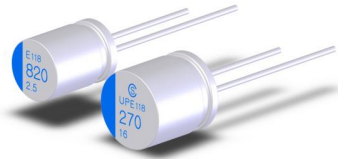


CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITOR





Application Guidelines

1. Polarity

CS-CAP is solid aluminum electrolytic capacitors with positive and negative electrodes. Do not reverse the polarity when using. If it is used with the polarities reversed, its life may shorten because of increasing leakage current or short circuit.

2. Prohibited circuits

Since problems can be expected due to leakage current increasing during soldering and other processes, CS-CAP cannot be used in the following circuits:

- (1) High impedance circuits
- (2) Coupling circuits
- (3) Time constant circuits
- (4) Connection of two or more capacitors in series for higher withstand voltage
- (5) Circuits to get bad influence by big leakage current

* In addition to the leakage current fluctuation above, the operational conditions such as characteristics at high and low temperature, damp heat and endurance stipulated in the specifications will affect the capacitance. The fluctuation of the capacitance may cause problem if it is used as a time constant capacitor, which is extremely sensitive to the fluctuation of the capacitance. Do not use it as a time constant capacitor. Additionally, please contact Taiwan Chinsan Electronic Industrial Co., Ltd. for usage of two or more CS-CAP in series for voltage proof.

3. Over voltage

Over voltage exceeding the rated voltage may not be applied even for an instant as if may cause a short circuit.

4. Sudden charge and discharge

Sudden charge and discharge restricted (for maintenance of high-proof reliability). A protection circuit is recommended for when a sudden charge or discharge causes excessive rush current because this is a main cause of short circuits and large leakage current. Use protection circuits if the rush current exceeds 10A. The rush current exceeds 10×the maximum allowable ripple current of CS-CAP. Be sure to insert a protection resistor of about 1kΩ for charge and discharge when measuring the leakage current.

5. Soldering

The soldering conditions are to be within the range prescribed in the specifications. If the specifications are not followed, there is the possibility of the appearance becoming defective and of increase of abnormal leakage current and capacity reduction when soldering is conducted under conditions that are harsher than those stipulated.

Sufficient PCB installation space(PCB means Printed Circuit Board after this.) Sealing resin of CS-CAP may have a bulge. The design must give consideration to the standard of height and lead position displacement given in the specifications.

6. Use of CS-CAP for industrial equipments

To ensure reliability when the CS-CAP is used in industrial equipments, design must allow for its capacitance, impedance and other characteristics.

7. Use of CS-CAP for human life equipments

In case of using in equipments regarding human life (e.g. Space equipment, aeronautic equipment and atomic equipment etc.), be sure to talk over the matter with Taiwan Chinsan Electronic Industrial Co., Ltd. Don't use without recognition document of Taiwan Chinsan Electronic Industrial Co., Ltd.

8. Storage

- (1) Store CS-CAP with the temperature range between 15 to 35 °C and the relative humidity of 75% or less without direct sunshine and store CS-CAP in the package states if possible.
- (2) CS-CAP are recommended that you shall open the bag just before use and CS-CAP shall be used up.
- (3) Never store CS-CAP in which it is directly exposed to water, brine, oil or in condensation status.
- (4) Never store CS-CAP in any area filled with poisonous gases(including hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and ammonia).
- (5) Never store CS-CAP in any area to which ultraviolet and/or radial rays are radiated.

9. Cleaning

Concerning about HCFC, higher alcohol system, petroleum system, terrene system, water system with surface active agent and other solvents the washing way (separateness or combinations) by soak, ultrasonic wave, boil, vapor etc. is confirmed under the maker's recommendation. Please contact us if you require further details.

10. Notes on circuit designs for CS-CAP

10.1 Performance

Use CS-CAP within the rating and performance ranges defined in this specifications.

10.2 Operating temperature and ripple current

If CS-CAP is used at a temperature higher than the upper category temperature, or excess ripple current flows through CS-CAP, there are high possibilities of life cycle reduction or leakage current increasing to cause CS-CAP defective.

10.3 Leakage current

The leakage current of CS-CAP may increase slightly by soldering conditions. The application of DC voltage enables the capacitors to be repaired by itself and this leads the leakage current to be smaller gradually.

10.4 Applied voltage

For the reliability of CS-CAP, it is recommended that the voltage applied to the peak value of the ripple voltage should be less than the rated voltage.

10.5 Failure mode

CS-CAP contains a conductive polymer. The life ends mostly due to random failure mode, mainly short circuit. In case of short circuit, CS-CAP can be overheated by continuous current flow, the case of CS-CAP would be removed by internal pressure increasing.

10.6 Insulation

Plastic coated case of CS-CAP can't guarantee the insulation. Do not use CS-CAP in areas requiring insulation.



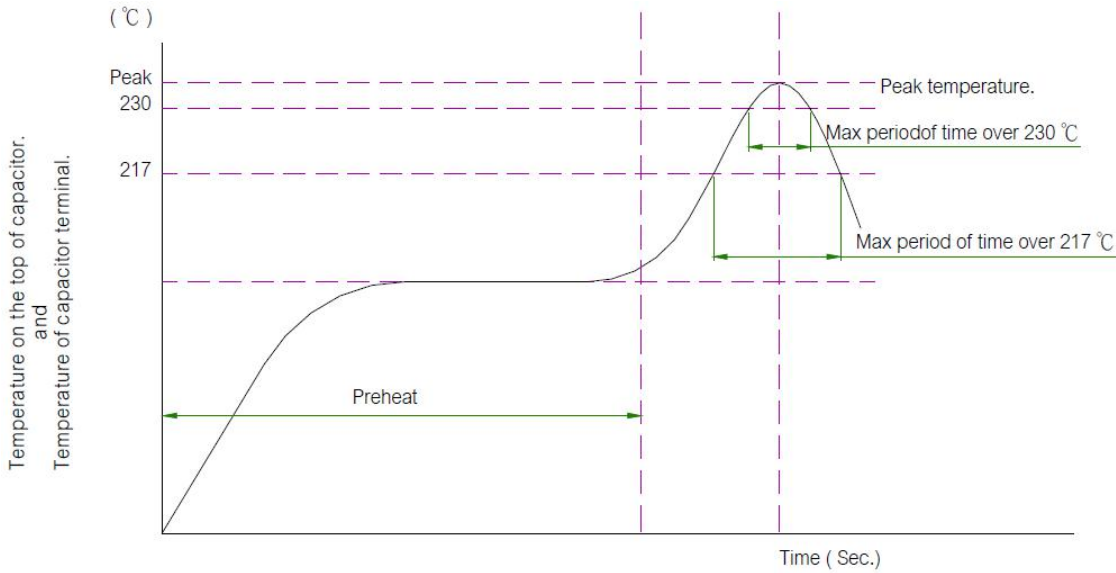
11. Soldering condition for CS-CAP

11.1 Wave soldering condition for DIP type

Wave soldering	Temperature	Time
Preheat	125°C Max	Within 120 sec
Soldering condition	260+5°C Max	Within 10 sec

11.2 Reflow soldering condition for SMD type

Preheat	Time maintained above 217°C	Time maintained above 230°C	Peak Temp	Reflow times
150°C~180°C 120 sec Max	50 sec Max	40 sec Max	260°C MAX	1 cycle only
			250°C MAX	2 cycle allowed



12. Catalogs

Specifications in the catalogs are subject to change without notice. The data shown in the catalogs are not assured as the whole performance values, but typical values.

For more details, refer to JEITA RCR-2367C (March 2019) with the title “Safety Application Guide for fixed aluminum electrolytic capacitors for use in electronic equipment”.



Capacitor Series Table

Series	Page	Features	Voltage Range (Vdc)	Capacitance Range (µF)	Operating Temperature Range (°C)	Endurance (Hours)	
DIP	UPS	10	Super Low ESR 7 mΩ and Large Capacitance	2.5 to 16	150 to 2,000	-55 to 105°C	2,000
	UPR	12	Super Low ESR 8 mΩ and Small size	2.5 to 16	100 to 820	-55 to 105°C	2,000
	UL	14	Small size, Low profile and Low ESR	2.5 to 16	100 to 680	-55 to 105°C	2,000
	UPE	16	Super Low ESR Endurance 105°C 5,000 hours	2.5 to 35	22 to 1,000	-55 to 105°C	5,000
	RP	18	ESR 12 mΩ	2.5 to 16	100 to 2,700	-55 to 105°C	2,000
	RH	20	Higher heat resistance 125°C High reliability	2.5 to 25	82 to 1,200	-55 to 125°C	2,000
	GP	22	Low ESR and High voltage	10 to 25	47 to 1,000	-55 to 105°C	2,000
	GV	24	High reliability and High voltage	25 to 100	18 to 470	-55 to 105°C	2,000
	GS	26	Low ESR and Large Capacitance	16 to 25	470 to 2,700	-55 to 105°C	2,000
NEW	UPC	28	Super Low ESR and High Ripple Current	6.3 to 22	180 to 1,000	-55 to 105°C	2,000
SMD	SG	30	Low ESR and High voltage	2.5 to 63	22 to 2,700	-55 to 105°C	2,000
	SP	32	Super Low ESR	2.5 to 25	47 to 2,700	-55 to 105°C	2,000
	SU	34	Ultra Low ESR	2.5 to 6.3	330 to 390	-55 to 105°C	2,000
	SE	36	Low ESR, Long Life 5,000 hours	2.5 to 35	47 to 560	-55 to 105°C	5,000

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS



◆ MARKING AND DATE CODE

Trade mark(Chinsan)
Series
Code
Rated Capacitance
Rated Voltage
Negative Polarity

Trade Mark "CS"	Chinsan Solid Capacitor, Show on Dimension $\geq 8 \Phi$																																																						
Code (Date Code)	<p>(1)DAY</p> <table border="1" style="width: 100%; text-align: center;"> <tr><th>Code</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr> <tr><td>Week</td><td>The first week</td><td>The second week</td><td>The third week</td><td>The fourth week</td><td>The fifth week</td></tr> </table> <p>(2)Month</p> <table border="1" style="width: 100%; text-align: center;"> <tr><th>Code</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr> <tr><td>Month</td><td>Jan</td><td>Feb</td><td>Mar</td><td>Apr</td><td>May</td><td>Jun</td></tr> <tr><th>Code</th><th>7</th><th>8</th><th>9</th><th>X</th><th>Y</th><th>Z</th></tr> <tr><td>Month</td><td>July</td><td>Aug</td><td>Sep</td><td>Oct</td><td>Nov</td><td>Dec</td></tr> </table> <p>(3)Year</p> <table border="1" style="width: 100%; text-align: center;"> <tr><th>Code</th><th>9</th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th></tr> <tr><td>Year</td><td>2019</td><td>2020</td><td>2021</td><td>2022</td><td>2023</td><td>2024</td></tr> </table>	Code	1	2	3	4	5	Week	The first week	The second week	The third week	The fourth week	The fifth week	Code	1	2	3	4	5	6	Month	Jan	Feb	Mar	Apr	May	Jun	Code	7	8	9	X	Y	Z	Month	July	Aug	Sep	Oct	Nov	Dec	Code	9	0	1	2	3	4	Year	2019	2020	2021	2022	2023	2024
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Series (Print Code)	<table border="1" style="width: 100%; text-align: center;"> <tr> <th>Series</th><th>UPS</th><th>UPR</th><th>UL</th><th>UPE</th><th>RP</th><th>RH</th><th>GP</th><th>GV</th><th>GS</th><th>UPC</th><th>SG</th><th>SP</th><th>SU</th><th>SE</th> </tr> <tr> <td>$\Phi 5 \sim \Phi 6.3$</td><td>--</td><td>R</td><td>L</td><td>E</td><td>--</td><td>H</td><td>P</td><td>V</td><td>--</td><td>C</td><td>G</td><td>P</td><td>U</td><td>E</td> </tr> <tr> <td>$\Phi 8 \sim \Phi 10$</td><td>UPS</td><td>--</td><td>UL</td><td>UPE</td><td>RP</td><td>RH</td><td>GP</td><td>GV</td><td>GS</td><td>UPC</td><td>SG</td><td>SP</td><td>SU</td><td>SE</td> </tr> </table>	Series	UPS	UPR	UL	UPE	RP	RH	GP	GV	GS	UPC	SG	SP	SU	SE	$\Phi 5 \sim \Phi 6.3$	--	R	L	E	--	H	P	V	--	C	G	P	U	E	$\Phi 8 \sim \Phi 10$	UPS	--	UL	UPE	RP	RH	GP	GV	GS	UPC	SG	SP	SU	SE									
Series	UPS	UPR	UL	UPE	RP	RH	GP	GV	GS	UPC	SG	SP	SU	SE																																									
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$\Phi 8 \sim \Phi 10$	UPS	--	UL	UPE	RP	RH	GP	GV	GS	UPC	SG	SP	SU	SE																																									

