AiSHi

ALUMINUM ELECTROLYTIC CAPACITORS

2017-2018Y

Provide Aluminum Electrolytic Capacitor To
The World With Excellent Performance

www.aihuaglobal.com

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CAPACITOR SERIES TABLE, CONTENTS

Series				Features	Endurance (hours)	Rated Voltage Range (Vdc)	Operating Temperature Range(°C)	Capacitance Range(μF)	Page
Conductive Polymer Aluminum Solid Electrolytic Capacitors		Multilayer Type	A1	Low ESR	105°C 2,000	2~25	-55~+105	6.8~470	18
			A2	Low ESR	105°C 2,000	2~25	-55~+105	6.8~470	20
		Radial Type	PZ	Low ESR	105°C 2,000	6.3~100	-55~+105	4.7~5600	22
			PD	Low ESR, small size	105°C 2,000	6.3~35	-55~+105	4.7~4700	27
			PV	High voltage	125°C 2,000	35~100	-55~+125	4.7~1000	32
			PH	Huge capacitance, jumbo size	105°C 2,000	6.3~25	-55~+105	6.8~2200	34
			PT	Resistance to high temperature	125°C 2,000	6.3~25	-55~+125	22~5600	38
			PK	Resistance to high temperature	135°C 1,000	6.3~25	-55~+135	10~1800	42
			PF	Long life	105°C 3,000~5,000	6.3~100	-55~+105	4.7~5600	45
			PU	Ultra-low ESR	105°C 2,000	6.3~25	-55~+105	39~5600	50
		SMD Type	VZ	Standard type	105°C 2,000	2.5~63	-55~+105	10~1500	54
			VS	Low ESR	105°C 2,000	2.5~25	-55~+105	10~1500	56
			VD	High voltage	105°C 2,000	35~63	-55~+105	10~560	58
Aluminum Electrolytic Capacitors	Surface Mount Type	SMD Type	MK	Standard type	105°C 2,000~3,000	6.3~450	-40~+105	1~1,000	60
			MF	Long life	105°C 6,000	6.3~450	-40~+105	2.2~470	62
			MA	Long life	105°C 10,000	16~450	-40~+105	2.2~1000	64
			MH	Resistant to130°C, long life	130°C 1,000~5,000	10~450	-40~+130	1~4700	66
	Radial Type	Low Profile	M5	85°C 5mm Height, Standard type	85°C 1,000	4~50	-40~+85	0.1~470	68
			H5	105°C 5mm Height	105°C 1,000	6.3~50	-40~+105	0.1~100	70
			M7	85°C 7mm Height, Standard type	85°C 1,000	4~100	-40~+85	0.1~330	72
			H7	105°C 7mm Height, Standard type	105°C 1,000	6.3~50	-40~+105	0.1~100	74
			L7	105°C 7mm Height, Long life	105°C 2,000	6.3~63	-40~+105	0.1~220	76
		Standard Type	WK	Standard series for general purpose	85°C 2,000	6.3~100	-40~+85	0.1~22000	78
						160~450	-25~+85		
			WH	Standard series for general purpose	105°C 2,000	6.3~100	-40~+105	0.1~22000	81
						160~500	-25~+105		
			HP	Standard bi-polarized series	105°C 1,000	6.3~100	-40~+105	0.47~6800	84
		High reliability, long life. Especially designed for LED driver, electronic ballast, electronic energy saving lamp	CD11GC	Resistant to130°C, Long life	130°C 4,000~5,000	160~450	-40~+130	1~220	86
					105°C 15,000~20,000				
			CD11GES	Resistant to130°C, miniaturized, high ripple current and long life	130°C 3,000 105°C 12,000	160~450	-40~+130	1~220	88
					105°C 10,000	500	-40~+105		
			CD11GK	Extremely miniaturized, long life	105°C 12,000~20,000	160~450	-40~+105	1~47	91
			CD11GN	Resistant to130°C, miniaturized and long life	130°C 1,000~2,000 105°C 8,000~12,000	160~450	-40~+130	1~150	93
					105°C 10,000	500	-40~+105		
			CD11GZ(new)	Long life, suited for outdoor lighting	105°C 12,000	250~500	-40~+105	10~150	96
			CD11GAS	Miniaturized and long life	105°C 10,000	160~450	-40~+105	1~220	98
					105°C 8,000	500			
			CD11GD	Miniaturized and long life	105°C 6,000	160~500	-40~+105	1~330	101
			CD11GHS	Miniaturized, long life and high cost performance	105°C 6,000	160~450	-40~+105	1~150	105
			CD11GM	Miniaturized and high cost performance	105°C 3,000	160~400	-40~+105	1~68	108
		For input and output circuit	RR	High frequency,low impedance, Standard	105°C 2,000	6.3~50	-40~+105	22~6800	110
			RE(upgrade)	Miniaturized, low impedance	105°C 2,000~4,000	6.3~100	-40~+105	15~4700	112
			RF	High ripple current, low impedance	105°C 3,000~6,000	6.3~120	-40~+105	6.8~6800	115
			RS	High ripple current, low impe -dance and long life	105°C 4,000~10,000	6.3~120	-40~+105	6.8~18000	118
			RN (new)	Miniaturized, large capacitance	105°C 5,000~10,000	25~120	-40~+105	2.7~1500	122
			RZ	Miniaturized, long life and low impedance, high reliability	105°C 6,000~10,000	6.3~50	-40~+105	22~10000	125
			RJ(upgrade)	Downsized, long life and low impedance	105°C 8,000~12,000	10~120	-40~+105	8.2~5600	127
			RH	High frequency, low impedance	105°C 2,000~3,000	160~400	-40~+105	0.47~470	130
						450	-25~+105		

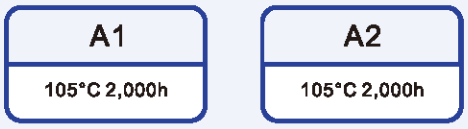
Continued

Series				Features	Endurance (hours)	Rated Voltage Range (Vdc)	Operating Temperature Range(°C)	Capacitance Range(μF)	Page
Aluminum Electrolytic Capacitors	Radial Type	For input and output circuit	HH	High ripple current	105°C 2,000	400	-40~+105	22~120	132
						420~450	-25~+105		
			HS	High ripple current	105°C 3,000~5,000	160~450	-25~+105	0.47~330	134
			HF	Long life and high ripple current	105°C 5,000~10,000	160~450	-25~+105	1~330	136
			HL(upgrade)	Long life, downsized and high ripple current	105°C 10,000~12,000	160~450	-25~+105	6.8~680	138
					105°C 8,000~10,000	500			
			RK	Miniaturized, high voltage. Specially designed for charger	105°C 2,000	400	-40~+105	1~150	141
						450~500	-25~+105		
		High Reliability	RG	"GBL"system,high reliability	105°C 2,000~8,000	6.3~63	-55~+105	10~10000	143
			RV	High reliability, low impedance, small size	105°C 4,000~5,000	6.3~35	-55~+105	330~6800	146
			ML	105°C 5~9mm Height, long life	105°C 3,000~5,000	6.3~50	-40~+105	1~1000	148
			RM	Miniaturized, long life	105°C 10,000	10~100	-40~+105	0.47~330	150
			NB	High reliability	130°C 2,000~5,000	10~120	-40~+130	1~4700	152
		Special Purpose	RD	Low water content series	105°C 2,000~5,000	6.3~100	-40~+105	0.47~15000	154
			GH(upgrade)	For Intelligent Instrument, high reliability	105°C 5,000~8,000	6.3~100	-40~+105	1~18000	157
					105°C 10,000	160~450			
			LL	Extremely low leakage current	105°C 2,000	6.3~100	-40~+105	0.47~2200	161
			BG	Large capacitance, low impedance; For airbags	105°C 5,000	25~35	-55~+105	1000~11000	163
			BH(new)	For automobile electronics	130°C 3,000	25~400	-40~+130	12~11000	165
			FP	For Photo Flash	5,000 times	330	-20~+55	22~300	168
	Snap-In&Lug Terminal Type	General Purpose	LK	Standard series for general purpose	85°C 2,000	10~100	-40~+85	56~82000	169
						160~500	-25~+85		
			LH	Withstand high temperature, general purpose	105°C 2,000	10~100	-40~+105	47~56000	175
						160~500	-25~+105		
			LC(new)	Wide temperature range; miniaturized	105°C 2,000	400~500	-40~+105	47~680	181
			LS(upgrade)	Downsized, Long life	85°C 3,000	160~600	-25~+85	47~3300	183
			LM(upgrade)	Downsized, high ripple current, long life	105°C 3,000	160~550	-25~+105	47~3300	187
			LP(new)	High ripple current, long life	105°C 3,000	400~450	-40~+105	82~820	191
			KX	High stability, suited for Photo Flash	5,000 times	330,360	-20~+55	150~1500	193
		High Reliability	LQ	Long life	85°C 5,000	160~450	-25~+85	68~2200	195
			LG(new)	Long life, high ripple current	85°C 12,000	350~450	-25~+85	470~2700	199
			LT(upgrade)	Long life, downsized	105°C 5,000	160~550	-25~+105	82~2700	201
			LX	Long life	105°C 7,000	160~450	-25~+105	47~2200	205
			LB	High reliability, long life	105°C 10,000	200~450	-25~+105	39~1500	208
			LF	No sparks against DC overvoltage	105°C 5,000	200,400	-25~+105	68~1500	210
			LU	No sparks against DC overvoltage	105°C 2,000	200~450	-25~+105	56~1200	212
	Screw-mount Terminal Type	Standard Type	NR	Screw terminal, general	85°C 2,000	350~550	-25~+85	1000~15000	214
			NS	Screw terminal, general	105°C 2,000	350~450	-25~+105	1000~15000	216
		Long Life	NX	High ripple current, downsized, long life	85°C 5,000	350~500	-25~+85	1000~12000	218
			NL(new)	Long life	85°C 12,000	350~450	-25~+85	1500~15000	220
			NE	High ripple current, long life	85°C 20,000	350~450	-25~+85	1500~15000	222
			NF	Long life	105°C 5,000	350~450	-25~+105	1000~15000	224
			NK	High ripple current, long life	105°C 5,000	350~450	-25~+105	1000~15000	226

Group Chart

CONDUCTIVE POLYMER ALUMINUM SOLID ELECTROLYTIC CAPACITORS

MULTILAYER TYPE



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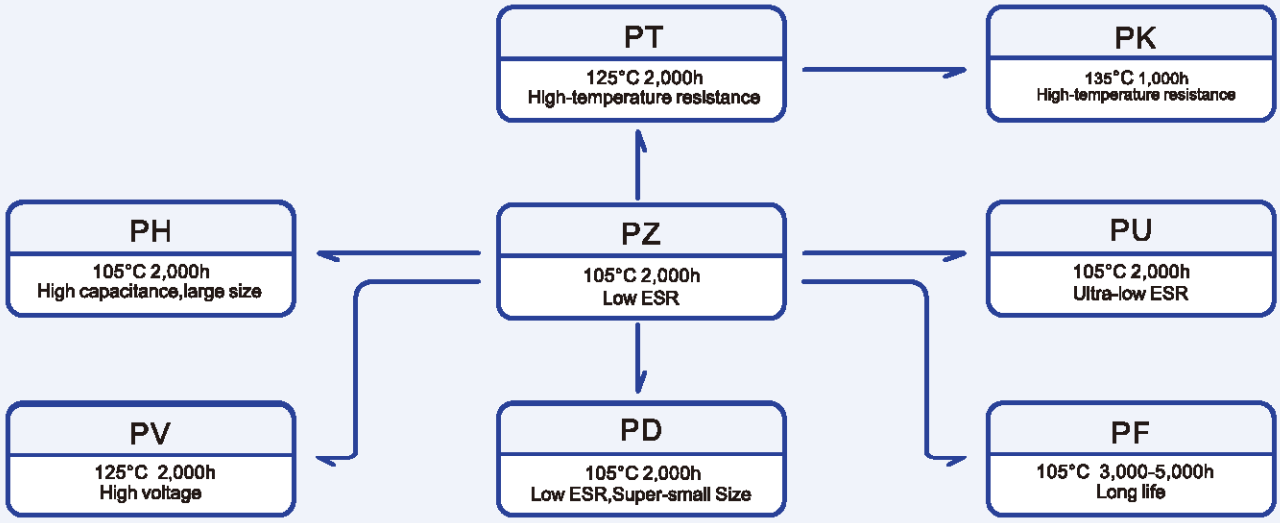
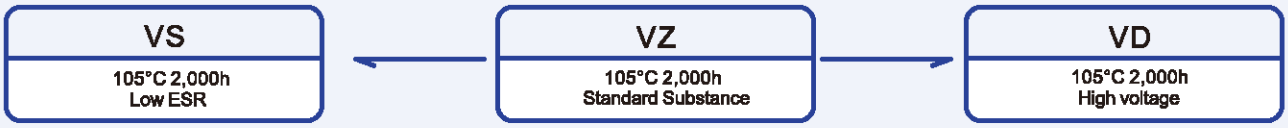


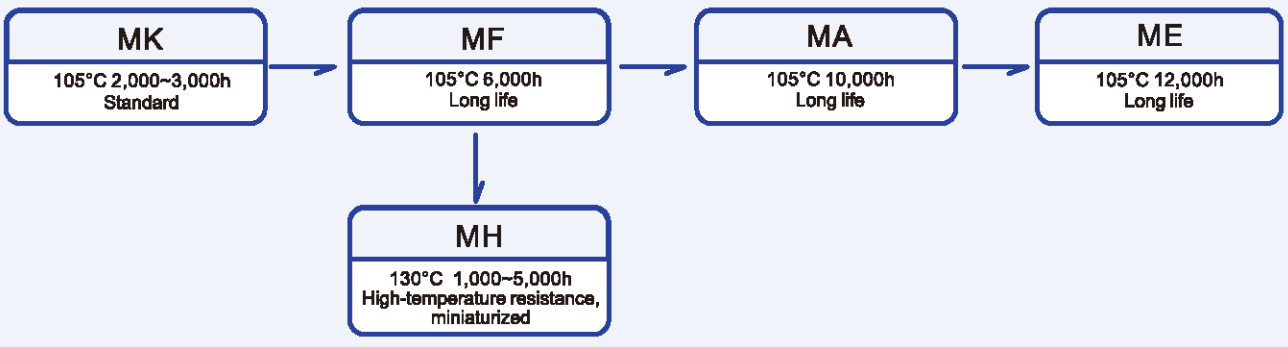
SMD TYPE

Downsized & Low Profile



ALUMINUM ELECTROLYTIC CAPACITORS

SMD TYPE



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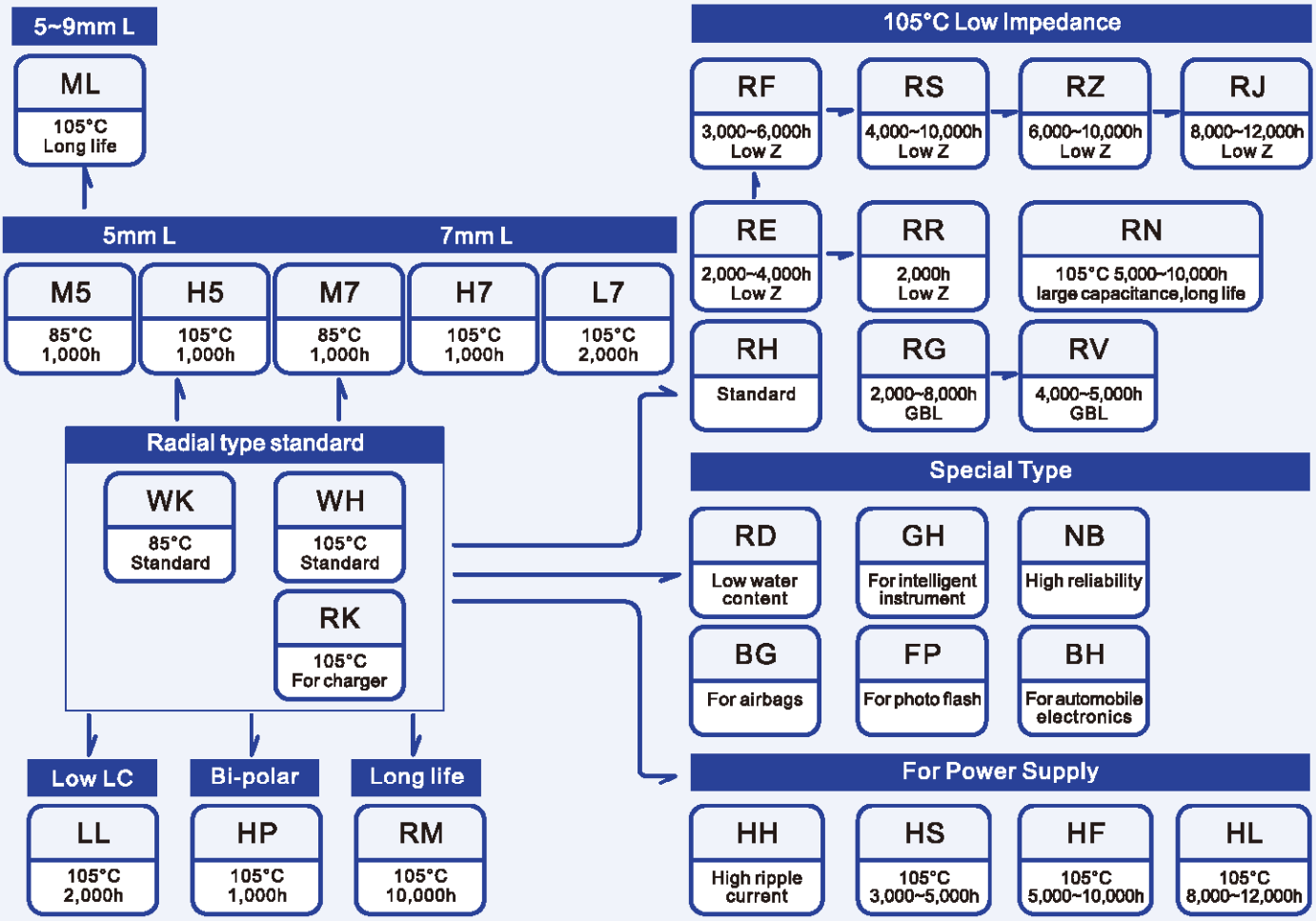
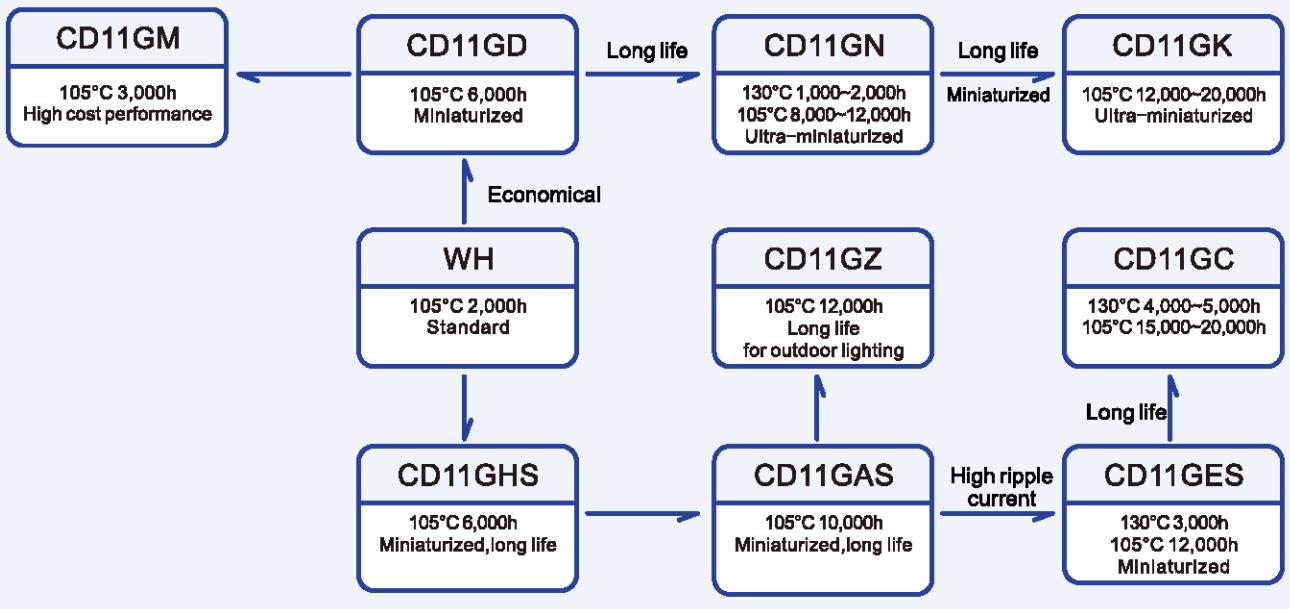
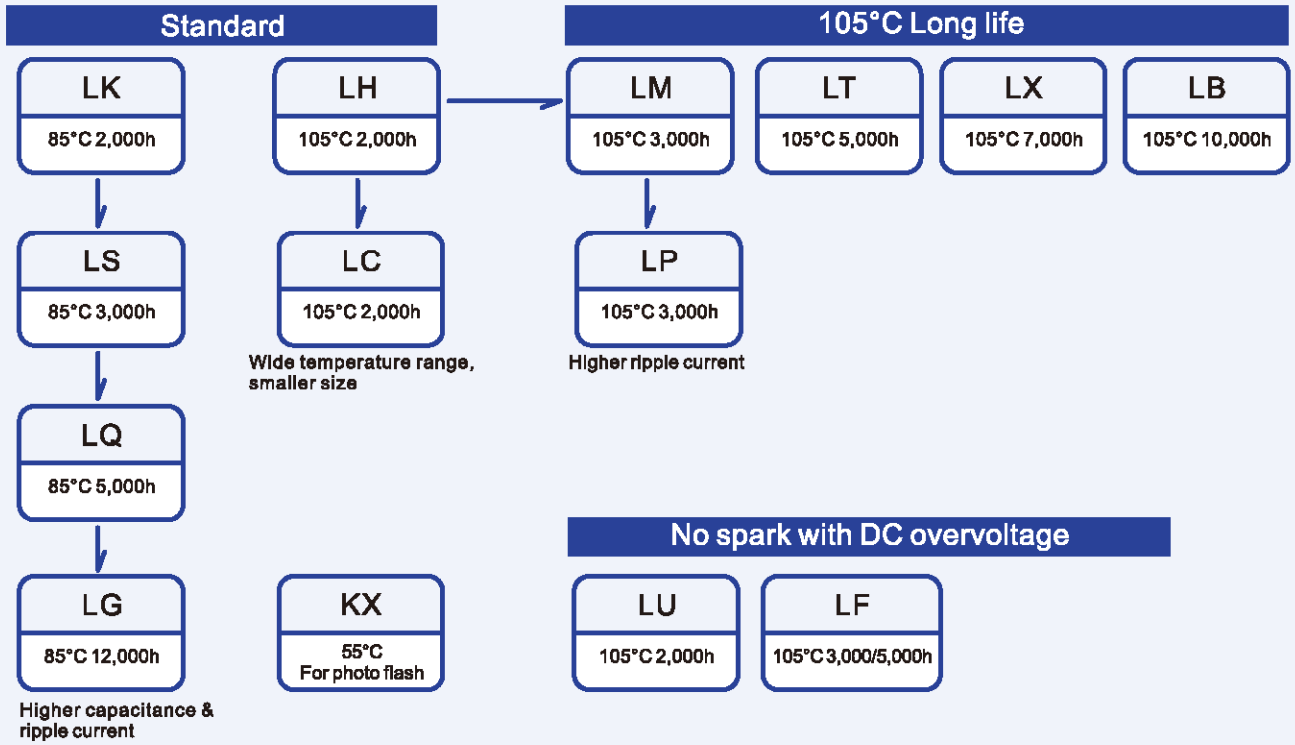


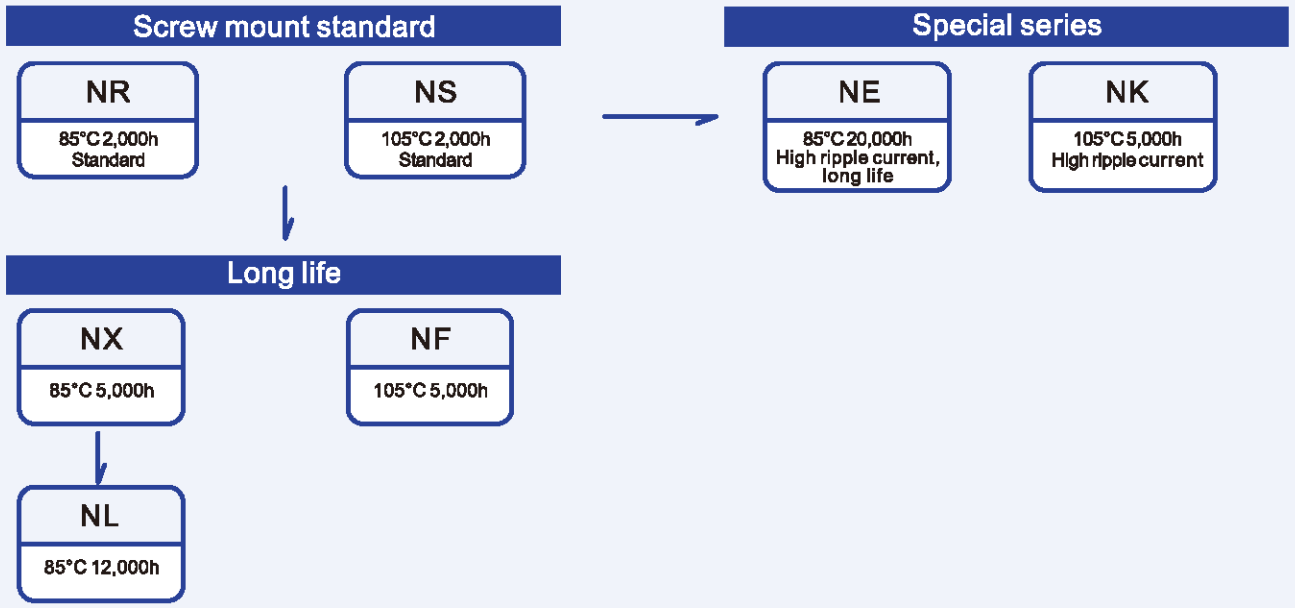
FOR LIGHTING APPLICATION



SNAP-IN & LUG TERMINAL TYPE

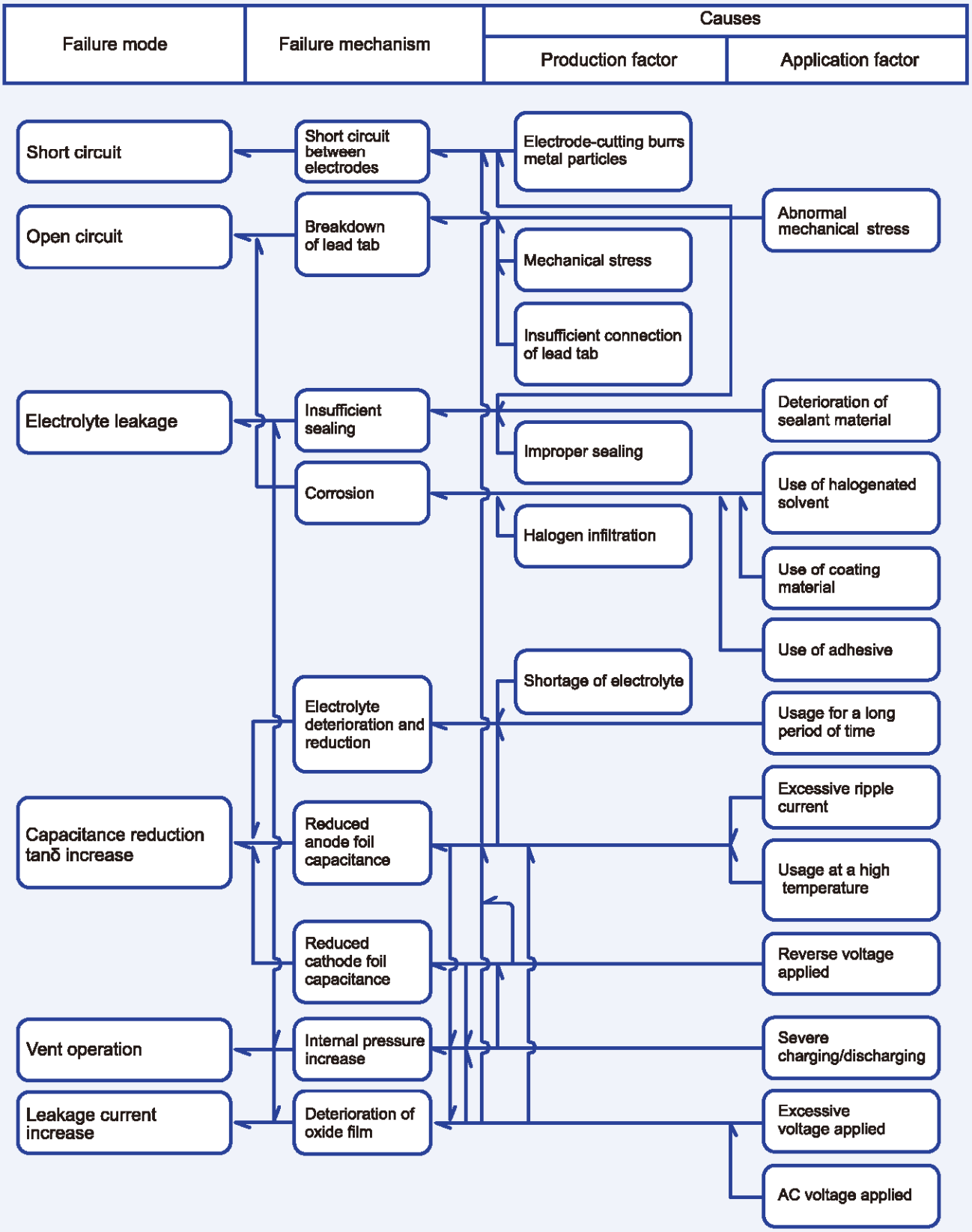


SCREW-MOUNT TERMINAL TYPE



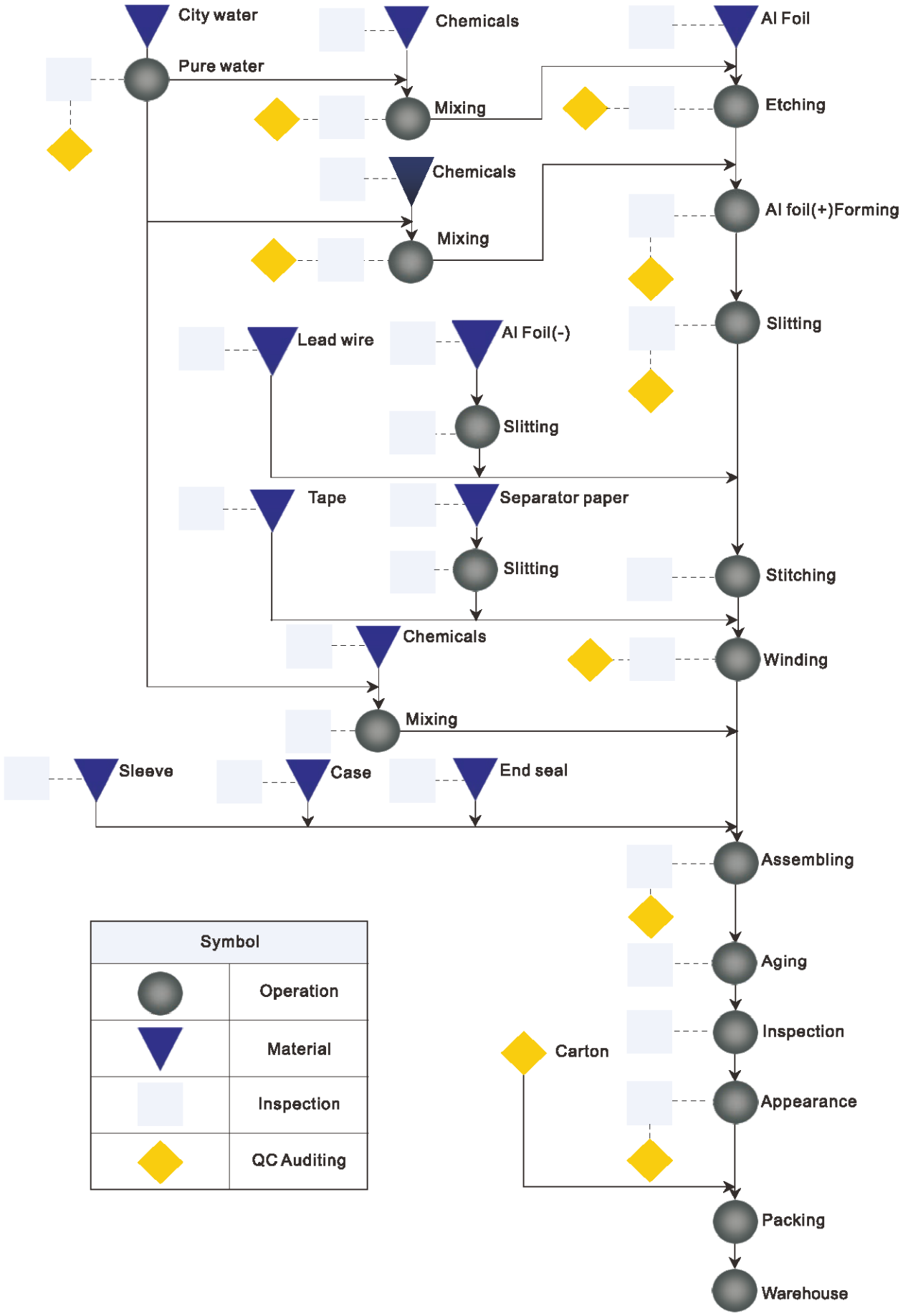
Failure Modes

Aluminum Electrolytic Capacitors Show Various Failure Modes in Different Applications



Flow Chart

Aluminum Electrolytic Capacitors Flow Chart



Application Guidelines for Conductive Polymer Aluminum Solid Electrolytic Capacitors

1. Polarity

AishiCAP is a solid aluminum electrolytic capacitor with positive and negative electrodes. Do not reverse the polarity when using. If it is used with the polarities reversed, its life may be shortened because of increasing leakage current or short circuit.

2. Prohibited circuits

Since leakage current may be increased during soldering and other processes, AishiCAP cannot be used in the following circuits.

1) High impedance circuits;

2) Coupling circuits;

3) Time-limited constant circuits;

4) Connection of two or more capacitors in series for higher withstand voltage;

5) Circuits to get bad influence by large leakage current.

* In addition to the leakage current fluctuation, 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-limited constant capacitor, which is extremely sensitive to the fluctuation of the capacitance. So do not use it as a time-limited constant capacitor.

Additionally, please contact Hunan Aihua Group Co., Ltd. for usage of two or more AishiCAP in series for voltage proof.

3. Over voltage

Over voltage cannot be applied even for an instant as it may cause a short circuit.

4. Sudden charge and discharge

Sudden charge and discharge are prohibited (for maintenance of high reliability). A protection circuit is recommended 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. If the rush current exceeds 10 times the maximum allowable ripple current of AishiCAP, be sure to insert a protection resistor of about 1kΩ for charge and discharge when measuring the leakage current.

5. Considerations when soldering

The soldering conditions are to be within the range prescribed in specifications. If the specifications are not followed, there is a possibility of the intensive increase of leakage current, and the capacitance reduction. Things to be noted before mounting:

a) Do not reuse capacitors that have been assembled in a set and energized. Capacitors that have been removed for measuring electrical characteristics during a periodic inspection also cannot be reused.

b) Leakage current may increase when capacitors are stored for one year. In this case, apply rated voltage for 2 hours at 105°C with load of 1 kΩ resistor.

c) Reflow soldering

Do not apply reflow soldering to radial lead type capacitors.

d) Handling after soldering

Do not tilt, bend or twist the AishiCAP;

Do not move the PCB with catching AishiCAP itself.

When stacking PCB, make sure that the AishiCAP does not touch other PCB or components.

Do not dump the AishiCAP with other objects.

6. Application of AishiCAP in industrial equipments

To ensure reliability, when using the AishiCAP in industrial equipments, appropriate design is required.

7. Use of AishiCAP 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 consult with Hunan Aihua Group Co., Ltd. Don't use products without recognition document of Hunan Aihua Group Co., Ltd.

8. Storage

1) Store AishiCAP with the temperature range between -40 to 85°C(If between 35 to 85°C, it should be less than three months),and the relative humidity of 75% without direct sunshine and store AishiCAP in the package states if possible.

2) It is recommended that you open the bag just before use and use up as early as possible.

3) Store the capacitors in places free from water, oil or salt water or in condensation status.

4) Never store AishiCAP in any area filled with poisonous gases (including hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and ammonia).

5) Store the capacitors in places free from ozone, ultraviolet rays or radiation.

(Radial lead type)

Before unseal: within 1 year after delivery

After seal: within 7 days from opening

9. Cleaning

Concerning about HCFC, soak with high concentration alcohol, petroleum and terpene, water or surface active agent and other solvents (separate or blended), wash under the maker's recommendation by ultrasonic wave, boiling and evaporation, etc. Please contact us if you require further details.

10. Notes on circuit designs for AishiCAP

10.1 Performance

Use AishiCAP within the rated performance ranges defined in this specification.

10.2 Operating temperature and ripple current

If AishiCAP is used at a temperature higher than the upper category temperature(105°C), or excess ripple current flows through AishiCAP, there are high possibilities of service life reduction or leakage current increase to cause AishiCAP defective.

10.3 Leakage current

The leakage current of AishiCAP 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 AishiCAP, it is recommended that the voltage applied to AishiCAP should be less than 80% of the rated voltage. Peak value of the DC and AC voltage should not exceed its rated voltage.

10.5 Failure mode

AishiCAP contains conductive polymer. The life ends mostly due to random failure mode, mainly short circuit. In case of short circuit, AishiCAP can be overheated by continuous current flow, and then Al case of AishiCAP would be separated by increased internal pressure.

Application Guidelines for Aluminum Electrolytic Capacitors

Designing Device Circuits

1. Select the capacitors to suit installation and operating conditions, and use the capacitors to meet the performance limits prescribed in this catalog or the product specifications.

2. Polarity

Aluminum Electrolytic Capacitors are polarized.

Apply neither reverse voltage nor AC voltage to polarized capacitors. Using reversed polarity causes a short circuit or venting. Before use, refer to the catalog, product specifications or capacitor body to identify the polarity marking. (The shape of rubber seal does not represent the directional rule for polarity.) Use a bi-polar type of non-solid aluminum electrolytic capacitor for a circuit where the polarity is occasionally reversed. However, note that even a bi-polar aluminum electrolytic capacitor must not be used for AC voltage applications.

3. Operating voltage

Do not apply a DC voltage which exceeds the full rated voltage. The peak voltage of a superimposed AC voltage (ripple voltage) on the DC voltage must not exceed the full rated voltage.

A surge voltage value, which exceeds the full rated voltage, is prescribed in the catalogs, but it is a restricted condition, for especially short periods of time.

4. Ripple current

The rated ripple current has been specified at a certain ripple frequency. The rated ripple current at several frequencies must be calculated by multiplying the rated ripple current at the original frequency using the frequency multipliers for each product series.

5. Category temperature

The use of a capacitor outside the maximum rated category temperature will considerably shorten the life or cause the capacitor to vent.

The relation between the lifetime of aluminum electrolytic capacitors and ambient temperature follows Arrhenius' rule that the lifetime is approximately halved with each 10°C rise in ambient temperature.

6. Life expectancy

Select the capacitors to meet the service life of a device.

7. Charge and discharge

Do not use capacitors in circuits where heavy charge and discharge cycles are frequently repeated. Frequent and sharp heavy discharging cycles will result in decreasing capacitance and damage to the capacitors due to generated heat. Specified capacitors can be designed to enduring such a condition. Rapid charging/discharging may be repeated in a circuit where the ripple voltage at the two terminals of the aluminum electrolytic capacitor fluctuates greatly. If the variation range of voltage exceeds 70Vp-p, please consult us.

8. Failure modes of capacitors

Non-solid aluminum electrolytic capacitors, in general, have a lifetime which ends in an open circuit, the period is dependent upon temperature. Consequently, lifetime of capacitors can be extended by reducing the ambient temperature and/or ripple current.

9. Insulating

a) Electrically isolate the following parts of a capacitor from the negative terminal, the positive terminal and the circuit traces.

- The outer can case of a non-solid aluminum electrolytic capacitors.
- The dummy terminal of a non-solid aluminum electrolytic capacitors, which is designed for mounting stability.

b) The outer sleeve of a capacitor is not assured as an insulator (Except for screw type). For applications that require an insulated outer sleeve, a custom-designed capacitor is recommended.

10. Conditions

Do not use/expose capacitors to the following conditions.

a) Oil, water, salty water. Avoid storage in damp locations.

b) Direct sunlight.

c) Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or its compounds, and ammonium.

d) Ozone, ultraviolet rays or radiation.

e) Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalogs or the product specification.

11. Mounting

a) The electrolytic paper and the electrolytic-conductive electrolyte in a non-solid aluminum electrolytic capacitor are flammable. Leaking electrolyte on a printed circuit board can gradually erode the copper traces, possibly causing smoke or burning by shortcircuiting the copper traces.

Verify the following points when designing a PC board.

- Provide the appropriate hole spacing on the PC board to match the terminal spacing of the capacitor.
- Make the following open space over the vent so that the vent can operate correctly.

Case diameter	Clearance
Ø6.3 to Ø16mm	2mm minimum
Ø18 to Ø35mm	3mm minimum
Ø40mm or more	5mm minimum

- Do not place any wires or copper traces over the vent of the capacitor.
- Installing a capacitor with the vent facing the PC board needs an appropriate ventilation hole in PC board.
- Do not pass any copper traces beneath the seal side of a capacitor. The trace must pass 1 or 2mm to the side of the capacitor.
- Avoid placing any heat-generating objects adjacent to a capacitor or even on the reverse side of the PC board.
- Do not pass anything via holes or underneath a capacitor.
- In designing double-sided PC boards, do not locate any copper trace under the seal side of a capacitor.

b) Do not mount the terminal side of a screw mount capacitor downwards. If a screw terminal capacitor is mounted on its side, make sure the positive terminal is higher than the negative terminal.

Do not fasten the screws of the terminals and the mounting clamps over

the specified torque prescribed in the catalog or the product specifications.

c) For a surface mount capacitor, design the copper pads of the PC board in accordance with the catalog or the product specifications.

12. Others

a) The electrical characteristics of capacitors vary in respect to temperature, frequency and service life. Design the device circuits by taking these changes into account.

b) Capacitors mounted in parallel need the current to flow equally through the individual capacitors.

c) Capacitors mounted in series require resistors in parallel with the individual capacitors to balance the voltage.

d) Using capacitor for applications which always consider safety. Consult with our factory before use in applications which can affect human life.(space equipment, aerial equipment, nuclear equipment, medical equipment, vehicle control equipment, etc.) Please note that the product which is designed only for specific usage can not be used for other purposes.(ex.Photo flash type, etc.)

■ Installing Capacitors

1. Installing

a) Used capacitors are not reusable, except in the case that the capacitors are detached from a device for periodic inspection to measure their electrical characteristics.

b) If the capacitors have self-charged, discharge the capacitors through a resistor of approximately 1kΩ before use.

c) If capacitors are stored at a temperature of 35°C or more and more than 75% RH, the leakage current may increase. In this case, they can be reformed by applying the rated voltage through a resistor of approximately 1kΩ.

d) Verify the rated capacitance and voltage of the capacitors when installing.

e) Verify the polarity of the capacitors.

f) Do not use the capacitors if they have been dropped on the floor.

g) Do not deform the cases of capacitors.

h) Verify that the lead spacing of the capacitor fits the hole spacing in the PC board before installing the capacitors. Some standard preformed leads are available.

I) For pin terminals or snap-in terminals, insert the terminals into PC board and press the capacitor downward until the bottom of the capacitor body reaches PC board surface.

j) Do not apply any mechanical force in excess of the limits prescribed in the catalogs or the product specifications of the capacitors. Also, note the capacitors may be damaged by mechanical shocks caused by the vacuum/insertion head, component checker or centering operation of an automatic mounting or insertion machine.

2. Soldering and Solderability

a) When soldering with a soldering iron

- Soldering conditions (temperature and time) should be within the limits prescribed in the catalogs or the product specifications.
- If the terminal spacing of a capacitor does not fit the terminal hole spacing of the PC board, reform the terminals in a manner to minimize a mechanical stress into the body of the capacitor.
- Remove the capacitors from the PC board , after the solder is completely melted, reworking by using a soldering iron minimizes the mechanical stress to the capacitors.
- Do not touch the capacitor body with the hot tip of the soldering iron.

b) Flow soldering

- Do not dip the body of a capacitor into the solder bath, only dip the terminals in. The soldering must be done on the reverse side of PC board.
- Soldering conditions (preheat, solder temperature and dipping time) should be within the limits prescribed in the catalogs or the product specifications.
- Do not apply flux to any part of capacitors other than their terminals.
- Make sure the capacitors do not come into contact with any other components while soldering.

c) Reflow soldering (only applicable for SMD type)

- Soldering conditions (preheat, solder temperature and dipping time) should be within the limits prescribed in the catalogs or the product specifications.
- When setting the temperature infrared heaters, consider that the infrared absorption causes material to be discolored and change in appearance.
- Do not solder capacitors more than once using reflow. If it should be done for twice, please consult us first.
- Make sure capacitors do not come into contact with copper traces.

d) Do not re-use surface mount capacitors which have already been soldered. In addition, when installing a new capacitor onto the assembly board to rework, remove old residual flux from the surface of the PC board, and then use a soldering iron within the prescribed conditions.

e) Confirm whether reflow soldering is applicable for the capacitors.

3. Handling after soldering

Do not apply any mechanical stress to the capacitor after soldering onto the PC board.

a) Do not lean or twist the body of the capacitor after soldering the capacitors onto the PC board.

b) Do not use the capacitors for lifting or carrying the assembly board.

c) Do not hit or poke the capacitor after soldering to PC board.
When stacking the assembly board, be careful that other components do not touch the aluminum electrolytic capacitors.

d) Do not drop the assembly board.

4. Cleaning PC board

a) Do not wash capacitors by using the following cleaning agents.

