	0.20	7.9	53	50	22	VFH2H222YD123
		77×95	0.20	8.9	53	50	24	VFH2H222YE095
	2,700	64×147	0.20	8.6	40	35	22	VFH2H272YD147
		77×108	0.20	9.8	40	35	24	VFH2H272YE108
	3,300	64×164	0.20	9.8	38	32	22	VFH2H332YD164
		90×97	0.20	12.6	38	32	24	VFH2H332YF097
	3,900	64×187	0.20	10.7	30	27	22	VFH2H392YD187
		77×124	0.20	12.1	30	27	24	VFH2H392YE124
		90×110	0.20	13.6	30	27	24	VFH2H392YF110
	4,700	77×148	0.20	13.0	25	20	24	VFH2H472YE148
		90×126	0.20	14.8	25	20	24	VFH2H472YF126
	5,600	77×165	0.20	14.5	20	17	24	VFH2H562YE165
		90×150	0.20	16.1	20	17	24	VFH2H562YF150
	6,800	77×188	0.20	16.1	17	17	24	VFH2H682YE188
		90×167	0.20	17.4	17	17	24	VFH2H682YF167
	8,200	90×190	0.20	19.3	14	14	24	VFH2H822YF190
	10,000	90×230	0.20	20.7	12	12	24	VFH2H103YF230
	12,000	90×268	0.20	21.5	10	10	24	VFH2H123YF268

Life time graph

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



UPGRADE!

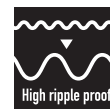
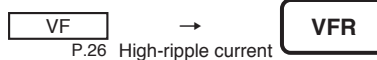
VFR Series

Useful of 4,000 hours at 85°C

- Conform RoHS

Features

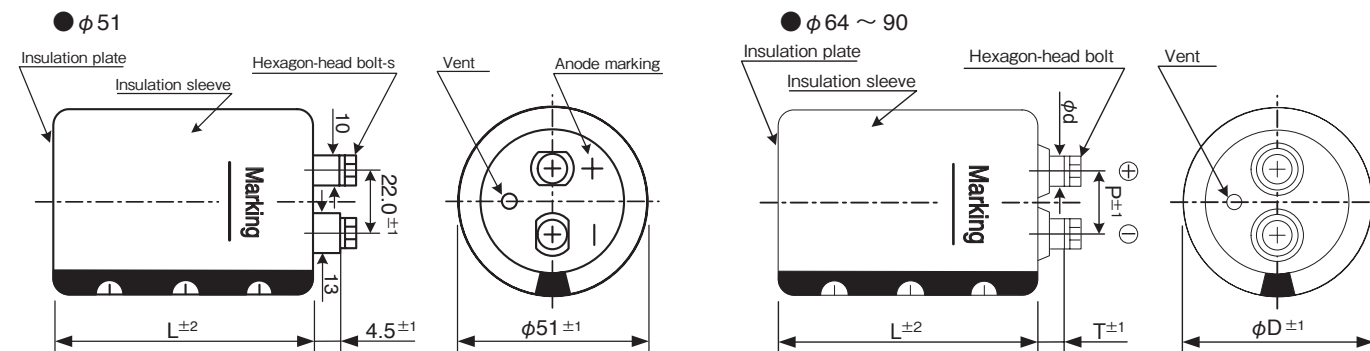
- The permissible ripple current is improved to VF series by approx.30% using low ESR material.



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



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		

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5×10	Phenol resin
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

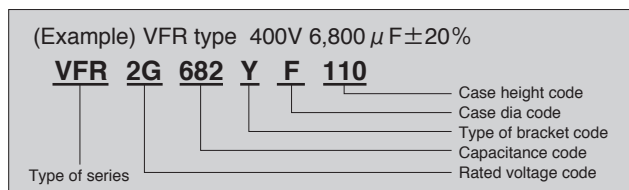
Terminal permissible current is limited to 60Arms for M5, 100Arms for M6. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms for M5, 100Arms for M6)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

Product code



Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	2,200	51 $\times$ 96	0.20	10.2	43	47	21	VFR2V222YC096
	2,700	51 $\times$ 109	0.20	11.4	35	38	21	VFR2V272YC109
	3,300	51 $\times$ 125	0.20	12.7	29	31	21	VFR2V332YC125
	3,900	64 $\times$ 107	0.20	17.0	24	26	22	VFR2V392YD107
	4,700	64 $\times$ 123	0.20	19.2	20	21	22	VFR2V472YD123
	5,600	64 $\times$ 147	0.20	20.6	17	18	22	VFR2V562YD147
		77 $\times$ 108	0.20	23.5	17	18	24	VFR2V562YE108
	6,800	64 $\times$ 164	0.20	23.3	14	15	22	VFR2V682YD164
		77 $\times$ 124	0.20	26.5	14	15	24	VFR2V682YE124
	8,200	64 $\times$ 187	0.20	25.8	12	12	22	VFR2V822YD187
		77 $\times$ 148	0.20	28.5	12	12	24	VFR2V822YE148
		90 $\times$ 110	0.20	32.6	12	12	24	VFR2V822YF110
	10,000	77 $\times$ 165	0.20	32.1	9	10	24	VFR2V103YE165
		90 $\times$ 126	0.20	35.9	9	10	24	VFR2V103YF126
	12,000	77 $\times$ 188	0.20	35.3	8	8	24	VFR2V123YE188
		90 $\times$ 150	0.20	39.1	8	8	24	VFR2V123YF150
	15,000	77 $\times$ 228	0.20	40.8	6	7	24	VFR2V153YE228
		90 $\times$ 167	0.20	43.3	6	7	24	VFR2V153YF167
400	1,800	51 $\times$ 96	0.20	9.5	54	55	21	VFR2G182YC096
	2,200	51 $\times$ 109	0.20	10.6	44	45	21	VFR2G222YC109
	2,700	51 $\times$ 125	0.20	11.9	36	37	21	VFR2G272YC125
	3,300	64 $\times$ 107	0.20	15.7	29	30	22	VFR2G332YD107
	3,900	64 $\times$ 123	0.20	17.5	24	26	22	VFR2G392YD123
	4,700	64 $\times$ 147	0.20	18.9	20	21	22	VFR2G472YD147
		77 $\times$ 108	0.20	21.5	20	21	24	VFR2G472YE108
	5,600	64 $\times$ 164	0.20	21.2	17	18	22	VFR2G562YD164
		77 $\times$ 124	0.20	24.0	17	18	24	VFR2G562YE124
	6,800	64 $\times$ 187	0.20	23.5	14	15	22	VFR2G682YD187
		77 $\times$ 148	0.20	26.0	14	15	24	VFR2G682YE148
		90 $\times$ 110	0.20	29.7	14	15	24	VFR2G682YF110
	8,200	77 $\times$ 165	0.20	29.1	12	12	24	VFR2G822YE165
		90 $\times$ 126	0.20	32.5	12	12	24	VFR2G822YF126
	10,000	77 $\times$ 188	0.20	32.2	9	10	24	VFR2G103YE188
		90 $\times$ 150	0.20	35.7	9	10	24	VFR2G103YF150
	12,000	77 $\times$ 228	0.20	36.5	8	8	24	VFR2G123YE228
		90 $\times$ 167	0.20	38.7	8	8	24	VFR2G123YF167
	15,000	90 $\times$ 190	0.20	43.0	6	7	24	VFR2G153YF190
	18,000	90 $\times$ 230	0.20	46.3	5	6	24	VFR2G183YF230
	22,000	90 $\times$ 268	0.20	46.8	4	5	24	VFR2G223YF268
450	1,500	51 $\times$ 96	0.20	9.0	63	67	21	VFR2W152YC096
	1,800	51 $\times$ 109	0.20	10.1	53	56	21	VFR2W182YC109
	2,200	51 $\times$ 125	0.20	11.3	43	46	21	VFR2W222YC125
	2,700	64 $\times$ 107	0.20	14.5	35	37	22	VFR2W272YD107
	3,300	64 $\times$ 123	0.20	16.5	29	30	22	VFR2W332YD123
	3,900	64 $\times$ 147	0.20	17.6	24	26	22	VFR2W392YD147
		77 $\times$ 108	0.20	20.1	24	26	24	VFR2W392YE108
	4,700	64 $\times$ 164	0.20	19.9	20	21	22	VFR2W472YD164
		77 $\times$ 124	0.20	22.6	20	21	24	VFR2W472YE124
	5,600	64 $\times$ 187	0.20	21.9	17	18	22	VFR2W562YD187
		77 $\times$ 148	0.20	24.1	17	18	24	VFR2W562YE148
		90 $\times$ 110	0.20	27.6	17	18	24	VFR2W562YF110
	6,800	77 $\times$ 165	0.20	27.1	14	15	24	VFR2W682YE165
		90 $\times$ 126	0.20	30.3	14	15	24	VFR2W682YF126
	8,200	77 $\times$ 188	0.20	29.9	12	12	24	VFR2W822YE188
		90 $\times$ 150	0.20	33.1	12	12	24	VFR2W822YF150
	10,000	77 $\times$ 228	0.20	34.1	9	10	24	VFR2W103YE228
		90 $\times$ 167	0.20	36.2	9	10	24	VFR2W103YF167
	12,000	90 $\times$ 190	0.20	39.4	8	8	24	VFR2W123YF190
	15,000	90 $\times$ 230	0.20	43.3	6	7	24	VFR2W153YF230
	18,000	90 $\times$ 268	0.20	43.4	5	6	24	VFR2W183YF268

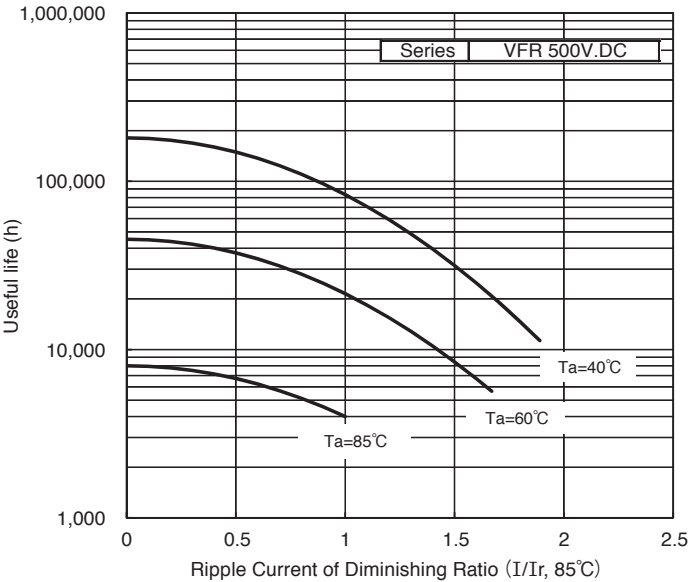
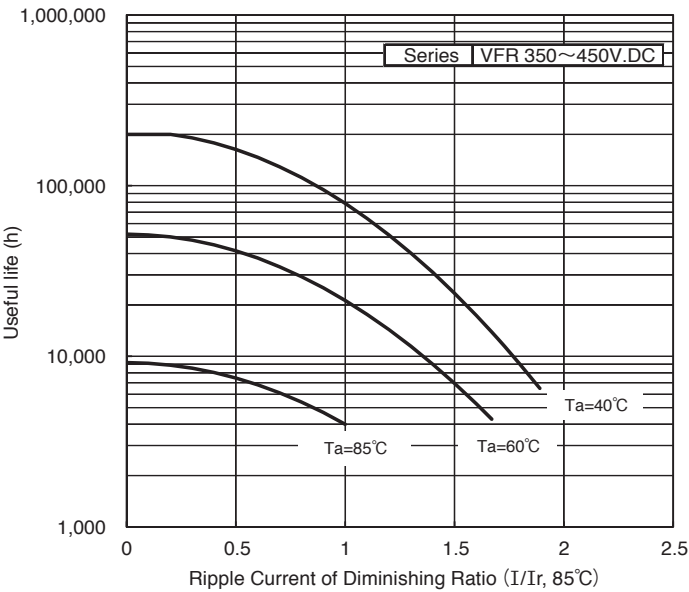
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D×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
500	820	51×96	0.20	6.1	128	134	21	VFR2H821YC096
	1,000	51×109	0.20	7.0	105	110	21	VFR2H102YC109
	1,200	51×125	0.20	7.9	87	92	21	VFR2H122YC125
	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
	12,000	90×268	0.20	33.6	8	9	24	VFR2H123YF268

Life time graph

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



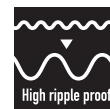
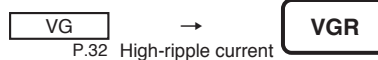
UPGRADE!

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

- Conform RoHS

Features

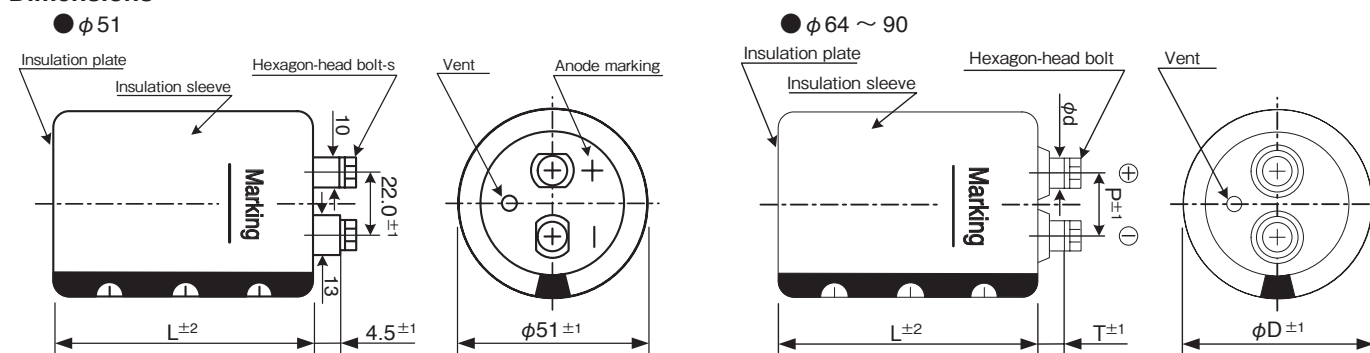
- The permissible ripple current is improved to VG series by approx.60% using low ESR material.



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



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		

(unit : mm)

φ D	P	T	φ d	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5×10	Phenol resin
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

Terminal permissible current is limited to 60Arms for M5, 100Arms for M6. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms for M5, 100Arms for M6)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

Product code

(Example) VGR type 400V 5,600 μF ±20%					
VGR	2G	562	Y	F	110
Type of series	Case height code	Case dia code	Type of bracket code	Capacitance code	Rated voltage code

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	1,800	51 $\times$ 96	0.20	9.1	54	55	21	VGR2V182YC096
	2,200	51 $\times$ 109	0.20	10.2	44	45	21	VGR2V222YC109
	2,700	51 $\times$ 125	0.20	11.4	36	37	21	VGR2V272YC125
	3,300	64 $\times$ 107	0.20	15.1	29	30	22	VGR2V332YD107
	3,900	64 $\times$ 123	0.20	16.8	24	26	22	VGR2V392YD123
	4,700	64 $\times$ 147	0.20	18.2	20	21	22	VGR2V472YD147
		77 $\times$ 108	0.20	20.6	20	21	24	VGR2V472YE108
	5,600	64 $\times$ 164	0.20	20.3	17	18	22	VGR2V562YD164
		77 $\times$ 124	0.20	23.1	17	18	24	VGR2V562YE124
	6,800	64 $\times$ 187	0.20	22.6	14	15	22	VGR2V682YD187
		77 $\times$ 148	0.20	24.9	14	15	24	VGR2V682YE148
		90 $\times$ 110	0.20	28.6	14	15	24	VGR2V682YF110
	8,200	77 $\times$ 165	0.20	27.9	12	12	24	VGR2V822YE165
		90 $\times$ 150	0.20	31.0	12	12	24	VGR2V822YF150
	10,000	77 $\times$ 188	0.20	31.0	9	10	24	VGR2V103YE188
		90 $\times$ 150	0.20	34.2	9	10	24	VGR2V103YF150
	12,000	77 $\times$ 228	0.20	35.1	8	8	24	VGR2V123YE228
		90 $\times$ 167	0.20	36.8	8	8	24	VGR2V123YF167
	15,000	90 $\times$ 190	0.20	41.5	6	7	24	VGR2V153YF190
	18,000	90 $\times$ 230	0.20	44.3	5	6	24	VGR2V183YF230
	22,000	90 $\times$ 268	0.20	45.0	4	5	24	VGR2V223YF268
400	1,500	51 $\times$ 96	0.20	8.4	63	67	21	VGR2G152YC096
	1,800	51 $\times$ 109	0.20	9.4	53	56	21	VGR2G182YC109
	2,200	51 $\times$ 125	0.20	10.6	43	46	21	VGR2G222YC125
	2,700	64 $\times$ 107	0.20	13.6	35	37	22	VGR2G272YD107
	3,300	64 $\times$ 123	0.20	15.5	29	30	22	VGR2G332YD123
	3,900	64 $\times$ 147	0.20	16.5	24	26	22	VGR2G392YD147
		77 $\times$ 108	0.20	18.8	24	26	24	VGR2G392YE108
	4,700	64 $\times$ 164	0.20	18.6	20	21	22	VGR2G472YD164
		77 $\times$ 124	0.20	21.2	20	21	24	VGR2G472YE124
	5,600	64 $\times$ 187	0.20	20.5	17	18	22	VGR2G562YD187
		77 $\times$ 148	0.20	22.6	17	18	24	VGR2G562YE148
		90 $\times$ 110	0.20	26.0	17	18	24	VGR2G562YF110
	6,800	77 $\times$ 165	0.20	25.4	14	15	24	VGR2G682YE165
		90 $\times$ 150	0.20	28.2	14	15	24	VGR2G682YF150
	8,200	77 $\times$ 188	0.20	28.1	12	12	24	VGR2G822YE188
		90 $\times$ 150	0.20	31.0	12	12	24	VGR2G822YF150
	10,000	77 $\times$ 228	0.20	32.0	9	10	24	VGR2G103YE228
		90 $\times$ 167	0.20	33.6	9	10	24	VGR2G103YF167
	12,000	90 $\times$ 190	0.20	37.1	8	8	24	VGR2G123YF190
	15,000	90 $\times$ 230	0.20	40.4	6	7	24	VGR2G153YF230
	18,000	90 $\times$ 268	0.20	40.6	5	6	24	VGR2G183YF268
450	1,200	51 $\times$ 96	0.20	7.9	79	83	21	VGR2W122YC096
	1,500	51 $\times$ 109	0.20	9.0	64	66	21	VGR2W152YC109
	1,800	51 $\times$ 125	0.20	10.1	53	55	21	VGR2W182YC125
	2,200	64 $\times$ 107	0.20	12.6	43	45	22	VGR2W222YD107
	2,700	64 $\times$ 123	0.20	14.4	35	37	22	VGR2W272YD123
		77 $\times$ 108	0.20	16.1	35	37	24	VGR2W272YE108
	3,300	64 $\times$ 147	0.20	15.6	29	30	22	VGR2W332YD147
		77 $\times$ 124	0.20	18.2	29	30	24	VGR2W332YE124
	3,900	64 $\times$ 164	0.20	17.5	24	26	22	VGR2W392YD164
		77 $\times$ 148	0.20	19.4	24	26	24	VGR2W392YE148
		90 $\times$ 110	0.20	22.3	24	26	24	VGR2W392YF110
	4,700	64 $\times$ 187	0.20	19.3	20	21	22	VGR2W472YD187
		77 $\times$ 148	0.20	21.3	20	21	24	VGR2W472YE148
		90 $\times$ 126	0.20	24.2	20	21	24	VGR2W472YF126
	5,600	77 $\times$ 165	0.20	23.7	17	18	24	VGR2W562YE165
		90 $\times$ 150	0.20	26.3	17	18	24	VGR2W562YF150
	6,800	77 $\times$ 188	0.20	26.3	14	15	24	VGR2W682YE188
		90 $\times$ 167	0.20	28.5	14	15	24	VGR2W682YF167
	8,200	77 $\times$ 228	0.20	29.8	12	12	24	VGR2W822YE228
		90 $\times$ 190	0.20	31.5	12	12	24	VGR2W822YF190
	10,000	90 $\times$ 230	0.20	33.9	9	10	24	VGR2W103YF230
	15,000	90 $\times$ 268	0.20	38.2	6	7	24	VGR2W153YF268

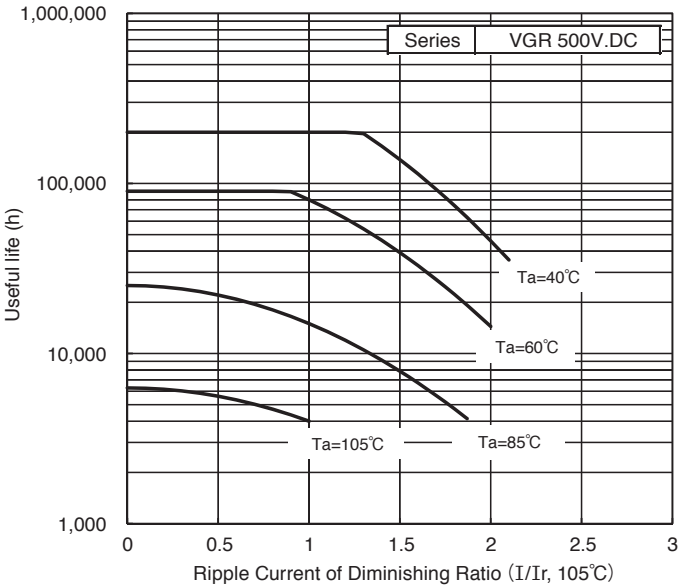
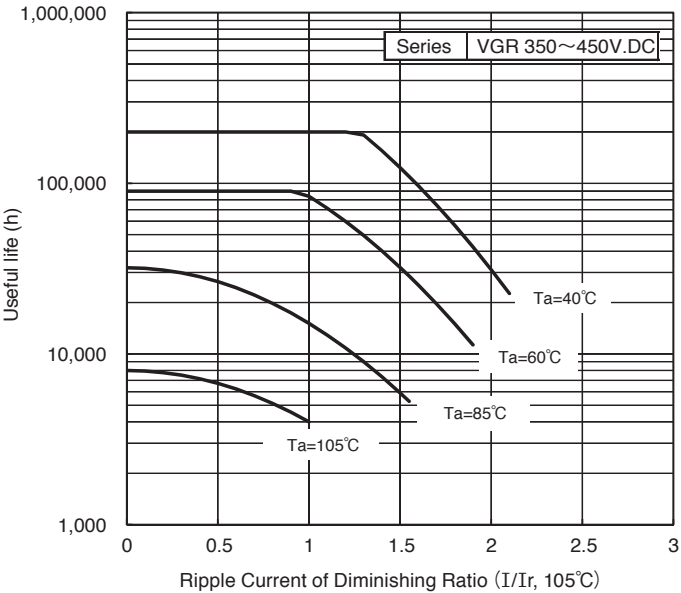
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D×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
500	680	51×96	0.20	4.6	153	162	21	VGR2H681YC096
	820	51×109	0.20	5.2	127	134	21	VGR2H821YC109
	1,000	51×125	0.20	5.9	104	110	21	VGR2H102YC125
	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
	10,000	90×268	0.20	25.1	11	11	24	VGR2H103YF268

Life time graph

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



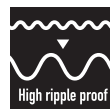
UPGRADE!

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.



FXR3

High-ripple current

VFLR

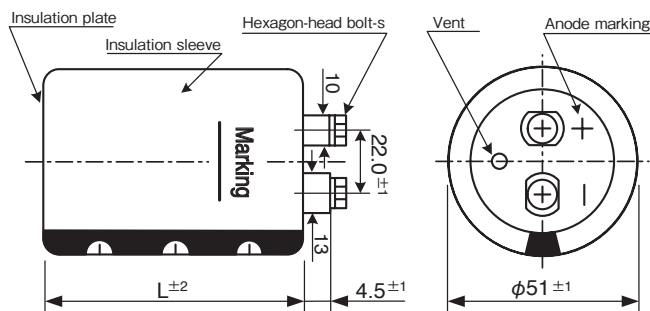
Obsoleted series

Product Specifications

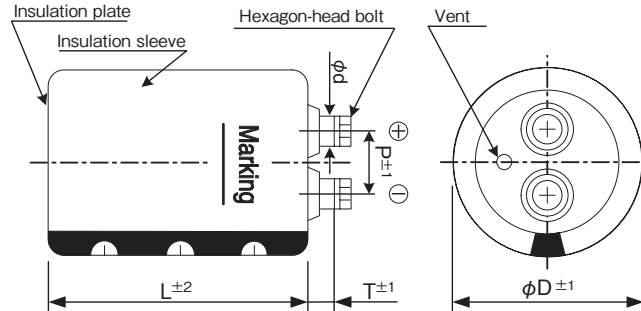
Items	Specifications
Temperature range	−40°C ~ +85°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (μA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (μF), V = rated voltage (V)]
Dissipation factor	Less than the value 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 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

● φ51



● φ64 ~ 90



Ripple current correction coefficient

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

(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5×10	Phenol resin
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

Terminal permissible current is limited to 60Arms for M5, 100Arms for M6. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms for M5, 100Arms for M6)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

Product code

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

VFLR 2W 153 Y F 230

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

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	2,200	51 $\times$ 96	0.20	10.2	43	47	21	VFLR2V222YC096
	2,700	51 $\times$ 109	0.20	11.4	35	38	21	VFLR2V272YC109
	3,300	51 $\times$ 125	0.20	12.7	29	31	21	VFLR2V332YC125
	3,900	64 $\times$ 107	0.20	17.0	24	26	22	VFLR2V392YD107
	4,700	64 $\times$ 123	0.20	19.2	20	21	22	VFLR2V472YD123
	5,600	64 $\times$ 147	0.20	20.6	17	18	22	VFLR2V562YD147
		77 $\times$ 108	0.20	23.5	17	18	24	VFLR2V562YE108
	6,800	64 $\times$ 164	0.20	23.3	14	15	22	VFLR2V682YD164
		77 $\times$ 124	0.20	26.5	14	15	24	VFLR2V682YE124
	8,200	64 $\times$ 187	0.20	25.8	12	12	22	VFLR2V822YD187
		77 $\times$ 148	0.20	28.5	12	12	24	VFLR2V822YE148
		90 $\times$ 110	0.20	32.6	12	12	24	VFLR2V822YF110
	10,000	77 $\times$ 165	0.20	32.1	9	10	24	VFLR2V103YE165
		90 $\times$ 126	0.20	35.9	9	10	24	VFLR2V103YF126
	12,000	77 $\times$ 188	0.20	35.3	8	8	24	VFLR2V123YE188
		90 $\times$ 150	0.20	39.1	8	8	24	VFLR2V123YF150
	15,000	77 $\times$ 228	0.20	40.8	6	7	24	VFLR2V153YE228
		90 $\times$ 167	0.20	43.3	6	7	24	VFLR2V153YF167
400	1,800	51 $\times$ 96	0.20	9.5	54	55	21	VFLR2G182YC096
	2,200	51 $\times$ 109	0.20	10.6	44	45	21	VFLR2G222YC109
	2,700	51 $\times$ 125	0.20	11.9	36	37	21	VFLR2G272YC125
	3,300	64 $\times$ 107	0.20	15.7	29	30	22	VFLR2G332YD107
	3,900	64 $\times$ 123	0.20	17.5	24	26	22	VFLR2G392YD123
	4,700	64 $\times$ 147	0.20	18.9	20	21	22	VFLR2G472YD147
		77 $\times$ 108	0.20	21.5	20	21	24	VFLR2G472YE108
	5,600	64 $\times$ 164	0.20	21.2	17	18	22	VFLR2G562YD164
		77 $\times$ 124	0.20	24.0	17	18	24	VFLR2G562YE124
	6,800	64 $\times$ 187	0.20	23.5	14	15	22	VFLR2G682YD187
		77 $\times$ 148	0.20	26.0	14	15	24	VFLR2G682YE148
		90 $\times$ 110	0.20	29.7	14	15	24	VFLR2G682YF110
	8,200	77 $\times$ 165	0.20	29.1	12	12	24	VFLR2G822YE165
		90 $\times$ 126	0.20	32.5	12	12	24	VFLR2G822YF126
	10,000	77 $\times$ 188	0.20	32.2	9	10	24	VFLR2G103YE188
		90 $\times$ 150	0.20	35.7	9	10	24	VFLR2G103YF150
	12,000	77 $\times$ 228	0.20	36.5	8	8	24	VFLR2G123YE228
		90 $\times$ 167	0.20	38.7	8	8	24	VFLR2G123YF167
450	1,500	51 $\times$ 96	0.20	9.0	63	67	21	VFLR2W152YC096
	1,800	51 $\times$ 109	0.20	10.1	53	56	21	VFLR2W182YC109
	2,200	51 $\times$ 125	0.20	11.3	43	46	21	VFLR2W222YC125
	2,700	64 $\times$ 107	0.20	14.5	35	37	22	VFLR2W272YD107
	3,300	64 $\times$ 123	0.20	16.5	29	30	22	VFLR2W332YD123
	3,900	64 $\times$ 147	0.20	17.6	24	26	22	VFLR2W392YD147
		77 $\times$ 108	0.20	20.1	24	26	24	VFLR2W392YE108
	4,700	64 $\times$ 164	0.20	19.9	20	21	22	VFLR2W472YD164
		77 $\times$ 124	0.20	22.6	20	21	24	VFLR2W472YE124
	5,600	64 $\times$ 187	0.20	21.9	17	18	22	VFLR2W562YD187
		77 $\times$ 148	0.20	24.1	17	18	24	VFLR2W562YE148
		90 $\times$ 110	0.20	27.6	17	18	24	VFLR2W562YF110
	6,800	77 $\times$ 165	0.20	27.1	14	15	24	VFLR2W682YE165
		90 $\times$ 126	0.20	30.3	14	15	24	VFLR2W682YF126
	8,200	77 $\times$ 188	0.20	29.9	12	12	24	VFLR2W822YE188
		90 $\times$ 150	0.20	33.1	12	12	24	VFLR2W822YF150
	10,000	77 $\times$ 228	0.20	34.1	9	10	24	VFLR2W103YE228
		90 $\times$ 167	0.20	36.2	9	10	24	VFLR2W103YF167
	12,000	90 $\times$ 190	0.20	39.4	8	8	24	VFLR2W123YF190
	15,000	90 $\times$ 230	0.20	43.3	6	7	24	VFLR2W153YF230
	18,000	90 $\times$ 268	0.20	43.4	5	6	24	VFLR2W183YF268

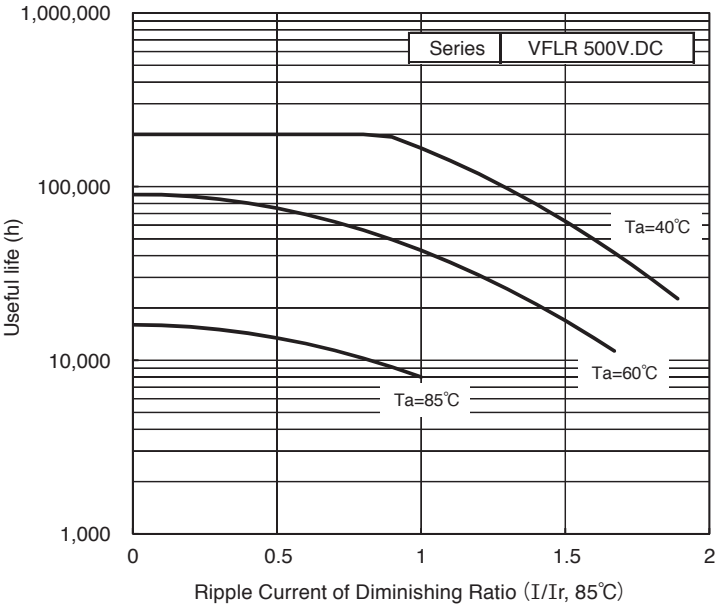
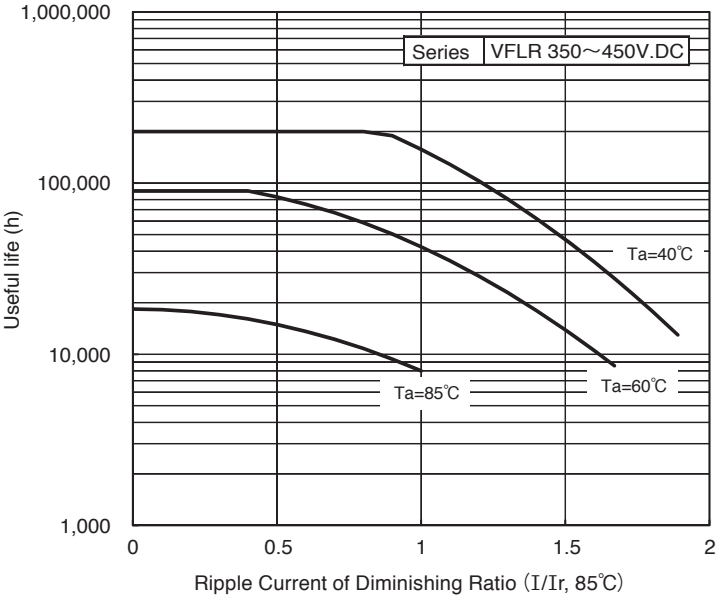
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D×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
500	820	51×96	0.20	6.1	128	134	21	VFLR2H821YC096
	1,000	51×109	0.20	7.0	105	110	21	VFLR2H102YC109
	1,200	51×125	0.20	7.9	87	92	21	VFLR2H122YC125
	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
	12,000	90×268	0.20	33.6	8	9	24	VFLR2H123YF268

Life time graph

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



UPGRADE!

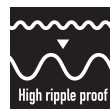
VGLR Series

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.



GXR3

→ High-ripple current

VGLR

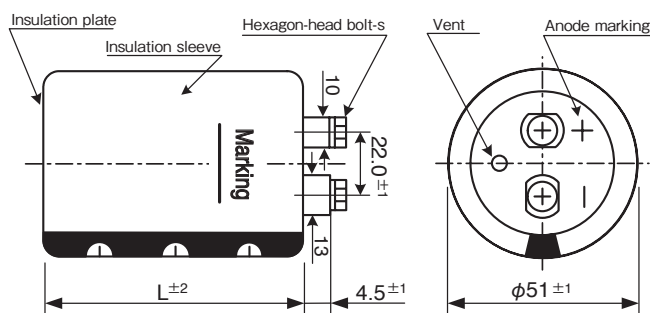
Obsoleted series

Product Specifications

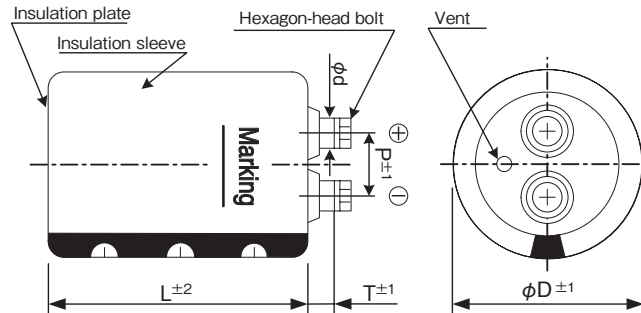
Items	Specifications
Temperature range	-40°C ~ +105°C
Rated voltage	350 ~ 500V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01CV (µA) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (µF), V = rated voltage (V)]
Dissipation factor	Less than the value 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

● φ51



● φ64 ~ 90



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		

(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5×10	Phenol resin
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

Terminal permissible current is limited to 60Arms for M5, 100Arms for M6. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms for M5, 100Arms for M6)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

Product code

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

VGLR 2G 153 Y F 230

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

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	1,800	51 $\times$ 96	0.20	9.1	54	55	21	VGLR2V182YC096
	2,200	51 $\times$ 109	0.20	10.2	44	45	21	VGLR2V222YC109
	2,700	51 $\times$ 125	0.20	11.4	36	37	21	VGLR2V272YC125
	3,300	64 $\times$ 107	0.20	15.1	29	30	22	VGLR2V332YD107
	3,900	64 $\times$ 123	0.20	16.8	24	26	22	VGLR2V392YD123
	4,700	64 $\times$ 147	0.20	18.2	20	21	22	VGLR2V472YD147
		77 $\times$ 108	0.20	20.6	20	21	24	VGLR2V472YE108
	5,600	64 $\times$ 164	0.20	20.3	17	18	22	VGLR2V562YD164
		77 $\times$ 124	0.20	23.1	17	18	24	VGLR2V562YE124
	6,800	64 $\times$ 187	0.20	22.6	14	15	22	VGLR2V682YD187
		77 $\times$ 148	0.20	24.9	14	15	24	VGLR2V682YE148
		90 $\times$ 110	0.20	28.6	14	15	24	VGLR2V682YF110
	8,200	77 $\times$ 165	0.20	27.9	12	12	24	VGLR2V822YE165
		90 $\times$ 150	0.20	31.0	12	12	24	VGLR2V822YF150
	10,000	77 $\times$ 188	0.20	31.0	9	10	24	VGLR2V103YE188
		90 $\times$ 150	0.20	34.2	9	10	24	VGLR2V103YF150
	12,000	77 $\times$ 228	0.20	35.1	8	8	24	VGLR2V123YE228
		90 $\times$ 167	0.20	36.8	8	8	24	VGLR2V123YF167
400	1,500	51 $\times$ 96	0.20	8.4	63	67	21	VGLR2G152YC096
	1,800	51 $\times$ 109	0.20	9.4	53	56	21	VGLR2G182YC109
	2,200	51 $\times$ 125	0.20	10.6	43	46	21	VGLR2G222YC125
	2,700	64 $\times$ 107	0.20	13.6	35	37	22	VGLR2G272YD107
	3,300	64 $\times$ 123	0.20	15.5	29	30	22	VGLR2G332YD123
	3,900	64 $\times$ 147	0.20	16.5	24	26	22	VGLR2G392YD147
		77 $\times$ 108	0.20	18.8	24	26	24	VGLR2G392YE108
	4,700	64 $\times$ 164	0.20	18.6	20	21	22	VGLR2G472YD164
		77 $\times$ 124	0.20	21.2	20	21	24	VGLR2G472YE124
	5,600	64 $\times$ 187	0.20	20.5	17	18	22	VGLR2G562YD187
		77 $\times$ 148	0.20	22.6	17	18	24	VGLR2G562YE148
		90 $\times$ 110	0.20	26.0	17	18	24	VGLR2G562YF110
	6,800	77 $\times$ 165	0.20	25.4	14	15	24	VGLR2G682YE165
		90 $\times$ 150	0.20	28.2	14	15	24	VGLR2G682YF150
	8,200	77 $\times$ 188	0.20	28.1	12	12	24	VGLR2G822YE188
		90 $\times$ 150	0.20	31.0	12	12	24	VGLR2G822YF150
	10,000	77 $\times$ 228	0.20	32.0	9	10	24	VGLR2G103YE228
		90 $\times$ 167	0.20	33.6	9	10	24	VGLR2G103YF167
	12,000	90 $\times$ 190	0.20	37.1	8	8	24	VGLR2G123YF190
	15,000	90 $\times$ 230	0.20	40.4	6	7	24	VGLR2G153YF230
	18,000	90 $\times$ 268	0.20	40.6	5	6	24	VGLR2G183YF268
450	1,200	51 $\times$ 96	0.20	7.9	79	83	21	VGLR2W122YC096
	1,500	51 $\times$ 109	0.20	9.0	64	66	21	VGLR2W152YC109
	1,800	51 $\times$ 125	0.20	10.1	53	55	21	VGLR2W182YC125
	2,200	64 $\times$ 107	0.20	12.6	43	45	22	VGLR2W222YD107
	2,700	64 $\times$ 123	0.20	14.4	35	37	22	VGLR2W272YD123
		77 $\times$ 108	0.20	16.1	35	37	24	VGLR2W272YE108
	3,300	64 $\times$ 147	0.20	15.6	29	30	22	VGLR2W332YD147
		77 $\times$ 124	0.20	18.2	29	30	24	VGLR2W332YE124
	3,900	64 $\times$ 164	0.20	17.5	24	26	22	VGLR2W392YD164
		77 $\times$ 148	0.20	19.4	24	26	24	VGLR2W392YE148
		90 $\times$ 110	0.20	22.3	24	26	24	VGLR2W392YF110
	4,700	64 $\times$ 187	0.20	19.3	20	21	22	VGLR2W472YD187
		77 $\times$ 148	0.20	21.3	20	21	24	VGLR2W472YE148
		90 $\times$ 126	0.20	24.2	20	21	24	VGLR2W472YF126
	5,600	77 $\times$ 165	0.20	23.7	17	18	24	VGLR2W562YE165
		90 $\times$ 150	0.20	26.3	17	18	24	VGLR2W562YF150
	6,800	77 $\times$ 188	0.20	26.3	14	15	24	VGLR2W682YE188
		90 $\times$ 167	0.20	28.5	14	15	24	VGLR2W682YF167
	8,200	77 $\times$ 228	0.20	29.8	12	12	24	VGLR2W822YE228
		90 $\times$ 190	0.20	31.5	12	12	24	VGLR2W822YF190
	10,000	90 $\times$ 230	0.20	33.9	9	10	24	VGLR2W103YF230
	15,000	90 $\times$ 268	0.20	38.2	6	7	24	VGLR2W153YF268

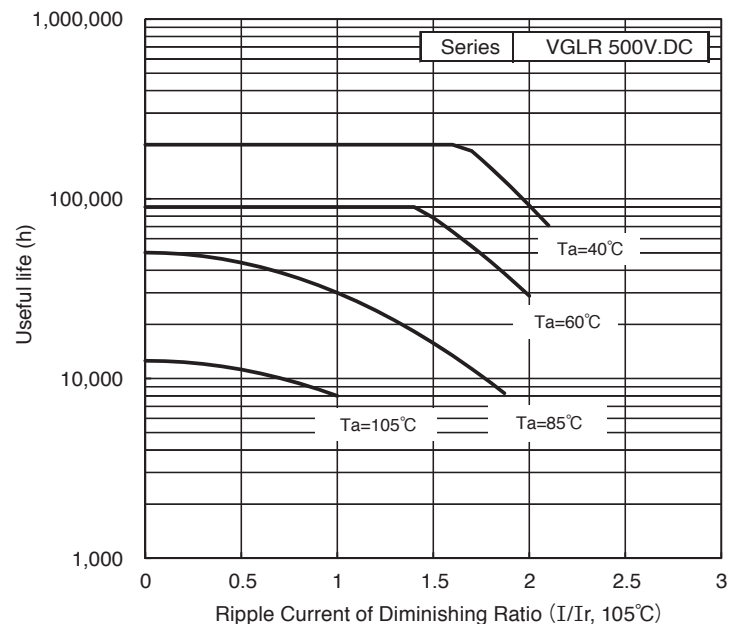
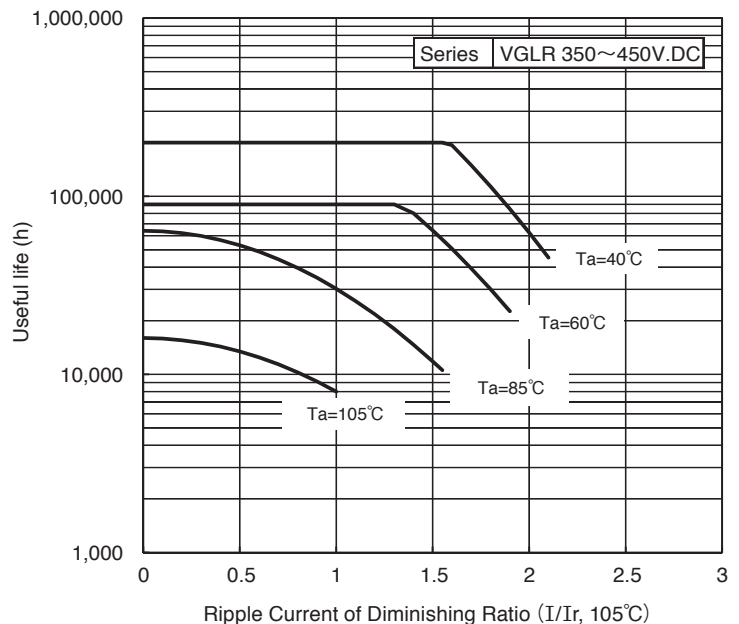
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
500	680	51 $\times$ 96	0.20	4.6	153	162	21	VGLR2H681YC096
	820	51 $\times$ 109	0.20	5.2	127	134	21	VGLR2H821YC109
	1,000	51 $\times$ 125	0.20	5.9	104	110	21	VGLR2H102YC125
	1,500	64 $\times$ 107	0.20	8.4	69	73	22	VGLR2H152YD107
	1,800	64 $\times$ 123	0.20	9.5	58	61	22	VGLR2H182YD123
	2,200	64 $\times$ 147	0.20	10.3	47	50	22	VGLR2H222YD147
		77 $\times$ 108	0.20	11.7	47	50	24	VGLR2H222YE108
	2,700	64 $\times$ 187	0.20	11.8	39	41	22	VGLR2H272YD187
		77 $\times$ 124	0.20	13.3	39	41	24	VGLR2H272YE124
	3,300	77 $\times$ 148	0.20	14.4	32	33	24	VGLR2H332YE148
		90 $\times$ 110	0.20	16.5	32	33	24	VGLR2H332YF110
	3,900	77 $\times$ 165	0.20	15.9	27	28	24	VGLR2H392YE165
		90 $\times$ 126	0.20	17.8	27	28	24	VGLR2H392YF126
	4,700	77 $\times$ 188	0.20	17.6	22	23	24	VGLR2H472YE188
		90 $\times$ 150	0.20	19.4	22	23	24	VGLR2H472YF150
	5,600	77 $\times$ 228	0.20	19.8	19	20	24	VGLR2H562YE228
		90 $\times$ 167	0.20	20.8	19	20	24	VGLR2H562YF167
	6,800	90 $\times$ 190	0.20	23.1	15	16	24	VGLR2H682YF190
	8,200	90 $\times$ 230	0.20	24.7	13	13	24	VGLR2H822YF230
	10,000	90 $\times$ 268	0.20	25.1	11	11	24	VGLR2H103YF268

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



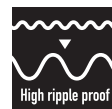
UPGRADE!