◆ LEAD FORMING TYPE

Type	Part Number	Dimensions (Unit: mm)															
		ΦD	F	t	L (Part number for lead length and pitch for taping)												
					3	4	U	7	D	X	R	B	E	G	2	M	T
					3.5	4.5	5.5	7	4	2.3	2.5	2.8	3.1	3.3	2.5	3.5	3.8
					± 0.5					± 0.2			± 0.3				
Cut	C	5	2	----													
		6.3	2.5	----													
		8	3.5	----													
		10	5	----													

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS



◆ TAPING

Figure 1	Symbol	Tolerance	Φ 5		Φ 6.3		Φ 8	
			PS	P5	PS	P5	PS	P5
	Φd	±0.05	0.45		0.45/0.6		0.6	
	P	±0.1	12.7		12.7		12.7	
	P0	±0.2	12.7		12.7		12.7	
	P1	±0.5	3.85		3.85		3.85	
	P2	±1.0	6.35		6.35		6.35	
	F	+0.8 -0.2	5		5		5	
	H	±0.5	17.5	18.5	17.5	18.5	17.5	18.5
	H0	±0.5	16		16		16	
	W	±0.5	18		18		18	
	W0	Minimum	12.5		12.5		12.5	
	D0	±0.2	4		4		4	
	t	±0.2	0.7		0.7		0.7	

Figure 2	Symbol	Tolerance	Φ 6.3		Φ 8			Φ 10		
			P2	P3	H3	P7	P5	H5	J5	
	Φd	±0.05	0.45/0.6		0.6			0.6		
	P	±0.1	12.7		12.7			12.7		
	P0	±0.2	12.7		12.7			12.7		
	P1	±0.5	5.1		4.6			3.85		
	P2	±1.0	6.35		6.35			6.35		
	F	+0.8 -0.2	2.5		3.5			5		
	H	±0.5	118.5	18.5	20	17.5	18.5	20	21	
	H0	±0.5	-	-			-			
	W	±0.5	18		18			18		
	W0	Minimum	12.5		12.5			12.5		
	D0	±0.2	4		4			4		
	t	±0.2	0.7		0.7			0.7		

Figure 3	Symbol	Tolerance	Φ 5	
			PZ	
	Φd	±0.05	0.45	
	P	±0.1	12.7	
	P0	±0.2	12.7	
	P1	±0.5	5.35	
	P2	±1.0	6.35	
	F	+0.8 -0.2	2.0	
	H	±0.5	18.5	
	H0	±0.5	-	
	W	±0.5	18	
	W0	Minimum	12.5	
	D0	±0.2	4	
	t	±0.2	0.7	

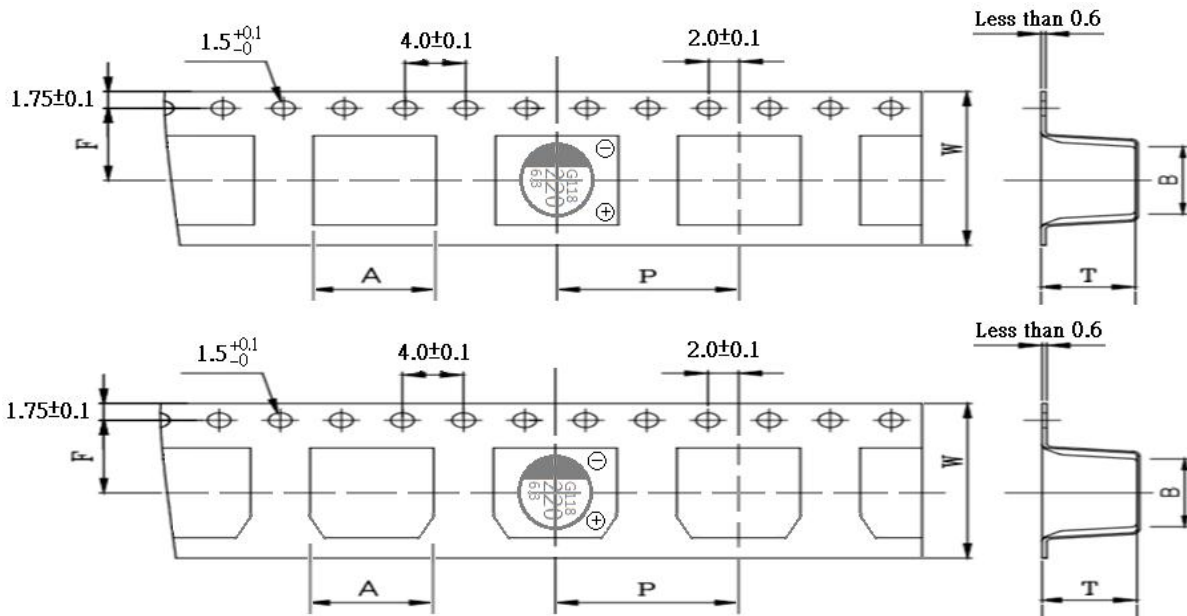
Packing quantity

Size		Inner Box	Carton Box
ØD	L	Q'ty (Pcs.)	Q'ty (Pcs.)
5	8~12	2500	12500
	5.5	8~12	2200
6.3	5~12	2000	10000
	16	2000	10000
8	6~12	1000	5000
	16~22	1200	6000
10	7~12	800	4000
	16~22	800	4000

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

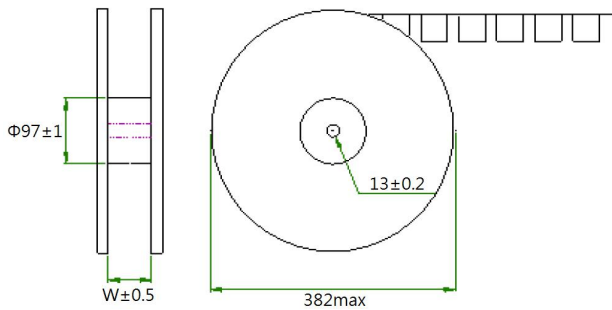


◆ SMD CARRIER TAPE DIMENTIONS



Dimension Code	Item	W	A	B	F	P	T
		±0.3	±0.2	±0.2	±0.1	±0.1	±0.2
	5057 (5x5.7)	16	5.6	5.6	7.5	12	6.2
	6343 (6.3x4.3)	16	7.0	7.0	7.5	12	4.7
	6357 (6.3x5.7)	16	7.0	7.0	7.5	12	6.2
	6377 (6.3x7.7)	16	7.0	7.0	7.5	12	8.2
	6309 (6.3x9)	16	7.0	7.0	7.5	12	10.0
	8067 (8x6.7)	24	8.7	8.7	11.5	12	7.2
	8097 (8x9.7)	24	8.7	8.7	11.5	16	10.3
	8127 (8x12.7)	24	8.7	8.7	11.5	16	13.2
	1077 (10x7.7)	24	10.7	10.7	11.5	16	8.3
	1124 (10x12.4)	24	10.7	10.7	11.5	16	13.0

◆ SMD REEL DIMENTIONS AND PACKING QUANTITY



Case Code	Quantity per reel	Quantity per Box※	W
5057	1200	12000	17.5
6343	1500	15000	
6357	1200	12000	
6377	1000	10000	
6309	800	8000	
8067	1000	7000	25.3
8097	500	3500	
8127	400	2800	
1077	500	3500	
1124	400	2800	

※ This may change according to a delivered quantity



PART NUMBER SYSTEM

◆ RADIAL LEAD TYPE

Series	Rated Voltage	Capacitance	Tolerance	Lead Forming Type	Lead Length	Case Dimension	Special Request
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
□ □ □	□ □	□ □ □	□	□	□	□ □ □ □	□ □ □ □ □ □

(1) Series

Series	DIP	UPS	UPR	UL	UPE	RP	RH	GP	GV	GS	UPC
	SMD	SG	SP	SU	SE						

(2) Rated Voltage

Code	0E	0J	6K	7H	1A	1B	AG	1C	1D	1P	1E	1F	1V	1H	1J	2A
WV	2.5	6.3	6.8	7.5	10	12	14	16	20	22	25	30	35	50	63	100

(3) Capacitance

Code	6R8	100	180	560	101	181	561	102	182
μF	6.8	10	18	56	100	180	560	1000	1800

(4) Capacitance Tolerance

Code	J	Q	R	K	V	M	H
%	± 5	+30 / -10	+20 / -0	± 10	+20 / -10	± 20	+20 / -5

(5) Lead Type

Code	C	P
Description	Cutting	Taping
Drawing	Fig 1	Fig 2

(6) Lead Length (Cut / Formed lead)

Code	3	4	U	7	D	X	R	B	E	G	2	M	T	N
Length	3.5	4.5	5.5	7	4	2.3	2.5	2.8	3.1	3.3	2.5	3.5	3.8	+20mm min
Tolerance	±0.5			±0.2				±0.3			-15mm min			

Taping Code

Code	Z	2	3	7	5	S
Lead Pitch: +0.8/-0.2	2.0	2.5	3.5	3.5	5.0	5.0

(7) Case Dimension

DIP Code	0508	6305	6308	6311	0807	0808	0811	0816	0820	1012	1016	1020
Size	5×8	6.3×5	6.3×8	6.3×11	8×7	8×8	8×11	8×16	8×20	10×12	10×16	10×20
SMD Code	5057	6343	6357	6377	6309	8067	8097	8127	1077	1124		
Size	5×5.7	6.3×4.3	6.3×5.7	6.3×7.7	6.3×9	8×6.7	8×9.7	8×12.7	10×7.7	10×12.4		

(8) Special Request

Code	R	F	L	D
Description	High Rated ripple current	Endurance	Low Leakage Current	Low Dissipation Factor
Code	U	E		---
Description	Convex Rubber	Low ESR		---

UPS Series

- Super low ESR at a high frequency range
- High ripple current capability
- 2,000 hours at 105°C

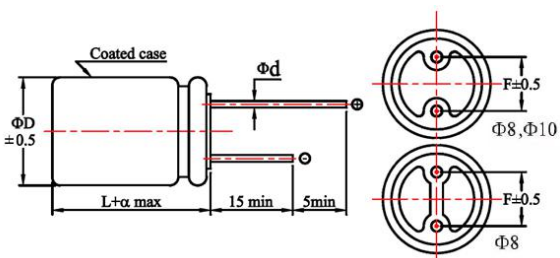


◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-55 ~ +105°C	
Working Voltage Range	2.5 ~ 16Vdc	
Surge Voltage	Rated Voltage x1.15	
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)	
ESR	See the standard ratings table (at 25°C, 100~300KHz)	
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)	
Leakage Current ※1	See the standard ratings table.(Impress the rated voltage for 2 minutes)	
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤1.25 at 100KHz	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C	
	Capacitance change	≒ ±20% of the initial value
	ESR	≒ 150% of the specified value
	Dissipation factor(tanδ)	≒ 150% of the specified value
	Leakage current	≒ specified value
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH	
	Capacitance change	≒ ±20% of the initial value
	ESR	≒ 150% of the specified value
	Dissipation factor(tanδ)	≒ 150% of the specified value
	Leakage current	≒ specified value

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C
 ※2 ESR should be measured at both of the terminal ends closest to the capacitor body

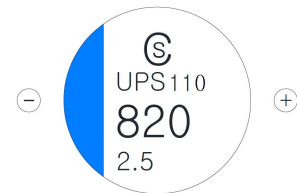
◆ DIMENSIONS (mm)