- Halogenated solvents: cause capacitors to fail due to corrosion.
- Alkali system solvents: corrode (dissolve) an aluminum case.
- Petroleum and terpene system solvents: cause the rubber seal material to deteriorate.
- Xylene: cause the rubber seal material to deteriorate.
- Acetone: erase the marking. Solvent-proof capacitors are only suitable for washing within the cleaning conditions prescribed in the catalogs or the product specifications. In particular, ultrasonic cleaning will accelerate damaging capacitors.

b) Verify the following points when washing capacitors.
- Monitor conductivity, pH, specific gravity, and the water content of cleaning agents. Contamination adversely affects these characteristics.
- Be sure not to keep the capacitors in an atmosphere containing the cleaning agent or in an air tight container.
  In addition, please dry the solvent sufficiently on the PC board and the capacitor with an air knife (temperature should be less than the maximum rated category temperature of the capacitor) over 10 minutes.
  Aluminum electrolytic capacitors can be characteristically and catastrophically damaged by halogen ions, particularly by chlorine ions, though the degree of the damage mainly depends upon the characteristics of the electrolyte and rubber seal material. When halogen ions come into contact with the capacitors, the foil corrodes when voltage is applied. This corrosion causes extremely high leakage current, which in turn, causes venting and an open circuit.

5. Precautions for using adhesives and coating

a) Do not use any adhesive and coating materials containing halogenated solvent.

b) Verify the following before using adhesive and coating material.
- Remove flux and dust leftover between the rubber seal and the PC board before applying adhesive or coating materials to the capacitor.
- Dry and remove any residual cleaning agents before applying adhesive and coating materials to the capacitors. Do not cover over the whole surface of the rubber seal with the adhesive or coating materials.
- For permissible heat conditions for curing adhesives or coating materials, follow the instructions in the catalogs or the product specifications of the capacitors.
- Covering over the whole surface of the capacitor rubber seal with resin may result in a hazardous condition because the inside pressure cannot be released completely. Also, a large amount of halogen ions in resins will cause the capacitors to fail because the halogen ions penetrate into the rubber seal and the inside of the capacitor.

c) Some of coating material cannot be cured over the capacitor. Please note that loose luster and whitening on the surface of the outer sleeve might be caused according to the kind of solvents used for mounting adhesives and coating agents.

6. Fumigation

In many cases when exporting or importing electronic devices, such as capacitors, wooden packaging is used. In order to control insects, most often, it becomes necessary to fumigate the shipments. Precautions during "Fumigation" using halogenated chemical such as Methyl Bromide must be taken. Halogen gas can penetrate packaging materials used, such as, cardboard boxes and vinyl bags. Penetration of the halogenated gas can cause corrosion of electrolytic capacitors.

■ The Operation of Devices

a) Do not touch a capacitor directly with bare hands.

b) Do not short-circuit the terminal of a capacitor by letting it come into contact with any conductive object. Also, do not spill conductive liquid such as acid or alkaline solution over the capacitor.

c) Do not use capacitors in circumstance where they would be subject to exposure to the following materials:
- Oil, water, salty water or damp location.
- Direct sunlight.
- Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or its compounds, and ammonium.
- Ozone, ultraviolet rays or radiation.
- Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalogs or product specification.

■ Maintenance Inspection

a) Make periodic inspections of capacitors that have been used in industrial applications. Before inspection, turn off the power supply and carefully discharge the electricity in the capacitors. Verify the polarity when measuring the capacitors with a volt-ohm meter. Also, do not apply any mechanical stress to the terminals of the capacitors.

b) The following items should be checked during the periodic inspections.
- Significant damage in appearance: venting and electrolyte leakage.
- Electrical characteristics: leakage current, capacitance, tanδ and other characteristics prescribed in the catalog or product specifications.We recommend replacing the capacitors if the parts are out of specification.

■ In Case of Venting

a) If a non-solid aluminum electrolytic capacitor expels gas when venting, it will discharge odors or smoke, or burn in the case of a short-circuit failure. Immediately turn off or unplug the main power supply of the device.

b) When venting, a non-solid aluminum electrolytic capacitor blows out gas with a temperature of over 100°C. (A solid aluminum electrolytic capacitor discharges decomposition gas or burning gas while the outer resin case is burning.) Never expose the face close to a venting capacitor.
  If your eyes inadvertently become exposed to the spouting gas or you inhale it, immediately flush the open eyes with large amounts of water and gargle with water respectively. If electrolyte is on the skin, wash the electrolyte away from the skin with soap and plenty of water. Do not lick the electrolyte of non-solid aluminum electrolytic capacitors.

■ Storage

We recommend the following conditions for storage.

a) Do not store capacitors at a high temperature or in high humidity. Store the capacitors indoors at a temperature of 5 to 35°C and a relative humidity of 75% or below.

b) Store the capacitors in places free from water, oil or salt water.

c) Store the capacitors in places free from toxic gases (hydrogen sulfide, sulfurous acid, chlorine, ammonium, etc.)

d) Store the capacitors in places free from ozone, ultraviolet rays or radiation.

e) Keep capacitors in the original package.

■ Disposal

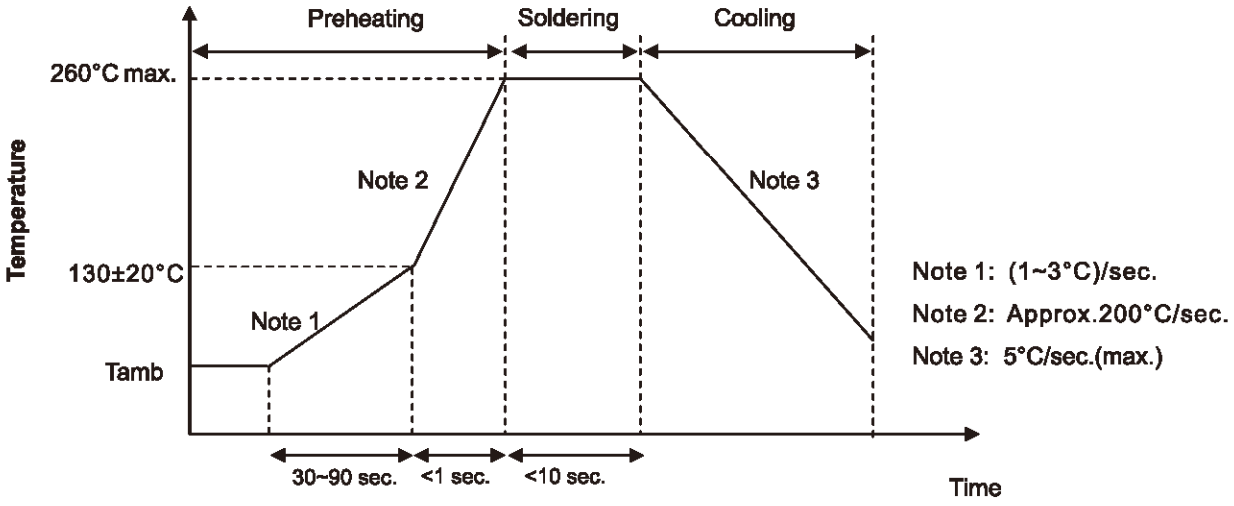
Please consult with a local industrial waste disposal specialist when disposing aluminum electrolytic capacitors.

■ Catalog

Specifications in the catalog may be subject to change without notice. Please consult us first before use. Hunan Aihua Group reserves the right of final interpretation of all the content.

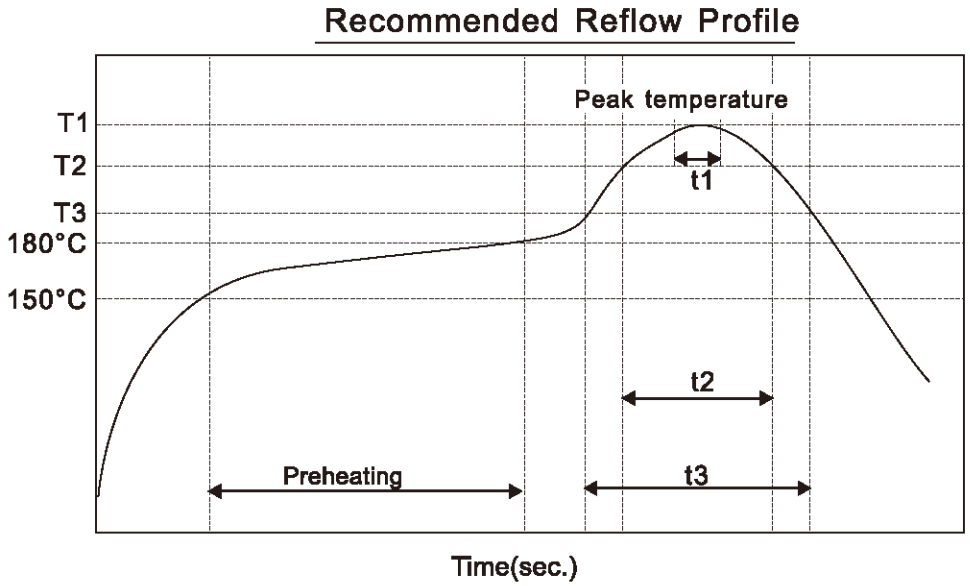
Solering Recommendation

■ Flow Soldering(Radial Lead Type)



■ Reflow Soldering

• (For Polymer SMD Type)

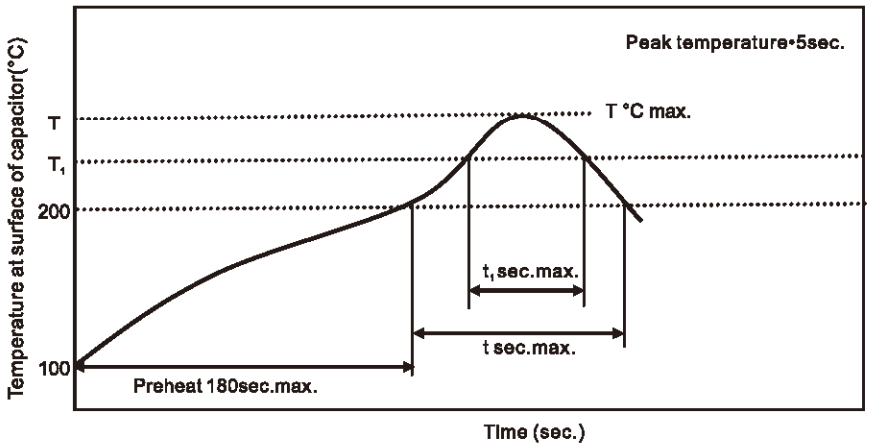


Item	Preheating	T1(°C)	T2(°C)	T3(°C)	t1(sec.)	t2(sec.)	t3(sec.)	Reflow cycle
Condition 1	150°C to 180°C Within 90sec.	≤260	230	200	≤10	≤40	≤60	1
Condition 2		≤250	230	200	≤10	≤40	≤60	2

• (For Liquid SMD Type)

Case size:Φ6.3~Φ10mm:

- Temperature at surface of capacitor shall not exceed T°C.
- The duration for over 200°C temperature and T_1°C at surface of capacitor shall not exceed t and $t_1$seconds,respectively.
- Preheat shall be done at 100°C to 200°C and for Maximum 180 seconds.

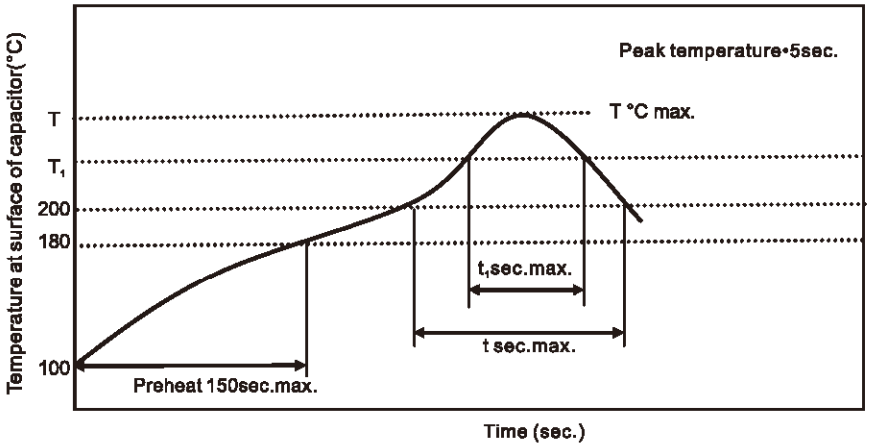


Case size (mm)	T(°C) ①	T_1(°C)	t(sec.) ②	t_1(sec.) ③	Reflow cycle
Φ6.3	250	230	90	40	1
Φ8	240	230	90	30	1
Φ10	235	230	60	30	1

① Peak temperature
② The duration over 200°C (max.)
③ The duration over T_1°C
■ Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

Case size:Φ12.5~Φ18mm:

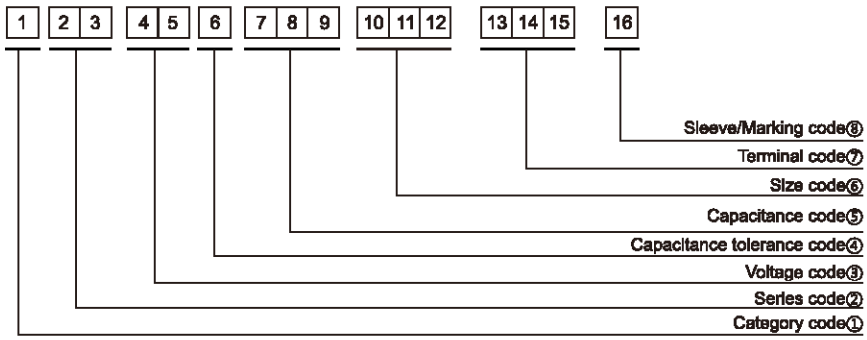
- Temperature at surface of capacitor shall not exceed T°C.
- The duration for over 200°C temperature and T_1°C at surface of capacitor shall not exceed t and t_1 seconds,respectively.
- Preheat shall be done at 100°C to 180°C and for Maximum 150 seconds.



Case size (mm)	T(°C) ①	T_1(°C)	t(sec.) ②	t_1(sec.) ③	Reflow cycle
Φ12.5~Φ18	240	230	60	30	1

① Peak temperature
② The duration over 200°C (max.)
③ The duration over T_1°C
■ Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

Part Numbering System



① Category code

Type	Code
	1
Electrolytic Capacitor	E
Conductive Polymer	S

② Series code

Series name	Code	
	2	3
WH	W	H
CD11GE	G	E
CD11GES	G	X
CD11GAS	G	W
CD11GHS	G	S
NR	N	R
PZ	P	Z

③ Voltage code

WV (V_{dc})	Code	
	4	5
2.5	0	E
3	0	D
4	0	G
6.3	0	J
6.8	0	C
7	0	Q
7.5	0	A
10	1	A
12	1	T
16	1	C
25	1	E
35	1	V
40	1	G
50	1	H
63	1	J
80	1	B
100	1	K
120	2	B
160	2	C
180	2	L
200	2	D
220	2	N
250	2	E
315	2	F
350	2	V
380	2	P
400	2	G
420	2	T
450	2	W
500	2	H
550	2	J
600	2	K

④ Capacitance tolerance code

Tol. (%)	Code
	6
-10~+10	K
-20~+20	M
-10~+30	Q
-10~+20	V
0~+20	A
-5~+20	C
-10~-20	B
-5~+5	D
0~+10	E
-5~-20	F
-15~+5	N

⑤ Capacitance code

Cap (μF)	Code		
	7	8	9
0.10	R	1	0
0.22	R	2	2
0.33	R	3	3
0.47	R	4	7
0.68	R	6	8
1	0	1	0
2.2	2	R	2
3.3	3	R	3
4.7	4	R	7
6.8	6	R	8
10	1	0	0
22	2	2	0
33	3	3	0
47	4	7	0
68	6	8	0
100	1	0	1
220	2	2	1
330	3	3	1
470	4	7	1
680	6	8	1
1000	1	0	2
2200	2	2	2
3300	3	3	2
4700	4	7	2
6800	6	8	2
10000	1	0	3
22000	2	2	3
33000	3	3	3
68000	6	8	3

⑥ Size code

ΦD (mm)	Code
	10
4	C
5	D
6.3	E
8	F
10	G
11	H
12	J
12.5	W
13	K
14	X
16	L
18	M
19	Z
20	N
22	O
25	P
30	Q
35	R
40	Y
51.6	S
64.3	T
76.9	U
91	V
100	A

L (mm)	Code	
	11	12
5	0	5
7	0	7
11	1	1
12	1	2
16	1	6
20	2	0
25	2	5
30	3	0
35	3	5
40	4	0
46	4	6
50	5	0
60	6	0
80	8	0
100	A	0
115	B	5
120	C	0
130	D	0
140	E	0
160	G	0
200	K	0
220	M	0
236	N	6
250	P	0

⑦ Terminal code

Specification	Code	Size	
	13	14	15
Bulk packing	O	-	-
Taping (SMD Type)	D	0	0
Φ4~8 Taping F=5.0mm	P	5	0
Φ10~12.5 Taping F=5.0mm	B	5	0
Lead Cut L=3.5mm	C	3	5
Lead Cut L=11.0mm	C	B	0
Lead Forming & Cut L=4.5mm	F	-	-
Kink & Cut L=4.5mm	J	-	-
Snap-in type Terminal 4.0mm in length	K	-	-
Three Terminals	T	-	-
Ring clip mounting standard design	A	0	0
Ring clip mounting special design	S	-	-

⑧ Sleeve/Marking code

Sleeve/Marking	Code
	16
PVC	C
PET	T
Dark blue	B
Bright red	R
Sky-blue	S
Light blue	T
Pink	Z
Black	H
Purple-blue	V
Red	O

Lead Forming

Taping Specifications

Fig.1 code: X

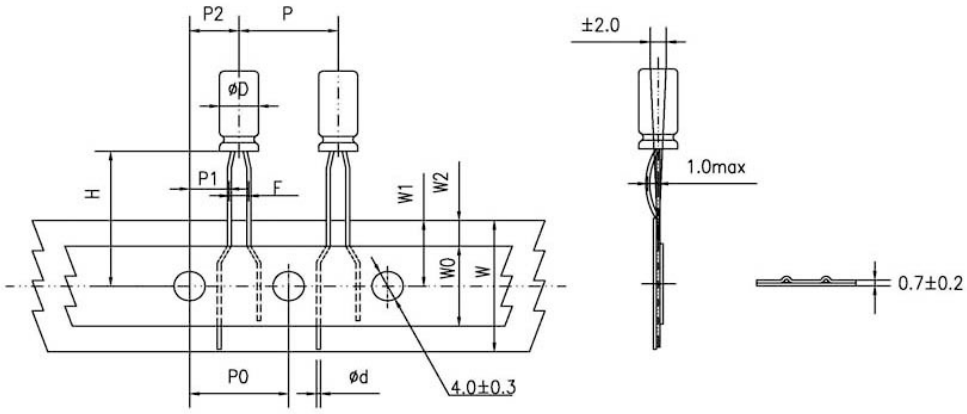


Fig.2 code: B

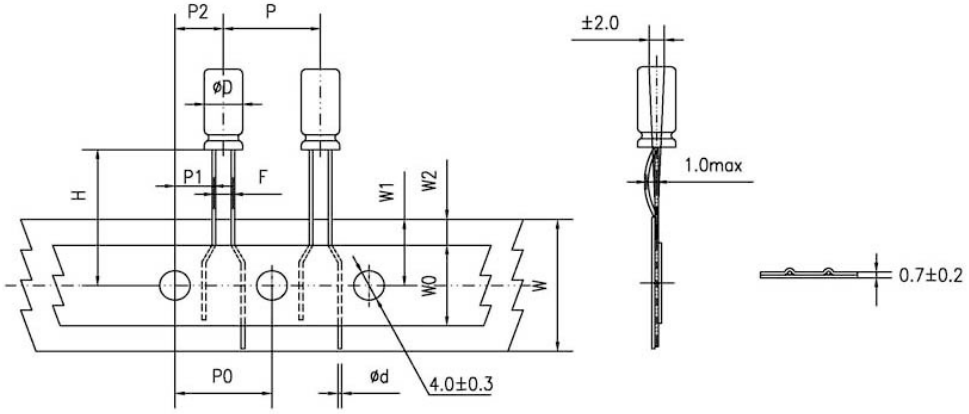


Fig.3 code: B

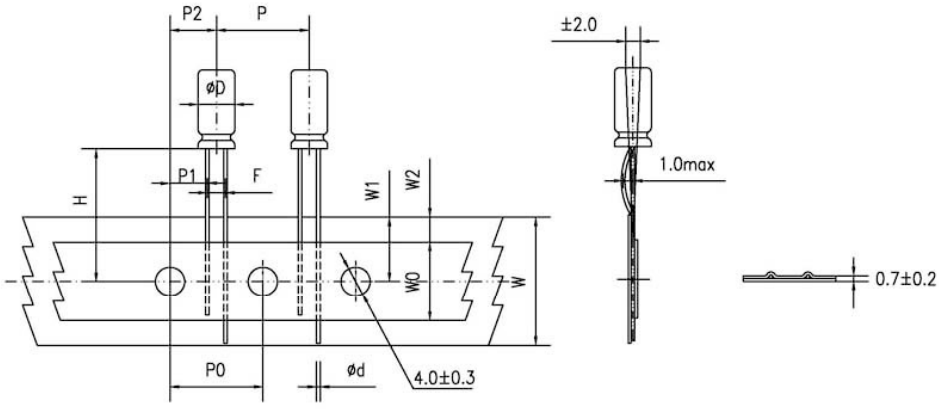
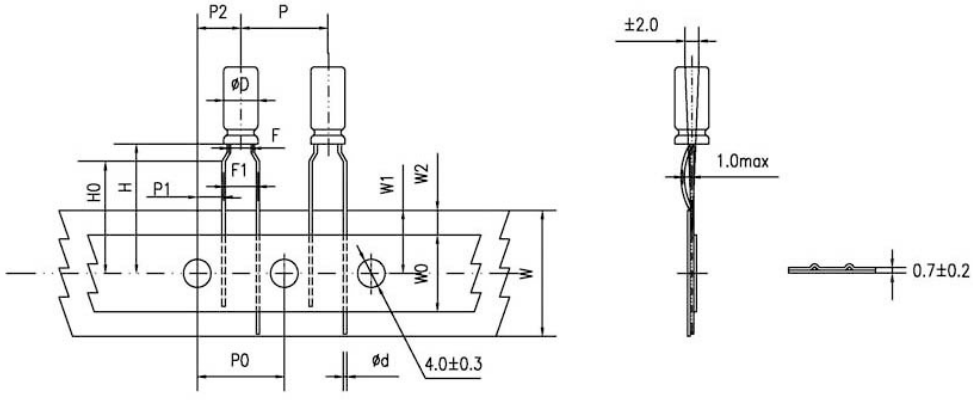


Fig.4 code: P



Lead Forming

Specification Fig.1 & Fig.2 & Fig.3

Items	Symbol	Case size													Tolerance
		4*5 4*7		5*5 5*7		5*11		6.3*5	6.3*7 6.3*9	6.3*11 6.3*12	8*5/7 8*9/11 8*11.5 8*12	8*16 8*20	10*9/12 10*12.5 10*13/16 10*20/25		
Pin Code		X	B	X	B	X	B	B	B	B	B	B	B		
Lead wire diameter	Φd	0.45		0.45		0.5		0.45	0.5	0.5	0.45/0.5	0.6	0.6		±0.05
Pitch of body	P	12.7		12.7		12.7		12.7	12.7	12.7	12.7	12.7	12.7		±1.0
Feed hole pitch	P0	12.7		12.7		12.7		12.7	12.7	12.7	12.7	12.7	12.7		±0.2
Distance from hole center to lead	P1	5.1	5.6	5.1	5.35	5.1	5.35	5.1	5.1	5.1	4.6	4.6	3.85		±0.7
Distance from feed hole center to body center	P2	6.35		6.35		6.35		6.35	6.35	6.35	6.35	6.35	6.35		±1.0
Lead-to-lead distance	F	2.5	1.5	2.5	2.0	2.5	2.0	2.5	2.5	2.5	3.5	3.5	5.0		±0.5
Height of body from tape center	H	18.5		18.5		18.5		18.5	18.5	18.5	18.5	18.5	18.5		±0.75
Base tape width	W	18.0		18.0		18.0		18.0	18.0	18.0	18.0	18.0	18.0		±0.5
Adhesive tape width	W0	6.0		6.0		6.0		6.0	6.0	8.0	8.0	8.0	11.0		min
Hole position	W1	9.0		9.0		9.0		9.0	9.0	9.0	9.0	9.0	9.0		+0.75 -0.5
Hole down tape position	W2	3.0		3.0		3.0		3.0	3.0	3.0	3.0	3.0	3.0		max

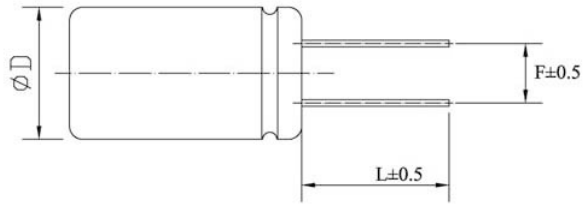
Specification Fig.4

Items	Symbol	Case size									Tolerance
		4*5 4*7	5*5	5*7	5*11	6.3*5	6.3*7 6.3*9	6.3*11 6.3*12	8*5/7 8*9/11 8*11.5/12	8*16 8*20	
Pin Code		P	P	P	P	P	P	P	P	P	
Lead wire diameter	Φd	0.45	0.45	0.45	0.5	0.45	0.5	0.5	0.45/0.5	0.6	±0.05
Pitch of body	P	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	±1.0
Feed hole pitch	P0	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	±0.2
Distance from hole center to lead	P1	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	±0.7
Distance from feed hole center to body center	P2	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	±1.0
Lead-to-lead distance	F	1.5	2.0	2.0	2.0	2.5	2.5	2.5	3.5	3.5	±0.5
Lead to lead distance	F1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	+0.8 -0.2
Height of body from tape center	H	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	±0.75
Lead wire clinch height	H0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	±0.5
Base tape width	W	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	±0.5
Adhesive tape width	W0	6.0	6.0	6.0	6.0	6.0	6.0	8.0	8.0	8.0	min
Hole position	W1	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	+0.75 -0.5
Hole down tape position	W2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	max

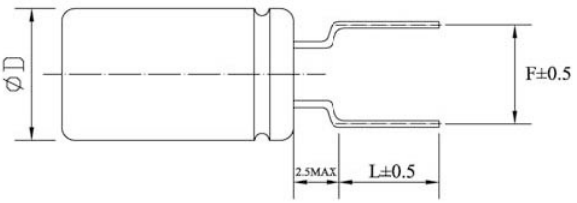
Lead Forming

Lead Forming & Cut

Code:C
RANGE: Φ4~Φ18

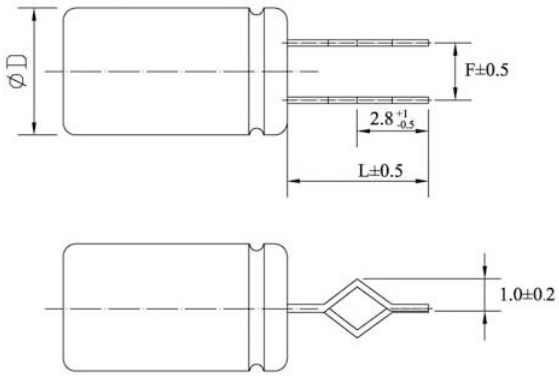


Code:F
RANGE: Φ4~Φ8



ΦD	F	L	ΦD	F	L
4	1.5	3.0~12.0	4	5.0	3.5, 4.5, 5.0, 7.0
5	2.0	3.0~12.0	5	5.0	3.5, 4.5, 5.0, 7.0
6.3	2.5	3.0~12.0	6.3	5.0	3.5, 4.5, 5.0, 7.0
8	3.5	3.0~12.0	8	5.0	3.5, 4.5, 5.0, 7.0
10	5.0	3.0~12.0	-	-	-
12.5	5.0	3.0~12.0	-	-	-
16	7.5	3.0~12.0	-	-	-
18	7.5	3.0~12.0	-	-	-

Code:J
RANGE: Φ10~Φ18



ΦD	F	L
10	5.0	4.0, 4.5, 5.0
12.5	5.0	4.0, 4.5, 5.0
16	7.5	4.0, 4.5, 5.0
18	7.5	4.0, 4.5, 5.0

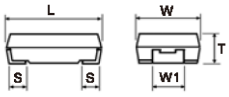
A1 series

- Endurance: 2,000 hours at 105°C
- Low ESR
- Recommended Applications: System Board,Display Card,Small Charger and intelligent TV
- **RoHS Compliant and lead-free**

SPECIFICATIONS

Items	Characteristics										
Category Temperature Range	-55~+105°C										
Rated Working Voltage Range	2~25 Vdc										
Nominal Capacitance Range	6.8~470μF										
Capacitance Tolerance	±20%(M)										(at 20°C,120Hz)
DC Leakage Current	I≤0.06CV W.V.:2V~10V I≤0.1CV W.V.:12.5V~25V Where, I: Leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)										(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	2	2.5	4	6.3	7.5	10	12.5	16	25	
	tanδ (max.)	0.06								0.10	(at 20°C,120Hz)
ESR(100k~300kHz,20°C)	Value in characteristics table										
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25										
Endurance	After applying rated voltage with rated ripple current for 2,000 hours at 105°C,the capacitors shall meet the following requirements.										
	Appearance	No significant damage									
	Capacitance Change	≤±20% of the initial value									
	D.F. (tanδ)	≤150% of the initial specified value									
	Leakage Current	≤The initial specified value									
Humidity Test	After subjecting to 90%~95% RH for 500 hours at 60°C(no voltage), the capacitors shall meet the requirement as Endurance.										
	Rated Voltage(Vdc)	2~2.5			4		6.3~7.5		8~16		25
	Capacitance Change	+70,-20%			+60,-20%		+50,-20%		+40,-20%		
	D.F. (tanδ)	≤200% of the initial specified value									
	Leakage Current	≤The initial specified value									
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.										
	Appearance	No significant damage									
	Capacitance Change	≤±20% of the initial value									
	D.F. (tanδ)	≤150% of the initial specified value									
	Leakage Current	≤The initial specified value									

DIMENSIONS[mm]



Case Size	L±0.3(mm)	W±0.2(mm)	T±0.1(mm)	W1±0.2(mm)	S±0.2(mm)
7.3x4.3x1.9	7.3	4.3	1.9	2.4	1.3

MARKING

PART NUMBERING SYSTEM

S A1 0J M 221 A19 R04 XXX

- S: Category code
- A1: Series code
- 0J: Voltage code
- M: Capacitance tolerance code
- 221: Capacitance code
- A19: Size code
- R04: ESR code
- XXX: Special code

A1 series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size (LxWxT mm)	ESR (mΩ,20°C,100kHz) (max.)	Rated ripple current (100kHz,20~105°C)(mArms)	Leakage Current (20°C) (μA max.)
2 (2.3)	100	7.3*4.3*1.9	16	2000	12.0
	150	7.3*4.3*1.9	9	3000	18.0
	220	7.3*4.3*1.9	9	3000	26.4
	270	7.3*4.3*1.9	9	3500	32.4
	330	7.3*4.3*1.9	7	3500	39.6
		7.3*4.3*1.9	9	3500	39.6
	470	7.3*4.3*1.9	4.5	3500	56.4
		7.3*4.3*1.9	6	3500	56.4
		7.3*4.3*1.9	9	3500	56.4
2.5 (2.5)	100	7.3*4.3*1.9	16	2000	15.0
	150	7.3*4.3*1.9	9	3000	22.5
	220	7.3*4.3*1.9	9	3000	33.0
	270	7.3*4.3*1.9	9	3500	40.5
	330	7.3*4.3*1.9	9	3500	49.5
4 (4.6)	68	7.3*4.3*1.9	20	1900	16.3
	82	7.3*4.3*1.9	16	2100	19.7
	150	7.3*4.3*1.9	16	2100	36.0
6.3 (7.2)	10	7.3*4.3*1.9	55	1000	3.8
	22	7.3*4.3*1.9	45	1000	8.3
	33	7.3*4.3*1.9	25	1800	12.5
	47	7.3*4.3*1.9	25	1800	17.8
	68	7.3*4.3*1.9	15	2000	25.7
	100	7.3*4.3*1.9	15	2000	37.8
	150	7.3*4.3*1.9	10	3000	56.7
		7.3*4.3*1.9	15	3000	56.7
	220	7.3*4.3*1.9	10	3000	83.2
		7.3*4.3*1.9	15	3000	83.2
7.5 (8.6)	150	7.3*4.3*1.9	10	3000	67.5
	200	7.3*4.3*1.9	12	3000	90.0
10 (11.5)	10	7.3*4.3*1.9	55	1000	6.0
	22	7.3*4.3*1.9	28	1600	13.2
	33	7.3*4.3*1.9	25	1800	19.8
	100	7.3*4.3*1.9	15	2500	60.0
12.5 (14.4)	10	7.3*4.3*1.9	55	1000	12.5
	15	7.3*4.3*1.9	45	1000	18.8
	22	7.3*4.3*1.9	30	1600	27.5
	33	7.3*4.3*1.9	25	1800	41.3
	47	7.3*4.3*1.9	20	2000	58.8
	56	7.3*4.3*1.9	15	2000	70.0
	100	7.3*4.3*1.9	12	2500	125.0
16 (18.4)	6.8	7.3*4.3*1.9	70	1000	10.9
	10	7.3*4.3*1.9	60	1000	16.0
	15	7.3*4.3*1.9	40	1000	24.0
	47	7.3*4.3*1.9	55	1400	75.2
	68	7.3*4.3*1.9	30	1600	108.8
25 (28.8)	10	7.3*4.3*1.9	35	1000	25.0
	33	7.3*4.3*1.9	60	1400	55

※ Specifications may be subject to change without notice.

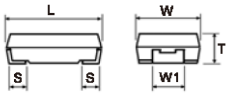
A2 series

- Endurance: 2,000 hours at 105°C
- Low ESR
- Recommended Applications: System Board,Display Card,Small Charger and intelligent TV
- **RoHS Compliant and lead-free**

SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	-55~+105°C									
Rated Working Voltage Range	2~25 Vdc									
Nominal Capacitance Range	6.8~470μF									
Capacitance Tolerance	±20%(M)									(at 20°C,120Hz)
DC Leakage Current	I≤0.06CV W.V.:2V~10V I≤0.1CV W.V.:12.5V~25V Where, I: Leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)									(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	2	2.5	4	6.3	7.5	10	12.5	16	25	
	tanδ (max.)	0.06								0.10	(at 20°C,120Hz)
ESR(100k~300kHz,20°C)	Value in characteristics table									
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25									
Endurance	After applying rated voltage with rated ripple current for 2,000 hours at 105°C,the capacitors shall meet the following requirements.									
	Appearance	No significant damage								
	Capacitance Change	≤±20% of the initial value								
	D.F. (tanδ)	≤150% of the initial specified value								
	Leakage Current	≤The initial specified value								
Humidity Test	After subjecting to 90%~95% RH for 500 hours at 60°C(no voltage), the capacitors shall meet the requirement as Endurance.									
	Rated Voltage(Vdc)	2~2.5		4		6.3~7.5		8~16		25
	Capacitance Change	+70,-20%		+60,-20%		+50,-20%		+40,-20%		
	D.F. (tanδ)	≤200% of the initial specified value								
	Leakage Current	≤The initial specified value								
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.									
	Appearance	No significant damage								
	Capacitance Change	≤±20% of the initial value								
	D.F. (tanδ)	≤150% of the initial specified value								
	Leakage Current	≤The initial specified value								

DIMENSIONS[mm]



Case Size	L±0.3(mm)	W±0.2(mm)	T±0.1(mm)	W1±0.2(mm)	S±0.2(mm)
7.3x4.3x2.8	7.3	4.3	2.8	2.4	1.3

MARKING

PART NUMBERING SYSTEM

S A2 0J M 221 A19 R04 XXX

- S: Category code
- A2: Series code
- 0J: Voltage code
- M: Capacitance tolerance code
- 221: Capacitance code
- A19: Size code
- R04: ESR code
- XXX: Special code

A2 series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size (LxWxT mm)	ESR (mΩ,20°C,100kHz) (max.)	Rated ripple current (100kHz,20~105°C)(mArms)	Leakage Current (20°C) (μA max.)
2 (2.3)	100	7.3*4.3*2.8	16	2000	12.0
	150	7.3*4.3*2.8	9	3000	18.0
	220	7.3*4.3*2.8	9	3000	26.4
	270	7.3*4.3*2.8	9	3500	32.4
	330	7.3*4.3*2.8	9	3500	39.6
	470	7.3*4.3*2.8	9	3500	56.4
2.5 (2.5)	100	7.3*4.3*2.8	16	2000	15.0
	150	7.3*4.3*2.8	9	3000	22.5
	180	7.3*4.3*2.8	12	2500	27.0
	220	7.3*4.3*2.8	9	3000	33.0
	270	7.3*4.3*2.8	9	3500	40.5
	330	7.3*4.3*2.8	7	3500	49.5
		7.3*4.3*2.8	9	3500	49.5
	470	7.3*4.3*2.8	4.5	3500	70.5
		7.3*4.3*2.8	6	3500	70.5
		7.3*4.3*2.8	9	3500	70.5
4 (4.6)	68	7.3*4.3*2.8	20	1900	16.3
	82	7.3*4.3*2.8	16	2100	19.7
	150	7.3*4.3*2.8	18	2100	36.0
6.3 (7.2)	10	7.3*4.3*2.8	55	1000	3.8
	22	7.3*4.3*2.8	45	1000	8.3
	33	7.3*4.3*2.8	25	1800	12.5
	47	7.3*4.3*2.8	25	1800	17.8
	68	7.3*4.3*2.8	15	2000	25.7
	100	7.3*4.3*2.8	15	2000	37.8
	150	7.3*4.3*2.8	10	3000	56.7
		7.3*4.3*2.8	15	3000	56.7
	220	7.3*4.3*2.8	10	3000	83.2
		7.3*4.3*2.8	15	3000	83.2
7.5 (8.6)	150	7.3*4.3*2.8	10	3000	67.5
	200	7.3*4.3*2.8	12	3000	90.0
10 (11.5)	10	7.3*4.3*2.8	55	1000	6.0
	22	7.3*4.3*2.8	28	1600	13.2
	33	7.3*4.3*2.8	25	1800	19.8
	68	7.3*4.3*2.8	15	2000	40.8
	100	7.3*4.3*2.8	15	2500	60.0
12.5 (14.4)	10	7.3*4.3*2.8	55	1000	12.5
	15	7.3*4.3*2.8	45	1000	18.8
	22	7.3*4.3*2.8	30	1600	27.5
	33	7.3*4.3*2.8	25	1800	41.3
	47	7.3*4.3*2.8	20	2000	58.8
	56	7.3*4.3*2.8	15	2000	70.0
	100	7.3*4.3*2.8	12	2500	125.0
16 (18.4)	6.8	7.3*4.3*2.8	70	1000	10.9
	10	7.3*4.3*2.8	60	1000	16.0
	15	7.3*4.3*2.8	40	1000	24.0
	22	7.3*4.3*2.8	30	1600	35.2
	33	7.3*4.3*2.8	30	1600	52.8
	47	7.3*4.3*2.8	30	1600	75.2
	68	7.3*4.3*2.8	30	1600	108.8
	100	7.3*4.3*2.8	25	1800	160
25 (28.8)	10	7.3*4.3*2.8	45	1000	25.0
	33	7.3*4.3*2.8	60	1400	82.5

※ Specifications may be subject to change without notice.

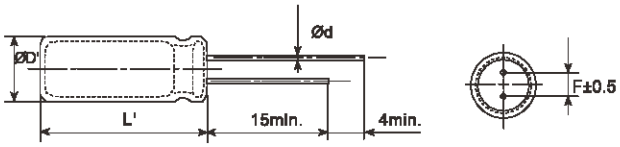
PZ series

- Endurance: +105°C 2,000 hours
- Low ESR
- Recommended Applications: System Board,Display Card,Small Charger and intelligent TV
- **RoHS Compliant and lead-free**

SPECIFICATIONS

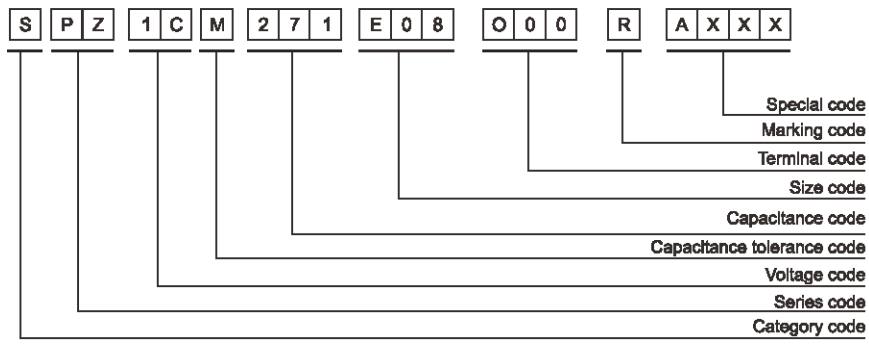
Items	Characteristics											
Category Temperature Range	-55~+105°C											
Rated Working Voltage Range	6.3~100 Vdc											
Nominal Capacitance Range	4.7~5600μF											
Capacitance Tolerance	±20%(M)											(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)											(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	6.8	7.5	10	16	25	35	50	63	100	
	tanδ (max.)	0.08			0.12						0.15	(at 20°C,120Hz)
ESR(100k~300kHz,20°C)	Value in characteristics table											
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25											
Endurance	After applying rated voltage for 2,000 hours at 105°C,the capacitors shall meet the following requirements.											
	Appearance	No significant damage										
	Capacitance Change	≤±20% of the initial value										
	D.F. (tanδ)	≤150% of the initial specified value										
	ESR	≤150% of the initial specified value										
	Leakage Current	≤The initial specified value										
Humidity Test	After subjecting to 90%~95% RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.											
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.											
	Appearance	No significant damage										
	Capacitance Change	≤±20% of the initial value										
	D.F. (tanδ)	≤150% of the initial specified value										
	ESR	≤150% of the initial specified value										
	Leakage Current	≤The initial specified value										

DIMENSIONS[mm]



ØD	5	5.5	6.3	6.8	8	10	13
Ød	0.5	0.5	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	2.5	2.5	3.5	5.0	5.0
ØD'	ØD+0.5max.						
L'	L+1.0max.				L-0.5~+1		L-0.5~+2

PART NUMBERING SYSTEM



PZ series

STANDARD RATINGS

VDC (SV)	Cap (µF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (µA)(max.)
6.3 (7.2)	47	6.3*5	40	1100	500
	82	6.3*5	40	1100	500
	100	4*7	30	1500	500
		5*7	30	1800	500
		6.3*6	40	1900	500
	150	4*7	30	2100	500
	180	5*7	30	2600	500
	220	5*7	20	3500	500
		6.3*7	20	3550	500
		6.3*8	15	3600	500
	270	5*7	20	3600	500
		5*6	20	3200	500
	330	5*8	20	4000	500
		6.3*5	25	3160	500
		6.3*8	15	4000	500
	390	5*9	20	4100	500
	470	5*10	20	4300	592
		5.5*9	20	4100	592
		6.3*7	20	3900	592
		6.3*8	15	4400	592
	500	5*9	20	4100	630
	560	6.3*7	20	4200	706
		6.3*8	20	4800	706
		5.5*9	20	4300	706
	680	6.3*9	20	5080	857
		5.5*9	20	4800	857
		8*9	20	4600	857
	820	5.5*10	20	4800	1033
		6.3*9	20	5080	1033
		8*9	15	4700	1033
	1000	6.3*10	10	5150	1260
		8*9	12	4800	1260
		8*11	10	5200	1260
	1200	6.3*11	10	5200	1512
		8*11	10	5300	1512
	1500	8*11	10	5400	1890
		10*12	10	5500	1890
	1800	10*10	10	5560	2268
	2200	8*14	10	5700	2772
		10*12	10	5800	2772
	3300	10*14	10	5900	4158
	4700	10*17	10	6100	5000
	5600	10*18	10	6300	5000
6.8 (7.8)	220	5*7	20	3300	500
	270	5*7	20	3600	500
		6.3*8	20	3900	500
	330	5*6	20	3600	500
		6.3*5	25	3100	500
		6.3*7	20	3400	500
	390	5*9	20	3900	530
	470	5*9	20	4100	639
		6.3*7	20	3700	639
	560	6.3*8	20	4500	762
	680	6.3*9	20	4800	925
	820	6.3*9	20	4900	1115
	1000	6.3*11	12	5100	1360
		8*11	10	5150	1360
7 (8)	150	5*6	30	1500	500
	220	5*7	20	3200	500
	270	5*8	20	3400	500
	330	5*9	20	3600	500
	470	6.3*8	20	3800	658
		5.5*9	20	3600	658
	560	6.3*8	20	4000	784
	680	6.3*9	12	4200	952
	820	6.3*10	12	4500	1148
		8*9	12	4600	1148
7.5 (8.6)	220	5*7	20	3100	500
	270	5*8	20	3300	500
	330	5*9	20	3500	500
	390	5*9	20	3500	585
	470	6.3*7	25	3200	705
		5.5*9	20	3550	705
		5*9	20	3550	705
		5.5*8	25	3100	705
	500	5.5*9	20	3600	750
	560	6.3*8	20	3900	840
	680	6.3*9	12	4100	1020
		6.8*8	20	4000	1020
	820	6.3*10	12	4400	1230
		8*9	12	4550	1230
	1000	8*11	12	4700	1500
		6.3*11	12	4500	1500
	1200	8*11	12	4800	1800
		6.8*11	12	4600	1800