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.



VFH

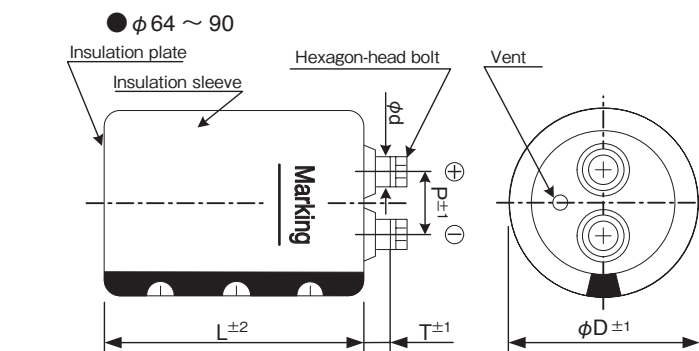
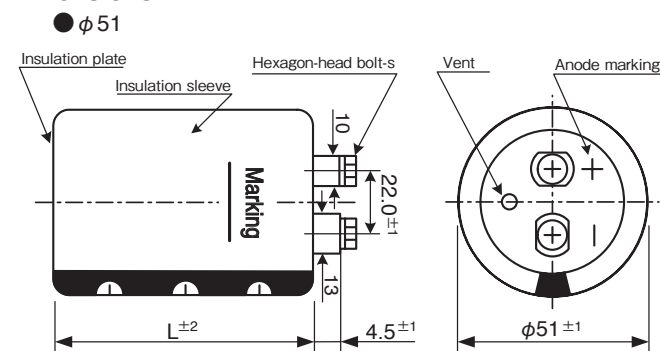
P.46 High-ripple current

VFHR

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 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



Ripple current correction coefficient

Temperature (°C)	40	60	85
Correction coefficient	1.90	1.75	1.00
Frequency (Hz)	120	300	1k
Correction coefficient	1.0	1.1	1.3
Forced wind (m/s)	<0.5	0.5≤	
Correction coefficient	1.0	1.1	

(unit : mm)

φD	P	T	φd	Hexagon-head bolt	Cap material
51	22.0	4.5	—	M5×10	Phenol resin
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

Terminal permissible current is limited to 60Arms for M5, 100Arms for M6. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms for M5, 100Arms for M6)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

Product code

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

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

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	1,800	51 $\times$ 96	0.20	9.1	54	55	21	VFHR2V182YC096
	2,200	51 $\times$ 109	0.20	10.2	44	45	21	VFHR2V222YC109
	2,700	51 $\times$ 125	0.20	11.4	36	37	21	VFHR2V272YC125
	3,300	64 $\times$ 107	0.20	15.1	29	30	22	VFHR2V332YD107
	3,900	64 $\times$ 123	0.20	16.8	24	26	22	VFHR2V392YD123
	4,700	64 $\times$ 147	0.20	18.2	20	21	22	VFHR2V472YD147
		77 $\times$ 108	0.20	20.6	20	21	24	VFHR2V472YE108
	5,600	64 $\times$ 164	0.20	20.3	17	18	22	VFHR2V562YD164
		77 $\times$ 124	0.20	23.1	17	18	24	VFHR2V562YE124
	6,800	64 $\times$ 187	0.20	22.6	14	15	22	VFHR2V682YD187
		77 $\times$ 148	0.20	24.9	14	15	24	VFHR2V682YE148
		90 $\times$ 110	0.20	28.6	14	15	24	VFHR2V682YF110
	8,200	77 $\times$ 165	0.20	27.9	12	12	24	VFHR2V822YE165
		90 $\times$ 150	0.20	31.0	12	12	24	VFHR2V822YF150
	10,000	77 $\times$ 188	0.20	31.0	9	10	24	VFHR2V103YE188
		90 $\times$ 150	0.20	34.2	9	10	24	VFHR2V103YF150
	12,000	77 $\times$ 228	0.20	35.1	8	8	24	VFHR2V123YE228
		90 $\times$ 167	0.20	36.8	8	8	24	VFHR2V123YF167
	15,000	90 $\times$ 190	0.20	41.5	6	7	24	VFHR2V153YF190
	18,000	90 $\times$ 230	0.20	44.3	5	6	24	VFHR2V183YF230
	22,000	90 $\times$ 268	0.20	45.0	4	5	24	VFHR2V223YF268
400	1,500	51 $\times$ 96	0.20	8.4	63	67	21	VFHR2G152YC096
	1,800	51 $\times$ 109	0.20	9.4	53	56	21	VFHR2G182YC109
	2,200	51 $\times$ 125	0.20	10.6	43	46	21	VFHR2G222YC125
	2,700	64 $\times$ 107	0.20	13.6	35	37	22	VFHR2G272YD107
	3,300	64 $\times$ 123	0.20	15.5	29	30	22	VFHR2G332YD123
	3,900	64 $\times$ 147	0.20	16.5	24	26	22	VFHR2G392YD147
		77 $\times$ 108	0.20	18.8	24	26	24	VFHR2G392YE108
	4,700	64 $\times$ 164	0.20	18.6	20	21	22	VFHR2G472YD164
		77 $\times$ 124	0.20	21.2	20	21	24	VFHR2G472YE124
	5,600	64 $\times$ 187	0.20	20.5	17	18	22	VFHR2G562YD187
		77 $\times$ 148	0.20	22.6	17	18	24	VFHR2G562YE148
		90 $\times$ 110	0.20	26.0	17	18	24	VFHR2G562YF110
	6,800	77 $\times$ 165	0.20	25.4	14	15	24	VFHR2G682YE165
		90 $\times$ 150	0.20	28.2	14	15	24	VFHR2G682YF150
	8,200	77 $\times$ 188	0.20	28.1	12	12	24	VFHR2G822YE188
		90 $\times$ 150	0.20	31.0	12	12	24	VFHR2G822YF150
	10,000	77 $\times$ 228	0.20	32.0	9	10	24	VFHR2G103YE228
		90 $\times$ 167	0.20	33.6	9	10	24	VFHR2G103YF167
	12,000	90 $\times$ 190	0.20	37.1	8	8	24	VFHR2G123YF190
	15,000	90 $\times$ 230	0.20	40.4	6	7	24	VFHR2G153YF230
	18,000	90 $\times$ 268	0.20	40.6	5	6	24	VFHR2G183YF268
450	1,200	51 $\times$ 96	0.20	7.9	79	83	21	VFHR2W122YC096
	1,500	51 $\times$ 109	0.20	9.0	64	66	21	VFHR2W152YC109
	1,800	51 $\times$ 125	0.20	10.1	53	55	21	VFHR2W182YC125
	2,200	64 $\times$ 107	0.20	12.6	43	45	22	VFHR2W222YD107
	2,700	64 $\times$ 123	0.20	14.4	35	37	22	VFHR2W272YD123
		77 $\times$ 108	0.20	16.1	35	37	24	VFHR2W272YE108
	3,300	64 $\times$ 147	0.20	15.6	29	30	22	VFHR2W332YD147
		77 $\times$ 124	0.20	18.2	29	30	24	VFHR2W332YE124
	3,900	64 $\times$ 164	0.20	17.5	24	26	22	VFHR2W392YD164
		77 $\times$ 148	0.20	19.4	24	26	24	VFHR2W392YE148
		90 $\times$ 110	0.20	22.3	24	26	24	VFHR2W392YF110
	4,700	64 $\times$ 187	0.20	19.3	20	21	22	VFHR2W472YD187
		77 $\times$ 148	0.20	21.3	20	21	24	VFHR2W472YE148
		90 $\times$ 126	0.20	24.2	20	21	24	VFHR2W472YF126
	5,600	77 $\times$ 165	0.20	23.7	17	18	24	VFHR2W562YE165
		90 $\times$ 150	0.20	26.3	17	18	24	VFHR2W562YF150
	6,800	77 $\times$ 188	0.20	26.3	14	15	24	VFHR2W682YE188
		90 $\times$ 167	0.20	28.5	14	15	24	VFHR2W682YF167
	8,200	77 $\times$ 228	0.20	29.8	12	12	24	VFHR2W822YE228
		90 $\times$ 190	0.20	31.5	12	12	24	VFHR2W822YF190
	10,000	90 $\times$ 230	0.20	33.9	9	10	24	VFHR2W103YF230
	15,000	90 $\times$ 268	0.20	38.2	6	7	24	VFHR2W153YF268

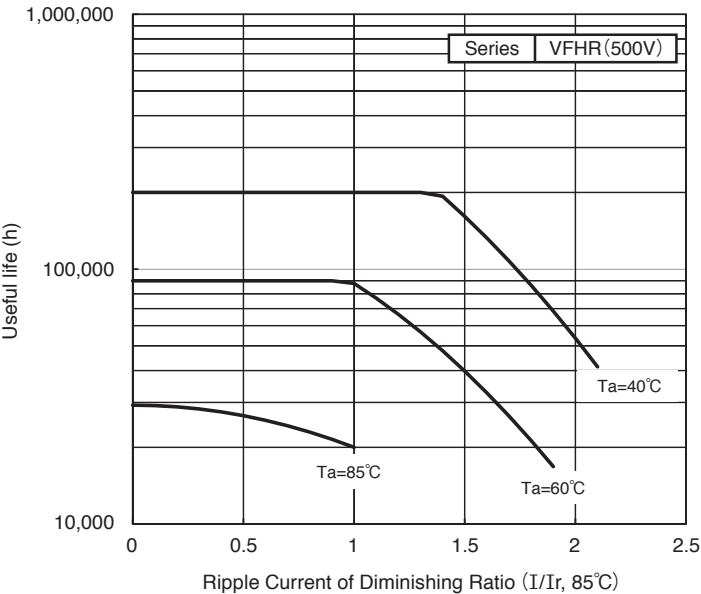
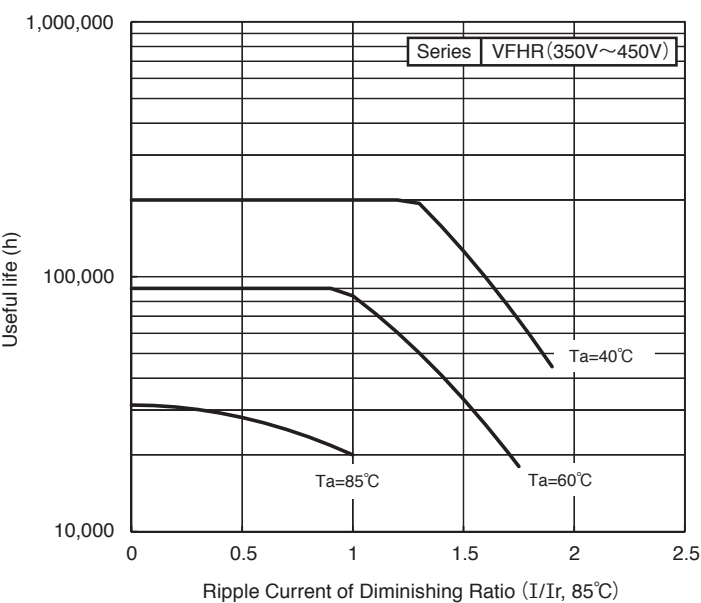
SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D×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
500	680	51×96	0.20	4.6	153	162	21	VFHR2H681YC096
	820	51×109	0.20	5.2	127	134	21	VFHR2H821YC109
	1,000	51×125	0.20	5.9	104	110	21	VFHR2H102YC125
	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
	10,000	90×268	0.20	25.1	11	11	24	VFHR2H103YF268

Life time graph

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



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

→ Small-size
→ Long-life

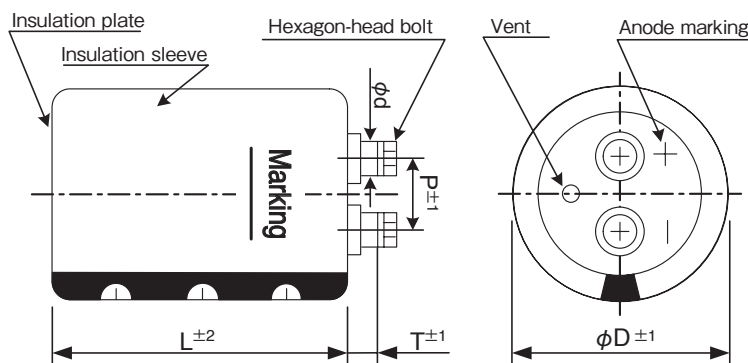
HCGW2 P.72
FXW P.76



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 (μ A) or 7mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (μ 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)

φ D	P	T	φ 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	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 current is limited to 60Arms for M5, 100Arms for M6. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms for M5, 100Arms for M6)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

Product code

(Example) HCGWA Series 450V 22,000 μ F ±20%					
HCGWA	2W	223	Y	F	236 PH
Type of series	Sealing code	Case height code	Case dia code	Type of bracket code	Capacitance code
					Rated voltage code

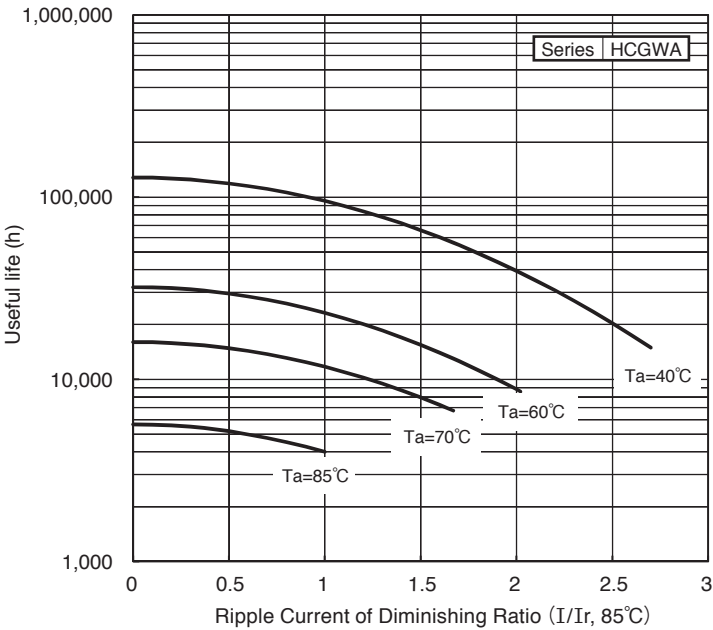
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D×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
	25,000	90×196	0.70	20.7	15	16	26	HCGWA2V253YF196PH
	31,000	101×195	0.70	23.9	12	13	36	HCGWA2V313YG195PH
	36,000	90×283	0.70	29.0	11	13	26	HCGWA2V363YF283PH
	44,000	101×283	0.70	33.2	9	11	36	HCGWA2V443YG283PH
	57,000	121×283	0.70	40.7	7	8	36	HCGWA2V573XK283PH
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	90×157	0.70	15.2	21	22	26	HCGWA2G163YF157PH
	20,000	90×196	0.70	18.5	20	21	26	HCGWA2G203YF196PH
	25,000	101×195	0.70	21.4	16	18	36	HCGWA2G253YG195PH
	32,000	90×283	0.70	27.3	12	13	26	HCGWA2G323YF283PH
	38,000	101×283	0.70	30.8	10	11	36	HCGWA2G383YG283PH
	50,000	121×283	0.70	38.1	9	11	36	HCGWA2G503XK283PH
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
	17,000	90×196	0.70	17.1	21	22	26	HCGWA2W173YF196PH
	22,000	101×195	0.70	20.1	18	19	36	HCGWA2W223YG195PH
	27,000	90×283	0.70	25.1	15	17	26	HCGWA2W273YF283PH
	33,000	101×283	0.70	28.7	13	15	36	HCGWA2W333YG283PH
	42,000	121×283	0.70	34.9	10	12	36	HCGWA2W423XK283PH
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
	11,000	90×196	0.70	13.7	32	33	26	HCGWA2H113YF196PH
	14,000	101×195	0.70	16.0	29	30	36	HCGWA2H143YG195PH
	16,000	90×283	0.70	19.3	25	27	26	HCGWA2H163YF283PH

ALUMINUM ELECTROLYTIC CAPACITORS

Life time graph

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



UPGRADE!

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.
- The correspondence size has been expanded to $\phi 90 \times 268\text{L}$.

HCGWA
P.70

→
Small-size

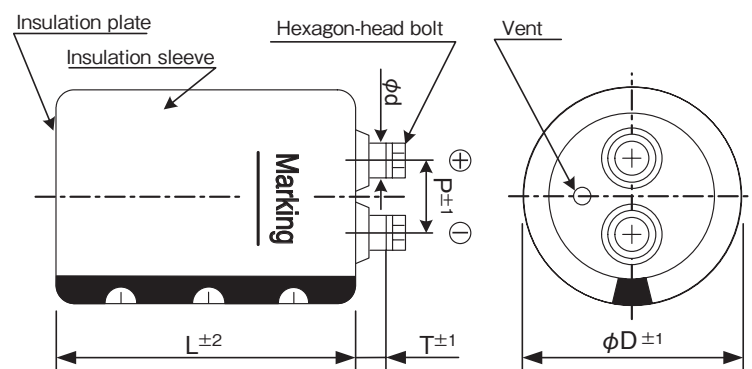
HCGW2



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 permissible current is limited to 100Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 100Arms)

Please consult us when the ripple voltage exceeds 50 Vp-p.

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 21 for product code.

Bracket

- Refer to page 22-23 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.

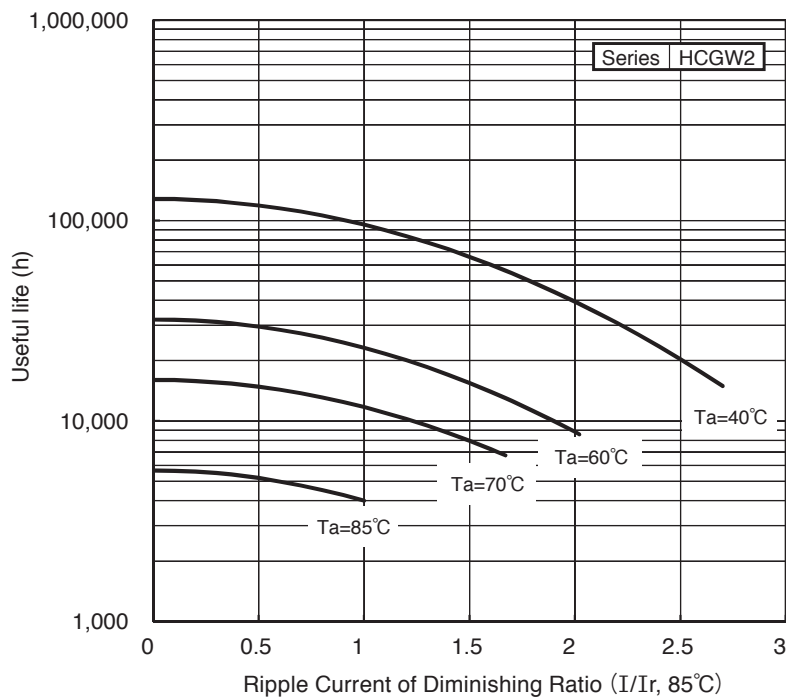
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 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
	23,000	90 $\times$ 190	0.70	19.8	15	16	24	HCGW22G233YF190PH
	33,000	90 $\times$ 268	0.70	27.5	10	11	24	HCGW22G333YF268PH
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
	20,000	90 $\times$ 190	0.70	17.6	20	21	24	HCGW22W203YF190PH
	30,000	90 $\times$ 268	0.70	24.9	13	14	24	HCGW22W303YF268PH
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
	15,000	90 $\times$ 190	0.70	15.3	24	25	24	HCGW22H153YF190PH
	22,000	90 $\times$ 268	0.70	21.3	16	17	24	HCGW22H223YF268PH

ALUMINUM ELECTROLYTIC CAPACITORS

Life time graph

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



UPGRADE!

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).
- The correspondence size has been expanded to $\phi 90 \times 268\text{L}$.

HCGW2
P.72

→
Small-size

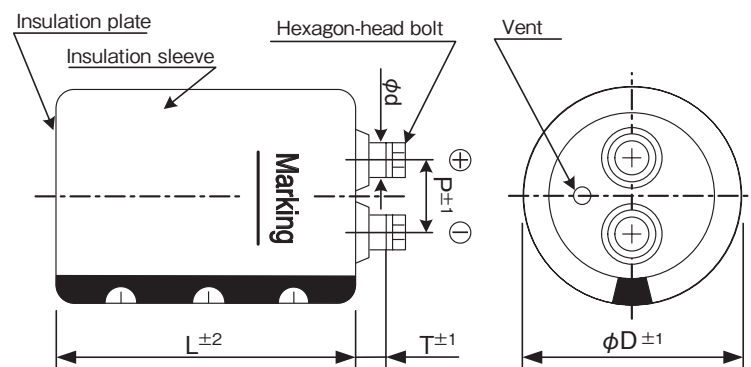
HCGW3



Product Specifications

Items	Specifications
Temperature range	$-10^{\circ}\text{C} \sim +70^{\circ}\text{C}$
Rated voltage	350 $\sim$ 500V.DC
Capacitance tolerance	$\pm 20\%$ (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 $\pm 15\%$ 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 $\pm 15\%$ 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 $\times$ 12	Phenol resin
90	31.5	8.0	12.0	M6 $\times$ 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 current is limited to 100Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 100Arms)

Please consult us when the ripple voltage exceeds 50 Vp-p.

Product code

(Example) HCGW3 Series 400V 16,000 $\mu\text{F} \pm 20\%$

HCGW3 2G 163 Y E 148

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

Refer to page 21 for product code.

Bracket

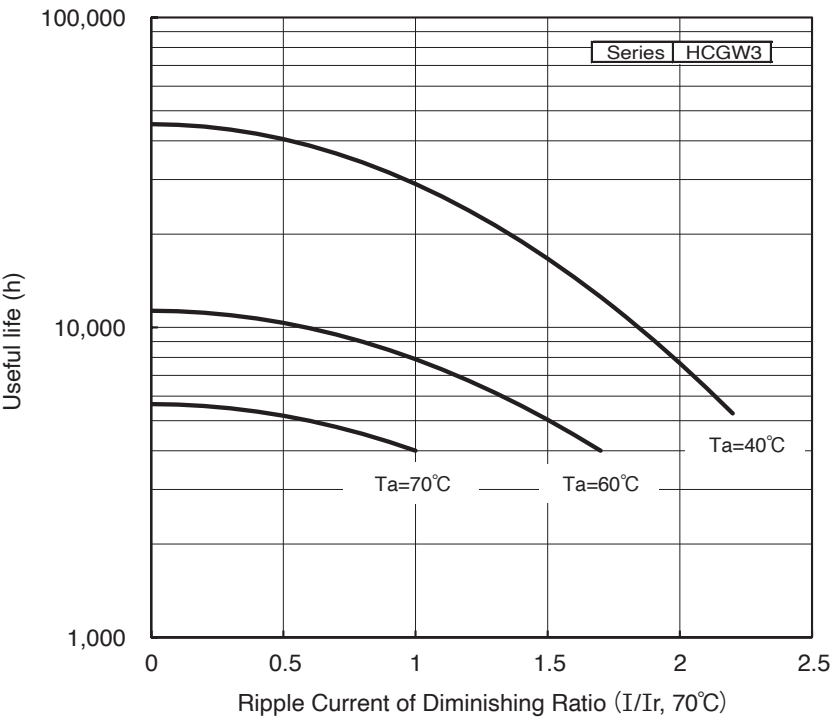
- Refer to page 22-23 for shapes and dimensions.
- Product names in the Standard Products Table correspond to the bracket for Type Y, but Type I bracket may be used (Type of bracket code = I).
- If bracket are not necessary, enter "N" for type of bracket code.
- Bracket will be delivered separately.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L(mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 70°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Z max (m Ω) 20°C, 10kHz	ESL(typ.) (nH)	Product name
350	19,000	77 $\times$ 148	0.70	15.8	18	19	24	HCGW32V193YE148
	25,000	77 $\times$ 188	0.70	19.4	14	15	24	HCGW32V253YE188
	28,000	90 $\times$ 150	0.70	20.4	12	13	24	HCGW32V283YF150
	35,000	90 $\times$ 190	0.70	24.3	10	11	24	HCGW32V353YF190
	51,000	90 $\times$ 268	0.70	34.2	7	8	24	HCGW32V513YF268
400	16,000	77 $\times$ 148	0.70	14.5	21	22	24	HCGW32G163YE148
	20,000	77 $\times$ 188	0.70	17.4	17	18	24	HCGW32G203YE188
	22,000	90 $\times$ 150	0.70	18.2	16	17	24	HCGW32G223YF150
	29,000	90 $\times$ 190	0.70	22.1	12	13	24	HCGW32G293YF190
	42,000	90 $\times$ 268	0.70	31.0	8	9	24	HCGW32G423YF268
450	13,000	77 $\times$ 148	0.70	12.5	31	32	24	HCGW32W133YE148
	17,000	77 $\times$ 188	0.70	15.3	23	25	24	HCGW32W173YE188
	18,000	90 $\times$ 150	0.70	15.7	22	23	24	HCGW32W183YF150
	25,000	90 $\times$ 190	0.70	19.6	16	17	24	HCGW32W253YF190
	35,000	90 $\times$ 268	0.70	26.8	11	12	24	HCGW32W353YF268
500	10,000	77 $\times$ 148	0.70	11.0	36	37	24	HCGW32H103YE148
	14,000	77 $\times$ 188	0.70	13.9	26	27	24	HCGW32H143YE188
	15,000	90 $\times$ 150	0.70	14.3	24	25	24	HCGW32H153YF150
	20,000	90 $\times$ 190	0.70	17.6	18	19	24	HCGW32H203YF190
	28,000	90 $\times$ 268	0.70	24.1	13	13	24	HCGW32H283YF268

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



SCREW TERMINAL TYPE ALUMINUM ELECTROLYTIC CAPACITORS

UPGRADE!

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.70

→
Long-life

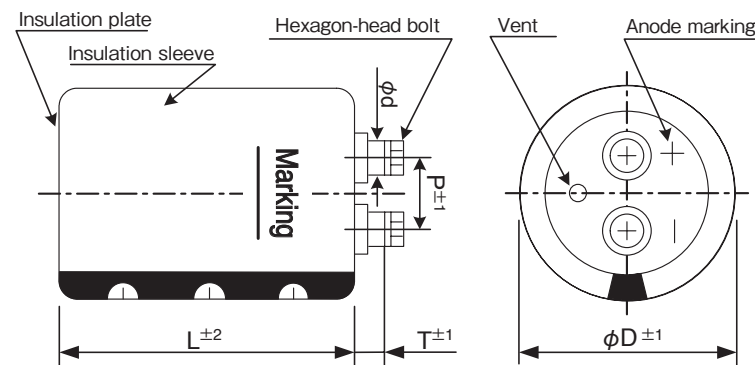
FXW



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 permissible current is limited to 60Arms for M5, 100Arms for M6. (Even if calculated the permissible ripple current with the correction coefficient exceeds 60Arms for M5, 100Arms for M6)
Please consult us when the ripple voltage exceeds 50 Vp-p.

Product code

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

FXW 2G 243 Y F 236 PH

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

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

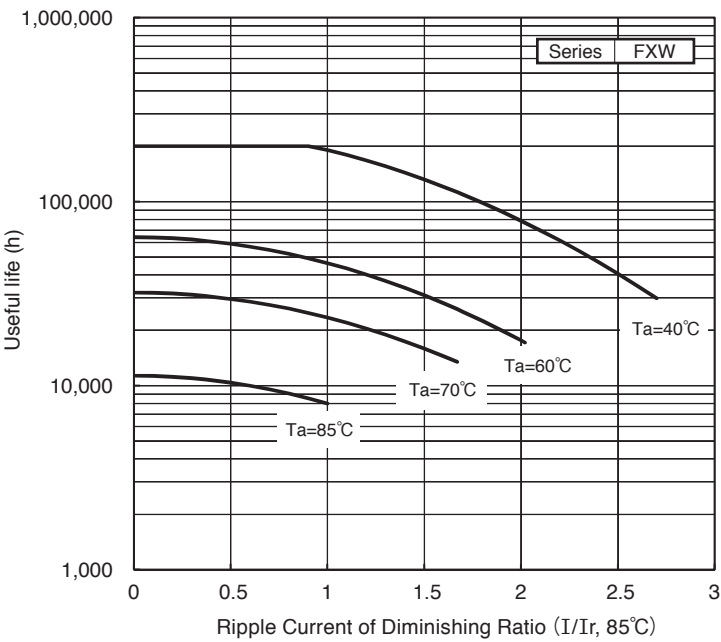
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D×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	FXW2V133YE155PH
	17,000	77×195	0.70	16.1	19	20	26	FXW2V173YE195PH
		90×157	0.70	15.6	19	20	26	FXW2V173YF157PH
	24,000	90×196	0.70	20.3	17	18	26	FXW2V243YF196PH
	26,000	77×283	0.70	23.4	15	16	26	FXW2V263YE283PH
	30,000	101×195	0.70	23.5	12	13	36	FXW2V303YG195PH
	37,000	90×283	0.70	29.4	10	12	26	FXW2V373YF283PH
400	45,000	101×283	0.70	33.6	8	10	36	FXW2V453YG283PH
	11,000	77×155	0.70	11.8	31	32	26	FXW2G113YE155PH
	13,000	77×195	0.70	14.1	26	27	26	FXW2G133YE195PH
	15,000	90×157	0.70	14.7	23	24	26	FXW2G153YF157PH
	19,000	90×196	0.70	18.1	21	22	26	FXW2G193YF196PH
	22,000	77×283	0.70	21.5	18	19	26	FXW2G223YE283PH
	24,000	101×195	0.70	21.0	17	18	36	FXW2G243YG195PH
450	30,000	90×283	0.70	26.5	13	14	26	FXW2G303YF283PH
	38,000	101×283	0.70	30.8	10	11	36	FXW2G383YG283PH
	9,000	77×155	0.70	10.6	38	39	26	FXW2W902YE155PH
	11,000	77×195	0.70	12.9	31	32	26	FXW2W113YE195PH
	12,000	90×157	0.70	13.1	28	29	26	FXW2W123YF157PH
	16,000	90×196	0.70	16.6	23	25	26	FXW2W163YF196PH
	19,000	77×283	0.70	20.0	20	21	26	FXW2W193YE283PH
	20,000	101×195	0.70	19.2	19	20	36	FXW2W203YG195PH
	27,000	90×283	0.70	25.1	16	17	26	FXW2W273YF283PH
	34,000	101×283	0.70	29.2	13	14	36	FXW2W343YG283PH

ALUMINUM ELECTROLYTIC CAPACITORS

Life time graph

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



UPGRADE!

FXW2 Series

Useful of 8,000 hours at 85°C



- Conform RoHS

Features

- Capacitance is increased by around 30%, from conventional FXW series through development of etched foil technology.
- The correspondence size has been expanded to $\phi 90 \times 268\text{L}$.

FXW
P.76

→
Small-size

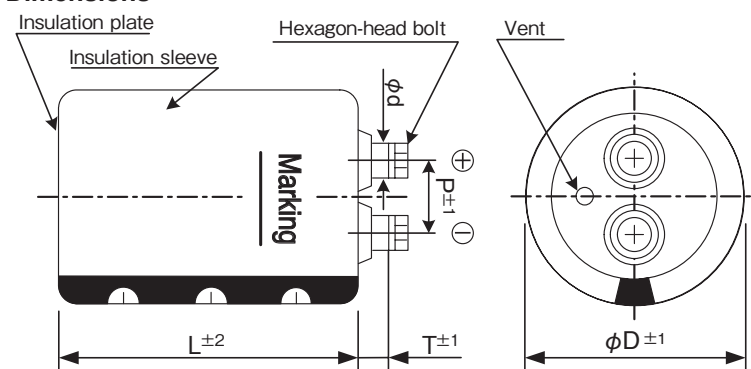
FXW2



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 (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 $\pm 15\%$ 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 $\pm 15\%$ 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	$\geq 10\text{k}$
Correction coefficient	1.0	1.1	1.3	1.4

Terminal permissible current is limited to 100Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 100Arms) Please consult us when the ripple voltage exceeds 50 Vp-p.

Product code

(Example) FXW2 Series 400V 18,000 $\mu\text{F} \pm 20\%$

FXW2 2G 183 Y F 150

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

Refer to page 21 for product code.

Bracket

- Refer to page 22-23 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.

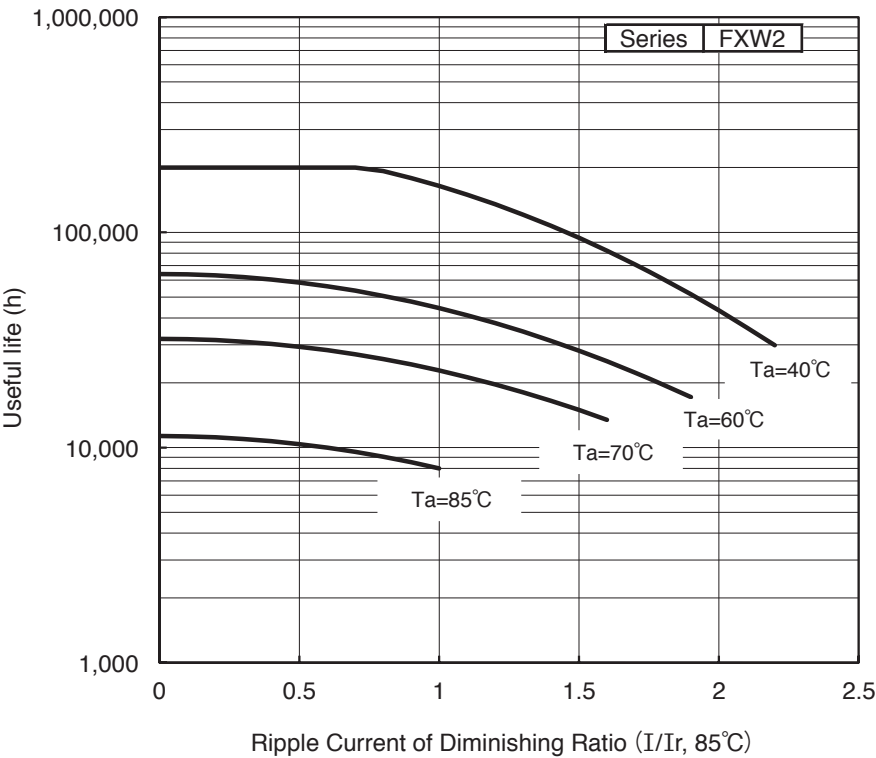
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D×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	15,000	77×148	0.70	14.0	23	24	24	FXW22V153YE148
	20,000	77×188	0.70	17.4	17	18	24	FXW22V203YE188
	21,000	90×150	0.70	17.7	17	18	24	FXW22V213YF150
	28,000	90×190	0.70	21.8	13	14	24	FXW22V283YF190
	42,000	90×268	0.70	31.0	8	9	24	FXW22V423YF268
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
	24,000	90×190	0.70	20.2	15	16	24	FXW22G243YF190
	34,000	90×268	0.70	27.8	10	11	24	FXW22G343YF268
450	10,000	77×148	0.70	9.1	40	42	24	FXW22W103YE148
	14,000	77×188	0.70	11.5	29	30	24	FXW22W143YE188
	15,000	90×150	0.70	11.9	27	29	24	FXW22W153YF150
	20,000	90×190	0.70	14.7	20	21	24	FXW22W203YF190
	30,000	90×268	0.70	20.8	13	14	24	FXW22W303YF268
500	7,900	77×148	0.70	8.6	45	46	24	FXW22H792YE148
	10,000	77×188	0.70	10.4	36	38	24	FXW22H103YE188
	11,000	90×150	0.70	10.8	33	34	24	FXW22H113YF150
	14,000	90×190	0.70	13.1	26	27	24	FXW22H143YF190
	22,000	90×268	0.70	18.9	16	17	24	FXW22H223YF268

ALUMINUM ELECTROLYTIC CAPACITORS

Life time graph

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



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 (μ A) or 5mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (μ 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 $\pm 15\%$ 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 3 or 2 Hz ^(*)) at 40°C, following requirements must be met. Capacitance change : Within $\pm 15\%$ 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 μ F or more, all other products are 3Hz.

Charge-Discharge option available series

Type of series	VF	VFL	VFH	VG	VGL
Temperature range	-40°C~85°C			-40°C~105°C	
Useful life	4,000h	8,000h	20,000h	4,000h	8,000h
Reference page	P.26	P.38	P.46	P.32	P.42

• 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.

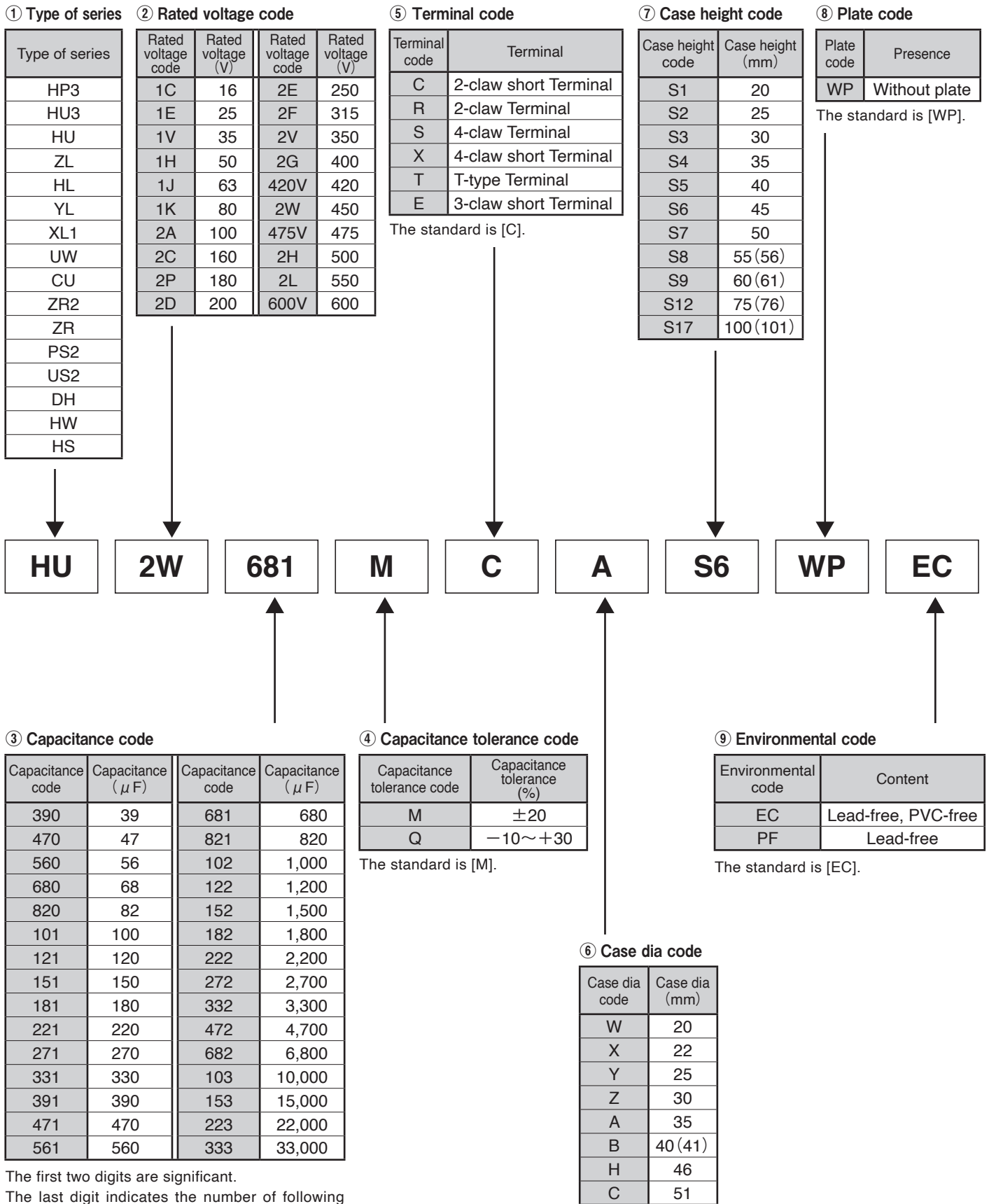
• Standard Products Table

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.

HOW TO ORDER



OUTLINE OF DRAWINGS AND DIMENSIONS

• PS2 and US2 series use resin insulation cap. Please refer to page of each series for dimensions.