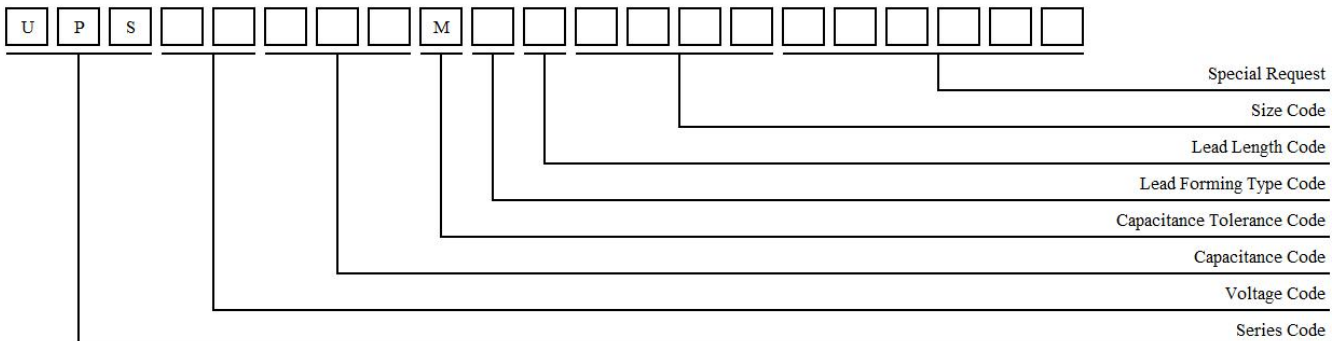
◆ Lead

ΦD	8	8	10
Φd	0.6	0.6	0.6
L	8	11	12
α	1.0	1.5	1.5
F	3.5	3.5	5.0

◆ Marking



◆ PART NUMBER SYSTEM





UPS Series

◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩmax)	Rated Ripple Current 105°C,100KHz (mArms max)	Tanδ max	Leakage Current (μA max)	Part Number
2.5(0E)	560	8×8	7	4700	0.12	350	UPS0E561MNN0808U
	680	8×8	7	5580	0.12	425	UPS0E681MNN0808U
	820	8×8	7	6100	0.12	512	UPS0E821MNN0808U
	820	8×11	7	6100	0.12	410	UPS0E821MNN0811U
	1000	8×8	7	6100	0.12	500	UPS0E102MNN0808U
	1000	8×11	7	6100	0.12	500	UPS0E102MNN0811U
	1200	8×8	7	6100	0.12	600	UPS0E122MNN0808U
	1500	8×11	7	6100	0.12	750	UPS0E152MNN0811U
	1500	10×12	7	6100	0.12	750	UPS0E152MNN1012U
4(0G)	1800	8×11	7	6100	0.12	900	UPS0E182MNN0811U
	470	8×8	7	5600	0.12	470	UPS0G471MNN0808U
	560	8×8	7	6100	0.12	560	UPS0G561MNN0808U
	680	8×8	7	6100	0.12	544	UPS0G681MNN0808U
	820	10×12	7	6100	0.12	656	UPS0G821MNN1012U
6.3(0J)	1200	10×12	7	6100	0.12	960	UPS0G122MNN1012U
	220	8×8	7	3700	0.12	347	UPS0J221MNN0808U
	330	8×8	7	3700	0.12	520	UPS0J331MNN0808U
	390	8×8	7	5700	0.12	491	UPS0J391MNN0808U
	470	8×8	7	5700	0.12	740	UPS0J471MNN0808U
	560	8×8	7	5700	0.12	882	UPS0J561MNN0808U
	680	8×8	7	5860	0.12	857	UPS0J681MNN0808U
	820	8×11	7	6100	0.12	1033	UPS0J821MNN0811U
	820	10×12	7	6100	0.12	1033	UPS0J821MNN1012U
	1000	10×12	7	6100	0.12	1260	UPS0J102MNN1012U
	1500	10×12	7	6100	0.12	1890	UPS0J152MNN1012U
10(1A)	2000	10×12	7	7100	0.12	2520	UPS0J202MNN1012U
	270	8×11	7	5600	0.12	540	UPS1A271MNN0811U
	470	10×12	7	6100	0.12	940	UPS1A471MNN1012U
	560	8×11	7	5700	0.12	882	UPS1A561MNN0811U
	560	10×12	7	6100	0.12	1120	UPS1A561MNN1012U
	680	8×11	7	5600	0.12	1360	UPS1A681MNN0811U
	820	8×11	7	5700	0.12	1640	UPS1A821MNN0811U
	820	10×12	7	6100	0.12	1640	UPS1A821MNN1012U
16(1C)	1000	10×12	7	6100	0.12	2000	UPS1A102MNN1012U
	150	8×11	7	5600	0.12	480	UPS1C151MNN0811U
	180	8×8	7	5600	0.12	576	UPS1C181MNN0808U
	180	8×11	7	5600	0.12	576	UPS1C181MNN0811U
	270	8×11	7	5600	0.12	864	UPS1C271MNN0811U
	330	8×11	7	5600	0.12	1056	UPS1C331MNN0811U
	330	10×12	7	6100	0.12	1056	UPS1C331MNN1012U
	470	8×11	7	5600	0.12	1504	UPS1C471MNN0811U
	470	10×12	7	6100	0.12	1504	UPS1C471MNN1012U
820	10×12	7	6100	0.12	2000	UPS1C821MNN1012U	



UPR Series

- Super low ESR at a high frequency range
- High ripple current capability
- 2,000 hours at 105°C



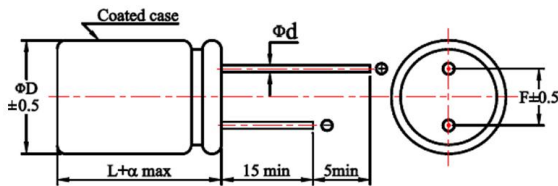
◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-55 ~ +105°C	
Working Voltage Range	2.5 ~ 16Vdc	
Surge Voltage	Rated Voltage x1.15	
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)	
ESR	See the standard ratings table (at 25°C, 100~300KHz)	
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)	
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)	
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤1.25 at 100KHz	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C	
	Capacitance change	≅ ±20% of the initial value
	ESR	≅ 150% of the specified value
	Dissipation factor(tanδ)	≅ 150% of the specified value
	Leakage current	≅ specified value
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH	
	Capacitance change	≅ ±20% of the initial value
	ESR	≅ 150% of the specified value
	Dissipation factor(tanδ)	≅ 150% of the specified value
	Leakage current	≅ specified value

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

※2 ESR should be measured at both of the terminal ends closest to the capacitor body

◆ DIMENSIONS (mm)



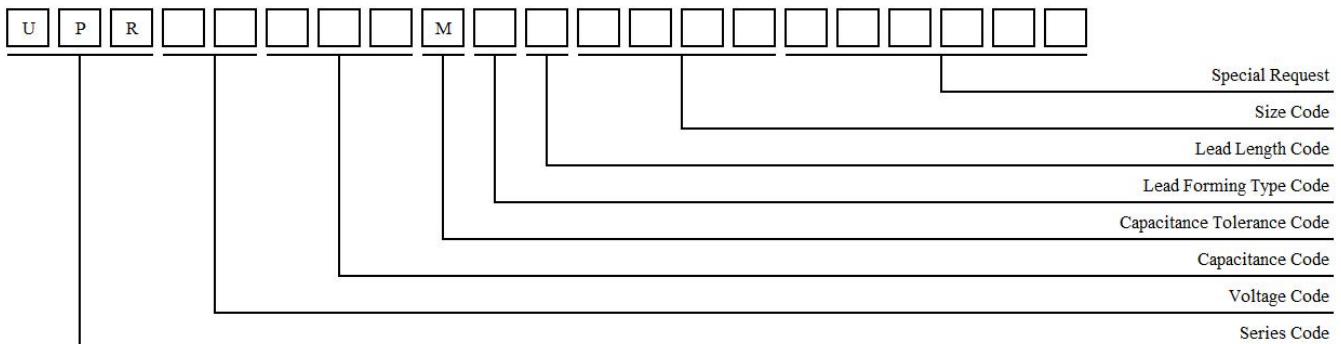
◆ Lead

ΦD	5	6.3
Φd	0.45	0.6
L	8	8
α	1	1
F	2	2.5

◆ Marking



◆ PART NUMBER SYSTEM





UPR Series

◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩmax)	Rated Ripple Current 105°C,100KHz (mArms max)	Tanδ max	Leakage Current (μA max)	Part Number
2.5(0E)	220	5×8	8	4340	0.10	500	UPR0E221MNN0508
	330	5×8	8	4340	0.10	500	UPR0E331MNN0508
	560	5×8	8	4340	0.10	500	UPR0E561MNN0508
	560	6.3×8	8	4700	0.10	500	UPR0E561MNN6308
	680	6.3×8	8	4900	0.10	500	UPR0E681MNN6308
	820	6.3×8	8	5000	0.10	513	UPR0E821MNN6308
	820	6.3×8	5	5900	0.10	513	UPR0E821MNN6308E
4(0G)	560	6.3×8	8	4700	0.10	560	UPR0G561MNN6308
6.3(0J)	220	5×8	11	3200	0.10	300	UPR0J221MNN0508
	220	6.3×8	9	3900	0.10	500	UPR0J221MNN6308
	270	5×8	8	4050	0.10	500	UPR0J271MNN0508
	330	5×8	8	4050	0.10	500	UPR0J331MNN0508
	330	6.3×8	8	4700	0.10	500	UPR0J331MNN6308
	390	6.3×8	8	4700	0.10	530	UPR0J391MNN6308
	470	6.3×8	8	4700	0.10	592	UPR0J471MNN6308
	560	5×8	7	4180	0.10	500	UPR0J561MNN0508
	560	6.3×8	8	4700	0.10	706	UPR0J561MNN6308
	680	6.3×8	8	4700	0.10	856	UPR0J681MNN6308
	820	6.3×8	8	4700	0.10	1033	UPR0J821MNN6308
10(1A)	100	5×8	35	2200	0.10	300	UPR1A101MNN0508
	150	6.3×8	24	2820	0.10	480	UPR1A151MNN6308
	220	6.3×8	8	4700	0.10	550	UPR1A221MNN6308
	270	6.3×8	8	4700	0.10	540	UPR1A271MNN6308
	330	6.3×8	8	4700	0.10	660	UPR1A331MNN6308
16(1C)	100	6.3×8	10	4680	0.10	320	UPR1C101MNN6308
	270	6.3×8	10	5080	0.10	864	UPR1C271MNN6308

UL Series

- Super low ESR at a high frequency range
- Low profile 6.3x6 max, 8x7 max
- 2,000 hours at 105°C



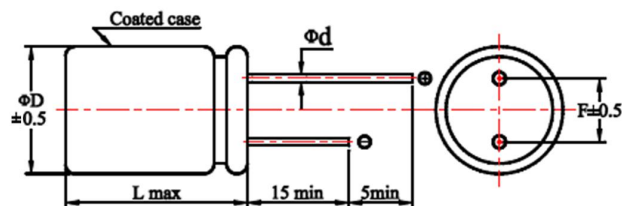
SPECIFICATIONS

Item	Performance Characteristics								
Category Temperature Range	-55 ~ +105°C								
Working Voltage Range	2.5 ~ 16Vdc								
Surge Voltage	Rated Voltage x1.15								
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)								
ESR	See the standard ratings table (at 25°C, 100~300KHz)								
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)								
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)								
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤ 1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤ 1.25 at 100KHz								
Endurance	<p>The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≲ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≲ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≲ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≲ specified value</td> </tr> </table>	Capacitance change	≲ ±20% of the initial value	ESR	≲ 150% of the specified value	Dissipation factor(tanδ)	≲ 150% of the specified value	Leakage current	≲ specified value
Capacitance change	≲ ±20% of the initial value								
ESR	≲ 150% of the specified value								
Dissipation factor(tanδ)	≲ 150% of the specified value								
Leakage current	≲ specified value								
Damp Heat (Steady State)	<p>The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≲ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≲ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≲ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≲ specified value</td> </tr> </table>	Capacitance change	≲ ±20% of the initial value	ESR	≲ 150% of the specified value	Dissipation factor(tanδ)	≲ 150% of the specified value	Leakage current	≲ specified value
Capacitance change	≲ ±20% of the initial value								
ESR	≲ 150% of the specified value								
Dissipation factor(tanδ)	≲ 150% of the specified value								
Leakage current	≲ specified value								

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

※2 ESR should be measured at both of the terminal ends closest to the capacitor body

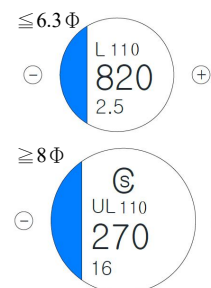
DIMENSIONS (mm)