PZ series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
7.5 (8.6)	1500	8*11	12	4900	2250
		7*13	12	4800	2250
	1800	8*14	12	5100	2700
	2200	10*12	12	5700	3300
10 (11.5)	47	5*7	35	2200	500
	56	5*7	35	2250	500
	68	5*7	35	2300	500
	82	5*7	35	2350	500
	100	5*7	35	2400	500
		6.3*5	30	2300	500
		5*5	30	2000	500
	120	5*7	20	2450	500
	150	5*7	20	2500	500
	180	6.3*7	20	2800	500
		5*8	20	2700	500
	220	5*9	20	2820	500
		6.3*5	25	2800	500
		6.3*8	15	3160	500
	270	6.3*8	20	3100	540
	330	6.3*8	20	3300	660
		8*9	15	3400	660
		6.3*10	12	3500	660
	390	6.3*8	20	3400	780
	470	5.5*9	20	3400	940
		6.3*8	20	3500	940
		8*9	15	3550	940
		8*11	12	5650	940
	560	6.3*10	13	3600	1120
		8*9	15	3600	1120
	680	6.3*11	15	3800	1360
		8*11	12	3900	1360
		8*8	20	3300	1360
	820	8*11	12	4000	1640
	1000	8*11	12	4200	2000
		10*12	10	5300	2000
	1200	8*12	10	4500	2400
		10*12	10	5450	2400
	1500	10*12	10	5500	3000
		8*14	10	4800	3000
	1800	10*13	10	5800	3600
	2200	10*15	10	6100	4400
	3300	10*18	10	6200	5000
12 (13.8)	220	4*10	15	2100	528
	330	5.5*9	20	3100	792
		6.3*8	20	3100	792
		5*10	20	3100	792
	470	5.5*9	20	3200	1128
		6.3*9	20	3450	1128
	560	6.3*10	15	3400	1344
	680	6.3*11	15	3600	1632
		8*10	15	3700	1632
	820	8*11	12	3800	1968
		6.8*11	13	3200	1968
	1000	8*12	12	4000	2400
	1200	8*14	12	4400	2880
	1500	8*16	12	4800	3600
16 (18.4)	22	5*9	80	1600	500
	47	5*7	20	2050	500
	56	5*7	20	2100	500
	68	5*7	20	2150	500
	82	5*8	20	2200	500
	100	5*7	20	2250	500
		6.3*5	25	2100	500
		6.3*8	20	2800	500
	120	5*8	20	2350	500
	150	5*8	20	2400	500
	180	5*8	20	2450	576
		6.3*7	16	2500	576
	220	5*10	20	2600	704
		6.3*8	20	2700	704
		6.3*10	15	2900	704
	270	5.5*9	20	2750	864
		6.3*8	20	2800	864
		8*9	20	2900	864
	330	5.5*9	20	2900	1056
		6.3*9	20	2900	1056
		6.3*10	15	3100	1056
	470	5.5*10	20	3000	1504
		6.3*11	15	3100	1504
		8*11	11	4600	1504
		8*9	13	4100	1504
	560	8*11	11	3200	1792
		8*13	11	3300	1792
		10*12	11	3500	1792
	680	8*11	11	3400	2176
		10*12	11	3600	2176
		6.8*11	11	3200	2176
	820	8*13	11	3500	2624
		10*12	11	3800	2624
	1000	10*12	11	4000	3200
		8*14	11	3600	3200

PZ series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
16 (18.4)	1200	10*15	11	4300	3840
		10*12	11	4200	3840
	1500	10*12	11	4800	4800
		10*18	11	5500	4800
	1800	10*14	11	5400	5000
	2200	10*17	11	5800	5000
		10*15	11	5500	5000
	3300	13*18	11	6100	5000
20 (23)	33	5*8	40	1900	500
	39	5*8	40	1950	500
	47	5*8	40	2200	500
	56	5*9	40	2100	500
	68	6.3*8	30	2100	500
	82	6.3*8	30	2150	500
	100	6.3*8	30	2200	500
	120	6.3*8	30	2300	500
	150	6.3*10	20	2350	600
	180	8*9	30	2450	720
	220	8*11	20	2550	880
	270	8*11	20	2700	1080
	330	8*11	20	2800	1320
		6.3*11	20	2100	1320
	470	10*12	20	2900	1880
		8*16	20	3000	1880
		8*11	20	2400	1880
	560	10*12	20	3100	2240
		8*16	20	3200	2240
	680	10*15	20	3300	2720
		8*14	20	2700	2720
	820	10*18	20	3400	3280
	1000	10*18	20	3900	4000
25 (29)	6.8	6.3*6	100	1100	500
	10	5*8	70	1800	500
	22	5*9	60	1810	500
	33	5*9	50	1850	500
	39	5*8	40	1900	500
	47	5*9	40	1950	500
	56	5*9	40	2050	500
	68	6.3*7	30	2100	500
	82	6.3*7	30	2150	500
	100	6.3*8	30	2200	500
		6.3*10	20	2300	500
		8*11	20	2450	500
	120	6.3*8	30	2300	600
	150	6.3*10	20	2350	750
	180	6.3*10	20	2350	900
		8*9	30	2450	900
	220	8*11	20	2550	1100
		10*12	20	2900	1100
		5.5*10	20	1900	1100
	270	8*11	20	2700	1350
	330	8*11	20	2800	1650
		10*12	20	3100	1650
		10*10	25	2800	1650
	470	10*12	20	2800	2350
		8*16	20	2700	2350
		8*11	20	2300	2350
		10*10	25	2300	2350
	560	10*12	20	3000	2800
		8*11	20	2400	2800
	680	10*15	20	3200	3400
		10*12	20	2800	3400
		8*14	20	2500	3400
	820	10*18	20	3300	4100
		10*12	20	2600	4100
		8*16	20	2600	4100
	1000	10*18	20	3800	5000
	1500	13*16	20	4000	5000
35 (41)	4.7	5*8	60	1700	500
	10	5*8	60	1800	500
	15	5*8	60	1850	500
	22	5*9	100	1950	500
	33	5*9	50	2000	500
	39	5*9	50	2050	500
	47	6.3*7	50	2100	500
	56	6.3*7	50	2150	500
	68	6.3*7	50	2200	500
	82	6.3*7	50	2250	574
	100	6.3*8	50	2350	700
		6.3*10	40	2400	700
		8*11	40	2600	700
	120	6.3*10	40	2500	840
	150	6.3*10	40	2550	1050
	180	6.3*11	40	2600	1260
	220	8*11	40	2800	1540
		10*12	30	2900	1540
		6.3*11	30	2700	1540
	270	10*12	30	3000	1890
	330	10*12	30	3100	2310
	470	10*13	20	3200	3290

PZ series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
35 (41)	560	10*14	20	3300	3920
	680	10*16	20	3400	4760
	820	10*18	20	3500	5000
	1000	10*18	20	3700	5000
50 (58)	4.7	5*8	60	1600	500
	10	6.3*7	35	1850	500
		5*8	70	1630	500
	15	5*8	70	1660	500
	22	6.3*7	40	1900	500
	33	6.3*7	40	2000	500
	47	6.3*8	35	2100	500
	56	6.3*8	35	2120	560
	68	6.3*10	30	2150	680
	100	8*11	30	2300	1000
		8*9	40	2100	1000
	120	8*11	30	2400	1200
	150	10*12	30	2500	1500
	180	10*12	30	2600	1800
	220	10*12	30	2700	2200
	270	10*13	20	2900	2700
	330	10*15	20	3000	3300
	440	10*18	20	3100	4400
	470	10*18	20	3150	4700
	680	13*18	20	3300	5000
63 (73)	4.7	6.3*8	60	1600	500
	6.8	6.3*8	60	1650	500
	10	6.3*5	60	1600	500
	33	6.3*8	30	1700	500
	39	6.3*8	30	1750	500
	47	6.3*9	30	1900	592
	56	8*9	30	1800	706
	68	8*11	30	2000	857
	82	8*11	30	2100	1033
	100	10*12	30	2200	1260
	150	10*12	30	2500	1890
	180	10*13	20	2600	2268
	220	10*15	20	2650	2772
	270	10*17	20	2850	3402
	330	10*18	20	2950	4158
	470	13*18	20	3100	5000
	1000	16*20	20	3500	5000
		18*20	20	3700	5000
80 (92)	4.7	6.3*8	60	1500	500
	6.8	6.3*8	60	1550	500
	22	6.3*10	60	1650	500
	33	8*11	35	1700	528
	47	10*12	35	1850	752
	68	10*12	35	1900	1088
	100	10*14	35	2100	1600
	220	13*18	35	2700	4400
100 (115)	4.7	6.3*8	60	1400	500
	6.8	6.3*8	60	1450	500
	10	6.3*10	50	1500	500
		8*11	50	1550	500
	15	8*11	50	1550	500
	22	10*12	35	1600	500
	33	10*14	35	1650	660
	47	10*16	35	1800	940

※ Specifications subject to change without notice.

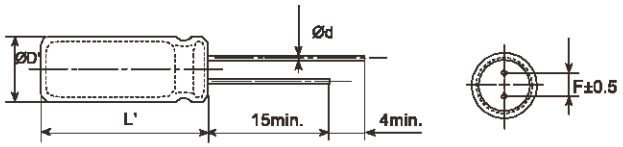
PD series

- Endurance: +105°C 2,000 hours
- Low ESR,Small Size
- Recommended Applications: High order main board, Industrial computer
- **RoHS Compliant and lead-free**

SPECIFICATIONS

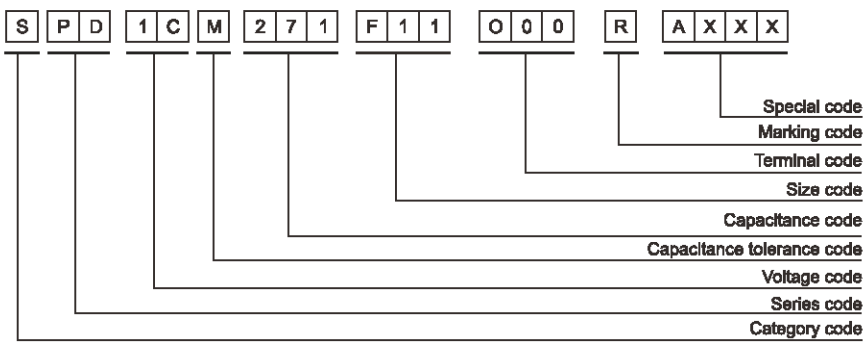
Items	Characteristics								
Category Temperature Range	-55~+105°C								
Rated Working Voltage Range	6.3~35 Vdc								
Nominal Capacitance Range	4.7~4700μF								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)								(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	6.8	7.5	10	16	20	35	(at 20°C,120Hz)
	tanδ (max.)	0.08			0.12				
ESR(100k~300kHz,20°C)	Value in characteristics table								
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25								
Endurance	After applying rated voltage for 2,000 hours at 105°C,the capacitors shall meet the following requirements.								
	Appearance	No significant damage							
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤150% of the initial specified value							
	ESR	≤150% of the initial specified value							
	Leakage Current	≤The initial specified value							
Humidity Test	After subjecting to 90%~95% RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the endurance characteristics listed above.								
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.								
	Appearance	No significant damage							
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤150% of the initial specified value							
	ESR	≤150% of the initial specified value							
	Leakage Current	≤The initial specified value							

DIMENSIONS[mm]



ØD	5	5.5	6.3	6.8	8	10	13
Ød	0.5	0.5	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	2.5	2.5	3.5	5.0	5.0
ØD'	ØD+0.5max.						
L'	L+1.0max.				L-0.5~+1	L-0.5~+2	

PART NUMBERING SYSTEM



PD series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
6.3 (7.2)	47	6.3*5	40	1100	500
	82	6.3*5	40	1100	500
	100	4*7	30	1500	500
		5*7	30	1800	500
		6.3*6	40	1900	500
	150	4*7	30	2100	500
		5*7	30	2600	500
	220	5*7	20	3500	500
		6.3*7	20	3550	500
		6.3*8	15	3600	500
	270	5*7	20	3800	500
		5*6	20	3200	500
	330	5*8	20	4000	500
		6.3*5	25	3160	500
		6.3*8	15	4000	500
	390	5*9	20	4100	500
	470	5*10	20	4300	592
		5.5*9	20	4100	592
		6.3*7	20	3900	592
		6.3*8	15	4400	592
	500	5*9	20	4100	630
	560	6.3*7	20	4200	706
		6.3*8	20	4800	706
		5.5*9	20	4300	706
	680	6.3*9	20	5080	857
		5.5*9	20	4800	857
		8*9	20	4600	857
	820	5.5*10	20	4800	1033
		6.3*9	20	5080	1033
		8*9	15	4700	1033
	1000	6.3*10	10	5150	1260
		8*9	12	4800	1260
		8*11	10	5200	1260
	1200	6.3*11	10	5200	1512
		8*11	10	5300	1512
	1500	8*11	10	5400	1890
		10*12	10	5500	1890
	1800	10*10	10	5560	2268
	2200	8*14	10	5700	2772
		10*12	10	5800	2772
	3300	10*14	10	5900	4158
	4700	10*17	10	6100	5000
6.8 (7.8)	47	6.3*5	40	1100	500
	82	6.3*5	40	1100	500
	100	4*7	30	1500	500
		5*7	30	1800	500
		6.3*6	40	1900	500
	150	4*7	30	2100	500
		5*7	30	2600	500
	220	5*7	20	3500	500
		6.3*7	20	3550	500
		6.3*8	15	3600	500
	270	5*7	20	3800	500
		5*6	20	3200	500
	330	5*8	20	4000	500
		6.3*5	25	3160	500
		6.3*8	15	4000	500
	390	5*9	20	4100	530
	470	5*10	20	4300	639
		5.5*9	20	4100	639
		6.3*7	20	3900	639
		6.3*8	15	4400	639
	500	5*9	20	4100	680
	560	6.3*7	20	4200	762
		6.3*8	20	4800	762
		5.5*9	20	4300	762
	680	6.3*9	20	5080	925
		5.5*9	20	4800	925
		8*9	20	4600	925
	820	5.5*10	20	4800	1115
		6.3*9	20	5080	1115
		8*9	15	4700	1115
	1000	6.3*10	10	5150	1360
		8*9	12	4800	1360
		8*11	10	5200	1360
	1200	6.3*11	10	5200	1632
		8*11	10	5300	1632
	1500	8*11	10	5400	2040
		10*12	10	5500	2040
	1800	10*10	10	5560	2448

PD series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
6.8 (7.8)	2200	8*14	10	5700	2992
		10*12	10	5800	2992
	3300	10*14	10	5900	4488
	4700	10*17	10	6100	5000
7 (8)	150	5*6	30	1500	500
	220	5*7	20	3200	500
	270	5*8	20	3400	500
	330	5*9	20	3600	500
	470	6.3*8	20	3800	658
		5.5*9	20	3600	658
	560	6.3*8	20	4000	784
	680	6.3*8	12	4200	952
	820	6.3*10	12	4500	1148
		8*9	12	4600	1148
7.5 (8.6)	220	5*7	20	3100	500
	270	5*8	20	3300	500
	330	5*9	20	3500	500
	390	5*9	20	3500	585
	470	6.3*7	25	3200	705
		5.5*9	20	3550	705
		5*9	20	3550	705
		5.5*8	25	3100	705
	500	5.5*9	20	3600	750
	560	6.3*8	20	3900	840
	680	6.3*9	12	4100	1020
		6.8*8	20	4000	1020
	820	6.3*10	12	4400	1230
		8*9	12	4550	1230
	1000	8*11	12	4700	1500
		6.3*11	12	4500	1500
	1200	8*11	12	4800	1800
		6.8*11	12	4600	1800
	1500	8*11	12	4900	2250
		7*13	12	4800	2250
	1800	8*14	12	5100	2700
	2200	10*12	12	5700	3300
10 (11.5)	47	5*7	35	2200	500
	56	5*7	35	2250	500
	68	5*7	35	2300	500
	82	5*7	35	2350	500
	100	5*7	35	2400	500
		6.3*5	30	2300	500
		5*5	30	2000	500
	120	5*7	20	2450	500
	150	5*7	20	2500	500
	180	6.3*7	20	2800	500
		5*8	20	2700	500
	220	5*9	20	2820	500
		6.3*5	25	2800	500
		6.3*8	15	3160	500
	270	6.3*8	20	3100	540
	330	6.3*8	20	3300	660
		8*9	15	3400	660
		6.3*10	12	3500	660
	390	6.3*8	20	3400	780
	470	5.5*9	20	3400	940
		6.3*8	20	3500	940
		8*9	15	3550	940
		8*11	12	5650	940
	560	6.3*10	13	3600	1120
		8*9	15	3800	1120
	680	6.3*11	15	3800	1360
		8*11	12	3900	1360
		8*8	20	3300	1360
	820	8*11	12	4000	1640
	1000	8*11	12	4200	2000
		10*12	10	5300	2000
	1200	8*12	10	4500	2400
		10*12	10	5450	2400
	1500	10*12	10	5500	3000
		8*14	10	4800	3000
	1800	10*13	10	5800	3600
	2200	10*15	10	6100	5000
	3300	10*18	10	6200	5000
12 (13.8)	47	5*7	35	2200	500
	56	5*7	35	2250	500
	68	5*7	35	2300	500
	82	5*7	35	2350	500
	100	5*7	35	2400	500
		6.3*5	30	2300	500
		5*5	30	2000	500
	120	5*7	20	2450	500

PD series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
12 (13.8)	150	5*7	20	2500	500
	180	6.3*7	20	2800	500
		5*8	20	2700	500
	220	5*9	20	2820	528
		6.3*5	25	2800	528
		6.3*8	15	3160	528
	270	6.3*8	20	3100	648
	330	6.3*8	20	3300	792
		8*9	15	3400	792
		6.3*10	12	3500	792
	390	6.3*8	20	3400	936
	470	5.5*9	20	3400	1128
		6.3*8	20	3500	1128
		8*9	15	3550	1128
		8*11	12	5650	1128
	560	6.3*10	13	3600	1344
		8*9	15	3600	1344
	680	6.3*11	15	3800	1632
		8*11	12	3900	1632
		8*8	20	3300	1632
	820	8*11	12	4000	1968
	1000	8*11	12	4200	2400
		10*12	10	5300	2400
	1200	8*12	10	4500	2880
		10*12	10	5450	2880
	1500	10*12	10	5500	3600
		8*14	10	4800	3600
	1800	10*13	10	5800	4320
	2200	10*15	10	6100	5000
	3300	10*18	10	6200	5000
16 (18.4)	47	5*7	35	2200	500
	56	5*7	35	2250	500
	68	5*7	35	2300	500
	82	5*7	35	2350	500
	100	5*7	35	2400	500
		6.3*5	30	2300	500
		5*5	30	2000	500
	120	5*7	20	2450	500
	150	5*7	20	2500	500
	180	6.3*7	20	2800	576
		5*8	20	2700	576
	220	5*9	20	2820	704
		6.3*5	25	2800	704
		6.3*8	15	3160	704
	270	6.3*8	20	3100	864
	330	6.3*8	20	3300	1056
		8*9	15	3400	1056
		6.3*10	12	3500	1056
	390	6.3*8	20	3400	1248
	470	5.5*9	20	3400	1504
		6.3*8	20	3500	1504
		8*9	15	3550	1504
		8*11	12	5650	1504
	560	6.3*10	13	3600	1792
		8*9	15	3600	1792
	680	6.3*11	15	3800	2176
		8*11	12	3900	2176
		8*8	20	3300	2176
	820	8*11	12	4000	2624
	1000	8*11	12	4200	3200
		10*12	10	5300	3200
	1200	8*12	10	4500	3840
		10*12	10	5450	3840
	1500	10*12	10	5500	4800
		8*14	10	4800	4800
	1800	10*13	10	5800	5000
	2200	10*15	10	6100	5000
	3300	10*18	10	6200	5000
20 (23)	33	5*8	40	1900	500
	39	5*8	40	1950	500
	47	5*8	40	2200	500
	56	5*9	40	2100	500
	68	6.3*8	30	2100	500
	82	6.3*8	30	2150	500
	100	6.3*8	30	2200	500
	120	6.3*8	30	2300	500
	150	6.3*10	20	2350	600
	180	8*9	30	2450	720
	220	8*11	20	2550	880
	270	8*11	20	2700	1080

PD series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
20 (23)	330	8*11	20	2800	1320
		6.3*11	20	2100	1320
	470	10*12	20	2900	1880
		8*16	20	3000	1880
		8*11	20	2400	1880
		10*12	20	3100	1880
		8*16	20	3200	1880
	680	10*15	20	3300	2720
		8*14	20	2700	2720
	820	10*18	20	3400	3280
	1000	10*18	20	3900	4000
25 (29)	6.8	6.3*6	100	1100	500
	10	5*8	70	1800	500
	22	5*9	60	1810	500
	33	5*9	50	1850	500
	39	5*8	40	1900	500
	47	5*9	40	1950	500
	56	5*9	40	2050	500
	68	6.3*7	30	2100	500
	82	6.3*7	30	2150	500
	100	6.3*8	30	2200	500
		6.3*10	20	2300	500
		8*11	20	2450	500
	120	6.3*8	30	2300	600
	150	6.3*10	20	2350	750
	180	6.3*10	20	2350	900
		8*9	30	2450	900
	220	8*11	20	2550	1100
		10*12	20	2900	1100
		5.5*10	20	1900	1100
	270	8*11	20	2700	1350
	330	8*11	20	2800	1650
		10*12	20	3100	1650
		10*10	25	2800	1650
	470	10*12	20	2800	2350
		8*16	20	2700	2350
		8*11	20	2300	2350
		10*10	25	2300	2350
	560	10*12	20	3000	2800
		8*11	20	2400	2800
	680	10*15	20	3200	3400
		10*12	20	2800	3400
		8*14	20	2500	3400
	820	10*18	20	3300	4100
		10*12	20	2600	4100
		8*16	20	2600	4100
	1000	10*18	20	3800	5000
35 (41)	4.7	5*8	60	1700	500
	10	5*8	60	1800	500
	15	5*8	60	1850	500
	22	5*9	100	1950	500
	33	5*9	50	2000	500
	39	5*9	50	2050	500
	47	6.3*7	50	2100	500
	56	6.3*7	50	2150	500
	68	6.3*7	50	2200	500
	82	6.3*7	50	2250	574
	100	6.3*8	50	2350	700
		6.3*10	40	2400	700
		8*11	40	2600	700
	120	6.3*10	40	2500	840
	150	6.3*10	40	2550	1050
	180	6.3*11	40	2600	1260
	220	8*11	40	2800	1540
		10*12	30	2900	1540
		6.3*11	30	2700	1540
	270	10*12	30	3000	1890
	330	10*12	30	3100	2310
	470	10*13	20	3200	3290
		10*14	20	3300	3290
	680	10*16	20	3400	4760
	820	10*18	20	3500	5000
	1000	10*18	20	3700	5000

※ Specifications subject to change without notice.

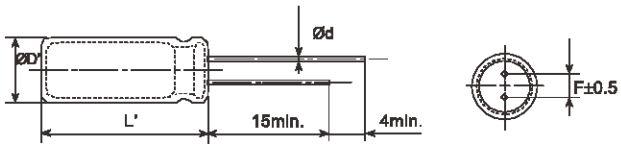
PV series

- Endurance: +125°C 2,000 hours
- High voltage
- Recommended Applications: System Board,Display Card,Small Charger,and intelligent TV
- **RoHS Compliant and lead-free**

SPECIFICATIONS

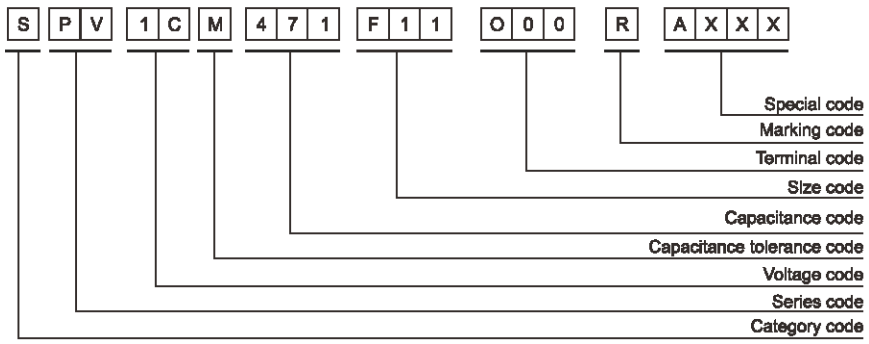
Items	Characteristics						
Category Temperature Range	-55~+125°C						
Rated Working Voltage Range	35~100 Vdc						
Nominal Capacitance Range	4.7~1000μF						
Capacitance Tolerance	±20%(M)						(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)						(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	35	50	63	80	100	
	tanδ (max.)	0.12				0.15	(at 20°C,120Hz)
ESR(100k~300kHz,20°C)	Value in characteristics table						
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+125°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25						
Endurance	After applying rated voltage for 2,000 hours at 125°C,the capacitors shall meet the following requirements.						
	Appearance	No significant damage					
	Capacitance Change	≤±20% of the initial value					
	D.F. (tanδ)	≤150% of the initial specified value					
	ESR	≤150% of the initial specified value					
	Leakage Current	≤The initial specified value					
Humidity Test	After subjecting to 90%~95% RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.						
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.						
	Appearance	No significant damage					
	Capacitance Change	≤±20% of the initial value					
	D.F. (tanδ)	≤150% of the initial specified value					
	ESR	≤150% of the initial specified value					
	Leakage Current	≤The initial specified value					

DIMENSIONS[mm]



ØD	5	5.5	6.3	6.8	8	10	13
Ød	0.5	0.5	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	2.5	2.5	3.5	5.0	5.0
ØD'	ØD+0.5max.						
L'	L+1.0max.				L-0.5~+1		L-0.5~+2

PART NUMBERING SYSTEM



PV series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/125°C,100kHz)	Leakage Current (μA)(max.)
35 (41)	4.7	5*8	84	1020	500
	10	5*8	84	1080	500
	15	5*8	84	1100	500
	22	5*9	100	1170	500
	33	5*9	100	1200	500
	39	5*9	100	1230	500
	47	6.3*7	70	1260	500
		6.3*8	50	1800	500
	56	6.3*7	70	1290	500
	68	6.3*7	70	1320	500
	82	6.3*7	70	1350	574
	100	6.3*8	70	1410	700
		6.3*10	56	1440	700
		8*11	56	1560	700
	120	6.3*10	56	1500	840
	150	6.3*10	56	1530	1050
		6.3*11	56	1560	1050
	220	8*11	56	1680	1540
		10*12	42	1740	1540
	270	10*12	42	1800	1890
	330	10*12	42	1860	2310
	470	10*13	28	1920	3290
	560	10*14	28	1980	3920
	680	10*16	28	2040	4760
	820	10*18	28	2100	5000
	1000	10*18	28	2220	5000
50 (58)	4.7	5*8	84	960	500
	10	6.3*7	49	1110	500
		5*8	98	978	500
	15	5*8	98	996	500
	22	5*9	100	1000	500
		6.3*7	75	1140	500
	33	6.3*7	75	1200	500
	47	6.3*8	49	1260	500
	56	6.3*8	49	1272	560
	68	6.3*10	42	1290	680
	100	8*11	42	1380	1000
		8*9	70	1300	1000
	150	10*12	42	1500	1500
	220	10*12	42	1620	2200
	270	10*13	28	1740	2700
	330	10*15	28	1800	3300
	440	10*18	28	1860	4400
	470	10*18	28	1890	4700
	680	13*18	28	1980	5000
63 (73)	4.7	6.3*8	100	960	500
	6.8	6.3*8	100	990	500
	10	6.3*5	100	960	500
		5*8	100	970	500
	22	6.3*8	45	1000	500
	33	6.3*8	42	1020	500
	39	6.3*8	42	1050	500
	47	6.3*10	42	1140	592
		8*11	42	1200	592
	56	8*9	42	1080	706
	68	8*11	42	1200	857
	82	8*11	42	1260	1033
	100	10*12	42	1320	1260
		8*12	42	1100	1260
	150	10*12	42	1500	1890
	180	10*13	30	1530	2268
	220	10*15	28	1590	2772
	270	10*17	28	1710	3402
	330	10*18	28	1770	4158
	470	13*18	28	1860	5000
	1000	16*20	28	2100	5000
80 (92)	4.7	6.3*8	84	900	500
	6.8	6.3*8	84	930	500
	22	6.3*10	84	990	500
	33	8*11	49	1020	528
	47	10*12	49	1110	752
	68	10*12	49	1140	1088
	100	10*14	49	1260	1600
100 (115)	4.7	6.3*8	84	840	500
	6.8	6.3*8	84	870	500
	10	6.3*10	70	900	500
		8*11	85	930	500
	15	8*11	85	930	500
	22	10*12	49	960	500
	33	10*14	49	990	660
	47	10*16	49	1080	940

※ Specifications subject to change without notice.

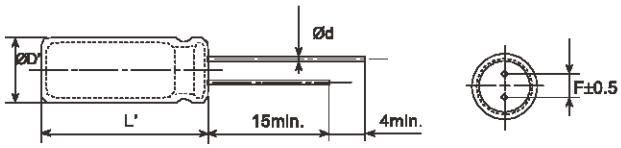
PH series

- Endurance: +105°C 2,000 hours
- High Capacitance,Jumbo Size
- Recommended Applications: Charger. Ripple current can be applied.
- **RoHS Compliant and lead-free**

SPECIFICATIONS

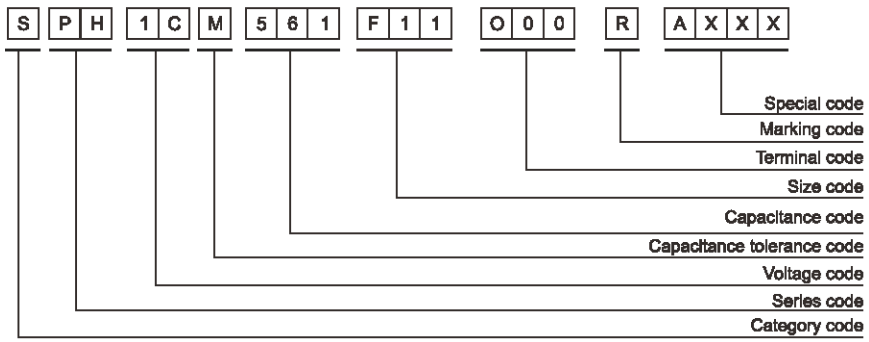
Items	Characteristics								
Category Temperature Range	-55~+105°C								
Rated Working Voltage Range	6.3~25 Vdc								
Nominal Capacitance Range	6.8~2200μF								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)								
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	6.8	7.5	10	16	20	25	(at 20°C,120Hz)
	tanδ (max.)	0.08			0.12				
ESR(100k~300kHz,20°C)	Value in characteristics table								
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25								
Endurance	After applying rated voltage for 2,000 hours at 105°C,the capacitors shall meet the following requirements.								
	Appearance	No significant damage							
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	ESR	≤200% of the initial specified value							
	Leakage Current	≤The initial specified value							
Humidity Test	After subjecting to 90~95% RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the requirement as surge test.								
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.								
	Appearance	No significant damage							
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤150% of the initial specified value							
	ESR	≤150% of the initial specified value							
	Leakage Current	≤The initial specified value							

DIMENSIONS[mm]



ØD	5	5.5	6.3	6.8	8	10
Ød	0.5	0.5	0.5	0.5	0.6	0.6
F	2.0	2.5	2.5	2.5	3.5	5.0
ØD'	ØD+0.5max.					
L'	L+1.0max.				L-0.5~+1	

PART NUMBERING SYSTEM



PH series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
6.3 (7.2)	47	6.3*5	36	1200	500
	82	6.3*5	36	1200	500
	100	6.3*6	36	2000	500
		5*7	27	1900	500
	180	5*7	27	2700	500
	220	5*7	18	3700	500
		6.3*7	18	3700	500
		6.3*8	14	3800	500
	270	5*7	18	4000	500
		5*6	18	3400	500
	330	5*8	18	4200	500
		6.3*5	23	3300	500
		6.3*8	14	4200	500
	390	5*9	18	4300	500
	470	5*10	18	4500	592
		5.5*9	18	4300	592
		6.3*7	18	4100	592
		6.3*8	14	4600	592
	500	5*9	18	4300	630
	560	5.5*9	18	4500	706
		6.3*8	18	5000	706
	680	6.3*9	18	5300	857
		5.5*9	18	5000	857
		8*9	18	4800	857
	820	5.5*10	18	5000	1033
		6.3*9	18	5300	1033
		8*9	14	4900	1033
	1000	6.3*10	9	5400	1260
		8*9	11	5000	1260
		8*11	9	5500	1260
	1200	6.3*11	9	5500	1512
		8*11	9	5600	1512
	1500	8*11	9	5700	1890
		10*12	9	5800	1890
	1800	10*10	9	5800	2268
	2200	8*14	9	6000	2772
		10*12	9	6100	2772
6.8 (7.8)	220	5*7	18	3500	500
	270	5*7	18	3800	500
		6.3*8	18	4100	500
	330	5*8	18	4000	500
		6.3*5	23	3300	500
		6.3*7	18	3600	500
	390	5*9	18	4100	530
	470	5*9	18	4300	639
		6.3*7	18	3900	639
	560	6.3*8	18	4700	762
	680	6.3*9	18	5000	925
	820	6.3*9	18	5100	1115
	1000	6.3*11	11	5400	1360
		8*11	9	5400	1360
7 (8)	150	5*6	27	1600	500
	220	5*7	18	3400	500
	270	5*8	18	3600	500
	330	5*9	18	3800	500
	470	6.3*8	18	4000	658
		5.5*9	18	3800	658
	560	6.3*8	18	4200	784
	680	6.3*9	11	4400	952
	820	6.3*10	11	4700	1148
		8*9	11	4800	1148
7.5 (8.6)	220	5*7	18	3300	500
	270	5*8	18	3500	500
	330	5*9	18	3700	500
	390	5*9	18	3700	585
	470	6.3*7	23	3400	705
		5.5*9	18	3700	705
		5*9	18	3700	705
		5.5*8	23	3300	705
	500	5.5*9	18	3800	750
	560	6.3*8	18	4100	840
	680	6.3*9	11	4300	1020
		6.8*8	18	4200	1020
	820	6.3*10	11	4600	1230
		8*9	11	4800	1230

PH series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
7.5 (8.6)	1000	8*11	11	4900	1500
		6.3*11	11	4700	1500
	1200	8*11	11	5000	1800
		6.8*11	11	4800	1800
	1500	8*11	11	5100	2250
		7*13	11	5000	2250
	1800	8*14	11	5400	2700
	2200	10*12	11	6000	3300
10 (11.5)	47	5*7	32	2300	500
	56	5*7	32	2400	500
	68	5*7	32	2400	500
	82	5*7	32	2500	500
	100	5*7	32	2500	500
		6.3*5	27	2400	500
	150	5*7	18	2600	500
	180	6.3*7	18	2900	500
	220	5*9	18	3000	500
		6.3*5	23	2900	500
		6.3*8	14	3300	500
	270	6.3*8	18	3300	540
	330	6.3*8	18	3500	660
		8*9	14	3600	660
		6.3*10	11	3700	660
	390	6.3*8	18	3600	780
	470	5.5*9	18	3600	940
		6.3*8	18	3700	940
		8*9	14	3700	940
		8*11	11	5900	940
	560	8*9	14	3800	1120
		6.3*10	12	3800	1120
	680	6.3*11	14	4000	1360
		8*11	11	4100	1360
		8*8	18	3500	1360
	820	8*11	11	4200	1640
	1000	8*11	11	4400	2000
		10*12	9	5600	2000
	1200	8*12	9	4700	2400
		10*12	9	5700	2400
	1500	10*12	9	5800	3000
		8*14	9	5000	3000
	1800	10*13	9	6100	3600
	2200	10*15	9	6400	4400
12 (13.8)	220	4*10	14	2200	528
	330	5.5*9	18	3300	792
		6.3*8	18	3300	792
		5*10	18	3300	792
	470	5.5*9	18	3400	1128
		6.3*9	18	3600	1128
	560	6.3*10	14	3600	1344
	680	6.3*11	14	3800	1632
		8*10	14	3900	1632
	820	8*11	11	4000	1968
		6.8*11	12	3400	1968
	1000	8*12	11	4200	2400
	1200	8*14	11	4600	2880
	1500	8*16	11	5000	3600
16 (18.4)	22	5*9	72	1700	500
	47	5*7	18	2200	500
	56	5*7	18	2200	500
	68	5*7	18	2300	500
	82	5*8	18	2300	500
	100	5*7	18	2400	500
		6.3*5	23	2200	500
		6.3*8	18	2900	500
	120	5*8	18	2500	500
	150	5*8	18	2500	500
	180	5*8	18	2600	576
		6.3*7	14	2600	576
	220	5*10	18	2700	704
		6.3*8	18	2800	704
		6.3*10	14	3000	704
	270	5.5*9	18	2900	864
		6.3*8	18	2900	864
		8*9	18	3000	864
	330	5.5*9	18	3000	1056
		6.3*9	18	3000	1056
		6.3*10	14	3300	1056

PH series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
16 (18.4)	470	5.5*10	18	3200	1504
		6.3*11	14	3300	1504
		8*11	10	4800	1504
		8*9	12	4300	1504
	560	8*11	10	3400	1792
		8*13	10	3500	1792
		10*12	10	3700	1792
	680	8*11	10	3600	2176
		10*12	10	3800	2176
		6.8*11	10	3400	2176
	820	8*13	10	3700	2624
		10*12	10	4000	2624
	1000	10*12	10	4200	3200
	1200	10*15	10	4500	3840
	1500	10*12	10	5000	4800
		10*18	10	5800	4800
	1800	10*14	10	5700	5000
	2200	10*17	10	6100	5000
		10*15	10	5800	5000
20 (23)	33	5*8	36	2000	500
	39	5*8	36	2000	500
	47	5*8	36	2300	500
	56	5*9	36	2200	500
	68	6.3*8	27	2200	500
	82	6.3*8	27	2300	500
	100	6.3*8	27	2300	500
	120	6.3*8	27	2400	500
	150	6.3*10	18	2500	600
	180	8*9	27	2600	720
	220	8*11	18	2700	880
	270	8*11	18	2800	1080
	330	8*11	18	2900	1320
		6.3*11	18	2200	1320
	470	10*12	18	3000	1880
		8*16	18	3200	1880
		8*11	18	2500	1880
	560	10*12	18	3300	2240
		8*16	18	3400	2240
	680	10*15	18	3500	2720
		8*14	18	2800	2720
	820	10*18	18	3600	3280
	1000	10*18	18	4100	4000
25 (29)	6.8	6.3*6	90	1200	500
	10	5*8	63	1900	500
	22	5*9	54	1900	500
	33	5*9	45	1900	500
	39	5*8	36	2000	500
	47	5*9	36	2000	500
	56	5*9	36	2200	500
	68	6.3*7	27	2200	500
	82	6.3*7	27	2300	500
	100	6.3*8	27	2300	500
		6.3*10	18	2400	500
		8*11	18	2600	500
	120	6.3*8	27	2400	600
	150	6.3*10	18	2500	750
	180	6.3*10	18	2500	900
		8*9	27	2600	900
	220	8*11	18	2700	1100
		10*12	18	3000	1100
		5.5*10	18	2000	1100
	270	8*11	18	2800	1350
	330	8*11	18	2900	1650
		10*12	18	3300	1650
		10*10	23	2900	1650
	470	10*12	18	2900	2350
		8*16	18	2800	2350
		8*11	18	2400	2350
		10*10	23	2400	2350
	560	10*12	18	3200	2800
		8*11	18	2500	2800
	680	10*15	18	3400	3400
		10*12	18	2900	3400
		8*14	18	2600	3400
	820	10*18	18	3500	4100
		10*12	18	2700	4100
	1000	10*18	18	4000	5000

※ Specifications subject to change without notice.

PT series

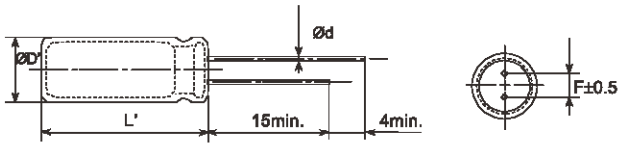
- Endurance: +125°C 2,000 hours
- Long Life,High Temperature Resistance
- Recommended Applications: Lamps Power,LED Power,Service Equipment
- **RoHS Compliant and lead-free**

SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-55~+125°C							
Rated Working Voltage Range	6.3~25 Vdc							
Nominal Capacitance Range	22~5600μF							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)							(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	6.8	7.5	10	16	25	(at 20°C,120Hz)
	tanδ (max.)	0.08			0.12			
ESR(100k~300kHz,20°C)	Value in characteristics table							
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+125°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25							
Endurance	After applying rated voltage for 2,000 hours at 125°C,the capacitors shall meet the following requirements.							
	Appearance	No significant damage						
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	ESR	≤200% of the initial specified value						
	Leakage Current	≤The initial specified value						
Humidity Test	After subjecting to 90~95% RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the requirement as surge test.							
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.							
	Appearance	No significant damage						
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤150% of the initial specified value						
	ESR	≤150% of the initial specified value						
	Leakage Current	≤The initial specified value						

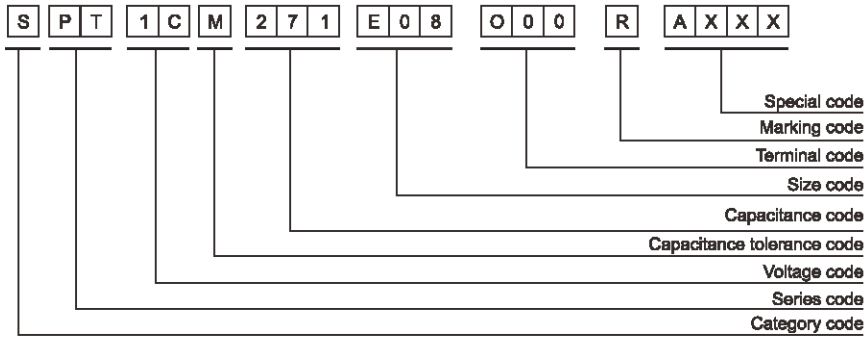
*Note: If any doubt arises,measure the leakage current after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

DIMENSIONS[mm]



ØD	5	5.5	6.3	6.8	8	10	13
Ød	0.5	0.5	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	2.5	2.5	3.5	5.0	5.0
ØD'	ØD+0.5max.						
L'	L+1.0max.				L-0.5~+1		L-0.5~+2

PART NUMBERING SYSTEM



PT series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/125°C,100kHz)	Leakage Current (μA)(max.)
6.3 (7.2)	100	4*7	42	900	500
	150	4*7	42	1260	500
	180	5*7	42	1560	500
	220	5*7	28	2100	500
		6.3*7	28	2130	500
		6.3*8	21	2160	500
	270	5*7	28	2280	500
	330	5*8	28	2400	500
		6.3*5	35	1896	500
		6.3*8	21	2400	500
	390	5*9	28	2460	500
	470	5*10	28	2580	592
		5.5*9	28	2460	592
		6.3*7	28	2340	592
		6.3*8	21	2640	592
	560	6.3*7	28	2520	706
		6.3*8	28	2880	706
		5.5*9	28	2580	706
	680	6.3*9	28	3048	857
		5.5*9	28	2880	857
		8*9	28	2760	857
	820	6.3*9	28	3000	1033
		6.3*10	18	3100	1033
		8*9	21	2820	1033
	1000	6.3*10	14	3090	1260
		8*9	17	2880	1260
		8*11	12	3120	1260
	1200	6.3*11	14	3120	1512
		8*11	14	3180	1512
	1500	8*11	14	3240	1890
		10*12	14	3300	1890
	1800	10*10	14	3336	2268
	2200	8*14	14	3420	2772
		10*12	14	3480	2772
	3300	10*14	14	3540	4158
	4700	10*17	14	3660	5000
	5600	10*18	14	3780	5000
6.8 (7.8)	220	5*7	28	1980	500
	270	5*7	28	2160	500
	330	5*8	28	2280	500
		6.3*5	35	1860	500
	470	5*9	28	2460	639
		6.3*7	28	2220	639
	560	6.3*8	28	2700	762
	680	6.3*9	28	2880	925
	820	6.3*9	28	2940	1115
	1000	6.3*11	17	3060	1360
		8*11	14	3090	1360
7 (8)	150	5*6	42	900	500
	220	5*7	28	1920	500
	270	5*8	28	2040	500
	330	5*9	28	2160	500
	470	6.3*8	28	2280	658
		5.5*9	28	2160	658
	560	6.3*8	28	2400	784
	680	6.3*9	17	2520	952
	820	6.3*10	17	2700	1148
		8*9	17	2760	1148
7.5 (8.6)	220	5*7	28	1860	500
	270	5*8	28	1980	500
	330	5*9	28	2100	500
	390	5*9	28	2100	585
	470	6.3*7	35	1920	705
		5.5*9	28	2130	705
	500	5.5*9	28	2160	750
	560	6.3*8	28	2340	840
	680	6.3*9	17	2460	1020
		6.8*8	28	2400	1020
	820	6.3*10	17	2640	1230
		8*9	17	2730	1230
	1200	8*11	17	2880	1800
10 (11.5)	47	5*7	49	1320	500
	56	5*7	49	1350	500
	68	5*7	49	1380	500
	82	5*7	49	1410	500
	100	5*7	49	1440	500

PT series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/125°C,100kHz)	Leakage Current (μA)(max.)
10 (11.5)	120	5*7	28	1470	500
	150	5*7	28	1500	500
	180	5*8	28	1620	500
	220	5*9	28	1692	500
		6.3*8	21	1896	500
	270	6.3*8	28	1860	540
	330	6.3*8	28	1980	660
		8*9	21	2040	660
	390	6.3*10	17	2100	660
		6.3*8	28	2040	780
	470	5.5*9	28	2040	940
		6.3*8	28	2100	940
		8*9	21	2130	940
		8*11	17	3390	940
	560	6.3*10	18	2160	1120
		8*9	21	2160	1120
	680	6.3*11	21	2280	1360
		8*11	17	2340	1360
	820	8*11	17	2400	1640
	1000	8*11	17	2520	2000
		10*12	14	3180	2000
	1200	8*12	14	2700	2400
		10*12	14	3270	2400
	1500	10*12	14	3300	3000
	1800	10*13	14	3480	3600
	2200	10*15	14	3660	4400
	3300	10*18	14	3720	5000
12 (13.8)	220	4*10	21	1260	528
	330	5.5*9	28	1860	792
	470	5.5*9	28	1920	1128
		6.3*9	28	2070	1128
	560	6.3*10	21	2040	1344
	680	6.3*11	21	2160	1632
		8*10	21	2220	1632
	820	8*11	17	2280	1968
	1000	8*12	17	2400	2400
	1200	8*14	17	2640	2880
	1500	8*16	17	2880	3600
16 (18.4)	47	5*7	28	1230	500
	56	5*7	28	1260	500
	68	5*7	28	1290	500
	82	5*7	28	1320	500
	100	5*7	28	1350	500
		6.3*5	35	1260	500
		6.3*8	28	1680	500
	120	5*8	28	1410	500
	150	5*8	28	1440	500
	180	5*8	28	1470	576
		6.3*7	22	1500	576
	220	5*10	28	1560	704
		6.3*8	28	1620	704
		6.3*10	21	1740	704
	270	5.5*9	28	1650	864
		6.3*8	28	1680	864
		8*9	28	1740	864
	330	5.5*9	28	1740	1056
		6.3*9	28	1740	1056
		6.3*10	21	1860	1056
	470	5.5*10	28	1800	1504
		6.3*11	21	1860	1504
		8*11	15	2760	1504
		8*9	18	2460	1504
	560	8*11	15	1920	1792
		8*13	15	1980	1792
		10*12	15	2100	1792
	680	8*11	15	2040	2176
		10*12	15	2160	2176
	820	8*13	15	2100	2624
		10*12	15	3060	2624
	1000	10*13	15	2400	3200
		8*14	15	2160	3200
	1200	10*15	15	2580	3840
	1500	10*14	15	2880	4800
		10*18	15	3300	4800
	1800	10*15	15	3240	5000
	2200	10*18	15	3480	5000
	3300	13*18	15	3660	5000

PT series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/125°C,100kHz)	Leakage Current (μA)(max.)
20 (23)	33	5*8	56	1140	500
	39	5*8	56	1170	500
	47	5*8	56	1320	500
	56	5*9	56	1260	500
	68	6.3*8	42	1260	500
	82	6.3*8	42	1290	500
	100	6.3*8	42	1320	500
	120	6.3*8	42	1380	500
	150	6.3*10	28	1410	600
	180	8*9	42	1470	720
	220	8*11	28	1530	880
	270	8*11	28	1620	1080
	330	8*11	28	1680	1320
		6.3*11	28	1300	1320
	470	10*12	28	1740	1880
		8*11	28	1400	1880
	560	10*13	28	1860	2240
	680	10*15	28	1980	2720
		8*15	28	1600	2720
	820	10*18	28	2040	3280
	1000	10*18	28	2340	4000
25 (29)	22	5*9	56	1100	500
	33	5*9	56	1110	500
	39	5*8	56	1140	500
	47	5*9	56	1170	500
	56	5*9	56	1230	500
	68	6.3*7	42	1260	500
	82	6.3*8	42	1290	500
	100	6.3*8	42	1320	500
		6.3*10	28	1380	500
		8*11	28	1470	500
	120	6.3*8	42	1380	600
	150	6.3*10	28	1410	750
	180	6.3*10	28	1450	900
		8*9	42	1470	900
	220	8*11	28	1530	1100
		10*12	28	1740	1100
	270	8*11	28	1620	1350
	330	8*11	28	1680	1650
		10*12	28	1860	1650
		10*10	28	1600	1650
	470	10*12	28	1680	2350
		8*16	28	1620	2350
	560	10*13	28	1800	2800
	680	10*15	28	1920	3400
		10*12	30	1700	3400
	820	10*18	28	1980	4100
	1000	10*18	28	2280	5000

※ Specifications subject to change without notice.