2-claw short terminal

Standard terminal

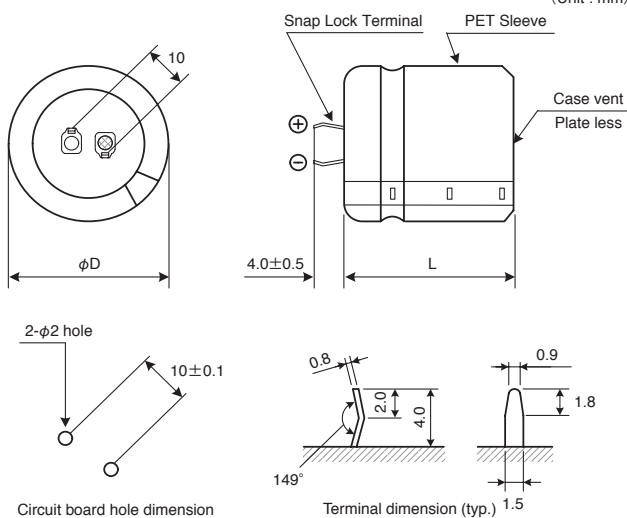
Terminal code : C

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

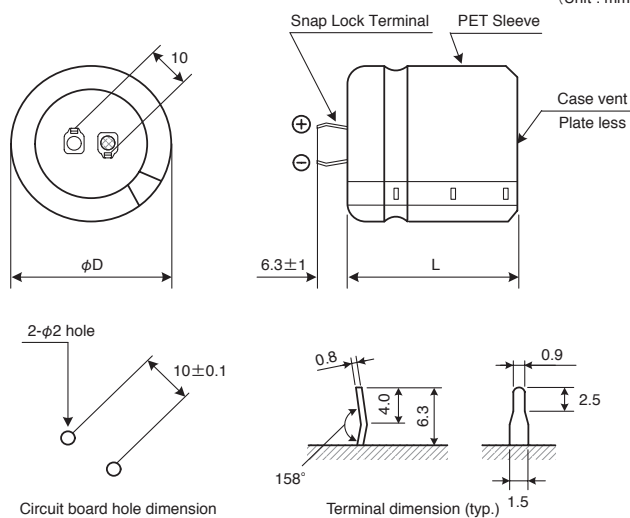
Terminal code : R

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)

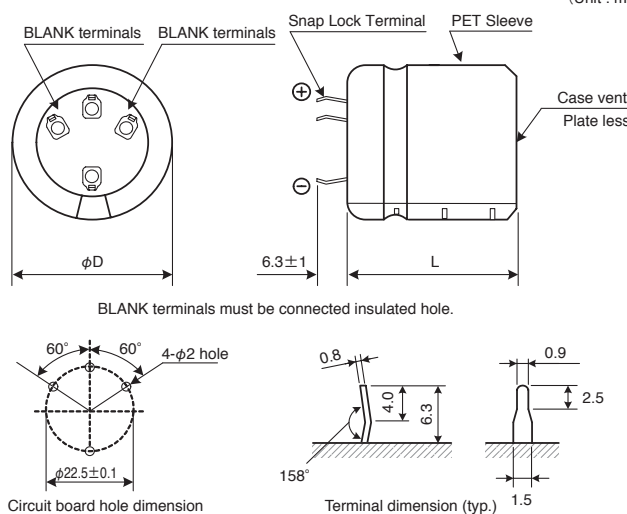


4-claw terminal

Terminal code : S

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

(Unit : mm)



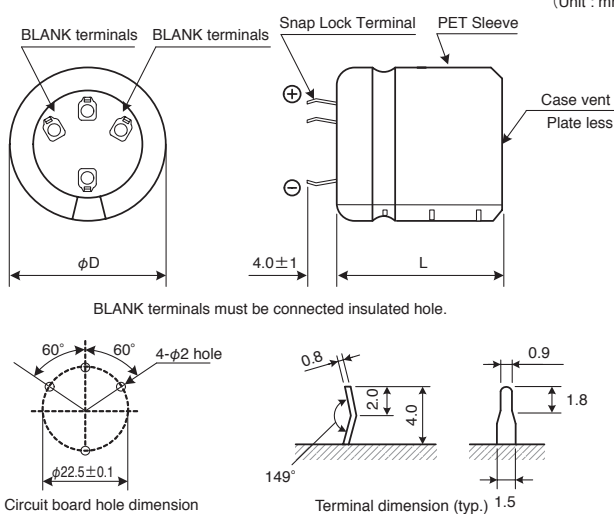
BLANK terminals must be connected insulated hole.

4-claw short terminal

Terminal code : X

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

(Unit : mm)

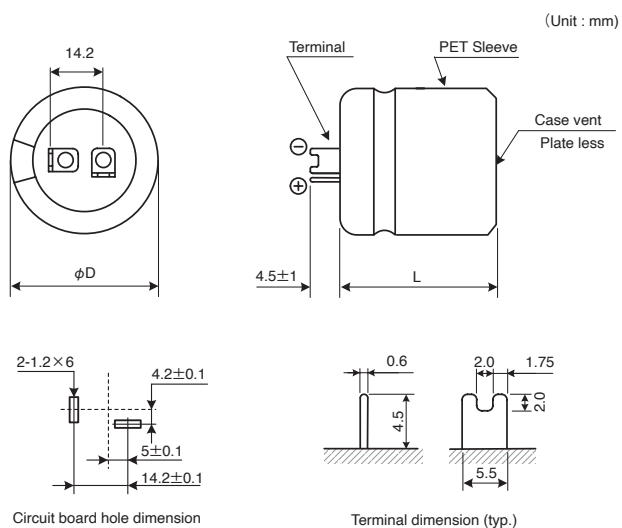


BLANK terminals must be connected insulated hole.

■ T-type terminal (φ 30 ~ φ 40)

Terminal code : T

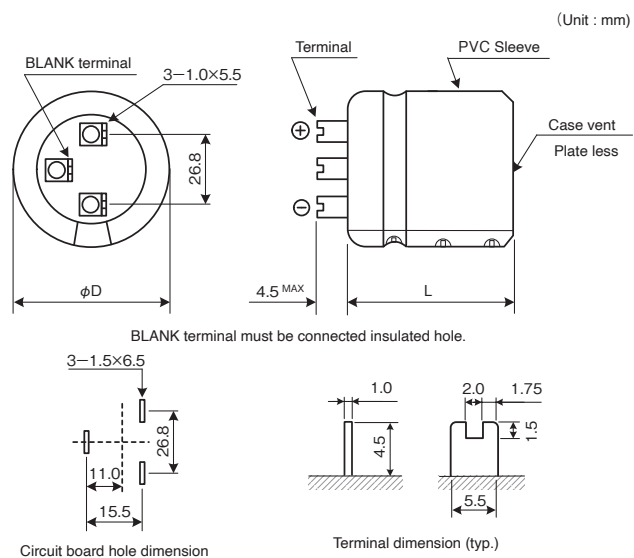
Case dia (D) : φ 30 ~ φ 40



■ T-type terminal (φ 51)

Terminal code : T

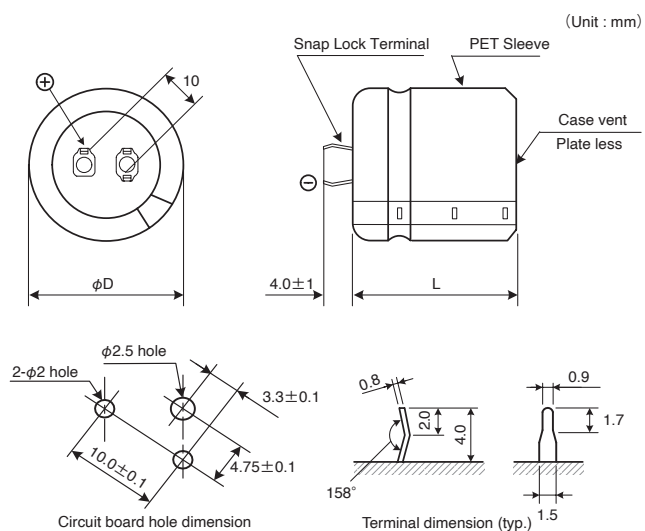
Case dia (D) : φ 51



■ 3-claw short terminal

Terminal code : E

Case dia (D) : φ 22 ~ φ 35



HP3 Series

Useful of 4,000 hours at 85°C

- Conform RoHS

Features

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

HP3

→
105°C

HU3
P.88



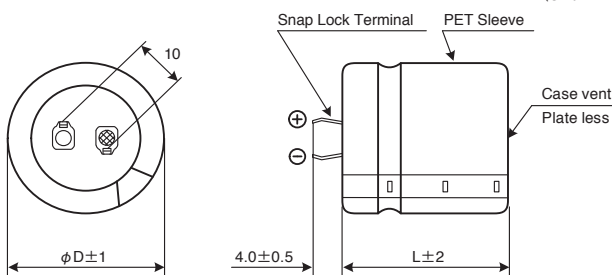
Product Specifications

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 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 : 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

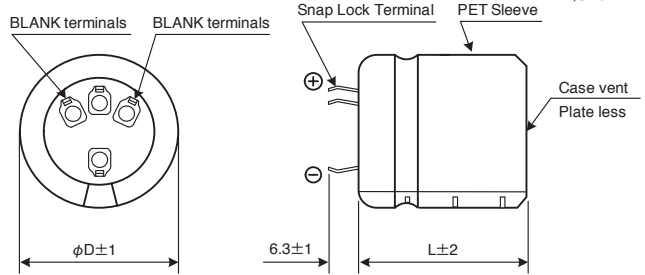
2-claw short terminal (Terminal code : C)

(Unit : mm)



4-claw terminal (Terminal code : S)

(Unit : mm)



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

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)

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
Type of series						
						Environmental code
						Plate code
						Case height code
						Case dia code
						Terminal code
						Capacitance tolerance code
						Capacitance code
						Rated voltage code

Refer to page 82-83 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
	33,000	35×35	0.50	4.12	17	HP31C333MCAS4WPEC
25	4,700	22×25	0.40	1.48	88	HP31E472MCXS2WPEC
		22×30	0.40	1.89	70	HP31E682MCXS3WPEC
	6,800	25×25	0.40	1.87	70	HP31E682MCYS2WPEC
		22×35	0.40	2.06	48	HP31E103MCXS4WPEC
	10,000	25×30	0.40	2.06	48	HP31E103MCYS3WPEC
		30×25	0.40	2.06	48	HP31E103MCZS2WPEC
		22×45	0.40	2.78	32	HP31E153MCXS6WPEC
		25×35	0.40	2.67	32	HP31E153MCYS4WPEC
	15,000	30×30	0.40	2.67	32	HP31E153MCZS3WPEC
		35×25	0.40	2.67	32	HP31E153MCAS2WPEC
		25×45	0.40	3.52	22	HP31E223MCYS6WPEC
	22,000	30×35	0.40	3.41	22	HP31E223MCZS4WPEC
		35×30	0.40	3.41	22	HP31E223MCAS3WPEC
		30×50	0.40	4.45	17	HP31E333MCZS7WPEC
	33,000	35×40	0.40	4.31	17	HP31E333MCAS5WPEC
35	3,300	22×25	0.35	1.38	165	HP31V332MCXS2WPEC
		22×30	0.35	1.57	115	HP31V472MCXS3WPEC
	4,700	25×25	0.35	1.56	115	HP31V472MCYS2WPEC
		22×35	0.35	2.01	80	HP31V682MCXS4WPEC
	6,800	25×30	0.35	2.01	80	HP31V682MCYS3WPEC
		30×25	0.35	2.01	80	HP31V682MCZS2WPEC
		22×45	0.35	2.27	55	HP31V103MCXS6WPEC
	10,000	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
		35×50	0.40	4.67	20	HP31V333MCAS7WPEC
50	2,200	22×25	0.30	1.13	108	HP31H222MCXS2WPEC
		22×30	0.30	1.47	72	HP31H332MCXS3WPEC
	3,300	25×25	0.30	1.46	72	HP31H332MCYS2WPEC
		22×35	0.30	1.67	50	HP31H472MCXS4WPEC
	4,700	25×30	0.30	1.67	50	HP31H472MCYS3WPEC
		30×25	0.30	1.67	50	HP31H472MCZS2WPEC
		22×50	0.30	2.31	35	HP31H682MCXS7WPEC
	6,800	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
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
		25×40	0.25	1.72	70	HP31K332MCYS5WPEC
	3,300	30×30	0.25	1.65	70	HP31K332MCZS3WPEC
		35×25	0.25	1.65	70	HP31K332MCAS2WPEC
		25×50	0.25	2.01	50	HP31K472MCYS7WPEC
		30×40	0.25	1.96	50	HP31K472MCZS5WPEC
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
	2,200	30×25	0.20	1.22	120	HP32A152MCZS2WPEC
		22×50	0.20	1.47	82	HP32A222MCXS7WPEC
		25×40	0.20	1.41	82	HP32A222MCYS5WPEC
		30×30	0.20	1.35	82	HP32A222MCZS3WPEC
	3,300	35×25	0.20	1.35	82	HP32A222MCAS2WPEC
		25×50	0.20	1.88	60	HP32A332MCYS7WPEC
		30×40	0.20	1.83	60	HP32A332MCZS5WPEC
		35×30	0.20	1.75	60	HP32A332MCAS3WPEC
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
		25×30	0.15	2.24	210	HP32C681MCYS3WPEC
		30×25	0.15	2.24	210	HP32C681MCZS2WPEC
	680	22×45	0.15	2.72	175	HP32C821MCXS6WPEC
		25×35	0.15	2.61	175	HP32C821MCYS4WPEC
		30×30	0.15	2.61	175	HP32C821MCZS3WPEC
		22×50	0.15	3.13	145	HP32C102MCXS7WPEC
160	1,000	25×40	0.15	3.00	145	HP32C102MCYS5WPEC
		30×30	0.15	2.88	145	HP32C102MCZS3WPEC
		35×25	0.15	2.88	145	HP32C102MCAS2WPEC
		25×45	0.15	3.44	120	HP32C122MCYS6WPEC
	1,200	30×35	0.15	3.34	120	HP32C122MCZS4WPEC
		35×30	0.15	3.34	120	HP32C122MCAS3WPEC
	1,500	30×40	0.15	3.91	95	HP32C152MCZS5WPEC
		35×35	0.15	3.96	95	HP32C152MCAS4WPEC
	1,800	30×45	0.15	4.47	80	HP32C182MCZS6WPEC
		35×35	0.15	4.34	80	HP32C182MCAS4WPEC

SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
180	330	22 $\times$ 25	0.15	1.38	375	HP32P331MCXS2WPEC
		22 $\times$ 30	0.15	1.60	320	HP32P391MCXS3WPEC
	390	25 $\times$ 25	0.15	1.58	320	HP32P391MCYS2WPEC
		22 $\times$ 30	0.15	1.76	265	HP32P471MCXS3WPEC
	470	25 $\times$ 25	0.15	1.74	265	HP32P471MCYS2WPEC
		22 $\times$ 35	0.15	2.03	225	HP32P561MCXS4WPEC
	560	25 $\times$ 30	0.15	2.03	225	HP32P561MCYS3WPEC
		30 $\times$ 25	0.15	2.03	225	HP32P561MCZS2WPEC
	680	22 $\times$ 40	0.15	2.36	185	HP32P681MCXS5WPEC
		25 $\times$ 35	0.15	2.35	185	HP32P681MCYS4WPEC
		30 $\times$ 25	0.15	2.24	185	HP32P681MCZS2WPEC
	820	22 $\times$ 45	0.15	2.72	155	HP32P821MCXS6WPEC
		25 $\times$ 35	0.15	2.59	155	HP32P821MCYS4WPEC
		30 $\times$ 30	0.15	2.61	155	HP32P821MCZS3WPEC
		35 $\times$ 25	0.15	2.61	155	HP32P821MCAS2WPEC
	1,000	25 $\times$ 45	0.15	3.14	125	HP32P102MCYS6WPEC
		30 $\times$ 35	0.15	3.04	125	HP32P102MCZS4WPEC
		35 $\times$ 25	0.15	2.88	125	HP32P102MCAS2WPEC
	1,200	25 $\times$ 50	0.15	3.59	105	HP32P122MCYS7WPEC
		30 $\times$ 40	0.15	3.49	105	HP32P122MCZS5WPEC
		35 $\times$ 30	0.15	3.34	105	HP32P122MCAS3WPEC
	1,500	30 $\times$ 45	0.15	4.08	85	HP32P152MCZS6WPEC
		35 $\times$ 35	0.15	3.96	85	HP32P152MCAS4WPEC
	1,800	35 $\times$ 40	0.15	4.50	70	HP32P182MCAS5WPEC
200	330	22 $\times$ 25	0.15	1.53	325	HP32D331MCXS2WPEC
		22 $\times$ 30	0.15	1.92	275	HP32D391MCXS3WPEC
	470	22 $\times$ 30	0.15	1.94	230	HP32D471MCXS3WPEC
		25 $\times$ 25	0.15	1.92	230	HP32D471MCYS2WPEC
	560	22 $\times$ 35	0.15	2.25	190	HP32D561MCXS4WPEC
		25 $\times$ 30	0.15	2.23	190	HP32D561MCYS3WPEC
	680	22 $\times$ 40	0.15	2.61	160	HP32D681MCXS5WPEC
		25 $\times$ 35	0.15	2.86	160	HP32D681MCYS4WPEC
		30 $\times$ 25	0.15	2.45	160	HP32D681MCZS2WPEC
	820	25 $\times$ 40	0.15	3.26	130	HP32D821MCYS5WPEC
		30 $\times$ 30	0.15	3.13	130	HP32D821MCZS3WPEC
		35 $\times$ 25	0.15	3.13	130	HP32D821MCAS2WPEC
	1,000	25 $\times$ 45	0.15	3.46	110	HP32D102MCYS6WPEC
		30 $\times$ 35	0.15	3.64	110	HP32D102MCZS4WPEC
		35 $\times$ 30	0.15	3.66	110	HP32D102MCAS3WPEC
	1,200	30 $\times$ 40	0.15	4.19	90	HP32D122MCZS5WPEC
		35 $\times$ 30	0.15	3.67	90	HP32D122MCAS3WPEC
	1,500	35 $\times$ 35	0.15	4.31	75	HP32D152MCAS4WPEC
	1,800	35 $\times$ 45	0.15	5.15	70	HP32D182MCAS6WPEC

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
250	270	22 $\times$ 25	0.15	1.38	395	HP32E271MCXS2WPEC
		22 $\times$ 30	0.15	1.63	325	HP32E331MCXS3WPEC
	330	25 $\times$ 25	0.15	1.60	325	HP32E331MCYS2WPEC
		22 $\times$ 35	0.15	2.04	275	HP32E391MCXS4WPEC
	390	25 $\times$ 30	0.15	2.04	275	HP32E391MCYS3WPEC
		22 $\times$ 40	0.15	2.35	230	HP32E471MCXS5WPEC
	470	25 $\times$ 30	0.15	2.04	230	HP32E471MCYS3WPEC
		30 $\times$ 25	0.15	2.24	230	HP32E471MCZS2WPEC
	560	22 $\times$ 45	0.15	2.48	190	HP32E561MCXS6WPEC
		25 $\times$ 35	0.15	2.35	190	HP32E561MCYS4WPEC
		30 $\times$ 30	0.15	2.59	190	HP32E561MCZS3WPEC
	680	25 $\times$ 40	0.15	2.73	160	HP32E681MCYS5WPEC
		30 $\times$ 30	0.15	2.60	160	HP32E681MCZS3WPEC
		35 $\times$ 25	0.15	2.61	160	HP32E681MCAS2WPEC
	820	25 $\times$ 45	0.15	3.13	130	HP32E821MCYS6WPEC
		30 $\times$ 35	0.15	3.01	130	HP32E821MCZS4WPEC
		35 $\times$ 30	0.15	3.31	130	HP32E821MCAS3WPEC
	1,000	30 $\times$ 40	0.15	3.49	110	HP32E102MCZS5WPEC
		35 $\times$ 35	0.15	3.88	110	HP32E102MCAS4WPEC
	1,200	30 $\times$ 45	0.15	3.99	90	HP32E122MCZS6WPEC
		35 $\times$ 40	0.15	4.40	90	HP32E122MCAS5WPEC
	1,500	35 $\times$ 45	0.15	4.70	75	HP32E152MCAS6WPEC
350	120	22 $\times$ 25	0.15	0.84	885	HP32V121MCXS2WPEC
		22 $\times$ 30	0.15	0.99	710	HP32V151MCXS3WPEC
	180	22 $\times$ 30	0.15	1.09	590	HP32V181MCXS3WPEC
		25 $\times$ 25	0.15	1.08	590	HP32V181MCYS2WPEC
	220	22 $\times$ 35	0.15	1.28	485	HP32V221MCXS4WPEC
		25 $\times$ 30	0.15	1.27	485	HP32V221MCYS3WPEC
	270	22 $\times$ 45	0.15	1.57	395	HP32V271MCXS6WPEC
		25 $\times$ 35	0.15	1.49	395	HP32V271MCYS4WPEC
		30 $\times$ 25	0.15	1.41	395	HP32V271MCZS2WPEC
	330	25 $\times$ 40	0.15	1.79	325	HP32V331MCYS5WPEC
		30 $\times$ 30	0.15	1.65	325	HP32V331MCZS3WPEC
		35 $\times$ 25	0.15	1.65	325	HP32V331MCAS2WPEC
	390	25 $\times$ 45	0.15	1.96	275	HP32V391MCYS6WPEC
		30 $\times$ 35	0.15	1.89	275	HP32V391MCZS4WPEC
		35 $\times$ 30	0.15	1.90	275	HP32V391MCAS3WPEC
	470	30 $\times$ 35	0.15	2.07	230	HP32V471MCZS4WPEC
		35 $\times$ 30	0.15	2.09	230	HP32V471MCAS3WPEC
	560	30 $\times$ 45	0.15	2.48	190	HP32V561MCZS6WPEC
		35 $\times$ 35	0.15	2.39	190	HP32V561MCAS4WPEC
	680	35 $\times$ 40	0.15	2.76	165	HP32V681MCAS5WPEC

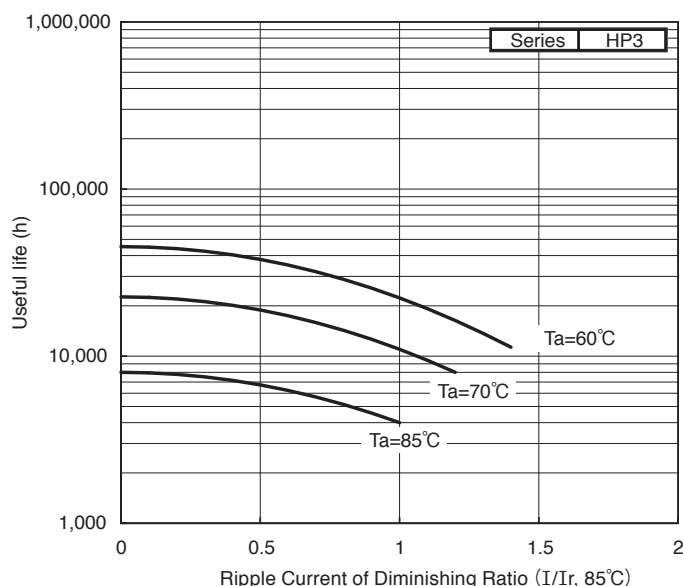
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
400	120	22 $\times$ 25	0.20	1.00	890	HP32G121MCXS2WPEC
	180	22 $\times$ 30	0.20	1.31	600	HP32G181MCXS3WPEC
		25 $\times$ 25	0.20	1.29	600	HP32G181MCYS2WPEC
	220	22 $\times$ 35	0.20	1.54	490	HP32G221MCXS4WPEC
		25 $\times$ 30	0.20	1.52	490	HP32G221MCYS3WPEC
	270	22 $\times$ 40	0.20	1.79	400	HP32G271MCXS5WPEC
		25 $\times$ 35	0.20	1.78	400	HP32G271MCYS4WPEC
		30 $\times$ 25	0.20	1.69	400	HP32G271MCZS2WPEC
	330	22 $\times$ 50	0.20	2.17	330	HP32G331MCXS7WPEC
		25 $\times$ 40	0.20	2.07	330	HP32G331MCYS5WPEC
		30 $\times$ 30	0.20	1.98	330	HP32G331MCZS3WPEC
	390	25 $\times$ 45	0.20	2.36	280	HP32G391MCYS6WPEC
		30 $\times$ 35	0.20	2.27	280	HP32G391MCAS4WPEC
		35 $\times$ 25	0.20	2.16	280	HP32G391MCAS2WPEC
	470	25 $\times$ 50	0.20	2.70	230	HP32G471MCYS7WPEC
		30 $\times$ 40	0.20	2.61	230	HP32G471MCZS5WPEC
		35 $\times$ 30	0.20	2.50	230	HP32G471MCAS3WPEC
	560	30 $\times$ 45	0.20	2.98	200	HP32G561MCZS6WPEC
		35 $\times$ 35	0.20	2.87	200	HP32G561MCAS4WPEC
	680	30 $\times$ 50	0.20	3.41	160	HP32G681MCZS7WPEC
		35 $\times$ 40	0.20	3.31	160	HP32G681MCAS5WPEC
	820	30 $\times$ 60	0.20	3.45	140	HP32G821MCZS9WPEC
		35 $\times$ 45	0.20	3.79	140	HP32G821MCAS6WPEC
	1,000	35 $\times$ 50	0.20	4.35	110	HP32G102MCAS7WPEC
	1,200	35 $\times$ 75	0.20	4.42	100	HP32G122MSAS12WPEC
		40 $\times$ 56	0.20	4.28	100	HP32G122MSBS8WPEC
	1,500	35 $\times$ 100	0.20	5.57	80	HP32G152MSAS17WPEC
		40 $\times$ 76	0.20	5.13	80	HP32G152MSBS12WPEC
	1,800	40 $\times$ 101	0.20	6.32	70	HP32G182MSBS17WPEC
420	120	22 $\times$ 25	0.20	1.00	920	HP3420V121MCXS2WPEC
	150	22 $\times$ 30	0.20	1.20	740	HP3420V151MCXS3WPEC
		25 $\times$ 25	0.20	1.18	740	HP3420V151MCYS2WPEC
	180	22 $\times$ 35	0.20	1.39	620	HP3420V181MCXS4WPEC
		25 $\times$ 30	0.20	1.38	620	HP3420V181MCYS3WPEC
	220	22 $\times$ 40	0.20	1.62	500	HP3420V221MCXS5WPEC
		25 $\times$ 35	0.20	1.61	500	HP3420V221MCYS4WPEC
		30 $\times$ 25	0.20	1.52	500	HP3420V221MCZS2WPEC
	270	22 $\times$ 45	0.20	1.88	410	HP3420V271MCXS6WPEC
		25 $\times$ 40	0.20	1.87	410	HP3420V271MCYS5WPEC
		30 $\times$ 30	0.20	1.79	410	HP3420V271MCZS3WPEC
	330	25 $\times$ 45	0.20	2.17	340	HP3420V331MCYS6WPEC
		35 $\times$ 25	0.20	1.98	340	HP3420V331MCAS2WPEC
		25 $\times$ 50	0.20	2.46	290	HP3420V391MCYS7WPEC
	390	30 $\times$ 35	0.20	2.27	290	HP3420V391MCZS4WPEC
		35 $\times$ 30	0.20	2.28	290	HP3420V391MCAS3WPEC
		30 $\times$ 40	0.20	2.61	240	HP3420V471MCZS5WPEC
	470	35 $\times$ 35	0.20	2.63	240	HP3420V471MCAS4WPEC
		30 $\times$ 50	0.20	3.10	200	HP3420V561MCZS7WPEC
	560	35 $\times$ 40	0.20	3.01	200	HP3420V561MCAS5WPEC
		30 $\times$ 60	0.20	3.35	170	HP3420V681MCZS9WPEC
	680	35 $\times$ 45	0.20	3.45	170	HP3420V681MCAS6WPEC
		35 $\times$ 50	0.20	3.94	140	HP3420V821MCAS7WPEC
	1,000	35 $\times$ 75	0.20	4.04	120	HP3420V102MSAS12WPEC
		40 $\times$ 56	0.20	3.91	120	HP3420V102MSBS8WPEC
	1,200	35 $\times$ 100	0.20	4.99	100	HP3420V122MSAS17WPEC
		40 $\times$ 76	0.20	4.59	100	HP3420V122MSBS12WPEC
	1,800	40 $\times$ 101	0.20	6.32	70	HP3420V182MSBS17WPEC

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 85°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
450	120	22 $\times$ 25	0.20	1.00	920	HP32W121MCXS2WPEC
	150	22 $\times$ 30	0.20	1.20	740	HP32W151MCXS3WPEC
		25 $\times$ 25	0.20	1.18	740	HP32W151MCYS2WPEC
	180	22 $\times$ 35	0.20	1.39	620	HP32W181MCXS4WPEC
		25 $\times$ 30	0.20	1.38	620	HP32W181MCYS3WPEC
	220	22 $\times$ 40	0.20	1.62	500	HP32W221MCXS5WPEC
		25 $\times$ 35	0.20	1.61	500	HP32W221MCYS4WPEC
		30 $\times$ 25	0.20	1.52	500	HP32W221MCZS2WPEC
	270	22 $\times$ 45	0.20	1.88	410	HP32W271MCXS6WPEC
		25 $\times$ 40	0.20	1.87	410	HP32W271MCYS5WPEC
		30 $\times$ 30	0.20	1.79	410	HP32W271MCZS3WPEC
	330	25 $\times$ 45	0.20	2.17	340	HP32W331MCYS6WPEC
		35 $\times$ 25	0.20	1.98	340	HP32W331MCAS2WPEC
		25 $\times$ 50	0.20	2.46	290	HP32W391MCYS7WPEC
	390	30 $\times$ 35	0.20	2.27	290	HP32W391MCZS4WPEC
		35 $\times$ 30	0.20	2.28	290	HP32W391MCAS3WPEC
		30 $\times$ 40	0.20	2.61	240	HP32W471MCZS5WPEC
	470	35 $\times$ 35	0.20	2.63	240	HP32W471MCAS4WPEC
		30 $\times$ 50	0.20	3.10	200	HP32W561MCZS7WPEC
	560	35 $\times$ 40	0.20	3.01	200	HP32W561MCAS5WPEC
		30 $\times$ 60	0.20	3.12	170	HP32W681MCZS9WPEC
	680	35 $\times$ 45	0.20	3.45	170	HP32W681MCAS6WPEC
		35 $\times$ 50	0.20	3.94	140	HP32W821MCAS7WPEC
	1,000	35 $\times$ 75	0.20	4.04	120	HP32W102MSAS12WPEC
		40 $\times$ 61	0.20	4.04	120	HP32W102MSBS9WPEC
	1,200	35 $\times$ 100	0.20	4.99	100	HP32W122MSAS17WPEC
		40 $\times$ 76	0.20	4.59	100	HP32W122MSBS12WPEC
	1,500	40 $\times$ 101	0.20	5.76	80	HP32W152MSBS17WPEC

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



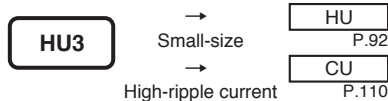
HU3 Series

Useful of 4,000 hours at 105°C

- Conform RoHS

Features

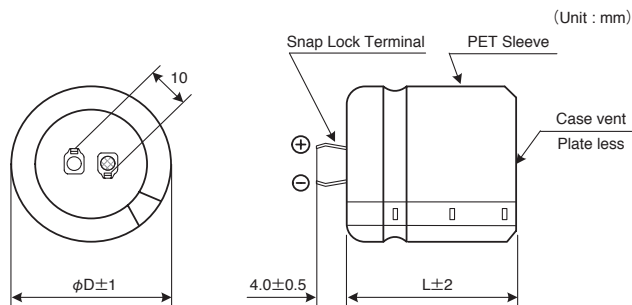
- The HU3 series is the standard products.



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	0.7	1.0	1.1	1.2	1.2
	0.7	1.0	1.1	1.3	1.4

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)
Please consult us when the ripple voltage exceeds 70Vp-p.

Product code

(Example) HU3 Series 16V 10,000μF ±20%

HU3	1C	103	M	C	X	S6	W	P	E	C
Type of series										Environmental code
										Plate code
										Case height code
										Case dia code
										Terminal code
										Capacitance tolerance code
										Capacitance code
										Rated voltage code

Refer to page 82-83 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
	6,800	22×35	0.50	1.27	46	HU31C682MCXS4WPEC
		25×30	0.50	1.26	46	HU31C682MCYS3WPEC
	10,000	22×45	0.50	1.43	38	HU31C103MCXS6WPEC
		25×35	0.50	1.36	38	HU31C103MCYS4WPEC
		30×25	0.50	1.30	38	HU31C103MCZS2WPEC
	15,000	25×45	0.50	1.84	25	HU31C153MCYS6WPEC
		30×35	0.50	1.77	25	HU31C153MCZS4WPEC
		35×30	0.50	1.78	25	HU31C153MCAS3WPEC
	22,000	30×45	0.50	2.36	20	HU31C223MCZS6WPEC
		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
	4,700	22×30	0.40	1.00	81	HU31E472MCXS3WPEC
		25×25	0.40	0.98	81	HU31E472MCYS2WPEC
	6,800	22×35	0.40	1.27	65	HU31E682MCXS4WPEC
		25×30	0.40	1.27	65	HU31E682MCYS3WPEC
		30×25	0.40	1.27	65	HU31E682MCZS2WPEC
	10,000	22×45	0.40	1.43	45	HU31E103MCXS6WPEC
		25×35	0.40	1.38	45	HU31E103MCYS4WPEC
		30×30	0.40	1.38	45	HU31E103MCZS3WPEC
		35×25	0.40	1.38	45	HU31E103MCAS2WPEC
	15,000	25×45	0.40	1.84	30	HU31E153MCYS6WPEC
		30×35	0.40	1.78	30	HU31E153MCZS4WPEC
		35×30	0.40	1.78	30	HU31E153MCAS3WPEC
	22,000	30×45	0.40	2.36	20	HU31E223MCZS6WPEC
		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
	3,300	22×30	0.35	0.93	72	HU31V332MCXS3WPEC
		25×25	0.35	0.92	72	HU31V332MCYS2WPEC
	4,700	22×35	0.35	1.05	61	HU31V472MCXS4WPEC
		25×30	0.35	1.05	61	HU31V472MCYS3WPEC
		30×25	0.35	1.05	61	HU31V472MCZS2WPEC
	6,800	22×50	0.35	1.46	55	HU31V682MCXS7WPEC
		25×40	0.35	1.40	55	HU31V682MCYS5WPEC
		30×30	0.35	1.34	55	HU31V682MCZS3WPEC
		35×25	0.35	1.34	55	HU31V682MCAS2WPEC
	10,000	25×50	0.35	1.57	35	HU31V103MCYS7WPEC
		30×35	0.35	1.46	35	HU31V103MCZS4WPEC
		35×30	0.35	1.46	35	HU31V103MCAS3WPEC
	15,000	30×50	0.35	2.03	25	HU31V153MCZS7WPEC
		35×40	0.35	1.96	25	HU31V153MCAS5WPEC
50	1,500	22×25	0.30	0.68	159	HU31H152MCXS2WPEC
	2,200	22×30	0.30	0.76	108	HU31H222MCXS3WPEC
		25×25	0.30	0.75	108	HU31H222MCYS2WPEC
	3,300	22×35	0.30	0.99	72	HU31H332MCXS4WPEC
		25×30	0.30	0.98	72	HU31H332MCYS3WPEC
		30×25	0.30	0.99	72	HU31H332MCZS2WPEC
	4,700	22×45	0.30	1.16	50	HU31H472MCXS6WPEC
		25×35	0.30	1.11	50	HU31H472MCYS4WPEC
		30×30	0.30	1.12	50	HU31H472MCZS3WPEC
		35×25	0.30	1.12	50	HU31H472MCAS2WPEC
	6,800	25×50	0.30	1.53	35	HU31H682MCYS7WPEC
		30×35	0.30	1.42	35	HU31H682MCZS4WPEC
		35×30	0.30	1.42	35	HU31H682MCAS3WPEC
	10,000	30×45	0.35	1.59	31	HU31H103MCZS6WPEC
		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
	1,500	22×30	0.25	0.73	159	HU31J152MCXS3WPEC
		25×25	0.25	0.72	159	HU31J152MCYS2WPEC
	2,200	22×35	0.25	0.81	108	HU31J222MCXS4WPEC
		25×30	0.25	0.80	108	HU31J222MCYS3WPEC
		30×25	0.25	0.81	108	HU31J222MCZS2WPEC
	3,300	22×45	0.25	1.09	80	HU31J332MCXS6WPEC
		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
80	1,000	35×30	0.25	1.18	60	HU31J472MCAS3WPEC
		30×45	0.25	1.55	40	HU31J682MCZS6WPEC
		35×40	0.25	1.56	40	HU31J682MCAS5WPEC
	10,000	35×50	0.35	1.74	30	HU31J103MCAS7WPEC
	1,500	22×30	0.20	0.59	230	HU31K102MCXS3WPEC
		25×25	0.20	0.59	230	HU31K102MCYS2WPEC
		22×35	0.20	0.77	155	HU31K152MCXS4WPEC
	2,200	25×30	0.20	0.77	155	HU31K152MCYS3WPEC
		30×25	0.20	0.77	155	HU31K152MCZS2WPEC
		22×50	0.20	0.93	105	HU31K222MCXS7WPEC
		25×40	0.20	0.89	105	HU31K222MCYS5WPEC
	3,300	30×30	0.20	0.85	105	HU31K222MCZS3WPEC
		35×25	0.20	0.85	105	HU31K222MCAS2WPEC
		25×50	0.20	1.19	70	HU31K332MCYS7WPEC
100	1,000	30×40	0.20	1.16	70	HU31K332MCZS5WPEC
		35×30	0.20	1.11	70	HU31K332MCAS3WPEC
		30×50	0.25	1.34	50	HU31K472MCZS7WPEC
	1,500	35×40	0.25	1.30	50	HU31K472MCAS5WPEC
		35×50	0.25	1.69	35	HU31K682MCAS7WPEC
	2,200	22×30	0.20	0.59	180	HU32A102MCXS3WPEC
		25×25	0.20	0.59	180	HU32A102MCYS2WPEC
		22×40	0.20	0.81	120	HU32A152MCXS5WPEC
	3,300	25×35	0.20	0.81	120	HU32A152MCYS4WPEC
		30×25	0.20	0.77	120	HU32A152MCZS2WPEC
		25×45	0.20	0.93	82	HU32A222MCYS6WPEC
		30×35	0.20	0.90	82	HU32A222MCZS4WPEC
160	4,700	30×45	0.20	1.21	60	HU32A332MCZS6WPEC
		35×35	0.20	1.16	60	HU32A332MCAS4WPEC
		35×45	0.25	1.35	45	HU32A472MCAS6WPEC
	560	22×25	0.15	0.98	430	HU32C331MCXS2WPEC
		22×30	0.15	1.10	365	HU32C391MCXS3WPEC
		25×25	0.15	1.09	365	HU32C391MCYS2WPEC
	680	22×30	0.15	1.21	305	HU32C471MCXS3WPEC
		25×25	0.15	1.19	305	HU32C471MCYS2WPEC
		22×35	0.15	1.40	255	HU32C561MCXS4WPEC
	820	25×30	0.15	1.40	255	HU32C561MCYS3WPEC
		30×25	0.15	1.40	255	HU32C561MCZS2WPEC
		22×40	0.15	1.62	210	HU32C681MCXS5WPEC
	1,000	25×35	0.15	1.61	210	HU32C681MCYS4WPEC
		30×25	0.15	1.54	210	HU32C681MCZS2WPEC
	1,200	22×45	0.15	1.86	175	HU32C821MCXS6WPEC
		25×40	0.15	1.86	175	HU32C821MCYS5WPEC
		30×30	0.15	1.79	175	HU32C821MCZS3WPEC
	1,500	35×25	0.15	1.79	175	HU32C821MCAS2WPEC
		25×45	0.15	2.15	145	HU32C102MCYS6WPEC
		30×35	0.15	2.09	145	HU32C102MCZS4WPEC
	1,800	35×25	0.15	1.98	145	HU32C102MCAS2WPEC
		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

SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

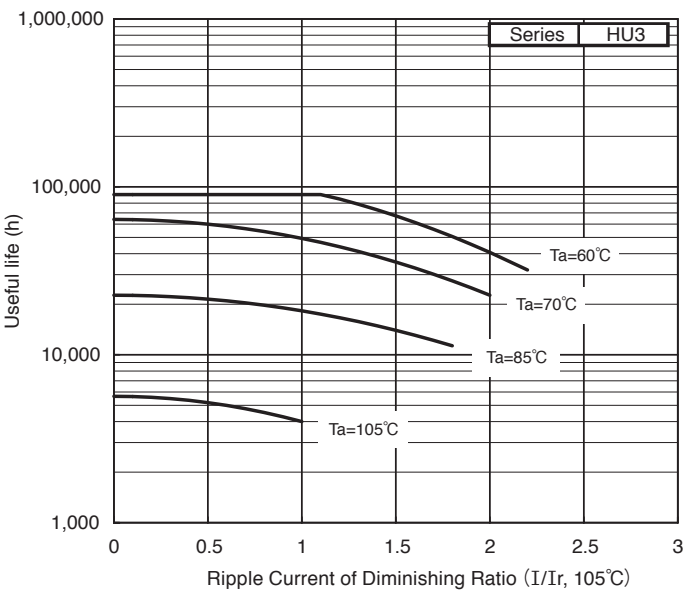
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
180	330	22 $\times$ 25	0.15	0.94	375	HU32P331MCXS2WPEC
		25 $\times$ 25	0.15	1.00	375	HU32P331MCYS2WPEC
	390	22 $\times$ 30	0.15	1.10	320	HU32P391MCXS3WPEC
		25 $\times$ 25	0.15	1.09	320	HU32P391MCYS2WPEC
	470	22 $\times$ 30	0.15	1.20	265	HU32P471MCXS3WPEC
		25 $\times$ 25	0.15	1.19	265	HU32P471MCYS2WPEC
		30 $\times$ 25	0.15	1.28	265	HU32P471MCZS2WPEC
	560	22 $\times$ 35	0.15	1.39	225	HU32P561MCXS4WPEC
		25 $\times$ 30	0.15	1.40	225	HU32P561MCYS3WPEC
		30 $\times$ 25	0.15	1.40	225	HU32P561MCZS2WPEC
	680	22 $\times$ 40	0.15	1.61	185	HU32P681MCXS5WPEC
		25 $\times$ 35	0.15	1.63	185	HU32P681MCYS4WPEC
		30 $\times$ 25	0.15	1.54	185	HU32P681MCZS3WPEC
	820	35 $\times$ 25	0.15	1.63	185	HU32P681MCAS2WPEC
		22 $\times$ 45	0.15	1.86	155	HU32P821MCXS6WPEC
		25 $\times$ 40	0.15	1.87	155	HU32P821MCYS5WPEC
	1,000	30 $\times$ 30	0.15	1.79	155	HU32P821MCZS3WPEC
		35 $\times$ 25	0.15	1.79	155	HU32P821MCAS2WPEC
		25 $\times$ 45	0.15	2.15	125	HU32P102MCYS6WPEC
	1,200	30 $\times$ 35	0.15	2.09	125	HU32P102MCZS4WPEC
		35 $\times$ 30	0.15	2.09	125	HU32P102MCAS3WPEC
		30 $\times$ 40	0.15	2.39	105	HU32P122MCZS5WPEC
	1,500	35 $\times$ 30	0.15	2.29	105	HU32P122MCAS3WPEC
		30 $\times$ 45	0.15	2.79	85	HU32P152MCZS6WPEC
350	120	22 $\times$ 25	0.15	0.57	770	HU32V121MCXS2WPEC
		25 $\times$ 25	0.15	0.60	770	HU32V121MCYS2WPEC
	150	22 $\times$ 30	0.15	0.68	615	HU32V151MCXS3WPEC
		25 $\times$ 25	0.15	0.67	615	HU32V151MCYS2WPEC
	180	30 $\times$ 25	0.15	0.72	615	HU32V151MCZS2WPEC
		22 $\times$ 35	0.15	0.79	520	HU32V181MCXS4WPEC
		25 $\times$ 30	0.15	0.79	520	HU32V181MCYS3WPEC
	220	30 $\times$ 25	0.15	0.79	520	HU32V181MCZS2WPEC
		22 $\times$ 45	0.15	0.96	450	HU32V221MCXS6WPEC
		25 $\times$ 35	0.15	0.92	450	HU32V221MCYS4WPEC
	270	30 $\times$ 25	0.15	0.87	450	HU32V221MCZS2WPEC
		35 $\times$ 25	0.15	0.93	450	HU32V221MCAS2WPEC
		25 $\times$ 40	0.15	1.07	366	HU32V271MCYS5WPEC
	330	30 $\times$ 30	0.15	1.03	366	HU32V271MCZS3WPEC
		35 $\times$ 25	0.15	1.02	366	HU32V271MCAS2WPEC
		25 $\times$ 45	0.15	1.24	299	HU32V331MCYS6WPEC
	390	30 $\times$ 35	0.15	1.20	299	HU32V331MCZS4WPEC
		35 $\times$ 25	0.15	1.13	299	HU32V331MCAS2WPEC
	470	30 $\times$ 40	0.15	1.36	253	HU32V391MCZS5WPEC
		35 $\times$ 30	0.15	1.30	253	HU32V391MCAS3WPEC
560	470	35 $\times$ 35	0.15	1.50	210	HU32V471MCAS4WPEC
	560	35 $\times$ 40	0.15	1.72	181	HU32V561MCAS5WPEC

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
400	100	22 $\times$ 25	0.15	0.57	924	HU32G101MCXS2WPEC
		22 $\times$ 30	0.15	0.67	770	HU32G121MCXS3WPEC
	120	25 $\times$ 25	0.15	0.66	770	HU32G121MCYS2WPEC
		22 $\times$ 35	0.15	0.79	615	HU32G151MCXS4WPEC
		25 $\times$ 30	0.15	0.79	615	HU32G151MCYS3WPEC
	150	30 $\times$ 25	0.15	0.79	615	HU32G151MCZS2WPEC
		22 $\times$ 40	0.15	0.91	520	HU32G181MCXS5WPEC
		25 $\times$ 35	0.15	0.91	520	HU32G181MCYS4WPEC
	180	30 $\times$ 25	0.15	0.87	520	HU32G181MCZS2WPEC
		25 $\times$ 40	0.15	1.06	450	HU32G221MCYS5WPEC
		30 $\times$ 30	0.15	1.02	450	HU32G221MCZS3WPEC
	220	35 $\times$ 25	0.15	1.02	450	HU32G221MCAS2WPEC
		25 $\times$ 45	0.15	1.23	366	HU32G271MCYS6WPEC
		30 $\times$ 35	0.15	1.19	366	HU32G271MCZS4WPEC
	270	35 $\times$ 25	0.15	1.13	366	HU32G271MCAS2WPEC
		30 $\times$ 40	0.15	1.38	299	HU32G331MCZS5WPEC
		35 $\times$ 30	0.15	1.32	299	HU32G331MCAS3WPEC
	390	35 $\times$ 35	0.15	1.51	253	HU32G391MCAS4WPEC
	470	35 $\times$ 45	0.15	1.80	210	HU32G471MCAS6WPEC
	560	35 $\times$ 45	0.15	1.97	181	HU32G561MCAS6WPEC
420	82	22 $\times$ 25	0.15	0.52	1,242	HU3420V820MCXS2WPEC
		25 $\times$ 25	0.15	0.54	1,242	HU3420V820MCYS2WPEC
	100	22 $\times$ 30	0.15	0.61	1,019	HU3420V101MCXS3WPEC
		25 $\times$ 25	0.15	0.61	1,019	HU3420V101MCYS2WPEC
	120	22 $\times$ 35	0.15	0.71	850	HU3420V121MCXS4WPEC
		25 $\times$ 25	0.15	0.66	850	HU3420V121MCYS2WPEC
		30 $\times$ 25	0.15	0.70	850	HU3420V121MCZS2WPEC
	150	22 $\times$ 40	0.15	0.83	679	HU3420V151MCXS5WPEC
		25 $\times$ 30	0.15	0.79	679	HU3420V151MCYS3WPEC
		30 $\times$ 25	0.15	0.79	679	HU3420V151MCZS2WPEC
	180	25 $\times$ 35	0.15	0.91	566	HU3420V181MCXS4WPEC
		30 $\times$ 25	0.15	0.87	566	HU3420V181MCZS2WPEC
		35 $\times$ 25	0.15	0.90	566	HU3420V181MCAS2WPEC
	220	25 $\times$ 45	0.15	1.11	463	HU3420V221MCYS6WPEC
		30 $\times$ 30	0.15	1.02	463	HU3420V221MCZS3WPEC
		35 $\times$ 25	0.15	1.02	463	HU3420V221MCAS2WPEC
	270	30 $\times$ 35	0.15	1.19	377	HU3420V271MCZS4WPEC
		35 $\times$ 30	0.15	1.19	377	HU3420V271MCAS3WPEC
		30 $\times$ 45	0.15	1.44	309	HU3420V331MCZS6WPEC
	330	35 $\times$ 35	0.15	1.39	309	HU3420V331MCAS4WPEC
	390	35 $\times$ 40	0.15	1.58	261	HU3420V391MCAS5WPEC
	470	35 $\times$ 45	0.15	1.80	218	HU3420V471MCAS6WPEC
450	68	22 $\times$ 25	0.15	0.47	1,499	HU32W680MCXS2WPEC
		22 $\times$ 30	0.15	0.55	1,242	HU32W820MCXS3WPEC
	82	25 $\times$ 25	0.15	0.55	1,242	HU32W820MCYS2WPEC
		22 $\times$ 35	0.15	0.65	1,019	HU32W101MCXS4WPEC
	100	25 $\times$ 30	0.15	0.64	1,019	HU32W101MCYS3WPEC
		22 $\times$ 40	0.15	0.75	850	HU32W121MCXS5WPEC
	120	25 $\times$ 30	0.15	0.71	850	HU32W121MCYS3WPEC
		30 $\times$ 25	0.15	0.71	850	HU32W121MCZS2WPEC
		25 $\times$ 40	0.15	0.88	679	HU32W151MCYS5WPEC
	150	30 $\times$ 30	0.15	0.84	679	HU32W151MCZS3WPEC
		35 $\times$ 25	0.15	0.84	679	HU32W151MCAS2WPEC
		25 $\times$ 45	0.15	1.01	566	HU32W181MCYS6WPEC
	180	30 $\times$ 30	0.15	0.92	566	HU32W181MCZS3WPEC
		35 $\times$ 25	0.15	0.92	566	HU32W181MCAS2WPEC
		30 $\times$ 35	0.15	1.07	463	HU32W221MCZS4WPEC
	220	35 $\times$ 30	0.15	1.08	463	HU32W221MCAS3WPEC
		30 $\times$ 45	0.15	1.30	377	HU32W271MCZS6WPEC
	270	35 $\times$ 35	0.15	1.25	377	HU32W271MCAS4WPEC
		35 $\times$ 40	0.15	1.45	309	HU32W331MCAS5WPEC
	390	35 $\times$ 45	0.15	1.64	261	HU32W391MCAS6WPEC

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!