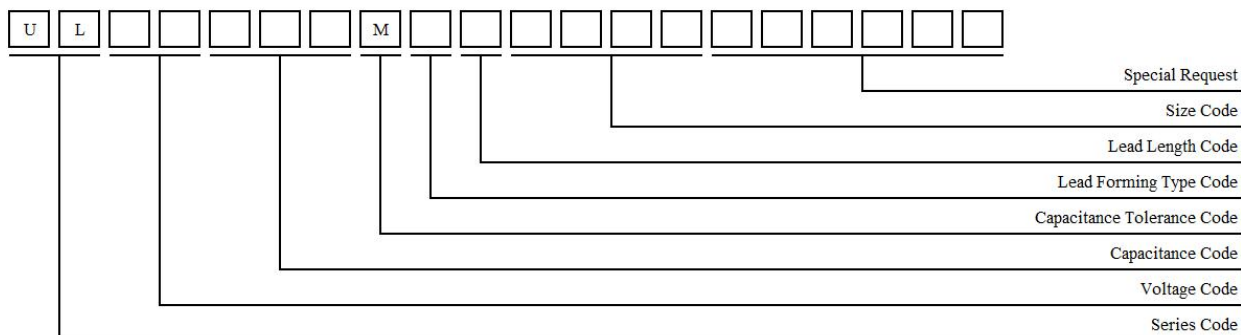
Lead

ΦD	6.3	8
Φd	0.45	0.6
L	6	7
F	2.5	3.5

Marking



PART NUMBER SYSTEM





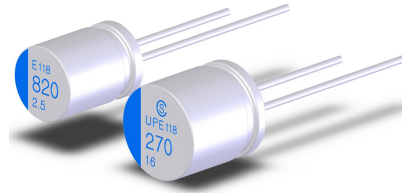
UL Series

◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C, 100KHz (mA rms max)	Tan δ max	Leakage Current (μA max)	Part Number
2.5(0E)	220	6.3×6	8	3400	0.10	500	UL0E221MNN6306
	390	6.3×6	8	3900	0.10	500	UL0E391MNN6306
	560	6.3×6	8	3900	0.10	500	UL0E561MNN6306
	680	6.3×6	8	4500	0.10	500	UL0E681MNN6306
6.3(0J)	220	6.3×6	17	3000	0.10	500	UL0J221MNN6306
	330	6.3×6	17	3300	0.10	500	UL0J331MNN6306
16(1C)	100	6.3×6	24	2490	0.10	500	UL1C101MNN6306
	150	6.3×6	22	3220	0.10	500	UL1C151MNN6306
	180	6.3×6	22	3300	0.10	576	UL1C181MNN6306
	220	8×7	13	4150	0.10	704	UL1C221MNN0807
	270	8×7	12	4300	0.10	864	UL1C271MNN0807
	330	8×7	12	4300	0.10	1056	UL1C331MNN0807
	390	8×7	12	4300	0.10	1248	UL1C391MNN0807
	470	8×7	13	4700	0.10	1504	UL1C471MNN0807

UPE Series

- Super low ESR at a high frequency range
- High ripple current capability
- 5,000 hours at 105°C



◆ **SPECIFICATIONS**

Item	Performance Characteristics	
Category Temperature Range	-55 ~ +105°C	
Working Voltage Range	2.5 ~ 35Vdc	
Surge Voltage	Rated Voltage x1.15	
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)	
ESR	See the standard ratings table (at 25°C, 100~300KHz)	
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)	
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)	
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤ 1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤ 1.25 at 100KHz	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value

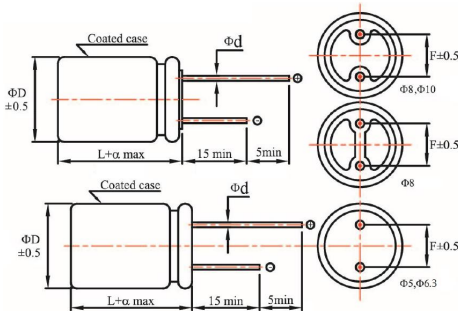
※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

※2 ESR should be measured at both of the terminal ends closest to the capacitor body

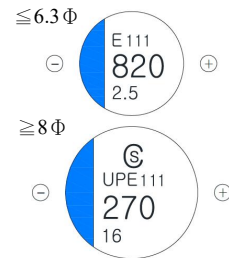
◆ **DIMENSIONS (mm)**

◆ **Lead**

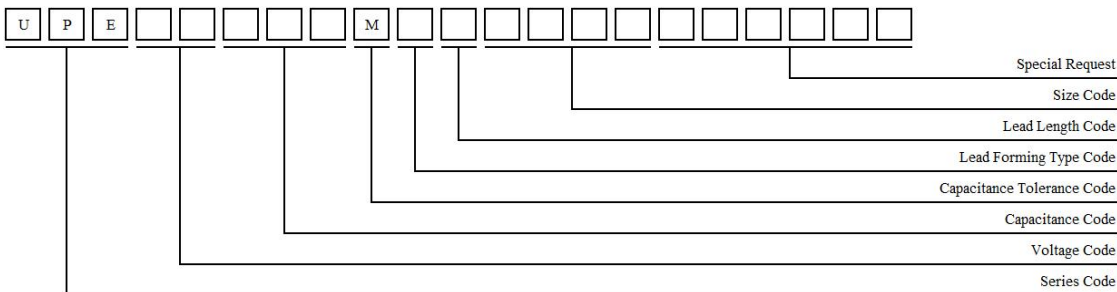
◆ **Marking**



ΦD	5	6.3	6.3	8	8	10
Φd	0.45	0.45	0.45	0.6	0.6	0.6
L	8	5	8	6~8	11	12
α	1	1	1	1	1.5	1.5
F	2.0	2.5	2.5	3.5	3.5	5



◆ **PART NUMBER SYSTEM**





UPE Series

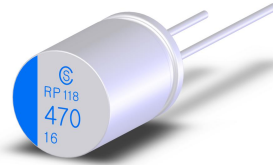
◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C,100KHz (mArms max)	Tan δ max	Leakage Current (μA max)	Part Number
2.5(0E)	390	6.3×5	10	3900	0.10	500	UPE0E391MNN6305
	560	5×8	7	4200	0.10	500	UPE0E561MNN0508
	560	6.3×8	7	5000	0.10	500	UPE0E561MNN6308
	560	8×8	8	4700	0.10	500	UPE0E561MNN0808U
	820	6.3×8	7	5000	0.10	500	UPE0E821MNN6308
	820	8×8	7	6100	0.10	500	UPE0E821MNN0808U
	1000	8×8	7	6100	0.10	900	UPE0E102MNN0808U
4(0G)	560	6.3×8	7	5000	0.10	500	UPE0G561MNN6308
	560	8×8	7	6100	0.10	500	UPE0G561MNN0808U
6.3(0J)	100	6.3×8	35	2100	0.10	500	UPE0J101MNN6308
	330	5×8	8	4050	0.10	500	UPE0J331MNN0508
	470	6.3×8	8	4700	0.10	592	UPE0J471MNN6308
	560	8×8	7	6100,	0.10	706	UPE0J561MNN0808U
	820	6.3×8	8	4700	0.10	1033	UPE0J821MNN6308
	820	8×8	8	6100	0.10	1033	UPE0J821MNN0808U
16(1C)	100	6.3×5	24	2400	0.10	500	UPE1C101MNN6305
	100	6.3×8	24	2490	0.10	500	UPE1C101MNN6308
	180	6.3×5	22	3300	0.10	576	UPE1C181MNN6305
	180	8×8	10	5000	0.10	576	UPE1C181MNN0808U
	180	8×11	16	4360	0.10	576	UPE1C181MNN0811U
	220	8×6	13	4150	0.10	500	UPE1C221MNN0806
	270	6.3×8	15	3800	0.10	864	UPE1C271MNN6308
	270	8×8	10	5000	0.10	864	UPE1C271MNN0808U
	270	8×11	11	5000	0.10	864	UPE1C271MNN0811U
	330	8×8	11	4700	0.10	1056	UPE1C331MNN0808U
	470	8×8	16	4000	0.10	1504	UPE1C471MNN0808U
	470	8×11	11	5400	0.10	1504	UPE1C471MNN0811U
	470	10×12	10	6100	0.10	1504	UPE1C471MNN1012U
	560	8×11	14	4970	0.10	1792	UPE1C561MNN0811U
	820	10×12	12	5400	0.10	2624	UPE1C821MNN1012U
1000	10×12	12	5400	0.10	3200	UPE1C102MNN1012U	
25(1E)	56	6.3×5	30	2800	0.10	300	UPE1E560MNN6305
	82	8×8	28	3000	0.10	410	UPE1E820MNN0808U
	180	8×11	16	4650	0.10	900	UPE1E181MNN0811U
	330	10×12	14	5000	0.10	1650	UPE1E331MNN1012U
35(1V)	22	6.3×5	35	2600	0.10	300	UPE1V220MNN6305
	33	8×8	30	2800	0.10	300	UPE1V330MNN0808U
	82	8×11	20	4000	0.10	574	UPE1V820MNN0811U
	120	10×12	18	4400	0.10	840	UPE1V121MNN1012U



RP Series

- Low ESR at a high frequency range
- High ripple current capability
- 2,000 hours at 105°C

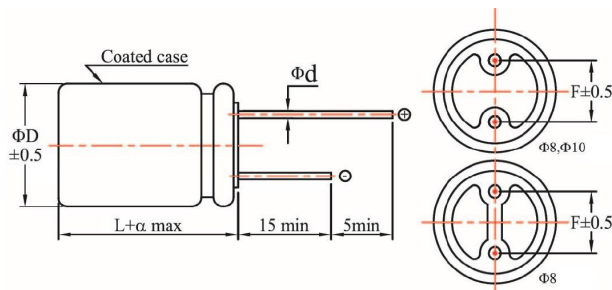


◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-55 ~ +105°C	
Working Voltage Range	2.5 ~ 16Vdc	
Surge Voltage	Rated Voltage x1.15	
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)	
ESR	See the standard ratings table (at 25°C, 100~300KHz)	
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)	
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)	
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤ 1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤ 1.25 at 100KHz	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C
 ※2 ESR should be measured at both of the terminal ends closest to the capacitor body

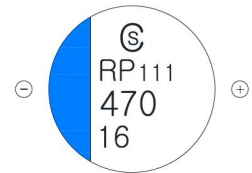
◆ DIMENSIONS (mm)