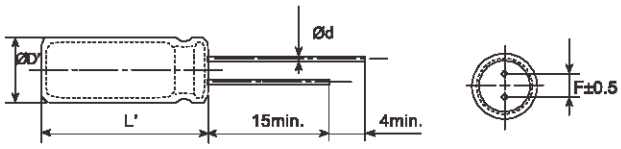
PK series

- Endurance: +135°C 1,000 hours
- High Temperature Resistance
- Recommended Applications: Large LED lamp power supply
- **RoHS Compliant and lead-free**

SPECIFICATIONS

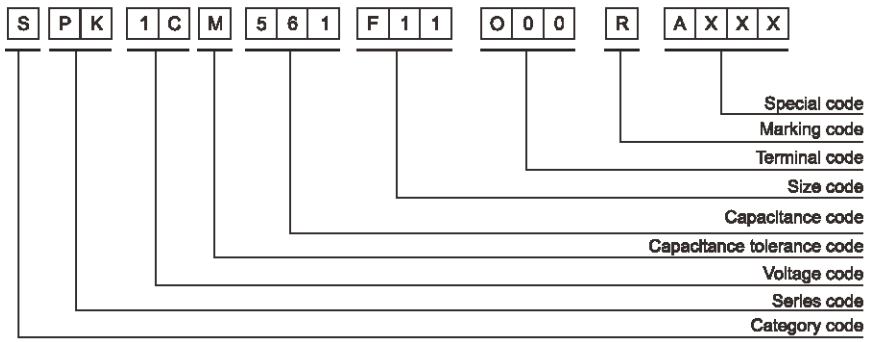
Items	Characteristics								
Category Temperature Range	-55~+135°C								
Rated Working Voltage Range	6.3~25 V_{dc}								
Nominal Capacitance Range	10~1800μF								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)								(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	6.3	6.8	7.5	10	16	20	25	(at 20°C,120Hz)
	tanδ (max.)	0.08			0.12				
ESR(100k~300kHz,20°C)	Value in characteristics table								
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+135°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25								
Endurance	After applying rated voltage for 1,000 hours at 135°C, the capacitors shall meet the following requirements.								
	Appearance	No significant damage							
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤150% of the initial specified value							
	ESR	≤150% of the initial specified value							
	Leakage Current	≤The initial specified value							
Humidity Test	After subjecting to 90~95% RH for 1,000 hours at 60°C without voltage applied,the capacitors shall meet the specified values for the Endurance characteristics listed above.								
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.								
	Appearance	No significant damage							
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤150% of the initial specified value							
	ESR	≤150% of the initial specified value							
	Leakage Current	≤The initial specified value							

DIMENSIONS[mm]



ØD	5	5.5	6.3	6.8	8	10	13
Ød	0.5	0.5	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	2.5	2.5	3.5	5.0	5.0
ØD'	ØD+0.5max.						
L'	L+1.0max.				L-0.5~+1		L-0.5~+2

PART NUMBERING SYSTEM



PK series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/135°C,100kHz)	Leakage Current (μA)(max.)
6.3 (7.2)	47	6.3*5	60	400	500
	82	6.3*5	60	400	500
	100	6.3*6	60	800	500
	150	6.3*6	50	800	500
	180	6.3*6	50	1000	500
	220	6.3*8	20	1400	500
	270	6.3*8	30	1500	500
	330	6.3*8	20	1600	500
	390	6.3*8	30	1600	500
	470	6.3*8	20	1800	592
	500	6.3*8	30	1600	630
	560	6.3*8	30	1900	706
	680	8*9	30	1800	857
	820	8*11	20	1900	1033
	1000	8*11	20	2100	1260
	1200	8*11	20	2100	1512
	1500	10*12	20	2200	1890
	1800	10*12	20	2200	2268
6.8 (7.8)	220	6.3*8	30	1300	500
	270	6.3*8	30	1600	500
	330	6.3*8	30	1500	500
	390	6.3*8	30	1600	530
	470	6.3*8	30	1800	639
	560	6.3*8	30	1900	762
	680	8*9	30	1900	925
	820	8*11	30	2000	1115
	1000	8*11	20	2100	1360
7 (8)	150	6.3*8	50	600	500
	220	6.3*8	30	1300	500
	270	6.3*8	30	1400	500
	330	6.3*8	30	1400	500
	470	6.3*8	30	1500	658
	560	6.3*8	30	1600	784
	680	8*9	30	1700	952
	820	8*11	20	1800	1148
7.5 (8.6)	220	6.3*8	30	1200	500
	270	6.3*8	30	1300	500
	330	6.3*8	30	1400	500
	470	6.3*8	40	1300	705
	500	6.3*8	30	1400	750
	560	8*9	30	1600	840
	680	8*9	30	1600	1020
	820	8*11	20	1800	1230
	1000	8*11	20	1900	1500
	1200	10*12	20	1900	1800
	1500	10*12	20	2000	2250
	1800	10*12	20	2000	2700
10 (11.5)	47	6.3*5	60	900	500
	56	6.3*5	60	900	500
	68	6.3*5	60	900	500
	82	6.3*5	60	900	500
	100	6.3*5	50	900	500
	120	6.3*7	30	1000	500
	150	6.3*7	30	1000	500
	180	6.3*7	30	1100	500
	220	6.3*8	20	1300	500
	270	6.3*8	30	1200	540
	330	6.3*10	20	1400	660
		8*9	20	1400	660
	390	6.3*10	30	1400	780
	470	8*9	20	1400	940
		8*11	20	2300	940
	560	8*9	20	1400	1120
	680	8*11	20	1600	1360
	820	10*12	20	1600	1640
	1000	10*12	20	2100	2000
	1200	10*12	20	2200	2400
	1500	10*12	20	2200	3000

PK series

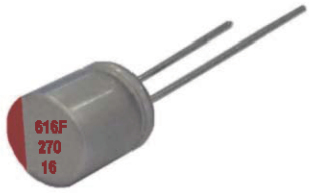
STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/135°C,100kHz)	Leakage Current (μA)(max.)
12 (13.8)	100	6.3*5	20	800	500
	180	6.3*8	30	1200	500
	270	6.3*10	20	1400	648
	390	8*11	20	1400	936
	470	8*11	20	1500	1128
	500	6.8*11	20	1300	1200
	560	8*11	20	1600	1344
	1000	10*12	20	1800	2400
16 (18.4)	22	5*9	130	600	500
	47	5*9	30	900	500
	56	6.3*5	40	800	500
	68	6.3*8	30	1100	500
	82	6.3*8	30	1000	500
	100	6.3*8	30	1000	500
	120	6.3*10	20	1200	500
	150	8*9	30	1200	500
	180	6.3*9	20	1200	576
		8*10	20	1800	576
	270	8*11	20	1300	864
	390	10*11	20	1400	1248
	470	8*11	20	1400	1504
	500	10*12	20	1500	1600
	560	10*12	20	1600	1792
	680	10*12	20	1700	2176
20 (23)	22	5*8	60	800	500
	33	5*8	60	800	500
	47	5*9	60	800	500
	56	6.3*8	50	900	500
	68	6.3*8	50	900	500
	82	6.3*10	30	900	500
		8*9	50	1000	500
	100	8*11	30	1000	500
	120	8*11	30	1100	500
		8*11	30	1100	500
	180	8*11	30	1100	720
		10*12	30	1200	720
	270	8*11	30	1000	1080
		10*12	30	1200	1080
	390	10*15	30	1300	1560
	470	10*18	30	1400	1880
25 (29)	10	5*8	110	700	500
	22	5*9	100	700	500
		5*9	80	700	500
	33	5*8	60	800	500
	47	5*9	60	800	500
	56	6.3*8	50	900	500
	68	8*11	30	1000	500
	82	6.3*10	30	900	500
		8*9	50	1000	500
	100	8*11	30	1000	500
	120	10*12	30	1200	600
		8*11	30	1100	600
	180	10*12	30	1200	900
	270	8*11	30	900	1350
		8*11	30	900	1350
	390	10*15	30	1300	1950
	470	10*18	30	1300	2350

※ Specifications subject to change without notice.

PF series

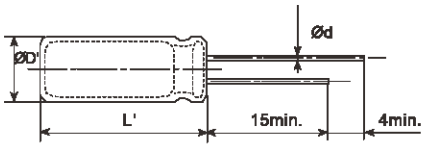
- Endurance: +105°C 3,000~5,000 hours
- Long life time
- Recommended Applications: System Board, Display Card, Small Charger and intelligent TV
- **RoHS Compliant and lead-free**

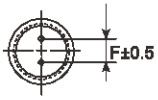


SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	-55~+105°C									
Rated Working Voltage Range	6.3~100 Vdc									
Nominal Capacitance Range	4.7~5600μF									
Capacitance Tolerance	±20%(M)									(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)									(at 20°C after 2 minutes)
DissipationFactor (tanδ)	Rated Voltage(Vdc)	6.3	6.8	7.5	10	16	63	80	100	
	tanδ (max.)	0.08			0.12				0.15	(at 20°C,120Hz)
ESR(100k~300kHz,20°C)	Value in characteristics table									
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25									
Endurance	After applying rated voltage for 3,000 to 5,000 hours at 105°C, the capacitors shall meet the following requirements.									
	Appearance	No significant damage								
	Capacitance Change	≤±20% of the initial value								
	D.F. (tanδ)	≤150% of the initial specified value								
	ESR	≤150% of the initial specified value								
	Leakage Current	≤The initial specified value								
Humidity Test	After subjecting to 90~95%RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.									
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.									
	Appearance	No significant damage								
	Capacitance Change	≤±20% of the initial value								
	D.F. (tanδ)	≤150% of the initial specified value								
	ESR	≤150% of the initial specified value								
	Leakage Current	≤The initial specified value								

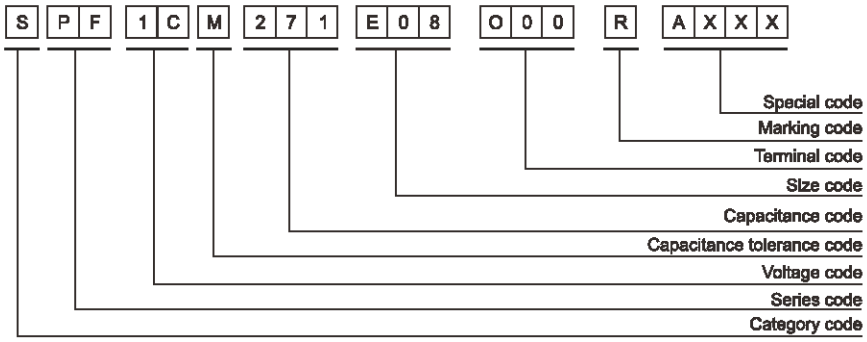
DIMENSIONS[mm]





ØD	5	5.5	6.3	6.8	8	10	13
Ød	0.5	0.5	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	2.5	2.5	3.5	5.0	5.0
ØD'	ØD+0.5max.						
L'	L+1.0max.				L-0.5~+1		L-0.5~+2

PART NUMBERING SYSTEM



PF series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
6.3 (7.2)	100	4*7	33	1350	500
	150	4*7	33	1890	500
		5*7	33	2340	500
	220	5*7	22	3150	500
		6.3*7	22	3195	500
		6.3*8	17	3240	500
	270	5*7	22	3420	500
	330	5*8	22	3600	500
		6.3*5	28	2844	500
		6.3*8	22	3800	500
	390	5*9	22	3690	500
	470	5*10	22	3870	592
		5.5*9	22	3690	592
		6.3*7	22	3510	592
		6.3*8	17	3960	592
	560	6.3*7	22	3780	706
		6.3*8	22	4320	706
		5.5*9	22	3870	706
	680	6.3*9	22	4572	857
		5.5*9	22	4320	857
		8*9	22	4140	857
	820	6.3*9	22	4572	1033
		6.3*10	18	4600	1033
		8*9	17	4230	1033
	1000	6.3*10	11	4635	1260
		8*9	13	4320	1260
		8*11	11	4680	1260
	1200	6.3*11	11	4680	1512
		8*11	11	4770	1512
	1500	8*11	11	4860	1890
		10*12	11	4950	1890
	1800	10*10	11	5004	2268
	2200	8*14	11	5130	2772
		10*12	11	5220	2772
	3300	10*14	11	5310	4158
	4700	10*17	11	5490	5000
	5600	10*18	11	5670	5000
6.8 (7.8)	220	5*7	22	2970	500
	270	5*7	22	3240	500
	330	5*8	22	3420	500
	390	5*9	22	3510	530
	470	5*9	22	3690	639
		6.3*7	22	3330	639
	560	6.3*8	22	4050	762
	680	6.3*9	22	4320	925
	820	6.3*9	22	4410	1115
	1000	6.3*11	13	4590	1360
		8*11	11	4635	1360
7 (8)	220	5*7	22	2880	500
	270	5*8	22	3060	500
	330	5*9	22	3240	500
	470	6.3*8	22	3420	658
		5.5*9	22	3240	658
	560	6.3*8	22	3600	784
	680	6.3*9	13	3780	952
	820	6.3*10	13	4050	1148
		8*9	13	4140	1148
7.5 (8.6)	220	5*7	22	2790	500
	270	5*8	22	2970	500
	330	5*9	22	3150	500
	470	6.3*7	28	2880	705
		5.5*9	22	3195	705
	500	5.5*9	22	3240	750
	560	6.3*8	22	3510	840
	680	6.3*9	13	3690	1020
	820	6.3*10	13	3960	1230
		8*9	13	4095	1230
	1200	8*11	13	4320	1800
10 (11.5)	47	5*7	39	1980	500
	56	5*7	39	2025	500
	68	5*7	39	2070	500
	82	5*7	39	2115	500
	100	5*7	39	2160	500
		5*5	39	1800	500
	120	5*7	22	2205	500

PF series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
10 (11.5)	150	5*7	22	2250	500
		5*8	22	2430	500
	220	5*9	22	2538	500
		6.3*8	17	2844	500
	270	6.3*8	22	2790	540
	330	6.3*8	22	2970	660
		8*9	17	3060	660
	390	6.3*8	22	3060	780
	470	5.5*9	22	3060	940
		6.3*8	22	3150	940
		8*9	17	3195	940
		8*11	15	3300	940
	560	6.3*10	14	3240	1120
		8*9	17	3240	1120
	680	6.3*11	17	3420	1360
		8*11	13	3510	1360
	820	8*11	13	3600	1640
	1000	8*11	13	3780	2000
		10*12	11	4770	2000
	1200	8*12	11	4050	2400
		10*12	11	4905	2400
	1500	10*12	11	4950	3000
	1800	10*13	11	5220	3600
	2200	10*15	11	5490	4400
	3300	10*18	11	5580	5000
12 (13.8)	330	5.5*9	22	2790	792
	470	5.5*9	22	2880	1128
		6.3*9	22	3105	1128
		6.3*10	17	3060	1128
	680	6.3*11	17	3240	1632
		8*10	17	3330	1632
	820	8*11	13	3420	1968
	1000	8*12	13	3600	2400
	1200	8*14	13	3960	2880
	1500	8*16	13	4320	3600
16 (18.4)	47	5*7	22	1845	500
	56	5*7	22	1890	500
	68	5*7	22	1935	500
	82	5*7	22	1980	500
	100	5*8	22	2025	500
		6.3*5	28	1890	500
	120	5*8	22	2115	500
	150	5*8	22	2160	500
	180	5*8	22	2205	576
		6.3*7	18	2250	576
	220	5*10	22	2340	704
		6.3*8	22	2430	704
		6.3*10	17	2610	704
	270	5.5*9	22	2475	864
		6.3*8	22	2520	864
		8*9	22	2610	864
	330	5.5*9	22	2610	1056
		6.3*9	22	2610	1056
		6.3*10	17	2790	1056
	470	5.5*11	22	2700	1504
		6.3*11	17	2790	1504
		8*11	12	4140	1504
		10*12	12	4800	1504
	560	8*11	12	2880	1792
		8*13	12	2970	1792
	680	8*11	12	3060	2176
		10*12	12	3240	2176
	820	8*13	12	3150	2624
		10*12	12	3420	2624
	1000	10*13	12	3600	3200
		8*14	12	3240	3200
	1200	10*15	12	3870	3840
		10*12	12	3600	3840
	1500	10*14	12	4320	4800
		10*18	12	4950	4800
	1800	10*15	12	4860	5000
	2200	10*18	12	5220	5000
		10*15	12	5000	5000
	3300	13*18	12	5490	5000

PF series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
20 (23)	33	5*8	44	1710	500
	39	5*8	44	1755	500
	47	5*8	44	1980	500
	56	5*9	44	1890	500
	68	6.3*8	33	1890	500
	82	6.3*8	33	1935	500
	100	6.3*8	33	1980	500
	120	6.3*8	33	2070	500
	150	6.3*10	22	2115	600
	220	8*9	33	2205	880
		8*11	22	2295	880
	270	8*11	22	2430	1080
	330	8*11	22	2520	1320
	470	10*12	22	2610	1880
		10*13	22	2790	1880
	680	10*15	22	2970	2720
		10*12	22	2700	2720
	820	10*18	22	3060	3280
	1000	10*18	22	3510	4000
25 (29)	33	5*8	44	1665	500
	39	5*8	44	1710	500
	47	5*9	44	1755	500
	56	5*9	44	1845	500
	68	6.3*8	33	1890	500
	82	6.3*8	33	1935	500
	100	6.3*8	33	1980	500
		6.3*10	22	2070	500
		8*11	22	2205	500
	120	6.3*8	33	2070	600
	150	6.3*10	22	2115	750
	180	8*9	33	2205	900
	220	8*11	22	2295	1100
	270	8*11	22	2430	1350
	330	8*11	22	2520	1650
		10*12	22	2790	1650
	470	10*12	22	2520	2350
		8*11	22	2070	2350
		10*12	22	2700	2350
	680	10*15	22	2880	3400
	820	10*18	22	2970	4100
		8*16	22	2300	4100
	1000	10*18	22	3420	5000
35 (41)	4.7	5*8	66	1530	500
	10	5*8	66	1620	500
	15	5*8	66	1665	500
	22	5*9	110	1755	500
	33	5*9	55	1800	500
	39	5*9	55	1845	500
	47	6.3*7	55	1890	500
	56	6.3*7	55	1935	500
	68	6.3*7	55	1980	500
	82	6.3*7	55	2025	574
	100	6.3*8	55	2115	700
		6.3*10	44	2160	700
		8*11	44	2340	700
	120	6.3*10	44	2250	840
	150	6.3*10	44	2295	1050
	180	6.3*11	44	2340	1260
	220	8*11	44	2520	1540
		10*12	33	2610	1540
	270	10*12	33	2700	1890
	330	10*12	33	2790	2310
	470	10*13	22	2880	3290
	680	10*16	22	3060	4760
	820	10*18	22	3150	5000
	1000	10*18	22	3330	5000
50 (58)	4.7	5*8	66	1440	500
	10	6.3*7	39	1665	500
		5*8	77	1467	500
	15	5*8	77	1494	500
	22	6.3*7	39	1710	500
	33	6.3*7	39	1800	500
	47	6.3*8	39	1890	500
	56	6.3*8	39	1908	560

PF series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
50 (58)	68	6.3*10	33	1935	680
	100	8*11	33	2070	1000
	120	8*11	33	2160	1200
	150	10*12	33	2250	1500
	220	10*12	33	2430	2200
	270	10*13	22	2610	2700
	330	10*15	22	2700	3300
	440	10*18	22	2790	4400
	470	10*18	22	2835	4700
	680	13*18	22	2970	5000
63 (73)	4.7	6.3*8	66	1440	500
	6.8	6.3*8	66	1485	500
	10	6.3*5	66	1440	500
	22	6.3*8	33	1400	500
	33	6.3*8	33	1530	500
	39	6.3*8	33	1575	500
	47	6.3*9	33	1710	592
	56	8*9	33	1620	706
	68	8*11	33	1800	857
	82	8*11	33	1890	1033
	100	10*12	33	1980	1260
	150	10*12	33	2250	1890
	220	10*15	22	2385	2772
	270	10*17	22	2565	3402
	330	10*18	22	2655	4158
	470	13*18	22	2790	5000
80 (92)	4.7	6.3*8	66	1350	500
	6.8	6.3*8	66	1395	500
	22	6.3*10	66	1485	500
	33	8*11	39	1530	528
	47	10*12	39	1665	752
	68	10*12	39	1710	1088
	100	10*14	39	1890	1600
100 (115)	4.7	6.3*8	66	1260	500
	6.8	6.3*8	66	1305	500
	10	6.3*10	55	1350	500
		8*11	55	1395	500
	15	8*11	55	1395	500
	22	10*12	39	1440	500
	33	10*14	39	1485	660
	47	10*16	39	1620	940

※ Specifications subject to change without notice.

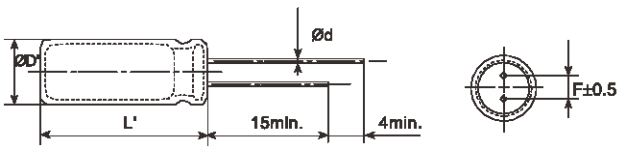
PU series

- Endurance: +105°C 2,000 hours
- Ultra-Low ESR
- Recommended Applications: High Order Main Board, Display Card
- **RoHS Compliant and lead-free**

SPECIFICATIONS

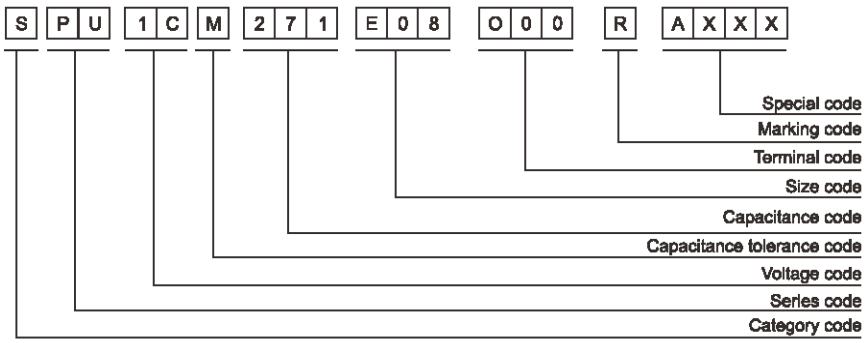
Items	Characteristics								
Category Temperature Range	-55~+105°C								
Rated Working Voltage Range	6.3~25 Vdc								
Nominal Capacitance Range	39~5600μF								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)								(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	6.8	7.5	10	16	20	25	(at 20°C,120Hz)
	tanδ (max.)	0.08			0.12				
ESR(100k~300kHz,20°C)	Value in characteristics table								
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25								
Endurance	After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements.								
	Appearance	No significant damage							
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤150% of the initial specified value							
	ESR	≤150% of the initial specified value							
	Leakage Current	≤The initial specified value							
Humidity Test	After subjecting to 90~95% RH for 2,000 hours at 60°C without voltage applied,the capacitors shall meet the specified values for the Endurance characteristics listed above.								
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.								
	Appearance	No significant damage							
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤150% of the initial specified value							
	ESR	≤150% of the initial specified value							
	Leakage Current	≤The initial specified value							

DIMENSIONS[mm]



ØD	5	5.5	6.3	6.8	8	10	13
Ød	0.5	0.5	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	2.5	2.5	3.5	5.0	5.0
ØD'	ØD+0.5max.						
L'	L+1.0max.				L-0.5~+1		L-0.5~+2

PART NUMBERING SYSTEM



PU series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
6.3 (7.2)	100	4*7	20	1650	500
	150	4*7	20	2310	500
		5*7	20	2860	500
	220	5*7	15	3850	500
		6.3*7	15	3905	500
		6.3*8	12	3960	500
	270	5*7	15	4180	500
	330	5*8	15	4400	500
		6.3*5	20	3476	500
		6.3*8	12	4400	500
	390	5*9	15	4510	500
	470	5*10	15	4730	592
		5.5*9	15	4510	592
		6.3*7	15	4290	592
		6.3*8	12	4840	592
	560	6.3*7	15	4620	706
		6.3*8	12	5280	706
		5.5*9	15	4730	706
	680	6.3*9	15	5588	857
		5.5*9	15	5280	857
		8*9	15	5060	857
	820	5.5*10	15	5280	1033
		6.3*9	15	5588	1033
		8*9	12	5170	1033
	1000	6.3*10	8	5665	1260
		8*9	11	5280	1260
		8*11	8	5720	1260
	1200	6.3*11	8	5720	1512
		8*11	8	5830	1512
	1500	8*11	8	5940	1890
		10*12	8	6050	1890
	1800	10*10	8	6116	2268
	2200	8*14	8	6270	2772
		10*12	8	6380	2772
	3300	10*14	8	6490	4158
	4700	10*17	8	6710	5000
	5600	10*18	8	6930	5000
6.8 (7.8)	220	5*7	15	3630	500
	270	5*7	15	3960	500
	330	5*8	15	4180	500
		6.3*5	20	3410	500
	390	5*9	15	4290	530
	470	5*9	15	4510	639
		6.3*7	15	4070	639
	560	6.3*8	15	4950	762
	680	6.3*9	15	5280	925
	820	6.3*9	15	5390	1115
	1000	6.3*11	10	5610	1360
		8*11	8	5665	1360
7 (8)	150	5*6	27	1650	500
	220	5*7	18	3520	500
	270	5*8	18	3740	500
	330	5*9	18	3960	500
	470	6.3*8	18	4180	658
		5.5*9	18	3960	658
	560	6.3*8	18	4400	784
	680	6.3*9	11	4620	952
	820	6.3*10	11	4950	1148
		8*9	11	5060	1148
7.5 (8.6)	220	5*7	18	3410	500
	270	5*8	18	3630	500
	330	5*9	18	3850	500
	390	5*9	18	3850	585
	470	6.3*7	23	3520	705
		5.5*9	18	3905	705
	500	5.5*9	18	3960	750
	560	6.3*8	18	4290	840
	680	6.3*9	11	4510	1020
		6.8*8	18	4400	1020
	820	6.3*10	11	4840	1230
		8*9	11	5005	1230
	1200	8*11	11	5280	1800

PU series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
10 (11.5)	47	5*7	32	2420	500
	56	5*7	32	2475	500
	68	5*7	32	2530	500
	82	5*7	32	2585	500
	100	5*7	32	2640	500
	120	5*7	18	2695	500
	150	5*7	18	2750	500
		5*8	18	2970	500
	220	5*9	18	3102	500
		6.3*8	14	3476	500
	270	6.3*8	18	3410	540
	330	6.3*8	18	3630	660
		8*9	14	3740	660
		6.3*10	11	3850	660
	390	6.3*8	18	3740	780
	470	5.5*9	18	3740	940
		6.3*8	18	3850	940
		8*9	14	3905	940
		8*11	11	6215	940
	560	6.3*10	12	3960	1120
		8*9	14	3960	1120
	680	6.3*11	14	4180	1360
		8*11	11	4290	1360
	820	8*11	11	4400	1640
	1000	8*11	11	4620	2000
		10*12	9	5830	2000
	1200	8*12	9	4950	2400
		10*12	9	5995	2400
	1500	10*12	9	6050	3000
	1800	10*13	9	6380	3600
	2200	10*15	9	6710	4400
	3300	10*18	9	6820	5000
12 (13.8)	220	4*10	14	2310	528
	330	5.5*9	18	3410	792
	470	5.5*9	18	3520	1128
		6.3*9	18	3795	1128
	560	6.3*10	14	3740	1344
	680	6.3*11	14	3960	1632
		8*10	14	4070	1632
	820	8*11	11	4180	1968
	1000	8*12	11	4400	2400
	1200	8*14	11	4840	2880
	1500	8*16	11	5280	3600
16 (18.4)	47	5*7	18	2255	500
	56	5*7	18	2310	500
	68	5*7	18	2365	500
	82	5*7	18	2420	500
	100	5*7	18	2475	500
		6.3*5	23	2310	500
		6.3*8	18	3080	500
	120	5*8	18	2585	500
	150	5*8	18	2640	500
	180	5*8	18	2695	576
		6.3*7	14	2750	576
	220	5*10	18	2860	704
		6.3*8	18	2970	704
		6.3*10	14	3190	704
	270	5.5*9	18	3025	864
		6.3*8	18	3080	864
		8*9	18	3190	864
	330	5.5*9	18	3190	1056
		6.3*9	18	3190	1056
		6.3*10	14	3410	1056
	470	5.5*10	18	3300	1504
		6.3*11	14	3410	1504
		8*11	10	5060	1504
		8*10	12	4510	1504
	560	8*11	10	3520	1792
		8*13	10	3630	1792
		10*12	10	3850	1792
	680	8*11	10	3740	2176
		10*12	10	3960	2176

PU series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
16 (18.4)	820	8*13	10	3850	2624
		10*12	10	4180	2624
	1000	10*12	10	4400	3200
		8*14	10	3960	3200
	1200	10*15	10	4730	3840
	1500	10*14	10	5280	4800
		10*18	10	6050	4800
	1800	10*15	10	5940	5000
	2200	10*18	10	6380	5000
	3300	13*18	10	6710	5000
20 (23)	39	5*8	36	2145	500
	47	5*8	36	2420	500
	56	5*9	36	2310	500
	68	6.3*8	27	2310	500
	82	6.3*8	27	2365	500
	100	6.3*8	27	2420	500
	120	6.3*8	27	2530	500
	150	6.3*10	18	2585	600
	180	8*9	27	2695	720
	220	8*11	15	4100	880
	270	8*11	15	3500	1080
	330	8*11	15	3600	1320
	470	10*12	15	3700	1880
	560	10*13	15	3800	2240
	680	10*15	15	3900	2720
	820	10*18	15	4000	3280
	1000	10*18	15	4300	4000
25 (29)	39	5*8	36	2090	500
	47	5*9	36	2145	500
	56	5*9	36	2255	500
	68	6.3*8	27	2310	500
	82	6.3*8	27	2365	500
	100	6.3*8	27	2420	500
		6.3*10	18	2530	500
		8*11	18	2695	500
	120	6.3*8	27	2530	600
	150	6.3*10	18	2585	750
	180	8*9	27	2695	900
	220	8*11	18	2805	1100
		10*12	18	3190	1100
	270	8*11	18	2970	1350
	330	8*11	18	3080	1650
		10*12	18	3410	1650
	470	10*12	18	3080	2350
		8*16	18	2970	2350
	560	10*13	18	3300	2800
	680	10*15	18	3520	3400
	820	10*18	18	3630	4100
	1000	10*18	18	4180	5000

※ Specifications subject to change without notice.

VZ series

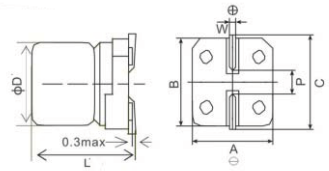
- Endurance: +105°C 2,000 hours
- Standard substance
- Recommended Applications: Display Card & System Board
- **RoHS Compliant and lead-free**

SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	-55~+105°C									
Rated Working Voltage Range	2.5~63 Vdc									
Nominal Capacitance Range	10~1500μF									
Capacitance Tolerance	±20%(M)									(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)									(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	2.5	6.3	10	16	25	35	50	63	(at 20°C,120Hz)
	tanδ (max.)	0.08		0.12						
ESR(100k~300kHz,20°C)	Value in characteristics table									
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25									
Endurance	After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements.									
	Appearance	No significant damage								
	Capacitance Change	≤±20% of the initial value								
	D.F. (tanδ)	≤150% of the initial specified value								
	ESR	≤150% of the initial specified value								
	Leakage Current	≤The initial specified value								
Humidity Test	After subjecting to 90~95% RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.									
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.									
	Appearance	No significant damage								
	Capacitance Change	≤±20% of the initial value								
	D.F. (tanδ)	≤150% of the initial specified value								
	ESR	≤150% of the initial specified value								
	Leakage Current	≤The initial specified value								

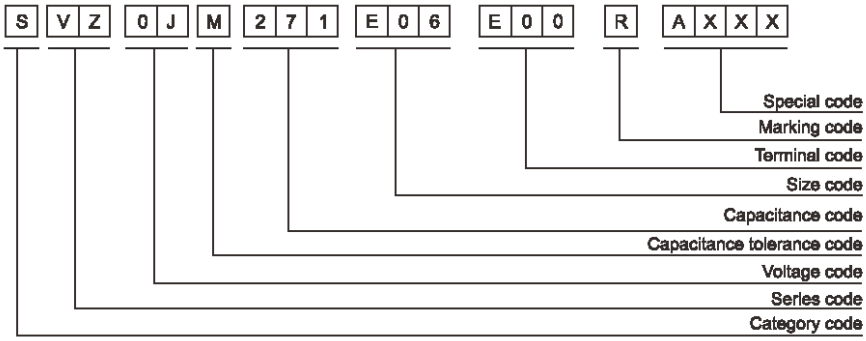
*Note: If any doubt arises, measure the leakage current after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

DIMENSIONS[mm]



D	5	6.3	8	10
P±0.2	1.4	1.9	3.1	4.5
A±0.2	5.3	6.6	8.3	10.3
B±0.2	5.3	6.6	8.3	10.3
C±0.2	5.9	7.2	9.0	11.0
W	0.5~0.8	0.5~0.8	0.7~1.1	0.7~1.1
ØD'	ØD±0.5	ØD±0.5	ØD±0.5	ØD±0.5
L'	L±0.3	L±0.3	L±0.5	L±0.5

PART NUMBERING SYSTEM



VZ series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
2.5 (2.9)	330	6.3*6	50	3400	500
	390	6.3*6	50	3500	500
	470	6.3*6	50	3600	500
	560	6.3*6	50	3800	500
6.3 (7.2)	47	6.3*6	60	700	500
	100	6.3*6	60	2700	500
	220	6.3*6	50	2900	500
	270	6.3*6	50	3100	500
	330	6.3*6	50	3300	500
	470	5*11	30	3220	592
		6.3*9	35	3500	592
	560	6.3*9	35	3700	706
	680	8*9	35	3800	857
	820	8*9	35	4100	1033
	1000	8*11	25	4300	1260
		10*12	25	4800	1260
	1500	8*11	25	4400	1890
10 (11.5)	10	6.3*6	60	300	500
	47	6.3*6	50	900	500
	68	6.3*6	50	2100	500
	100	6.3*6	50	2600	500
	120	6.3*6	50	2700	500
	220	6.3*9	35	3000	500
	470	6.3*9	35	3400	940
		8*9	40	3600	940
	560	8*9	35	3600	1120
	680	8*9	35	3800	1360
	1000	8*11	25	4200	2000
	1500	10*12	25	4400	3000
16 (18.4)	22	6.3*6	100	1100	500
	39	6.3*6	50	1620	500
	47	6.3*6	40	1700	500
	68	6.3*6	50	2000	500
	100	6.3*6	50	2500	500
	150	8*9	30	3100	500
	180	6.3*8	35	2500	576
		6.3*9	25	2700	576
		8*9	30	3100	576
	220	6.3*9	40	2510	704
	270	8*9	50	2600	864
	330	8*9	60	2700	1056
		10*12	50	3800	1056
	560	8*11	80	3500	1792
	680	8*11	30	3500	2176
	1000	10*12	40	4100	3200
25 (29)	22	6.3*6	80	1000	500
	47	6.3*6	80	1600	500
		6.3*8	60	1800	500
	56	6.3*8	50	1700	500
		6.3*6	80	1600	500
	100	6.3*9	50	2400	500
		6.3*6	80	2100	500
	150	6.3*11	50	2200	750
	180	10*10	80	2500	900
	220	8*11	50	2500	1100
		10*10	80	2600	1100
	330	10*12	60	2800	1650
		8*11	60	2500	500
	470	10*12	50	3100	2350
	680	10*15	50	3500	3400
35 (41)	22	5*10	60	1000	500
	33	5*10	60	1100	500
		6.3*8	60	1100	500
	47	6.3*8	50	1500	500
		6.3*6	80	1100	500
	100	6.3*11	60	2000	700
		8*9	60	2000	700
	120	8*9	50	2100	840
	220	8*11	50	2400	1540
		10*10	80	2100	1540
	330	10*12	50	2700	2310
	470	10*13	50	3000	3290
	560	10*14	50	3200	3920
50 (58)	22	6.3*6	80	800	500
	33	6.3*8	80	850	500
	47	6.3*9	80	1400	500
	100	8*9	60	1800	1000
		8*11	50	2000	1000
	120	8*11	50	2000	1200
	220	10*12	50	2300	2200
63 (73)	10	6.3*6	100	450	500
	22	6.3*6	100	450	500
	47	8*11	60	1300	592
	56	8*11	60	1400	706
	100	10*12	60	1600	1260

※ Specifications subject to change without notice.

VS series

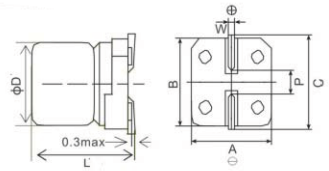
- Endurance: +105°C 2,000 hours
- Low ESR
- Recommended Applications: High order main board, server
- **RoHS Compliant and lead-free**

SPECIFICATIONS

Items	Characteristics						
Category Temperature Range	-55~+105°C						
Rated Working Voltage Range	2.5~25 Vdc						
Nominal Capacitance Range	10~1500μF						
Capacitance Tolerance	±20%(M)						(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)						(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	2.5	6.3	10	16	25	(at 20°C,120Hz)
	tanδ (max.)	0.08		0.12			
ESR(100k~300kHz,20°C)	Value in characteristics table						
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25						
Endurance	After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements.						
	Appearance	No significant damage					
	Capacitance Change	≤±20% of the initial value					
	D.F. (tanδ)	≤150% of the initial specified value					
	ESR	≤150% of the initial specified value					
	Leakage Current	≤The initial specified value					
Humidity Test	After subjecting to 90~95% RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.						
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.						
	Appearance	No significant damage					
	Capacitance Change	≤±20% of the initial value					
	D.F. (tanδ)	≤150% of the initial specified value					
	ESR	≤150% of the initial specified value					
	Leakage Current	≤The initial specified value					

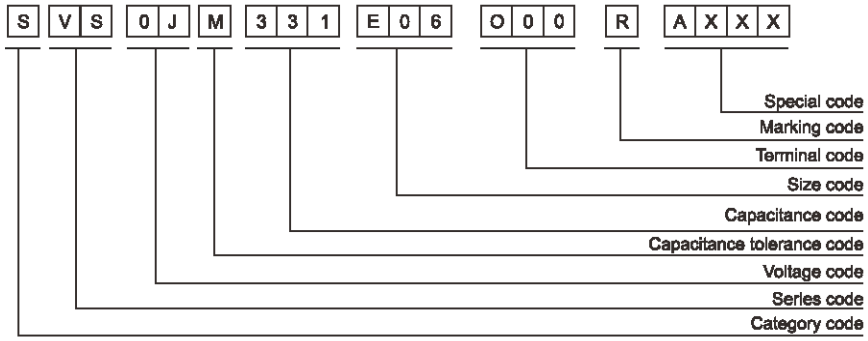
*Note: If any doubt arises, measure the leakage current after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

DIMENSIONS[mm]



D	5	6.3	8	10
P±0.2	1.4	1.9	3.1	4.5
A±0.2	5.3	6.6	8.3	10.3
B±0.2	5.3	6.6	8.3	10.3
C±0.2	5.9	7.2	9.0	11.0
W	0.5~0.8	0.5~0.8	0.7~1.1	0.7~1.1
ØD'	ØD±0.5	ØD±0.5	ØD±0.5	ØD±0.5
L'	L±0.3	L±0.3	L±0.5	L±0.5

PART NUMBERING SYSTEM



VS series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
2.5 (2.9)	330	6.3*6	40	3500	500
	390	6.3*6	40	3600	500
	470	6.3*6	40	3700	500
	560	6.3*6	40	3800	500
6.3 (7.2)	47	6.3*6	40	750	500
	100	6.3*6	40	2800	500
	220	6.3*6	40	3000	500
	270	6.3*6	40	3250	500
	330	6.3*6	40	3450	500
	470	5*11	30	3400	592
		6.3*9	30	3700	592
	560	6.3*9	30	3800	706
	680	8*9	30	4100	857
	820	8*9	30	4200	1033
	1000	8*11	25	4500	1260
		10*12	25	5000	1260
	1500	8*11	25	4600	1890
10 (11.5)	10	6.3*6	50	320	500
	47	6.3*6	40	950	500
	68	6.3*6	40	2200	500
	100	6.3*6	40	2700	500
	120	6.3*6	40	2800	500
	220	6.3*9	30	3150	500
	470	6.3*9	30	3600	940
		8*9	30	3800	940
	560	8*9	30	3900	1120
	680	8*9	30	4000	1360
	1000	8*11	25	4400	2000
	1500	10*12	25	4600	3000
16 (18.4)	22	6.3*6	90	1200	500
	39	6.3*6	40	1700	500
	47	6.3*6	30	1800	500
	68	6.3*6	40	2100	500
	100	6.3*6	40	2600	500
	150	8*9	30	3200	500
	180	6.3*8	30	2600	576
		6.3*9	30	2800	576
		8*9	30	3200	576
	220	6.3*9	30	2700	704
	330	8*9	30	2900	1056
		10*12	25	4000	1056
	470	8*11	25	3600	1504
	560	8*11	25	3700	1792
	680	8*11	25	3700	2176
	1000	10*12	25	4300	3200
25 (29)	22	6.3*6	70	1100	500
	47	6.3*6	70	1700	500
		6.3*8	50	1900	500
	56	6.3*8	40	1800	500
		6.3*6	70	1700	500
	100	6.3*9	40	2500	500
		6.3*6	70	2200	500
	150	6.3*11	40	2300	750
	180	10*10	70	2600	900
	220	8*11	40	2600	1100
		10*10	70	2700	1100
	330	10*12	50	2900	1650
		8*11	50	2600	1650
	470	10*12	40	3200	2350
	680	10*15	40	3700	3400

※ Specifications subject to change without notice.

VD series

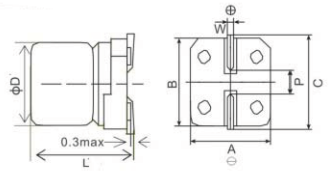
- Endurance: +105°C 2,000 hours
- High voltage
- Recommended Applications: Lamps and small LED power supply
- **RoHS Compliant and lead-free**

SPECIFICATIONS

Items	Characteristics				
Category Temperature Range	-55~+105°C				
Rated Working Voltage Range	35~63 Vdc				
Nominal Capacitance Range	10~560μF				
Capacitance Tolerance	±20%(M)				(at 20°C,120Hz)
DC Leakage Current	I≤0.2CV or 500μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)				(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	35	50	63	
	tanδ (max.)	0.12			(at 20°C,120Hz)
ESR(100k~300kHz,20°C)	Value in characteristics table				
Temperature Characteristic (Impedance Ratio at 100kHz)	Z(+105°C)/Z(+20°C)≤1.25 Z(-55°C)/Z(+20°C)≤1.25				
Endurance	After applying rated voltage for 2,000 hours at 105°C, the capacitors shall meet the following requirements.				
	Appearance	No significant damage			
	Capacitance Change	≤±20% of the initial value			
	D.F. (tanδ)	≤150% of the initial specified value			
	ESR	≤150% of the initial specified value			
	Leakage Current	≤The initial specified value			
Humidity Test	After subjecting to 90~95% RH for 2,000 hours at 60°C without voltage applied, the capacitors shall meet the specified values for the Endurance characteristics listed above.				
Surge Test	After subjecting to 1,000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the following requirements.				
	Appearance	No significant damage			
	Capacitance Change	≤±20% of the initial value			
	D.F. (tanδ)	≤150% of the initial specified value			
	ESR	≤150% of the initial specified value			
	Leakage Current	≤The initial specified value			

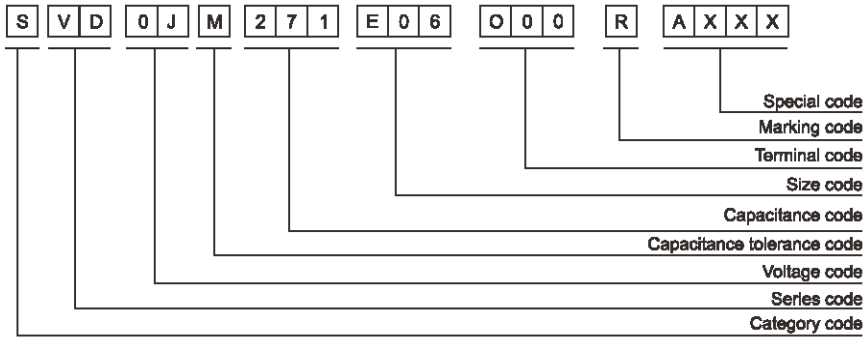
*Note: If any doubt arises, measure the leakage current after the following voltage treatment.
Voltage treatment: DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

DIMENSIONS[mm]



D	5	6.3	8	10
P±0.2	1.4	1.9	3.1	4.5
A±0.2	5.3	6.6	8.3	10.3
B±0.2	5.3	6.6	8.3	10.3
C±0.2	5.9	7.2	9.0	11.0
W	0.5~0.8	0.5~0.8	0.7~1.1	0.7~1.1
ØD'	ØD±0.5	ØD±0.5	ØD±0.5	ØD±0.5
L'	L±0.3	L±0.3	L±0.5	L±0.5

PART NUMBERING SYSTEM



VD series

STANDARD RATINGS

VDC (SV)	Cap (μF)	Size ΦDxL(mm)	ESR (mΩ,20°C,100kHz)(max.)	Rated ripple current (mArms/105°C,100kHz)	Leakage Current (μA)(max.)
35 (41)	22	5*10	60	1000	500
	33	5*10	60	1100	500
		6.3*8	60	1100	500
	47	6.3*8	50	1500	500
		6.3*6	80	1100	500
	100	6.3*11	60	2000	700
		8*9	60	2000	700
	120	8*9	50	2100	840
	220	8*11	50	2400	1540
		10*10	80	2100	1540
	330	10*12	50	2700	2310
	470	10*13	50	3000	3290
	560	10*14	50	3200	3920
50 (58)	22	6.3*6	80	800	500
	33	6.3*8	80	850	500
	47	6.3*9	80	1400	500
	100	8*9	60	1800	1000
		8*11	50	2000	1000
	120	8*11	50	2000	1200
	220	10*12	50	2300	2200
63 (73)	10	6.3*6	100	450	500
	22	6.3*6	100	450	500
	47	8*11	60	1300	592
	56	8*11	60	1400	706
	100	10*12	60	1600	1260

※ Specifications subject to change without notice.