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

- Conform RoHS

Features

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



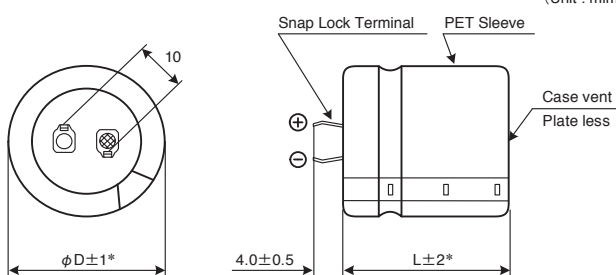
Product Specifications

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

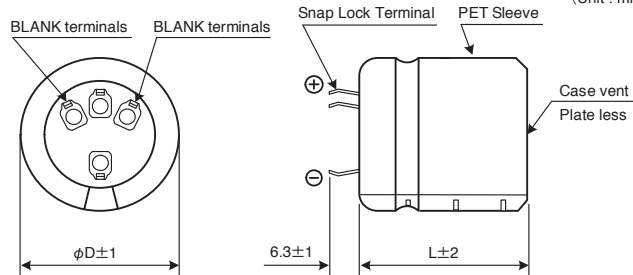
2-claw short terminal (Terminal code : C)

(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

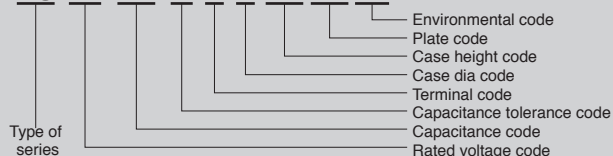
Temperature (℃)		60	70	85	105	
Correction coefficient	200~500V.DC	1.9	1.7	1.4	1.0	
	550V.DC	1.7	1.5	1.3	1.0	
Frequency (Hz)		50/60	120	300	1K	≥10K
Correction coefficient		0.7	1.0	1.1	1.3	1.4

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)
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



Refer to page 82-83 for other terminal shape available on request.

Standard Products Table

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

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
400	120	22 $\times$ 25	0.20	0.77	800	HU2G121MCXS2WPEC
	150	22 $\times$ 25*	0.20	0.87	640	HU2G151MCXS2WPEC
	180	22 $\times$ 30*	0.20	1.01	540	HU2G181MCXS3WPEC
		25 $\times$ 25	0.20	0.99	540	HU2G181MCYS2WPEC
	220	22 $\times$ 30*	0.20	1.11	440	HU2G221MCXS3WPEC
		22 $\times$ 35	0.20	1.17	440	HU2G221MCXS4WPEC
		25 $\times$ 25*	0.20	1.10	440	HU2G221MCYS2WPEC
		25 $\times$ 30	0.20	1.16	440	HU2G221MCYS3WPEC
	270	22 $\times$ 35*	0.20	1.29	360	HU2G271MCXS4WPEC
		25 $\times$ 30*	0.20	1.28	360	HU2G271MCYS3WPEC
		25 $\times$ 35	0.20	1.35	360	HU2G271MCYS4WPEC
		30 $\times$ 25	0.20	1.28	360	HU2G271MCZS2WPEC
	330	22 $\times$ 45*	0.20	1.54	290	HU2G331MCXS6WPEC
		22 $\times$ 50	0.20	1.59	290	HU2G331MCXS7WPEC
		25 $\times$ 35*	0.20	1.49	290	HU2G331MCYS4WPEC
		25 $\times$ 40	0.20	1.55	290	HU2G331MCYS5WPEC
		30 $\times$ 25*	0.20	1.41	290	HU2G331MCZS2WPEC
		30 $\times$ 30	0.20	1.49	290	HU2G331MCZS3WPEC
	390	35 $\times$ 25	0.20	1.46	290	HU2G331MCAS2WPEC
		22 $\times$ 50*	0.20	1.73	250	HU2G391MCXS7WPEC
		25 $\times$ 40*	0.20	1.68	250	HU2G391MCYS5WPEC
		25 $\times$ 45	0.20	1.74	250	HU2G391MCYS6WPEC
		30 $\times$ 30*	0.20	1.62	250	HU2G391MCZS3WPEC
		30 $\times$ 35	0.20	1.70	250	HU2G391MCZS4WPEC
	470	35 $\times$ 25*	0.20	1.59	250	HU2G391MCAS2WPEC
		25 $\times$ 45*	0.20	1.92	210	HU2G471MCYS6WPEC
		25 $\times$ 50*	0.20	1.98	210	HU2G471MCYS7WPEC
		30 $\times$ 35*	0.20	1.86	210	HU2G471MCZS4WPEC
	560	30 $\times$ 40	0.20	1.94	210	HU2G471MCZS5WPEC
		35 $\times$ 30	0.20	1.84	210	HU2G471MCAS3WPEC
		25 $\times$ 50*	0.20	2.16	180	HU2G561MCXS7WPEC
		30 $\times$ 40*	0.20	2.11	180	HU2G561MCZS5WPEC
		30 $\times$ 45	0.20	2.19	180	HU2G561MCZS6WPEC
		35 $\times$ 30*	0.20	2.01	180	HU2G561MCAS3WPEC
	680	35 $\times$ 35	0.20	2.09	180	HU2G561MCAS4WPEC
		25 $\times$ 60*	0.20	2.51	150	HU2G681MCYS9WPEC
		30 $\times$ 45*	0.20	2.41	150	HU2G681MCZS6WPEC
		30 $\times$ 50	0.20	2.48	150	HU2G681MCZS7WPEC
		35 $\times$ 35*	0.20	2.31	150	HU2G681MCAS4WPEC
		35 $\times$ 40	0.20	2.40	150	HU2G681MCAS5WPEC
	820	30 $\times$ 50*	0.20	2.65	120	HU2G821MCZS7WPEC
		35 $\times$ 40*	0.20	2.63	120	HU2G821MCAS5WPEC
		35 $\times$ 45	0.20	2.72	120	HU2G821MCAS6WPEC
	1,000	30 $\times$ 60*	0.20	3.17	100	HU2G102MCZS9WPEC
		35 $\times$ 50*	0.20	3.09	100	HU2G102MCAS7WPEC
	1,200	35 $\times$ 55*	0.20	3.38	80	HU2G122MCAS8WPEC
	1,500	35 $\times$ 100	0.20	3.93	70	HU2G152MSAS17WPEC
		40 $\times$ 76	0.20	3.99	70	HU2G152MSBS12WPEC
	1,800	40 $\times$ 101	0.20	4.47	60	HU2G182MSBS17WPEC

SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D × 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	HU420V271MCXS6WPEC
		25 × 30*	0.20	1.25	380	HU420V271MCYS3WPEC
		25 × 35*	0.20	1.35	380	HU420V271MCYS4WPEC
		30 × 25*	0.20	1.28	380	HU420V271MCZS2WPEC
	330	22 × 45*	0.20	1.54	310	HU420V331MCXS6WPEC
		25 × 35*	0.20	1.45	310	HU420V331MCYS4WPEC
		30 × 30*	0.20	1.49	310	HU420V331MCZS3WPEC
	390	25 × 40*	0.20	1.64	270	HU420V391MCYS5WPEC
		30 × 30*	0.20	1.62	270	HU420V391MCZS3WPEC
		30 × 35	0.20	1.70	270	HU420V391MCZS4WPEC
		35 × 25*	0.20	1.59	270	HU420V391MCAS2WPEC
		35 × 30	0.20	1.67	270	HU420V391MCAS3WPEC
	470	25 × 50*	0.20	1.98	220	HU420V471MCYS7WPEC
		30 × 35*	0.20	1.86	220	HU420V471MCZS4WPEC
		30 × 40	0.20	1.94	220	HU420V471MCZS5WPEC
		35 × 30*	0.20	1.84	220	HU420V471MCAS3WPEC
450	120	22 × 25*	0.20	0.77	850	HU2W121MCXS2WPEC
		22 × 30*	0.20	0.92	680	HU2W151MCXS3WPEC
		25 × 25	0.20	0.90	680	HU2W151MCYS2WPEC
		22 × 30*	0.20	1.01	570	HU2W181MCXS3WPEC
	150	22 × 35	0.20	1.05	570	HU2W181MCXS4WPEC
		25 × 25*	0.20	0.99	570	HU2W181MCYS2WPEC
		25 × 30	0.20	1.05	570	HU2W181MCYS3WPEC
		22 × 35*	0.20	1.17	470	HU2W221MCXS4WPEC
	180	25 × 30*	0.20	1.16	470	HU2W221MCYS3WPEC
		25 × 35	0.20	1.21	470	HU2W221MCYS4WPEC
		30 × 25	0.20	1.15	470	HU2W221MCZS2WPEC
		22 × 40*	0.20	1.31	380	HU2W271MCXS5WPEC
	220	25 × 35*	0.20	1.35	380	HU2W271MCYS4WPEC
		25 × 40	0.20	1.40	380	HU2W271MCYS5WPEC
		30 × 25*	0.20	1.28	380	HU2W271MCZS2WPEC
		30 × 30	0.20	1.35	380	HU2W271MCZS3WPEC
		35 × 25	0.20	1.32	380	HU2W271MCAS2WPEC
	270	22 × 50*	0.20	1.59	310	HU2W331MCXS7WPEC
		25 × 40*	0.20	1.55	310	HU2W331MCYS5WPEC
		25 × 45	0.20	1.61	310	HU2W331MCYS6WPEC
		30 × 30*	0.20	1.49	310	HU2W331MCZS3WPEC
	330	35 × 25*	0.20	1.46	310	HU2W331MCAS2WPEC
		25 × 45*	0.20	1.74	270	HU2W391MCYS6WPEC
		25 × 50*	0.20	1.80	270	HU2W391MCYS7WPEC
		30 × 35*	0.20	1.70	270	HU2W391MCZS4WPEC
	390	35 × 30	0.20	1.67	270	HU2W391MCAS3WPEC
		25 × 50*	0.20	1.92	220	HU2W471MCYS7WPEC
		30 × 40*	0.20	1.94	220	HU2W471MCZS5WPEC
		35 × 30*	0.20	1.84	220	HU2W471MCAS3WPEC
	470	35 × 35	0.20	1.92	220	HU2W471MCAS4WPEC
		25 × 60*	0.20	2.27	190	HU2W561MCYS9WPEC
		30 × 45*	0.20	2.19	190	HU2W561MCZS6WPEC
		30 × 50	0.20	2.25	190	HU2W561MCZS7WPEC
	560	35 × 35*	0.20	2.09	190	HU2W561MCAS4WPEC
		35 × 40	0.20	2.18	190	HU2W561MCAS5WPEC
		30 × 50*	0.20	2.48	150	HU2W681MCZS7WPEC
		35 × 40*	0.20	2.40	150	HU2W681MCAS5WPEC
	680	35 × 45	0.20	2.48	150	HU2W681MCAS6WPEC
		30 × 60*	0.20	2.87	130	HU2W821MCZS9WPEC
		35 × 45*	0.20	2.64	130	HU2W821MCAS6WPEC
		35 × 50*	0.20	2.80	130	HU2W821MCAS7WPEC
	820	35 × 55*	0.20	3.18	110	HU2W102MCAS8WPEC
		35 × 60	0.20	3.25	110	HU2W102MCAS9WPEC
		40 × 56	0.20	3.30	110	HU420V102MSBS8WPEC
	1,000	35 × 100	0.20	3.51	90	HU420V122MSAS17WPEC
		40 × 76	0.20	3.57	90	HU420V122MSBS12WPEC
	1,200	40 × 101	0.20	4.07	70	HU420V152MSBS17WPEC

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D × 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	1.31	380	HU420V271MCXS5WPEC
		25 × 35*	0.20	1.35	380	HU420V271MCYS4WPEC
		25 × 40	0.20	1.40	380	HU420V271MCYS5WPEC
		30 × 25*	0.20	1.28	380	HU420V271MCZS2WPEC
		30 × 30	0.20	1.35	380	HU420V271MCZS3WPEC
	330	22 × 45*	0.20	1.54	310	HU420V331MCXS6WPEC
		25 × 35*	0.20	1.45	310	HU420V331MCYS4WPEC
		30 × 30*	0.20	1.49	310	HU420V331MCZS3WPEC
	390	25 × 40*	0.20	1.64	270	HU420V391MCYS5WPEC
		30 × 30*	0.20	1.62	270	HU420V391MCZS3WPEC
		30 × 35	0.20	1.70	270	HU420V391MCZS4WPEC
		35 × 25*	0.20	1.59	270	HU420V391MCAS2WPEC
		35 × 30	0.20	1.67	270	HU420V391MCAS3WPEC
	470	25 × 50*	0.20	1.98	220	HU420V471MCYS7WPEC
		30 × 35*	0.20	1.86	220	HU420V471MCZS4WPEC
		30 × 40	0.20	1.94	220	HU420V471MCZS5WPEC
		35 × 30*	0.20	1.84	220	HU420V471MCAS3WPEC
450	120	22 × 25*	0.20	0.77	850	HU2W121MCXS2WPEC
		22 × 30*	0.20	0.92	680	HU2W151MCXS3WPEC
		25 × 25	0.20	0.90	680	HU2W151MCYS2WPEC
		22 × 30*	0.20	1.01	570	HU2W181MCXS3WPEC
	150	22 × 35	0.20	1.05	570	HU2W181MCXS4WPEC
		25 × 25*	0.20	0.99	570	HU2W181MCYS2WPEC
		25 × 30	0.20	1.05	570	HU2W181MCYS3WPEC
		22 × 35*	0.20	1.17	470	HU2W221MCXS4WPEC
	180	25 × 30*	0.20	1.16	470	HU2W221MCYS3WPEC
		25 × 35	0.20	1.21	470	HU2W221MCYS4WPEC
		30 × 25	0.20	1.15	470	HU2W221MCZS2WPEC
		22 × 40*	0.20	1.31	380	HU2W271MCXS5WPEC
	220	25 × 35*	0.20	1.35	380	HU2W271MCYS4WPEC
		25 × 40	0.20	1.40	380	HU2W271MCYS5WPEC
		30 × 25*	0.20	1.28	380	HU2W271MCZS2WPEC
		30 × 30	0.20	1.35	380	HU2W271MCZS3WPEC
		35 × 25	0.20	1.32	380	HU2W271MCAS2WPEC
	270	22 × 50*	0.20	1.59	310	HU2W331MCXS7WPEC
		25 × 40*	0.20	1.55	310	HU2W331MCYS5WPEC
		25 × 45	0.20	1.61	310	HU2W331MCYS6WPEC
		30 × 30*	0.20	1.49	310	HU2W331MCZS3WPEC
	330	35 × 25*	0.20	1.46	310	HU2W331MCAS2WPEC
		25 × 45*	0.20	1.74	270	HU2W391MCYS6WPEC
		25 × 50*	0.20	1.80	270	HU2W391MCYS7WPEC
		30 × 35*	0.20	1.70	270	HU2W391MCZS4WPEC
	390	35 × 30	0.20	1.67	270	HU2W391MCAS3WPEC
		25 × 50*	0.20	1.92	220	HU2W471MCYS7WPEC
		30 × 40*	0.20	1.94	220	HU2W471MCZS5WPEC
		35 × 30*	0.20	1.84	220	HU2W471MCAS3WPEC
	470	35 × 35	0.20	1.92	220	HU2W471MCAS4WPEC
		25 × 60*	0.20	2.27	190	HU2W561MCYS9WPEC
		30 × 45*	0.20	2.19	190	HU2W561MCZS6WPEC
		30 × 50	0.20	2.25	190	HU2W561MCZS7WPEC
	560	35 × 35*	0.20	2.09	190	HU2W561MCAS4WPEC
		35 × 40	0.20	2.18	190	HU2W561MCAS5WPEC
		30 × 50*	0.20	2.48	150	HU2W681MCZS7WPEC
		35 × 40*	0.20	2.40	150	HU2W681MCAS5WPEC
	680	35 × 45	0.20	2.48	150	HU2W681MCAS6WPEC
		30 × 60*	0.20	2.87	130	HU2W821MCZS9WPEC
		35 × 45*	0.20	2.64	130	HU2W821MCAS6WPEC
		35 × 50*	0.20	2.80	130	HU2W821MCAS7WPEC
	820	35 × 55*	0.20	3.18	110	HU2W102MCAS8WPEC
		35 × 60	0.20	3.25	110	HU2W102MCAS9WPEC
		40 × 56	0.20	3.30	110	HU420V102MSBS8WPEC
	1,000	35 × 100	0.20	3.51	90	HU420V122MSAS17WPEC
		40 × 76	0.20	3.57	90	HU420V122MSBS12WPEC
	1,200	40 × 101	0.20	4.07	70	HU420V152MSBS17WPEC

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 (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
475	82	22 $\times$ 25	0.20	0.64	1,170	HU475V820MCXS2WPEC
	100	22 $\times$ 25*	0.20	0.69	960	HU475V101MCXS2WPEC
		22 $\times$ 30	0.20	0.75	960	HU475V101MCXS3WPEC
		25 $\times$ 25	0.20	0.74	960	HU475V101MCYS2WPEC
	120	22 $\times$ 30*	0.20	0.82	800	HU475V121MCXS3WPEC
		22 $\times$ 35	0.20	0.86	800	HU475V121MCXS4WPEC
		25 $\times$ 25	0.20	0.81	800	HU475V121MCYS2WPEC
	150	22 $\times$ 35*	0.20	0.96	640	HU475V151MCXS4WPEC
		25 $\times$ 30	0.20	0.96	640	HU475V151MCYS3WPEC
		30 $\times$ 25	0.20	0.95	640	HU475V151MCZS2WPEC
	180	22 $\times$ 40*	0.20	1.07	540	HU475V181MCXS5WPEC
		22 $\times$ 45	0.20	1.14	540	HU475V181MCXS6WPEC
		25 $\times$ 30*	0.20	1.02	540	HU475V181MCYS3WPEC
		25 $\times$ 35	0.20	1.10	540	HU475V181MCYS4WPEC
		30 $\times$ 25	0.20	1.04	540	HU475V181MCZS2WPEC
		30 $\times$ 30	0.20	1.10	540	HU475V181MCZS3WPEC
		35 $\times$ 25	0.20	1.01	540	HU475V181MCAS2WPEC
	220	22 $\times$ 45*	0.20	1.22	440	HU475V221MCXS6WPEC
		22 $\times$ 50	0.20	1.30	440	HU475V221MCXS7WPEC
		25 $\times$ 35*	0.20	1.18	440	HU475V221MCYS4WPEC
		25 $\times$ 40	0.20	1.27	440	HU475V221MCYS5WPEC
		30 $\times$ 30	0.20	1.22	440	HU475V221MCZS3WPEC
		35 $\times$ 25	0.20	1.12	440	HU475V221MCAS2WPEC
	270	25 $\times$ 40*	0.20	1.36	360	HU475V271MCYS5WPEC
		25 $\times$ 45	0.20	1.45	360	HU475V271MCYS6WPEC
		30 $\times$ 30*	0.20	1.31	360	HU475V271MCZS3WPEC
		30 $\times$ 35	0.20	1.41	360	HU475V271MCZS4WPEC
		35 $\times$ 25*	0.20	1.28	360	HU475V271MCAS2WPEC
		35 $\times$ 30	0.20	1.31	360	HU475V271MCAS3WPEC
	330	25 $\times$ 50*	0.20	1.61	290	HU475V331MCYS7WPEC
		25 $\times$ 55	0.20	1.71	290	HU475V331MCYS8WPEC
		30 $\times$ 35*	0.20	1.51	290	HU475V331MCZS4WPEC
		30 $\times$ 40	0.20	1.62	290	HU475V331MCZS5WPEC
		35 $\times$ 30*	0.20	1.49	290	HU475V331MCAS3WPEC
	390	35 $\times$ 35	0.20	1.51	290	HU475V331MCAS4WPEC
		25 $\times$ 55*	0.20	1.80	250	HU475V391MCYS8WPEC
		30 $\times$ 40*	0.20	1.71	250	HU475V391MCZS5WPEC
		30 $\times$ 45	0.20	1.82	250	HU475V391MCZS6WPEC
	470	35 $\times$ 35	0.20	1.64	250	HU475V391MCAS4WPEC
		30 $\times$ 45*	0.20	1.94	210	HU475V471MCZS6WPEC
		30 $\times$ 50	0.20	2.06	210	HU475V471MCZS7WPEC
		35 $\times$ 35*	0.20	1.86	210	HU475V471MCAS4WPEC
	560	35 $\times$ 40	0.20	1.87	210	HU475V471MCAS5WPEC
		30 $\times$ 55*	0.20	2.25	180	HU475V561MCZS8WPEC
		30 $\times$ 60	0.20	2.37	180	HU475V561MCZS9WPEC
		35 $\times$ 40*	0.20	2.11	180	HU475V561MCAS5WPEC
		35 $\times$ 45	0.20	2.11	180	HU475V561MCAS6WPEC
	680	35 $\times$ 50*	0.20	2.48	150	HU475V681MCAS7WPEC
		35 $\times$ 55	0.20	2.45	150	HU475V681MCAS8WPEC
	820	35 $\times$ 55*	0.20	2.80	120	HU475V821MCAS8WPEC

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
500	82	22 $\times$ 25*	0.20	0.50	1,170	HU2H820MCXS2WPEC
	100	22 $\times$ 30	0.20	0.53	1,170	HU2H820MCXS3WPEC
		22 $\times$ 30*	0.20	0.59	960	HU2H101MCXS3WPEC
	120	25 $\times$ 25	0.20	0.61	960	HU2H101MCYS2WPEC
		22 $\times$ 35	0.20	0.69	800	HU2H121MCXS4WPEC
		25 $\times$ 30	0.20	0.71	800	HU2H121MCYS3WPEC
	150	22 $\times$ 40*	0.20	0.82	640	HU2H151MCXS5WPEC
		22 $\times$ 45	0.20	0.85	640	HU2H151MCXS6WPEC
		25 $\times$ 35	0.20	0.84	640	HU2H151MCYS4WPEC
		30 $\times$ 25	0.20	0.85	640	HU2H151MCZS2WPEC
	180	22 $\times$ 45*	0.20	0.94	540	HU2H181MCXS6WPEC
		22 $\times$ 50	0.20	0.97	540	HU2H181MCXS7WPEC
		25 $\times$ 35*	0.20	0.94	540	HU2H181MCYS4WPEC
		25 $\times$ 40	0.20	0.98	540	HU2H181MCYS5WPEC
		30 $\times$ 30	0.20	0.99	540	HU2H181MCZS3WPEC
		35 $\times$ 25	0.20	1.04	540	HU2H181MCAS2WPEC
	220	25 $\times$ 45	0.20	1.13	440	HU2H221MCYS6WPEC
		30 $\times$ 30*	0.20	1.11	440	HU2H221MCZS3WPEC
		30 $\times$ 35	0.20	1.17	440	HU2H221MCZS4WPEC
		35 $\times$ 25*	0.20	1.16	440	HU2H221MCAS2WPEC
		35 $\times$ 30	0.20	1.22	440	HU2H221MCAS3WPEC
	270	25 $\times$ 50*	0.20	1.31	360	HU2H271MCYS7WPEC
		30 $\times$ 35*	0.20	1.31	360	HU2H271MCZS4WPEC
		30 $\times$ 40	0.20	1.36	360	HU2H271MCZS5WPEC
	330	35 $\times$ 30*	0.20	1.37	360	HU2H271MCZS6WPEC
		30 $\times$ 45	0.20	1.58	290	HU2H331MCZS6WPEC
		35 $\times$ 35	0.20	1.61	290	HU2H331MCAS4WPEC
	390	30 $\times$ 50*	0.20	1.79	250	HU2H391MCZS7WPEC
		30 $\times$ 55	0.20	1.84	250	HU2H391MCZS8WPEC
	470	35 $\times$ 40	0.20	1.84	250	HU2H391MCAS5WPEC
		30 $\times$ 60*	0.20	2.10	210	HU2H471MCZS9WPEC
		35 $\times$ 45*	0.20	2.12	210	HU2H471MCAS6WPEC
	560	35 $\times$ 50	0.20	2.18	210	HU2H471MCAS7WPEC
		35 $\times$ 50*	0.20	2.40	180	HU2H561MCAS7WPEC
		35 $\times$ 55	0.20	2.47	180	HU2H561MCAS8WPEC
	680	35 $\times$ 60*	0.20	2.83	150	HU2H681MCAS9WPEC
550	82	30 $\times$ 25	0.25	0.59	2,920	HU2L820MCZS2WPEC
	120	30 $\times$ 30	0.25	0.77	1,990	HU2L121MCZS3WPEC
		35 $\times$ 25	0.25	0.80	1,990	HU2L121MCAS2WPEC
	150	30 $\times$ 35	0.25	0.91	1,600	HU2L151MCZS4WPEC
		35 $\times$ 30	0.25	0.96	1,600	HU2L151MCAS3WPEC
	180	30 $\times$ 40	0.25	1.05	1,330	HU2L181MCZS5WPEC
		35 $\times$ 35	0.25	1.11	1,330	HU2L181MCAS4WPEC
	220	30 $\times$ 50	0.25	1.26	1,090	HU2L221MCZS7WPEC
		35 $\times$ 40	0.25	1.29	1,090	HU2L221MCAS5WPEC
	270	35 $\times$ 45	0.25	1.50	890	HU2L271MCAS6WPEC
	330	35 $\times$ 50	0.25	1.73	730	HU2L331MCAS7WPEC
	390	35 $\times$ 60	0.25	2.00	620	HU2L391MCAS9WPEC

SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

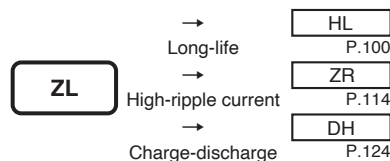
UPGRADE!

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

• Conform RoHS

Features

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



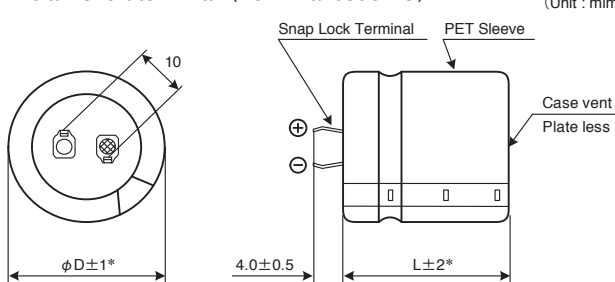
Product Specifications

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

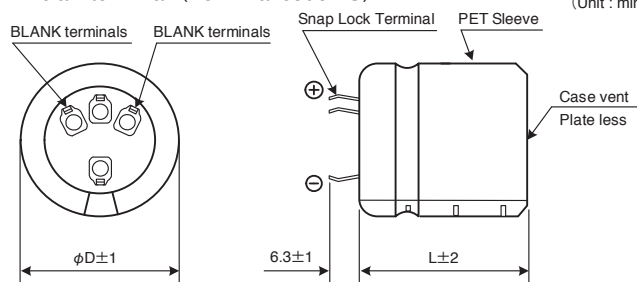
2-claw short terminal (Terminal code : C)

(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

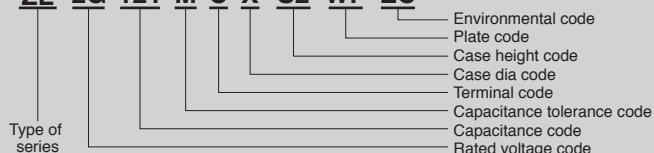
Temperature (°C)	60	70	85	105
Correction coefficient				
200~500V.DC	1.9	1.7	1.4	1.0
550V.DC	1.7	1.5	1.3	1.0
Frequency (Hz)	50/60	120	300	1K
Correction coefficient	0.7	1.0	1.1	1.3
				≥10K
				1.4

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)
Please consult us when the ripple voltage exceeds 70Vp-p.

Product code

(Example) ZL Series 400V 120μF ±20%

ZL 2G 121 M C X S2 WP EC



Refer to page 82-83 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
200	330	22 $\times$ 25	0.15	1.09	330	ZL2D331MCXS2WPEC
	470	22 $\times$ 30	0.15	1.37	240	ZL2D471MCXS3WPEC
		25 $\times$ 25	0.15	1.36	240	ZL2D471MCYS2WPEC
	560	22 $\times$ 35	0.15	1.57	200	ZL2D561MCXS4WPEC
		25 $\times$ 30	0.15	1.57	200	ZL2D561MCYS3WPEC
	680	22 $\times$ 40	0.15	1.81	160	ZL2D681MCXS5WPEC
		30 $\times$ 25	0.15	1.75	160	ZL2D681MCZS2WPEC
	820	22 $\times$ 45	0.15	2.06	140	ZL2D821MCXS6WPEC
		25 $\times$ 35	0.15	1.99	140	ZL2D821MCYS4WPEC
	1,000	25 $\times$ 45	0.15	2.37	110	ZL2D102MCYS6WPEC
		30 $\times$ 30	0.15	2.24	110	ZL2D102MCZS3WPEC
		35 $\times$ 25	0.15	1.94	110	ZL2D102MCAS2WPEC
	1,200	25 $\times$ 50	0.15	2.67	100	ZL2D122MCYS7WPEC
		30 $\times$ 35	0.15	2.56	100	ZL2D122MCZS4WPEC
		35 $\times$ 30	0.15	2.23	100	ZL2D122MCAS3WPEC
	1,500	30 $\times$ 45	0.15	3.08	80	ZL2D152MCZS6WPEC
		35 $\times$ 35	0.15	2.61	80	ZL2D152MCAS4WPEC
	1,800	30 $\times$ 50	0.15	3.49	70	ZL2D182MCZS7WPEC
		35 $\times$ 40	0.15	2.97	70	ZL2D182MCAS5WPEC
250	270	22 $\times$ 25	0.15	0.98	360	ZL2E271MCXS2WPEC
	330	22 $\times$ 30	0.15	1.15	290	ZL2E331MCXS3WPEC
		25 $\times$ 25	0.15	1.14	290	ZL2E331MCYS2WPEC
	390	22 $\times$ 35	0.15	1.31	250	ZL2E391MCXS4WPEC
	470	22 $\times$ 40	0.15	1.50	210	ZL2E471MCXS5WPEC
		25 $\times$ 30	0.15	1.43	210	ZL2E471MCYS3WPEC
		30 $\times$ 25	0.15	1.45	210	ZL2E471MCZS2WPEC
	560	22 $\times$ 45	0.15	1.70	180	ZL2E561MCXS6WPEC
		25 $\times$ 35	0.15	1.64	180	ZL2E561MCYS4WPEC
	680	22 $\times$ 50	0.15	1.95	150	ZL2E681MCXS7WPEC
		25 $\times$ 40	0.15	1.88	150	ZL2E681MCYS5WPEC
		30 $\times$ 30	0.15	1.85	150	ZL2E681MCZS3WPEC
		35 $\times$ 25	0.15	1.60	150	ZL2E681MCAS2WPEC
	820	25 $\times$ 45	0.15	2.14	120	ZL2E821MCYS6WPEC
		30 $\times$ 35	0.15	2.12	120	ZL2E821MCZS4WPEC
		35 $\times$ 30	0.15	1.84	120	ZL2E821MCAS3WPEC
	1,000	30 $\times$ 40	0.15	2.44	100	ZL2E102MCZS5WPEC
	1,200	30 $\times$ 45	0.15	2.76	80	ZL2E122MCZS6WPEC
		35 $\times$ 35	0.15	2.33	80	ZL2E122MCAS4WPEC
	1,500	35 $\times$ 45	0.15	2.80	70	ZL2E152MCAS6WPEC
	1,800	35 $\times$ 50	0.15	3.16	60	ZL2E182MCAS7WPEC
315	180	22 $\times$ 25	0.20	0.95	710	ZL2F181MCXS2WPEC
	220	22 $\times$ 30	0.20	1.10	580	ZL2F221MCXS3WPEC
		25 $\times$ 25	0.20	1.10	580	ZL2F221MCYS2WPEC
	270	22 $\times$ 35	0.20	1.24	480	ZL2F271MCXS4WPEC
		25 $\times$ 30	0.20	1.25	480	ZL2F271MCYS3WPEC
	330	22 $\times$ 40	0.20	1.40	390	ZL2F331MCXS5WPEC
		30 $\times$ 25	0.20	1.43	390	ZL2F331MCZS2WPEC
	390	22 $\times$ 45	0.20	1.56	330	ZL2F391MCXS6WPEC
		25 $\times$ 35	0.20	1.57	330	ZL2F391MCYS4WPEC
	470	25 $\times$ 40	0.20	1.76	280	ZL2F471MCYS5WPEC
		30 $\times$ 30	0.20	1.73	280	ZL2F471MCZS3WPEC
		35 $\times$ 25	0.20	1.48	280	ZL2F471MCAS2WPEC
	560	25 $\times$ 50	0.20	1.99	230	ZL2F561MCYS7WPEC
		30 $\times$ 35	0.20	1.93	230	ZL2F561MCZS4WPEC
		35 $\times$ 30	0.20	1.70	230	ZL2F561MCAS3WPEC
	680	30 $\times$ 40	0.20	2.19	190	ZL2F681MCZS5WPEC
		35 $\times$ 35	0.20	1.96	190	ZL2F681MCAS4WPEC
	820	30 $\times$ 45	0.20	2.47	160	ZL2F821MCZS6WPEC
		35 $\times$ 40	0.20	2.23	160	ZL2F821MCAS5WPEC
	1,000	35 $\times$ 45	0.20	2.55	130	ZL2F102MCAS6WPEC
	1,200	35 $\times$ 50	0.20	2.87	110	ZL2F122MCAS7WPEC

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
400	120	22 $\times$ 25	0.20	0.77	800	ZL2G121MCXS2WPEC
	150	22 $\times$ 25*	0.20	0.87	640	ZL2G151MCXS2WPEC
	180	22 $\times$ 30*	0.20	1.01	540	ZL2G181MCXS3WPEC
		25 $\times$ 25	0.20	0.99	540	ZL2G181MCYS2WPEC
	220	22 $\times$ 30*	0.20	1.11	440	ZL2G221MCXS3WPEC
		22 $\times$ 35	0.20	1.17	440	ZL2G221MCXS4WPEC
		25 $\times$ 25*	0.20	1.10	440	ZL2G221MCYS2WPEC
		25 $\times$ 30	0.20	1.16	440	ZL2G221MCYS3WPEC
	270	22 $\times$ 35*	0.20	1.29	360	ZL2G271MCXS4WPEC
		25 $\times$ 30*	0.20	1.28	360	ZL2G271MCYS3WPEC
		25 $\times$ 35	0.20	1.35	360	ZL2G271MCYS4WPEC
		30 $\times$ 25	0.20	1.28	360	ZL2G271MCZS2WPEC
	330	22 $\times$ 45*	0.20	1.54	290	ZL2G331MCXS6WPEC
		22 $\times$ 50	0.20	1.59	290	ZL2G331MCXS7WPEC
		25 $\times$ 35*	0.20	1.49	290	ZL2G331MCYS4WPEC
		25 $\times$ 40	0.20	1.55	290	ZL2G331MCYS5WPEC
		30 $\times$ 25*	0.20	1.41	290	ZL2G331MCZS2WPEC
		30 $\times$ 30	0.20	1.49	290	ZL2G331MCZS3WPEC
	390	35 $\times$ 25	0.20	1.46	290	ZL2G331MCAS2WPEC
		22 $\times$ 50*	0.20	1.73	250	ZL2G391MCXS7WPEC
		25 $\times$ 40*	0.20	1.68	250	ZL2G391MCYS5WPEC
		25 $\times$ 45	0.20	1.74	250	ZL2G391MCYS6WPEC
		30 $\times$ 30*	0.20	1.62	250	ZL2G391MCZS3WPEC
		30 $\times$ 35	0.20	1.70	250	ZL2G391MCZS4WPEC
	470	35 $\times$ 25*	0.20	1.59	250	ZL2G391MCAS2WPEC
		25 $\times$ 45*	0.20	1.92	210	ZL2G471MCYS6WPEC
		25 $\times$ 50*	0.20	1.98	210	ZL2G471MCYS7WPEC
		30 $\times$ 35*	0.20	1.86	210	ZL2G471MCZS4WPEC
	560	30 $\times$ 40	0.20	1.94	210	ZL2G471MCZS5WPEC
		35 $\times$ 30	0.20	1.84	210	ZL2G471MCAS3WPEC
		25 $\times$ 50*	0.20	2.16	180	ZL2G561MCYS7WPEC
		30 $\times$ 40*	0.20	2.11	180	ZL2G561MCZS5WPEC
		30 $\times$ 45	0.20	2.19	180	ZL2G561MCZS6WPEC
		35 $\times$ 30*	0.20	2.01	180	ZL2G561MCAS3WPEC
	680	35 $\times$ 35	0.20	2.09	180	ZL2G561MCAS4WPEC
		25 $\times$ 60*	0.20	2.51	150	ZL2G681MCYS9WPEC
		30 $\times$ 45*	0.20	2.41	150	ZL2G681MCZS6WPEC
		30 $\times$ 50	0.20	2.48	150	ZL2G681MCZS7WPEC
		35 $\times$ 35*	0.20	2.31	150	ZL2G681MCAS4WPEC
		35 $\times$ 40	0.20	2.40	150	ZL2G681MCAS5WPEC
	820	30 $\times$ 50*	0.20	2.65	120	ZL2G821MCZS7WPEC
		35 $\times$ 40*	0.20	2.63	120	ZL2G821MCAS5WPEC
		35 $\times$ 45	0.20	2.72	120	ZL2G821MCAS6WPEC
	1,000	30 $\times$ 60*	0.20	3.17	100	ZL2G102MCZS9WPEC
		35 $\times$ 50*	0.20	3.09	100	ZL2G102MCAS7WPEC
	1,200	35 $\times$ 55*	0.20	3.38	80	ZL2G122MCAS8WPEC
	1,500	35 $\times$ 100	0.20	3.93	70	ZL2G152MSAS17WPEC
		40 $\times$ 76	0.20	3.99	70	ZL2G152MSBS12WPEC
	1,800	40 $\times$ 101	0.20	4.47	60	ZL2G182MSBS17WPEC

SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

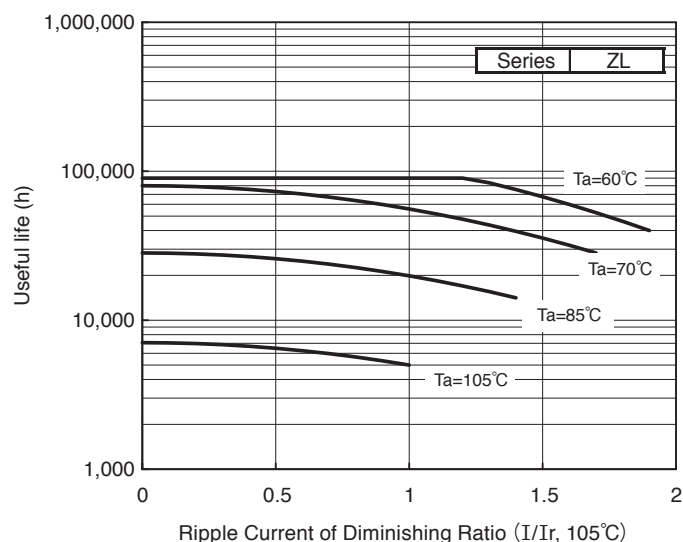
Standard Products Table

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
		30×25*	0.20	1.28	380	ZL420V271MCZS2WPEC
	330	22×45*	0.20	1.54	310	ZL420V331MCXS6WPEC
		25×35*	0.20	1.45	310	ZL420V331MCYS4WPEC
		30×30*	0.20	1.49	310	ZL420V331MCZS3WPEC
	390	25×40*	0.20	1.64	270	ZL420V391MCYS5WPEC
		30×30*	0.20	1.62	270	ZL420V391MCZS3WPEC
		30×35	0.20	1.70	270	ZL420V391MCZS4WPEC
		35×25*	0.20	1.59	270	ZL420V391MCAS2WPEC
		35×30	0.20	1.67	270	ZL420V391MCAS3WPEC
	470	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
450	120	22×25*	0.20	0.77	850	ZL2W121MCXS2WPEC
		22×30*	0.20	0.92	680	ZL2W151MCXS3WPEC
		25×25	0.20	0.90	680	ZL2W151MCYS2WPEC
		22×30*	0.20	1.01	570	ZL2W181MCXS3WPEC
	150	22×35	0.20	1.05	570	ZL2W181MCXS4WPEC
		25×25*	0.20	0.99	570	ZL2W181MCYS2WPEC
		25×30	0.20	1.05	570	ZL2W181MCYS3WPEC
		22×35*	0.20	1.17	470	ZL2W221MCXS4WPEC
	180	25×30*	0.20	1.16	470	ZL2W221MCYS3WPEC
		25×35	0.20	1.21	470	ZL2W221MCYS4WPEC
		30×25	0.20	1.15	470	ZL2W221MCZS2WPEC
		22×40*	0.20	1.31	380	ZL2W271MCXS5WPEC
	220	22×45	0.20	1.35	380	ZL2W271MCXS6WPEC
		25×30*	0.20	1.40	380	ZL2W271MCYS5WPEC
		30×25*	0.20	1.28	380	ZL2W271MCZS2WPEC
		30×30	0.20	1.35	380	ZL2W271MCZS3WPEC
		35×25	0.20	1.32	380	ZL2W271MCAS2WPEC
	270	22×50*	0.20	1.59	310	ZL2W331MCXS7WPEC
		25×40*	0.20	1.55	310	ZL2W331MCYS5WPEC
		25×45	0.20	1.61	310	ZL2W331MCYS6WPEC
		30×30*	0.20	1.49	310	ZL2W331MCZS3WPEC
	330	35×25*	0.20	1.46	310	ZL2W331MCAS2WPEC
		25×45*	0.20	1.74	270	ZL2W391MCYS6WPEC
		25×50*	0.20	1.80	270	ZL2W391MCYS7WPEC
		30×35*	0.20	1.70	270	ZL2W391MCZS4WPEC
	390	35×30	0.20	1.67	270	ZL2W391MCAS3WPEC
		25×50*	0.20	1.92	220	ZL2W471MCYS7WPEC
		30×40*	0.20	1.94	220	ZL2W471MCZS5WPEC
		35×30*	0.20	1.84	220	ZL2W471MCAS3WPEC
	470	35×35	0.20	1.92	220	ZL2W471MCAS4WPEC
		35×35*	0.20	2.27	190	ZL2W561MCYS9WPEC
		30×45*	0.20	2.19	190	ZL2W561MCZS6WPEC
		30×50	0.20	2.25	190	ZL2W561MCZS7WPEC
480	120	35×35*	0.20	2.09	190	ZL2W561MCAS4WPEC
		35×40	0.20	2.18	190	ZL2W561MCAS5WPEC
		30×50*	0.20	2.48	150	ZL2W681MCZS7WPEC
		35×40*	0.20	2.40	150	ZL2W681MCAS5WPEC
	150	35×45	0.20	2.48	150	ZL2W681MCAS6WPEC
		30×60*	0.20	2.87	130	ZL2W821MCZS9WPEC
		35×45*	0.20	2.64	130	ZL2W821MCAS6WPEC
		35×50*	0.20	2.80	130	ZL2W821MCAS7WPEC
	180	35×55*	0.20	3.18	110	ZL2W102MCAS8WPEC
		35×60	0.20	3.25	110	ZL2W102MCAS9WPEC
		40×56	0.20	3.30	110	ZL2W102MSBS8WPEC
		35×100	0.20	3.51	90	ZL2W122MSAS17WPEC
	1,200	40×76	0.20	3.57	90	ZL2W122MSBS12WPEC
		40×101	0.20	4.07	70	ZL2W152MSBS17WPEC

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	1.31	380	ZL420V271MCXS5WPEC
		22×45	0.20	1.35	380	ZL420V271MCXS6WPEC
		25×30*	0.20	1.25	380	ZL420V271MCYS3WPEC
		25×35*	0.20	1.35	380	ZL420V271MCYS4WPEC
		30×25*	0.20	1.28	380	ZL420V271MCZS2WPEC
	330	22×45*	0.20	1.54	310	ZL420V331MCXS6WPEC
		25×35*	0.20	1.45	310	ZL420V331MCYS4WPEC
		30×30*	0.20	1.49	310	ZL420V331MCZS3WPEC
	390	25×40*	0.20	1.64	270	ZL420V391MCYS5WPEC
		30×30*	0.20	1.62	270	ZL420V391MCZS3WPEC
		30×35	0.20	1.70	270	ZL420V391MCZS4WPEC
		35×25*	0.20	1.59	270	ZL420V391MCAS2WPEC
		35×30	0.20	1.67	270	ZL420V391MCAS3WPEC
	470	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
450	120	22×25*	0.20	0.77	850	ZL2W121MCXS2WPEC
		22×30*	0.20	0.92	680	ZL2W151MCXS3WPEC
		25×25	0.20	0.90	680	ZL2W151MCYS2WPEC
		22×30*	0.20	1.01	570	ZL2W181MCXS3WPEC
	150	22×35	0.20	1.05	570	ZL2W181MCXS4WPEC
		25×25*	0.20	0.99	570	ZL2W181MCYS2WPEC
		25×30	0.20	1.05	570	ZL2W181MCYS3WPEC
		22×35*	0.20	1.17	470	ZL2W221MCXS4WPEC
	180	25×30*	0.20	1.16	470	ZL2W221MCYS3WPEC
		25×35	0.20	1.21	470	ZL2W221MCYS4WPEC
		30×25	0.20	1.15	470	ZL2W221MCZS2WPEC
		22×40*	0.20	1.31	380	ZL2W271MCXS5WPEC
	220	22×45	0.20	1.35	380	ZL2W271MCXS6WPEC
		25×30*	0.20	1.40	380	ZL2W271MCYS5WPEC
		30×25*	0.20	1.28	380	ZL2W271MCZS2WPEC
		30×30	0.20	1.35	380	ZL2W271MCZS3WPEC
		35×25	0.20	1.32	380	ZL2W271MCAS2WPEC
	270	22×50*	0.20	1.59	310	ZL2W331MCXS7WPEC
		25×40*	0.20	1.55	310	ZL2W331MCYS5WPEC
		25×45	0.20	1.61	310	ZL2W331MCYS6WPEC
		30×30*	0.20	1.49	310	ZL2W331MCZS3WPEC
	330	35×25*	0.20	1.46	310	ZL2W331MCAS2WPEC
		25×45*	0.20	1.74	270	ZL2W391MCYS6WPEC
		25×50*	0.20	1.80	270	ZL2W391MCYS7WPEC
		30×35*	0.20	1.70	270	ZL2W391MCZS4WPEC
	390	35×30	0.20	1.67	270	ZL2W391MCAS3WPEC
		25×50*	0.20	1.92	220	ZL2W471MCYS7WPEC
		30×40*	0.20	1.94	220	ZL2W471MCZS5WPEC
		35×30*	0.20	1.84	220	ZL2W471MCAS3WPEC
	470	35×35	0.20	1.92	220	ZL2W471MCAS4WPEC
		35×35*	0.20	2.27	190	ZL2W561MCYS9WPEC
		30×45*	0.20	2.19	190	ZL2W561MCZS6WPEC
		30×50	0.20	2.25	190	ZL2W561MCZS7WPEC
480	120	35×35*	0.20	2.09	190	ZL2W561MCAS4WPEC
		35×40	0.20	2.18	190	ZL2W561MCAS5WPEC
		30×50*	0.20	2.48	150	ZL2W681MCZS7WPEC
		35×40*	0.20	2.40	150	ZL2W681MCAS5WPEC
	150	35×45	0.20	2.48	150	ZL2W681MCAS6WPEC
		30×60*	0.20	2.87	130	ZL2W821MCZS9WPEC
		35×45*	0.20	2.64	130	ZL2W821MCAS6WPEC
		35×50*	0.20	2.80	130	ZL2W821MCAS7WPEC
	180	35×55*	0.20	3.18	110	ZL2W102MCAS8WPEC
		35×60	0.20	3.25	110	ZL2W102MCAS9WPEC
		40×56	0.20	3.30	110	ZL2W102MSBS8WPEC
		35×100	0.20	3.51	90	ZL2W122MSAS17WPEC
	1,200	40×76	0.20	3.57	90	ZL2W122MSBS12WPEC
		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 (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
475	82	22 $\times$ 25	0.20	0.64	1,170	ZL475V820MCXS2WPEC
	100	22 $\times$ 25*	0.20	0.69	960	ZL475V101MCXS2WPEC
		22 $\times$ 30	0.20	0.75	960	ZL475V101MCXS3WPEC
		25 $\times$ 25	0.20	0.74	960	ZL475V101MCYS2WPEC
	120	22 $\times$ 30*	0.20	0.82	800	ZL475V121MCXS3WPEC
		22 $\times$ 35	0.20	0.86	800	ZL475V121MCXS4WPEC
		25 $\times$ 25	0.20	0.81	800	ZL475V121MCYS2WPEC
	150	22 $\times$ 35*	0.20	0.96	640	ZL475V151MCXS4WPEC
		25 $\times$ 30	0.20	0.96	640	ZL475V151MCYS3WPEC
		30 $\times$ 25	0.20	0.95	640	ZL475V151MCZS2WPEC
	180	22 $\times$ 40*	0.20	1.07	540	ZL475V181MCXS5WPEC
		22 $\times$ 45	0.20	1.14	540	ZL475V181MCXS6WPEC
		25 $\times$ 30*	0.20	1.02	540	ZL475V181MCXS3WPEC
		25 $\times$ 35	0.20	1.10	540	ZL475V181MCYS4WPEC
		30 $\times$ 25	0.20	1.04	540	ZL475V181MCZS2WPEC
		30 $\times$ 30	0.20	1.10	540	ZL475V181MCZS3WPEC
		35 $\times$ 25	0.20	1.01	540	ZL475V181MCAS2WPEC
	220	22 $\times$ 45*	0.20	1.22	440	ZL475V221MCXS6WPEC
		22 $\times$ 50	0.20	1.30	440	ZL475V221MCXS7WPEC
		25 $\times$ 35*	0.20	1.18	440	ZL475V221MCYS4WPEC
		25 $\times$ 40	0.20	1.27	440	ZL475V221MCYS5WPEC
		30 $\times$ 30	0.20	1.22	440	ZL475V221MCZS3WPEC
	270	35 $\times$ 25	0.20	1.12	440	ZL475V221MCAS2WPEC
		25 $\times$ 40*	0.20	1.36	360	ZL475V271MCYS5WPEC
		25 $\times$ 45	0.20	1.45	360	ZL475V271MCYS6WPEC
		30 $\times$ 30*	0.20	1.31	360	ZL475V271MCZS3WPEC
		30 $\times$ 35	0.20	1.41	360	ZL475V271MCZS4WPEC
		35 $\times$ 25*	0.20	1.28	360	ZL475V271MCAS2WPEC
		35 $\times$ 30	0.20	1.31	360	ZL475V271MCAS3WPEC
	330	25 $\times$ 50*	0.20	1.61	290	ZL475V331MCYS7WPEC
		25 $\times$ 55	0.20	1.71	290	ZL475V331MCYS8WPEC
		30 $\times$ 35*	0.20	1.51	290	ZL475V331MCZS4WPEC
		30 $\times$ 40	0.20	1.62	290	ZL475V331MCZS5WPEC
		35 $\times$ 30*	0.20	1.49	290	ZL475V331MCAS3WPEC
	390	35 $\times$ 35	0.20	1.51	290	ZL475V331MCAS4WPEC
		25 $\times$ 55*	0.20	1.80	250	ZL475V391MCYS8WPEC
		30 $\times$ 40*	0.20	1.71	250	ZL475V391MCZS5WPEC
		30 $\times$ 45	0.20	1.82	250	ZL475V391MCZS6WPEC
	470	35 $\times$ 35	0.20	1.64	250	ZL475V391MCAS4WPEC
		30 $\times$ 45*	0.20	1.94	210	ZL475V471MCZS6WPEC
		30 $\times$ 50	0.20	2.06	210	ZL475V471MCZS7WPEC
		35 $\times$ 35*	0.20	1.86	210	ZL475V471MCAS4WPEC
	560	35 $\times$ 40	0.20	1.87	210	ZL475V471MCAS5WPEC
		30 $\times$ 55*	0.20	2.25	180	ZL475V561MCZS8WPEC
		30 $\times$ 60	0.20	2.37	180	ZL475V561MCZS9WPEC
		35 $\times$ 40*	0.20	2.11	180	ZL475V561MCAS5WPEC
	680	35 $\times$ 45	0.20	2.11	180	ZL475V561MCAS6WPEC
		35 $\times$ 50*	0.20	2.48	150	ZL475V681MCAS7WPEC
	820	35 $\times$ 55	0.20	2.45	150	ZL475V681MCAS8WPEC
		35 $\times$ 55*	0.20	2.80	120	ZL475V821MCAS8WPEC

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
500	82	22 $\times$ 25*	0.20	0.50	1,170	ZL2H820MCXS2WPEC
		22 $\times$ 30	0.20	0.53	1,170	ZL2H820MCXS3WPEC
	100	22 $\times$ 30*	0.20	0.59	960	ZL2H101MCXS3WPEC
		25 $\times$ 25	0.20	0.61	960	ZL2H101MCYS2WPEC
	120	22 $\times$ 35	0.20	0.69	800	ZL2H121MCXS4WPEC
		25 $\times$ 30	0.20	0.71	800	ZL2H121MCYS3WPEC
	150	22 $\times$ 40*	0.20	0.82	640	ZL2H151MCXS5WPEC
		22 $\times$ 45	0.20	0.85	640	ZL2H151MCXS6WPEC
		25 $\times$ 35	0.20	0.84	640	ZL2H151MCYS4WPEC
		30 $\times$ 25	0.20	0.85	640	ZL2H151MCZS2WPEC
	180	22 $\times$ 45*	0.20	0.94	540	ZL2H181MCXS6WPEC
		22 $\times$ 50	0.20	0.97	540	ZL2H181MCXS7WPEC
		25 $\times$ 35*	0.20	0.94	540	ZL2H181MCYS4WPEC
		25 $\times$ 40	0.20	0.98	540	ZL2H181MCYS5WPEC
		30 $\times$ 30	0.20	0.99	540	ZL2H181MCZS3WPEC
		35 $\times$ 25	0.20	1.04	540	ZL2H181MCAS2WPEC
	220	25 $\times$ 45	0.20	1.13	440	ZL2H221MCYS6WPEC
		30 $\times$ 30*	0.20	1.11	440	ZL2H221MCZS3WPEC
		30 $\times$ 35	0.20	1.17	440	ZL2H221MCZS4WPEC
		35 $\times$ 25*	0.20	1.16	440	ZL2H221MCAS2WPEC
		35 $\times$ 30	0.20	1.22	440	ZL2H221MCAS3WPEC
	270	25 $\times$ 50*	0.20	1.31	360	ZL2H271MCYS7WPEC
		30 $\times$ 35*	0.20	1.31	360	ZL2H271MCZS4WPEC
		30 $\times$ 40	0.20	1.36	360	ZL2H271MCZS5WPEC
		35 $\times$ 30*	0.20	1.37	360	ZL2H271MCAS3WPEC
	330	30 $\times$ 45	0.20	1.58	290	ZL2H331MCZS6WPEC
		35 $\times$ 35	0.20	1.61	290	ZL2H331MCAS4WPEC
	390	30 $\times$ 50*	0.20	1.79	250	ZL2H391MCZS7WPEC
		30 $\times$ 55	0.20	1.84	250	ZL2H391MCZS8WPEC
	470	35 $\times$ 40	0.20	1.84	250	ZL2H391MCAS5WPEC
		30 $\times$ 60*	0.20	2.10	210	ZL2H471MCZS9WPEC
		35 $\times$ 45*	0.20	2.12	210	ZL2H471MCAS6WPEC
560	35 $\times$ 50	0.20	2.18	210	ZL2H471MCAS7WPEC	
	35 $\times$ 50*	0.20	2.40	180	ZL2H561MCAS7WPEC	
680	35 $\times$ 55	0.20	2.47	180	ZL2H561MCAS8WPEC	
	35 $\times$ 60*	0.20	2.83	150	ZL2H681MCAS9WPEC	
550	82	30 $\times$ 25	0.25	0.59	2,920	ZL2L820MCZS2WPEC
	120	30 $\times$ 30	0.25	0.77	1,990	ZL2L121MCZS3WPEC
		35 $\times$ 25	0.25	0.80	1,990	ZL2L121MCAS2WPEC
	150	30 $\times$ 35	0.25	0.91	1,600	ZL2L151MCZS4WPEC
		35 $\times$ 30	0.25	0.96	1,600	ZL2L151MCAS3WPEC
	180	30 $\times$ 40	0.25	1.05	1,330	ZL2L181MCZS5WPEC
		35 $\times$ 35	0.25	1.11	1,330	ZL2L181MCAS4WPEC
	220	30 $\times$ 50	0.25	1.26	1,090	ZL2L221MCZS7WPEC
		35 $\times$ 40	0.25	1.29	1,090	ZL2L221MCAS5WPEC
	270	35 $\times$ 45	0.25	1.50	890	ZL2L271MCAS6WPEC
	330	35 $\times$ 50	0.25	1.73	730	ZL2L331MCAS7WPEC
	390	35 $\times$ 60	0.25	2.00	620	ZL2L391MCAS9WPEC

SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

UPGRADE!

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

- Conform RoHS

Features

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

HL

→
Long-life

YL
P.104

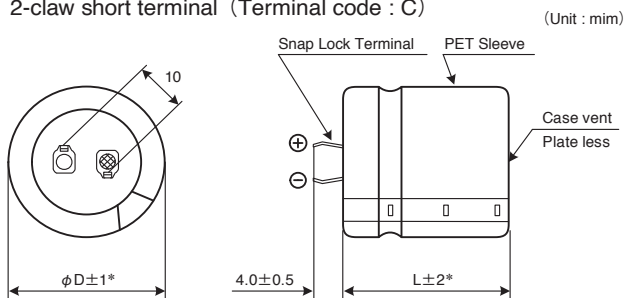


Product Specifications

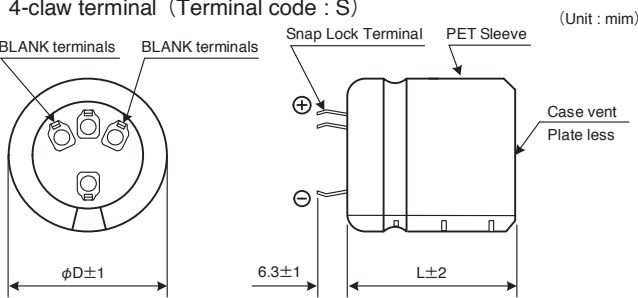
Items	Specifications
Temperature range	−40°C ~ +105°C (200, 250V.DC) −25°C ~ +105°C (315 ~ 500V.DC)
Rated voltage	200 ~ 550V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (μA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) [C = nominal capacitance (μF), V = rated voltage (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

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)
Please consult us when the ripple voltage exceeds 70Vp-p.

Product code

(Example) HL Series 400V 120μF ±20%									
HL	2G	121	M	C	X	S2	WP	EC	
Type of series									
									Environmental code
									Plate code
									Case height code
									Case dia code
									Terminal code
									Capacitance tolerance code
									Capacitance code
									Rated voltage code

Refer to page 82-83 for other terminal shape available on request.

HL Series

Rated Voltage (V: DC)	Capacitance (μF)	Case size φ D×L (mm)	tanδ 20℃, 120Hz	Ripple current (Arms) 105℃, 120Hz	ESR(typ.) (mΩ) 20℃, 100Hz	Product name
400	120	22×25	0.20	0.77	800	HL2G121MCXS2WPEC
	150	22×25*	0.20	0.87	640	HL2G151MCXS2WPEC
		22×30	0.20	0.92	640	HL2G151MCXS3WPEC
		25×25	0.20	0.90	640	HL2G151MCXS2WPEC
		25×30	0.20	0.90	640	HL2G151MCXS3WPEC
	180	22×30*	0.20	1.01	540	HL2G181MCXS3WPEC
		22×35	0.20	1.05	540	HL2G181MCXS4WPEC
		25×25*	0.20	0.99	540	HL2G181MCYS2WPEC
		25×30	0.20	1.05	540	HL2G181MCYS3WPEC
	220	22×35*	0.20	1.17	440	HL2G221MCXS4WPEC
		22×40	0.20	1.22	440	HL2G221MCXS5WPEC
		25×30	0.20	1.16	440	HL2G221MCYS3WPEC
		25×35	0.20	1.21	440	HL2G221MCYS4WPEC
	270	30×25	0.20	1.17	440	HL2G221MCZS2WPEC
		22×40*	0.20	1.35	360	HL2G271MCXS5WPEC
		22×45	0.20	1.40	360	HL2G271MCXS6WPEC
		25×35	0.20	1.35	360	HL2G271MCYS4WPEC
	330	25×40	0.20	1.40	360	HL2G271MCYS5WPEC
		30×25*	0.20	1.28	360	HL2G271MCZS2WPEC
		22×45*	0.20	1.54	290	HL2G331MCXS6WPEC
		22×50*	0.20	1.59	290	HL2G331MCXS7WPEC
	390	25×40	0.20	1.55	290	HL2G331MCYS5WPEC
		25×45	0.20	1.61	290	HL2G331MCYS6WPEC
		30×30	0.20	1.49	290	HL2G331MCZS3WPEC
		35×25	0.20	1.52	290	HL2G331MCAS2WPEC
	470	25×45*	0.20	1.74	250	HL2G391MCYS6WPEC
		25×50	0.20	1.80	250	HL2G391MCYS7WPEC
		30×30*	0.20	1.62	250	HL2G391MCZS3WPEC
		30×35	0.20	1.70	250	HL2G391MCZS4WPEC
	560	35×25*	0.20	1.59	250	HL2G391MCAS2WPEC
		35×30	0.20	1.68	250	HL2G391MCAS3WPEC
		25×50*	0.20	1.98	210	HL2G471MCYS7WPEC
		30×35*	0.20	1.86	210	HL2G471MCZS4WPEC
	680	30×40	0.20	1.94	210	HL2G471MCZS5WPEC
		35×30*	0.20	1.84	210	HL2G471MCAS3WPEC
		35×35	0.20	1.92	210	HL2G471MCAS4WPEC
		30×40*	0.20	2.11	180	HL2G561MCZS5WPEC
	820	30×45	0.20	2.19	180	HL2G561MCZS6WPEC
		35×35	0.20	2.09	180	HL2G561MCAS4WPEC
		35×40	0.20	2.18	180	HL2G561MCAS5WPEC
		30×50*	0.20	2.48	150	HL2G681MCZS7WPEC
	1,000	35×40*	0.20	2.40	150	HL2G681MCAS5WPEC
35×45		0.20	2.48	150	HL2G681MCAS6WPEC	
35×45*		0.20	2.72	120	HL2G821MCAS6WPEC	
35×50		0.20	2.80	120	HL2G821MCAS7WPEC	

SNAP MOUNT TYPE ALUMINUM ELECTROLYTIC CAPACITORS

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D × 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
		30 × 30	0.20	1.35	380	HL420V271MCZS3WPEC
		35 × 25	0.20	1.38	380	HL420V271MCAS2WPEC
		22 × 50*	0.20	1.59	310	HL420V331MCXS7WPEC
	330	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
		35 × 25*	0.20	1.46	310	HL420V331MCAS2WPEC
	390	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
		35 × 30	0.20	1.67	270	HL420V391MCAS3WPEC
	470	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
		35 × 35	0.20	1.92	220	HL420V471MCAS4WPEC
	560	30 × 45*	0.20	2.19	190	HL420V561MCZS6WPEC
		30 × 50	0.20	2.25	190	HL420V561MCZS7WPEC
		35 × 35*	0.20	2.09	190	HL420V561MCAS4WPEC
		35 × 40	0.20	2.18	190	HL420V561MCAS5WPEC
	680	30 × 50*	0.20	2.48	150	HL420V681MCZS7WPEC
		35 × 40*	0.20	2.40	150	HL420V681MCAS5WPEC
		35 × 45	0.20	2.48	150	HL420V681MCAS6WPEC
	820	35 × 45*	0.20	2.72	130	HL420V821MCAS6WPEC

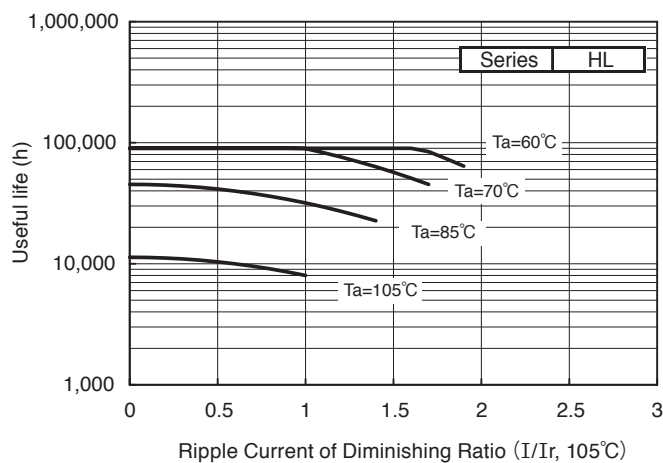
Rated Voltage (V. DC)	Capacitance (μ F)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
450	82	22 × 25	0.20	0.64	1,250	HL2W820MCXS2WPEC
	100	22 × 25*	0.20	0.71	1,020	HL2W101MCXS2WPEC
	120	22 × 30	0.20	0.82	850	HL2W121MCXS3WPEC
		25 × 25	0.20	0.81	850	HL2W121MCYS2WPEC
	150	22 × 30*	0.20	0.92	680	HL2W151MCXS3WPEC
		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
		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
	270	22 × 50*	0.20	1.44	380	HL2W271MCXS7WPEC
		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
	330	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
	390	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
	470	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
		35 × 40	0.20	1.99	220	HL2W471MCAS5WPEC
	560	30 × 50*	0.20	2.25	190	HL2W561MCZS7WPEC
		35 × 40*	0.20	2.18	190	HL2W561MCAS5WPEC
	680	35 × 45	0.20	2.25	190	HL2W561MCAS6WPEC
		35 × 45*	0.20	2.48	150	HL2W681MCAS6WPEC
		35 × 50	0.20	2.55	150	HL2W681MCAS7WPEC

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
500	56	22 $\times$ 25	0.20	0.40	1,710	HL2H560MCXS2WPEC
	68	22 $\times$ 25*	0.20	0.45	1,410	HL2H680MCXS2WPEC
	82	22 $\times$ 30	0.20	0.53	1,170	HL2H820MCXS3WPEC
		25 $\times$ 25	0.20	0.54	1,170	HL2H820MCYS2WPEC
	100	22 $\times$ 35	0.20	0.62	960	HL2H101MCXS4WPEC
		25 $\times$ 30	0.20	0.64	960	HL2H101MCYS3WPEC
	120	22 $\times$ 40	0.20	0.72	800	HL2H121MCXS5WPEC
		25 $\times$ 30*	0.20	0.71	800	HL2H121MCYS3WPEC
		25 $\times$ 35	0.20	0.74	800	HL2H121MCYS4WPEC
		30 $\times$ 25	0.20	0.75	800	HL2H121MCZS2WPEC
	150	22 $\times$ 45*	0.20	0.85	640	HL2H151MCXS6WPEC
		22 $\times$ 50	0.20	0.88	640	HL2H151MCXS7WPEC
		25 $\times$ 35*	0.20	0.84	640	HL2H151MCYS4WPEC
		25 $\times$ 40	0.20	0.88	640	HL2H151MCYS5WPEC
		30 $\times$ 30	0.20	0.90	640	HL2H151MCZS3WPEC
	180	35 $\times$ 25	0.20	0.94	640	HL2H151MCAS2WPEC
		22 $\times$ 50*	0.20	0.97	540	HL2H181MCXS7WPEC
		25 $\times$ 40*	0.20	0.98	540	HL2H181MCYS5WPEC
		25 $\times$ 45	0.20	1.01	540	HL2H181MCYS6WPEC
		30 $\times$ 30*	0.20	0.99	540	HL2H181MCZS3WPEC
	220	30 $\times$ 35	0.20	1.04	540	HL2H181MCZS4WPEC
		35 $\times$ 25*	0.20	1.04	540	HL2H181MCAS2WPEC
		25 $\times$ 50	0.20	1.17	440	HL2H221MCYS7WPEC
		30 $\times$ 35*	0.20	1.17	440	HL2H221MCZS4WPEC
	270	30 $\times$ 40	0.20	1.21	440	HL2H221MCZS5WPEC
		35 $\times$ 30	0.20	1.22	440	HL2H221MCAS3WPEC
		30 $\times$ 40*	0.20	1.36	360	HL2H271MCZS5WPEC
		30 $\times$ 45	0.20	1.41	360	HL2H271MCZS6WPEC
	330	35 $\times$ 35	0.20	1.44	360	HL2H271MCAS4WPEC
		30 $\times$ 50	0.20	1.63	290	HL2H331MCZS7WPEC
		35 $\times$ 40	0.20	1.67	290	HL2H331MCAS5WPEC
	390	30 $\times$ 55*	0.20	1.84	250	HL2H391MCZS8WPEC
		30 $\times$ 60	0.20	1.89	250	HL2H391MCZS9WPEC
		35 $\times$ 45	0.20	1.90	250	HL2H391MCAS6WPEC
	470	35 $\times$ 50*	0.20	2.18	210	HL2H471MCAS7WPEC
		35 $\times$ 55	0.20	2.23	210	HL2H471MCAS8WPEC
	560	35 $\times$ 60*	0.20	2.53	180	HL2H561MCAS9WPEC

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.



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

- Conform RoHS

Features

- The YL series is the miniaturization products of 10,000 hours.

YL

→
Long-life

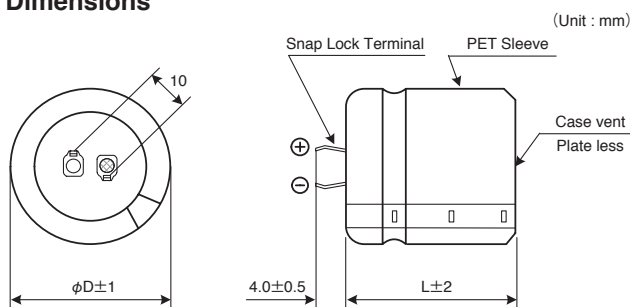
XL1
P.106



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

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)
Please consult us when the ripple voltage exceeds 70Vp-p.

Product code

(Example) YL Series 400V 82μF ±20%

YL	2G	820	M	C	X	S2	WP	EC
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 82-83 for other terminal shape available on request.

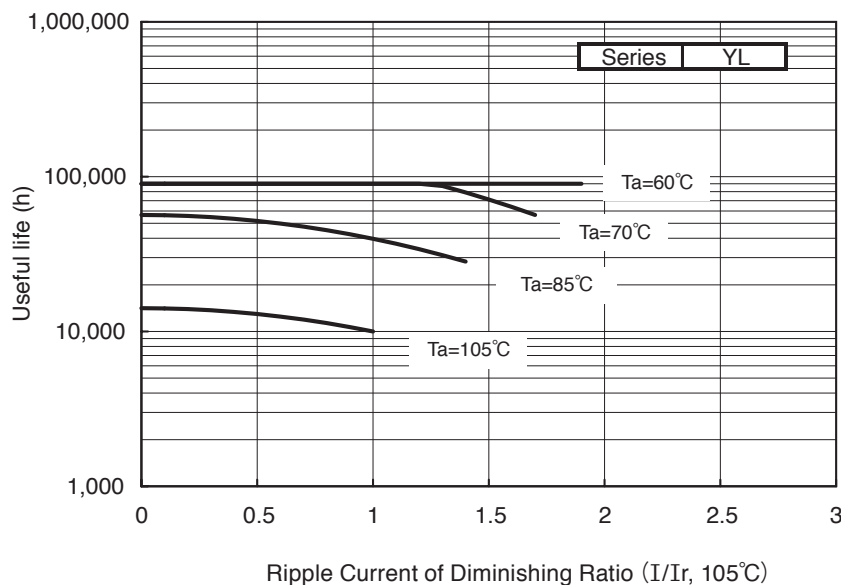
Standard Products Table

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

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
450	82	22 $\times$ 30	0.20	0.63	1,250	YL2W820MCXS3WPEC
	100	25 $\times$ 25	0.20	0.68	1,020	YL2W101MCYS2WPEC
	120	22 $\times$ 35	0.20	0.79	850	YL2W121MCXS4WPEC
		25 $\times$ 30	0.20	0.79	850	YL2W121MCYS3WPEC
	150	22 $\times$ 45	0.20	0.96	680	YL2W151MCXS6WPEC
		25 $\times$ 35	0.20	0.93	680	YL2W151MCYS4WPEC
		30 $\times$ 25	0.20	0.88	680	YL2W151MCZS2WPEC
	180	22 $\times$ 50	0.20	1.09	570	YL2W181MCXS7WPEC
		25 $\times$ 40	0.20	1.06	570	YL2W181MCYS5WPEC
		30 $\times$ 30	0.20	1.02	570	YL2W181MCZS3WPEC
		35 $\times$ 25	0.20	1.00	570	YL2W181MCAS2WPEC
	220	25 $\times$ 45	0.20	1.21	470	YL2W221MCYS6WPEC
		30 $\times$ 35	0.20	1.18	470	YL2W221MCZS4WPEC
		35 $\times$ 30	0.20	1.16	470	YL2W221MCAS3WPEC
	270	30 $\times$ 40	0.20	1.35	380	YL2W271MCZS5WPEC
		35 $\times$ 35	0.20	1.34	380	YL2W271MCAS4WPEC
	330	30 $\times$ 45	0.20	1.55	310	YL2W331MCZS6WPEC
	390	30 $\times$ 50	0.20	1.74	270	YL2W391MCZS7WPEC
	470	35 $\times$ 40	0.20	1.67	270	YL2W391MCAS5WPEC
		35 $\times$ 50	0.20	1.96	220	YL2W471MCAS7WPEC
500	100	25 $\times$ 35	0.20	0.67	960	YL2H101MCYS4WPEC
		30 $\times$ 25	0.20	0.64	960	YL2H101MCZS2WPEC
	120	25 $\times$ 40	0.20	0.77	800	YL2H121MCYS5WPEC
		30 $\times$ 30	0.20	0.74	800	YL2H121MCZS3WPEC
		35 $\times$ 25	0.20	0.72	800	YL2H121MCAS2WPEC
	150	25 $\times$ 50	0.20	0.92	640	YL2H151MCYS7WPEC
		30 $\times$ 35	0.20	0.86	640	YL2H151MCZS4WPEC
		35 $\times$ 30	0.20	0.85	640	YL2H151MCAS3WPEC
		30 $\times$ 40	0.20	0.98	540	YL2H181MCZS5WPEC
	180	35 $\times$ 35	0.20	0.97	540	YL2H181MCAS4WPEC
		30 $\times$ 45	0.20	1.13	440	YL2H221MCZS6WPEC
	220	35 $\times$ 40	0.20	1.12	440	YL2H221MCAS5WPEC
		35 $\times$ 45	0.20	1.28	360	YL2H271MCAS6WPEC
	330	35 $\times$ 50	0.20	1.46	290	YL2H331MCAS7WPEC

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.

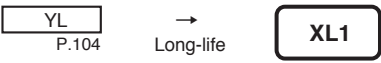


XL1 Series Useful of 15,000 hours at 105°C

• Conform RoHS

Features

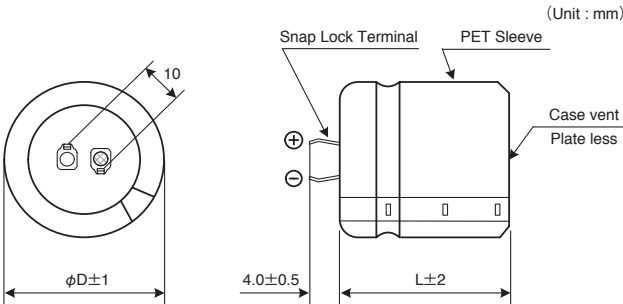
• Useful of 15,000 hours at 105°C through improvement of electrolyte liquid and etched foil technology.



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

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)
Please consult us when the ripple voltage exceeds 70Vp-p.

Product code

(Example) XL1 series 450V 100µF±20%

XL1 2W 101 M C X S5 WP EC

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 82-83 for other terminal shape available on request.

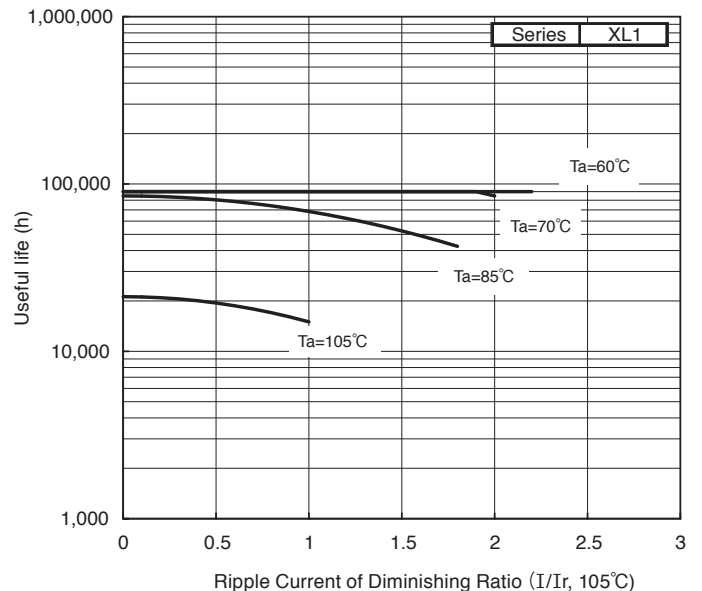
Standard Products Table

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
	330	22×30	0.15	1.03	265	XL12D331MCXS3WPEC
		25×25	0.15	0.97	265	XL12D331MCYS2WPEC
	390	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
	220	22×30	0.15	0.84	398	XL12E221MCXS3WPEC
		25×25	0.15	0.79	398	XL12E221MCYS2WPEC
	270	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
	100	22×30	0.25	0.57	924	XL12G101MCXS3WPEC
		25×25	0.25	0.53	924	XL12G101MCYS2WPEC
	120	22×35	0.25	0.66	770	XL12G121MCXS4WPEC
		25×30	0.25	0.63	770	XL12G121MCYS3WPEC
	150	22×40	0.25	0.78	615	XL12G151MCXS5WPEC
		30×25	0.25	0.70	615	XL12G151MCZS2WPEC
	180	22×45	0.25	0.90	520	XL12G181MCXS6WPEC
		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	XL12G271MCYS7WPEC
		30×35	0.25	1.07	354	XL12G271MCZS4WPEC
	330	35×30	0.25	1.05	354	XL12G271MCAS3WPEC
		30×40	0.25	1.25	290	XL12G331MCZS5WPEC
	390	35×35	0.25	1.24	290	XL12G331MCAS4WPEC
		30×50	0.25	1.50	245	XL12G391MCZS7WPEC
	470	35×40	0.25	1.42	245	XL12G391MCAS5WPEC
		35×45	0.25	1.63	203	XL12G471MCAS6WPEC
	560	35×50	0.25	1.86	171	XL12G561MCAS7WPEC
450	56	22×25	0.25	0.39	1,678	XL12W560MCXS2WPEC
	68	22×30	0.25	0.47	1,382	XL12W680MCXS3WPEC
		25×25	0.25	0.44	1,382	XL12W680MCYS2WPEC
	82	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
		35×30	0.25	0.86	522	XL12W181MCAS3WPEC
	220	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
	390	35×50	0.25	1.56	246	XL12W391MCAS7WPEC

Life time graph

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



UW Series

Useful of 2,000 hours at 105°C

- Conform RoHS

Features

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

HU
P.92

→
Small-size

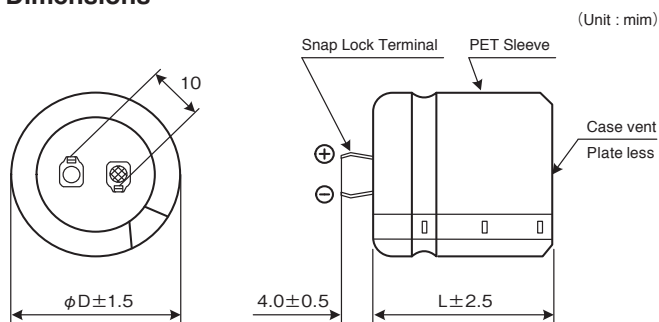
UW



Product Specifications

Items	Specifications
Temperature range	−10°C ~ +105°C
Rated voltage	450V.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 1,500 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	2.7	2.4	2.1	1.0	
Frequency (Hz)	50/60	120	300	1K	
Correction coefficient	0.70	1.00	1.10	1.15	
					1.40

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)

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

Product code

(Example) UW Series 450V 790µF±20%

UW	2W	791	M	C	Z	S7	WP	EC
Type of series	Case height code	Capacitance tolerance code	Capacitance code	Rated voltage code	Terminal code	Case dia code	Case height code	Plate code

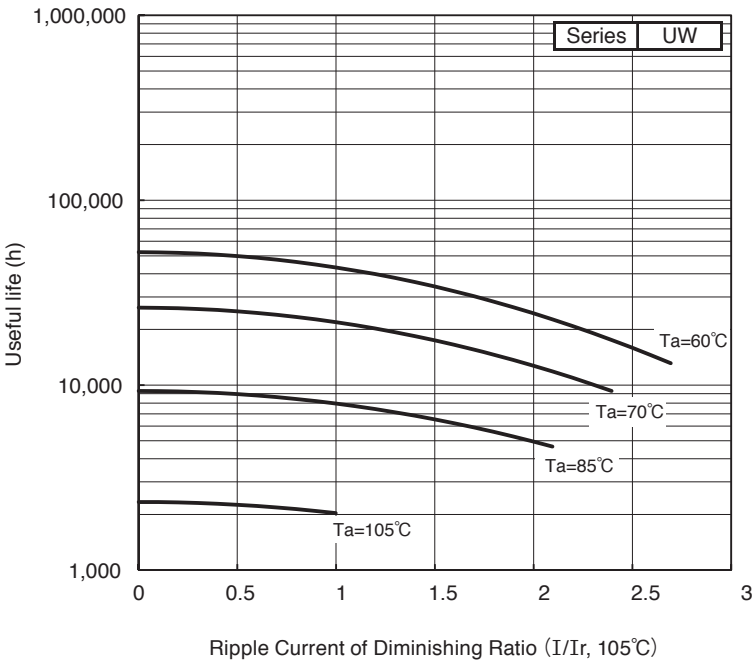
Refer to page 82-83 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	Case size ϕ D $\times$ L (mm)	$\tan\delta$ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (m Ω) 20°C, 100Hz	Product name
450	210	25 $\times$ 25	0.35	0.57	1,630	UW2W211MCYS2WPEC
	280	25 $\times$ 30	0.35	0.70	1,220	UW2W281MCYS3WPEC
	320	30 $\times$ 25	0.35	0.71	1,070	UW2W321MCZS2WPEC
	340	25 $\times$ 35	0.35	0.79	1,010	UW2W341MCYS4WPEC
	410	25 $\times$ 40	0.35	0.96	840	UW2W411MCYS5WPEC
		30 $\times$ 30	0.35	0.86	840	UW2W411MCZS3WPEC
	470	25 $\times$ 45	0.35	1.08	730	UW2W471MCYS6WPEC
	510	30 $\times$ 35	0.35	0.99	670	UW2W511MCZS4WPEC
	530	25 $\times$ 50	0.35	1.19	650	UW2W531MCYS7WPEC
	590	25 $\times$ 55	0.35	1.31	580	UW2W591MCYS8WPEC
	600	30 $\times$ 40	0.35	1.09	570	UW2W601MCZS5WPEC
	650	25 $\times$ 60	0.35	1.43	530	UW2W651MCYS9WPEC
	700	30 $\times$ 45	0.35	1.18	490	UW2W701MCZS6WPEC
	790	30 $\times$ 50	0.35	1.26	430	UW2W791MCZS7WPEC
	880	30 $\times$ 55	0.35	1.32	390	UW2W881MCZS8WPEC
	980	30 $\times$ 60	0.35	1.38	350	UW2W981MCZS9WPEC
	1,050	30 $\times$ 65	0.35	1.41	330	UW2W1050UFMCZS10WPEC
	1,150	30 $\times$ 70	0.35	1.46	300	UW2W1150UFMCZS11WPEC

Life time graph

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



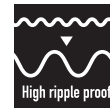
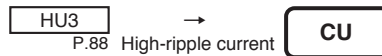
CU Series

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.