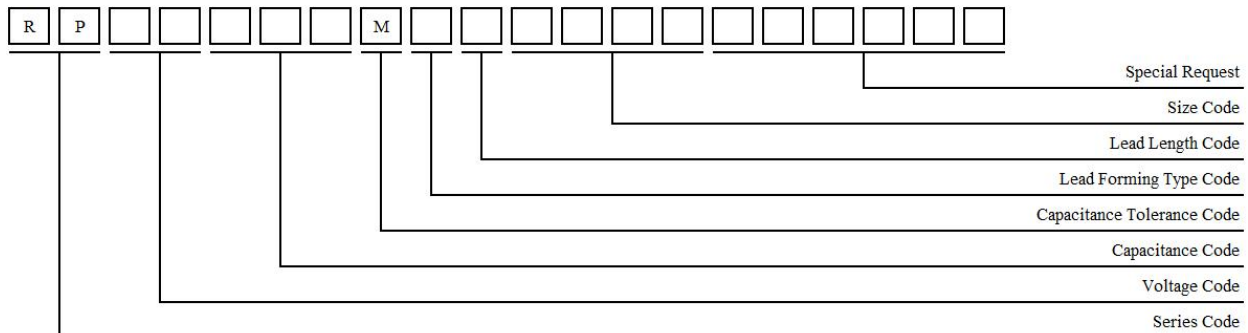
◆ Lead

ΦD	8	8	10
Φd	0.6	0.6	0.6
L	8	11	12
α	1	1.5	1.5
F	3.5	3.5	5

◆ Marking



◆ PART NUMBER SYSTEM



CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS



RP Series

◆ Standard Ratings

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C,100KHz (mA rms max)	Tan δ max	Leakage Current (μA max)	Part Number
2.5(0E)	680	8×11	12	4520	0.12	340	RP0E681MNN0811U
	820	8×11	12	5440	0.12	410	RP0E821MNN0811U
	1500	10×12	12	5440	0.12	750	RP0E152MNN1012U
	2700	10×12	12	5440	0.12	1350	RP0E272MNN1012U
4(0G)	560	8×11	12	4520	0.12	448	RP0G561MNN0811U
	820	10×12	12	5040	0.12	656	RP0G821MNN1012U
	1200	10×12	12	5040	0.12	960	RP0G122MNN1012U
6.3(0J)	270	8×8	12	3600	0.12	340	RP0J271MNN0808U
	470	8×8	12	4770	0.12	592	RP0J471MNN0808U
	680	10×12	12	5040	0.12	857	RP0J681MNN1012U
	820	10×12	12	5040	0.12	1033	RP0J821MNN1012U
	1000	10×12	12	5040	0.12	1260	RP0J102MNN1012U
	1200	8×11	12	5040	0.12	1512	RP0J122MNN0811U
	1500	8×11	12	5040	0.12	1890	RP0J152MNN0811U
	1500	10×12	12	5560	0.12	1890	RP0J152MNN1012U
10(1A)	220	8×8	12	4700	0.12	440	RP1A221MNN0808U
	270	8×11	12	4420	0.12	540	RP1A271MNN0811U
	330	8×8	12	4700	0.12	660	RP1A331MNN0808U
	470	8×8	12	5100	0.12	940	RP1A471MNN0808U
	470	10×12	12	5300	0.12	940	RP1A471MNN1012U
	560	8×11	12	4500	0.12	1260	RP1A561MNN0811U
	560	10×12	12	5300	0.12	1120	RP1A561MNN1012U
	680	8×11	12	4500	0.12	1360	RP1A681MNN0811U
	680	10×12	12	5300	0.12	1360	RP1A681MNN1012U
	820	8×11	12	5000	0.12	1640	RP1A821MNN0811U
	1000	10×12	12	5300	0.12	2000	RP1A102MNN1012U
	1200	10×12	12	5300	0.12	2400	RP1A122MNN1012U
16(1C)	100	8×11	12	4850	0.12	320	RP1C101MNN0811U
	180	8×8	12	3840	0.12	576	RP1C181MNN0808U
	180	8×11	12	4850	0.12	576	RP1C181MNN0811U
	270	8×8	12	4300	0.12	864	RP1C271MNN0808U
	270	8×11	12	5000	0.12	864	RP1C271MNN0811U
	270	10×12	12	5300	0.12	864	RP1C271MNN1012RU
	330	8×8	12	4700	0.12	1056	RP1C331MNN0808U
	330	8×11	12	5000	0.12	1056	RP1C331MNN0811U
	330	10×12	12	5300	0.12	1056	RP1C331MNN1012U
	470	8×11	12	5300	0.12	1504	RP1C471MNN0811U
	470	10×12	12	5300	0.12	1504	RP1C471MNN1012U
	560	8×11	12	5000	0.12	1792	RP1C561MNN0811U
	560	10×12	12	5300	0.12	1792	RP1C561MNN1012U
	680	10×12	12	5300	0.12	2176	RP1C681MNN1012U
	820	10×12	12	5300	0.12	2624	RP1C821MNN1012U
	1000	10×12	12	5400	0.12	3200	RP1C102MNN1012U



RH Series

- Low ESR at a high frequency range
- High ripple current capability
- 2,000 hours at 125°C



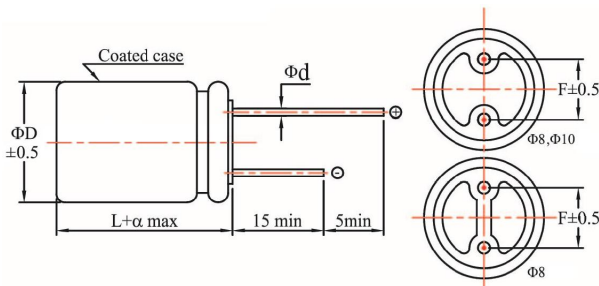
SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-55 ~ +125°C	
Working Voltage Range	2.5 ~ 25Vdc	
Surge Voltage	Rated Voltage x1.15	
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)	
ESR	See the standard ratings table (at 25°C, 100~300KHz)	
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)	
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)	
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤ 1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤ 1.25 at 100KHz	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 125°C	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

※2 ESR should be measured at both of the terminal ends closest to the capacitor body

DIMENSIONS (mm)



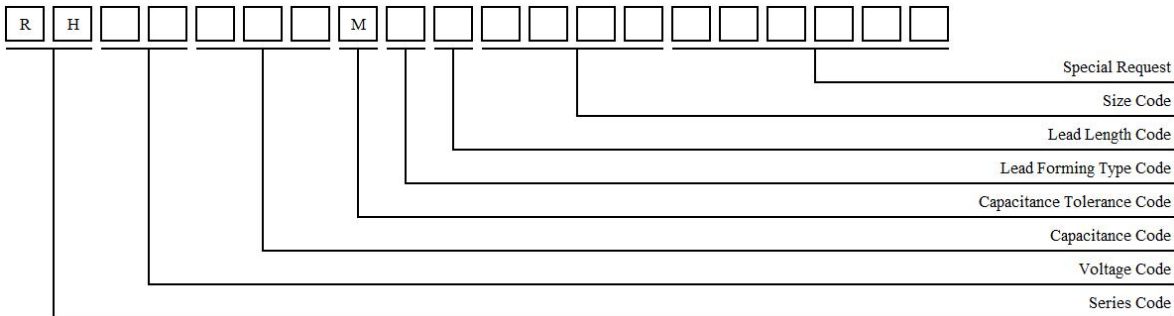
Lead

ΦD	8	10
Φd	0.6	0.6
L	8	11
α	1	1.5
F	3.5	3.5

Marking



PART NUMBER SYSTEM





RH Series

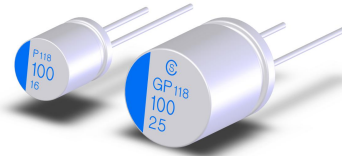
◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current (mA rms max)		Tan δ max	Leakage Current (μA max)	Part Number
				≤ 105°C	105~125°C			
2.5(0E)	680	8×11	13	4520	1430	0.12	340	RH0E681MNN0811U
	820	8×11	13	4520	1430	0.12	410	RH0E821MNN0811U
4(0G)	560	8×11	13	4520	1430	0.12	448	RH0G561MNN0811U
	680	8×11	13	4520	1430	0.12	544	RH0G681MNN0811U
	1200	10×12	12	5440	1720	0.12	960	RH0G122MNN1012U
6.3(0J)	470	8×11	13	4520	1430	0.12	592	RH0J471MNN0811U
	560	8×11	13	4520	1430	0.12	706	RH0J561MNN0811U
	820	10×12	12	5440	1720	0.12	1033	RH0J821MNN1012U
10(1A)	120	8×8	35	2560	810	0.12	300	RH1A121MNN0808U
	330	8×11	16	3950	1250	0.12	660	RH1A331MNN0811U
	390	8×11	16	3950	1250	0.12	780	RH1A391MNN0811U
	560	10×12	13	5230	1655	0.12	1120	RH1A561MNN1012U
	1000	10×12	13	5230	1200	0.12	2000	RH1A102MNN1012U
16(1C)	82	8×8	35	2560	810	0.12	300	RH1C820MNN0808U
	150	8×8	35	2560	810	0.12	480	RH1C151MNN0808U
	180	8×11	18	3640	1150	0.12	576	RH1C181MNN0811U
	220	8×11	18	3640	1150	0.12	704	RH1C221MNN0811U
	270	8×11	18	3640	1150	0.12	864	RH1C271MNN0811U
	270	10×12	16	4720	1490	0.12	864	RH1C271MNN1012U
	330	10×12	16	4720	1490	0.12	1056	RH1C331MNN1012U
	390	10×12	16	4720	1490	0.12	1248	RH1C391MNN1012U
	470	10×12	16	4720	1490	0.12	1504	RH1C471MNN1012U
820	10×12	12	5400	1630	0.12	2624	RH1C821MNN1012U	
25(1E)	120	8×11	27	2300	890	0.12	600	RH1E121MNN0811U
	180	10×12	25	2800	1080	0.12	900	RH1E181MNN1012U



GP Series

- Low ESR at a high frequency range
- High ripple current capability
- 2,000 hours at 105°C



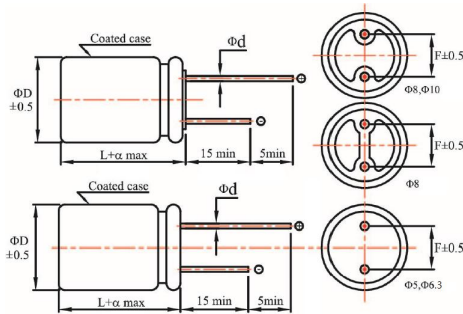
◆ **SPECIFICATIONS**

Item	Performance Characteristics	
Category Temperature Range	-55 ~ +105°C	
Working Voltage Range	10 ~ 25Vdc	
Surge Voltage	Rated Voltage x1.15	
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)	
ESR	See the standard ratings table (at 25°C, 100~300KHz)	
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)	
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)	
Low Temperature Characteristics Impedance Ratio	$Z(-25^{\circ}\text{C})/Z(+25^{\circ}\text{C}) \leq 1.15$ at 100KHz $Z(-55^{\circ}\text{C})/Z(+25^{\circ}\text{C}) \leq 1.25$ at 100KHz	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

※2 ESR should be measured at both of the terminal ends closest to the capacitor body

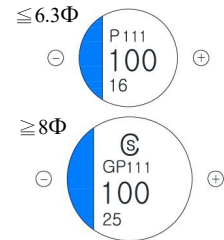
◆ **DIMENSIONS (mm)**



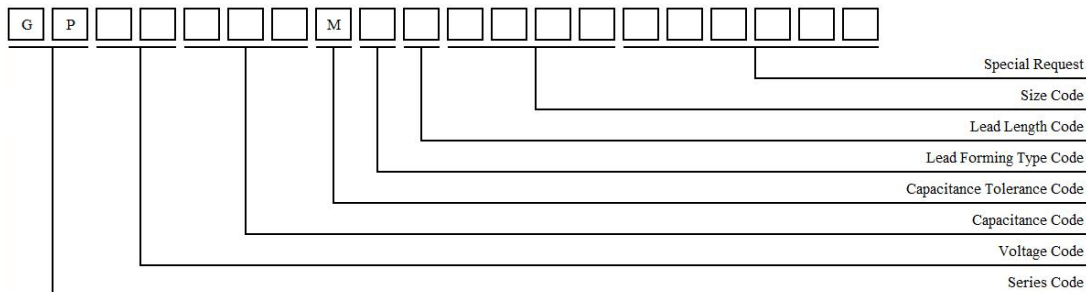
◆ **Lead**

ΦD	6.3	8	10
Φd	0.6	0.6	0.6
L	8	8	11
α	1	1	1.5
F	2.5	3.5	3.5

◆ **Marking**



◆ **PART NUMBER SYSTEM**





GP Series

◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C,100KHz (mArms max)	Tan δ max	Leakage Current (μA max)	Part Number
10(1A)	470	8×8	20	3400	0.12	940	GP1A471MNN0808U
	680	8×11	20	3900	0.12	1360	GP1A681MNN0811U
	1000	10×12	19	6100	0.12	2000	GP1A102MNN1012U
16(1C)	100	6.3×8	24	2490	0.12	320	GP1C101MNN6308
	180	8×8	19	3400	0.12	576	GP1C181MNN0808U
	330	10×12	19	4500	0.12	1056	GP1C331MNN1012U
	470	10×12	19	4500	0.12	1504	GP1C471MNN1012U
25(1E)	47	8×11	30	2500	0.12	568	GP1E470MNN0811U
	68	8×11	24	3320	0.12	425	GP1E680MNN0811U
	100	10×12	20	4320	0.12	625	GP1E101MNN1012U

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS



GV Series

- Low ESR at a high frequency range
- High ripple current capability
- High voltage 25~100V
- 2,000 hours at 105°C



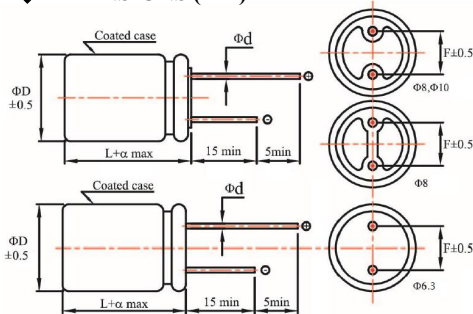
◆ SPECIFICATIONS

Item	Performance Characteristics								
Category Temperature Range	-55 ~ +105°C								
Working Voltage Range	25 ~ 100Vdc								
Surge Voltage	Rated Voltage x1.15								
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)								
ESR	See the standard ratings table (at 25°C, 100~300KHz)								
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)								
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)								
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤ 1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤ 1.25 at 100KHz								
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C <table border="1" style="margin-left: 20px;"> <tr> <td>Capacitance change</td> <td>≤ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≤ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≤ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≤ specified value</td> </tr> </table>	Capacitance change	≤ ±20% of the initial value	ESR	≤ 150% of the specified value	Dissipation factor(tanδ)	≤ 150% of the specified value	Leakage current	≤ specified value
Capacitance change	≤ ±20% of the initial value								
ESR	≤ 150% of the specified value								
Dissipation factor(tanδ)	≤ 150% of the specified value								
Leakage current	≤ specified value								
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH <table border="1" style="margin-left: 20px;"> <tr> <td>Capacitance change</td> <td>≤ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≤ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≤ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≤ specified value</td> </tr> </table>	Capacitance change	≤ ±20% of the initial value	ESR	≤ 150% of the specified value	Dissipation factor(tanδ)	≤ 150% of the specified value	Leakage current	≤ specified value
Capacitance change	≤ ±20% of the initial value								
ESR	≤ 150% of the specified value								
Dissipation factor(tanδ)	≤ 150% of the specified value								
Leakage current	≤ specified value								