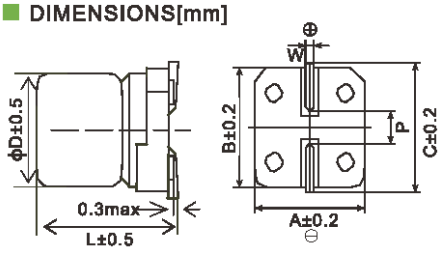
MK series

- Endurance: +105°C 2,000 ~ 3,000 hours
- Designed for surface mounting on high density PC board
- **RoHS Compliant**

SPECIFICATIONS

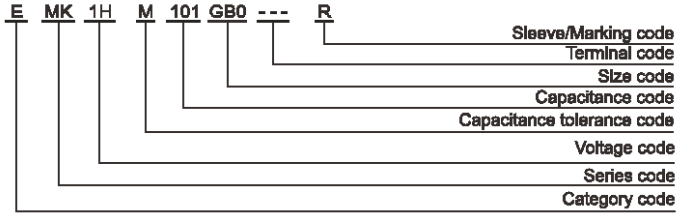
Items	Characteristics											
Category Temperature Range	-40~+105°C(6.3 ~450 Vdc)											
Rated Voltage Range	6.3~450 Vdc											
Capacitance Tolerance	±20%(M)											(at 20°C,120Hz)
Leakage Current	6.3~100 Vdc						160~450 Vdc					
	I≤0.01CV or 3μA, whichever is greater. (2 minutes)						I≤0.04CV+100μA (1 minute)					
	Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)											(at 20°C)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)		6.3	10	16	25	35	50	63	80	100	160~250	400~450	
	tanδ (max.)	D80~E80	0.30	0.24	0.20	0.16	0.14	0.12	0.12	0.12	0.12	-	0.20	
		EB0~MN0	0.40	0.30	0.26	0.16	0.14	0.12	0.12	0.12	0.12	0.15	0.20	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)		6.3	10	16	25	35	50	63	80	100	160~250	400~450	
	Z(-25°C)/Z(+20°C)		4	3	2	2	2	2	2	2	2	6	6	
	Z(-40°C)/Z(+20°C)		10	8	6	4	3	3	3	3	3	10	18	(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after rated voltage is applied for a specified period of time at 105°C.													
	Load Life		2,000 hours(160~450Vdc: 3,000 hours)											
	Capacitance Change		≤±20% of the initial value											
	Dissipation Factor (tanδ)		≤200% of the initial specified value											
	Leakage Current		≤The initial specified value											
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours (6.3~100Vdc: 500 hours).													
	Capacitance Change		≤±20% of the initial value											
	Dissipation Factor (tanδ)		≤200% of the initial specified value											
	Leakage Current		≤200% of the initial specified value											

DIMENSIONS[mm]



Size code	D	L	A	B	C	W	P
D80	5	7.7	5.3	5.3	5.9	0.5~0.8	1.4
E80	6.3	7.7	6.6	6.6	7.2	0.5~0.8	1.9
EB0	6.3	10.5	6.6	6.6	7.2	0.5~0.8	1.9
FB0	8	10.5	8.3	8.3	9.0	0.7~1.1	3.1
FD0	8	12.5	8.3	8.3	9.0	0.7~1.1	3.1
FE0	8	13.5	8.3	8.3	9.0	0.7~1.1	3.1
FG0	8	15.5	8.3	8.3	9.0	0.7~1.1	3.1
GB0	10	10.5	10.3	10.3	11.0	0.7~1.1	4.5
GD0	10	12.5	10.3	10.3	11.0	0.7~1.1	4.5
GE0	10	13.5	10.3	10.3	11.0	0.7~1.1	4.5
GH0	10	16.5	10.3	10.3	11.0	0.7~1.1	4.5
WE0	12.5	13.5	13.0	13.0	13.7	1.0~1.3	4.5
WG5	12.5	16.0	13.0	13.0	13.7	1.0~1.3	4.5
WM5	12.5	21.0	13.0	13.0	13.7	1.0~1.3	4.5
LH0	16	16.5	17.0	17.0	18.0	1.0~1.3	6.5
LN0	16	21.5	17.0	17.0	18.0	1.0~1.3	6.5
MH0	18	16.5	19.0	19.0	20.0	1.0~1.3	6.5
MN0	18	21.5	19.0	19.0	20.0	1.0~1.3	6.5

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Rated voltage(Vdc)	120	1k	10k	100k
6.3~450	0.50	0.80	0.90	1.00

MK series

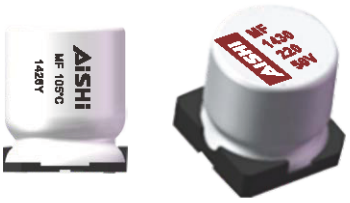
STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/105°C,100kHz)
6.3(0J)	100	D80	0.30	105
	220	E80	0.30	160
	330	FB0	0.40	340
	1000	GB0	0.40	860
10(1A)	33	D80	0.24	105
	100	E80	0.24	175
	220	E80	0.24	180
	330	FB0	0.30	340
	470	FB0	0.30	360
	820	GB0	0.30	860
16(1C)	47	D80	0.20	105
	100	E80	0.20	175
	150	E80	0.20	190
	220	FB0	0.26	500
	330	FB0	0.26	545
	470	GB0	0.26	800
25(1E)	33	D80	0.16	105
	47	E80	0.16	180
	100	E80	0.16	205
	220	FB0	0.16	550
	330	GB0	0.16	780
	470	GD0	0.16	875
35(1V)	10	D80	0.14	105
	22	D80	0.14	110
	47	E80	0.14	210
	100	FB0	0.14	575
	220	GB0	0.14	835
	330	GD0	0.14	900
50(1H)	10	D80	0.12	90
	22	E80	0.12	175
	33	E80	0.12	180
	47	FB0	0.12	540
	100	GB0	0.12	700
	220	WE0	0.12	900
	330	WG5	0.12	1180
63(1J)	10	D80	0.12	85
	22	E80	0.12	150
	33	FB0	0.12	375
	47	FB0	0.12	450
	100	GB0	0.12	575
	220	WE0	0.12	890
80(1B)	10	E80	0.12	140
	22	FB0	0.12	375
	33	FB0	0.12	450
	47	GB0	0.12	575
	100	GD0	0.12	600
	150	WE0	0.12	800
	220	WG5	0.12	960
100(1K)	4.7	D80	0.12	70
	10	E80	0.12	135
	22	FB0	0.12	345
	33	GB0	0.12	560
	47	GB0	0.12	575
	100	WE0	0.12	680

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	10	GB0	0.15	90
	15	GB0	0.15	136
	22	GE0	0.15	180
		WE0	0.15	200
	33	GH0	0.15	240
		WE0	0.15	310
	47	WG5	0.15	420
		LH0	0.15	520
	68	LN0	0.15	660
		MH0	0.15	660
	100	LN0	0.15	780
		MN0	0.15	780
200(2D)	10	GB0	0.15	120
	15	GB0	0.15	164
	22	GE0	0.15	200
		WG5	0.15	236
	33	GH0	0.15	260
		WG5	0.15	300
	47	WM5	0.15	440
		LN0	0.15	556
	68	LN0	0.15	680
250(2E)	2.2	EB0	0.15	56
	3.3	EB0	0.15	68
	4.7	FB0	0.15	96
		GB0	0.15	104
	10	WE0	0.15	184
	22	LH0	0.15	364
	33	LN0	0.15	470
		MH0	0.15	470
	47	MN0	0.15	580
400(2G)	1	E80	0.20	28
	1.5	EB0	0.20	36
	2.2	EB0	0.20	44
		FB0	0.20	52
	3.3	FB0	0.20	64
		GB0	0.20	72
	3.9	FE0	0.20	72
		GB0	0.20	76
	4.7	FB0	0.20	78
		FD0	0.20	80
		GB0	0.20	84
	5.6	FD0	0.20	96
	6.8	FE0	0.20	108
	8.2	FG0	0.20	130
	10	GH0	0.20	156
		LH0	0.20	176
	15	WG5	0.20	184
		LH0	0.20	210
	22	LN0	0.20	260
	33	MN0	0.20	280
450(2W)	2.2	GB0	0.20	50
	3.3	WE0	0.20	80
	4.7	WE0	0.20	96
	10	LH0	0.20	170
	15	LN0	0.20	200
	22	LN0	0.20	240

MF series

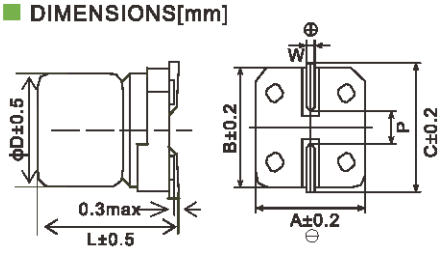
- Endurance: +105°C 6,000 hours
- Designed for surface mounting on high density PC board
- RoHS Compliant



SPECIFICATIONS

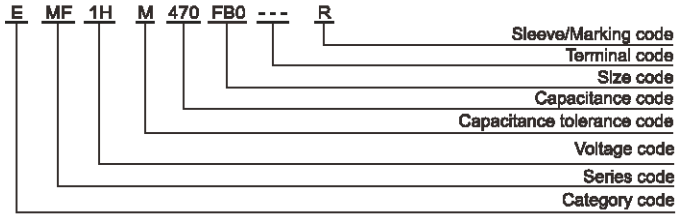
Items	Characteristics											
Category Temperature Range	-40~+105°C(6.3 ~450 Vdc)											
Rated Voltage Range	6.3~450 Vdc											
Capacitance Tolerance	±20%(M)											
Leakage Current	6.3~100 Vdc						160~450 Vdc					
	I≤0.03CV or 4μA, whichever is greater. (2 minutes)						I≤0.04CV+100μA (1 minute)					
	Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)											(at 20°C)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	80	100	160~250	400~450
	tanδ (max.)	0.32	0.28	0.26	0.16	0.14	0.14	0.12	0.12	0.10	0.20	0.24 (at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	80	100	160~250	400~450
	Z(-25°C)/Z(+20°C)	4	3	2	2	2	2	2	2	2	6	6
	Z(-40°C)/Z(+20°C)	10	8	6	4	3	3	3	3	3	10	18 (at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after rated voltage is applied for 6,000 hours at 105°C.											
	Rated Voltage(Vdc)	6.3~100									160~450	
	Capacitance Change	≤±30% of the initial value									≤±20% of the initial value	
	Dissipation Factor (tanδ)	≤300% of the initial specified value									≤200% of the initial specified value	
	Leakage Current	≤The initial specified value									≤The initial specified value	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.											
	Rated Voltage(Vdc)	6.3~100									160~450	
	Capacitance Change	≤±30% of the initial value									≤±20% of the initial value	
	Dissipation Factor (tanδ)	≤300% of the initial specified value									≤200% of the initial specified value	
	Leakage Current	≤200% of the initial specified value									≤200% of the initial specified value	

DIMENSIONS[mm]



Size code	D	L	A	B	C	W	P
D80	5	7.7	5.3	5.3	5.9	0.5~0.8	1.4
E80	6.3	7.7	6.6	6.6	7.2	0.5~0.8	1.9
FB0	8	10.5	8.3	8.3	9.0	0.7~1.1	3.1
FD0	8	12.5	8.3	8.3	9.0	0.7~1.1	3.1
GB0	10	10.5	10.3	10.3	11.0	0.7~1.1	4.5
GD0	10	12.5	10.3	10.3	11.0	0.7~1.1	4.5
WE0	12.5	13.5	13.0	13.0	13.7	1.0~1.3	4.5
WG5	12.5	16.0	13.0	13.0	13.7	1.0~1.3	4.5
LH0	16	16.5	17.0	17.0	18.0	1.0~1.3	6.5
LN0	16	21.5	17.0	17.0	18.0	1.0~1.3	6.5
MH0	18	16.5	19.0	19.0	20.0	1.0~1.3	6.5
MN0	18	21.5	19.0	19.0	20.0	1.0~1.3	6.5

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Rated voltage(Vdc)	120	1k	10k	100k
6.3~450	0.50	0.80	0.90	1.00

MF series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/105°C,100kHz)
6.3(0J)	47	D80	0.32	90
	100	E80	0.32	145
	220	E80	0.32	180
	330	FB0	0.32	280
	470	FB0	0.32	360
10(1A)	33	D80	0.28	71
	150	E80	0.28	105
	220	FB0	0.28	280
	330	GB0	0.28	400
	470	GB0	0.28	545
16(1C)	47	D80	0.26	90
	100	E80	0.26	145
	220	FB0	0.26	475
	330	FD0	0.26	510
	470	GB0	0.26	720
25(1E)	33	D80	0.16	90
	47	E80	0.16	165
	100	E80	0.16	175
	220	FB0	0.16	535
	330	GB0	0.16	750
35(1V)	10	D80	0.14	90
		E80	0.14	145
	22	D80	0.14	96
		E80	0.14	160
	33	E80	0.14	175
	47	E80	0.14	190
	100	FB0	0.14	560
	220	GB0	0.14	800
50(1H)	10	D80	0.14	86
	22	E80	0.14	145
	47	FB0	0.14	520
	100	GB0	0.14	680
	220	WE0	0.14	875
	330	WG5	0.14	1020
63(1J)	22	E80	0.12	140
	33	FB0	0.12	320
	47	FB0	0.12	380
	100	GB0	0.12	530
	220	WE0	0.12	840
	330	LH0	0.12	1040
	470	LN0	0.12	1700
80(1B)	10	E80	0.12	130
	22	FB0	0.12	360
	33	FB0	0.12	410
	47	GB0	0.12	490
	100	GD0	0.12	530
	220	WG5	0.12	1020
100(1K)	10	FB0	0.10	290
	22	FB0	0.10	320
	33	GB0	0.10	360
	47	GB0	0.10	540
	100	WE0	0.10	550
	220	LH0	0.10	1090

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	10	GB0	0.20	176
	15	WE0	0.20	240
	22	WG5	0.20	340
	33	LH0	0.20	440
	47	LH0	0.20	500
	68	LN0	0.20	620
	100	MN0	0.20	760
200(2D)	10	WE0	0.20	200
	15	WE0	0.20	240
	22	WG5	0.20	340
	33	LH0	0.20	440
		LN0	0.20	460
	47	LN0	0.20	540
		MN0	0.20	580
	68	MN0	0.20	680
250(2E)	4.7	FB0	0.20	90
	10	WE0	0.20	200
	15	WG5	0.20	260
	22	WG5	0.20	360
	33	MH0	0.20	500
	47	LN0	0.20	570
		MN0	0.20	610
	56	MN0	0.20	660
400(2G)	2.2	GB0	0.24	60
	3.3	GB0	0.24	80
	3.9	WE0	0.24	100
	4.7	WE0	0.24	110
	6.8	WE0	0.24	150
	10	WG5	0.24	240
	15	LN0	0.24	300
	22	LN0	0.24	400
450(2W)	2.2	GB0	0.24	60
	3.3	WE0	0.24	90
	4.7	WG5	0.24	120
	10	LH0	0.24	240
	15	LN0	0.24	300
	22	MN0	0.24	400

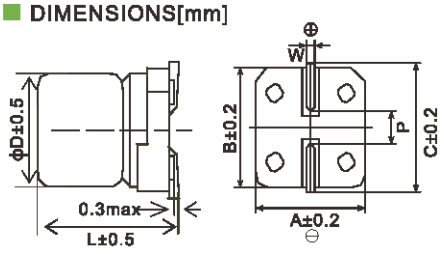
MA series

- Endurance: +105°C 10,000 hours
- Designed for surface mounting on high density PC board
- **RoHS Compliant**

SPECIFICATIONS

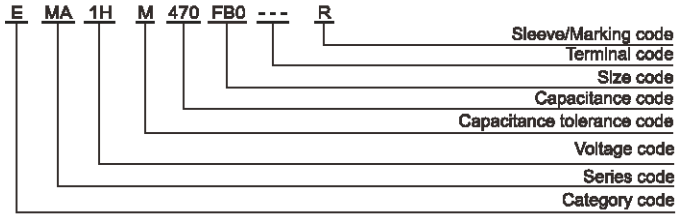
Items	Characteristics									
Category Temperature Range	-40~+105°C(16~450 Vdc)									
Rated Voltage Range	16~450 Vdc									
Capacitance Tolerance	±20%(M)									(at 20°C,120Hz)
Leakage Current	16~100 Vdc					160~450 Vdc				
	I≤0.03CV or 4μA, whichever is greater. (2 minutes)					I≤0.04CV+100μA (1 minute)				
	Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)									(at 20°C)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	16	25	35	50	63	80	100	160~250	400~450
	tanδ (max.)	0.26	0.16	0.14	0.14	0.20	0.20	0.20	0.20	0.24 (at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	16	25	35	50	63	80	100	160~250	400~450
	Z(-25°C)/Z(+20°C)	2	2	2	2	2	2	2	6	6
	Z(-40°C)/Z(+20°C)	6	4	3	3	3	3	3	10	18 (at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after rated voltage is applied for 10,000 hours at 105°C.									
	Rated Voltage(Vdc)	16~100						160~450		
	Capacitance Change	≤±30% of the initial value						≤±20% of the initial value		
	Dissipation Factor (tanδ)	≤300% of the initial specified value						≤200% of the initial specified value		
	Leakage Current	≤The initial specified value						≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.									
	Rated Voltage(Vdc)	16~100						160~450		
	Capacitance Change	≤±30% of the initial value						≤±20% of the initial value		
	Dissipation Factor (tanδ)	≤300% of the initial specified value						≤200% of the initial specified value		
	Leakage Current	≤300% of the initial specified value						≤200% of the initial specified value		

DIMENSIONS[mm]



Size code	D	L	A	B	C	W	P
E80	6.3	7.7	6.6	6.6	7.2	0.5~0.8	1.9
FB0	8	10.5	8.3	8.3	9.0	0.7~1.1	3.1
FD0	8	12.5	8.3	8.3	9.0	0.7~1.1	3.1
GB0	10	10.5	10.3	10.3	11.0	0.7~1.1	4.5
GD0	10	12.5	10.3	10.3	11.0	0.7~1.1	4.5
GE0	10	13.5	10.3	10.3	11.0	0.7~1.1	4.5
WE0	12.5	13.5	13.0	13.0	13.7	1.0~1.3	4.5
WG5	12.5	16.0	13.0	13.0	13.7	1.0~1.3	4.5
LH0	16	16.5	17.0	17.0	18.0	1.0~1.3	6.5
LN0	16	21.5	17.0	17.0	18.0	1.0~1.3	6.5
MH0	18	16.5	19.0	19.0	20.0	1.0~1.3	6.5
MN0	18	21.5	19.0	19.0	20.0	1.0~1.3	6.5

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Rated voltage(Vdc)	120	1k	10k	100k
16~450	0.50	0.80	0.90	1.00

Surface Mount Type

MA series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/105°C,100kHz)
16(1C)	47	E80	0.26	125
	100	FB0	0.26	245
	220	FB0	0.26	260
	330	GB0	0.26	450
	470	GD0	0.26	480
	680	WE0	0.26	820
	1000	WG5	0.26	860
25(1E)	47	E80	0.16	125
	100	FB0	0.16	245
	220	GB0	0.16	440
	330	GB0	0.16	460
	470	WE0	0.16	820
	680	WG5	0.16	860
35(1V)	33	E80	0.14	125
	47	E80	0.14	140
	100	FB0	0.14	245
	220	GB0	0.14	440
	330	WE0	0.14	820
	470	WG5	0.14	860
50(1H)	10	E80	0.14	100
	22	E80	0.14	105
	33	E80	0.14	110
	47	FB0	0.14	260
		GB0	0.14	400
	100	GB0	0.14	420
	220	WE0	0.14	800
	330	WG5	0.14	845
63(1J)	22	E80	0.20	95
	33	FB0	0.20	180
	47	FB0	0.20	210
	100	GD0	0.20	420
	220	WG5	0.20	820
80(1B)	10	FB0	0.20	165
	22	FB0	0.20	180
		GB0	0.20	305
	33	FB0	0.20	190
	47	GB0	0.20	350
	100	WE0	0.20	760
100(1K)	10	FB0	0.20	150
	22	FB0	0.20	165
	33	GB0	0.20	280
	47	GB0	0.20	320
	68	GD0	0.20	350
	82	WE0	0.20	530
	100	WE0	0.20	555

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	10	GB0	0.20	190
	15	WE0	0.20	280
	22	WG5	0.20	400
	33	LH0	0.20	560
	47	LH0	0.20	640
	68	LN0	0.20	800
	100	MN0	0.20	1120
200(2D)	10	WE0	0.20	220
	15	WE0	0.20	280
	22	WG5	0.20	400
	33	LN0	0.20	500
		MH0	0.20	490
	47	LN0	0.20	660
		MN0	0.20	700
	68	MN0	0.20	860
250(2E)	4.7	GB0	0.20	120
	10	WE0	0.20	220
	15	WG5	0.20	300
	22	LH0	0.20	440
	33	MH0	0.20	540
	47	LN0	0.20	660
		MN0	0.20	700
	56	MN0	0.20	800
400(2G)	2.2	GB0	0.24	70
	3.3	WE0	0.24	100
	4.7	WE0	0.24	144
	6.8	WG5	0.24	200
	10	LH0	0.24	280
	15	LN0	0.24	340
	22	LN0	0.24	460
450(2W)	2.2	GB0	0.24	70
	3.3	WE0	0.24	100
	4.7	WG5	0.24	150
	10	LH0	0.24	280
	15	LN0	0.24	340
	22	MN0	0.24	460

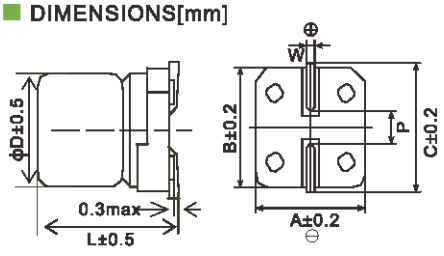
MH series

- Endurance: +130°C 1,000~5,000 hours
- Designed for surface mounting on high density PC board
- **RoHS Compliant**

SPECIFICATIONS

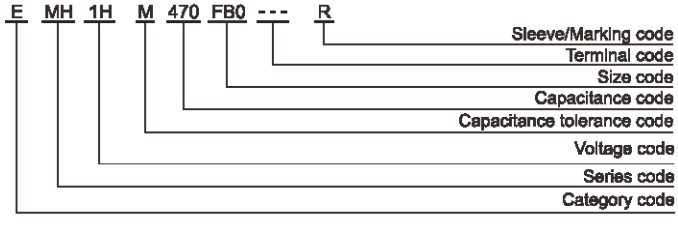
Items	Characteristics											
Category Temperature Range	-40~+130°C(10 ~450 Vdc)											
Rated Voltage Range	10~450 Vdc											
Capacitance Tolerance	±20%(M)											(at 20°C,120Hz)
Leakage Current	10~100 Vdc									160~450 Vdc		
	E80-GE0				WE0-MN0					I≤0.04CV+100μA (1 minute)		
	I≤0.01CV or 3μA, whichever is greater.(2 minutes)				I≤0.03CV or 4μA, whichever is greater. (2 minutes)							
	Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)											(at 20°C)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	10	16	25	35	50	63	80	100	160~250	400~450	
	tanδ (max.)	0.24	0.20	0.16	0.14	0.14	0.12	0.12	0.10	0.24	0.30	
	When nominal capacitance exceeds 1,000μF,add 0.02 to the value above for each 1,000μF increase.											(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)		10	16	25	35	50	63	80	100	160~250	400~450
	E80~GE0	Z(-25°C)/Z(+20°C)	3	2	2	2	2	2	2	2	6	6
		Z(-40°C)/Z(+20°C)	6	4	4	3	3	3	3	3	10	18
	WE0~MN0	Z(-25°C)/Z(+20°C)	4	3	2	2	2	2	2	2	6	6
		Z(-40°C)/Z(+20°C)	8	6	4	3	3	3	3	3	10	18
												(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage is applied for a specified period of time at 130°C.											
	Load Life	E80(10~100Vdc): 1000 hours FB0~GE0(10~100Vdc): 2000 hours WE0~MN0(10~100Vdc): 5000 hours GB0~MN0(160~450Vdc): 3000 hours										
	Capacitance Change	≤±30% of the initial value										
	Dissipation Factor (tanδ)	≤300% of the initial specified value										
	Leakage Current	≤The initial specified value										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 130°C for 1,000 hours (400~450WV: 500 hours).											
	Rated Voltage(Vdc)	10~450										
	Capacitance Change	≤±30% of the initial value										
	Dissipation Factor (tanδ)	≤300% of the initial specified value										
	Leakage Current	≤500% of the initial specified value										

DIMENSIONS[mm]



Size code	D	L	A	B	C	W	P
E80	6.3	7.7	6.6	6.6	7.2	0.5~0.8	1.9
FB0	8	10.5	8.3	8.3	9.0	0.7~1.1	3.1
FD0	8	12.5	8.3	8.3	9.0	0.7~1.1	3.1
GB0	10	10.5	10.3	10.3	11.0	0.7~1.1	4.5
GD0	10	12.5	10.3	10.3	11.0	0.7~1.1	4.5
GE0	10	13.5	10.3	10.3	11.0	0.7~1.1	4.5
WE0	12.5	13.5	13.0	13.0	13.7	1.0~1.3	4.5
WG5	12.5	16.0	13.0	13.0	13.7	1.0~1.3	4.5
LH0	16	16.5	17.0	17.0	18.0	1.0~1.3	6.5
LN0	16	21.5	17.0	17.0	18.0	1.0~1.3	6.5
MH0	16	16.5	19.0	19.0	20.0	1.0~1.3	6.5
MN0	16	21.5	19.0	19.0	20.0	1.0~1.3	6.5

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Rated voltage (Vdc)	Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
10~100	Cap.<220	0.40	0.75	0.90	1.00
	220≤Cap.<680	0.50	0.85	0.94	1.00
	680≤Cap.<2200	0.60	0.87	0.95	1.00
	2200≤Cap.<3300	0.75	0.90	0.95	1.00
	Cap.≥3300	0.85	0.95	0.98	1.00
160~450	Cap.≤33	0.55	0.83	0.97	1.00
	Cap.>33	0.66	0.86	0.93	1.00

MH series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/130°C,100kHz)
10(1A)	100	E80	0.24	110
	220	E80	0.24	110
		FB0	0.24	220
	330	FB0	0.24	220
		GB0	0.24	296
	470	GB0	0.24	296
	1000	WE0	0.24	750
	2200	LH0	0.26	1000
	3300	MH0	0.28	1200
	4700	MN0	0.30	1550
16(1C)	100	E80	0.20	110
		FB0	0.20	220
	220	FB0	0.20	220
	330	GB0	0.20	296
	470	GD0	0.20	340
	680	WE0	0.20	750
	1000	WG5	0.20	800
	1500	LH0	0.20	1000
25(1E)	47	E80	0.16	110
	100	E80	0.16	110
		FB0	0.16	220
	220	FB0	0.16	220
		GB0	0.16	296
	330	GB0	0.16	296
	470	WE0	0.16	750
	680	WG5	0.16	800
	1000	LH0	0.16	1000
35(1V)	33	E80	0.14	110
	47	E80	0.14	110
	100	FB0	0.14	220
	220	GB0	0.14	296
	330	WE0	0.14	750
	470	WG5	0.14	900
	680	LH0	0.14	1000
	1000	MH0	0.14	1200
50(1H)	10	E80	0.14	83
	22	E80	0.14	83
	33	E80	0.14	83
	47	FB0	0.14	160
		GB0	0.14	247
	100	GB0	0.14	247
		WE0	0.14	550
	220	WE0	0.14	550
	330	WG5	0.14	700
	470	LH0	0.14	850
	560	MH0	0.14	920
63(1J)	22	E80	0.12	65
	33	FB0	0.12	100
	47	FB0	0.12	125
	100	GD0	0.12	270
	220	WG5	0.12	600
	330	LH0	0.12	820
	470	LN0	0.12	1100

WV (Vdc)	Cap (μF)	Size code	tanδ	Rated ripple current (mArms/130°C,100kHz)
80(1B)	10	FB0	0.12	95
	22	FB0	0.12	110
		GB0	0.12	215
	33	FB0	0.12	130
	47	GB0	0.12	245
	100	WE0	0.12	475
100(1K)	10	FB0	0.10	90
	22	FB0	0.10	105
	33	GB0	0.10	200
	47	GB0	0.10	230
	68	GD0	0.10	275
	100	WE0	0.10	405
	220	LH0	0.10	650
160(2C)	10	GE0	0.24	90
	15	WE0	0.24	120
	22	WG5	0.24	180
	33	LH0	0.24	220
	47	LN0	0.24	260
	68	LN0	0.24	310
	100	MN0	0.24	400
200(2D)	10	WG5	0.24	110
	15	WG5	0.24	150
	22	LH0	0.24	200
	33	LN0	0.24	250
	47	MN0	0.24	320
250(2E)	10	WG5	0.24	110
	15	WG5	0.24	150
	22	LN0	0.24	210
	33	LN0	0.24	250
	47	MN0	0.24	320
400(2G)	1	GB0	0.30	22
	2.2	GE0	0.30	38
	3.3	WE0	0.30	50
	4.7	WG5	0.30	70
	6.8	LH0	0.30	100
	10	LN0	0.30	130
	15	LN0	0.30	160
	22	MN0	0.30	240
450(2W)	2.2	WE0	0.30	35
	3.3	WG5	0.30	45
	4.7	LH0	0.30	60
	10	LN0	0.30	110
	15	MN0	0.30	150
	22	MN0	0.30	230

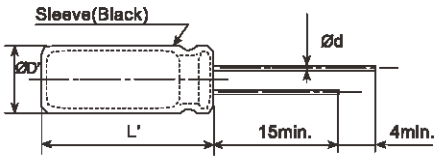
M5 series

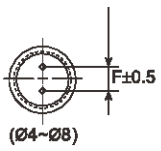
- Low profile with 5mm height
- Endurance: +85°C 1,000 hours
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	-40~+85°C								
Rated Voltage Range	4~50 Vdc								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)								(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)		4	6.3	10	16	25	35	50	
	tanδ (max.)	Φ4-Φ6.3	0.35	0.26	0.22	0.18	0.16	0.14	0.12	
		Φ8	0.39	0.28	0.24	0.18	0.16	0.14	0.12	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)		4	6.3	10	16	25	35	50	
	Z(-25°C)/Z(+20°C)		6	4	3	2				
	Z(-40°C)/Z(+20°C)		16	10	8	6	4			(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 85°C.									
	Capacitance Change		≤±25% of the initial value							
	D.F. (tanδ)		≤200% of the initial specified value							
	Leakage Current		≤The initial specified value							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied.									
	Capacitance Change		≤±20% of the initial value							
	D.F. (tanδ)		≤200% of the initial specified value							
	Leakage Current		≤200% of the initial specified value							

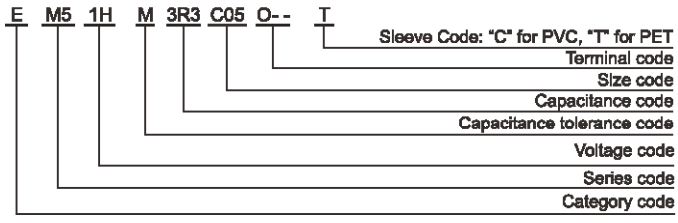
DIMENSIONS[mm]





ØD	4	5	6.3	8
Ød	0.45	0.45	0.45	0.45
F	1.5	2.0	2.5	3.5
ØD'	ØD+0.5max.			
L'	L+1.5max.			

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

WV(Vdc) \ Freq.(Hz)	50/60	120	1k	10k-100k
4 to 16	0.80	1.00	1.10	1.20
25 to 35	0.80	1.00	1.50	1.70
50	0.80	1.00	1.60	1.90

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

M5 series

■ STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)
4(0G)	22	4*5	0.35	25
	33	4*5	0.35	30
	47	4*5	0.35	35
	100	5*5	0.35	60
	220	6.3*5	0.35	105
	330	8*5	0.39	150
	470	8*5	0.39	180
6.3(0J)	10	4*5	0.26	20
	22	4*5	0.26	30
	33	5*5	0.26	40
	47	5*5	0.26	50
	100	6.3*5	0.26	85
	220	8*5	0.28	145
	330	8*5	0.28	175
10(1A)	10	4*5	0.22	22
	22	5*5	0.22	35
	33	5*5	0.22	45
	47	6.3*5	0.22	65
	100	6.3*5	0.22	95
	220	8*5	0.24	155
16(1C)	4.7	4*5	0.18	17
	10	4*5	0.18	25
	22	5*5	0.18	40
	33	6.3*5	0.18	60
	47	6.3*5	0.18	70
	100	8*5	0.18	125

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)
25(1E)	3.3	4*5	0.16	15
	4.7	4*5	0.16	18
	10	5*5	0.16	30
	22	6.3*5	0.16	50
	33	6.3*5	0.16	65
	47	8*5	0.16	95
	100	8*5	0.16	135
35(1V)	2.2	4*5	0.14	8.4
	3.3	4*5	0.14	17
	4.7	5*5	0.14	20
	10	5*5	0.14	30
	22	6.3*5	0.14	50
	33	8*5	0.14	80
	47	8*5	0.14	100
50(1H)	0.1	4*5	0.12	1
	0.22	4*5	0.12	2
	0.33	4*5	0.12	2.8
	0.47	4*5	0.12	4
	1	4*5	0.12	8.4
	2.2	4*5	0.12	13
	3.3	4*5	0.12	18
	4.7	5*5	0.12	25
	10	6.3*5	0.12	40
	22	8*5	0.12	75
	33	8*5	0.12	90

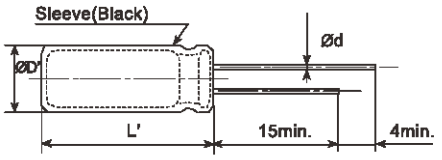
H5 series

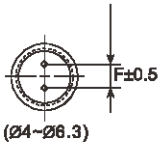
- Low profile with 5mm height
- Wide temperature range of -40 °C to +105°C
- Endurance: +105°C 1,000 hours
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-40~+105°C							
Rated Voltage Range	6.3~50 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)							(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	
	tanδ (max.)	0.28	0.24	0.20	0.14	0.12	0.10	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	
	Z(-25°C)/Z(+20°C)	3		2				
	Z(-40°C)/Z(+20°C)	8	5	4	3			(at120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 105°C.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤The initial specified value						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤200% of the initial specified value						

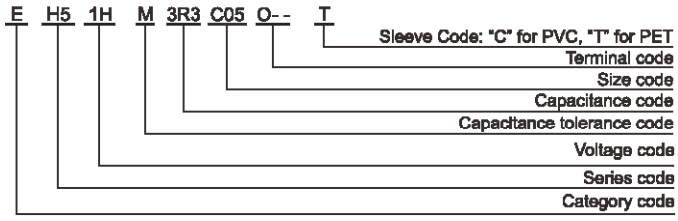
DIMENSIONS[mm]





ØD	4	5	6.3
Ød	0.45	0.45	0.45
F	1.5	2.0	2.5
ØD'	ØD+0.5max.		
L'	L+1.5max.		

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

WV(Vdc) \ Freq.(Hz)	50/60	120	1k	10k-100k
6.3 to 16	0.80	1.00	1.30	1.50
25 to 35	0.80	1.00	1.20	1.20
50	0.80	1.00	1.15	1.20

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

H5 series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
6.3(0J)	22	4*5	0.28	23
	33	5*5	0.28	30
	47	5*5	0.28	37
	100	6.3*5	0.28	57
10(1A)	10	4*5	0.24	20
	22	5*5	0.24	28
	33	5*5	0.24	34
	47	6.3*5	0.24	52
16(1C)	4.7	4*5	0.20	15
	10	4*5	0.20	23
	22	5*5	0.20	31
	33	6.3*5	0.20	48
	47	6.3*5	0.20	56
25(1E)	4.7	4*5	0.14	15
	10	5*5	0.14	22

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
25(1E)	22	6.3*5	0.14	44
	33	6.3*5	0.14	48
35(1V)	3.3	4*5	0.12	13
	4.7	4*5	0.12	17
	10	5*5	0.12	24
	22	6.3*5	0.12	48
50(1H)	0.1	4*5	0.10	1
	0.22	4*5	0.10	2
	0.33	4*5	0.10	3
	0.47	4*5	0.10	4
	1	4*5	0.10	8
	2.2	4*5	0.10	13
	3.3	4*5	0.10	14
	4.7	5*5	0.10	18
	10	6.3*5	0.10	28

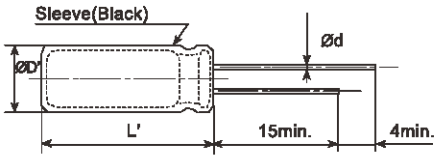
M7 series

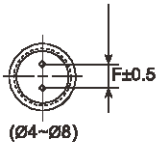
- Standard miniature series with 7mm height
- Endurance: +85°C 1,000 hours
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics										
Category Temperature Range	-40~+85°C										
Rated Voltage Range	4~100 Vdc										
Capacitance Tolerance	±20%(M)										(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)										(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	4	6.3	10	16	25	35	50	63	100	
	tanδ (max.)	0.35	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.08	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	4	6.3	10	16	25	35	50	63	100	
	Z(-25°C)/Z(+20°C)	6	4	3	2						
	Z(-40°C)/Z(+20°C)	16	10	8	6	4					(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 85°C.										
	Capacitance Change	≤±20% of the initial value									
	D.F. (tanδ)	≤200% of the initial specified value									
	Leakage Current	≤The initial specified value									
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied.										
	Capacitance Change	≤±20% of the initial value									
	D.F. (tanδ)	≤200% of the initial specified value									
	Leakage Current	≤200% of the initial specified value									

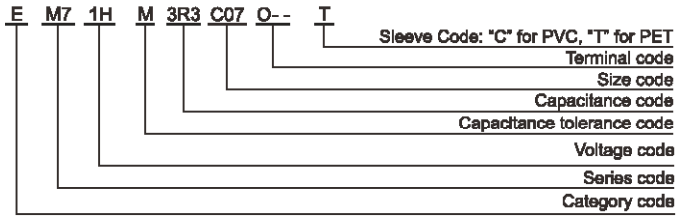
DIMENSIONS[mm]





ØD	4	5	6.3	8
Ød	0.45	0.45	0.5	0.5
F	1.5	2.0	2.5	3.5
ØD'	ØD+0.5max.			
L'	L+1.5max.			

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

WV(Vdc) \ Freq.(Hz)	50/60	120	1k	10k-100k
4 to 16	0.80	1.00	1.10	1.20
25 to 35	0.80	1.00	1.50	1.70
≥50	0.80	1.00	1.60	1.90

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

M7 series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)
4(0G)	33	4*7	0.35	35
	47	4*7	0.35	40
	100	5*7	0.35	70
	220	6.3*7	0.35	120
	330	8*7	0.35	170
6.3(0J)	22	4*7	0.24	35
	33	4*7	0.24	40
	47	4*7	0.24	50
	100	5*7	0.24	80
	220	6.3*7	0.24	140
	330	8*7	0.24	205
10(1A)	22	4*7	0.20	35
	33	4*7	0.20	45
	47	5*7	0.20	60
	100	6.3*7	0.20	108
	220	8*7	0.20	185
16(1C)	10	4*7	0.16	35
	22	4*7	0.16	40
	33	5*7	0.16	55
	47	5*7	0.16	70
	100	6.3*7	0.16	120
	220	8*7	0.16	205
25(1E)	3.3	4*7	0.14	15
	4.7	4*7	0.14	20
	10	4*7	0.14	30
	22	5*7	0.14	50
	33	6.3*7	0.14	70
	47	6.3*7	0.14	85
	100	8*7	0.14	145

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)
35(1V)	3.3	4*7	0.12	15
	4.7	4*7	0.12	20
	10	4*7	0.12	30
	22	5*7	0.12	55
	33	6.3*7	0.12	75
	47	8*7	0.12	110
50(1H)	0.1	4*7	0.10	4
	0.22	4*7	0.10	5
	0.33	4*7	0.10	7
	0.47	4*7	0.10	8
	1	4*7	0.10	10
	2.2	4*7	0.10	15
	3.3	4*7	0.10	20
	4.7	4*7	0.10	24
	10	5*7	0.10	40
	22	6.3*7	0.10	70
	33	8*7	0.10	100
63(1J)	0.1	4*7	0.08	4
	0.22	4*7	0.08	6
	0.33	4*7	0.08	7
	0.47	4*7	0.08	8
	1	4*7	0.08	10
	2.2	4*7	0.08	15
	3.3	4*7	0.08	23
	4.7	5*7	0.08	30
	10	6.3*7	0.08	50
100(1K)	1	4*7	0.08	12
	2.2	5*7	0.08	20
	3.3	6.3*7	0.08	30
	4.7	6.3*7	0.08	35

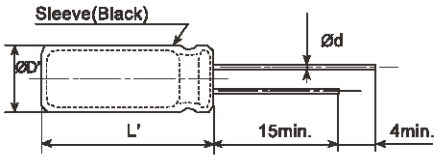
H7 series

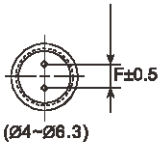
- Miniature series with 7mm height
- Endurance: +105°C 1,000 hours
- Wide temperature range of -40 °C to +105°C
- RoHS Compliant

SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-40~+105°C							
Rated Voltage Range	6.3~50 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)							(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	
	Z(-25°C)/Z(+20°C)	3		2				
	Z(-40°C)/Z(+20°C)	8	5	4	3			(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 105°C.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤The initial specified value						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤200% of the initial specified value						

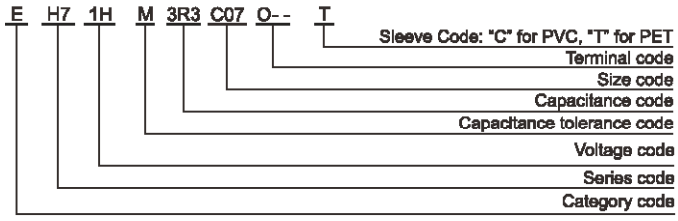
DIMENSIONS[mm]





ØD	4	5	6.3
Ød	0.45	0.45	0.5
F	1.5	2.0	2.5
ØD'	ØD+0.5max.		
L'	L+1.5max.		

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

WV(Vdc) \ Freq.(Hz)	50/60	120	1k	10k-100k
6.3 to 16	0.68	0.72	0.92	1.00
25 to 35	0.48	0.63	0.80	1.00
50	0.45	0.50	0.70	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

H7 series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
6.3(0J)	22	4*7	0.22	34
	33	5*7	0.22	42
	47	5*7	0.22	50
	100	6.3*7	0.22	77
10(1A)	22	5*7	0.19	38
	33	5*7	0.19	47
	47	6.3*7	0.19	65
	100	6.3*7	0.19	87
16(1C)	10	4*7	0.16	29
	22	5*7	0.16	44
	33	6.3*7	0.16	60
	47	6.3*7	0.16	70
25(1E)	3.3	4*7	0.14	21
	4.7	4*7	0.14	25
	10	5*7	0.14	33
	22	6.3*7	0.14	51
	33	6.3*7	0.14	65

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
35(1V)	3.3	4*7	0.12	23
	4.7	4*7	0.12	25
	10	5*7	0.12	36
	22	6.3*7	0.12	60
50(1H)	0.1	4*7	0.10	1.0
	0.22	4*7	0.10	2.3
	0.33	4*7	0.10	3.5
	0.47	4*7	0.10	5
	1	4*7	0.10	10
	2.2	4*7	0.10	19
	3.3	4*7	0.10	24
	4.7	5*7	0.10	29
	10	6.3*7	0.10	44
	22	6.3*7	0.10	60

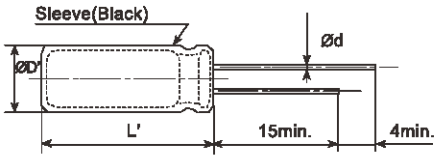
L7 series

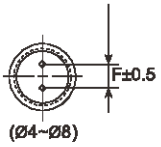
- Miniature series with 7mm height
- Endurance : +105 °C 2,000 hours
- Wide temperature range of -40°C to +105°C
- RoHS Compliant

SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	-40~+105°C								
Rated Voltage Range	6.3~63 Vdc								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)								(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	
	Z(-25°C)/Z(+20°C)	4	3	2					
	Z(-40°C)/Z(+20°C)	8	6	4	3				(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤The initial specified value							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤200% of the initial specified value							

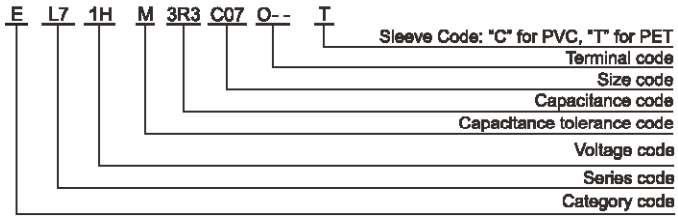
DIMENSIONS[mm]





ØD	4	5	6.3	8
Ød	0.45	0.45	0.5	0.5
F	1.5	2.0	2.5	3.5
ØD'	ØD+0.5max.			
L'	L+2max.			