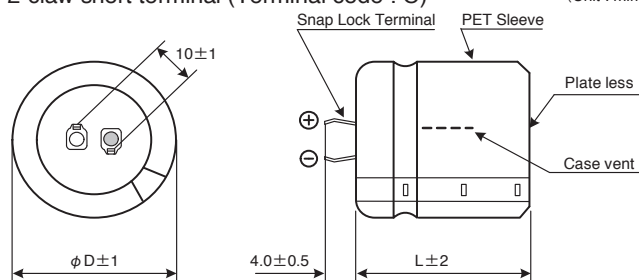
Product Specifications

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 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
Notes to users	The vent position is not fixed. Please do not set up an obstacle to circumference less than 1mm.

Dimensions

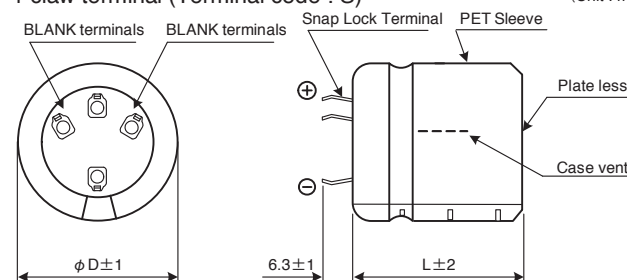
2-claw short terminal (Terminal code : C)

(Unit : mm)



4-claw terminal (Terminal code : S)

(Unit : mm)



Ripple current correction coefficient

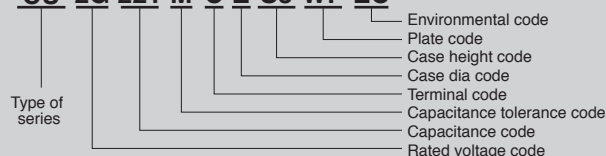
Temperature (°C)	60	70	85	105
Correction coefficient	1.9	1.7	1.4	1.0
Frequency (Hz)	120	300	1K	≥10K
Correction coefficient	1.0	1.1	1.3	1.4
Forced wind (m / s)	<0.5	0.5≤		
Correction coefficient	1.0	1.1		

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)
Please consult us when the ripple voltage exceeds 70Vp-p.

Product code

(Example) CU Series 400V 220μF ±20%

CU 2G 221 M C Z S3 WP EC



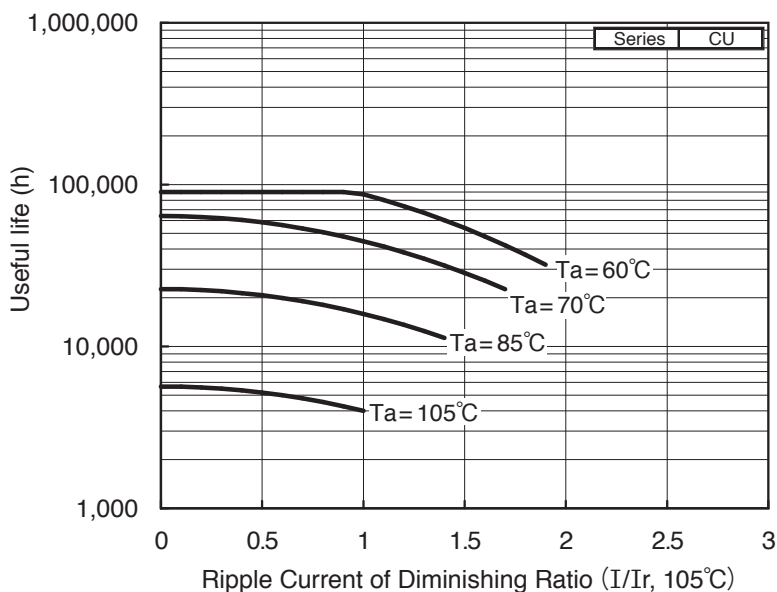
Refer to page 82-83 for other terminal shape available on request.

Standard Products Table

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

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



NEW!

ZR2 Series Useful of 5,000 hours at 105°C

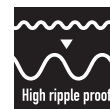
- Conform RoHS

Features

- ZR2 series has higher ripple current (ave 15%) compared with ZR series. These features are accomplished by new special anode foil and high reliability electrolyte.
- The vent is located in the side of the case.

ZR P.114 High-ripple current

ZR2



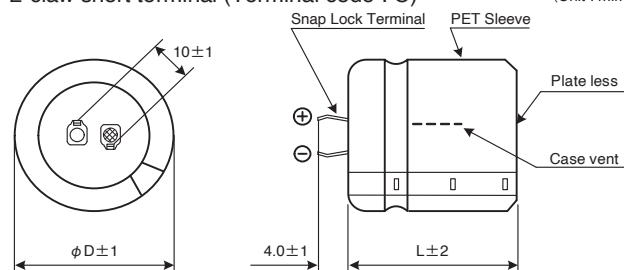
Product Specifications

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
Others	JIS C 5101-4

Dimensions

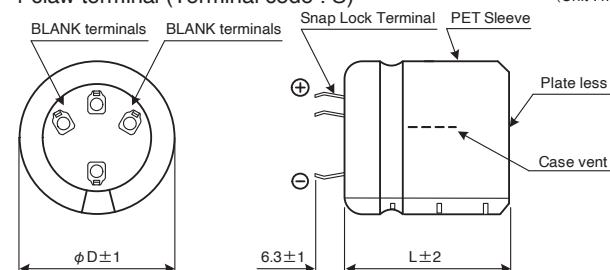
2-claw short terminal (Terminal code : C)

(Unit : mm)



4-claw terminal (Terminal code : S)

(Unit : mm)



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	1.3	1.5	1.6

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)

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

Product code

(Example) ZR2 Series 400V 680μF±20%

ZR2 2G 681 M C A S7 WP EC

Type of series	Environmental code	Plate code	Case height code	Case dia code	Terminal code	Capacitance tolerance code	Capacitance code	Rated voltage code
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Refer to page 82-83 for other terminal shape available on request.

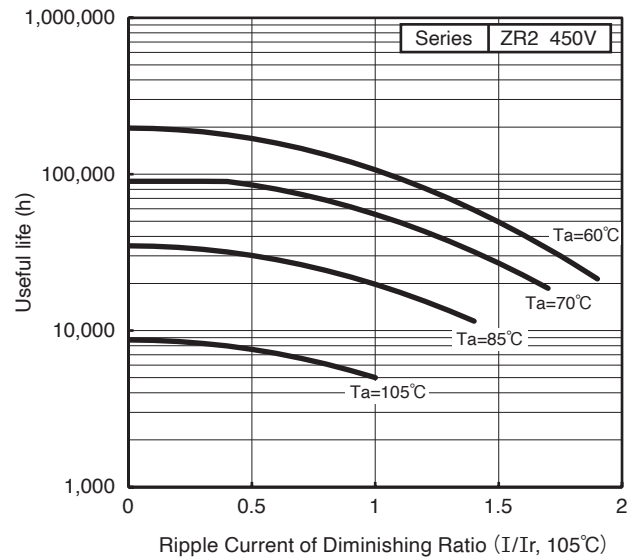
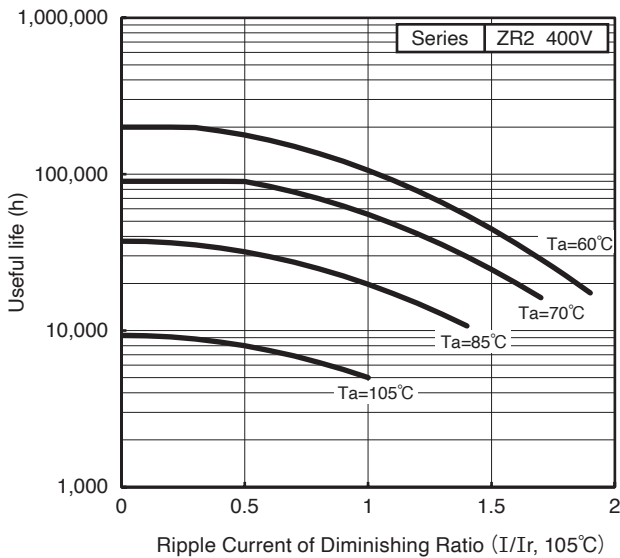
Standard Products Table

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	220	30×30	0.20	2.14	405	ZR22G221MCZS3WPEC
	270	30×35	0.20	2.46	330	ZR22G271MCZS4WPEC
	330	30×40	0.20	2.81	270	ZR22G331MCZS5WPEC
		35×31	0.20	2.79	270	ZR22G331MCAS3WPEC
	390	30×45	0.20	3.14	225	ZR22G391MCZS6WPEC
		35×36	0.20	3.16	225	ZR22G391MCAS4WPEC
	470	30×50	0.20	3.52	195	ZR22G471MCZS7WPEC
		35×41	0.20	3.57	195	ZR22G471MCAS5WPEC
		40×30	0.20	3.36	195	ZR22G471MSBS3WPEC
	560	30×55	0.20	3.91	165	ZR22G561MCZS8WPEC
		35×46	0.20	3.99	165	ZR22G561MCAS6WPEC
		40×40	0.20	3.89	165	ZR22G561MSBS5WPEC
	680	30×75	0.20	4.49	135	ZR22G681MCZS12WPEC
		35×51	0.20	4.49	135	ZR22G681MCAS7WPEC
		40×45	0.20	4.38	135	ZR22G681MSBS6WPEC
	820	30×80	0.20	4.94	110	ZR22G821MCZS13WPEC
		35×61	0.20	5.07	110	ZR22G821MCAS9WPEC
		40×50	0.20	4.89	110	ZR22G821MSBS7WPEC
	1,000	30×100	0.20	5.44	90	ZR22G102MCZS17WPEC
		35×75	0.20	5.69	90	ZR22G102MCAS12WPEC
		40×61	0.20	5.56	90	ZR22G102MSBS9WPEC
	1,200	35×81	0.20	6.30	75	ZR22G122MCAS13WPEC
	1,500	35×100	0.20	6.96	60	ZR22G152MCAS17WPEC

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	180	30×30	0.20	1.87	525	ZR22W181MCZS3WPEC
	220	30×35	0.20	2.15	435	ZR22W221MCZS4WPEC
	270	30×40	0.20	2.42	345	ZR22W271MCZS5WPEC
		35×31	0.20	2.38	345	ZR22W271MCAS3WPEC
	330	30×45	0.20	2.72	285	ZR22W331MCZS6WPEC
		35×36	0.20	2.74	285	ZR22W331MCAS4WPEC
		40×30	0.20	2.65	285	ZR22W331MSBS3WPEC
	390	30×50	0.20	3.02	255	ZR22W391MCZS7WPEC
		35×41	0.20	3.07	255	ZR22W391MCAS5WPEC
		40×40	0.20	3.36	210	ZR22W471MSBS5WPEC
	470	30×60	0.20	3.42	210	ZR22W471MCZS9WPEC
		35×46	0.20	3.45	210	ZR22W471MCAS6WPEC
		40×40	0.20	3.36	210	ZR22W471MSBS5WPEC
	560	30×75	0.20	3.84	180	ZR22W561MCZS12WPEC
		35×51	0.20	3.84	180	ZR22W561MCAS7WPEC
		40×45	0.20	3.74	180	ZR22W561MSBS6WPEC
	680	30×80	0.20	4.25	150	ZR22W681MCZS13WPEC
		35×61	0.20	4.36	150	ZR22W681MCAS9WPEC
		40×50	0.20	4.64	125	ZR22W821MCZS17WPEC
	820	35×75	0.20	4.87	125	ZR22W821MCAS12WPEC
		40×61	0.20	4.75	125	ZR22W821MSBS9WPEC
	1,000	35×100	0.20	5.36	100	ZR22W102MCAS17WPEC

Life time graph

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



ZR Series

Useful of 5,000 hours at 105°C

- Conform RoHS

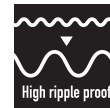
Features

- ZR series has higher ripple current (ave 30%) compared with ZLR series. These features are accomplished by new special anode foil and high reliability electrolyte.

ZLR

→ High-ripple current

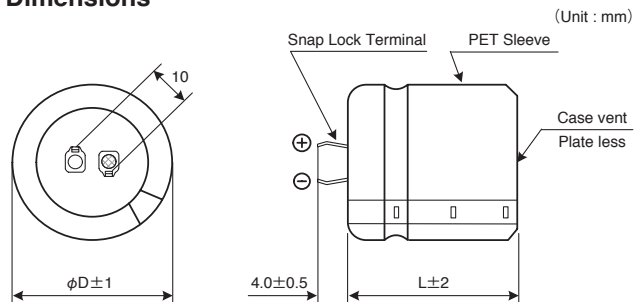
ZR



Product Specifications

Items	Specifications
Temperature range	−40°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
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)	120	300	1K	≥10K
Correction coefficient	1.0	1.3	1.5	1.6

Terminal permissible current is limited to 10Arms. (Even if calculated the permissible ripple current with the correction coefficient exceeds 10Arms)
Please consult us when the ripple voltage exceeds 70Vp-p.

Product code

(Example) ZR Series 400V 680μF±20%									
ZR	2G	681	M	C	A	S7	WP	EC	
Type of series									Environmental code
									Plate code
									Case height code
									Case dia code
									Terminal code
									Capacitance tolerance code
									Capacitance code
									Rated voltage code

Refer to page 82-83 for other terminal shape available on request.

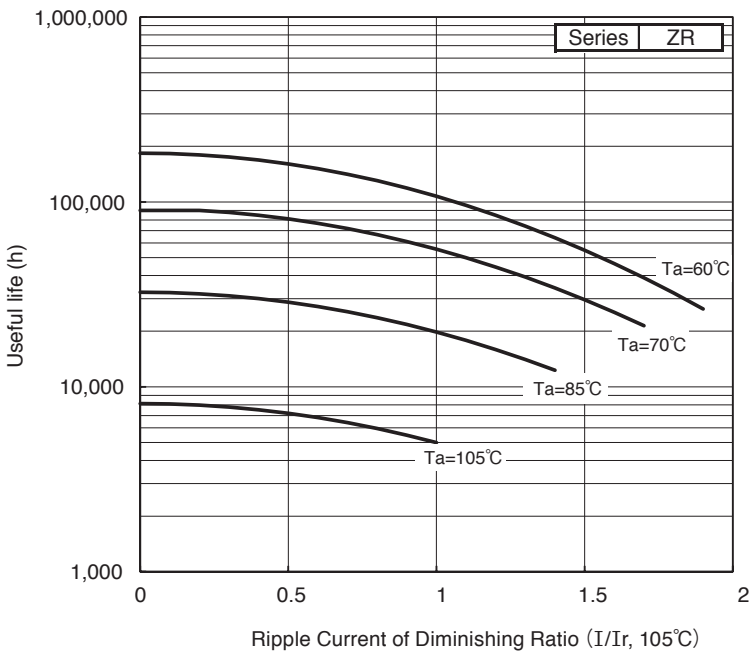
Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	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	180	30 × 25	0.20	1.50	330	ZR2G181MCZS2WPEC
	220	30 × 30	0.20	1.82	270	ZR2G221MCZS3WPEC
	270	30 × 35	0.20	2.11	220	ZR2G271MCZS4WPEC
		35 × 25	0.20	2.02	220	ZR2G271MCAS2WPEC
	330	30 × 40	0.20	2.43	180	ZR2G331MCZS5WPEC
		35 × 30	0.20	2.35	180	ZR2G331MCAS3WPEC
	390	30 × 45	0.20	2.73	150	ZR2G391MCZS6WPEC
		35 × 35	0.20	2.67	150	ZR2G391MCAS4WPEC
	470	30 × 50	0.20	3.09	130	ZR2G471MCZS7WPEC
		35 × 40	0.20	3.04	130	ZR2G471MCAS5WPEC
	560	35 × 45	0.20	3.43	110	ZR2G561MCAS6WPEC
	680	35 × 50	0.20	3.90	90	ZR2G681MCAS7WPEC
Rated Voltage (V. DC)	Capacitance (μ F)	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	150	30 × 25	0.20	1.25	410	ZR2W151MCZS2WPEC
	180	30 × 30	0.20	1.50	350	ZR2W181MCZS3WPEC
	220	30 × 35	0.20	1.83	290	ZR2W221MCZS4WPEC
		35 × 25	0.20	1.83	290	ZR2W221MCAS2WPEC
	270	30 × 40	0.20	2.21	230	ZR2W271MCZS5WPEC
		35 × 30	0.20	2.14	230	ZR2W271MCAS3WPEC
	330	30 × 45	0.20	2.52	190	ZR2W331MCZS6WPEC
		35 × 35	0.20	2.47	190	ZR2W331MCAS4WPEC
	390	30 × 50	0.20	2.83	170	ZR2W391MCZS7WPEC
		35 × 40	0.20	2.78	170	ZR2W391MCAS5WPEC
	470	35 × 45	0.20	3.16	140	ZR2W471MCAS6WPEC
	560	35 × 50	0.20	3.55	120	ZR2W561MCAS7WPEC

ALUMINUM ELECTROLYTIC CAPACITORS

Life time graph

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



NEW!

PS2 Series

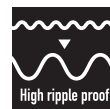
Useful of 4,000 hours at 85°C

- Conform RoHS

HP3

P.84 High-ripple current

PS2



Features

- Higher ripple though use of low-ESR material consequently, the permissible ripple current is improved by 27% in the windless status or 40% in the ventilated condition (0.5m/s) as compared with conventional constructions (HP3 series).
- Improvement in air exhaust (flow hole phenomenon) from the terminal insertion hole at solder fixing though improvement of cap construction.
- The operating space of the safety vent (arranged on the case bottom) is reduced from 5mm (conventional necessary distance) into 1mm through improvement of case construction. For these new case construction, pattern design can be move flexible.

Product Specifications

Items	Specifications
Temperature range	−40°C ~ +85°C (200 ~ 500V.DC) −25°C ~ +85°C (550, 600V.DC)
Rated voltage	200 ~ 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 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

Ripple current correction coefficient

Temperature (°C)	40	60	85		
Correction coefficient	200~500V.DC	1.89	1.51	1.00	
	550~600V.DC	1.65	1.45	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 current is limited to 15Arms (φ41, 46), 20Arms (φ51).

(Even if calculated the permissible ripple current with the correction coefficient exceeds 15, 20 Arms)

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

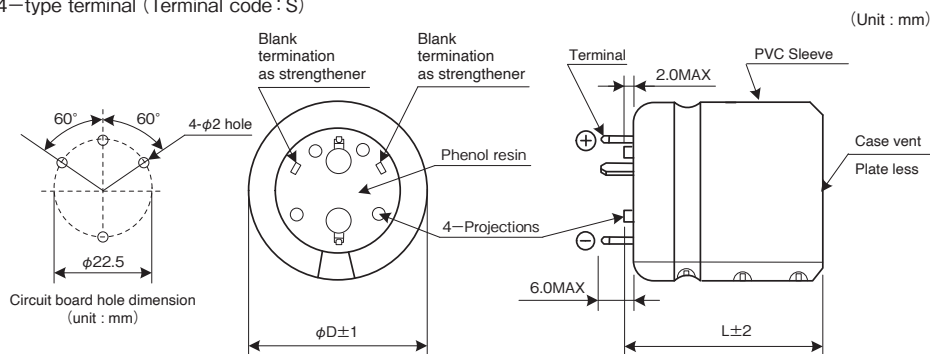
Product code

(Example) PS2 Series 500V 1,000μF ±20%									
PS2	2H	102	M	T	C	S11	PH	WP	PF
Type of series									Environmental code
									Plate code
									Sealing code
									Case height code
									Case dia code
									Terminal code
									Capacitance tolerance code
									Capacitance code
									Rated voltage code

Dimensions

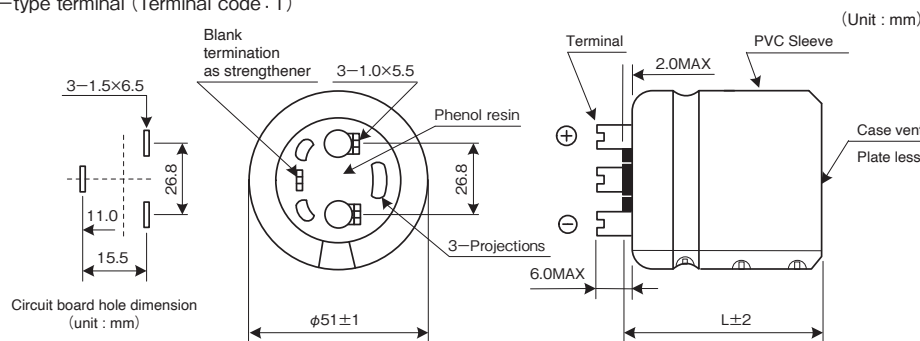
● $\phi 41, 46$

4-type terminal (Terminal code: S)



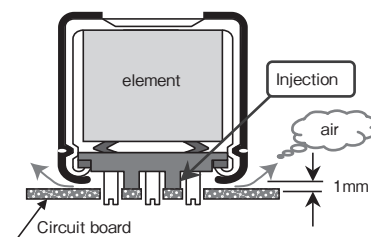
● $\phi 51$

T-type terminal (Terminal code: T)

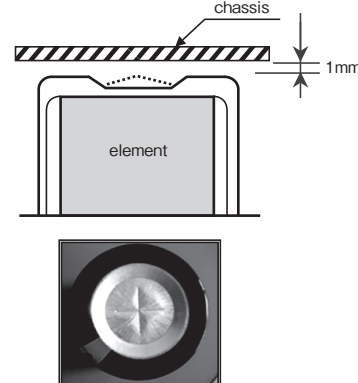


Special structure

① Improvement of flow hole



② Improved valve working distance



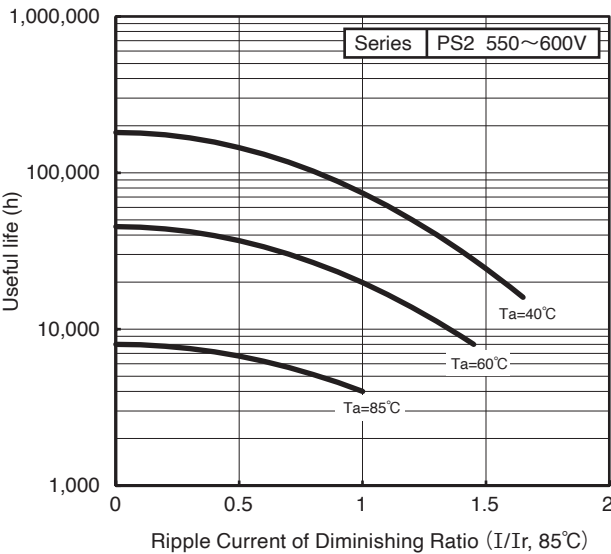
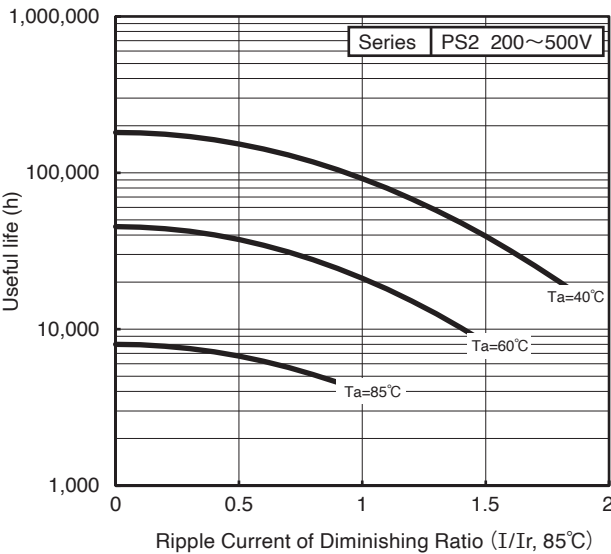
Standard Products Table

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
200	1,800	41×45	0.15	5.78	63	PS22D182MSBS6PHWPPF
	2,200	41×55	0.15	6.35	52	PS22D222MSBS8PHWPPF
	2,700	46×51	0.15	6.58	42	PS22D272MSHS7PHWPPF
	3,300	41×64	0.15	7.46	34	PS22D332MSBS10PHWPPF
		46×61	0.15	7.35	34	PS22D332MSHS9PHWPPF
		51×51	0.15	7.07	35	PS22D332MTCS7PHWPPF
	3,900	46×70	0.15	7.98	30	PS22D392MSBS10PHWPPF
		51×61	0.15	7.76	30	PS22D392MTCS9PHWPPF
		51×70	0.15	8.49	25	PS22D472MTCS11PHWPPF
	4,700	51×70	0.15	8.49	25	PS22D472MTCS11PHWPPF
250	1,200	41×45	0.15	4.72	95	PS22E122MSBS6PHWPPF
	1,800	41×55	0.15	5.75	63	PS22E182MSBS8PHWPPF
		46×51	0.15	5.37	63	PS22E182MSHS7PHWPPF
		41×64	0.15	6.41	52	PS22E222MSBS10PHWPPF
	2,200	46×61	0.15	6.00	52	PS22E222MSHS9PHWPPF
		51×51	0.15	6.40	43	PS22E272MTCS7PHWPPF
		46×70	0.15	7.34	34	PS22E332MSHS11PHWPPF
	3,300	51×61	0.15	7.14	34	PS22E332MTCS9PHWPPF
		51×70	0.15	7.73	30	PS22E392MTCS11PHWPPF
	3,900	51×70	0.15	7.73	30	PS22E392MTCS11PHWPPF
400	560	41×45	0.15	4.22	132	PS22G561MSBS6PHWPPF
	680	41×55	0.15	4.62	109	PS22G681MSBS8PHWPPF
	820	46×51	0.15	5.13	90	PS22G821MSHS7PHWPPF
	1,000	41×64	0.15	5.66	80	PS22G102MSBS10PHWPPF
		46×61	0.15	5.73	80	PS22G102MSHS9PHWPPF
		51×51	0.15	5.88	80	PS22G102MTCS7PHWPPF
	1,200	46×70	0.15	6.26	66	PS22G122MSHS11PHWPPF
		51×61	0.15	6.51	66	PS22G122MTCS9PHWPPF
		51×70	0.15	7.25	53	PS22G152MTCS11PHWPPF
	1,500	51×70	0.15	7.25	53	PS22G152MTCS11PHWPPF
420	470	41×45	0.15	3.71	158	PS2420V471MSBS6PHWPPF
	680	41×55	0.15	4.44	109	PS2420V681MSBS8PHWPPF
		46×51	0.15	4.48	109	PS2420V681MSHS7PHWPPF
		41×64	0.15	4.92	90	PS2420V821MSBS10PHWPPF
	820	51×51	0.15	5.11	90	PS2420V821MTCS7PHWPPF
		46×61	0.15	5.49	80	PS2420V102MSHS9PHWPPF
		46×70	0.15	6.01	66	PS2420V122MSHS11PHWPPF
	1,200	51×61	0.15	6.25	66	PS2420V122MTCS9PHWPPF
		51×70	0.15	6.96	53	PS2420V152MTCS11PHWPPF
	1,500	51×70	0.15	6.96	53	PS2420V152MTCS11PHWPPF
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
450	390	41×45	0.15	3.38	190	PS22W391MSBS6PHWPPF
	560	41×55	0.15	4.03	132	PS22W561MSBS8PHWPPF
	680	46×51	0.15	4.48	109	PS22W681MSHS7PHWPPF
	820	41×64	0.15	4.92	90	PS22W821MSBS10PHWPPF
		46×61	0.15	4.98	90	PS22W821MSHS9PHWPPF
		51×51	0.15	5.11	90	PS22W821MTCS7PHWPPF
	1,000	46×70	0.15	5.48	80	PS22W102MSHS11PHWPPF
		51×61	0.15	5.70	80	PS22W102MTCS9PHWPPF
		51×70	0.15	6.22	66	PS22W122MTCS11PHWPPF
	1,200	51×70	0.15	6.22	66	PS22W122MTCS11PHWPPF
500	330	41×45	0.20	2.96	290	PS22H331MSBS6PHWPPF
	470	41×55	0.20	3.51	210	PS22H471MSBS8PHWPPF
	560	46×51	0.20	3.54	210	PS22H471MSHS7PHWPPF
		41×64	0.20	3.87	180	PS22H561MSBS10PHWPPF
		46×61	0.20	4.31	150	PS22H681MSHS9PHWPPF
	680	51×51	0.20	4.43	150	PS22H681MTCS7PHWPPF
		46×70	0.20	4.72	120	PS22H821MSHS11PHWPPF
		51×61	0.20	4.91	120	PS22H821MTCS9PHWPPF
	1,000	51×70	0.20	5.40	100	PS22H102MTCS11PHWPPF
		51×70	0.20	5.40	100	PS22H102MTCS11PHWPPF
550	220	41×45	0.20	2.33	510	PS22L221MSBS6PHWPPF
	270	41×55	0.20	2.57	420	PS22L271MSBS8PHWPPF
	330	46×51	0.20	2.87	340	PS22L331MSHS7PHWPPF
	390	41×64	0.20	3.12	290	PS22L391MSBS10PHWPPF
		46×61	0.20	3.15	290	PS22L391MSHS9PHWPPF
		51×51	0.20	3.24	290	PS22L391MTCS7PHWPPF
	560	46×70	0.20	3.77	200	PS22L561MSHS11PHWPPF
		51×61	0.20	3.92	200	PS22L561MTCS9PHWPPF
		51×70	0.20	4.31	170	PS22L681MTCS11PHWPPF
	680	51×70	0.20	4.31	170	PS22L681MTCS11PHWPPF
600	180	41×45	0.20	2.11	620	PS2600V181MSBS6PHWPPF
	220	41×55	0.20	2.32	510	PS2600V221MSBS8PHWPPF
	270	46×51	0.20	2.59	420	PS2600V271MSHS7PHWPPF
	330	41×64	0.20	2.87	340	PS2600V331MSBS10PHWPPF
	390	46×61	0.20	3.15	290	PS2600V391MSHS9PHWPPF
		51×51	0.20	3.24	290	PS2600V391MTCS7PHWPPF
		46×70	0.20	3.45	240	PS2600V471MSHS11PHWPPF
	470	51×61	0.20	3.59	240	PS2600V471MTCS9PHWPPF
		51×70	0.20	3.91	200	PS2600V561MTCS11PHWPPF
	560	51×70	0.20	3.91	200	PS2600V561MTCS11PHWPPF

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



NEW!

US2 Series

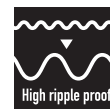
Useful of 4,000 hours at 105°C

- Conform RoHS

HU3

P.88 High-ripple current

US2



Features

- Higher ripple though use of low-ESR material consequently, the permissible ripple current is improved by 27% in the windless status or 40% in the ventilated condition (0.5m/s) as compared with conventional constructions (HU3 series).
- Improvement in air exhaust (flow hole phenomenon) from the terminal insertion hole at solder fixing though improvement of cap construction.
- The operating space of the safety vent (arranged on the case bottom) is reduced from 5mm (conventional necessary distance) into 1mm through improvement of case construction. For these new case construction, pattern design can be move flexible.

Product Specifications

Items	Specifications
Temperature range	−40°C ~ +105°C
Rated voltage	200 ~ 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 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

Ripple current correction coefficient

Temperature (°C)	40	60	85	105	
Correction coefficient	2.50	2.00	1.63	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 current is limited to 15Arms (φ41, 46), 20Arms (φ51).

(Even if calculated the permissible ripple current with the correction coefficient exceeds 15, 20Arms)

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

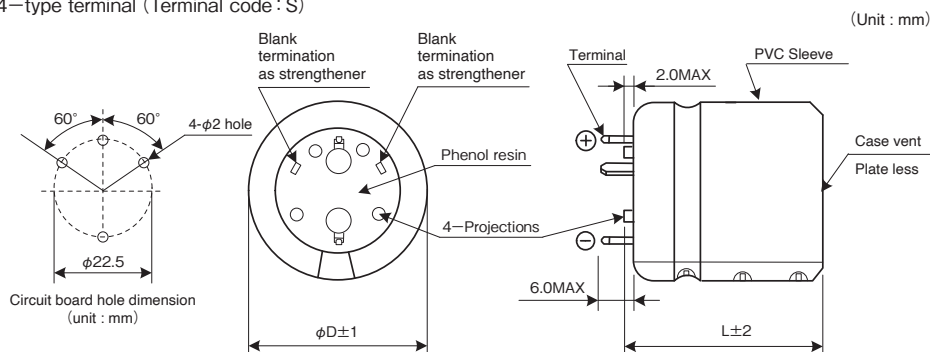
Product code

(Example) US2 Series 450V 1,000μF ±20%									
US2	2W	102	M	T	C	S11	PH	WP	PF
Type of series									Environmental code
									Plate code
									Sealing code
									Case height code
									Case dia code
									Terminal code
									Capacitance tolerance code
									Capacitance code
									Rated voltage code

Dimensions

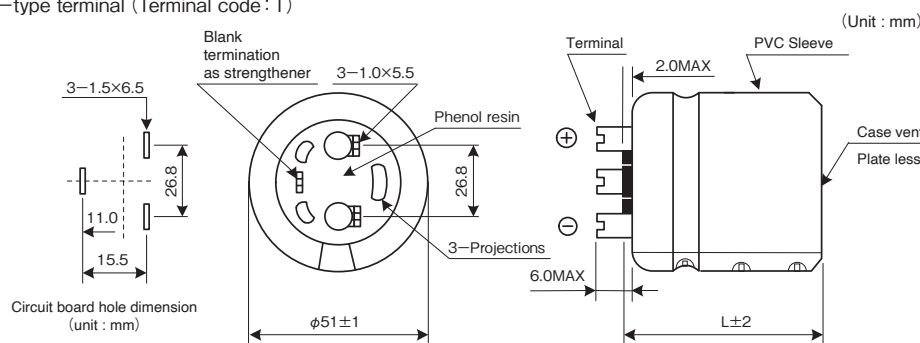
● $\phi 41, 46$

4-type terminal (Terminal code: S)



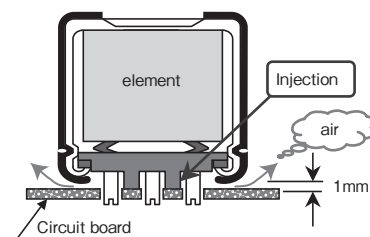
● $\phi 51$

T-type terminal (Terminal code: T)

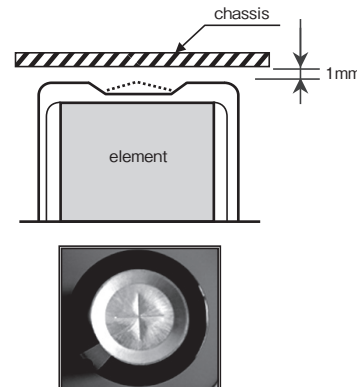


Special structure

① Improvement of flow hole



② Improved valve working distance



Standard Products Table

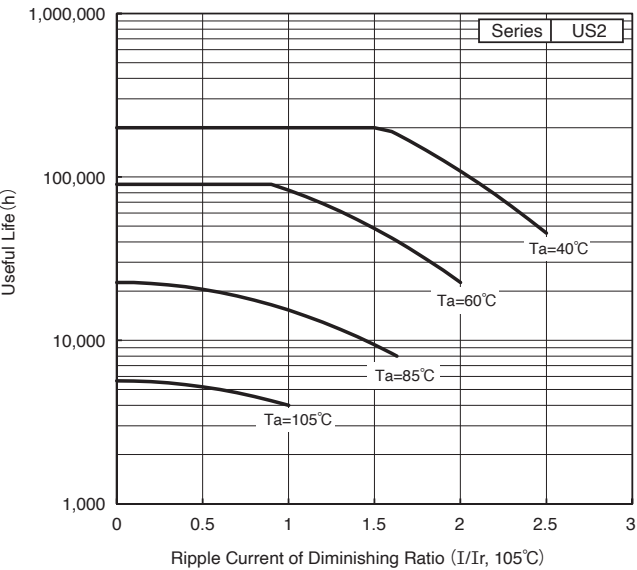
Rated Voltage (V. DC)	Capacitance (μF)	Case size φ D × L (mm)	tanδ 20°C, 120Hz	Ripple current (Arms) 105°C, 120Hz	ESR(typ.) (mΩ) 20°C, 100Hz	Product name
200	1,500	41×45	0.15	3.99	76	US22D152MSBS6PHWPPF
	2,200	41×55	0.15	4.80	52	US22D222MSBS8PHWPPF
		46×51	0.15	4.49	52	US22D222MSHS7PHWPPF
	2,700	41×64	0.15	5.37	42	US22D272MSBS10PHWPPF
		51×51	0.15	4.84	42	US22D272MTCS7PHWPPF
	3,300	46×61	0.15	5.56	34	US22D332MSHS9PHWPPF
	3,900	46×70	0.15	6.03	30	US22D392MSHS11PHWPPF
		51×61	0.15	5.87	30	US22D392MTCS9PHWPPF
4,700	51×70	0.15	6.42	25	US22D472MTCS11PHWPPF	
250	1,000	41×45	0.15	3.26	115	US22E102MSBS6PHWPPF
	1,500	41×55	0.15	3.96	76	US22E152MSBS8PHWPPF
	1,800	41×64	0.15	4.38	63	US22E182MSBS10PHWPPF
		46×51	0.15	4.06	63	US22E182MSHS7PHWPPF
		51×51	0.15	3.95	63	US22E182MTCS7PHWPPF
	2,200	46×61	0.15	4.54	52	US22E222MSHS9PHWPPF
		46×70	0.15	5.02	43	US22E272MSHS11PHWPPF
	2,700	51×61	0.15	4.88	43	US22E272MTCS9PHWPPF
		3,300	51×70	0.15	5.38	38
400	470	41×45	0.15	2.92	158	US22G471MSBS6PHWPPF
	680	41×55	0.15	3.50	109	US22G681MSBS8PHWPPF
		46×51	0.15	3.53	109	US22G681MSHS7PHWPPF
	820	41×64	0.15	3.87	90	US22G821MSBS10PHWPPF
		51×51	0.15	4.03	90	US22G821MTCS7PHWPPF
	1,000	46×61	0.15	4.33	80	US22G102MSHS9PHWPPF
	1,200	46×70	0.15	4.73	66	US22G122MSHS11PHWPPF
		51×61	0.15	4.92	66	US22G122MTCS9PHWPPF
	1,500	51×70	0.15	5.48	53	US22G152MTCS11PHWPPF

Rated Voltage (V. D.C)	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	390	41×45	0.15	2.56	190	US2420V391MSBS6PHWPPF
	560	41×55	0.15	3.04	132	US2420V561MSBS8PHWPPF
	680	46×51	0.15	3.39	109	US2420V681MSHS7PHWPPF
		41×64	0.15	3.72	90	US2420V821MSBS10PHWPPF
	820	46×61	0.15	3.76	90	US2420V821MSHS9PHWPPF
		51×51	0.15	3.87	90	US2420V821MTCS7PHWPPF
	1,000	46×70	0.15	4.15	80	US2420V102MSHS11PHWPPF
		51×61	0.15	4.31	80	US2420V102MTCS9PHWPPF
450	1,200	51×70	0.15	4.71	66	US2420V122MTCS11PHWPPF
	330	41×45	0.15	2.35	225	US22W331MSBS6PHWPPF
	470	41×55	0.15	2.79	158	US22W471MSBS8PHWPPF
	560	41×64	0.15	3.07	132	US22W561MSBS10PHWPPF
		46×51	0.15	3.07	132	US22W561MSHS7PHWPPF
	680	46×61	0.15	3.43	109	US22W681MSHS9PHWPPF
		51×51	0.15	3.52	109	US22W681MTCS7PHWPPF
	820	46×70	0.15	3.75	90	US22W821MSHS11PHWPPF

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.