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

※2 ESR should be measured at both of the terminal ends closest to the capacitor body

◆ DIMENSIONS (mm)



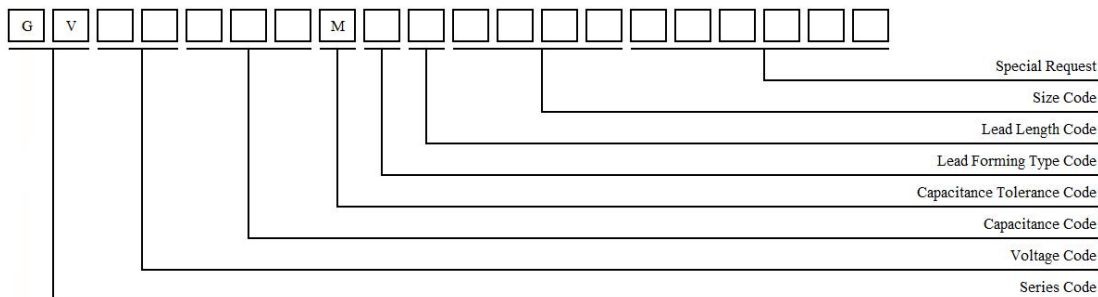
◆ Lead

ΦD	6.3	8	8	10
Φd	0.6	0.6	0.6	0.6
L	8	8	11	12
α	1	1	1.5	1.5
F	2.5	3.5	3.5	5

◆ Marking



◆ PART NUMBER SYSTEM





GV Series

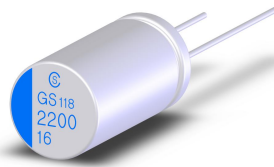
◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C, 100KHz (mA rms max)	Tan δ max	Leakage Current (μA max)	Part Number
25(1E)	150	6.3×8	18	3200	0.12	750	GV1E151MNN6308
	180	8×8	18	4100	0.12	900	GV1E181MNN0808U
	180	8×11	16	4650	0.12	900	GV1E181MNN0811U
	220	8×8	18	4100	0.12	1100	GV1E221MNN0808U
	270	10×12	16	5000	0.12	1350	GV1E271MNN1012U
	330	10×12	14	5000	0.12	1650	GV1E331MNN1012U
	390	10×12	14	5000	0.12	1950	GV1E391MNN1012U
35(1V)	470	10×12	14	5000	0.12	2350	GV1E471MNN1012U
	18	8×11	34	2100	0.12	300	GV1V180MNN0811U
	39	8×11	30	2100	0.12	300	GV1V390MNN0811U
	47	8×11	30	2100	0.12	329	GV1V470MNN0811U
	82	8×11	27	2300	0.12	574	GV1V820MNN0811U
	100	8×11	27	2300	0.12	700	GV1V101MNN0811U
	100	10×12	26	2700	0.12	700	GV1V101MNN1012U
	120	10×12	26	2700	0.12	840	GV1V121MNN1012U
50(1H)	150	10×12	26	2700	0.12	1050	GV1V151MNN1012U
	220	10×12	26	2700	0.12	1540	GV1V221MNN1012U
	27	8×11	33	2000	0.12	300	GV1H270MNN0811U
	39	8×11	29	2200	0.12	390	GV1H390MNN0811U
63(1J)	47	10×12	29	2500	0.12	470	GV1H470MNN1012U
	68	10×12	28	2600	0.12	680	GV1H680MNN1012U
100(2A)	47	10×12	29	2600	0.12	592	GV1J470MNN1012U
	68	10×12	29	2600	0.12	857	GV1J680MNN1012U
100(2A)	18	8×11	40	1850	0.12	360	GV2A180MNN0811U
	47	10×12	38	2100	0.12	940	GV2A470MNN1012U



GS Series

- Low ESR at a high frequency range
- High ripple current capability
- Large capacitance, size 8x16~10x20
- 2,000 hours at 105°C

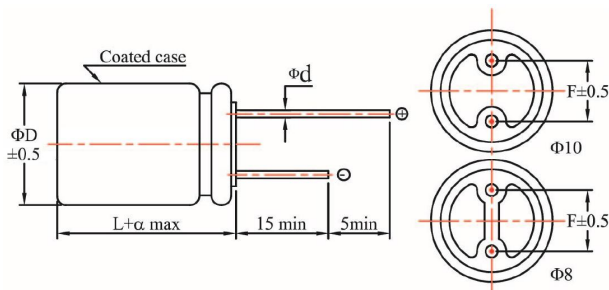


◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-55 ~ +105°C	
Working Voltage Range	16 ~ 25Vdc	
Surge Voltage	Rated Voltage x1.15	
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)	
ESR	See the standard ratings table (at 25°C, 100~300KHz)	
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)	
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)	
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤ 1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤ 1.25 at 100KHz	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH	
	Capacitance change	≦ ±20% of the initial value
	ESR	≦ 150% of the specified value
	Dissipation factor(tanδ)	≦ 150% of the specified value
	Leakage current	≦ specified value

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C
 ※2 ESR should be measured at both of the terminal ends closest to the capacitor body

◆ DIMENSIONS (mm)



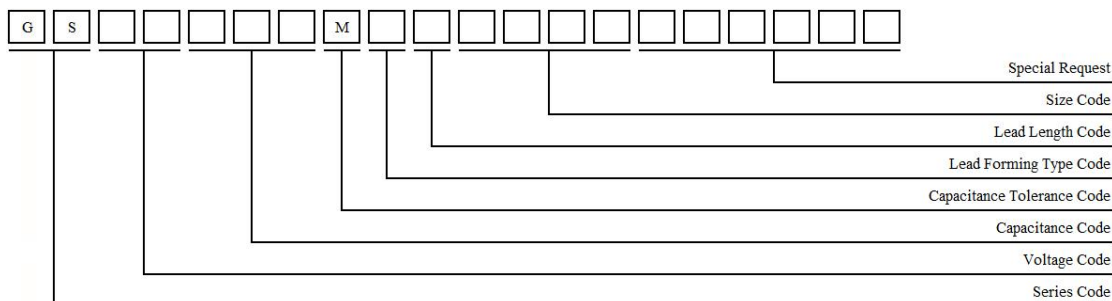
◆ Lead

ΦD	8	10
Φd	0.6	0.6
L	16~20	16~20
α	1.5	1.5
F	3.5	5.0

◆ Marking



◆ PART NUMBER SYSTEM





GS Series

◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C,100KHz (mArms max)	Tan δ max	Leakage Current (μA max)	Part Number
16(1C)	1000	8×20	8	6100	0.12	1600	GS1C102MNN0820U
	1200	8×20	8	6100	0.12	1920	GS1C122MNN0820U
	1500	10×16	8	6100	0.12	2400	GS1C152MNN1016U
	1800	10×20	8	6100	0.12	2880	GS1C182MNN1020U
	2200	10×20	8	6100	0.12	3520	GS1C222MNN1020U
	2700	10×20	10	10	5700	0.12	4320
25(1E)	470	8×20	16	4650	0.12	2350	GS1E471MNN0820U



UPC Series **NEW**

- Super low ESR at a high frequency range
- High ripple current capability
- 2,000 hours at 105°C



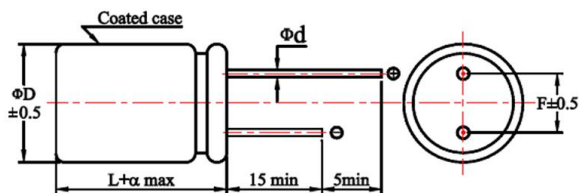
◆ SPECIFICATIONS

Item	Performance Characteristics	
Category Temperature Range	-55 ~ +105°C	
Working Voltage Range	6.3 ~ 22Vdc	
Surge Voltage	Rated Voltage x1.15	
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)	
ESR	See the standard ratings table (at 25°C, 100~300KHz)	
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)	
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)	
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤ 1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤ 1.25 at 100KHz	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C	
	Capacitance change	≤ ±20% of the initial value
	ESR	≤ 150% of the specified value
	Dissipation factor(tanδ)	≤ 150% of the specified value
	Leakage current	≤ specified value
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH	
	Capacitance change	≤ ±20% of the initial value
	ESR	≤ 150% of the specified value
	Dissipation factor(tanδ)	≤ 150% of the specified value
	Leakage current	≤ specified value

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

※2 ESR should be measured at both of the terminal ends closest to the capacitor body

◆ DIMENSIONS (mm)



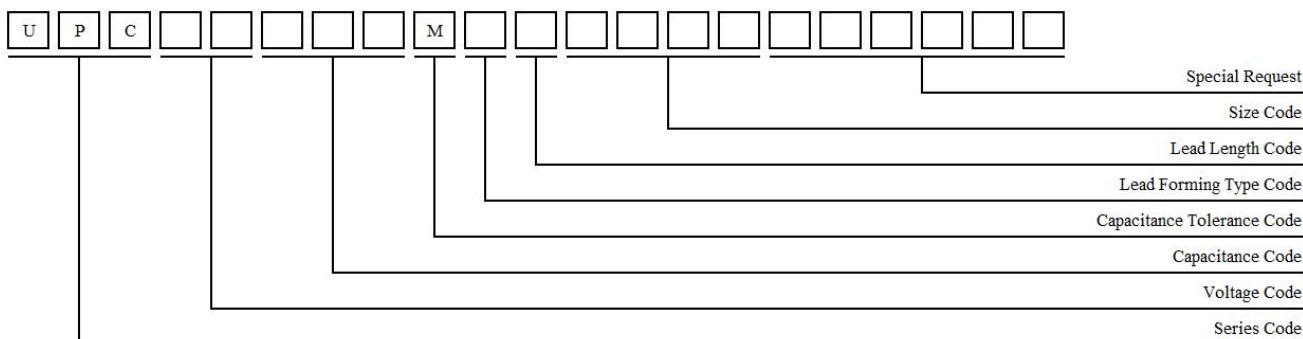
◆ Lead

	5	5.5		6.3		
ΦD	5	5.5	5.5	6.3	6.3	6.3
Φd	0.45	0.45	0.45	0.6	0.6	0.6
L	8	8	10	8	11	12
α	1	1	1	1	1.5	1.5
F	2	2.5	2.5	2.5	2.5	2.5

◆ Marking



◆ PART NUMBER SYSTEM





UPC Series

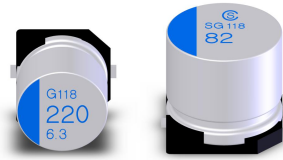
◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩmax)	Rated Ripple Current 105°C,100KHz (mA rms max)	Tanδ max	Leakage Current (μA max)	Part Number
6.3(0J)	220	5.5*8	12	3,600	0.12	300	UPC0J221MNN5508
	330	5.5*8	12	4,050	0.12	500	UPC0J331MNN5508
	390	5.5*8	11	3,700	0.12	491	UPC0J391MNN5508
	470	5.5*8	12	4,200	0.12	592	UPC0J471MNN5508
	560	6.3*8	8	4,700	0.12	706	UPC0J561MNN6308
	680	6.3*8	10	4,300	0.12	857	UPC0J681MNN6308
	820	6.3*8	8	4,700	0.12	1033	UPC0J821MNN6308
6.8(6K)	390	5*8	11	3,100	0.12	530	UPC6K391MNN0508
	470	5*8	11	3,700	0.12	639	UPC6K471MNN0508
	560	6.3*8	8	4,700	0.12	761	UPC6K561MNN6308
	680	6.3*8	8	4,700	0.12	925	UPC6K681MNN6308
	820	6.3*8	8	4,700	0.12	1115	UPC6K821MNN6308
	1000	6.3*12	8	5,000	0.12	1360	UPC6K102MNN6312
7.5(7H)	390	5.5*8	11	3,100	0.12	175	UPC7H391MNN5508
	470	5.5*8	10	3,700	0.12	705	UPC7H471MNN5508
	560	6.3*8	8	4,700	0.12	840	UPC7H561MNN6308
12(1B)	330	6.3*8	8	4,700	0.12	792	UPC1B331MNN6308
	470	6.3*11	8	4,700	0.12	1128	UPC1B471MP26311
	560	6.3*11	12	4,700	0.12	1344	UPC1B561MNN6311
16(1C)	180	5.5*10	20	3,100	0.12	576	UPC1C181MNN5510
	220	5.5*10	20	3,100	0.12	704	UPC1C221MNN5510
	270	5.5*10	20	3100	0.12	864	UPC1C271MNN5510
	330	6.3*11	15	3800	0.12	1056	UPC1C331MNN6311
20(1D)	270	6.3*12	16	3800	0.12	1080	UPC1D271MNN6312
	330	6.3*12	16	3800	0.12	1320	UPC1D331MNN6312
22(1P)	330	6.3*12	18	3800	0.12	1452	UPC1P331MNN6312