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

WV(Vdc) \ Freq.(Hz)	50/60	120	1k	10k-100k
6.3 to 16	0.80	1.00	1.30	1.50
25 to 35	0.80	1.00	1.20	1.20
≥50	0.80	1.00	1.15	1.20

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

L7 series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
6.3(0J)	22	4*7	0.22	28
	33	4*7	0.22	32
		5*7	0.22	35
	47	5*7	0.22	47
	68	5*7	0.22	50
	100	6.3*7	0.22	75
	220	8*7	0.22	92
10(1A)	22	4*7	0.19	32
	33	5*7	0.19	48
	47	5*7	0.19	51
	68	6.3*7	0.19	68
	100	6.3*7	0.19	80
		8*7	0.19	95
	220	8*7	0.19	130
16(1C)	10	4*7	0.16	28
	22	4*7	0.16	35
		5*7	0.16	42
	33	5*7	0.16	50
	47	6.3*7	0.16	67
	68	6.3*7	0.16	70
		8*7	0.16	78
	100	8*7	0.16	110
25(1E)	4.7	4*7	0.14	17
	6.8	4*7	0.14	19
	10	4*7	0.14	28
		5*7	0.14	33
	22	5*7	0.14	43
		6.3*7	0.14	45
	33	6.3*7	0.14	62
	47	8*7	0.14	75
	68	8*7	0.14	80
	100	8*7	0.14	115

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
35(1V)	4.7	4*7	0.12	22
	6.8	4*7	0.12	24
		5*7	0.12	28
	10	5*7	0.12	35
	22	6.3*7	0.12	60
	33	6.3*7	0.12	50
		8*7	0.12	68
	47	8*7	0.12	80
	68	8*7	0.12	85
50(1H)	0.1	4*7	0.10	1.5
	0.22	4*7	0.10	2.5
	0.33	4*7	0.10	3.5
	0.47	4*7	0.10	5
	0.68	4*7	0.10	7
	1	4*7	0.10	10
	2.2	4*7	0.10	20
	3.3	4*7	0.10	26
	4.7	4*7	0.10	27
		5*7	0.10	29
	10	6.3*7	0.10	38
	22	8*7	0.10	63
	33	8*7	0.10	78
63(1J)	0.1	4*7	0.09	1.5
	0.22	4*7	0.09	2.5
	0.33	4*7	0.09	3.5
	0.47	4*7	0.09	6
	1	4*7	0.09	12
	2.2	4*7	0.09	20
	3.3	5*7	0.09	28
	4.7	6.3*7	0.09	33
	10	6.3*7	0.09	40
	22	8*7	0.09	65

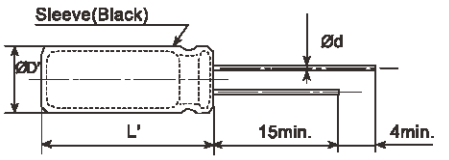
WK series

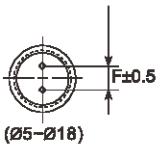
- Standard series for general purpose
- Endurance : +85 °C 2,000 hours
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics														
Category Temperature Range	-40~+85°C(6.3 to 100 Vdc) -25~+85°C(160 to 450 Vdc)														
Rated Voltage Range	6.3~450 Vdc														
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)														
Leakage Current	6.3~100 Vdc: I≤0.01CV or 3μA, whichever is greater. 160~450 Vdc: I≤0.03CV+10μA. Where, I: Max.leakage current (μA), C:Nominal capacitance (μF), V: Rated voltage (V) (at 20°C after 2 minutes)														
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	tanδ (max.)	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.20	0.20	0.20	0.24	0.24	0.24
	When nominal capacitance exceeds 1,000μF , add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)														
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	Z(-25°C)/Z(+20°C)	5	4	3	2					3			6		
	Z(-40°C)/Z(+20°C)	12	10	8	5	4	3			-			-		(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 85°C.														
	Capacitance Change	≤±20% of the initial value													
	D.F. (tanδ)	≤200% of the initial specified value													
	Leakage Current	≤The initial specified value													
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied.														
	Capacitance Change	≤±20% of the initial value													
	D.F. (tanδ)	≤200% of the initial specified value													
	Leakage Current	≤200% of the initial specified value													

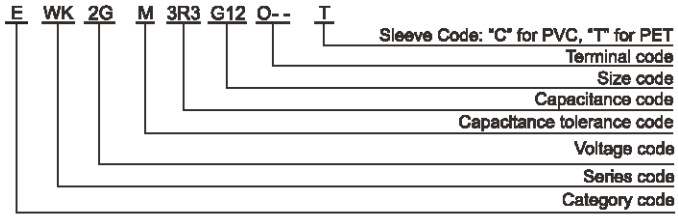
DIMENSIONS[mm]





ØD	5	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	50	120	300	1k	10k	100k
Cap.<10	0.65	1.00	1.35	1.75	2.30	2.50
10≤Cap.<100	0.75	1.00	1.25	1.50	1.75	1.80
100≤Cap.≤1000	0.80	1.00	1.15	1.30	1.40	1.50
Cap.>1000	0.85	1.00	1.03	1.05	1.08	1.08

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

WK series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)
6.3(0J)	33	5*11	0.24	65
	47	5*11	0.24	80
	100	5*11	0.24	135
	220	5*12	0.24	220
	330	6.3*11	0.24	280
	470	6.3*12	0.24	360
	1000	8*12	0.24	590
	2200	10*20	0.26	1000
	3300	10*25	0.28	1200
	4700	12.5*20	0.30	1550
	6800	12.5*25	0.34	1920
	10000	16*25	0.42	2370
	15000	16*35	0.52	2880
	22000	18*40	0.66	3350
10(1A)	22	5*11	0.20	60
	33	5*11	0.20	75
	47	5*11	0.20	95
	100	5*11	0.20	140
	220	5*12	0.20	240
	330	6.3*11	0.20	310
	470	6.3*12	0.20	400
	1000	10*12.5	0.20	660
	2200	10*20	0.22	1090
	3300	12.5*20	0.24	1450
	4700	12.5*25	0.26	1800
	6800	16*25	0.30	2250
	10000	16*35	0.38	2710
	15000	18*35	0.48	3120
16(1C)	10	5*11	0.16	50
	22	5*11	0.16	65
	33	5*11	0.16	80
	47	5*11	0.16	115
	100	5*11	0.16	175
	220	6.3*11	0.16	280
	330	8*11	0.16	380
	470	8*11	0.16	460
	1000	10*16	0.16	800
	2200	12.5*20	0.18	1320
	3300	12.5*25	0.20	1670
	4700	16*25	0.22	2120
	6800	16*30	0.26	2550
25(1E)	4.7	5*11	0.14	30
	10	5*11	0.14	45
	22	5*11	0.14	70
	33	5*11	0.14	98
	47	5*11	0.14	120
	100	6.3*11	0.14	190
	220	8*11	0.14	330
	330	8*12	0.14	440
	470	10*12.5	0.14	550
	1000	10*20	0.14	970
	2200	12.5*25	0.16	1570
	3300	16*25	0.18	2000
	4700	16*30	0.20	2450

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)
35(1V)	4.7	5*11	0.12	40
	10	5*11	0.12	55
	22	5*11	0.12	90
	33	5*11	0.12	110
	47	5*11	0.12	135
	100	6.3*11	0.12	215
	220	8*12	0.12	385
	330	10*12.5	0.12	500
	470	10*16	0.12	680
	1000	12.5*20	0.12	1180
	2200	16*25	0.14	1810
	3300	16*35	0.16	2300
	4700	18*35	0.18	2750
50(1H)	0.1	5*11	0.10	1.3
	0.22	5*11	0.10	2.9
	0.33	5*11	0.10	4.3
	0.47	5*11	0.10	7.0
	1	5*11	0.10	17
	2.2	5*11	0.10	28
	3.3	5*11	0.10	35
	4.7	5*11	0.10	41
	10	5*11	0.10	60
	22	5*11	0.10	95
	33	6.3*11	0.10	130
	47	6.3*11	0.10	160
	100	8*11	0.10	270
	220	10*16	0.10	435
	330	10*20	0.10	590
	470	10*20	0.10	760
	1000	12.5*25	0.10	1350
	2200	16*35	0.12	2110
	3300	18*35	0.14	2550
63(1J)	4.7	5*11	0.09	45
	10	5*11	0.09	70
	22	6.3*11	0.09	110
	33	6.3*11	0.09	140
	47	6.3*12	0.09	190
	100	10*12.5	0.09	300
	220	10*16	0.09	490
	330	10*20	0.09	710
	470	12.5*20	0.09	900
	1000	16*25	0.09	1350
	2200	18*35	0.11	2330
100(1K)	0.1	5*11	0.08	2.1
	0.22	5*11	0.08	4.7
	0.33	5*11	0.08	7.0
	0.47	5*11	0.08	10
	1	5*11	0.08	21
	2.2	5*11	0.08	35
	3.3	5*11	0.08	45
	4.7	5*11	0.08	50
	10	6.3*11	0.08	75
	22	8*11	0.08	135
	33	8*12	0.08	185

WK series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)
100(1K)	47	10*12.5	0.08	235
	100	10*20	0.08	380
	220	12.5* 25	0.08	630
	330	12.5* 30	0.08	760
	470	16*30	0.08	1000
	1000	18*40	0.08	1350
160(2C)	0.47	6.3*11	0.20	10
	1	6.3*11	0.20	15
	2.2	6.3*11	0.20	30
	3.3	6.3*11	0.20	40
	4.7	6.3*11	0.20	48
	10	8*12	0.20	80
		10*12	0.20	94
	22	10*12	0.20	130
		10*16	0.20	150
		10*20	0.20	170
	33	10*16	0.20	180
		10*20	0.20	210
	47	10*20	0.20	240
		12.5*20	0.20	280
	68	12.5*20	0.20	360
	100	12.5*25	0.20	470
	150	16*20	0.20	520
	180	16*25	0.20	600
	220	16*30	0.20	780
	270	18*30	0.20	860
	330	18*35	0.20	1000
	390	18*35	0.20	1020
	470	18*40	0.20	1220
200(2D)	0.47	6.3*11	0.20	10
	1	6.3*11	0.20	15
	2.2	6.3*11	0.20	34
	3.3	6.3*11	0.20	45
	4.7	6.3*11	0.20	55
		8*12	0.20	60
	10	10*12	0.20	100
	22	10*20	0.20	170
	33	10*20	0.20	205
	47	12.5*20	0.20	270
	68	12.5*25	0.20	370
	100	16*25	0.20	475
	150	16*25	0.20	550
	180	18*25	0.20	620
	220	18*35	0.20	810
	270	18*35	0.20	870
	330	18*35	0.20	1000
		18*40	0.20	1020
250(2E)	0.47	6.3*11	0.20	10
	1	6.3*11	0.20	16
	2.2	6.3*11	0.20	34
	3.3	6.3*11	0.20	42
		8*12	0.20	46
	4.7	6.3*11	0.20	50
		8*12	0.20	55
	10	10*12	0.20	100
		10*16	0.20	105
	22	10*20	0.20	170

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)
250(2E)	33	10*20	0.20	200
		12.5*20	0.20	230
	47	12.5*20	0.20	270
		12.5*25	0.20	295
	68	16*25	0.20	382
	100	16*25	0.20	450
		16*30	0.20	515
	120	16*30	0.20	530
	150	16*30	0.20	570
	180	18*30	0.20	620
350(2V)	0.47	6.3*11	0.24	15
	1	6.3*11	0.24	22
	2.2	8*12	0.24	38
	3.3	8*12	0.24	46
	4.7	10*12	0.24	65
	10	10*12	0.24	90
		10*16	0.24	100
		10*20	0.24	120
	22	12.5*20	0.24	185
	33	16*25	0.24	275
	47	16*25	0.24	325
	68	16*25	0.24	405
	100	18*30	0.24	530
400(2G)	1	6.3*11	0.24	22
	2.2	8*12	0.24	38
	3.3	10*12	0.24	54
	4.7	10*12	0.24	60
		10*16	0.24	75
	10	10*16	0.24	100
		10*20	0.24	120
	22	12.5*25	0.24	205
	33	16*25	0.24	275
	47	16*25	0.24	325
		16*30	0.24	350
	56	16*30	0.24	385
	68	18*25	0.24	420
	82	18*30	0.24	475
	100	18*35	0.24	545
450(2W)	1	8*12	0.24	16
	2.2	8*12	0.24	32
		10*12	0.24	35
	3.3	10*12	0.24	40
		10*16	0.24	44
	4.7	10*12	0.24	50
		10*16	0.24	58
		10*20	0.24	65
	10	10*20	0.24	80
		12.5*20	0.24	92
	22	12.5*25	0.24	150
		16*25	0.24	165
	33	16*30	0.24	215
	47	16*30	0.24	260
		18*35	0.24	280
	68	18*30	0.24	370
	82	18*35	0.24	390
	100	18*40	0.24	420

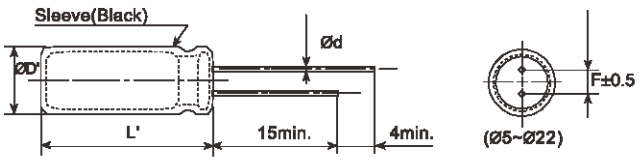
WH series

- Standard series for general purpose
- Wide temperature range from -40 °C to +105 °C
- Endurance: +105 °C 2,000 hours
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics												
Category Temperature Range	-40~+105 °C (6.3~100 Vdc) -25~+105°C(160~500 Vdc)												
Rated Voltage Range	6.3~500 Vdc												
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)												
Leakage Current	6.3~100 Vdc: I≤0.03CV or 4μA (at 1 minute); I≤0.01CV or 3μA (at 2 minutes); Whichever is greater. 160~500 Vdc: CV≤1,000 After 1 minute I≤0.1CV+40μA; CV>1,000 After 1 minute I≤0.04CV+100μA; CV≤1,000 After 5 minutes I≤0.03CV+15μA; CV>1,000 After 5 minutes I≤0.02CV+25μA. Where, I:Max. leakage current (μA), C:Nominal capacitance (μF), V: Rated voltage (V) (at 20°C)												
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100	160~250	350~400	450	500
	tanδ (max.)	0.26	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.20	0.24	0.24	0.24
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)												
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100	160~250	350~400	450	500
	Z(-25°C)/Z(+20°C)	5	4	3	2					3	6	6	8
	Z(-40°C)/Z(+20°C)	12	10	8	5	4	3			-	-	-	- (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 105°C.												
	Capacitance Change	≤±20% of the initial value											
	D.F. (tanδ)	≤200% of the initial specified value											
	Leakage Current	≤The initial specified value											
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.												
	Capacitance Change	≤±20% of the initial value											
	D.F. (tanδ)	≤200% of the initial specified value											
	Leakage Current	≤200% of the initial specified value											

DIMENSIONS[mm]



ØD	5	6.3	8		10	12.5	16	18	22
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5	10.0
ØD'	ØD+0.5max.								
L'	L+2max.								

PART NUMBERING SYSTEM

E WH 2E M 2R2 E11 O- - T

- T: Sleeve Code: "C" for PVC, "T" for PET
- O- -: Terminal code
- E11: Size code
- 2R2: Capacitance code
- M: Capacitance tolerance code
- 2E: Voltage code
- WH: Series code
- E: Category code

RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	50	120	300	1k	10k	100k
Cap.<10	0.65	1.00	1.35	1.75	2.30	2.50
10≤Cap.<100	0.75	1.00	1.25	1.50	1.75	1.80
100≤Cap.≤1000	0.80	1.00	1.15	1.30	1.40	1.50
Cap.>1000	0.85	1.00	1.03	1.05	1.08	1.08

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

WH series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
6.3(0J)	33	5*11	0.26	54
	47	5*11	0.26	64
	100	5*11	0.26	94
	220	5*11	0.26	140
	330	6.3*11	0.26	190
	470	6.3*11	0.26	230
	1000	8*12	0.26	380
	2200	10*20	0.28	710
	3300	10*20	0.30	840
	4700	12.5*20	0.32	1090
	6800	12.5*25	0.36	1350
	10000	16*25	0.44	1650
	15000	16*35	0.54	2010
	22000	18*40	0.68	2350
10(1A)	22	5*11	0.19	46
	33	5*11	0.19	57
	47	5*11	0.19	68
	100	5*11	0.19	100
	220	6.3*11	0.19	170
	330	6.3*11	0.19	200
	470	8*11	0.19	250
	1000	10*12.5	0.19	460
	2200	10*20	0.21	760
	3300	12.5*20	0.23	1000
	4700	12.5*25	0.25	1260
	6800	16*25	0.29	1570
	10000	16*35	0.37	1890
	15000	18*35	0.47	2180
16(1C)	10	5*11	0.16	34
	22	5*11	0.16	51
	33	5*11	0.16	63
	47	5*11	0.16	75
	100	5*11	0.16	110
	220	6.3*11	0.16	180
	330	8*11	0.16	260
	470	8*12	0.16	310
	1000	10*16	0.16	560
	2200	12.5*20	0.18	920
	3300	12.5*25	0.20	1170
	4700	16*25	0.22	1480
	6800	16*30	0.26	1780
	10000	18*35	0.34	2060
25(1E)	4.7	5*11	0.14	25
	10	5*11	0.14	36
	22	5*11	0.14	54
	33	5*11	0.14	67
	47	5*11	0.14	80
	100	6.3*11	0.14	130
	220	8*11	0.14	230
	330	8*12	0.14	310
	470	10*12.5	0.14	380
	1000	10*20	0.14	680
	2200	12.5*25	0.16	1090
	3300	16*25	0.18	1400
	4700	16*30	0.20	1710
	6800	18*35	0.24	2040

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
35(1V)	4.7	5*11	0.12	28
	10	5*11	0.12	41
	22	5*11	0.12	61
	33	5*11	0.12	75
	47	5*11	0.12	90
	100	6.3*11	0.12	150
	220	8*12	0.12	270
	330	10*12.5	0.12	350
	470	10*16	0.12	460
	1000	12.5*20	0.12	810
	2200	16*25	0.14	1260
	3300	16*35	0.16	1610
	4700	18*35	0.18	1910
50(1H)	0.10	5*11	0.10	1.3
	0.22	5*11	0.10	2.9
	0.33	5*11	0.10	4.3
	0.47	5*11	0.10	6.2
	1.0	5*11	0.10	13
	2.2	5*11	0.10	20
	3.3	5*11	0.10	25
	4.7	5*11	0.10	30
	10	5*11	0.10	40
	22	5*11	0.10	65
	33	6.3*11	0.10	90
	47	6.3*11	0.10	110
	100	8*11	0.10	180
	220	10*12.5	0.10	300
	330	10*16	0.10	410
	470	10*20	0.10	530
	1000	12.5*25	0.10	950
	2200	16*35	0.12	1470
	3300	18*35	0.14	1770
63(1J)	10	5*11	0.09	46
	22	5*11	0.09	71
	33	6.3*11	0.09	100
	47	6.3*11	0.09	120
	100	10*12.5	0.09	215
	220	10*16	0.09	335
	330	10*20	0.09	510
	470	12.5*20	0.09	640
	1000	16*25	0.09	930
100(1K)	0.10	5*11	0.08	1.5
	0.22	5*11	0.08	3.4
	0.33	5*11	0.08	5.0
	0.47	5*11	0.08	7.1
	1.0	5*11	0.08	15
	2.2	5*11	0.08	21
	3.3	5*11	0.08	29
	4.7	5*11	0.08	62
	10	6.3*11	0.08	54
	22	8*11	0.08	93
	33	8*12	0.08	130
	47	10*12.5	0.08	165
	100	10*20	0.08	265
	220	12.5*25	0.08	440

WH series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
100(1K)	330	16*25	0.08	540
	470	16*30	0.08	715
	1000	18*40	0.08	985
160(2C)	3.3	6.3*11	0.20	32
	4.7	6.3*11	0.20	38
	10	8*12	0.20	65
		10*12	0.20	76
	22	10*12	0.20	98
		10*16	0.20	108
		10*20	0.20	120
	33	10*16	0.20	158
		10*20	0.20	165
	47	10*20	0.20	182
		12.5*20	0.20	205
	68	12.5*20	0.20	265
	100	12.5*25	0.20	318
		16*25	0.20	335
	220	16*30	0.20	568
	330	18*35	0.20	710
	470	18*40	0.20	870
200(2D)	1	6.3*11	0.20	16
	2.2	6.3*11	0.20	22
	3.3	6.3*11	0.20	32
	4.7	8*12	0.20	48
	10	8*12	0.20	78
		10*12	0.20	82
		10*16	0.20	86
	22	10*16	0.20	128
		10*20	0.20	132
	33	10*20	0.20	185
		12.5*20	0.20	194
	47	12.5*20	0.20	225
	68	12.5*25	0.20	308
	82	12.5*25	0.20	318
	100	16*25	0.20	345
	150	16*25	0.20	446
	180	16*30	0.20	560
	220	16*35	0.20	678
		18*30	0.20	695
	330	18*35	0.20	755
	470	18*45	0.20	938
250(2E)	2.2	6.3*11	0.20	22
	3.3	6.3*11	0.20	32
		8*12	0.20	34
	4.7	6.3*11	0.20	38
		8*12	0.20	48
	10	10*12	0.20	75
		10*16	0.20	84
	22	10*20	0.20	128
		12.5*20	0.20	145
	33	10*20	0.20	150
		12.5*20	0.20	185
	47	12.5*20	0.20	232
		12.5*25	0.20	245
	100	16*25	0.20	370
		16*30	0.20	400
	150	16*35	0.20	468
	220	18*35	0.20	660
		18*40	0.20	702
	330	18*40	0.20	730

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
350(2V)	0.47	6.3*11	0.24	11
	1	6.3*11	0.24	16
	2.2	8*12	0.24	26
	3.3	8*12	0.24	34
		10*12	0.24	38
	4.7	8*12	0.24	48
		10*12	0.24	52
	10	10*12	0.24	68
		10*16	0.24	82
		10*20	0.24	88
	22	12.5*20	0.24	154
	33	12.5*20	0.24	184
		16*20	0.24	198
	47	16*25	0.24	250
	68	16*25	0.24	336
	100	18*30	0.24	398
400(2G)	1	6.3*11	0.24	16
	2.2	6.3*11	0.24	30
		8*12	0.24	34
	3.3	8*12	0.24	35
		10*12	0.24	38
	4.7	8*12	0.24	48
		10*12	0.24	52
	10	10*16	0.24	98
		10*20	0.24	115
	22	12.5*25	0.24	192
	33	16*20	0.24	258
	47	16*25	0.24	305
	68	16*30	0.24	465
		18*25	0.24	445
	82	18*25	0.24	474
	100	16*40	0.24	544
		18*30	0.24	532
	120	18*35	0.24	588
	150	18*40	0.24	668
450(2W)	0.47	8*12	0.24	11
	1	8*12	0.24	18
	2.2	8*12	0.24	25
		10*12	0.24	32
	3.3	10*12	0.24	36
		10*16	0.24	40
	4.7	10*20	0.24	55
	10	10*20	0.24	90
		12.5*20	0.24	100
	22	12.5*25	0.24	168
		16*20	0.24	185
	33	16*25	0.24	215
	47	16*30	0.24	344
	68	18*30	0.24	455
	82	18*30	0.24	472
	100	18*35	0.24	530
	120	18*40	0.24	582
	150	18*50	0.24	700
500(2H)	4.7	10*20	0.24	60
	10	12.5*20	0.24	115
	15	12.5*25	0.24	140
	22	16*25	0.24	185
	33	18*25	0.24	215
	47	18*35	0.24	345
	68	18*40	0.24	455
	82	18*50	0.24	520
	100	22*40	0.24	550
	120	22*46	0.24	580

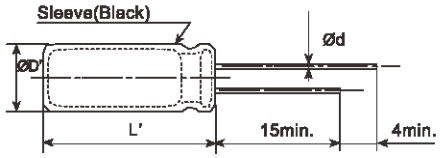
HP series

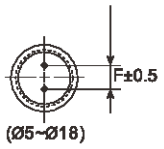
- Standard bi-polarized series
- Endurance: +105°C 1,000 hours
- RoHS Compliant

SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	-40~+105°C								
Rated Voltage Range	6.3~100 Vdc								
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)								
Leakage Current	I≤0.06CV or 10μA, whichever is greater.(at 20°C after 2 minutes) I≤0.03CV or 3μA, whichever is greater.(at 20°C after 5 minutes) Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)								
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100
	tanδ (max.)	0.24	0.24	0.20	0.20	0.16	0.14	0.12	0.10
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)								
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100
	Z(-25°C)/Z(+20°C)	4	3	2					
	Z(-40°C)/Z(+20°C)	10	8	6	4	3			(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 105°C with the polarity inverted every 250 hours.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤150% of the initial specified value							
	Leakage Current	≤The initial specified value							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤150% of the initial specified value							
	Leakage Current	≤200% of the initial specified value							

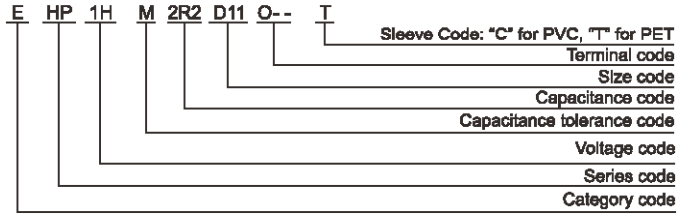
DIMENSIONS[mm]





ØD	5	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



HP series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
6.3(0J)	33	5*11	0.24	45
	47	5*11	0.24	54
	100	6.3*11	0.24	90
	220	8*11	0.24	150
	330	8*11	0.24	185
	470	10*12.5	0.24	260
	1000	10*20	0.24	460
	2200	12.5*25	0.26	820
	3300	16*25	0.28	1110
	4700	16*30	0.30	1430
	6800	18*35	0.34	1830
10(1A)	22	5*11	0.24	37
	33	5*11	0.24	45
	47	5*11	0.24	54
	100	6.3*11	0.24	90
	220	8*11	0.24	150
	330	10*16	0.24	240
	470	10*16	0.24	290
	1000	12.5*20	0.24	510
	2200	16*25	0.26	910
	3300	16*30	0.28	1200
	4700	18*35	0.30	1520
16(1C)	10	5*11	0.20	27
	22	5*11	0.20	40
	33	5*11	0.20	49
	47	6.3*11	0.20	67
	100	8*11	0.20	110
	220	10*12.5	0.20	195
	330	10*16	0.20	265
	470	10*20	0.20	345
	1000	12.5*25	0.20	605
	2200	16*30	0.22	1070
	3300	18*35	0.24	1400
25(1E)	10	5*11	0.20	27
	22	5*11	0.20	46
	33	6.3*11	0.20	56
	47	6.3*11	0.20	67
	100	8*11	0.20	110
	220	10*16	0.20	215
	330	12.5*20	0.20	320
	470	12.5*20	0.20	380
	1000	16*25	0.20	670
	2200	18*35	0.22	1140
35(1V)	4.7	5*11	0.16	21
	10	5*11	0.16	30
	22	6.3*11	0.16	51
	33	8*11	0.16	72
	47	8*11	0.16	86
	100	10*16	0.16	160

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
35(1V)	220	12.5*20	0.16	290
	330	12.5*20	0.16	350
	470	12.5*25	0.16	465
	1000	16*30	0.16	805
50(1H)	0.47	5*11	0.14	7.0
	1.0	5*11	0.14	10
	2.2	5*11	0.14	15
	3.3	5*11	0.14	18
	4.7	5*11	0.14	22
	10	6.3*11	0.14	37
	22	8*11	0.14	63
	33	8*11	0.14	77
	47	10*12.5	0.14	105
	100	10*20	0.14	190
	220	12.5*25	0.14	340
	330	16*25	0.14	460
	470	16*30	0.14	590
63(1J)	3.3	5*11	0.12	20
	4.7	6.3*11	0.12	24
	10	6.3*11	0.12	40
	22	8*11	0.12	68
	33	10*12.5	0.12	98
	47	10*16	0.12	130
	100	12.5*20	0.12	225
	220	16*25	0.12	405
	330	16*30	0.12	535
	470	18*35	0.12	680
80(1B)	2.2	5*11	0.12	16
	3.3	6.3*11	0.12	23
	4.7	6.3*11	0.12	27
	10	8*11	0.12	46
	22	10*16	0.12	89
	33	10*16	0.12	105
	47	10*20	0.12	140
	100	12.5*25	0.12	245
	220	16*30	0.12	435
	330	18*35	0.12	570
100(1K)	0.47	5*11	0.10	8.0
	1.0	5*11	0.10	12
	2.2	6.3*11	0.10	20
	3.3	6.3*11	0.10	25
	4.7	6.3*11	0.10	30
	10	8*11	0.10	50
	22	10*16	0.10	97
	33	12.5*20	0.10	140
	47	12.5*20	0.10	170
	100	16*25	0.10	300
	220	18*35	0.10	510

CD11GC series

- Endurance: +130°C 4,000~5,000 hours +105°C 15,000~20,000 hours
- Withstand high temperature, extremely long life
- Suitable for output circuit and input circuit of LED driving power, electronic ballast and electronic energy saving lamp.
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-40~+130°C(160~450 Vdc)							
Rated Voltage Range	160~450 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
Leakage Current	160~400 Vdc	450 Vdc	Where, I: Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V)					
	I≤0.02CV+10μA	I≤0.03CV+10μA						(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	350	400	450	
	tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	350	400	450	
	Z(-25°C)/Z(+20°C)	3	3	3	5	5	6	
	Z(-40°C)/Z(+20°C)	6	6	6	6	6	9	(at 120Hz)

Endurance

The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 130°C or 105°C, the peak voltage shall not exceed the rated voltage.

Capacitance Change	≤±30% of the initial value
D.F. (tanδ)	≤300% of the initial specified value
Leakage Current	≤The initial specified value

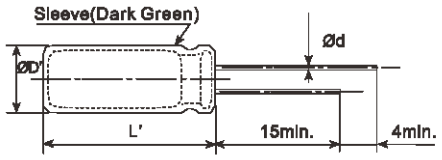
Height (mm)	130°C Load life (hours)	105°C Load life (hours)
L≤10	4,000	15,000
L>10	5,000	20,000

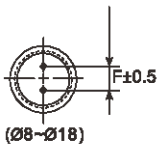
Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.

Capacitance Change	≤±20% of the initial value
D.F. (tanδ)	≤200% of the initial specified value
Leakage Current	≤200% of the initial specified value

DIMENSIONS[mm]





ØD	8		10	12.5	16	18
Ød	0.5	0.6	0.6	0.6	0.8	0.8
F	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.					
L'	L+2max.					

PART NUMBERING SYSTEM

E GC 2G M 3R3 G16 O- - T

- T: Sleeve Code: "C" for PVC, "T" for PET
- O- -: Terminal code
- G16: Size code
- 3R3: Capacitance code
- M: Capacitance tolerance code
- 2G: Voltage code
- GC: Series code
- E: Category code

RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Rated voltage(Vdc) \ Freq.(Hz)	120	1k	10k	100k
160~450	0.50	0.80	0.90	1.00

CD11GC series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/130°C,100kHz)
160(2C)	3.3	8*12	0.15	70
	4.7	8*12	0.15	77
	5.6	8*16	0.15	82
		10*9	0.15	80
	6.8	8*16	0.15	88
	8.2	10*9	0.15	145
		10*16	0.15	183
	10	10*9	0.15	190
		10*16	0.15	223
	15	10*16	0.15	300
	22	10*20	0.15	400
	33	12.5*20	0.15	480
	47	12.5*25	0.15	590
	68	16*25	0.15	750
	82	16*25	0.15	825
	100	16*25	0.15	960
		18*20	0.15	960
	150	18*30	0.15	1050
	220	18*35	0.15	1500
200(2D)	2.8	8*12	0.15	64
	3.3	8*12	0.15	73
	4.7	8*16	0.15	126
		10*9	0.15	100
		10*12	0.15	126
	5.6	8*16	0.15	148
		10*9	0.15	120
	6.8	8*16	0.15	160
		10*9	0.15	145
		10*16	0.15	200
	8.2	10*9	0.15	165
		10*16	0.15	203
	10	10*9	0.15	215
		10*16	0.15	230
		10*20	0.15	245
	15	10*20	0.15	327
	22	12.5*20	0.15	430
	33	12.5*20	0.15	500
	47	12.5*25	0.15	650
		16*20	0.15	650
	68	16*25	0.15	750
	82	16*30	0.15	900
		18*25	0.15	900
	100	16*30	0.15	1100
		18*25	0.15	1100
	150	18*35	0.15	1350
250(2E)	2.2	8*12	0.15	64
	2.8	8*12	0.15	72
	3.3	8*12	0.15	80
	4.7	8*16	0.15	133
	5.6	10*9	0.15	120
		10*16	0.15	150
	6.8	10*16	0.15	169
	8.2	10*9	0.15	165
		10*16	0.15	203
	10	10*16	0.15	238
		10*20	0.15	250
	15	10*20	0.15	327
	22	12.5*20	0.15	430
	33	12.5*25	0.15	530
		16*20	0.15	530
	47	16*25	0.15	690
		18*20	0.15	690
	68	16*30	0.15	780
		18*25	0.15	780
	82	18*25	0.15	900
	100	18*30	0.15	970

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/130°C,100kHz)
350(2V)	1	8*12	0.20	49
	1.5	8*16	0.20	73
	1.8	8*16	0.20	75
		10*9	0.20	65
	2.2	10*9	0.20	75
		10*16	0.20	90
	2.8	10*16	0.20	95
	3.3	10*16	0.20	100
	4.7	10*20	0.20	142
	5.6	10*20	0.20	152
		12.5*20	0.20	165
	6.8	10*20	0.20	190
		12.5*20	0.20	200
	8.2	12.5*20	0.20	205
	10	12.5*20	0.20	250
		12.5*25	0.20	270
	15	12.5*25	0.20	335
		16*20	0.20	335
	22	16*25	0.20	450
	33	16*30	0.20	535
		16*35	0.20	555
	47	18*30	0.20	700
		18*35	0.20	750
	68	18*40	0.20	900
400(2G)	1	8*12	0.20	54
		8*16	0.20	60
	1.5	8*16	0.20	73
	1.8	8*16	0.20	75
		10*9	0.20	65
	2.2	10*9	0.20	76
		10*16	0.20	92
	2.8	10*16	0.20	100
	3.3	10*16	0.20	105
		10*20	0.20	120
	4.7	10*20	0.20	142
		12.5*20	0.20	150
	5.6	12.5*20	0.20	165
	6.8	12.5*20	0.20	225
	8.2	12.5*20	0.20	230
	10	12.5*25	0.20	280
	15	12.5*25	0.20	335
		16*20	0.20	335
	22	16*25	0.20	480
		16*30	0.20	500
	33	18*30	0.20	635
	47	18*35	0.20	750
	68	18*40	0.20	900
	100	18*50	0.20	1030
450(2W)	1.5	8*16	0.20	70
	1.8	8*16	0.20	74
	2.2	10*16	0.20	77
	2.8	10*16	0.20	80
	3.3	10*16	0.20	88
		10*20	0.20	92
	4.7	10*20	0.20	104
	5.6	12.5*20	0.20	144
	6.8	12.5*20	0.20	175
	8.2	12.5*20	0.20	183
	10	12.5*20	0.20	225
	15	12.5*25	0.20	294
	22	16*25	0.20	395
		16*30	0.20	420
	33	18*30	0.20	500
	47	18*35	0.20	615
	68	18*40	0.20	710
	100	18*50	0.20	840

CD11GES series

- Endurance: +130°C 3,000 hours +105°C 12,000 hours
- Withstand high temperature 130°C, miniaturized and long life
- Suitable for output circuit and input circuit of LED driving power, electronic ballast and electronic energy saving lamp.
- **RoHS Compliant**

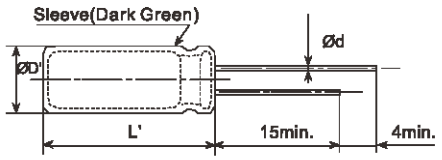
Miniaturized

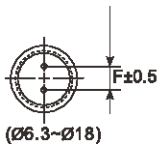
CD11GE → CD11GES

SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	-40~+130°C(160~ 450 Vdc) -40~+105°C(500 Vdc)								
Rated Voltage Range	160~500 Vdc								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
Leakage Current	160~400 Vdc	450~500 Vdc	Where, I: Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V)						
	I≤0.02CV+10μA	I≤0.03CV+10μA							(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	350	400	450	500	
	tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20	0.24	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	350	400	450	500	
	Z(-25°C)/Z(+20°C)	3	3	3	5	5	6	6	
	Z(-40°C)/Z(+20°C)	6	6	6	6	6	9	15	(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage is applied for 3,000 hours (WV:160~450V) at 130°C or after DC voltage with the rated ripple current is applied for 12,000 hours at 105°C (500V: 10,000 hours), the peak voltage shall not exceed the rated voltage.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤The initial specified value							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤200% of the initial specified value							

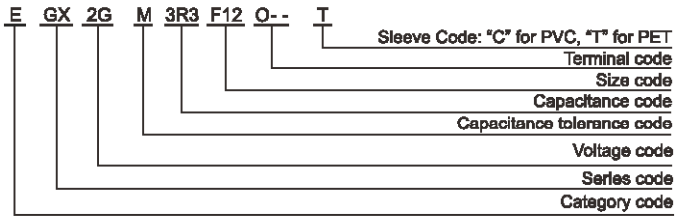
DIMENSIONS[mm]





ØD	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.						
L'	L+2max.						

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<33	0.40	0.70	0.90	1.00
Cap.≥33	0.50	0.80	0.90	1.00

CD11GES series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	1	6.3*9	0.15	40
		6.3*12	0.15	45
	1.5	6.3*9	0.15	45
		6.3*12	0.15	50
	1.8	6.3*9	0.15	50
		6.3*12	0.15	55
	2.2	6.3*9	0.15	56
		6.3*12	0.15	61
	2.8	6.3*9	0.15	70
		6.3*12	0.15	78
	3.3	6.3*9	0.15	85
		6.3*12	0.15	92
	4.7	6.3*12	0.15	96
		8*12	0.15	100
	5.6	8*9	0.15	102
		8*12	0.15	107
	6.8	8*12	0.15	112
		8*16	0.15	115
	8.2	8*12	0.15	172
		8*16	0.15	189
	10	8*12	0.15	255
		8*16	0.15	300
	15	8*16	0.15	310
		8*20	0.15	350
	22	10*16	0.15	450
		10*20	0.15	500
	33	10*16	0.15	580
		10*20	0.15	650
	47	10*20	0.15	750
	68	12.5*20	0.15	1180
	100	12.5*25	0.15	1420
	150	16*25	0.15	1890
	220	18*25	0.15	2370
200(2D)	1	6.3*9	0.15	55
		6.3*12	0.15	62
	1.5	6.3*9	0.15	62
		6.3*12	0.15	66
	1.8	6.3*9	0.15	66
		6.3*12	0.15	72
	2.2	6.3*9	0.15	72
		6.3*12	0.15	81
	2.8	6.3*9	0.15	84
		6.3*12	0.15	95
	3.3	6.3*12	0.15	112
	4.7	8*9	0.15	144
		8*12	0.15	160
	5.6	8*9	0.15	170
		8*12	0.15	190
	6.8	8*12	0.15	200
		8*16	0.15	220
	8.2	8*16	0.15	279
	10	8*16	0.15	300
		10*16	0.15	320
	15	8*20	0.15	358
	22	10*16	0.15	500
		10*20	0.15	525
	33	10*20	0.15	650
	47	12.5*20	0.15	980

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
200(2D)	68	12.5*25	0.15	1300
		16*20	0.15	1300
	82	16*20	0.15	1380
	100	16*20	0.15	1420
		16*25	0.15	1494
	150	16*25	0.15	1890
		16*30	0.15	1989
250(2E)	1	6.3*9	0.15	55
		6.3*12	0.15	62
	1.5	6.3*9	0.15	62
		6.3*12	0.15	66
	1.8	6.3*9	0.15	66
		6.3*12	0.15	72
	2.2	6.3*9	0.15	72
		6.3*12	0.15	81
	2.8	6.3*12	0.15	95
	3.3	6.3*12	0.15	112
	4.7	8*12	0.15	160
	5.6	8*12	0.15	190
	6.8	8*16	0.15	225
	8.2	8*20	0.15	288
	10	8*20	0.15	320
	15	8*20	0.15	420
	22	10*16	0.15	500
		10*20	0.15	550
	33	12.5*16	0.15	760
		12.5*20	0.15	800
	47	12.5*20	0.15	980
	56	12.5*25	0.15	1080
	68	16*25	0.15	1368
	82	12.5*30	0.15	1500
	100	16*30	0.15	1610
	150	16*35	0.15	2000
350(2V)	1	6.3*9	0.20	56
		6.3*12	0.20	64
	1.5	8*9	0.20	71
		8*12	0.20	75
	1.8	8*9	0.20	80
		8*12	0.20	85
	2.2	8*9	0.20	90
		8*12	0.20	95
	2.8	8*9	0.20	95
		8*12	0.20	100
	3.3	8*9	0.20	110
		8*12	0.20	118
	4.7	8*16	0.20	170
	5.6	8*16	0.20	200
	6.8	8*20	0.20	252
		10*16	0.20	252
	8.2	8*20	0.20	288
	10	8*20	0.20	320
		10*20	0.20	350
	15	10*20	0.20	450
	22	12.5*20	0.20	650
	33	12.5*20	0.20	855
		16*20	0.20	900
	47	16*20	0.20	1080

CD11GES series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
350(2V)	68	18*20	0.20	1368
		18*25	0.20	1470
	82	18*25	0.20	1530
	100	18*30	0.20	1700
400(2G)	1	6.3*12	0.20	65
		8*12	0.20	72
	1.5	6.3*12	0.20	82
		8*12	0.20	90
		8*16	0.20	100
	1.8	8*9	0.20	90
		8*12	0.20	95
		8*16	0.20	120
	2.2	8*9	0.20	88
		8*12	0.20	100
		8*16	0.20	140
	2.8	8*12	0.20	130
		8*16	0.20	145
	3.3	8*12	0.20	140
		8*16	0.20	150
		10*16	0.20	180
	4.7	8*20	0.20	198
		10*16	0.20	220
	5.6	8*20	0.20	225
		10*16	0.20	250
	6.8	8*20	0.20	252
		10*16	0.20	265
	8.2	10*16	0.20	288
		10*20	0.20	294
	10	10*20	0.20	350
	15	12.5*20	0.20	550
	22	12.5*25	0.20	760
		16*20	0.20	760
	33	16*20	0.20	900
		16*25	0.20	1125
	47	16*30	0.20	1180
		18*25	0.20	1180
	56	18*25	0.20	1476
	68	18*30	0.20	1547
	100	18*40	0.20	1718

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
450(2W)	1	6.3*12	0.20	80
		8*12	0.20	82
	1.5	8*12	0.20	88
	1.8	8*12	0.20	90
	2.2	8*16	0.20	96
	2.8	8*16	0.20	119
	3.3	8*16	0.20	128
	4.7	10*16	0.20	180
	5.6	10*20	0.20	250
	6.8	10*20	0.20	265
	8.2	10*20	0.20	280
	10	10*25	0.20	330
	15	12.5*20	0.20	450
	22	12.5*25	0.20	600
		16*20	0.20	730
	33	16*25	0.20	980
	47	16*35	0.20	1080
		18*25	0.20	1200
	56	18*30	0.20	1429
	68	18*35	0.20	1500
	100	18*45	0.20	1666
500(2H)	10	12.5*20	0.24	320
		12.5*25	0.24	336
	15	12.5*25	0.24	440
		16*20	0.24	440
	22	12.5*35	0.24	560
		16*25	0.24	560
	33	18*25	0.24	700
	47	18*30	0.24	880

CD11GK series

- Endurance: +105 °C 12,000~20,000 hours
- Extremely miniaturized, high ripple current
- Suitable for output circuit and input circuit of LED driving power.
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-40~+105°C(160~ 450 Vdc)							
Rated Voltage Range	160~450 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
Leakage Current	160~400 Vdc	450 Vdc	Where, I: Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V)					
	I≤0.03CV+15μA	I≤0.03CV+25μA						(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	350	400	450	
	tanδ (max.)	0.24	0.24	0.24	0.24	0.24	0.24	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	350	400	450	
	Z(-25°C)/Z(+20°C)	3	3	3	5	5	8	
	Z(-40°C)/Z(+20°C)	8	8	8	8	8	12	(at 120Hz)

Endurance

The specifications listed below shall be met when the capacitors are restored to 20 °C after DC voltage plus rated ripple current is applied for a specified period of time at 105°C, the peak voltage shall not exceed the rated voltage.

Capacitance Change	≤±30% of the initial value
D.F. (tanδ)	≤300% of the initial specified value
Leakage Current	≤The initial specified value

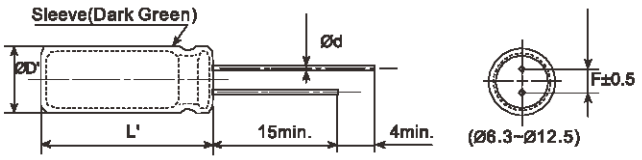
Size	Load life (hours)
6.3*9 6.3*11 8*9 10*9	12,000
8*12 8*16 8*20 10*12	15,000
≥10*16	20,000

Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.

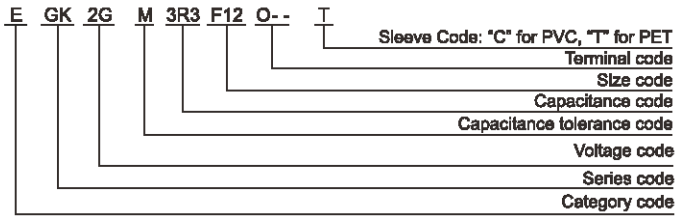
Capacitance Change	≤±20% of the initial value
D.F. (tanδ)	≤200% of the initial specified value
Leakage Current	≤200% of the initial specified value

DIMENSIONS[mm]



ØD	6.3	8		10	12.5
Ød	0.5	0.5	0.6	0.6	0.6
F	2.5	3.5		5.0	5.0
ØD'	ØD+0.5max.				
L'	L+2max.				