ALUMINUM ELECTROLYTIC CAPACITORS

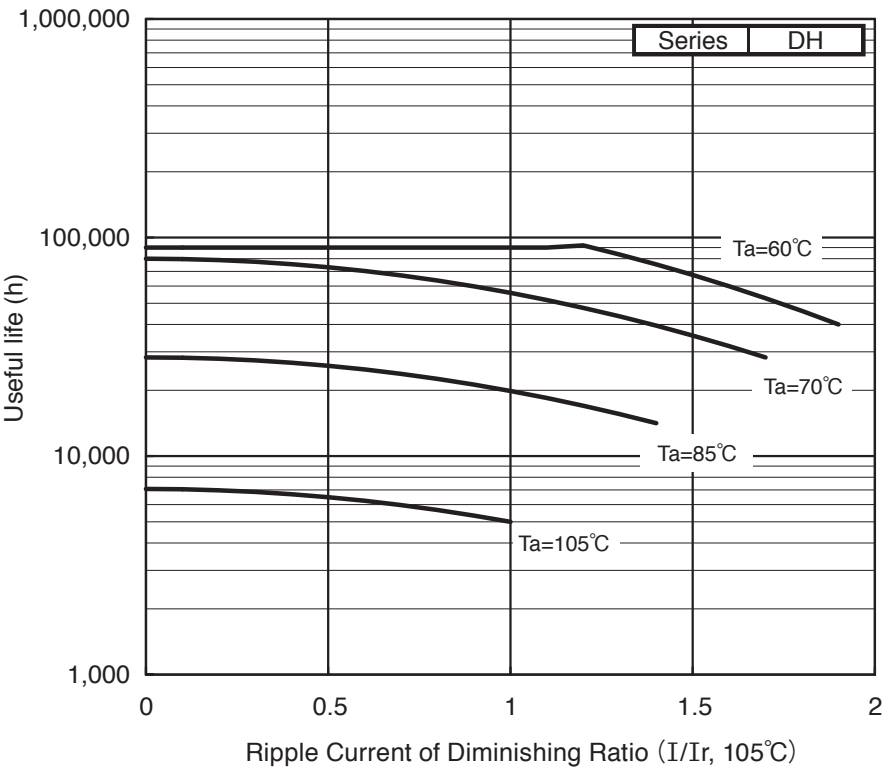


Standard Products Table

Rated Voltage (V. DC)	Capacitance (μ F)	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
	120	22 × 30	0.20	0.82	920	DH2G121MCXS3WPEC
		25 × 25	0.20	0.81	920	DH2G121MCYS2WPEC
	150	22 × 35	0.20	0.96	730	DH2G151MCXS4WPEC
	180	22 × 40	0.20	1.09	610	DH2G181MCXS5WPEC
		25 × 30	0.20	1.04	610	DH2G181MCYS3WPEC
	220	22 × 45	0.20	1.25	500	DH2G221MCXS6WPEC
		25 × 35	0.20	1.21	500	DH2G221MCYS4WPEC
		30 × 25	0.20	1.15	500	DH2G221MCZS2WPEC
	270	22 × 50	0.20	1.44	410	DH2G271MCXS7WPEC
		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	680	35 × 45	0.20	2.47	160	DH2G681MCAS6WPEC
Rated Voltage (V. DC)	Capacitance (μ F)	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	560	35 × 50	0.20	2.31	180	DH2W561MCAS7WPEC

Life time graph

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



HW Series

- Conform RoHS

Features

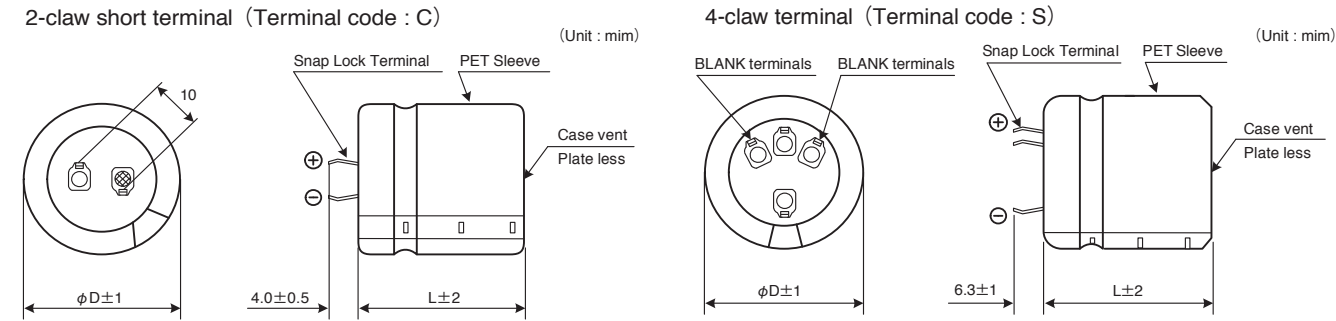
- Best fit for applications requiring fast energy discharge like aesthetic equipment, medical laser, portable X-ray generator, and photo flash.



Product Specifications

Items	Specifications			
Temperature range	−20°C ~ +55°C			
Rated voltage	330WV.DC	360WV.DC	400WV.DC	450WV.DC
Withstanding voltage	350SV.DC	380SV.DC	420SV.DC	470SV.DC
Capacitance tolerance	−10°C ~ +20% (20°C, 120Hz)			
Leakage current	C ≤ 3,000 : 0.02CV (µA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) C > 3,000 : 1×C (µA) (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)			
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



Product code

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

330 HW 1700 S C A S7 WP EC

Rated voltage: 330
Type of series: HW
Rated Capacitance: 1700
Capacitance tolerance code: S
Terminal code: C
Case dia code: A
Case height code: S7
Plate code: WP
Environmental code: EC

Refer to page 82-83 for other terminal shape available on request.

Standard Products Table

Rated Voltage (WV, DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Product name	Rated Voltage (WV, DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Product name
330	700	30×30	0.15	330HW700SCZS3WPEC	400	370	30×30	0.15	400HW370SCZS3WPEC
	870	30×35	0.15	330HW870SCZS4WPEC		460	30×35	0.15	400HW460SCZS4WPEC
	920	35×30	0.15	330HW920SCAS3WPEC		490	35×30	0.15	400HW490SCAS3WPEC
	1,000	30×40	0.15	330HW1000SCZS5WPEC		550	30×40	0.15	400HW550SCZS5WPEC
		35×35	0.15	330HW1000SCAS4WPEC		610	35×35	0.15	400HW610SCAS4WPEC
	1,100	30×45	0.15	330HW1100SCZS6WPEC		640	30×45	0.15	400HW640SCZS6WPEC
	1,200	30×50	0.15	330HW1200SCZS7WPEC		730	30×50	0.15	400HW730SCZS7WPEC
		35×40	0.15	330HW1200SCAS5WPEC		740	35×40	0.15	400HW740SCAS5WPEC
	1,300	30×55	0.15	330HW1300SCZS8WPEC		820	30×55	0.15	400HW820SCZS8WPEC
	1,400	30×60	0.15	330HW1400SCZS9WPEC		860	35×45	0.15	400HW860SCAS6WPEC
	1,500	35×45	0.15	330HW1500SCAS6WPEC		870	30×60	0.15	400HW870SCZS9WPEC
	1,700	35×50	0.15	330HW1700SCAS7WPEC		980	35×50	0.15	400HW980SCAS7WPEC
	1,900	35×55	0.15	330HW1900SCAS8WPEC		1,100	35×55	0.15	400HW1100SCAS8WPEC
	2,000	35×60	0.15	330HW2000SCAS9WPEC		1,200	35×60	0.15	400HW1200SCAS9WPEC
	2,700	35×100	0.15	330HW2700SSAS17WPEC		1,700	35×100	0.15	400HW1700SSAS17WPEC
	2,800	40×76	0.15	330HW2800SSBS12WPEC		1,800	40×76	0.15	400HW1800SSBS12WPEC
	3,800	40×101	0.15	330HW3800SSBS17WPEC		2,400	40×101	0.15	400HW2400SSBS17WPEC
360	500	30×30	0.15	360HW500SCZS3WPEC	450	320	30×30	0.35	450HW320SCZS3WPEC
	610	30×35	0.15	360HW610SCZS4WPEC		400	30×35	0.35	450HW400SCZS4WPEC
	650	35×30	0.15	360HW650SCAS3WPEC		420	35×30	0.35	450HW420SCAS3WPEC
	730	30×40	0.15	360HW730SCZS5WPEC		480	30×40	0.35	450HW480SCZS5WPEC
	810	35×35	0.15	360HW810SCAS4WPEC		530	35×35	0.35	450HW530SCAS4WPEC
	850	30×45	0.15	360HW850SCZS6WPEC		560	30×45	0.35	450HW560SCZS6WPEC
	950	30×50	0.15	360HW950SCZS7WPEC		640	30×50	0.35	450HW640SCZS7WPEC
	970	35×40	0.15	360HW970SCAS5WPEC		640	35×40	0.35	450HW640SCAS5WPEC
	1,000	30×55	0.15	360HW1000SCZS8WPEC		720	30×55	0.35	450HW720SCZS8WPEC
		30×60	0.15	360HW1100SCZS9WPEC		750	35×45	0.35	450HW750SCAS6WPEC
	1,100	35×45	0.15	360HW1100SCAS6WPEC		760	30×60	0.35	450HW760SCZS9WPEC
		35×50	0.15	360HW1300SCAS7WPEC		850	35×50	0.35	450HW850SCAS7WPEC
	1,400	35×55	0.15	360HW1400SCAS8WPEC		960	35×55	0.35	450HW960SCAS8WPEC
	1,500	35×60	0.15	360HW1500SCAS9WPEC		1,000	35×60	0.35	450HW1000SCAS9WPEC
	2,300	35×100	0.15	360HW2300SSAS17WPEC		1,500	35×100	0.35	450HW1500SSAS17WPEC
	2,400	40×76	0.15	360HW2400SSBS12WPEC			40×76	0.35	450HW1500SSBS12WPEC
	3,200	40×101	0.15	360HW3200SSBS17WPEC		2,100	40×101	0.35	450HW2100SSBS17WPEC

HS Series

- Conform RoHS

Features

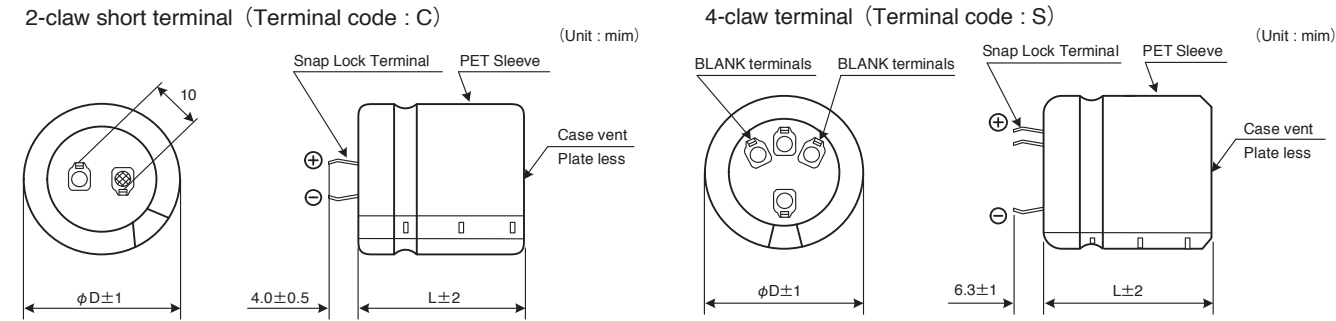
- Best fit for applications requiring fast energy discharge like aesthetic equipment, medical laser, portable X-ray generator, and photo flash.



Product Specifications

Items	Specifications			
Temperature range	−20°C ~ +55°C			
Rated voltage	330WV.DC	360WV.DC	400WV.DC	450WV.DC
Withstanding voltage	350SV.DC	380SV.DC	420SV.DC	470SV.DC
Capacitance tolerance	−10°C ~ +20% (20°C, 120Hz)			
Leakage current	C ≤ 3,000 : 0.02CV (μA) or 3mA, whichever is smaller or less (20°C, after 5 minutes) C > 3,000 : 1×C (μA) (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)			
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



Product code

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

450 HS 810 S C A S7 WP EC

Rated voltage: 450
Series: HS
Capacitance: 810
Capacitance tolerance: S
Terminal code: C
Case dia code: A
Case height code: S7
Plate code: WP
Environmental code: EC

Refer to page 82-83 for other terminal shape available on request.

Standard Products Table

Rated Voltage (WV, DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Product name
330	490	30×30	0.15	330HS490SCZS3WPEC
	610	30×35	0.15	330HS610SCZS4WPEC
	660	35×30	0.15	330HS660SCAS3WPEC
	730	30×40	0.15	330HS730SCZS5WPEC
	820	35×35	0.15	330HS820SCAS4WPEC
	850	30×45	0.15	330HS850SCZS6WPEC
	960	30×50	0.15	330HS960SCZS7WPEC
	990	35×40	0.15	330HS990SCAS5WPEC
	1,000	30×55	0.15	330HS1000SCZS8WPEC
	1,100	30×60	0.15	330HS1100SCZS9WPEC
		35×45	0.15	330HS1100SCAS6WPEC
	1,300	35×50	0.15	330HS1300SCAS7WPEC
	1,400	35×55	0.15	330HS1400SCAS8WPEC
	1,500	35×60	0.15	330HS1500SCAS9WPEC
	2,300	35×100	0.15	330HS2300SSAS17WPEC
		40×76	0.15	330HS2300SSBS12WPEC
	3,100	40×101	0.15	330HS3100SSBS17WPEC
360	420	30×30	0.15	360HS420SCZS3WPEC
	530	30×35	0.15	360HS530SCZS4WPEC
	570	35×30	0.15	360HS570SCAS3WPEC
	630	30×40	0.15	360HS630SCZS5WPEC
	710	35×35	0.15	360HS710SCAS4WPEC
	730	30×45	0.15	360HS730SCZS6WPEC
	830	30×50	0.15	360HS830SCZS7WPEC
	850	35×40	0.15	360HS850SCAS5WPEC
	910	30×55	0.15	360HS910SCZS8WPEC
	960	30×60	0.15	360HS960SCZS9WPEC
	1,000	35×45	0.15	360HS1000SCAS6WPEC
	1,100	35×50	0.15	360HS1100SCAS7WPEC
	1,200	35×55	0.15	360HS1200SCAS8WPEC
	1,300	35×60	0.15	360HS1300SCAS9WPEC
	2,000	35×100	0.15	360HS2000SSAS17WPEC
		40×76	0.15	360HS2000SSBS12WPEC
	2,700	40×101	0.15	360HS2700SSBS17WPEC

Rated Voltage (WV, DC)	Capacitance (μF)	Case size φD×L (mm)	tanδ 20°C, 120Hz	Product name
400	340	30×30	0.15	400HS340SCZS3WPEC
	430	30×35	0.15	400HS430SCZS4WPEC
	460	35×30	0.15	400HS460SCAS3WPEC
	510	30×40	0.15	400HS510SCZS5WPEC
	580	35×35	0.15	400HS580SCAS4WPEC
	590	30×45	0.15	400HS590SCZS6WPEC
	680	30×50	0.15	400HS680SCZS7WPEC
	690	35×40	0.15	400HS690SCAS5WPEC
	740	30×55	0.15	400HS740SCZS8WPEC
	780	30×60	0.15	400HS780SCZS9WPEC
	810	35×45	0.15	400HS810SCAS6WPEC
	920	35×50	0.15	400HS920SCAS7WPEC
	1,000	35×55	0.15	400HS1000SCAS8WPEC
	1,100	35×60	0.15	400HS1100SCAS9WPEC
	1,600	35×100	0.15	400HS1600SSAS17WPEC
		40×76	0.15	400HS1600SSBS12WPEC
	2,200	40×101	0.15	400HS2200SSBS17WPEC
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

■ HOW TO ORDER

① Type of series

Type of series
HU
HL

③ Capacitance code

Capacitance code	Capacitance (μF)	Capacitance code	Capacitance (μF)
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(μF)

⑥ Case dia code

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

⑧ Environmental code

Environmental code	Content
EC	Lead-free, PVC-free

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

② Rated voltage code

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

④ Capacitance tolerance code

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

The standard is [M].

⑤ Terminal code

Terminal code	Terminal
L	Lead terminal

⑦ Case height code

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

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.

HU

→
Long-life

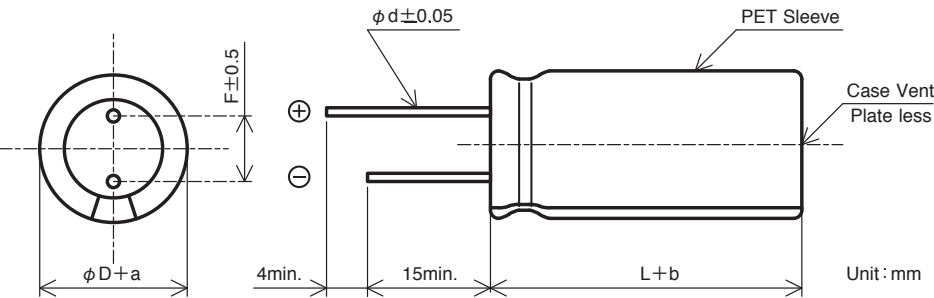
HL
P.136



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

Type of series

Rated voltage code

Capacitance code

Capacitance tolerance code

Terminal code

Case dia code

Case height code

Environmental code

Refer to page 131 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V.DC)	Capacitance (μ F)	Case size ϕ 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
	470	18 $\times$ 50	0.20	1.83	HU2E471MLV50EC
350	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
	56	16 $\times$ 25	0.24	0.50	HU2G560MLU25EC
		18 $\times$ 20	0.24	0.50	HU2G560MLV20EC
	68	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 (μ F)	Case size ϕ 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	HU420V100MLR16EC
	15	10 $\times$ 20	0.24	0.18	HU420V150MLR20EC
	22	12.5 $\times$ 20	0.24	0.27	HU420V220MLS20EC
	27	12.5 $\times$ 25	0.24	0.30	HU420V270MLS25EC
	33	12.5 $\times$ 25	0.24	0.37	HU420V330MLS25EC
	39	16 $\times$ 20	0.24	0.40	HU420V390MLU20EC
	47	16 $\times$ 20	0.24	0.47	HU420V470MLU20EC
	56	16 $\times$ 25	0.24	0.65	HU420V560MLU25EC
		18 $\times$ 20	0.24	0.65	HU420V560MLV20EC
	68	16 $\times$ 25	0.24	0.72	HU420V680MLU25EC
	82	16 $\times$ 31.5	0.24	0.72	HU420V820MLU315EC
		18 $\times$ 25	0.24	0.72	HU420V820MLV25EC
	100	16 $\times$ 35.5	0.24	0.83	HU420V101MLU355EC
		18 $\times$ 31.5	0.24	0.83	HU420V101MLV315EC
	120	16 $\times$ 40	0.24	0.93	HU420V121MLU40EC
		18 $\times$ 35.5	0.24	0.93	HU420V121MLV355EC
	150	16 $\times$ 45	0.24	1.05	HU420V151MLU45EC
		18 $\times$ 40	0.24	1.05	HU420V151MLV40EC
	180	18 $\times$ 45	0.24	1.15	HU420V181MLV45EC
450	8.2	10 $\times$ 16	0.24	0.12	HU2W8R2MLR16EC
	10	10 $\times$ 20	0.24	0.13	HU2W100MLR20EC
	22	12.5 $\times$ 20	0.24	0.25	HU2W220MLS20EC
	27	12.5 $\times$ 25	0.24	0.29	HU2W270MLS25EC
	33	12.5 $\times$ 25	0.24	0.39	HU2W330MLS25EC
	47	18 $\times$ 20	0.24	0.51	HU2W470MLV20EC
	56	16 $\times$ 25	0.24	0.57	HU2W560MLU25EC
		18 $\times$ 20	0.24	0.57	HU2W560MLV20EC
	68	18 $\times$ 25	0.24	0.67	HU2W680MLV25EC
	82	16 $\times$ 31.5	0.24	0.75	HU2W820MLU315EC
	100	16 $\times$ 35.5	0.24	0.84	HU2W101MLU355EC
		18 $\times$ 31.5	0.24	0.84	HU2W101MLV315EC
	120	16 $\times$ 45	0.24	0.94	HU2W121MLU45EC
	150	16 $\times$ 50	0.24	1.05	HU2W151MLU50EC
		18 $\times$ 40	0.24	1.05	HU2W151MLV40EC
	180	18 $\times$ 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.132

→
Long-life

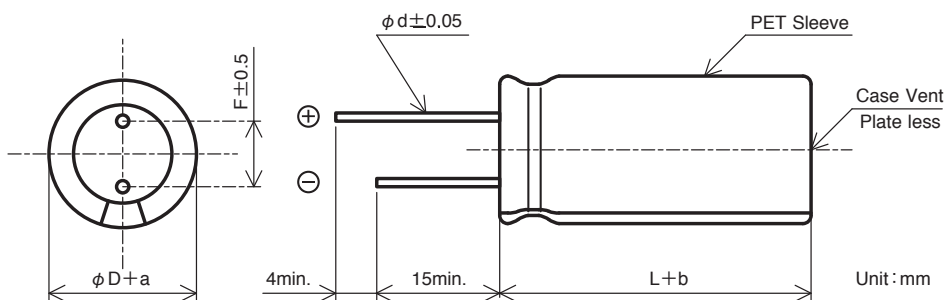
HL



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
Type of series	Rated voltage code	Capacitance code	Capacitance tolerance code	Terminal code	Case dia code	Case height code	Environmental code

Refer to page 131 for other terminal shape available on request.

Standard Products Table

Rated Voltage (V.DC)	Capacitance (μ F)	Case size ϕ 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 (μ F)	Case size ϕ 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

PLASTIC FILM CAPACITORS



PLASTIC FILM CAPACITORS

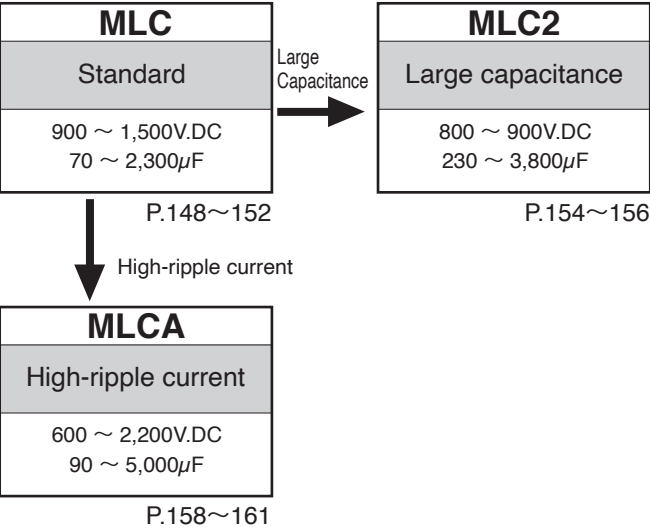
Contents

Product Line Chart	P.140
Series Table	P.141
Technical Report	P.142 ~ 145
Glossary	P.146
Series Specifications	P.148 ~ 169

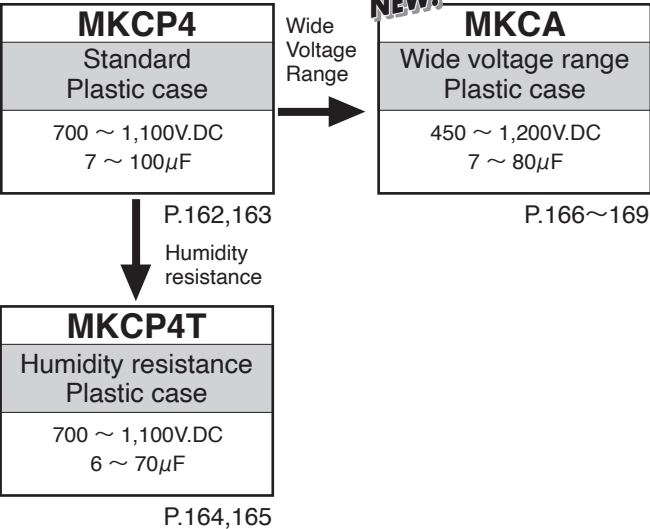
Product Line Chart

• For power electronics

Cylindrical type (DC)



PCB mount type



PLASTIC FILM CAPACITORS

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 μF	Page
MLC	Standard, For DC, Aluminium encased type	$-40 \sim +85^{\circ}\text{C}$	○		○	900~1,500	70~2,300	148
MLC2	Large capacitance, For DC, Aluminium encased type	$-40 \sim +85^{\circ}\text{C}$		○	○	800, 900	230~3,800	154
MLCA	High-ripple current, For DC, Aluminum encased type	$-40 \sim +85^{\circ}\text{C}$			○	600~2,200	90~5,000	158
MKCP4	Standard, For DC, Resin encased type	$-40 \sim +85^{\circ}\text{C}$ (105 $^{\circ}\text{C}$)	○	○	○	700~1,100	7~100	162
MKCP4T	Humidity resistance, For DC, Resin encased type	$-40 \sim +85^{\circ}\text{C}$ (105 $^{\circ}\text{C}$)	○	○	○	700~1,100	6~70	164
MKCA NEW!	Wide voltage range, For DC, Resin encased type	$-40 \sim +85^{\circ}\text{C}$ (105 $^{\circ}\text{C}$)	○	○	○	450~1,200	1~80	166

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

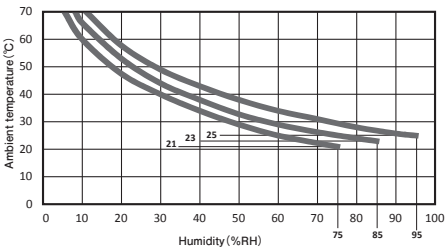
- (1) Keep the torque described in catalog or data sheet. Toothed washer has to be used for fixing stud bolt.
- (2) Stud bolt

Series	Stud bolt	Torque
MLC/MLC2/MLCA	M12	7 ± 1Nm

- (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/MLCA series

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

PLASTIC FILM CAPACITORS

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 / MLCA 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, MLCA MKCP4, MKCP4T, MKCA	< 3kg	10 cycles per each axes	10 to 55Hz	50m/s ²	±0.35mm
	3kg ≤	information available on request			

6. 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.

7. 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.

8. 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.

9. Earthing

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

10. Environmental Compatibility

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

11. Storage

☆ Storage environment

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

☆ Storage limitation

- 3 years without any verifications (2 years for lead-wire terminals)

If the storage time exceeds the above term, 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.

12. 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.

13. 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.

14. 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.

15. 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

16. Formula for estimating service life (MLC, MLC2, MLCA)

- (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_0 and base voltage is (V_0)
 L : Estimated service life when core temperature is T and applied voltage is (V)
 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 ($^{\circ}\text{C}$)
 Ta : Ambient temperature ($^{\circ}\text{C}$)
 I : Ripple current (Arms)
 ESR : Equivalent series resistance of capacitor (Ω)
 Rth : Thermal resistance (K/W)

※ Ripple current (I) is limited by maximum current (I_{max}) 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 θ_U

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

Lower category temperature θ_{min}

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

Upper category temperature θ_{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

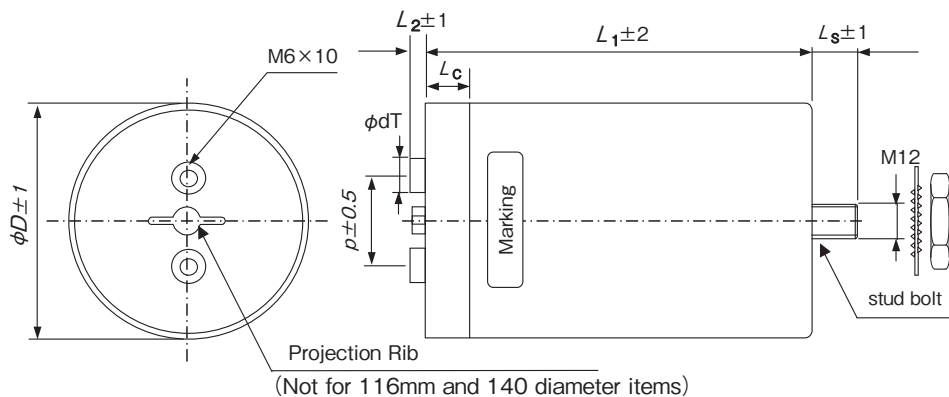
Items	Characteristics
Operating Temperature range *	-40 ~ +85°C at 0.7 U_N
	-40 ~ +80°C at 0.8 U_N
	-40 ~ +75°C at 0.9 U_N
	-40 ~ +70°C at 1.0 U_N
Rated Voltage U_N	900 ~ 1,500V.DC
Voltage test between terminals U_{TT}	$1.5 \times U_N / 10s$
Voltage test terminals to case U_{TC}	3,200Vac / 10s
Terminals (permitted Torque)	M6 × 10 (4 ±0.5Nm)
Stud Bolt (permitted Torque)	M12 × 16 / 18 (7 ±1Nm)
Reference / Standard	IEC 61071 : 2007
Dielectric	Polypropylene
Safety Function	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

		ϕD				
		$\phi 85$	$\phi 88.5$	$\phi 100$	$\phi 116$	$\phi 140$
Dimensions (mm)	P	32	32	32	50	50
	ϕdT	$\phi 12$	$\phi 12$	$\phi 12$	$\phi 14$	$\phi 19$
	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			

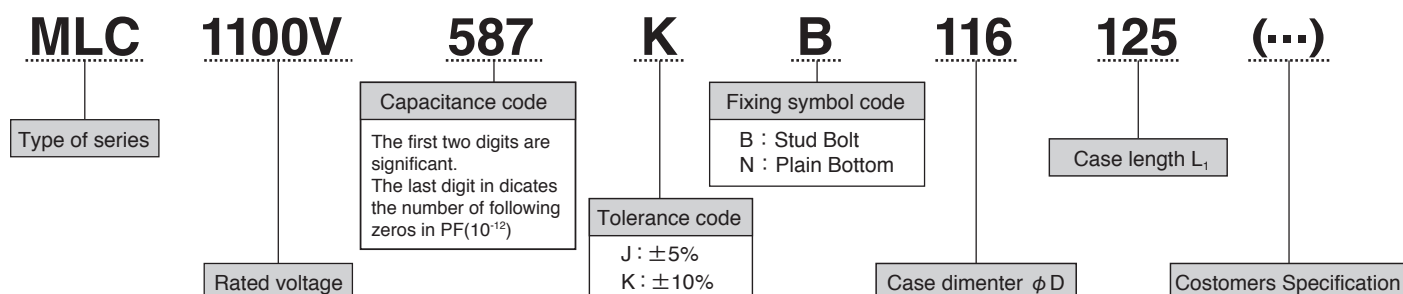
Outline of drawings and dimensions



Part number

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

MLC1100V587KB116125



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 [μF]	Dimensions		Maximum ripple current (Arms) I_{max}^* [Arms / at 50°C, 1k ~ 10kHz]	Maximum peak current 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 ϕD [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
330	85	106	27	4	12	4.8	90	5.6	MLC900V337KB85106
	100	80	36	6	18	2.5	65	5.9	MLC900V337KB10080
360	88.5	106	28	4	12	4.4	90	5.7	MLC900V367KB885106
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
460	85	145	52	8	24	1.7	45	4.1	MLC900V467KB85145
	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
780	85	225	50	8	24	2.9	70	2.7	MLC900V787KB85225
	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

- * • 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.

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

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 [μF]	Dimensions		Maximum ripple current (Arms) I_{max}^* [Arms / at 50°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 ϕD [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
	116	70	41	7	21	1.9	60	6.0	MLC1100V297KB11670
310	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
	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
	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. $U_{TC} : 3,200Vac/10s$								
Nominal Capacitance C_N [μF]	Dimensions		Maximum ripple current (Arms) I_{max}^* [Arms / at 50°C, 1k ~ 10kHz]	Maximum peak current i [kA]	Maximum Surge current I_s [kA]	Equivalent Series Resistance ESR [m Ω]	Equivalent Series Inductance ESL [nH]	Thermal resistance R_{th} [K/W]	Part number
	Diameter ϕD [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
	88.5	95	26	3	9	4.8	80	6.0	MLC1300V187KB88595
180	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
	116	80	39	6	18	2.5	65	5.2	MLC1300V267KB11680
270	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
	85	175	46	6	18	2.7	55	3.4	MLC1300V337KB85175
330	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
	85	197	46	6	18	3.1	60	3.0	MLC1300V387KB85197
380	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
	100	197	57	9	27	2.3	60	2.6	MLC1300V557KB100197
550	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

- * • 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 $U_N : 1,500Vdc$		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 [μF]	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 Ω]	Equivalent Series Inductance ESL [nH]	Thermal resistance R_{th} [K/W]	Part number
	Diameter ϕD [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
270	85	197	42	5	15	3.6	60	3.0	MLC1500V277KB85197
	116	106	34	5	15	3.9	90	4.3	MLC1500V277KB116106
280	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
320	85	225	42	5	15	4.2	70	2.6	MLC1500V327KB85225
	116	120	34	5	15	4.5	100	3.7	MLC1500V327KB116120
	140	87	40	8	24	2.3	75	5.3	MLC1500V327KB14087
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.

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



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

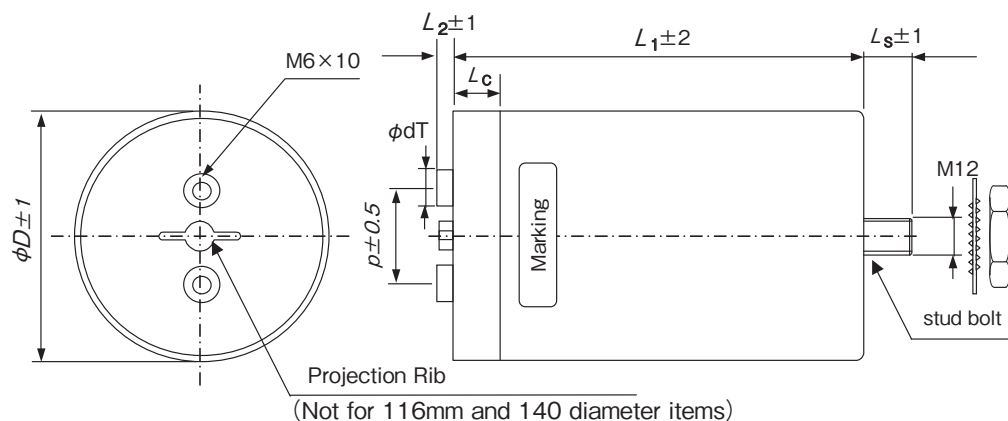
Items	Characteristics
Operating Temperature range *	-40 ~ +85°C at 0.7 U_N
	-40 ~ +80°C at 0.8 U_N
	-40 ~ +75°C at 0.9 U_N
	-40 ~ +70°C at 1.0 U_N
Rated Voltage U_N	800 ~ 900V.DC
Voltage test between terminals U_{TT}	$1.5 \times U_N / 10s$
Voltage test terminals to case U_{TC}	3,200Vac / 10s
Terminals (permitted Torque)	M6 × 10 (4 ± 0.5Nm)
Stud Bolt (permitted Torque)	M12 × 16 / 18 (7 ± 1Nm)
Reference / Standard	IEC 61071 : 2007
Dielectric	Polypropylene
Safety Function	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

		ϕD				
		$\phi 85$	$\phi 88.5$	$\phi 100$	$\phi 116$	$\phi 140$
Dimensions (mm)	P	32	32	32	50	50
	ϕdT	$\phi 12$	$\phi 12$	$\phi 12$	$\phi 14$	$\phi 19$
	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 μF , $\pm 10\%$, $D = \phi 116$, $L = 125$, with stud bolt

MLC2800V128KB116125

MLC2

Type of series

800V

Rated voltage

128

Capacitance code

The first two digits are significant.
The last digit indicates the number of following zeros in PF
(128 : $12 \times 10^8 pF$)

K

Tolerance code

J : $\pm 5\%$
K : $\pm 10\%$

B

Fixing symbol code

B : Stud Bolt
N : Plain Bottom

116

Case diameter ϕD

125

Case length L_1

(...)

Customers Specification

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								
Nominal Capacitance C_N [μF]	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 ϕD [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
	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
	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

- * • 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.

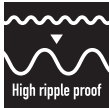
$$\theta_{\text{HOTSPOT}} = T_a + I^2 \times ESR \times R_{th}$$

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 [μF]	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 ϕD [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
470	100	87	37	7	21	2.6	75	5.6	MLC2900V477KB10087
	116	70	45	9	27	1.6	60	6.0	MLC2900V477KB11670
480	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
1,000	88.5	225	54	9	27	2.6	70	2.6	MLC2900V108KB885225
	100	175	66	12	36	1.6	55	2.8	MLC2900V108KB100175
	116	135	79	17	51	0.9	40	3.5	MLC2900V108KB116135
1,100	100	197	64	13	39	1.8	60	2.7	MLC2900V118KB100197
	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
1,400	100	225	66	13	39	2.0	70	2.3	MLC2900V148KB100225
	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
1,900	116	225	77	18	54	1.6	70	2.1	MLC2900V198KB116225
	140	159	84	26	78	0.9	50	3.1	MLC2900V198KB140159
2,200	140	175	84	27	81	1.0	55	2.8	MLC2900V228KB140175
2,500	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.

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



MLCA Series

(Cylindrically-Shaped Metallized Polypropylene Film Capacitors)

- Features**
- Large DC film capacitor with high voltage / high ripple current
 - Suitable for applications that require high voltage and high current, such as large inverters / power supplies.

Specifications

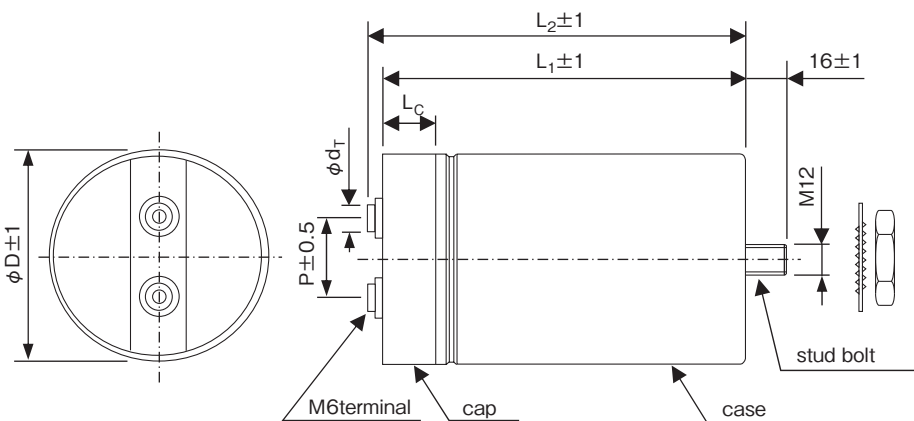
Items	Characteristics
Operating Temperature range	− 40 ~ + 85°C
Rated Voltage U_N	600 ~ 2,200V.DC
Voltage test between terminals U_{TT}	$1.5 \times U_N / 10s$
Voltage test terminals to case U_{TC}	$\geq 3,000Vac / 10s$
Terminals (permitted Torque)	M6 × 10 (Max. 5Nm)
Stud Bolt (permitted Torque)	M12 × 16 (Max. 12Nm)
Standard	IEC 61071 : 2017, UL810
Dielectric	Polypropylene
Case material	Aluminium
Environmental regulations	Comply with RoHS

Dimensions

ϕD	L_1	Style code	P	ϕd_T	L_2	L_c
$\phi 76$	—	B	32	$\phi 12$	$L_1 + 5$	32
$\phi 86$	—	B	32	$\phi 12$	$L_1 + 5$	32
$\phi 116$	< 100	H	50	$\phi 14$	$L_1 + 5$	10
$\phi 116$	$100 <$	I	50	$\phi 14$	$L_1 + 5$	45

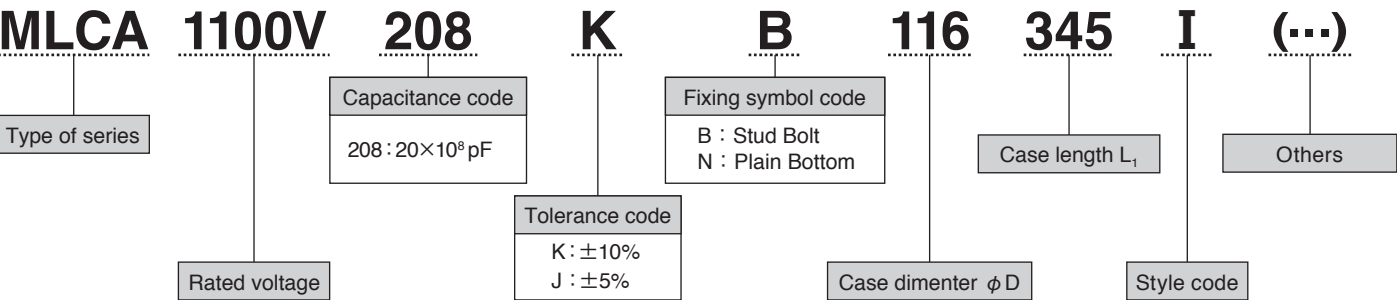
PLASTIC FILM CAPACITORS

Outline of drawings and dimensions



Part number

Example : MLCA, 1,100V.dc, 2,000 μF , $\pm 10\%$, D = $\phi 116$, L1 = 345, with stud bolt



Standard Products Table

Nominal Capacitance C_N [μF]	Dimensions		Maximum ripple current (Arms) at 1kHz I_{max}			Maximum peak current $\hat{I}$ [Ap]	Equivalent Series Resistance ESR [mΩ]	Equivalent Series Inductance ESL [nH]	Thermal resistance R_{th} [K/W]	Part number
	Diameter ϕD [mm]	Case length L_1 [mm]								
			40°C	50°C	60°C					
Rated voltage U_N : 500Vdc	Test voltage between terminals U_{TT} : 750Vdc/10s, Test voltage between terminals and case U_{TC} : 3,000Vac/10s									
480	76	95	70	61	50	4,800	1.6	50	5.1	MLCA500V487KB7695B
650	86	95	81	70	57	5,200	1.1	50	5.6	MLCA500V657KB8695B
650	76	120	67	58	47	5,200	1.9	60	4.7	MLCA500V657KB76120B
770	76	136	88	76	62	6,160	1.2	60	4.3	MLCA500V777KB76136B
880	86	120	80	69	57	6,248	1.3	60	4.8	MLCA500V887KB86120B
950	76	175	82	71	58	6,650	1.4	60	4.2	MLCA500V957KB76175B
1,000	86	136	93	81	66	6,700	1.0	60	4.6	MLCA500V108KB86136B
1,100	86	155	81	70	57	6,600	1.4	50	4.4	MLCA500V118KB86155B
1,200	116	95	96	83	68	7,200	0.8	50	5.4	MLCA500V128KB11695H
1,300	86	175	96	84	68	7,800	1.0	60	4.3	MLCA500V138KB86175B
1,600	116	120	94	82	67	9,600	0.9	60	5.0	MLCA500V168KB116120I
1,800	86	225	95	83	67	10,800	1.1	60	4.0	MLCA500V188KB86225B
1,900	116	136	86	75	61	11,400	1.1	60	4.9	MLCA500V198KB116136I
2,100	116	155	100	100	85	11,550	0.6	60	4.6	MLCA500V218KB116155I
2,400	116	175	100	100	86	12,000	0.6	60	4.5	MLCA500V248KB116175I
3,000	116	230	100	100	96	15,000	0.8	60	2.7	MLCA500V308KB116230I
5,000	116	345	100	100	100	25,000	0.9	80	2.2	MLCA500V508KB116345I
Rated voltage U_N : 600Vdc	Test voltage between terminals U_{TT} : 900Vdc/10s, Test voltage between terminals and case U_{TC} : 3,000Vac/10s									
350	76	95	70	61	50	3,600	1.6	60	5.1	MLCA600V357KB7695B
480	76	120	64	55	45	3,840	2.1	60	4.7	MLCA600V487KB76120B
480	86	95	71	62	51	3,840	1.4	60	5.6	MLCA600V487KB8695B
580	76	136	60	52	43	5,800	2.4	60	4.6	MLCA600V587KB76136B
620	76	155	79	68	56	6,200	1.5	60	4.3	MLCA600V627KB76155B
700	76	175	77	67	55	7,200	1.6	60	4.2	MLCA600V707KB76175B
750	86	136	66	57	47	7,200	2.0	60	4.6	MLCA600V757KB86136B
780	86	136	68	59	48	7,800	1.9	60	4.6	MLCA600V787KB86136B
920	116	95	100	89	73	9,200	0.7	60	5.4	MLCA600V927KB11695H
950	86	175	79	68	56	9,500	1.5	60	4.3	MLCA600V957KB86175B
1,200	116	120	89	77	63	7,200	1.0	60	5.0	MLCA600V128KB116120I
1,500	116	136	86	75	61	9,000	1.1	60	4.9	MLCA600V158KB116136I
1,500	116	155	100	90	74	9,000	0.8	60	4.6	MLCA600V158KB116155I
1,800	116	175	94	82	67	10,800	1.0	60	4.5	MLCA600V188KB116175I
2,300	116	230	100	100	96	13,800	0.8	60	2.7	MLCA600V238KB116230I
Rated voltage U_N : 800Vdc	Test voltage between terminals U_{TT} : 1,200Vdc/10s, Test voltage between terminals and case U_{TC} : 3,000Vac/10s									
280	76	95	68	59	48	2,800	1.7	50	5.1	MLCA800V287KB7695B
370	86	95	69	60	49	3,700	1.5	50	5.6	MLCA800V377KB8695B
430	76	136	57	49	40	4,300	2.6	60	4.6	MLCA800V437KB76136B
470	76	155	76	66	54	4,700	1.6	60	4.3	MLCA800V477KB76155B
510	86	120	70	61	50	5,100	1.7	60	4.8	MLCA800V517KB86120B
560	76	175	73	63	51	5,600	1.7	60	4.2	MLCA800V567KB76175B
580	86	136	68	59	48	5,800	1.9	60	4.6	MLCA800V587KB86136B
640	86	155	91	79	64	6,400	1.1	50	4.4	MLCA800V647KB86155B
710	116	95	82	71	58	7,100	1.1	50	5.4	MLCA800V717KB11695H
750	86	175	85	73	60	7,500	1.3	60	4.3	MLCA800V757KB86175B
970	116	120	82	71	58	7,760	1.2	60	5.0	MLCA800V977KB116120I
1,000	86	225	85	73	60	8,000	1.4	60	4.0	MLCA800V108KB86225B
1,000	116	136	76	66	54	8,000	1.4	60	4.9	MLCA800V108KB116136I
1,200	116	155	100	90	74	9,600	0.8	60	4.6	MLCA800V128KB116155I
1,400	116	175	100	91	75	11,200	0.8	60	4.5	MLCA800V148KB116175I
1,800	116	230	100	100	86	11,700	1.0	60	2.7	MLCA800V188KB116230I
3,300	116	345	100	100	100	19,800	0.9	80	2.2	MLCA800V338KB116345I

• Please inquire us in case low frequency (commercial frequency) or frequency above 10kHz is included in ripple current.

POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

Standard Products Table

Nominal Capacitance C_N [μF]	Dimensions		Maximum ripple current (Arms) at 1kHz I_{max}			Maximum peak current $\hat{I}$ [Ap]	Equivalent Series Resistance ESR [mΩ]	Equivalent Series Inductance ESL [nH]	Thermal resistance R_{th} [K/W]	Part number
	Diameter ϕD [mm]	Case length L_1 [mm]								
			40°C	50°C	60°C					
Rated voltage U_N : 900Vdc	Test voltage between terminals U_{TT} : 1,350Vdc/10s, Test voltage between terminals and case U_{TC} : 3,000Vac/10s									
220	76	95	57	50	40	2,420	2.4	50	5.1	MLCA900V227KB7695B
290	86	95	65	56	46	3,190	1.7	50	5.6	MLCA900V297KB8695B
300	76	120	55	48	39	3,300	2.8	60	4.7	MLCA900V307KB76120B
330	76	136	54	47	38	3,630	3.0	60	4.6	MLCA900V337KB76136B
360	76	155	72	62	51	3,960	1.8	60	4.3	MLCA900V367KB76155B
400	86	120	66	57	47	4,400	1.9	60	4.8	MLCA900V407KB86120B
420	76	175	69	60	49	4,620	2.0	60	4.2	MLCA900V427KB76175B
450	86	136	64	56	46	4,950	2.1	60	4.6	MLCA900V457KB86136B
500	86	155	87	75	62	5,000	1.2	50	4.4	MLCA900V507KB86155B
540	116	95	79	68	56	5,400	1.2	50	5.4	MLCA900V547KB11695H
560	86	175	82	71	58	5,600	1.4	60	4.3	MLCA900V567KB86175B
740	116	120	79	68	55	7,400	1.3	60	5.0	MLCA900V747KB116120I
860	116	136	71	62	51	8,600	1.6	60	4.9	MLCA900V867KB116136B
900	116	155	98	85	70	8,760	0.9	60	4.6	MLCA900V907KB116155I
1,100	116	175	99	86	70	8,800	0.9	60	4.5	MLCA900V118KB116175I
1,400	116	230	100	100	82	11,200	1.1	60	2.7	MLCA900V148KB116230I
2,200	116	345	100	100	91	13,200	1.1	80	2.2	MLCA900V228KB116345I
Rated voltage U_N : 1,100Vdc	Test voltage between terminals U_{TT} : 1,650Vdc/10s, Test voltage between terminals and case U_{TC} : 3,000Vac/10s									
170	76	95	54	47	38	2,040	2.7	50	5.1	MLCA1100V177KB7695B
240	86	95	61	53	43	2,880	1.9	50	5.6	MLCA1100V247KB8695B
240	76	120	52	45	37	2,880	3.1	60	4.7	MLCA1100V247KB76120B
270	76	136	51	44	36	3,240	3.4	60	4.6	MLCA1100V277KB76136B
300	76	155	68	59	48	3,600	2.0	60	4.3	MLCA1100V307KB76155B
320	86	120	62	53	44	3,840	2.2	60	4.8	MLCA1100V327KB86120B
350	76	175	64	56	46	4,200	2.3	60	4.2	MLCA1100V357KB76175B
420	86	136	60	52	43	5,040	2.4	60	4.6	MLCA1100V427KB86136B
420	86	155	81	70	57	5,040	1.4	50	4.4	MLCA1100V427KB86155B
450	116	95	75	65	53	5,400	1.3	50	5.4	MLCA1100V457KB11695H
480	86	175	76	66	54	5,760	1.6	60	4.3	MLCA1100V487KB86175B
620	116	120	73	63	52	6,200	1.5	60	5.0	MLCA1100V627KB116120I
650	86	225	75	65	53	6,500	1.8	60	4.0	MLCA1100V657KB86225B
690	116	136	69	60	49	6,900	1.7	60	4.9	MLCA1100V697KB116136I
770	116	155	93	81	66	7,700	1.0	60	4.6	MLCA1100V777KB116155I
910	116	175	94	82	67	9,100	1.0	60	4.5	MLCA1100V917KB116175I
1,200	116	230	100	96	79	9,600	1.2	60	2.7	MLCA1100V128KB116230I
2,000	116	345	100	100	84	16,000	1.3	80	2.2	MLCA1100V208KB116345I
Rated voltage U_N : 1,200Vdc	Test voltage between terminals U_{TT} : 1,800Vdc/10s, Test voltage between terminals and case U_{TC} : 3,000Vac/10s									
140	76	95	51	44	36	1,680	3.0	50	5.1	MLCA1200V147KB7695B
190	86	95	58	51	41	2,280	2.1	50	5.6	MLCA1200V197KB8695B
200	76	120	50	43	35	2,400	3.4	50	4.7	MLCA1200V207KB76120B
220	76	136	48	42	34	2,640	3.7	60	4.6	MLCA1200V227KB76136B
240	76	155	65	56	46	2,880	2.2	60	4.3	MLCA1200V247KB76155B
260	86	120	59	51	42	3,120	2.4	60	4.8	MLCA1200V267KB86120B
280	76	175	62	53	44	3,360	2.5	60	4.2	MLCA1200V287KB76175B
300	86	136	58	50	41	3,600	2.6	60	4.6	MLCA1200V307KB86136B
330	86	155	78	67	55	3,960	1.5	50	4.4	MLCA1200V337KB86155B
360	116	95	73	63	51	4,320	1.4	50	5.4	MLCA1200V367KB11695H
380	86	175	72	62	51	4,560	1.8	60	4.3	MLCA1200V387KB86175B
500	116	120	69	59	49	5,500	1.7	60	5.0	MLCA1200V507KB116120I
540	86	225	71	61	50	5,940	2.0	60	4.0	MLCA1200V547KB86225B
570	116	136	66	57	46	6,270	1.9	60	4.9	MLCA1200V577KB116136I
620	116	155	89	77	63	6,820	1.1	60	4.6	MLCA1200V627KB116155I
720	116	175	90	78	64	7,920	1.1	60	4.5	MLCA1200V727KB116175I
950	116	230	100	92	75	9,500	1.3	60	2.7	MLCA1200V957KB116230I
1,600	116	345	100	100	95	16,000	1.0	80	2.2	MLCA1200V168KB116345I

• Please inquire us in case low frequency (commercial frequency) or frequency above 10kHz is included in ripple current.

Standard Products Table

Nominal Capacitance C_N [μF]	Dimensions		Maximum ripple current (Arms) at 1kHz I_{max}			Maximum peak current I [Ap]	Equivalent Series Resistance ESR [mΩ]	Equivalent Series Inductance ESL [nH]	Thermal resistance R_{th} [K/W]	Part number
	Diameter ϕD [mm]	Case length L_1 [mm]								
			40°C	50°C	60°C					
Rated voltage U_N : 1,300Vdc	Test voltage between terminals U_{TT} : 1,950Vdc/10s, Test voltage between terminals and case U_{TC} : 3,000Vac/10s									
120	76	95	49	42	34	1,440	3.3	50	5.1	MLCA1300V127KB7695B
160	86	95	56	48	39	1,920	2.3	50	5.6	MLCA1300V167KB8695B
160	76	120	48	42	34	1,920	3.7	60	4.7	MLCA1300V167KB76120B
180	76	136	46	40	33	2,160	4.1	60	4.6	MLCA1300V187KB76136B
210	76	155	62	54	44	2,520	2.4	60	4.3	MLCA1300V217KB76155B
220	86	120	57	49	40	2,640	2.6	60	4.8	MLCA1300V227KB86120B
240	76	175	58	51	41	2,880	2.8	60	4.2	MLCA1300V247KB76175B
250	86	136	55	47	39	3,000	2.9	60	4.6	MLCA1300V257KB86136B
280	86	155	73	63	52	3,360	1.7	50	4.4	MLCA1300V287KB86155B
310	116	95	68	59	48	3,720	1.6	50	5.4	MLCA1300V317KB11695H
320	86	175	70	61	49	3,840	1.9	60	4.3	MLCA1300V327KB86175B
420	116	120	67	58	47	5,040	1.8	60	5.0	MLCA1300V427KB116120I
450	86	225	67	58	48	5,400	2.2	60	4.0	MLCA1300V457KB86225B
480	116	136	62	54	44	5,760	2.1	60	4.9	MLCA1300V487KB116136I
530	116	155	89	77	63	6,360	1.1	60	4.6	MLCA1300V537KB116155I
630	116	175	90	78	64	7,560	1.1	60	4.5	MLCA1300V637KB116175I
820	116	230	99	86	70	9,840	1.5	60	2.7	MLCA1300V827KB116230I
1,400	116	345	100	100	87	15,400	1.2	80	2.2	MLCA1300V148KB116345I
Rated voltage U_N : 1,500Vdc	Test voltage between terminals U_{TT} : 2,250Vdc/10s, Test voltage between terminals and case U_{TC} : 3,000Vac/10s									
170	86	120	52	45	37	2,040	3.1	60	4.8	MLCA1500V177KB86120B
210	86	155	67	58	48	2,520	2.0	60	4.4	MLCA1500V217KB86155B
310	116	120	62	53	44	3,720	2.1	60	5.0	MLCA1500V317KB116120I
330	86	225	63	55	45	3,960	2.5	60	4.0	MLCA1500V337KB86225B
400	116	155	79	68	56	4,800	1.4	60	4.6	MLCA1500V407KB116155I
600	116	230	93	81	66	7,200	1.7	60	2.7	MLCA1500V607KB116230I
1,000	116	345	100	100	95	12,000	1.0	80	2.2	MLCA1500V108KB116345I
Rated voltage U_N : 1,700Vdc	Test voltage between terminals U_{TT} : 2,550Vdc/10s, Test voltage between terminals and case U_{TC} : 4,000Vac/10s									
130	86	120	49	42	35	1,560	3.5	60	4.8	MLCA1700V137KB86120B
160	86	155	63	54	44	1,920	2.3	60	4.4	MLCA1700V167KB86155B
240	116	120	58	50	41	2,880	2.4	60	5.0	MLCA1700V247KB116120I
250	86	225	59	51	42	3,000	2.9	60	4.0	MLCA1700V257KB86225B
300	116	155	74	64	52	3,600	1.6	60	4.6	MLCA1700V307KB116155I
460	116	230	91	79	64	5,520	1.8	60	2.7	MLCA1700V467KB116230I
Rated voltage U_N : 2,000Vdc	Test voltage between terminals U_{TT} : 3,000Vdc/10s, Test voltage between terminals and case U_{TC} : 4,000Vac/10s									
100	86	120	46	40	32	1,200	4.0	60	4.8	MLCA2000V107KB86120B
120	86	155	48	42	34	1,440	3.8	60	4.4	MLCA2000V127KB86155B
190	116	120	54	47	38	2,280	2.7	60	5.0	MLCA2000V197KB116120I
190	86	225	55	48	39	2,280	3.3	60	4.0	MLCA2000V197KB86225B
240	116	155	70	60	49	2,880	1.8	60	4.6	MLCA2000V247KB116155I
370	116	230	82	71	58	4,440	2.2	60	2.7	MLCA2000V377KB116230I
600	116	345	100	100	87	6,000	1.2	80	2.2	MLCA2000V607KB116345I
Rated voltage U_N : 2,200Vdc	Test voltage between terminals U_{TT} : 3,300Vdc/10s, Test voltage between terminals and case U_{TC} : 4,000Vac/10s									
90	86	136	48	42	34	1,080	3.7	60	4.6	MLCA2200V906KB86136B
140	116	120	60	52	43	1,680	2.2	60	5.0	MLCA2200V147KB116120I
150	86	225	73	63	51	1,800	1.9	60	4.0	MLCA2200V157KB86225B
170	116	155	59	51	42	2,040	2.5	60	4.6	MLCA2200V177KB116155I
210	116	175	90	78	64	2,520	1.1	60	4.5	MLCA2200V217KB116175I
290	116	230	100	89	73	3,480	1.4	60	2.7	MLCA2200V297KB116230I
450	116	345	100	100	87	5,400	1.2	80	2.2	MLCA2200V457KB116345I

• Please inquire us in case low frequency (commercial frequency) or frequency above 10kHz is included in ripple current.



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℃ (voltage derating is required at ≥ + 85℃)
Rated Voltage U_N	700, 900, 1,100V.DC
Voltage test between terminals	$1.5 \times U_N / 10s$
Terminals	Tinned wire leads
Reference standard	IEC 61071 : 2007
Dielectric	Polypropylene
Case	UL94V-0
Filling material	UL94V-0
Environmental regulation	Comply with RoHS

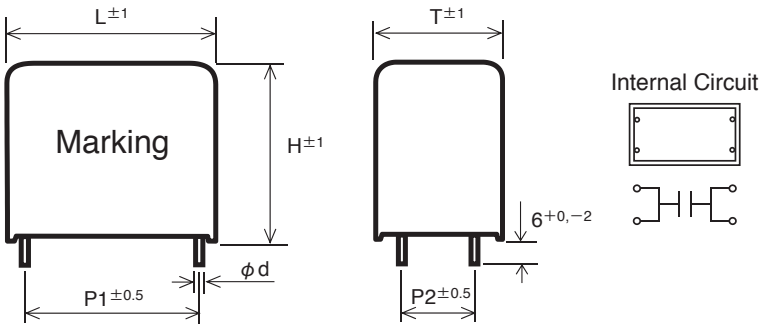
* Temperature in table is value at hot spot on capacitor case.

Dimension

Case (mm)			Terminal (mm)			Case dimension code
T	H	L	P1	P2	ϕd	
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

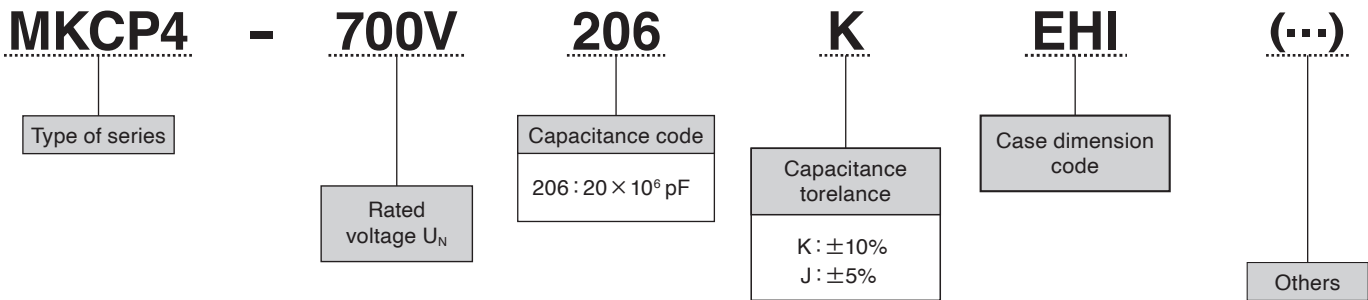
PLASTIC FILM CAPACITORS

Outline of drawings and dimensions



Part number

Example : MKCP4 series 700V.dc 20 μ F $\pm$ 10%



Standard Products Table

Nominal Capacitance C_N [μ F]	Dimensions [mm]						dv/dt [V/us]	Maximum peak current $\hat{I}$ [A _p]	Maximum ripple current I_{max} [Arms] (at85°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



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 ≥ + 85°C)
Rated Voltage U_N	700, 900, 1,100V.DC
Voltage test between terminals	$1.5 \times U_N / 10s$
Terminals	Tinned wire leads
Reference standard	IEC 61071 : 2007
Dielectric	Polypropylene
Case	UL94V-0
Filling material	UL94V-0
Environmental regulation	Comply with RoHS

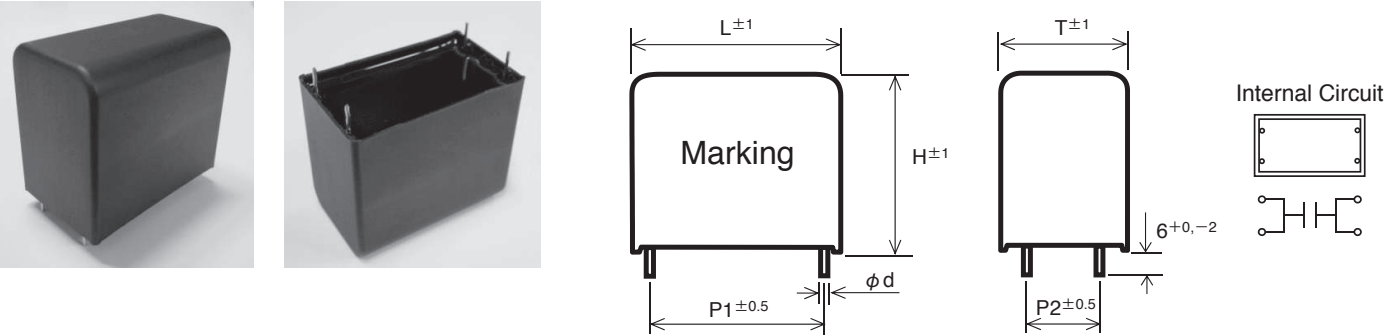
* Temperature in table is value at hot spot on capacitor case.

Dimension

Case (mm)			Terminal (mm)			Case dimension code
T	H	L	P1	P2	ϕd	
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

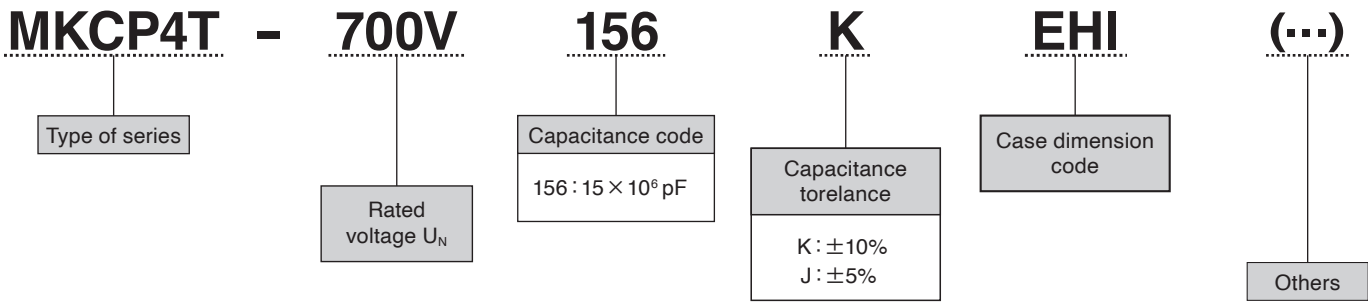
PLASTIC FILM CAPACITORS

Outline of drawings and dimensions



Part number

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



Standard Products Table

Nominal Capacitance C_N [μF]	Dimensions (mm)						dv/dt [V/μs]	Maximum peak current $\hat{i}$ [A _P]	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				
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

NEW!

MKCA Series

(Resin-encased Metallized Polypropylene film capacitors)

Features

- Suitable for DC link circuit
- Wide range of rated voltages (450 ~ 1,200V.DC)

Specifications

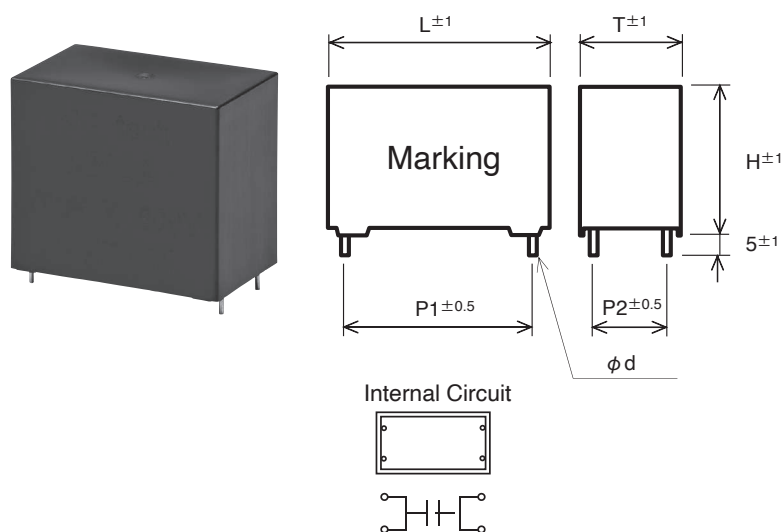
Items	Description
Operating Temperature range *	-40 ~ +105°C (85°C ~ 105°C : decreasing factor 1.4% per °C for U_N)
Rated Voltage U_N	450 ~ 1,200V.DC at 85°C
Voltage test between terminals	$1.5 \times U_N / 10s$
Terminals	Tinned wire leads
Reference standard	IEC 61071 : 2017, UL810
Dielectric	Polypropylene
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)			Case dimension code
T	H	L	
9	18	32	G10
11	20	32	G30
13	22	32	G50
14	28	32	G60
15	24.5	32	G70
18	28	32	GA0
18	33	32	GA1
22	37	32	GE0
19	32	42.5	JB0
20	40	42.5	JC0
22	33.5	42.5	JE0
22	37	42.5	JE1
24	18	42.5	JG0
24	44	42.5	JG1
28	37	42.5	JL0
30	45	42.5	JN0
35	50	42.5	JP0
25	45	57.5	MH0
30	45	57.5	MN0
35	45	57.5	MP0
35	50	57.5	MP1
35	55	57.5	MP2
35	60	57.5	MP3
35	65	57.5	MP4
35	70	57.5	MP5
35	75	57.5	MP6
35	80	57.5	MP7
45	55	57.5	MR0
45	60	57.5	MR1
45	65	57.5	MR2

Outline of drawings and dimensions



Part number

Example : MKCA series 700V.dc 35 μ F $\pm$ 10%

MKCA	700V	356	K	JP0	4	E	D	(...)
Type of series	Rated voltage U_N	Capacitance code 356 : 35×10^6 pF	Capacitance tolerance K : $\pm$ 10% J : $\pm$ 5%	Case demension code	Terminal 2 : 2pins 4 : 4pins	Terminal length E : 5mm	Lead diameter B : 0.8mm C : 1.0mm D : 1.2mm	Others

Standard Products Table

Nominal Capacitance C_N [μ F]	Dimensions [mm]						dv/dt [V/ μ s]	Maximum peak current $\hat{I}$ [A _P]	Maximum ripple current I_{max} (Arms) (at 70°C, 10kHz)	ESR (typ.) [m Ω]	R_{th} [K/W]	Part number
	T	H	L	$P1$	$P2$	ϕd						
Rated voltage U_N : 450Vdc									Voltage test between terminals U_{TT} : 675Vdc/10s			
3	11	20	32	27.5	—	0.8	50	150	4.0	28.0	41.3	MKCA450V305KG302EB
5	13	22	32	27.5	—	0.8	50	250	6.0	14.0	35.6	MKCA450V505KG502EB
10	18	33	32	27.5	—	0.8	50	500	10.0	8.0	22.5	MKCA450V106KGA12EB
15	22	37	32	27.5	—	0.8	50	750	12.0	6.5	18.5	MKCA450V156KGE02EB
15	22	37	32	27.5	10.2	0.8	50	750	13.0	5.5	18.5	MKCA450V156KGE04EB
20	20	40	42.5	37.5	10.2	1	30	600	12.5	6.5	16.6	MKCA450V206KJC04EC
22	20	40	42.5	37.5	10.2	1	30	660	13.5	6.5	16.6	MKCA450V226KJC04EC
30	24	44	42.5	37.5	10.2	1	30	900	15.0	6.0	14.1	MKCA450V306KJG14EC
35	30	45	42.5	37.5	20.3	1.2	30	1,050	16.5	5.8	12.2	MKCA450V356KJN04ED
40	30	45	42.5	37.5	20.3	1.2	30	1,200	17.0	5.5	12.2	MKCA450V406KJN04ED
50	35	50	42.5	37.5	20.3	1.2	30	1,500	19.5	5.0	10.4	MKCA450V506KJP04ED
60	30	45	57.5	52.5	20.3	1.2	15	900	17.0	6.8	9.8	MKCA450V606KMN04ED
75	35	50	57.5	52.5	20.3	1.2	15	1,125	20.0	5.0	8.4	MKCA450V756KMP14ED
Rated voltage U_N : 600Vdc									Voltage test between terminals U_{TT} : 900Vdc/10s			
3	11	20	32	27.5	—	0.8	50	150	3.5	31.8	41.3	MKCA600V305KG302EB
4	11	20	32	27.5	—	0.8	50	200	4.5	23.9	41.3	MKCA600V405KG302EB
5	14	28	32	27.5	—	0.8	50	250	6.0	14.5	28.8	MKCA600V505KG602EB
10	18	33	32	27.5	—	0.8	50	500	8.5	9.7	22.5	MKCA600V106KGA12EB
15	22	37	32	27.5	—	0.8	50	750	10.5	9.0	18.5	MKCA600V156KGE02EB
20	20	40	42.5	37.5	10.2	1	30	600	11.0	9.8	16.6	MKCA600V206KJC04EC
30	28	37	42.5	37.5	10.2	1	30	900	13.0	5.5	14.6	MKCA600V306KJL04EC
40	30	45	42.5	37.5	20.3	1.2	30	1,200	17.5	5.2	12.2	MKCA600V406KJN04ED
50	35	50	57.5	52.5	20.3	1.2	15	750	14.0	6.5	8.4	MKCA600V506KMP14ED
60	35	50	57.5	52.5	20.3	1.2	15	900	16.0	6.0	8.4	MKCA600V606KMP14ED
70	35	50	57.5	52.5	20.3	1.2	15	1,050	20.5	5.6	8.4	MKCA600V706KMP14ED
Rated voltage U_N : 700Vdc									Voltage test between terminals U_{TT} : 1,050Vdc/10s			
1	9	18	32	27.5	—	0.8	50	50	2.5	54.0	48.7	MKCA700V105KG102EB
3.3	14	28	32	27.5	—	0.8	50	165	5.0	26.0	28.8	MKCA700V335KG602EB
5	14	28	32	27.5	—	0.8	50	250	5.5	16.0	28.8	MKCA700V505KG602EB
6	18	28	32	27.5	—	0.8	50	300	6.0	14.0	25.3	MKCA700V605KGA02EB
8	18	33	32	27.5	—	0.8	50	400	9.0	10.0	22.5	MKCA700V805KGA12EB
10	22	37	32	27.5	—	0.8	50	500	12.0	6.5	18.5	MKCA700V106KGE02EB
12	22	37	32	27.5	—	0.8	50	600	12.5	6.0	18.5	MKCA700V126KGE02EB
15	22	33.5	42.5	37.5	—	1	30	450	9.0	9.0	17.9	MKCA700V156KJE02EC
15	22	33.5	42.5	37.5	10.2	1	30	450	10.0	8.0	17.9	MKCA700V156KJE04EC
15	20	40	42.5	37.5	10.2	1	30	450	10.0	8.0	16.6	MKCA700V156KJC04EC
20	28	37	42.5	37.5	10.2	1	30	600	12.0	7.5	14.6	MKCA700V206KJL04EC
22	24	44	42.5	37.5	10.2	1	30	660	14.0	6.5	14.1	MKCA700V226KJG14EC
25	24	44	42.5	37.5	10.2	1	30	750	15.0	6.0	14.1	MKCA700V256KJG14EC
30	30	45	42.5	37.5	20.3	1.2	30	900	16.0	5.8	12.2	MKCA700V306KJN04ED
35	35	50	42.5	37.5	20.3	1.2	30	1,050	18.5	5.5	10.4	MKCA700V356KJP04ED
40	30	45	57.5	52.5	20.3	1.2	15	600	14.0	6.2	9.8	MKCA700V406KMN04ED
45	30	45	57.5	52.5	20.3	1.2	15	675	15.5	5.1	9.8	MKCA700V456KMN04ED
50	35	50	57.5	52.5	20.3	1.2	15	750	15.0	4.8	8.4	MKCA700V506KMP14ED
55	35	50	57.5	52.5	20.3	1.2	15	825	16.0	4.5	8.4	MKCA700V556KMP14ED
60	35	50	57.5	52.5	20.3	1.2	15	900	18.0	4.2	8.4	MKCA700V606KMP14ED
80	35	60	57.5	52.5	20.3	1.2	15	1,200	23.0	3.5	7.3	MKCA700V806KMP34ED
Rated voltage U_N : 800Vdc									Voltage test between terminals U_{TT} : 1,200Vdc/10s			
1	9	18	32	27.5	—	0.8	50	50	2.0	62.0	48.7	MKCA800V105KG102EB
2	11	20	32	27.5	—	0.8	50	100	3.5	31.0	41.3	MKCA800V205KG302EB
3	13	22	32	27.5	—	0.8	50	150	4.0	25.0	35.6	MKCA800V305KG502EB
3.3	14	28	32	27.5	—	0.8	50	165	4.5	21.0	28.8	MKCA800V335KG602EB
5	14	28	32	27.5	—	0.8	50	250	7.0	14.0	28.8	MKCA800V505KG602EB
6	18	28	32	27.5	—	0.8	50	300	7.5	13.5	25.3	MKCA800V605KGA02EB
8	18	33	32	27.5	—	0.8	50	400	8.0	12.5	22.5	MKCA800V805KGA12EB
9	18	33	32	27.5	—	0.8	50	450	8.5	11.1	22.5	MKCA800V905KGA12EB
10	22	37	32	27.5	—	0.8	50	500	9.5	11.0	18.5	MKCA800V106KGE02EB
10	19	32	42.5	37.5	—	1	30	300	8.0	12.5	20	MKCA800V106KJB02EC
15	20	40	42.5	37.5	10.2	1	30	450	10.0	11.9	16.6	MKCA800V156KJC04EC
20	28	37	42.5	37.5	10.2	1	30	600	12.0	8.9	14.6	MKCA800V206KJL04EC
20	24	44	42.5	37.5	10.2	1	30	600	12.5	8.9	14.1	MKCA800V206KJG14EC
22	24	44	42.5	37.5	10.2	1	30	660	14.0	6.0	14.1	MKCA800V226KJG14EC
25	30	45	42.5	37.5	20.3	1.2	30	750	15.0	6.0	12.2	MKCA800V256KJN04ED
30	30	45	42.5	37.5	20.3	1.2	30	900	16.5	5.9	12.2	MKCA800V306KJN04ED
35	30	45	57.5	52.5	20.3	1.2	15	525	12.0	9.5	9.8	MKCA800V356KMN04ED
40	30	45	57.5	52.5	20.3	1.2	15	600	13.5	8.9	9.8	MKCA800V406KMN04ED
45	30	45	57.5	52.5	20.3	1.2	15	675	15.0	7.9	9.8	MKCA800V456KMN04ED
50	35	50	57.5	52.5	20.3	1.2	15	750	16.5	7.1	8.4	MKCA800V506KMP14ED
55	35	50	57.5	52.5	20.3	1.2	15	825	18.5	6.5	8.4	MKCA800V556KMP14ED
65	35	60	57.5	52.5	20.3	1.2	15	975	19.0	5.5	7.3	MKCA800V656KMP34ED
70	35	60	57.5	52.5	20.3	1.2	15	1,050	20.0	5.1	7.3	MKCA800V706KMP34ED
75	35	65	57.5	52.5	20.3	1.2	15	1,125	22.0	4.8	6.9	MKCA800V756KMP44ED

POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

Standard Products Table

Nominal Capacitance C_N [μF]	Dimensions (mm)						dv/dt	Maximum peak current $\hat{i}$ [A _P]	Maximum ripple current I_{max} [Arms] (at70°C, 10kHz)	ESR (typ.) [m Ω]	R_{th} [K/W]	Part number
	T	H	L	$P1$	$P2$	ϕd	[V/us]					
Rated voltage U_N : 900Vdc									Voltage test between terminals U_{TT} : 1,350Vdc/10s			
1	9	18	32	27.5	—	0.8	50	50	1.5	86.0	48.7	MKCA900V105KG102EB
2	11	20	32	27.5	—	0.8	50	100	3.0	43.0	41.3	MKCA900V205KG302EB
3	13	22	32	27.5	—	0.8	50	150	4.0	28.7	35.6	MKCA900V305KG502EB
3.3	15	24.5	32	27.5	—	0.8	50	165	4.5	26.5	30.6	MKCA900V335KG702EB
5	18	28	32	27.5	—	0.8	50	250	5.5	22.5	25.3	MKCA900V505KGA02EB
6	18	33	32	27.5	—	0.8	50	300	6.5	18.0	22.5	MKCA900V605KGA12EB
8	22	37	32	27.5	—	0.8	50	400	8.5	13.5	18.5	MKCA900V805KGE02EB
10	22	37	32	27.5	—	0.8	50	500	9.0	12.0	18.5	MKCA900V106KGE02EB
10	20	40	42.5	37.5	—	1	30	300	7.0	16.7	16.6	MKCA900V106KJC02EC
10	20	40	42.5	37.5	10.2	1	30	300	7.0	16.7	16.6	MKCA900V106KJC04EC
15	24	44	42.5	37.5	—	1	30	450	10.5	11.1	14.1	MKCA900V156KJG12EC
18	24	44	42.5	37.5	—	1	30	540	12.0	9.3	14.1	MKCA900V186KJG12EC
18	24	44	42.5	37.5	10.2	1	30	540	12.0	9.3	14.1	MKCA900V186KJG14EC
20	30	45	42.5	37.5	—	1	30	600	13.5	8.5	12.2	MKCA900V206KJN02EC
20	30	45	42.5	37.5	20.3	1.2	30	600	13.5	8.5	12.2	MKCA900V206KJN04ED
25	30	45	42.5	37.5	20.3	1.2	30	750	15.5	6.7	12.2	MKCA900V256KJN04ED
30	35	50	42.5	37.5	20.3	1.2	30	900	18.5	5.6	10.4	MKCA900V306KJP04ED
30	30	45	57.5	52.5	20.3	1.2	15	450	10.5	11.1	9.8	MKCA900V306KMN04ED
35	35	50	57.5	52.5	20.3	1.2	15	525	13.5	9.5	8.4	MKCA900V356KMP14ED
40	35	50	57.5	52.5	20.3	1.2	15	600	14.0	8.4	8.4	MKCA900V406KMP14ED
50	35	50	57.5	52.5	20.3	1.2	15	750	17.5	6.7	8.4	MKCA900V506KMP14ED
55	35	60	57.5	52.5	20.3	1.2	15	825	19.0	6.1	7.3	MKCA900V556KMP34ED
60	35	65	57.5	52.5	20.3	1.2	15	900	22.0	5.6	6.9	MKCA900V606KMP44ED
Rated voltage U_N : 1,000Vdc									Voltage test between terminals U_{TT} : 1,500Vdc/10s			
1	11	20	32	27.5	—	0.8	70	70	2.5	45.0	41.3	MKCA1000V105KG302EB
2	13	22	32	27.5	—	0.8	70	140	3.5	38.2	35.6	MKCA1000V205KG502EB
3	15	24.5	32	27.5	—	0.8	70	210	5.0	25.5	30.6	MKCA1000V305KG702EB
5	18	33	32	27.5	—	0.8	70	350	7.5	15.3	22.5	MKCA1000V505KGA12EB
8	22	37	32	27.5	—	0.8	70	560	9.0	13.0	18.5	MKCA1000V805KGE02EB
10	20	40	42.5	37.5	—	1	35	350	6.5	15.6	16.6	MKCA1000V106KJC02EC
10	20	40	42.5	37.5	10.2	1	35	350	6.5	15.6	16.6	MKCA1000V106KJC04EC
12	24	44	42.5	37.5	10.2	1	35	420	10.0	13.0	14.1	MKCA1000V126KJG14EC
15	24	44	42.5	37.5	—	1	35	525	11.5	10.4	14.1	MKCA1000V156KJG12EC
15	24	44	42.5	37.5	10.2	1	35	525	11.5	10.4	14.1	MKCA1000V156KJG14EC
15	30	45	42.5	37.5	20.3	1.2	35	525	12.5	10.4	12.2	MKCA1000V156KJN04ED
20	30	45	42.5	37.5	20.3	1.2	35	700	14.0	7.8	12.2	MKCA1000V206KJN04ED
25	35	50	42.5	37.5	20.3	1.2	35	875	17.5	6.2	10.4	MKCA1000V256KJP04ED
30	30	45	57.5	52.5	20.3	1.2	17	510	11.5	10.4	9.8	MKCA1000V306KMN04ED
35	35	50	57.5	52.5	20.3	1.2	17	595	13.5	8.9	8.4	MKCA1000V356KMP14ED
40	35	50	57.5	52.5	20.3	1.2	17	680	15.0	7.8	8.4	MKCA1000V406KMP14ED
40	35	60	57.5	52.5	20.3	1.2	17	680	17.0	7.8	7.3	MKCA1000V406KMP34ED
50	35	65	57.5	52.5	20.3	1.2	17	850	19.0	6.2	6.9	MKCA1000V506KMP44ED
Rated voltage U_N : 1,100Vdc									Voltage test between terminals U_{TT} : 1,650Vdc/10s			
1	11	20	32	27.5	—	0.8	70	70	1.5	80.0	41.3	MKCA1100V105KG302EB
2	15	24.5	32	27.5	—	0.8	70	140	4.0	25.0	30.6	MKCA1100V205KG702EB
2.2	14	28	32	27.5	—	0.8	70	154	5.0	18.5	28.8	MKCA1100V225KG602EB
4	18	33	32	27.5	—	0.8	70	280	7.5	15.3	22.5	MKCA1100V405KGA12EB
5	22	37	32	27.5	—	0.8	70	350	8.5	14.0	18.5	MKCA1100V505KGE02EB
6.8	22	33.5	42.5	37.5	10.2	1	40	272	6.0	20.5	17.9	MKCA1100V685KJE04EC
8	20	40	42.5	37.5	—	1	40	320	7.5	18.1	16.6	MKCA1100V805KJC02EC
8	20	40	42.5	37.5	10.2	1	40	320	7.5	18.1	16.6	MKCA1100V805KJC04EC
8	22	37	42.5	37.5	10.2	1	40	320	6.5	18.1	16.7	MKCA1100V805KJE14EC
9	22	37	42.5	37.5	10.2	1	40	360	7.5	16.1	16.7	MKCA1100V905KJE14EC
10	24	44	42.5	37.5	—	1	40	400	8.0	14.5	14.1	MKCA1100V106KJG12EC
10	24	44	42.5	37.5	10.2	1	40	400	8.0	14.5	14.1	MKCA1100V106KJG14EC
12	30	45	42.5	37.5	20.3	1.2	40	480	11.5	12.1	12.2	MKCA1100V126KJN04ED
15	30	45	42.5	37.5	20.3	1.2	40	600	12.0	9.7	12.2	MKCA1100V156KJN04ED
18	35	50	42.5	37.5	20.3	1.2	40	720	14.5	8.1	10.4	MKCA1100V186KJP04ED
20	30	45	57.5	52.5	20.3	1.2	20	400	8.0	14.5	9.8	MKCA1100V206KMN04ED
25	35	50	57.5	52.5	20.3	1.2	20	500	10.0	11.6	8.4	MKCA1100V256KMP14ED
30	35	50	57.5	52.5	20.3	1.2	20	600	12.0	9.7	8.4	MKCA1100V306KMP14ED
35	35	60	57.5	52.5	20.3	1.2	20	700	16.0	5.5	7.3	MKCA1100V356KMP34ED
40	35	65	57.5	52.5	20.3	1.2	20	800	17.0	4.9	6.9	MKCA1100V406KMP44ED

Standard Products Table

Nominal Capacitance C_N [μ F]	Dimensions [mm]						dv/dt	Maximum peak current $\hat{i}$ [A _P]	Maximum ripple current I_{max} [Arms] (at 70°C, 10kHz)	ESR (typ.) [m Ω]	R_{th} [K/W]	Part number
	T	H	L	$P1$	$P2$	ϕd	[V/ μ s]					
Rated voltage U_N : 1,200Vdc									Voltage test between terminals U_{TT} : 1,800Vdc/10s			
1	11	20	32	27.5	—	0.8	80	80	3.5	39.5	41.3	MKCA1200V105KG302EB
2.2	18	28	32	27.5	—	0.8	80	176	5.5	17.0	25.3	MKCA1200V225KGA02EB
3	18	28	32	27.5	—	0.8	80	240	7.0	16.0	25.3	MKCA1200V305KGA02EB
3.3	18	33	32	27.5	—	0.8	80	264	8.0	13.5	22.5	MKCA1200V335KGA12EB
5	22	37	32	27.5	—	0.8	80	400	9.0	12.7	18.5	MKCA1200V505KGE02EB
5	22	33.5	42.5	37.5	—	1	45	225	6.0	22.3	17.9	MKCA1200V505KJE02EC
6	20	40	42.5	37.5	—	1	45	270	6.5	18.6	16.6	MKCA1200V605KJC02EC
7	22	37	42.5	37.5	10.2	1	45	315	7.5	15.9	16.7	MKCA1200V705KJE14EC
8	24	44	42.5	37.5	10.2	1	45	360	8.5	13.9	14.1	MKCA1200V805KJG14EC
10	24	44	42.5	37.5	10.2	1	45	450	10.5	11.1	14.1	MKCA1200V106KJG14EC
10	30	45	42.5	37.5	20.3	1.2	45	450	12.0	11.1	12.2	MKCA1200V106KJN04ED
15	35	50	42.5	37.5	20.3	1.2	45	675	16.0	7.4	10.4	MKCA1200V156KJP04ED
20	30	45	57.5	52.5	20.3	1.2	23	460	10.0	11.9	9.8	MKCA1200V206KMN04ED
25	35	50	57.5	52.5	20.3	1.2	23	575	12.5	9.6	8.4	MKCA1200V256KMP14ED
30	35	60	57.5	52.5	20.3	1.2	23	690	16.0	8.0	7.3	MKCA1200V306KMP34ED



ATTENTION

- The description in this catalogue is as of Dec. 2023 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,

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