SG Series

- Low ESR at a high frequency range
- High ripple current capability
- 2,000 hours at 105°C

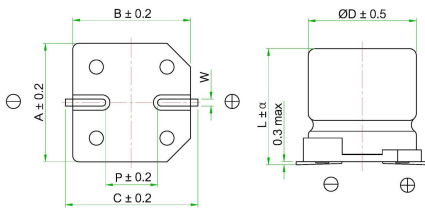


◆ SPECIFICATIONS

Item	Performance Characteristics								
Category Temperature Range	-55 ~ +105°C								
Working Voltage Range	2.5 ~ 63Vdc								
Surge Voltage	Rated Voltage x1.15								
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)								
ESR	See the standard ratings table (at 25°C, 100~300KHz)								
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)								
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)								
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤1.25 at 100KHz								
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≒ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> </tr> </table>	Capacitance change	≒ ±20% of the initial value	ESR	≒ 150% of the specified value	Dissipation factor(tanδ)	≒ 150% of the specified value	Leakage current	≒ specified value
Capacitance change	≒ ±20% of the initial value								
ESR	≒ 150% of the specified value								
Dissipation factor(tanδ)	≒ 150% of the specified value								
Leakage current	≒ specified value								
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≒ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> </tr> </table>	Capacitance change	≒ ±20% of the initial value	ESR	≒ 150% of the specified value	Dissipation factor(tanδ)	≒ 150% of the specified value	Leakage current	≒ specified value
Capacitance change	≒ ±20% of the initial value								
ESR	≒ 150% of the specified value								
Dissipation factor(tanδ)	≒ 150% of the specified value								
Leakage current	≒ specified value								

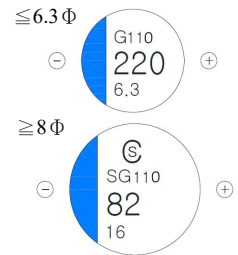
※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C
 ※2 ESR should be measured at both of the terminal ends closest to the capacitor body

◆ DIMENSIONS (mm)

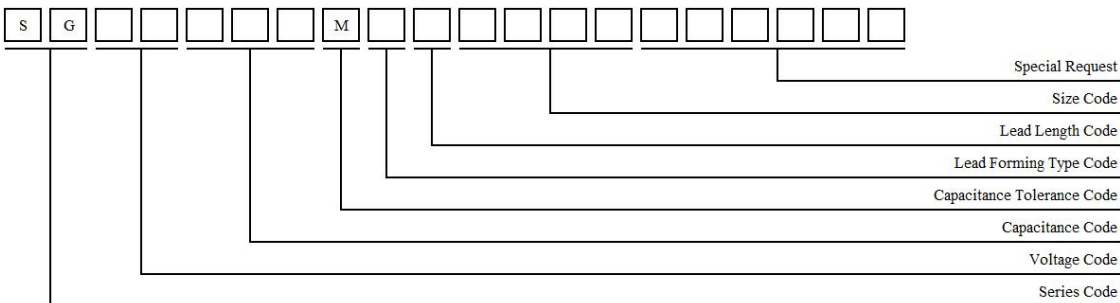


Code	Case Size	ΦD	L	α	A	B	C	W	P
5057	5×5.7	5	5.7	0.3	5.3	5.3	5.9	0.5~0.8	1.4
6357	6.3×5.7	6.3	5.7	0.3	6.6	6.6	7.3	0.5~0.8	2.1
6309	6.3×9	6.3	9.0	1	6.6	6.6	7.3	0.7~1.1	2.1
8067	8×6.7	8	6.7	0.3	8.3	8.3	9	0.7~1.1	3.2
8097	8×9.7	8	9.7	0.5	8.3	8.3	9	0.7~1.1	3.2
1077	10×7.7	10	7.7	0.5	10.3	10.3	11	0.7~1.1	4.6
1124	10×12.4	10	12.4	0.5	10.3	10.3	11	0.7~1.1	4.6

◆ Marking



◆ PART NUMBER SYSTEM





SG Series

◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C,100KHz (mArms max)	Tan δ max	Leakage Current (μA max)	Part Number
2.5(0E)	220	6.3×5.7	25	2500	0.12	300	SG0E221MCB6357
	560	6.3×5.7	25	2500	0.12	420	SG0E561MCB6357
	680	8×6.7	20	3370	0.12	510	SG0E681MCB8067
	1500	10×12.4	12	5400	0.12	1125	SG0E152MCB1124
	2700	10×12.4	12	5070	0.12	2025	SG0E272MCB1124
4(0G)	100	6.3×5.7	35	2200	0.12	300	SG0G101MCB6357
	150	5×5.7	30	1490	0.12	300	SG0G151MCB5057
	330	6.3×5.7	27	2700	0.12	400	SG0G331MCB6357
	680	10×7.7	20	4130	0.12	816	SG0G681MCB1077
	1200	10×12.4	12	5500	0.12	1440	SG0G122MCB1124
6.3(0J)	82	6.3×5.7	35	2200	0.12	300	SG0J820MCB6357
	100	5×5.7	35	1380	0.12	300	SG0J101MCB5057
	220	6.3×5.7	27	2320	0.12	416	SG0J221MCB6357
	330	10×7.7	22	3600	0.12	624	SG0J331MCB1077
	390	8×6.7	18	3220	0.12	737	SG0J391MCB8067
	820	10×12.4	12	5500	0.12	1550	SG0J821MCB1124
10(1A)	47	6.3×5.7	40	2100	0.12	300	SG1A470MCB6357
	56	6.3×5.7	40	2100	0.12	300	SG1A560MCB6357
	120	8×6.7	30	2600	0.12	360	SG1A121MCB8067
	270	10×7.7	25	3500	0.12	810	SG1A271MCB1077
	330	10×7.7	25	3770	0.12	990	SG1A331MCB1077
	560	10×12.4	13	5300	0.12	1680	SG1A561MCB1124
16(1C)	33	6.3×5.7	37	2050	0.12	300	SG1C330MCB6357
	39	6.3×5.7	45	2000	0.12	300	SG1C390MCB6357
	82	8×6.7	40	2300	0.12	394	SG1C820MCB8067
	100	6.3×5.7	24	2490	0.12	300	SG1C101MCB6357
	100	10×7.7	30	3200	0.12	480	SG1C101MCB1077
	180	6.3×5.7	22	3300	0.12	576	SG1C181MCB6357
	180	10×7.7	29	3200	0.12	864	SG1C181MCB1077
	270	6.3×9	22	3300	0.12	864	SG1C271MCB6309
	330	8×9.7	16	3890	0.12	1584	SG1C331MCB8097
	330	10×12.4	16	4800	0.12	1584	SG1C331MCB1124
	560	10×12.4	16	4720	0.12	1792	SG1C561MCB1124
	1000	10×12.4	18	4300	0.12	3200	SG1C102MCB1124
25(1E)	47	6.3×5.7	30	2800	0.12	235	SG1E470MCB6357
35(1V)	47	10×12.4	28	3800	0.12	410	SG1V470MCB1124
	100	10×12.4	29	2600	0.12	700	SG1V101MCB1124
	220	10×12.4	28	2600	0.12	1540	SG1V221MCB1124
50(1H)	100	10×12.4	27	3600	0.12	1000	SG1H101MCB1124
63(1J)	22	8×9.7	37	1700	0.12	300	SG1J220MCB8097



SP Series

- Super Low ESR at a high frequency range
- High ripple current capability
- 2,000 hours at 105°C



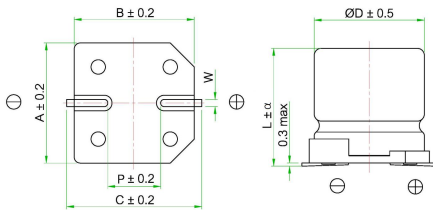
◆ SPECIFICATIONS

Item	Performance Characteristics								
Category Temperature Range	-55 ~ +105°C								
Working Voltage Range	2.5 ~ 25Vdc								
Surge Voltage	Rated Voltage x1.15								
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)								
ESR	See the standard ratings table (at 25°C, 100~300KHz)								
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)								
Leakage Current ※1	See the standard ratings table.(Impress the rated voltage for 2 minutes)								
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤1.25 at 100KHz								
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C <table border="1"> <tr> <td>Capacitance change</td> <td>≦ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≦ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≦ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≦ specified value</td> </tr> </table>	Capacitance change	≦ ±20% of the initial value	ESR	≦ 150% of the specified value	Dissipation factor(tanδ)	≦ 150% of the specified value	Leakage current	≦ specified value
Capacitance change	≦ ±20% of the initial value								
ESR	≦ 150% of the specified value								
Dissipation factor(tanδ)	≦ 150% of the specified value								
Leakage current	≦ specified value								
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH <table border="1"> <tr> <td>Capacitance change</td> <td>≦ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≦ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≦ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≦ specified value</td> </tr> </table>	Capacitance change	≦ ±20% of the initial value	ESR	≦ 150% of the specified value	Dissipation factor(tanδ)	≦ 150% of the specified value	Leakage current	≦ specified value
Capacitance change	≦ ±20% of the initial value								
ESR	≦ 150% of the specified value								
Dissipation factor(tanδ)	≦ 150% of the specified value								
Leakage current	≦ specified value								

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

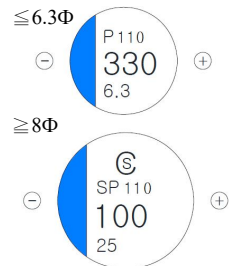
※2 ESR should be measured at both of the terminal ends closest to the capacitor body

◆ DIMENSIONS

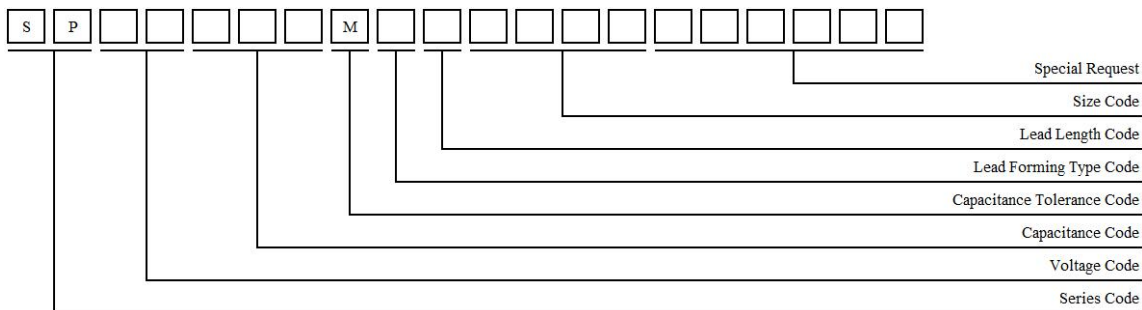


	Case Size	ΦD	L	α	A	B	C	W	P
5057	5×5.7	5	5.7	0.3	5.3	5.3	5.9	0.5~0.8	1.4
6343	6.3×4.3	6.3	4.3	+0.4 -0.3	6.6	6.6	7.3	0.5~0.8	2.1
6357	6.3×5.7	6.3	5.7	0.3	6.6	6.6	7.3	0.5~0.8	2.1
8067	8×6.7	8	6.7	0.3	8.3	8.3	9	0.7~1.1	3.2
8097	8×9.7	8	9.7	0.5	8.3	8.3	9	0.7~1.1	3.2
1077	10×7.7	10	7.7	0.5	10.3	10.3	11	0.7~1.1	4.6
1124	10×12.4	10	12.4	0.5	10.3	10.3	11	0.7~1.1	4.6