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Rated voltage(Vdc)	120	1k	10k	100k
160~450	0.50	0.80	0.90	1.00

CD11GK series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	1	6.3*9	0.24	50
	1.5	6.3*9	0.24	62
	1.8	6.3*9	0.24	72
	2.2	6.3*9	0.24	76
	2.8	6.3*11	0.24	80
	3.3	6.3*11	0.24	92
	4.7	6.3*11	0.24	104
	5.6	6.3*11	0.24	110
	6.8	6.3*11	0.24	124
	8.2	8*9	0.24	135
	10	8*9	0.24	150
	15	8*12	0.24	190
		10*9	0.24	210
	22	10*12	0.24	250
	33	10*16	0.24	412
	47	10*20	0.24	525
200(2D)	1	6.3*9	0.24	52
	1.5	6.3*9	0.24	60
	1.8	6.3*9	0.24	64
	2.2	6.3*11	0.24	72
	2.8	6.3*11	0.24	84
	3.3	6.3*11	0.24	88
	4.7	6.3*11	0.24	102
	5.6	8*9	0.24	116
	6.8	8*9	0.24	128
	8.2	8*9	0.24	144
	10	8*12	0.24	160
	12	10*9	0.24	180
	15	8*16	0.24	240
		10*12	0.24	280
	22	10*16	0.24	340
	33	10*20	0.24	550
	47	12.5*18	0.24	725
250(2E)	1	6.3*9	0.24	52
	1.5	6.3*9	0.24	60
	1.8	6.3*11	0.24	64
	2.2	6.3*11	0.24	72
	2.8	6.3*11	0.24	88
	3.3	6.3*11	0.24	92
	4.7	6.3*11	0.24	120
		8*9	0.24	125
	5.6	8*9	0.24	132
	6.8	8*9	0.24	160
	8.2	8*9	0.24	172
	10	8*12	0.24	200
	15	10*12	0.24	270
	22	10*16	0.24	370
	33	10*20	0.24	562
	47	12.5*20	0.24	788

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
350(2V)	1	6.3*9	0.24	56
	1.5	6.3*11	0.24	66
	1.8	6.3*11	0.24	72
	2.2	8*9	0.24	80
		8*12	0.24	85
	2.8	8*12	0.24	92
	3.3	8*12	0.24	100
		10*9	0.24	120
	4.7	8*12	0.24	128
	5.6	8*16	0.24	136
	6.8	10*12	0.24	168
	8.2	10*16	0.24	180
	10	10*16	0.24	210
	15	10*20	0.24	290
400(2G)	1	6.3*11	0.24	54
	1.2	8*9	0.24	60
	1.5	8*9	0.24	66
	1.8	8*9	0.24	72
	2.2	8*9	0.24	76
		8*12	0.24	82
	2.8	8*12	0.24	88
	3.3	8*12	0.24	100
		10*9	0.24	110
	4.7	10*12	0.24	126
	5.6	8*20	0.24	156
		10*12	0.24	158
	6.8	8*20	0.24	170
		10*16	0.24	180
	8.2	10*16	0.24	190
	10	10*16	0.24	224
	15	12.5*18	0.24	290
450(2W)	1	6.3*11	0.24	54
	1.5	8*12	0.24	70
	1.8	8*12	0.24	80
	2.2	8*12	0.24	88
	2.8	8*16	0.24	100
	3.3	8*16	0.24	110
	4.7	10*12	0.24	140
	5.6	10*16	0.24	180
	6.8	10*16	0.24	200
	8.2	10*20	0.24	238
	10	10*20	0.24	284

CD11GN series

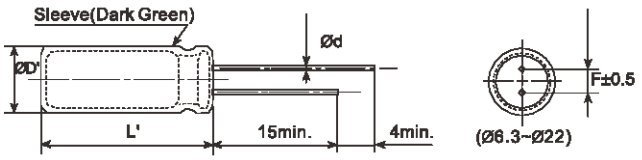
- Endurance +130°C 1,000~2,000 hours +105°C 8,000~12,000 hours
- Withstand high temperature,miniaturized,long life
- Suitable for output circuit and input circuit of LED driving power.
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	-40~+130°C(160~ 450 Vdc) -40~+105°C(500 Vdc)								
Rated Voltage Range	160~500 Vdc								
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)								
Leakage Current	160~400 Vdc: I≤0.02CV+10μA; 450~500 Vdc: I≤0.03CV+10μA. Where, I: Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V) (at 20°C after 2 minutes)								
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	350	400	450	500	
	tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20	0.24	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	350	400	450	500	
	Z(-25°C)/Z(+20°C)	3	3	3	5	5	6	6	
	Z(-40°C)/Z(+20°C)	6	6	6	6	6	9	15	(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 130°C or 105°C,the peak voltage shall not exceed the rated voltage.								
	Capacitance Change: ≤±20% of the initial value								
	D.F. (tanδ): ≤200% of the initial specified value								
	Leakage Current: ≤The initial specified value								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.								
	Capacitance Change: ≤±20% of the initial value								
	D.F. (tanδ): ≤200% of the initial specified value								
	Leakage Current: ≤200% of the initial specified value								

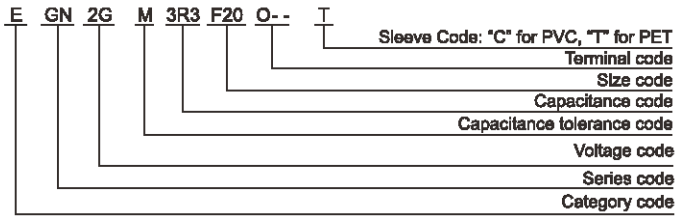
Case Dia.	130°C Load life (hours)	105°C Load life (hours)	
	160~450WV	160~450WV	500WV
ØD=6.3	1,000	8,000	-
ØD≥8	2,000	12,000	10,000

DIMENSIONS[mm]



ØD	6.3	8		10	12.5	16	18	22
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5	10
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<33	0.40	0.70	0.90	1.00
Cap.≥33	0.50	0.80	0.90	1.00

CD11GN series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
160(2C)	1	6.3*7	0.15	40	26
		6.3*9	0.15	45	30
		6.3*12	0.15	50	34
	1.5	6.3*7	0.15	46	31
		6.3*9	0.15	50	34
		6.3*12	0.15	55	36
	1.8	6.3*7	0.15	53	35
		6.3*9	0.15	58	38
		6.3*12	0.15	64	42
	2.2	6.3*7	0.15	58	38
		6.3*9	0.15	64	42
		6.3*12	0.15	70	46
	2.8	6.3*7	0.15	61	40
		6.3*9	0.15	68	45
		6.3*12	0.15	75	49
	3.3	6.3*9	0.15	72	47
		6.3*12	0.15	80	52
	4.7	6.3*12	0.15	81	53
		8*9	0.15	82	54
		8*12	0.15	86	56
	5.6	8*9	0.15	88	58
		8*12	0.15	98	64
	6.8	8*9	0.15	100	65
		8*16	0.15	110	72
	10	8*12	0.15	190	124
		8*16	0.15	225	146
		10*9	0.15	200	130
	15	8*12	0.15	255	165
		8*16	0.15	288	188
	22	10*12	0.15	420	273
		10*16	0.15	475	309
	33	10*16	0.15	520	340
		10*20	0.15	570	372
	47	10*20	0.15	595	387
		12.5*25	0.15	660	429
	68	12.5*20	0.15	750	490
		12.5*25	0.15	800	520
	100	12.5*20	0.15	1100	715
		16*25	0.15	1120	728
	150	16*25	0.15	1210	785
		16*30	0.15	1280	832
200(2D)	1	6.3*7	0.15	46	31
		6.3*9	0.15	52	40
		6.3*12	0.15	56	42
	1.5	6.3*7	0.15	52	40
		6.3*9	0.15	56	42
		6.3*12	0.15	60	45
	1.8	6.3*7	0.15	56	40
		6.3*9	0.15	60	45
		6.3*12	0.15	68	50
	2.2	6.3*9	0.15	68	50
		6.3*12	0.15	74	55
	2.8	6.3*9	0.15	74	55
		6.3*12	0.15	80	60
	3.3	6.3*9	0.15	86	65
		6.3*12	0.15	96	72
	4.7	6.3*12	0.15	128	102
		8*9	0.15	135	107
		8*12	0.15	154	122
	5.6	8*9	0.15	150	120
		8*12	0.15	165	132
		8*16	0.15	220	176
	6.8	8*9	0.15	158	125
		8*12	0.15	175	140
		8*16	0.15	228	182

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
200(2D)	8.2	8*12	0.15	195	146
		10*9	0.15	210	160
	10	8*12	0.15	240	167
		8*16	0.15	290	202
		8*20	0.15	330	230
		10*9	0.15	280	195
	15	8*16	0.15	338	235
		8*20	0.15	350	240
	22	8*20	0.15	382	248
		10*16	0.15	446	290
		10*20	0.15	492	320
	33	10*20	0.15	570	370
		12.5*16	0.15	570	370
		12.5*20	0.15	600	390
	47	12.5*16	0.15	600	390
		12.5*20	0.15	628	408
		12.5*25	0.15	660	430
	68	16*25	0.15	860	560
	100	12.5*30	0.15	882	574
		16*25	0.15	1060	690
	150	12.5*40	0.15	1120	728
		16*35	0.15	1290	840
250(2E)	1	6.3*7	0.15	46	31
		6.3*9	0.15	52	40
		6.3*12	0.15	56	42
	1.5	6.3*7	0.15	52	40
		6.3*9	0.15	56	42
		6.3*12	0.15	60	45
	1.8	6.3*7	0.15	56	40
		6.3*9	0.15	60	45
		6.3*12	0.15	68	50
	2.2	6.3*9	0.15	68	50
		6.3*12	0.15	74	55
	2.8	6.3*9	0.15	74	55
		6.3*12	0.15	84	62
	3.3	6.3*9	0.15	86	65
		6.3*12	0.15	100	74
	4.7	8*9	0.15	120	95
		8*12	0.15	154	122
	5.6	8*9	0.15	150	120
		8*12	0.15	165	132
	6.8	8*9	0.15	158	125
		8*16	0.15	228	182
	8.2	8*12	0.15	245	172
		8*16	0.15	274	192
		10*9	0.15	235	165
	10	8*12	0.15	265	185
		8*16	0.15	294	205
	15	8*20	0.15	378	245
	22	10*16	0.15	462	300
	33	12.5*16	0.15	550	358
		12.5*20	0.15	610	398
	47	12.5*16	0.15	610	398
		12.5*20	0.15	648	420
	68	12.5*30	0.15	874	568
		16*25	0.15	874	568
	100	12.5*35	0.15	966	628
		16*25	0.15	1030	668
		16*30	0.15	1140	740
	150	12.5*50	0.15	1288	838
		18*25	0.15	1330	865
		16*35	0.15	1400	910

CD11GN series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
350(2V)	1	6.3*9	0.20	52	40
		6.3*12	0.20	58	44
	1.5	6.3*12	0.20	65	50
		8*9	0.20	68	52
	1.8	6.3*12	0.20	70	54
		8*9	0.20	74	57
	2.2	6.3*12	0.20	78	60
		8*9	0.20	82	63
	2.8	8*12	0.20	90	68
		10*9	0.20	95	72
	3.3	8*9	0.20	95	71
		8*12	0.20	100	75
		10*9	0.20	105	78
	4.7	8*12	0.20	135	108
	5.6	8*12	0.20	140	109
		8*16	0.20	160	125
	6.8	8*16	0.20	170	123
		8*20	0.20	195	142
	8.2	8*20	0.20	250	164
	10	10*16	0.20	275	178
		10*20	0.20	300	195
	15	10*20	0.20	380	247
	22	12.5*20	0.20	476	309
	33	16*20	0.20	600	390
	47	16*20	0.20	740	480
	68	18*25	0.20	880	572
	100	18*30	0.20	1160	754
400(2G)	1	6.3*9	0.20	62	55
		6.3*12	0.20	66	60
		8*12	0.20	72	66
	1.2	6.3*12	0.20	68	62
	1.5	8*9	0.20	75	68
		8*12	0.20	86	75
		8*16	0.20	92	80
	1.8	8*9	0.20	80	70
		8*12	0.20	90	78
		8*16	0.20	104	88
	2.2	6.3*12	0.20	87	72
		8*12	0.20	92	80
		8*16	0.20	110	94
	2.8	8*12	0.20	108	85
		8*16	0.20	120	96
		8*20	0.20	148	118
	3.3	8*12	0.20	120	96
		8*14	0.20	125	98
		8*16	0.20	128	102
		8*20	0.20	152	122
	4.7	8*12	0.20	148	110
		8*20	0.20	168	125
	5.6	8*20	0.20	175	133
		10*12	0.20	162	122
		10*16	0.20	180	135
		10*20	0.20	200	140
	6.8	8*20	0.20	202	142
		10*16	0.20	210	148
		10*20	0.20	220	154
	8.2	10*16	0.20	252	164

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
400(2G)	8.2	10*20	0.20	266	174
	10	10*16	0.20	288	187
		10*20	0.20	304	198
	15	8*40	0.20	340	220
		12.5*16	0.20	360	234
		12.5*20	0.20	400	260
	22	8*50	0.20	476	310
		12.5*20	0.20	490	318
		12.5*25	0.20	532	346
	33	10*45	0.20	627	408
		16*20	0.20	560	364
		16*25	0.20	608	395
	47	12.5*40	0.20	660	429
		16*25	0.20	700	455
		18*25	0.20	792	515
	68	12.5*55	0.20	870	566
		18*25	0.20	835	543
		18*30	0.20	900	585
	100	18*35	0.20	1090	708
		18*40	0.20	1180	768
450(2W)	1	8*9	0.20	64	56
		8*12	0.20	68	62
	1.5	8*12	0.20	84	74
		10*9	0.20	90	76
	1.8	8*12	0.20	90	76
		10*9	0.20	95	80
	2.2	8*16	0.20	92	78
	2.8	8*16	0.20	120	96
	3.3	8*16	0.20	125	100
	4.7	8*20	0.20	168	125
		10*12	0.20	150	110
	5.6	10*16	0.20	180	135
	6.8	10*16	0.20	200	132
		10*20	0.20	220	154
	8.2	10*16	0.20	235	153
		10*20	0.20	266	174
	10	10*25	0.20	304	198
		12.5*16	0.20	290	188
	15	8*45	0.20	400	260
		12.5*20	0.20	400	260
	22	10*40	0.20	500	325
		16*20	0.20	500	325
	33	10*50	0.20	615	400
		16*25	0.20	665	432
	47	12.5*45	0.20	720	468
		16*35	0.20	818	532
	68	18*30	0.20	900	585
	100	18*35	0.20	1110	722
		18*40	0.20	1180	768
500(2H)	10	12.5*20	0.24	288	/
		12.5*25	0.24	302	/
	15	12.5*25	0.24	396	/
		16*20	0.24	396	
	22	12.5*35	0.24	504	/
		16*25	0.24	504	/
	33	18*25	0.24	630	/
	47	18*30	0.24	792	/
	68	22*35	0.24	1100	/
	100	22*35	0.24	1480	/

CD11GZ series

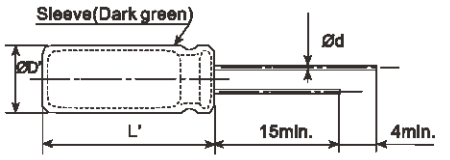
- Endurance: +105°C 12,000 hours
- Suitable for outdoor lighting;long life
- RoHS Compliant

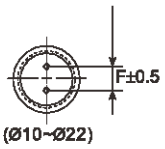
New

SPECIFICATIONS

Items	Characteristics						
Category Temperature Range	-40~+105°C (250~ 500 Vdc)						
Rated Voltage Range	250~500 Vdc						
Capacitance Tolerance	±20%(M)						(at 20°C,120Hz)
Leakage Current	250~400 Vdc	450~500 Vdc	Where, I: Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V)				
	I≤0.02CV+10μA	I≤0.03CV+10μA					(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	250	350	400	450	500	
	tanδ (max.)	0.15	0.20	0.20	0.20	0.24	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	250	350	400	450	500	
	Z(-25°C)/Z(+20°C)	3	3	3	3	3	
	Z(-40°C)/Z(+20°C)	4	4	4	4	4	(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 12,000 hours at 105°C (WV: 500V for 10,000 hours), the peak voltage shall not exceed the rated voltage.						
	Capacitance Change	≤±20% of the initial value					
	D.F. (tanδ)	≤200% of the initial specified value					
	Leakage Current	≤The initial specified value					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.						
	Capacitance Change	≤±20% of the initial value					
	D.F. (tanδ)	≤200% of the initial specified value					
	Leakage Current	≤200% of the initial specified value					

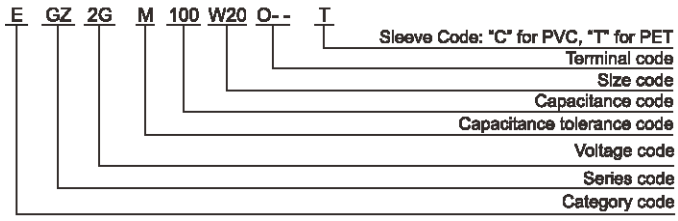
DIMENSIONS[mm]





ØD	10	12.5	16	18	22
Ød	0.6	0.6	0.8	0.8	0.8
F	5.0	5.0	7.5	7.5	10
ØD'	ØD+0.5max.				
L'	L+2max.				

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Cap.(μF) \ Freq.(Hz)	120	1k	10k	100k
Cap.<33	0.40	0.70	0.90	1.00
Cap.≥33	0.50	0.80	0.90	1.00

CD11GZ series

STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
250(2E)	10	10*16	0.15	320
	15	10*20	0.15	420
	22	12.5*16	0.15	550
	33	12.5*20	0.15	800
	47	12.5*25	0.15	980
	68	16*25	0.15	1368
	82	16*25	0.15	1500
	100	16*30	0.15	1610
	150	18*35	0.15	2000
350(2V)	10	10*20	0.20	350
	15	12.5*20	0.20	450
	22	12.5*20	0.20	650
	33	16*20	0.20	900
	47	16*25	0.20	1080
	68	18*25	0.20	1470
	82	18*30	0.20	1530
	100	18*35	0.20	1700
	150	18*45	0.20	1860
400(2G)	10	12.5*20	0.20	350
	15	12.5*25	0.20	550
	22	16*20	0.20	760
	33	16*30	0.20	1125
	47	18*30	0.20	1180
	68	18*30	0.20	1547
	82	18*35	0.20	1620
	100	18*40	0.20	1718
	120	22*35	0.20	1820
	150	22*40	0.20	1880

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
450(2W)	10	12.5*20	0.20	330
	15	12.5*25	0.20	450
	22	16*20	0.20	730
	33	16*30	0.20	980
	47	18*30	0.20	1200
	68	18*35	0.20	1500
	82	18*35	0.20	1560
	100	18*45	0.20	1666
	120	22*40	0.20	1780
	150	22*46	0.20	1820
500(2H)	10	12.5*20	0.24	320
	15	12.5*25	0.24	440
	22	16*25	0.24	560
	33	18*25	0.24	700
	47	18*30	0.24	880
	68	22*35	0.24	1350
	82	22*35	0.24	1420
	100	22*35	0.24	1460
	120	22*40	0.24	1560
	150	22*46	0.24	1630

CD11GAS series

- Upgrade for CD11GA Series, longer life,better performance
- Endurance: +105°C 10,000 hours
- Suitable for LED driver.
- **RoHS Compliant**

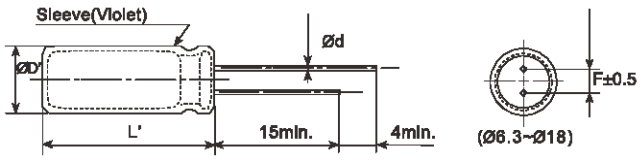
Upgrade

CD11GA → CD11GAS

SPECIFICATIONS

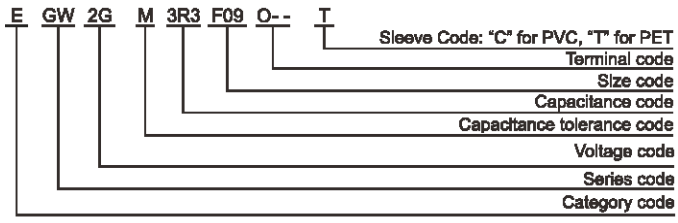
Items	Characteristics							
Category Temperature Range	-40~+105°C (160~ 500 Vdc)							
Rated Voltage Range	160~500 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
Leakage Current	160~400 Vdc	450~500 Vdc	Where, I: Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V)					
	I≤0.02CV+10μA	I≤0.03CV+10μA						(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	350	400	450	500
	tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20	0.24 (at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	350	400	450	500
	Z(-25°C)/Z(+20°C)	3	3	3	5	5	6	6
	Z(-40°C)/Z(+20°C)	6	6	6	6	6	9	15 (at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 10,000 hours at 105°C(WV:500V for 8,000 hours),the peak voltage shall not exceed the rated voltage.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤The initial specified value						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤200% of the initial specified value						

DIMENSIONS[mm]



ØD	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.						
L'	L+2max.						

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Rated voltage(Vdc)	120	1k	10k	100k
160~500	0.50	0.80	0.90	1.00

CD11GAS series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	1	6.3*7	0.15	36
		6.3*9	0.15	40
		6.3*12	0.15	45
	1.5	6.3*7	0.15	40
		6.3*12	0.15	50
	1.8	6.3*7	0.15	45
		6.3*9	0.15	50
		6.3*12	0.15	55
	2.2	6.3*7	0.15	50
		6.3*9	0.15	55
		6.3*12	0.15	61
	2.8	6.3*9	0.15	70
		6.3*12	0.15	78
	3.3	6.3*9	0.15	85
		6.3*12	0.15	92
	4.7	6.3*9	0.15	92
		8*12	0.15	100
	5.6	8*9	0.15	100
		8*12	0.15	107
	6.8	8*9	0.15	107
		8*16	0.15	115
	8.2	8*9	0.15	150
		8*16	0.15	189
	10	8*9	0.15	190
		8*16	0.15	275
	15	8*12	0.15	290
		8*20	0.15	340
		10*9	0.15	280
	22	10*12	0.15	430
		10*16	0.15	475
	33	10*16	0.15	520
		10*20	0.15	650
	47	10*16	0.15	680
		10*20	0.15	750
	68	12.5*16	0.15	1060
		12.5*20	0.15	1180
	100	12.5*20	0.15	1350
		12.5*25	0.15	1420
	150	16*20	0.15	1790
		16*25	0.15	1890
	220	16*25	0.15	2130
		18*25	0.15	2370
200(2D)	1	6.3*7	0.15	45
		6.3*9	0.15	50
		6.3*12	0.15	58
	1.2	6.3*7	0.15	50
		6.3*9	0.15	55
	1.5	6.3*7	0.15	55
		6.3*9	0.15	60
		6.3*12	0.15	66
	1.8	6.3*7	0.15	60
		6.3*9	0.15	66
		6.3*12	0.15	70
	2.2	6.3*9	0.15	72
		6.3*12	0.15	81
	2.8	6.3*9	0.15	81
		6.3*12	0.15	88
		6.3*9	0.15	105
	3.3	6.3*12	0.15	112

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
200(2D)	4.7	6.3*12	0.15	115
		8*9	0.15	117
		8*12	0.15	120
	5.6	8*9	0.15	120
		8*12	0.15	126
	6.8	8*9	0.15	126
		8*16	0.15	140
	8.2	8*16	0.15	260
		10*9	0.15	200
	10	8*16	0.15	275
		10*9	0.15	220
	15	8*20	0.15	345
	22	10*16	0.15	475
	33	10*20	0.15	650
		12.5*16	0.15	650
	47	12.5*16	0.15	880
		12.5*20	0.15	980
	68	12.5*25	0.15	1300
	82	16*20	0.15	1380
	100	16*20	0.15	1420
		16*25	0.15	1494
	150	16*25	0.15	1680
		16*30	0.15	1989
250(2E)	1	6.3*7	0.15	45
		6.3*9	0.15	50
		6.3*12	0.15	58
	1.2	6.3*7	0.15	50
		6.3*9	0.15	55
	1.5	6.3*7	0.15	55
		6.3*9	0.15	60
		6.3*12	0.15	66
	1.8	6.3*7	0.15	61
		6.3*9	0.15	70
		6.3*12	0.15	77
	2.2	6.3*9	0.15	72
		6.3*12	0.15	81
	2.8	6.3*9	0.15	81
		6.3*12	0.15	88
	3.3	6.3*12	0.15	112
		8*9	0.15	114
	4.7	8*9	0.15	115
		8*12	0.15	120
	5.6	8*9	0.15	120
		8*12	0.15	126
	6.8	8*9	0.15	145
		8*16	0.15	160
		10*9	0.15	150
	8.2	8*16	0.15	260
		10*9	0.15	200
	10	8*16	0.15	275
	15	8*20	0.15	378
	22	10*16	0.15	480
		10*20	0.15	500
	33	12.5*16	0.15	600
		12.5*20	0.15	660
	47	12.5*16	0.15	880
		12.5*20	0.15	980
	68	16*25	0.15	1320
	100	16*25	0.15	1420
		16*30	0.15	1500
	150	16*35	0.15	2000

CD11GAS series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
350(2V)	1	6.3*9	0.20	55
		6.3*12	0.20	60
	1.2	6.3*9	0.20	60
	1.5	6.3*9	0.20	65
		6.3*12	0.20	70
	1.8	6.3*9	0.20	72
		6.3*12	0.20	80
		8*9	0.20	82
	2.2	8*9	0.20	86
		8*12	0.20	90
	2.8	8*9	0.20	88
		8*12	0.20	95
	3.3	8*9	0.20	100
		8*12	0.20	108
	4.7	8*16	0.20	128
		10*9	0.20	120
	5.6	8*16	0.20	162
		10*9	0.20	145
	6.8	8*20	0.20	215
	8.2	8*20	0.20	220
	10	8*20	0.20	260
	15	10*20	0.20	360
	22	12.5*20	0.20	525
	33	12.5*20	0.20	600
		16*20	0.20	650
	47	16*20	0.20	700
	68	18*20	0.20	780
		18*25	0.20	850
	82	18*25	0.20	1000
400(2G)	1	6.3*7	0.20	61
		6.3*9	0.20	65
		8*12	0.20	70
	1.2	6.3*9	0.20	68
	1.5	6.3*12	0.20	74
		8*9	0.20	72
		8*12	0.20	76
	1.8	8*9	0.20	76
		8*12	0.20	85
	2.2	8*9	0.20	85
		8*12	0.20	90
	2.8	8*9	0.20	90
		8*16	0.20	99
	3.3	8*9	0.20	100
		8*16	0.20	108
	4.7	8*20	0.20	130
		10*9	0.20	120
	5.6	8*20	0.20	175
	6.8	10*16	0.20	215
	8.2	10*16	0.20	232
		10*20	0.20	240
	10	10*16	0.20	253
		10*20	0.20	275
	12	12.5*20	0.20	300

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
400(2G)	15	12.5*16	0.20	324
		12.5*20	0.20	360
	22	12.5*25	0.20	500
		16*20	0.20	500
	33	16*20	0.20	585
		16*25	0.20	620
	47	16*25	0.20	730
		16*30	0.20	756
	56	16*40	0.20	800
	68	18*30	0.20	900
	100	18*40	0.20	1200
450(2W)	1	6.3*9	0.20	76
		8*12	0.20	82
	1.2	8*9	0.20	80
	1.5	8*9	0.20	82
		8*12	0.20	85
	1.8	8*12	0.20	88
		10*9	0.20	90
	2.2	8*12	0.20	91
		8*16	0.20	95
		10*9	0.20	92
	2.8	8*16	0.20	99
		10*9	0.20	95
	3.3	8*16	0.20	100
		10*9	0.20	98
	3.9	10*9	0.20	115
	4.7	10*12	0.20	123
		10*16	0.20	130
	5.6	10*16	0.20	167
		10*20	0.20	177
	6.8	10*16	0.20	195
		10*20	0.20	215
	8.2	10*16	0.20	220
		10*20	0.20	230
	10	10*25	0.20	300
		12.5*16	0.20	280
	15	12.5*20	0.20	410
	22	12.5*25	0.20	530
		16*20	0.20	530
	33	16*25	0.20	670
	47	16*30	0.20	800
		16*35	0.20	850
	56	18*30	0.20	1080
	68	18*30	0.20	1230
		18*35	0.20	1300
	100	18*40	0.20	1530
500(2H)	10	12.5*20	0.24	288
		12.5*25	0.24	302
	15	12.5*25	0.24	396
		16*20	0.24	396
	22	12.5*35	0.24	504
		16*25	0.24	504
	33	18*25	0.24	630
	47	18*30	0.24	792

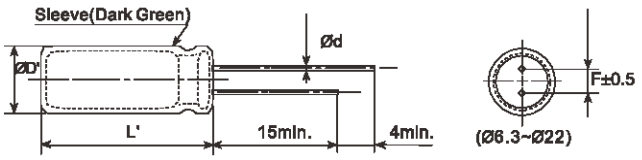
CD11GD series

- Endurance: +105 °C 6,000 hours
- Miniaturized and high stability
- Suitable for output circuit and input circuit of LED driving power.
- **RoHS Compliant**

SPECIFICATIONS

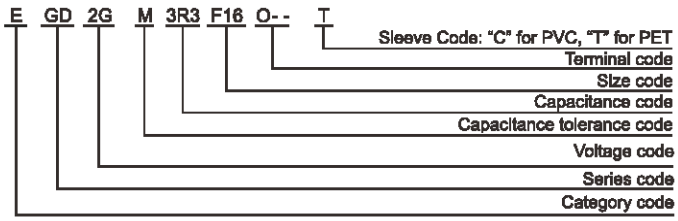
Items	Characteristics								
Category Temperature Range	-40~+105°C(160~500 Vdc)								
Rated Voltage Range	160~500 Vdc								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
Leakage Current	160~400 Vdc	450~500 Vdc	Where, I: Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V)						
	I≤0.02CV+10μA	I≤0.03CV+10μA							(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	350	400	450	500	
	tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20	0.24	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	350	400	450	500	
	Z(-25°C)/Z(+20°C)	3	3	3	5	5	6	6	
	Z(-40°C)/Z(+20°C)	6	6	6	6	6	9	15	(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20 °C after DC voltage plus rated ripple current is applied for 6,000 hours at 105°C,the peak voltage shall not exceed the rated voltage.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤The initial specified value							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤200% of the initial specified value							

DIMENSIONS[mm]



ØD	6.3	8		10	12.5	16	18	22
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5	10
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Rated voltage(Vdc)	120	1k	10k	100k
160~500	0.50	0.80	0.90	1.00

CD11GD series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	1	6.3*7	0.15	34
		6.3*9	0.15	36
		6.3*12	0.15	40
	1.5	6.3*7	0.15	38
		6.3*12	0.15	50
	1.8	6.3*7	0.15	49
		6.3*9	0.15	50
		6.3*12	0.15	56
	2.2	6.3*7	0.15	53
		6.3*9	0.15	56
		6.3*12	0.15	60
	2.8	6.3*7	0.15	57
		6.3*9	0.15	60
		6.3*12	0.15	65
	3.3	6.3*7	0.15	61
		6.3*9	0.15	65
		6.3*12	0.15	68
	3.9	6.3*7	0.15	65
		6.3*9	0.15	68
	4.7	6.3*7	0.15	66
		6.3*9	0.15	70
		6.3*12	0.15	72
	5.6	6.3*9	0.15	72
		8*9	0.15	74
		8*12	0.15	76
	6.8	6.3*12	0.15	84
		8*9	0.15	86
		8*12	0.15	96
	8.2	6.3*12	0.15	120
		8*9	0.15	135
	10	6.3*12	0.15	145
		8*9	0.15	165
		8*12	0.15	206
		8*16	0.15	216
	12	8*9	0.15	180
	15	8*12	0.15	213
		8*16	0.15	225
		10*9	0.15	200
	22	8*16	0.15	330
		8*20	0.15	360
		10*16	0.15	360
	33	10*12	0.15	400
		10*20	0.15	450
	47	10*16	0.15	435
		10*20	0.15	500
	56	10*20	0.15	530
	68	12.5*16	0.15	565
		12.5*20	0.15	600
	100	12.5*20	0.15	700
		12.5*25	0.15	722
		16*20	0.15	722
	150	16*20	0.15	740
		16*25	0.15	798
	220	16*25	0.15	900
	330	16*30	0.15	1100

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
200(2D)	1	6.3*7	0.15	35
		6.3*9	0.15	38
		6.3*12	0.15	42
	1.2	6.3*7	0.15	38
		6.3*9	0.15	42
	1.5	6.3*7	0.15	49
		6.3*9	0.15	50
		6.3*12	0.15	54
	1.8	6.3*7	0.15	50
		6.3*9	0.15	54
		6.3*12	0.15	60
	2.2	6.3*7	0.15	55
		6.3*9	0.15	60
		6.3*12	0.15	68
	2.8	6.3*7	0.15	61
		6.3*9	0.15	68
		6.3*12	0.15	71
	3.3	6.3*7	0.15	65
		6.3*9	0.15	72
		6.3*12	0.15	78
	4.7	6.3*9	0.15	76
		6.3*12	0.15	85
		8*9	0.15	88
	5.6	6.3*12	0.15	90
		8*9	0.15	92
		8*12	0.15	98
	6.8	6.3*12	0.15	94
		8*9	0.15	98
		8*16	0.15	103
	8.2	8*9	0.15	145
	10	8*12	0.15	180
		8*16	0.15	216
		10*9	0.15	190
	15	8*12	0.15	200
		8*16	0.15	225
		8*20	0.15	250
	22	8*20	0.15	380
		10*12	0.15	320
		10*16	0.15	380
	33	10*20	0.15	450
		12.5*13	0.15	430
		12.5*16	0.15	450
	47	10*20	0.15	520
		12.5*16	0.15	520
		12.5*20	0.15	580
	68	12.5*20	0.15	600
		12.5*25	0.15	665
	100	12.5*25	0.15	700
		16*25	0.15	760
	150	16*25	0.15	800
		16*30	0.15	895

CD11GD series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
250(2E)	1	6.3*7	0.15	36
		6.3*9	0.15	40
		6.3*12	0.15	46
	1.2	6.3*7	0.15	41
		6.3*9	0.15	46
	1.5	6.3*7	0.15	51
		6.3*9	0.15	54
		6.3*12	0.15	58
	1.8	6.3*7	0.15	54
		6.3*9	0.15	58
		6.3*12	0.15	62
	2.2	6.3*7	0.15	55
		6.3*9	0.15	62
		6.3*12	0.15	70
	2.8	6.3*7	0.15	63
		6.3*9	0.15	70
		6.3*12	0.15	78
	3.3	6.3*9	0.15	75
		6.3*12	0.15	80
	4.7	6.3*12	0.15	92
		8*9	0.15	92
		8*12	0.15	102
	5.6	8*9	0.15	95
		8*12	0.15	105
	6.8	8*9	0.15	105
		8*16	0.15	115
	8.2	8*10	0.15	108
		8*16	0.15	120
		10*9	0.15	110
	10	8*10	0.15	187
		8*16	0.15	216
		10*9	0.15	175
	15	8*16	0.15	225
		8*20	0.15	250
	22	8*16	0.15	350
		10*16	0.15	380
	33	12.5*16	0.15	450
		12.5*20	0.15	470
	47	12.5*16	0.15	520
		12.5*20	0.15	580
	68	12.5*25	0.15	660
		16*25	0.15	720
	100	16*20	0.15	730
		16*30	0.15	836
	150	16*35	0.15	978
		18*25	0.15	885
350(2V)	1	6.3*7	0.20	40
		6.3*9	0.20	45
		6.3*12	0.20	50
	1.2	6.3*7	0.20	55
		6.3*9	0.20	50
	1.5	6.3*9	0.20	55
		6.3*12	0.20	60
	1.8	6.3*9	0.20	60
		6.3*12	0.20	64
	2.2	6.3*9	0.20	66
		6.3*12	0.20	70
		8*9	0.20	72

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
350(2V)	2.8	8*9	0.20	76
		8*12	0.20	80
	3.3	6.3*12	0.20	77
		8*9	0.20	78
		8*12	0.20	82
	4.7	8*9	0.20	90
		8*12	0.20	102
		10*9	0.20	104
	5.6	8*12	0.20	105
		8*16	0.20	110
		10*9	0.20	106
	6.8	8*12	0.20	112
		8*20	0.20	128
		10*9	0.20	120
	8.2	8*16	0.20	130
		8*20	0.20	144
	10	8*20	0.20	226
		10*12	0.20	205
	15	10*16	0.20	260
		10*20	0.20	285
	22	12.5*20	0.20	410
	33	12.5*20	0.20	425
		12.5*25	0.20	480
	47	16*20	0.20	600
	68	18*20	0.20	720
	100	18*25	0.20	850
		18*30	0.20	900
400(2G)	1	6.3*7	0.20	50
		6.3*9	0.20	55
		6.3*12	0.20	59
	1.2	6.3*9	0.20	59
		6.3*12	0.20	63
	1.5	6.3*9	0.20	65
		8*12	0.20	72
	1.8	8*7	0.20	68
		8*9	0.20	70
		8*12	0.20	75
	2.2	6.3*9	0.20	68
		6.3*12	0.20	72
		8*9	0.20	75
		8*12	0.20	78
	2.8	6.3*12	0.20	74
		8*9	0.20	78
		8*16	0.20	85
	3.3	8*7	0.20	78
		8*9	0.20	85
		8*12	0.20	91
		8*16	0.20	95
	4.7	8*9	0.20	90
		8*12	0.20	104
		8*16	0.20	110
		10*9	0.20	106
	5.6	8*12	0.20	114
		8*20	0.20	138
		10*16	0.20	138
	6.8	8*16	0.20	132
		8*20	0.20	148
		10*16	0.20	148

CD11GD series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
400(2G)	8.2	10*16	0.20	218
		10*20	0.20	230
	10	10*16	0.20	226
		10*20	0.20	238
	15	10*20	0.20	255
		12.5*16	0.20	270
		12.5*20	0.20	300
	22	12.5*20	0.20	400
		12.5*25	0.20	420
		16*20	0.20	420
	33	16*25	0.20	550
		16*30	0.20	579
	47	16*25	0.20	590
		12.5*40	0.20	630
		16*30	0.20	637
	68	18*25	0.20	700
		18*30	0.20	760
	100	18*30	0.20	900
		18*40	0.20	1100
450(2W)	1	6.3*9	0.20	55
		8*12	0.20	60
	1.2	6.3*9	0.20	60
	1.5	8*9	0.20	65
		8*12	0.20	70
	1.8	8*9	0.20	68
		8*12	0.20	72
	2.2	8*9	0.20	72
		8*16	0.20	75
	2.8	8*9	0.20	75
		8*16	0.20	79
	3.3	8*12	0.20	80
		8*16	0.20	86
		10*9	0.20	80
	4.7	8*12	0.20	84
		8*20	0.20	99

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
450(2W)	5.6	10*12	0.20	102
		10*16	0.20	115
	6.8	10*12	0.20	130
		10*20	0.20	158
	8.2	10*16	0.20	185
		10*20	0.20	209
	10	10*16	0.20	218
		10*20	0.20	225
		12.5*16	0.20	225
	15	12.5*20	0.20	332
	22	12.5*25	0.20	427
	33	10*45	0.20	510
		16*25	0.20	522
	47	12.5*45	0.20	660
		16*25	0.20	630
		16*35	0.20	700
	68	18*30	0.20	769
	100	18*35	0.20	890
		18*40	0.20	950
500(2H)	10	12.5*20	0.24	259
		12.5*25	0.24	272
	15	12.5*25	0.24	356
		16*20	0.24	356
	22	12.5*35	0.24	453
		16*25	0.24	453
	33	18*25	0.24	567
	47	18*30	0.24	713
	68	22*35	0.24	1000
	100	22*35	0.24	1400

CD11GHS series

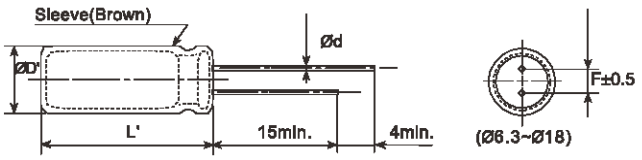
- Upgrade for CD11GH Series, longer life, better performance, cost-effective
- Endurance: +105°C 6,000 hours
- Suitable for electronic ballast and electronic energy saving lamp.
- **RoHS Compliant**

Upgrade: CD11GH → CD11GHS

SPECIFICATIONS

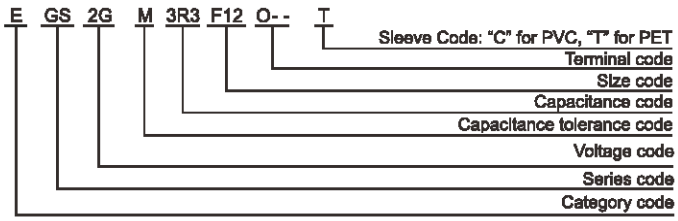
Items	Characteristics							
Category Temperature Range	-40~+105°C(160~ 450 Vdc)							
Rated Voltage Range	160~450 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
Leakage Current	160~400 Vdc	450 Vdc	Where, I: Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V)					
	I≤0.02CV+10μA	I≤0.03CV+10μA						(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	350	400	450	
	tanδ (max.)	0.15	0.15	0.15	0.20	0.20	0.20	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	350	400	450	
	Z(-25°C)/Z(+20°C)	3	3	3	5	5	6	
	Z(-40°C)/Z(+20°C)	6	6	6	6	6	9	(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 6,000 hours at 105°C,the peak voltage shall not exceed the rated voltage.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤The initial specified value						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤200% of the initial specified value						

DIMENSIONS[mm]



ØD	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.						
L'	L+2max.						

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Rated voltage(Vdc)	120	1k	10k	100k
160~450	0.50	0.80	0.90	1.00

CD11GHS series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	1	6.3*9	0.15	36
		6.3*12	0.15	40
	1.5	6.3*12	0.15	50
	1.8	6.3*9	0.15	50
		6.3*12	0.15	56
	2.2	6.3*9	0.15	56
		6.3*12	0.15	60
	2.8	6.3*9	0.15	62
		6.3*12	0.15	68
	3.3	6.3*9	0.15	67
		6.3*12	0.15	72
	4.7	6.3*12	0.15	75
		8*12	0.15	80
	5.6	6.3*12	0.15	79
		8*12	0.15	84
	6.8	8*9	0.15	89
		8*12	0.15	96
	8.2	8*9	0.15	105
		8*12	0.15	110
	10	8*9	0.15	165
		8*12	0.15	206
	15	8*12	0.15	230
		8*16	0.15	250
	22	8*16	0.15	340
		8*20	0.15	400
	33	10*16	0.15	420
		10*20	0.15	450
	47	10*16	0.15	460
		10*20	0.15	500
	68	12.5*16	0.15	570
		12.5*20	0.15	630
	100	12.5*20	0.15	680
		12.5*25	0.15	720
	150	16*20	0.15	760
		16*25	0.15	850
200(2D)	1	6.3*9	0.15	38
		6.3*12	0.15	42
	1.5	6.3*9	0.15	50
		6.3*12	0.15	54
	1.8	6.3*9	0.15	54
		6.3*12	0.15	60
	2.2	6.3*9	0.15	60
		6.3*12	0.15	68
	2.8	6.3*9	0.15	68
		6.3*12	0.15	71
	3.3	6.3*9	0.15	74
		6.3*12	0.15	80
	4.7	6.3*12	0.15	90
		8*12	0.15	95
	5.6	8*9	0.15	92
		8*12	0.15	98
	6.8	8*9	0.15	98
		8*12	0.15	110
	8.2	8*12	0.15	115
		8*16	0.15	120
	10	8*12	0.15	185
		8*16	0.15	210

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
200(2D)	15	8*16	0.15	250
		8*20	0.15	268
	22	8*20	0.15	400
		10*16	0.15	400
	33	10*20	0.15	450
	47	12.5*20	0.15	610
	68	12.5*20	0.15	635
		12.5*25	0.15	700
	100	16*20	0.15	735
		16*25	0.15	800
	150	16*25	0.15	855
		16*30	0.15	900
250(2E)	1	6.3*9	0.15	40
		6.3*12	0.15	46
	1.5	6.3*9	0.15	54
		6.3*12	0.15	58
	1.8	6.3*9	0.15	59
		6.3*12	0.15	63
	2.2	6.3*9	0.15	71
		6.3*12	0.15	75
	2.8	6.3*9	0.15	73
		6.3*12	0.15	78
	3.3	6.3*9	0.15	78
		6.3*12	0.15	83
	4.7	6.3*12	0.15	91
		8*12	0.15	102
	5.6	8*9	0.15	95
		8*12	0.15	105
	6.8	8*12	0.15	109
		8*16	0.15	115
	8.2	8*12	0.15	116
		8*16	0.15	120
	10	8*12	0.15	170
		8*16	0.15	210
	15	8*20	0.15	310
		10*16	0.15	320
	22	8*20	0.15	390
		10*16	0.15	400
	33	10*20	0.15	480
		12.5*20	0.15	530
	47	12.5*20	0.15	627
	68	16*20	0.15	660
		16*25	0.15	720
	100	16*25	0.15	800
		16*30	0.15	880
	150	16*30	0.15	930
		16*35	0.15	1030

CD11GHS series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
350(2V)	1	6.3*9	0.20	58
		6.3*12	0.20	65
	1.5	6.3*9	0.20	68
		6.3*12	0.20	72
	1.8	6.3*9	0.20	74
		6.3*12	0.20	80
	2.2	6.3*9	0.20	85
		6.3*12	0.20	90
	2.8	8*9	0.20	101
		8*12	0.20	106
	3.3	8*9	0.20	106
		8*12	0.20	110
	4.7	8*12	0.20	115
		8*16	0.20	120
	5.6	8*12	0.20	130
		8*16	0.20	150
	6.8	8*16	0.20	160
		8*20	0.20	170
	8.2	8*20	0.20	189
	10	8*20	0.20	230
	15	10*20	0.20	310
	22	12.5*20	0.20	430
	33	12.5*20	0.20	515
		12.5*25	0.20	535
	47	16*20	0.20	650
	68	18*20	0.20	726
	82	18*25	0.20	910
400(2G)	1	6.3*9	0.20	70
		6.3*12	0.20	75
	1.5	6.3*12	0.20	78
		8*12	0.20	80
	1.8	6.3*12	0.20	85
		8*12	0.20	90
	2.2	6.3*12	0.20	88
		8*12	0.20	105
	2.8	8*12	0.20	107
		8*16	0.20	109
	3.3	8*12	0.20	108
		8*16	0.20	112
	4.7	8*12	0.20	114
		8*16	0.20	120
	5.6	8*16	0.20	145
		8*20	0.20	155
	6.8	8*20	0.20	170
		10*12	0.20	160
	8.2	10*16	0.20	210
		10*20	0.20	230

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
400(2G)	10	10*16	0.20	225
		10*20	0.20	280
	12	10*20	0.20	290
	15	10*20	0.20	300
		12.5*20	0.20	320
	22	12.5*20	0.20	390
		12.5*25	0.20	450
	33	16*25	0.20	550
	47	16*25	0.20	640
		16*30	0.20	670
	56	16*30	0.20	680
		16*35	0.20	720
	68	18*30	0.20	800
	100	18*35	0.20	930
		18*40	0.20	950
450(2W)	1	8*12	0.20	72
	1.5	8*12	0.20	75
	1.8	8*12	0.20	90
	2.2	8*12	0.20	103
		8*16	0.20	115
	2.8	8*12	0.20	115
		8*16	0.20	120
	3.3	8*16	0.20	128
	4.7	8*20	0.20	140
	5.6	10*16	0.20	158
	6.8	10*16	0.20	180
		10*20	0.20	200
	8.2	10*20	0.20	230
	10	10*20	0.20	250
	15	12.5*20	0.20	350
	22	12.5*25	0.20	450
	33	16*25	0.20	550
	47	16*35	0.20	700
	68	18*30	0.20	810
	100	18*40	0.20	950

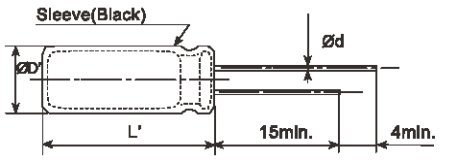
CD11GM series

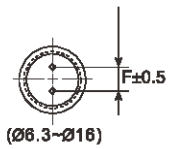
- Endurance: +105°C 3,000 hours
- Economical type, miniaturized
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics					
Category Temperature Range	-40~+105°C (160~400 Vdc)					
Rated Voltage Range	160~400 Vdc					
Capacitance Tolerance	±20%(M)					(at 20°C,120Hz)
Leakage Current	I≤0.02CV+25μA (160~400 Vdc) Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)					(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	400	
	tanδ (max.)	0.15	0.15	0.15	0.20	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	400	
	Z(-25°C)/Z(+20°C)	3	3	3	5	
	Z(-40°C)/Z(+20°C)	6	6	6	6	(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 3,000 hours at 105°C, the peak voltage shall not exceed the rated voltage.					
	Capacitance Change	≤±20% of the initial value				
	D.F. (tanδ)	≤200% of the initial specified value				
	Leakage Current	≤The initial specified value				
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.					
	Capacitance Change	≤±20% of the initial value				
	D.F. (tanδ)	≤200% of the initial specified value				
	Leakage Current	≤500% of the initial specified value				

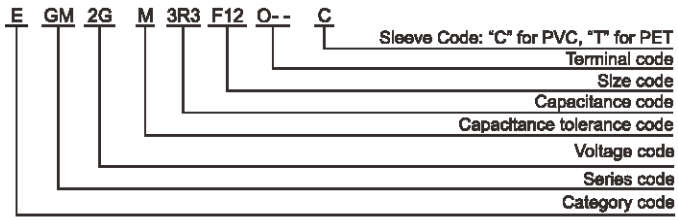
DIMENSIONS[mm]





ØD	6.3	8		10	12.5	13	16
Ød	0.5	0.5	0.6	0.6	0.6	0.6	0.8
F	2.5	3.5		5.0	5.0	5.0	7.5
ØD'	ØD+0.5max.						
L'	L+2max.						