◆ Marking



◆ PART NUMBER SYSTEM





SP Series

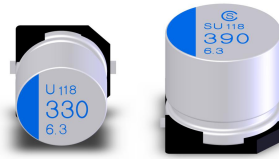
◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C,100KHz (mArms max)	Tan δ max	Leakage Current (μA max)	Part Number
2.5(0E)	180	5×5.7	21	2670	0.12	300	SP0E181MCB5057
	330	5×5.7	15	3150	0.12	300	SP0E331MCB5057
	330	6.3×4.3	17	3500	0.12	413	SP0E331MCB6343
	330	6.3×4.3	12	3500	0.12	700	SP0E331MCB6343E
	390	6.3×5.7	15	3160	0.12	344	SP0E391MCB6357
	560	6.3×5.7	16	3600	0.12	420	SP0E561MCB6357
	560	6.3×5.7	10	3870	0.12	500	SP0E561MCB6357E
	680	8×6.7	13	4100	0.12	510	SP0E681MCB8067
4(0G)	2700	10×12.4	12	5070	0.12	2025	SP0E272MCB1124
	330	6.3×5.7	15	3160	0.12	396	SP0G331MCB6357
6.3(0J)	1500	8×12.7	12	4700	0.12	1800	SP0G152MCB8127
	100	5×5.7	24	2500	0.12	300	SP0J101MCB5057
	120	5×5.7	24	2500	0.12	300	SP0J121MCB5057
	220	6.3×4.3	17	3160	0.12	693	SP0J221MCB6343
	220	6.3×5.7	15	3160	0.12	416	SP0J221MCB6357
	330	6.3×5.7	17	3600	0.12	624	SP0J331MCB6357
	470	8×12.7	15	3950	0.12	888	SP0J471MCB8127
10(1A)	330	8×12.7	17	3950	0.12	990	SP1A331MCB8127
16(1C)	100	6.3×5.7	24	2490	0.12	320	SP1C101MCB6357
	180	8×9.7	16	3890	0.12	576	SP1C181MCB8097
	270	8×9.7	16	3890	0.12	864	SP1C271MCB8097
25(1E)	47	6.3×5.7	30	2500	0.12	588	SP1E470MCB6357
	100	8×9.7	24	3300	0.12	500	SP1E101MCB8097
	120	8×9.7	22	3500	0.12	600	SP1E121MCB8097



SU Series

- Ultra low ESR at a high frequency range
- High ripple current capability
- 2,000 hours at 105°C



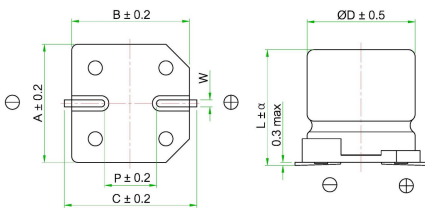
◆ SPECIFICATIONS

Item	Performance Characteristics								
Category Temperature Range	-55 ~ +105°C								
Working Voltage Range	2.5 ~ 6.3Vdc								
Surge Voltage	Rated Voltage x1.15								
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)								
ESR	See the standard ratings table (at 25°C, 100~300KHz)								
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)								
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)								
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤1.25 at 100KHz								
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C <table border="1"> <tr> <td>Capacitance change</td> <td>≦ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≦ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≦ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≦ specified value</td> </tr> </table>	Capacitance change	≦ ±20% of the initial value	ESR	≦ 150% of the specified value	Dissipation factor(tanδ)	≦ 150% of the specified value	Leakage current	≦ specified value
Capacitance change	≦ ±20% of the initial value								
ESR	≦ 150% of the specified value								
Dissipation factor(tanδ)	≦ 150% of the specified value								
Leakage current	≦ specified value								
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH <table border="1"> <tr> <td>Capacitance change</td> <td>≦ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≦ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≦ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≦ specified value</td> </tr> </table>	Capacitance change	≦ ±20% of the initial value	ESR	≦ 150% of the specified value	Dissipation factor(tanδ)	≦ 150% of the specified value	Leakage current	≦ specified value
Capacitance change	≦ ±20% of the initial value								
ESR	≦ 150% of the specified value								
Dissipation factor(tanδ)	≦ 150% of the specified value								
Leakage current	≦ specified value								

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

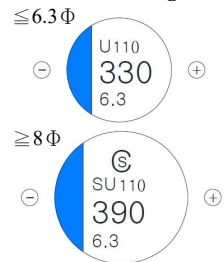
※2 ESR should be measured at both of the terminal ends closest to the capacitor body

◆ DIMENSIONS

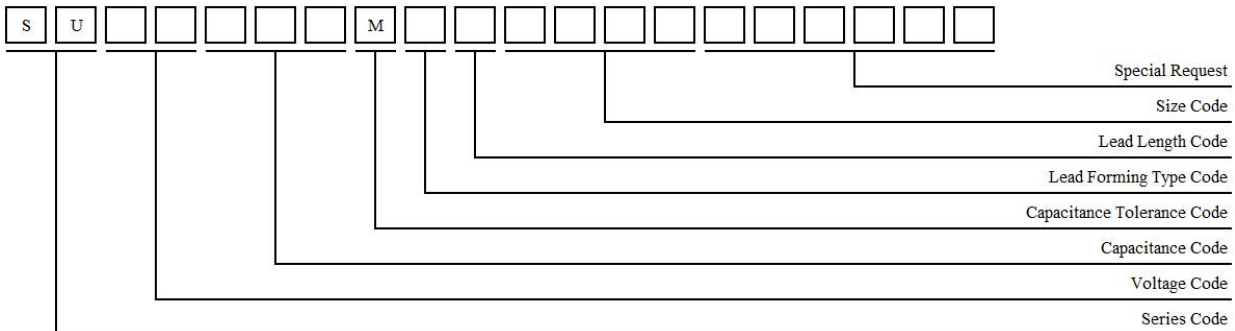


Code	Case Size	ΦD	L	α	A	B	C	W	P
5057	5×5.7	5	5.7	0.3	5.3	5.3	5.9	0.5~0.8	1.4
6357	6.3×5.7	6.3	5.7	0.3	6.6	6.6	7.3	0.5~0.8	2.1
8067	8×6.7	8	6.7	0.3	8.3	8.3	9	0.7~1.1	3.2

◆ Marking



◆ PART NUMBER SYSTEM





SU Series

◆ **Standard Ratings**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C,100KHz (mArms max)	Tan δ max	Leakage Current (μA max)	Part Number
2.5(0E)	330	5×5.7	12	3860	0.12	300	SU0E331MCB5057
	390	5×5.7	10	3650	0.12	300	SU0E391MCB5057
	390	6.3×5.7	10	3650	0.12	300	SU0E391MCB6357
6.3(0J)	330	6.3×5.7	10	3900	0.12	623	SU0J331MCB6357
	390	8×6.7	9	4500	0.12	737	SU0J391MCB8067



SE Series

- Super low ESR at a high frequency range
- High ripple current capability
- 5,000 hours at 105°C



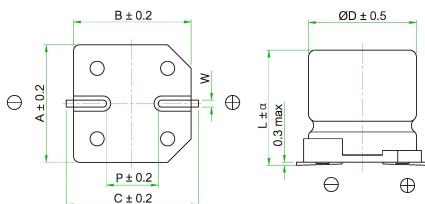
◆ SPECIFICATIONS

Item	Performance Characteristics								
Category Temperature Range	-55 ~ +105°C								
Working Voltage Range	2.5 ~ 35Vdc								
Surge Voltage	Rated Voltage x1.15								
Capacitance Tolerance	M: ±20% (at 25°C and 120Hz)								
ESR	See the standard ratings table (at 25°C, 100~300KHz)								
Dissipation Factor (Tanδ)	See the standard ratings table (at 25°C, 120Hz)								
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)								
Low Temperature Characteristics Impedance Ratio	Z(-25°C)/Z(+25°C) ≤ 1.15 at 100KHz Z(-55°C)/Z(+25°C) ≤ 1.25 at 100KHz								
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C <table border="1" style="margin-left: 20px;"> <tr> <td>Capacitance change</td> <td>≤ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≤ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≤ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≤ specified value</td> </tr> </table>	Capacitance change	≤ ±20% of the initial value	ESR	≤ 150% of the specified value	Dissipation factor(tanδ)	≤ 150% of the specified value	Leakage current	≤ specified value
Capacitance change	≤ ±20% of the initial value								
ESR	≤ 150% of the specified value								
Dissipation factor(tanδ)	≤ 150% of the specified value								
Leakage current	≤ specified value								
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 60°C 90 to 95% RH <table border="1" style="margin-left: 20px;"> <tr> <td>Capacitance change</td> <td>≤ ±20% of the initial value</td> </tr> <tr> <td>ESR</td> <td>≤ 150% of the specified value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≤ 150% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≤ specified value</td> </tr> </table>	Capacitance change	≤ ±20% of the initial value	ESR	≤ 150% of the specified value	Dissipation factor(tanδ)	≤ 150% of the specified value	Leakage current	≤ specified value
Capacitance change	≤ ±20% of the initial value								
ESR	≤ 150% of the specified value								
Dissipation factor(tanδ)	≤ 150% of the specified value								
Leakage current	≤ specified value								

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C

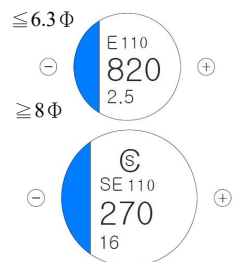
※2 ESR should be measured at both of the terminal ends closest to the capacitor body

◆ DIMENSIONS

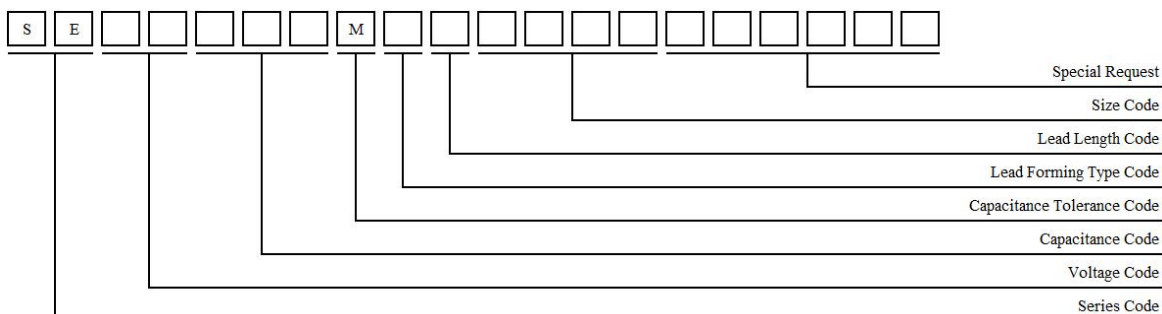


Code	Case Size	ΦD	L	α	A	B	C	W	P
6357	6.3×5.7	6.3	5.7	0.3	6.6	6.6	7.3	0.5~0.8	2.1
8067	8×6.7	8	6.7	0.3	8.3	8.3	9	0.7~1.1	3.2
8127	8×12.7	8	12.7	0.5	8.3	8.3	9	0.7~1.1	3.2
1124	10×12.4	10	12.4	0.5	10.3	10.3	11	0.7~1.1	4.6

◆ Marking



◆ PART NUMBER SYSTEM





SE Series

◆ **Standard Rating**

Rated Voltage (Vdc)	Rated Capacitance (μF)	Case Size ΦD×L (mm)	ESR 100~300KHz (mΩ max)	Rated Ripple Current 105°C,100KHz (mArms max)	Tan δ max	Leakage Current (μA max)	Part Number
2.5(0E)	560	6.3×5.7	16	3500	0.10	300	SE0E561MCB6357
4(0G)	560	8×6.7	22	3220	0.10	448	SE0G561MCB8067
6.3(0J)	220	6.3×5.7	15	3160	0.10	300	SE0J221MCB6357
	330	6.3×5.7	15	3160	0.10	416	SE0J331MCB6357
	390	8×6.7	22	3220	0.10	491	SE0J391MCB8067
10(1A)	120	6.3×5.7	22	2600	0.10	300	SE1A121MCB6357
	270	8×6.7	22	3220	0.10	540	SE1A271MCB8067
16(1C)	68	6.3×5.7	40	2450	0.10	544	SE1C680MCB6343
	100	6.3×5.7	24	2490	0.10	320	SE1C101MCB6357
	270	8×9.7	16	4070	0.10	864	SE1C271MCB8097
	270	8×12.7	11	4070	0.10	864	SE1C271MCB8127
	560	8×12.7	16	3800	0.10	1792	SE1C561MCB8127
	560	10×12.4	16	3800	0.10	1792	SE1C561MCB1124
25(1E)	47	6.3×5.7	30	2500	0.10	588	SE1E470MCB6357
	100	8×9.7	24	3300	0.10	500	SE1E101MCB8097
35(1V)	120	10×12.4	32	2400	0.10	840	SE1V121MCB1124