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Rated voltage(Vdc)	120	1k	10k	100k
160~400	0.50	0.80	0.90	1.00

CD11GM series

■ STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	4.7	6.3*7	0.15	52
	5.6	6.3*9	0.15	58
	6.8	6.3*12	0.15	70
	8.2	6.3*12	0.15	100
	10	6.3*12	0.15	135
		8*9	0.15	135
		8*12	0.15	145
	15	8*12	0.15	162
		8*16	0.15	180
		10*9	0.15	160
	22	8*16	0.15	245
		10*12	0.15	260
	33	10*16	0.15	320
	47	10*16	0.15	365
		10*20	0.15	400
	56	10*20	0.15	450
	68	12.5*16	0.15	490
		12.5*20	0.15	530
200(2D)	4.7	6.3*9	0.15	52
	5.6	6.3*12	0.15	62
	6.8	6.3*12	0.15	76
	8.2	8*9	0.15	90
		8*12	0.15	95
	10	8*9	0.15	130
		8*12	0.15	145
		10*9	0.15	145
	15	8*12	0.15	170
		8*16	0.15	185
	22	8*16	0.15	255
	33	10*16	0.15	330
	47	10*20	0.15	420
	56	12.5*20	0.15	500

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
250(2E)	4.7	6.3*9	0.15	80
		6.3*12	0.15	85
		8*9	0.15	80
		8*12	0.15	90
	6.8	8*9	0.15	92
		8*12	0.15	96
	8.2	8*9	0.15	96
		8*12	0.15	100
		10*9	0.15	100
	10	8*12	0.15	150
		10*9	0.15	150
	15	8*16	0.15	195
	22	10*16	0.15	280
	33	10*20	0.15	360
		12.5*16	0.15	360
	47	12.5*16	0.15	430
		12.5*20	0.15	455
400(2G)	1	6.3*9	0.20	35
	1.5	6.3*9	0.20	40
	1.8	6.3*12	0.20	49
	2.2	6.3*12	0.20	60
		8*9	0.20	60
	3.3	8*9	0.20	70
		8*12	0.20	75
	4.7	8*12	0.20	95
		10*9	0.20	95
	6.8	8*12	0.20	117
		8*16	0.20	130
		10*12	0.20	130
	10	8*16	0.20	170
		10*12	0.20	170
		10*16	0.20	195
	15	10*16	0.20	230
	22	12.5*20	0.20	345
	33	13*20	0.20	445
	47	16*25	0.20	650

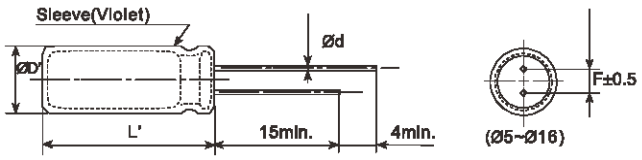
RR series

- High frequency,low impedance,high reliability
- Endurance: +105°C 2,000 hours
- Suitable for switching power, UPS, power sources,etc.
- **RoHS Compliant**

SPECIFICATIONS

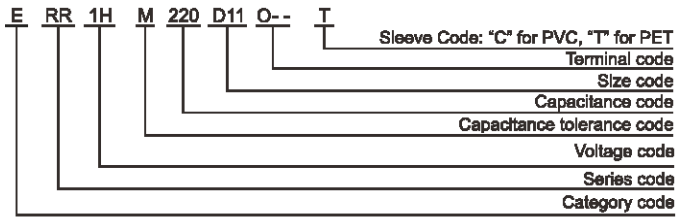
Items	Characteristics							
Category Temperature Range	-40~+105°C							
Rated Voltage Range	6.3~50 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)							(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	
	tanδ (max.)	0.22	0.18	0.14	0.12	0.10	0.08	
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.							(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	
	Z(-25°C)/Z(+20°C)	2						(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 2,000 hours at 105 °C.							
	Capacitance Change	≤±20% of the initial value (6.3,10V:≤±30%)						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤The initial specified value						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.							
	Capacitance Change	≤±20% of the initial value (6.3,10V:≤±30%)						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤200% of the initial specified value						

DIMENSIONS[mm]



ØD	5		6.3	8		10	12.5	16
Ød	0.45	0.5	0.5	0.5	0.6	0.6	0.6	0.8
F	2.0		2.5	3.5		5.0	5.0	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<220	0.40	0.75	0.90	1.00
220≤Cap.<680	0.50	0.85	0.94	1.00
680≤Cap.<2200	0.60	0.87	0.95	1.00
2200≤Cap.<4700	0.75	0.90	0.95	1.00
Cap.≥4700	0.85	0.95	0.98	1.00

RR series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
6.3(0J)	150	5*11	0.22	0.3	250
		6.3*7	0.22	0.3	250
	330	6.3*9	0.22	0.15	350
		6.3*11	0.22	0.13	405
	560	8*9	0.22	0.12	605
		8*12	0.22	0.072	760
	820	8*16	0.22	0.056	995
		10*9	0.22	0.085	800
	1000	10*12.5	0.22	0.053	1030
	1200	8*20	0.22	0.041	1250
		10*16	0.22	0.038	1430
	1500	10*20	0.22	0.023	1820
	2200	10*25	0.24	0.022	2150
	3300	12.5*20	0.26	0.021	2360
	3900	12.5*25	0.26	0.018	2770
	4700	12.5*30	0.28	0.016	3290
	5600	12.5*35	0.30	0.015	3400
		16*20	0.30	0.018	3140
	6800	16*25	0.32	0.016	3460
10(1A)	100	5*7	0.18	1.38	185
		5*11	0.18	0.3	250
	220	6.3*7	0.18	0.35	405
		6.3*11	0.18	0.13	405
	470	8*9	0.18	0.18	606
		8*11	0.18	0.072	760
	680	8*16	0.18	0.056	995
		10*9	0.18	0.085	760
		10*12.5	0.18	0.053	1030
	1000	8*20	0.18	0.041	1250
		10*16	0.18	0.038	1430
	1200	10*20	0.18	0.023	1820
	1500	10*25	0.18	0.022	2150
	2200	12.5*20	0.20	0.021	2360
	3300	12.5*25	0.22	0.018	2770
	3900	12.5*30	0.22	0.016	3290
		16*20	0.22	0.018	3140
	4700	12.5*35	0.24	0.015	3400
	5600	16*25	0.26	0.016	3460
16(1C)	56	5*7	0.14	0.7	180
		5*11	0.14	0.3	250
	120	6.3*7	0.14	0.4	300
		6.3*11	0.14	0.13	405
	330	8*7	0.14	0.14	510
		8*12	0.14	0.072	760
	470	8*16	0.14	0.056	795
		10*12.5	0.14	0.053	1030
	680	8*20	0.14	0.041	1250
		10*16	0.14	0.038	1430
	1000	10*20	0.14	0.023	1820
	1200	10*25	0.14	0.022	2150
	1500	12.5*20	0.14	0.021	2360
	2200	12.5*25	0.16	0.018	2770
	2700	12.5*30	0.16	0.016	3290
		16*20	0.16	0.018	3140
	3300	12.5*35	0.18	0.015	3400
	3900	16*25	0.18	0.016	3460

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
25(1E)	47	5*11	0.12	0.3	250
		6.3*7	0.12	1.1	200
	100	6.3*11	0.12	0.13	405
		8*7	0.12	0.3	430
	220	8*9	0.12	0.1	600
		8*12	0.12	0.072	760
	330	8*16	0.12	0.056	995
	470	8*20	0.12	0.041	1250
	680	10*12.5	0.12	0.053	1030
	820	10*16	0.12	0.038	1430
	1000	10*20	0.12	0.023	1820
	1500	10*25	0.12	0.022	2150
	1800	12.5*20	0.12	0.021	2360
		12.5*30	0.12	0.016	3290
		16*20	0.12	0.018	3140
	2200	12.5*25	0.14	0.018	2770
		12.5*35	0.14	0.015	3400
	2700	16*25	0.14	0.016	3460
35(1V)	33	5*7	0.10	1.15	160
		5*11	0.10	0.3	250
	56	6.3*11	0.10	0.13	405
		8*7	0.10	0.39	405
	150	8*9	0.10	0.17	600
		8*12	0.10	0.072	760
	220	8*16	0.10	0.056	995
		10*12.5	0.10	0.053	1030
	270	8*20	0.10	0.041	1250
	330	10*16	0.10	0.038	1430
	470	10*20	0.10	0.023	1820
	560	10*25	0.10	0.022	2150
	680	12.5*20	0.10	0.021	2360
	1000	12.5*25	0.10	0.018	2770
	1200	12.5*30	0.10	0.016	3290
		16*20	0.10	0.018	3140
	1500	12.5*35	0.10	0.015	3400
	1800	16*25	0.10	0.016	3460
50(1H)	22	5*11	0.08	0.34	238
		6.3*7	0.08	0.52	200
	56	6.3*12	0.08	0.14	385
		8*7	0.08	0.36	320
	100	8*9	0.08	0.2	580
		8*12	0.08	0.074	724
	120	8*16	0.08	0.061	950
	150	10*12.5	0.08	0.061	979
	180	8*20	0.08	0.046	1190
	220	10*16	0.08	0.042	1370
	270	10*20	0.08	0.03	1580
	330	10*25	0.08	0.028	1870
	470	12.5*20	0.08	0.027	2050
	560	12.5*25	0.08	0.023	2410
	680	12.5*30	0.08	0.021	2860
	820	12.5*35	0.08	0.019	2960
		16*20	0.08	0.023	2730
	1000	16*25	0.08	0.021	3010

RE series

- Low impedance and high frequency.
- Endurance: +105°C 2,000~4,000 hours
- Suitable for switching power, UPS, power sources, etc.
- **RoHS Compliant**

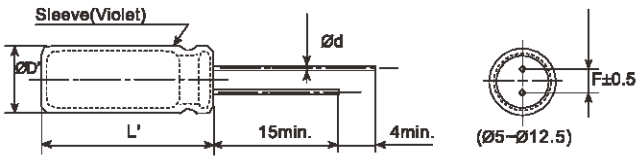
Upgrade

SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	-40~+105°C									
Rated Voltage Range	6.3~100 Vdc									
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)									
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)									
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100	
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)									
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100	
	Z(-25°C)/Z(+20°C)	4	3	2						
	Z(-40°C)/Z(+20°C)	8	6	4	3					(at 120Hz)
Endurance	The following specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105 °C.									
	Capacitance Change	≤±25% of the initial value								
	D.F. (tanδ)	≤200% of the initial specified value								
	Leakage Current	≤The initial specified value								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.									
	Capacitance Change	≤±25% of the initial value								
	D.F. (tanδ)	≤200% of the initial specified value								
	Leakage Current	≤200% of the initial specified value								

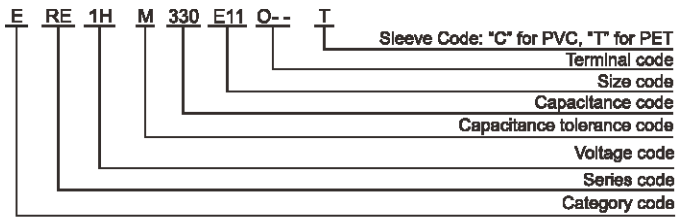
Case Dia.	Load life (hours)
ØD≤6.3	2,000
ØD=8&10	3,000
ØD≥12.5	4,000

DIMENSIONS[mm]



ØD	5	6.3	8		10	12.5
Ød	0.5	0.5	0.5	0.6	0.6	0.6
F	2.0	2.5	3.5		5.0	5.0
ØD'	ØD+0.5max.					
L'	L+2max.					

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<220	0.40	0.75	0.90	1.00
220≤Cap.<680	0.50	0.85	0.94	1.00
680≤Cap.<2200	0.60	0.87	0.95	1.00
2200≤Cap.<4700	0.75	0.90	0.95	1.00
Cap.≥4700	0.85	0.95	0.98	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RE series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
6.3(0J)	180	6.3*11	0.22	0.25	340
		8*9	0.22	0.33	300
	220	6.3*11	0.22	0.25	340
		8*9	0.22	0.33	300
	270	6.3*11	0.22	0.25	340
		8*9	0.22	0.33	300
	330	8*11	0.22	0.13	650
		10*9	0.22	0.17	580
	470	8*11	0.22	0.13	650
		10*9	0.22	0.17	580
	560	8*11	0.22	0.13	650
		10*9	0.22	0.17	580
	680	8*11	0.22	0.13	650
		10*9	0.22	0.17	580
	820	10*12	0.22	0.08	870
	1000	10*9	0.22	0.17	580
		10*12	0.22	0.08	870
	1200	10*12	0.22	0.08	870
	1500	8*20	0.22	0.068	1050
		10*16	0.22	0.060	1210
	1800	10*20	0.22	0.045	1400
	2200	10*20	0.24	0.045	1400
	2700	10*25	0.24	0.042	1650
		12.5*20	0.24	0.035	1900
	3300	10*25	0.24	0.042	1650
		12.5*20	0.26	0.035	1900
	3900	12.5*20	0.26	0.035	1900
	4700	12.5*25	0.28	0.030	2130
10(1A)	150	6.3*11	0.19	0.25	340
		8*9	0.19	0.33	300
	180	6.3*11	0.19	0.25	340
		8*9	0.19	0.33	300
	220	6.3*11	0.19	0.25	340
		8*9	0.19	0.33	300
	270	8*9	0.19	0.33	300
		10*9	0.19	0.17	580
	330	10*9	0.19	0.17	580
	470	10*9	0.19	0.17	580
	560	10*9	0.19	0.17	580
	680	10*9	0.19	0.17	580
	820	10*12	0.19	0.08	870
	1000	8*16	0.19	0.087	850
		10*16	0.19	0.060	1210
	1200	10*20	0.19	0.045	1400
	1500	10*20	0.19	0.045	1400
	1800	10*20	0.19	0.045	1400
	2200	10*20	0.21	0.045	1400
	2700	10*25	0.21	0.042	1650
		12.5*20	0.21	0.035	1900
	3300	12.5*25	0.23	0.030	2130
16(1C)	100	8*9	0.16	0.33	300
	120	8*9	0.16	0.33	300
	150	8*9	0.16	0.33	300
		10*9	0.16	0.33	580
	180	8*9	0.16	0.33	300
		10*9	0.16	0.33	580
	220	8*9	0.16	0.33	300
		10*9	0.16	0.33	580
	270	10*9	0.16	0.17	580
	330	10*9	0.16	0.17	580
	470	10*9	0.16	0.17	580
		10*12	0.16	0.08	870
	560	10*12	0.16	0.08	870
	680	8*16	0.16	0.087	850
		10*12	0.16	0.080	870
	820	10*16	0.16	0.06	1210
	1000	10*16	0.16	0.06	1210
	1200	10*20	0.16	0.045	1400
	1500	10*20	0.16	0.045	1400
	1800	10*25	0.16	0.042	1650
		12.5*20	0.16	0.035	1900
	2200	12.5*20	0.18	0.035	1900
	2700	12.5*20	0.18	0.030	2130
25(1E)	82	6.3*11	0.14	0.25	340
		8*9	0.14	0.33	300
	100	6.3*11	0.14	0.25	340
		8*9	0.14	0.33	300

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
25(1E)	120	8*11	0.14	0.13	650
		10*9	0.14	0.17	580
	150	8*11	0.14	0.13	650
		10*9	0.14	0.17	580
	180	8*11	0.14	0.13	650
		10*9	0.14	0.17	580
	220	8*11	0.14	0.13	650
		10*9	0.14	0.17	580
	270	10*9	0.14	0.17	580
		10*12	0.14	0.08	870
	330	10*9	0.14	0.17	580
		10*12	0.14	0.08	870
	470	8*16	0.14	0.087	840
		10*12	0.14	0.080	870
	560	10*16	0.14	0.060	1210
	680	10*16	0.14	0.060	1210
	820	10*20	0.14	0.045	1400
	1000	10*20	0.14	0.045	1400
	1200	10*20	0.14	0.045	1400
	1500	10*25	0.14	0.042	1650
		12.5*20	0.14	0.035	1900
	1800	12.5*25	0.14	0.030	2130
	2200	12.5*25	0.14	0.030	2130
35(1V)	47	6.3*11	0.12	0.25	340
		8*9	0.12	0.33	300
	56	6.3*11	0.12	0.25	340
		8*9	0.12	0.33	300
	68	6.3*11	0.12	0.25	340
		8*9	0.12	0.33	300
	82	8*11	0.12	0.13	650
		10*9	0.12	0.17	580
	100	8*11	0.12	0.13	650
		10*9	0.12	0.17	580
	120	8*11	0.12	0.13	650
		10*9	0.12	0.17	580
	150	8*11	0.12	0.13	650
		10*9	0.12	0.17	580
	180	10*12	0.12	0.08	870
	220	8*11	0.12	0.13	650
		10*9	0.12	0.17	580
		8*16	0.12	0.087	840
		10*12	0.12	0.080	870
	270	10*16	0.12	0.060	1210
	330	8*20	0.12	0.069	1050
		10*12	0.12	0.080	870
		10*16	0.12	0.060	1210
	470	10*16	0.12	0.060	1210
	560	10*20	0.12	0.045	1400
	680	10*20	0.12	0.045	1400
	820	10*25	0.12	0.042	1650
		12.5*20	0.12	0.035	1900
	1000	12.5*20	0.12	0.035	1900
		12.5*25	0.12	0.030	2130
50(1H)	33	6.3*11	0.10	0.30	295
		8*9	0.10	0.40	260
	39	6.3*11	0.10	0.30	295
		8*9	0.10	0.40	260
	47	6.3*11	0.10	0.30	295
		8*9	0.10	0.40	260
	56	8*11	0.10	0.17	560
		10*9	0.10	0.23	500
	68	8*11	0.10	0.17	560
		10*9	0.10	0.23	500
	82	8*11	0.10	0.17	560
		10*9	0.10	0.23	500
	100	10*12	0.10	0.12	760
	120	8*16	0.10	0.12	730
		10*12	0.10	0.12	760
	150	10*16	0.10	0.084	1050
	180	8*20	0.10	0.090	1050
		10*16	0.10	0.084	1050
	220	10*16	0.10	0.084	1050
	270	10*25	0.10	0.055	1440
	330	12.5*20	0.10	0.045	1660
	470	12.5*25	0.10	0.034	1950
	560	12.5*25	0.10	0.034	1950

RE series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
63(1J)	22	6.3*11	0.09	0.95	120
		8*9	0.09	1.24	100
	27	6.3*11	0.09	0.95	120
		8*9	0.09	1.24	100
	33	6.3*11	0.09	0.95	120
		8*9	0.09	1.24	100
	39	8*11	0.09	0.51	235
		10*9	0.09	0.67	210
	47	8*11	0.09	0.51	235
		10*9	0.09	0.67	210
	56	8*11	0.09	0.51	235
		10*9	0.09	0.67	210
	68	8*11	0.09	0.51	235
		10*9	0.09	0.67	210
	82	10*12	0.09	0.34	315
	100	8*16	0.09	0.35	300
		10*12	0.09	0.34	315
	120	10*16	0.09	0.245	360
	150	8*20	0.09	0.265	360
	180	10*20	0.09	0.165	470
	220	10*20	0.09	0.165	470
	270	12.5*20	0.09	0.125	700
	330	12.5*20	0.09	0.125	700
	390	12.5*25	0.09	0.095	930

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
100(1K)	15	6.3*11	0.08	0.95	120
		8*9	0.08	1.24	100
	27	8*11	0.08	0.51	235
		10*9	0.08	0.67	210
	39	8*16	0.08	0.36	300
	47	10*12	0.08	0.34	315
	56	8*20	0.08	0.265	360
	68	10*16	0.08	0.245	360
	82	10*20	0.08	0.165	470
	100	10*20	0.08	0.165	470
	120	12.5*20	0.08	0.125	700
	180	12.5*25	0.08	0.095	930
	220	12.5*25	0.08	0.095	930

RF series

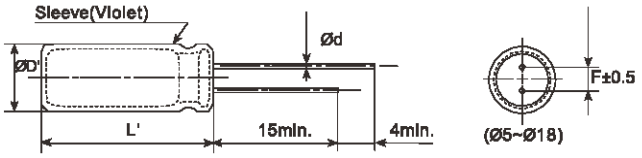
- Ultra-low impedance, high ripple current
- Endurance: +105°C 3,000~6,000 hours
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics										
Category Temperature Range	-40~+105°C										
Rated Voltage Range	6.3~120 Vdc										
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)										
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)										
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	80	100	120
	tanδ (max.)	0.15	0.14	0.12	0.10	0.10	0.08	0.08	0.08	0.08	0.12
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)										
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	80	100	120
	Z(-25°C)/Z(+20°C)	5	4	3							3
	Z(-40°C)/Z(+20°C)	10	8	5	4						6 (at 120Hz)
Endurance	The following specifications shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105 °C.										
	Capacitance Change: ≤±25% of the initial value										
	D.F. (tanδ): ≤200% of the initial specified value										
	Leakage Current: ≤The initial specified value										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.										
	Capacitance Change: ≤±25% of the initial value										
	D.F. (tanδ): ≤200% of the initial specified value										
	Leakage Current: ≤200% of the initial specified value										

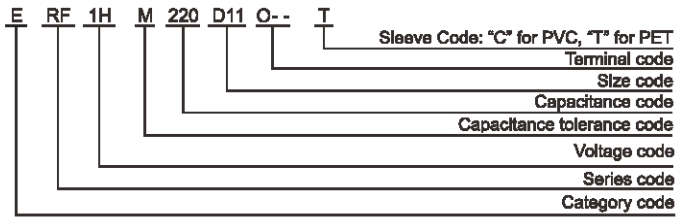
Dia.	Load life (hours)
ØD≤6.3	3,000
ØD=8	4,000
ØD=10	5,000
ØD≥12.5	6,000

DIMENSIONS[mm]



ØD	5	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<220	0.40	0.75	0.90	1.00
220≤Cap.<680	0.50	0.85	0.94	1.00
680≤Cap.<2200	0.60	0.87	0.95	1.00
2200≤Cap.<4700	0.75	0.90	0.95	1.00
Cap.≥4700	0.85	0.95	0.98	1.00

RF series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
6.3(0J)	150	5*11	0.15	0.29	300
		6.3*9	0.15	0.37	270
	220	6.3*11	0.15	0.205	377
		8*9	0.15	0.26	337
	330	6.3*11	0.15	0.12	455
		8*9	0.15	0.15	408
	470	8*11	0.15	0.09	632
		10*9	0.15	0.12	565
	820	8*16	0.15	0.055	1045
	1000	8*16	0.15	0.052	1000
	1200	8*20	0.15	0.04	1300
		10*16	0.15	0.037	1480
	1500	10*20	0.15	0.022	1870
	2200	10*20	0.17	0.021	2200
	2700	10*25	0.17	0.02	2250
	3300	12.5*20	0.19	0.02	2410
	3900	12.5*25	0.19	0.017	2820
	4700	12.5*30	0.21	0.015	3340
	5600	12.5*35	0.23	0.014	3400
		16*20	0.23	0.017	3190
	6800	16*25	0.25	0.015	3510
10(1A)	100	5*11	0.14	0.29	300
		6.3*9	0.14	0.37	270
	220	6.3*11	0.14	0.12	455
		8*9	0.14	0.15	408
	470	8*11	0.14	0.071	810
		10*9	0.14	0.092	720
	680	8*16	0.14	0.055	1046
		10*12.5	0.14	0.052	1080
	1000	8*20	0.14	0.04	1300
		10*16	0.14	0.037	1480
	1200	10*20	0.14	0.022	1870
	1500	10*20	0.14	0.021	2220
	2200	12.5*20	0.16	0.02	2410
	3300	12.5*25	0.18	0.017	2820
	3900	12.5*30	0.18	0.015	3340
	4700	12.5*35	0.20	0.014	3450
	5600	16*25	0.22	0.015	3510
16(1C)	56	5*11	0.12	0.29	300
		6.3*9	0.12	0.37	270
	120	6.3*11	0.12	0.12	455
		8*9	0.12	0.15	408
	150	6.3*11	0.12	0.096	632
		8*9	0.12	0.12	565
	220	6.3*12	0.12	0.084	721
		8*9	0.12	0.1	650
	330	8*11	0.12	0.071	810
		10*9	0.12	0.092	720
	470	8*16	0.12	0.055	1045
		10*12.5	0.12	0.052	1080
	680	8*20	0.12	0.04	1300
		10*16	0.12	0.04	1480
	1000	10*20	0.12	0.022	1870
	1200	10*25	0.12	0.021	2200
	1500	12.5*20	0.12	0.02	2410
	2200	12.5*25	0.14	0.017	2820
	2700	12.5*30	0.14	0.015	3340
		16*20	0.14	0.017	3190
	3300	12.5*35	0.16	0.014	3450
		16*25	0.16	0.016	3350
	3900	16*25	0.16	0.015	3510

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
25(1E)	47	5*11	0.10	0.29	300
		6.3*9	0.10	0.37	270
	100	6.3*11	0.10	0.12	455
		8*9	0.10	0.15	408
	220	8*11	0.10	0.071	810
		10*9	0.10	0.092	720
	330	8*16	0.10	0.055	1045
		10*12.5	0.10	0.052	1080
	390	8*20	0.10	0.044	1236
	470	10*16	0.10	0.037	1480
	560	10*16	0.10	0.03	1675
	680	10*20	0.10	0.022	1870
	820	10*25	0.10	0.021	2200
	1000	12.5*20	0.10	0.019	2550
	1500	12.5*25	0.10	0.017	2820
	1800	12.5*30	0.10	0.015	3340
		16*20	0.10	0.017	3190
	2200	12.5*35	0.12	0.014	3450
	2700	16*25	0.12	0.015	3510
35(1V)	33	5*11	0.10	0.29	300
		6.3*9	0.10	0.37	270
	56	6.3*11	0.10	0.12	455
		8*9	0.10	0.15	408
	100	8*11	0.10	0.095	632
		10*9	0.10	0.12	565
	150	8*11	0.10	0.071	810
		10*9	0.10	0.092	720
	220	8*16	0.10	0.055	1045
		10*12.5	0.10	0.052	1080
	270	8*20	0.10	0.04	1300
	330	10*16	0.10	0.037	1480
	470	10*20	0.10	0.022	1870
	560	10*25	0.10	0.021	2200
	680	12.5*20	0.10	0.02	2410
	1000	12.5*25	0.10	0.017	2820
	1200	12.5*30	0.10	0.015	3340
		16*20	0.10	0.017	3190
	1500	12.5*35	0.10	0.014	3450
50(1H)	22	5*11	0.08	0.33	288
		6.3*9	0.08	0.43	260
	56	6.3*11	0.08	0.13	435
		8*9	0.08	0.17	390
	100	8*11	0.08	0.073	774
		10*9	0.08	0.095	695
	120	8*16	0.08	0.06	1000
	150	10*12.5	0.08	0.06	1029
	180	8*20	0.08	0.045	1240
	220	10*16	0.08	0.041	1420
	270	10*20	0.08	0.029	1630
	330	10*25	0.08	0.027	1920
	470	12.5*20	0.08	0.026	2100
	560	12.5*25	0.08	0.022	2460
	680	12.5*30	0.08	0.02	2910
	820	12.5*35	0.08	0.018	3010
		16*20	0.08	0.022	2780
	1000	16*25	0.08	0.02	3060

RF series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
63(1J)	15	5*11	0.08	0.88	165
		6.3*9	0.08	1.14	148
	33	6.3*11	0.08	0.35	265
		8*9	0.08	0.45	235
	56	8*11	0.08	0.22	500
		10*9	0.08	0.28	450
	82	8*16	0.08	0.16	665
		10*12.5	0.08	0.11	690
	120	8*20	0.08	0.12	820
		10*16	0.08	0.076	950
	180	10*20	0.08	0.056	1150
		12.5*16	0.08	0.072	1150
	220	10*25	0.08	0.046	1350
	270	12.5*20	0.08	0.041	1500
	390	12.5*25	0.08	0.031	1900
	470	12.5*30	0.08	0.028	2300
		16*20	0.08	0.032	2000
	560	12.5*35	0.08	0.024	2500
	680	12.5*40	0.08	0.021	2800
		16*25	0.08	0.025	2600
		18*20	0.08	0.03	2500
	820	16*30	0.08	0.021	2850
		18*25	0.08	0.024	2800
	1000	16*35	0.08	0.019	2900
	1200	16*40	0.08	0.018	3400
		18*30	0.08	0.02	3300
	1500	18*35	0.08	0.018	3400
	1800	18*40	0.08	0.017	3500
80(1B)	68	10*12.5	0.08	0.17	480
	100	10*16	0.08	0.11	600
	120	10*20	0.08	0.084	800
	150	10*25	0.08	0.069	900
		12.5*16	0.08	0.11	750
	220	12.5*20	0.08	0.062	1100
	330	12.5*25	0.08	0.047	1250
		16*20	0.08	0.048	1350
	390	12.5*30	0.08	0.042	1500
	470	12.5*35	0.08	0.036	1650
		16*25	0.08	0.038	1700
		18*20	0.08	0.045	1500
	560	12.5*40	0.08	0.032	1800
	680	16*30	0.08	0.032	1850
		18*25	0.08	0.036	1750
	820	16*35	0.08	0.029	2000
		18*30	0.08	0.03	1900
	1000	16*40	0.08	0.027	2200
		18*35	0.08	0.027	2200
	1200	18*40	0.08	0.026	2700

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
100(1K)	6.8	5*11	0.08	1.4	125
		6.3*9	0.08	1.8	110
	15	6.3*11	0.08	0.57	205
		8*9	0.08	0.74	180
	27	8*12	0.08	0.36	355
		10*9	0.08	0.47	320
	39	8*16	0.08	0.25	450
	47	10*12.5	0.08	0.17	480
	56	8*20	0.08	0.19	565
	68	10*16	0.08	0.11	600
	82	10*20	0.08	0.084	800
	100	12.5*16	0.08	0.11	750
	120	10*25	0.08	0.069	900
	150	12.5*20	0.08	0.062	1100
	220	12.5*25	0.08	0.047	1250
		16*20	0.08	0.048	1350
	270	12.5*30	0.08	0.042	1500
	330	12.5*35	0.08	0.036	1650
		16*25	0.08	0.038	1700
		18*20	0.08	0.045	1500
	390	12.5*40	0.08	0.032	1800
	470	16*30	0.08	0.032	1850
		18*25	0.08	0.036	1750
	560	16*35	0.08	0.029	2000
		18*30	0.08	0.03	1900
	680	16*40	0.08	0.027	2200
		18*35	0.08	0.027	2200
	820	18*40	0.08	0.026	2700
120(2B)	10	6.3*11	0.12	5.5	80
	15	6.3*12	0.12	4.5	100
	18	8*9	0.12	4.0	120
	22	8*12	0.12	3.5	130
	33	8*16	0.12	3.0	220
		10*12.5	0.12	3.0	220
	47	8*20	0.12	2.5	270
		10*16	0.12	2.5	270
	56	10*16	0.12	2.2	285
	68	10*16	0.12	2.0	285
	82	10*20	0.12	1.8	300
	100	10*25	0.12	1.5	380
	120	12.5*20	0.12	1.3	520
	150	12.5*25	0.12	1.0	570
	220	13*30	0.12	0.75	700
		16*20	0.12	0.75	700
	270	16*25	0.12	0.55	800
		18*20	0.12	0.55	800
	330	16*30	0.12	0.42	860
		18*25	0.12	0.42	860
	470	16*40	0.12	0.30	960
		18*30	0.12	0.30	960

RS series

- High performance, high reliability
- Low impedance, high ripple current, long life
- Endurance: +105°C 4,000~10,000 hours
- **RoHS Compliant**

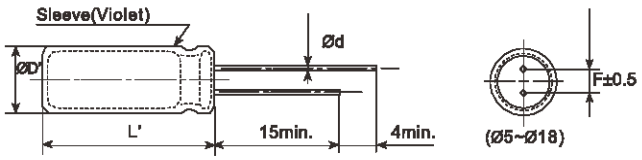
SPECIFICATIONS

Items	Characteristics										
Category Temperature Range	-40~+105°C										
Rated Voltage Range	6.3~120 Vdc										
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)										
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)										
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	80	100	120
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.08	0.12
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)										
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	80	100	120
	Z(-25°C)/Z(+20°C)	4	3	2							3
	Z(-40°C)/Z(+20°C)	8	6	4	3						6 (at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105 °C.										
	Capacitance Change: ≤±20% of the initial value (6.3,10V:≤±30%)										
	D.F. (tanδ): ≤200% of the initial specified value										
	Leakage Current: ≤The initial specified value										

Dia.	Load life (hours)	
	6.3~10V	16~120V
ØD≤6.3	4,000	5,000
ØD=8&10	6,000	7,000
ØD≥12.5	8,000	10,000

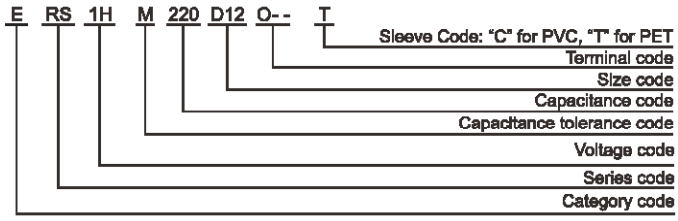
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.
	Capacitance Change: ≤±20% of the initial value (6.3,10V:≤±30%)
	D.F. (tanδ): ≤200% of the initial specified value
	Leakage Current: ≤200% of the initial specified value

DIMENSIONS[mm]



ØD	5	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<220	0.40	0.75	0.90	1.00
220≤Cap.<680	0.50	0.85	0.94	1.00
680≤Cap.<2200	0.60	0.87	0.95	1.00
2200≤Cap.<4700	0.75	0.90	0.95	1.00
Cap.≥4700	0.85	0.95	0.98	1.00

RS series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
6.3(0J)	150	5*11	0.22	0.57	200
		6.3*9	0.22	0.74	180
	330	6.3*11	0.22	0.21	350
		8*9	0.22	0.27	310
	680	8*12	0.22	0.13	660
		10*9	0.22	0.17	590
	820	10*12.5	0.22	0.08	870
	1000	8*16	0.22	0.086	850
	1200	8*20	0.22	0.07	1050
		10*16	0.22	0.06	1230
	1500	10*20	0.22	0.046	1400
	1800	12.5*16	0.22	0.049	1450
	2200	10*20	0.24	0.042	1650
	2700	10*30	0.24	0.03	1920
		16*15	0.24	0.041	1950
	3300	12.5*20	0.26	0.035	1910
	3900	12.5*25	0.26	0.026	2230
	4700	12.5*30	0.28	0.024	2650
	5600	12.5*35	0.30	0.02	2880
		16*20	0.30	0.027	2530
	6800	12.5*40	0.32	0.017	3350
		16*25	0.32	0.02	2930
		18*20	0.32	0.026	2860
	8200	16*30	0.36	0.017	3450
	10000	16*35	0.40	0.015	3610
		18*25	0.40	0.019	3140
	12000	16*40	0.44	0.013	4100
		18*30	0.44	0.015	4170
	15000	18*35	0.50	0.014	4220
	18000	18*40	0.56	0.012	4300
10(1A)	100	5*11	0.19	0.57	200
		6.3*9	0.19	0.74	180
	220	6.3*11	0.19	0.21	350
		8*9	0.19	0.27	310
	470	8*12	0.19	0.13	660
		10*9	0.19	0.17	590
	680	8*16	0.19	0.086	850
		10*12.5	0.19	0.08	870
	1000	8*20	0.19	0.069	1050
		10*16	0.19	0.06	1230
	1200	10*20	0.19	0.046	1400
	1500	10*25	0.19	0.042	1650
		12.5*16	0.19	0.049	1450
	2200	10*30	0.21	0.03	1920
		12.5*20	0.21	0.035	1910
		16*15	0.21	0.041	1950
	3300	12.5*25	0.23	0.026	2230
	3900	12.5*30	0.23	0.024	2650
		16*20	0.23	0.027	2530
	4700	12.5*35	0.25	0.02	2880
	5600	12.5*40	0.27	0.017	3350
		16*25	0.27	0.021	2930
		18*20	0.27	0.026	2860
	6800	16*30	0.29	0.017	3450
		18*25	0.29	0.019	3140
	8200	16*35	0.33	0.015	3610
		18*30	0.33	0.015	4170
	10000	16*40	0.37	0.013	4100
		18*35	0.37	0.014	4220
	12000	18*40	0.41	0.012	4300

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
16(1C)	56	5*11	0.16	0.57	200
		6.3*9	0.16	0.74	180
	120	6.3*11	0.16	0.21	350
		8*9	0.16	0.27	310
	330	8*12	0.16	0.13	660
		10*9	0.16	0.17	590
	470	8*16	0.16	0.087	850
		10*12.5	0.16	0.08	870
	680	8*20	0.16	0.069	1050
		10*16	0.16	0.06	1230
	1000	10*20	0.16	0.046	1400
		12.5*16	0.16	0.049	1450
	1200	10*25	0.16	0.042	1650
	1500	10*30	0.16	0.031	1920
		12.5*20	0.16	0.035	1910
		16*15	0.16	0.041	1950
	2200	12.5*25	0.18	0.027	2230
	2700	12.5*30	0.18	0.024	2650
		16*20	0.18	0.027	2530
	3300	12.5*35	0.20	0.02	2880
	3900	12.5*40	0.20	0.017	3350
		16*25	0.20	0.021	2930
		18*20	0.20	0.026	2860
	4700	16*30	0.22	0.017	3450
		18*25	0.22	0.019	3140
	5600	16*35	0.24	0.015	3610
		18*30	0.24	0.015	4170
	6800	16*40	0.26	0.013	4100
	8200	18*35	0.30	0.014	4220
	10000	18*40	0.34	0.012	4300
25(1E)	47	5*11	0.14	0.57	200
		6.3*9	0.14	0.74	180
	100	6.3*11	0.14	0.21	350
		8*9	0.14	0.27	310
	220	8*12	0.14	0.13	660
		10*9	0.14	0.17	590
	330	8*16	0.14	0.086	850
		10*12.5	0.14	0.08	870
	470	8*20	0.14	0.069	1050
		10*16	0.14	0.06	1230
	680	10*20	0.14	0.046	1400
		12.5*16	0.14	0.049	1450
	820	10*25	0.14	0.042	1650
	1000	10*30	0.14	0.03	1920
		12.5*20	0.14	0.035	1910
		16*15	0.14	0.041	1950
	1500	12.5*25	0.14	0.026	2230
	1800	12.5*30	0.14	0.024	2650
		16*20	0.14	0.027	2530
	2200	12.5*35	0.16	0.02	2880
		18*20	0.16	0.026	2860
	2700	12.5*40	0.16	0.017	3350
		16*25	0.16	0.021	2930
	3300	16*30	0.18	0.017	3450
		18*25	0.18	0.019	3140
	3900	16*35	0.18	0.015	3610
		18*30	0.18	0.015	4170
	4700	16*40	0.20	0.013	4100
		18*35	0.20	0.014	4220
	5600	18*40	0.22	0.012	4300

RS series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
35(1V)	33	5*11	0.12	0.57	200
		6.3*9	0.12	0.74	180
	56	6.3*11	0.12	0.21	350
		8*9	0.12	0.27	310
	150	8*12	0.12	0.13	660
		10*9	0.12	0.17	590
	220	8*16	0.12	0.086	850
		10*12.5	0.12	0.08	870
	270	8*20	0.12	0.069	1050
	330	10*16	0.12	0.06	1230
	470	10*20	0.12	0.046	1400
		12.5*16	0.12	0.049	1450
	560	10*25	0.12	0.042	1650
	680	10*30	0.12	0.03	1920
		12.5*20	0.12	0.035	1910
		16*15	0.12	0.041	1950
	1000	12.5*25	0.12	0.026	2230
	1200	12.5*30	0.12	0.024	2650
		16*20	0.12	0.028	2247
		16*25	0.12	0.027	2530
	1500	12.5*35	0.12	0.02	2880
	1800	12.5*40	0.12	0.017	3350
		16*25	0.12	0.021	2930
		18*20	0.12	0.026	2860
	2200	16*30	0.14	0.017	3450
		18*25	0.14	0.019	3140
	2700	16*35	0.14	0.015	3610
		18*30	0.14	0.015	4170
	3300	16*40	0.16	0.012	4100
		18*35	0.16	0.014	4220
	3900	18*40	0.16	0.011	4300
50(1H)	22	5*12	0.10	0.68	190
		6.3*9	0.10	0.89	170
	56	6.3*11	0.10	0.3	300
		8*9	0.10	0.39	270
	100	8*12	0.10	0.17	560
		10*9	0.10	0.22	500
	120	8*16	0.10	0.12	740
	150	10*12.5	0.10	0.12	760
	180	8*20	0.10	0.09	910
	220	10*16	0.10	0.084	1050
	270	10*20	0.10	0.058	1230
		12.5*16	0.10	0.061	1260
	330	10*25	0.10	0.055	1440
	470	10*30	0.10	0.043	1700
		12.5*20	0.10	0.045	1660
		16*15	0.10	0.055	1690
	560	12.5*25	0.10	0.034	1960
	680	12.5*30	0.10	0.03	2310
	820	12.5*35	0.10	0.025	2510
		16*20	0.10	0.034	2210
	1000	12.5*40	0.10	0.021	2920
		16*25	0.10	0.025	2560
		18*20	0.10	0.036	2490
	1200	16*30	0.10	0.021	3010
		18*25	0.10	0.026	2740
	1500	16*35	0.10	0.019	3150
	1800	16*40	0.10	0.016	3710
		18*30	0.10	0.021	3640
	2200	18*35	0.12	0.017	3680
	2700	18*40	0.12	0.014	3800

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
63(1J)	15	5*11	0.09	0.88	165
		6.3*9	0.09	1.15	145
	33	6.3*12	0.09	0.35	265
		8*9	0.09	0.46	235
	56	8*12	0.09	0.22	500
		10*9	0.09	0.29	440
	82	8*16	0.09	0.16	665
		10*12.5	0.09	0.11	690
	120	8*20	0.09	0.12	820
		10*16	0.09	0.076	950
	180	10*20	0.09	0.056	1150
		12.5*16	0.09	0.072	1150
	220	10*25	0.09	0.046	1350
	330	12.5*20	0.09	0.041	1500
	390	12.5*25	0.09	0.031	1900
	470	12.5*30	0.09	0.028	2300
		16*20	0.09	0.032	2000
	560	12.5*35	0.09	0.024	2500
	680	12.5*40	0.09	0.021	2800
		16*25	0.09	0.025	2600
		18*20	0.09	0.03	2500
	820	16*30	0.09	0.021	2850
		18*25	0.09	0.024	2800
	1000	16*35	0.09	0.019	2900
	1200	16*40	0.09	0.018	3400
		18*30	0.09	0.02	3300
	1500	18*35	0.09	0.018	3400
	1800	18*40	0.09	0.017	3500
80(1B)	68	10*12.5	0.08	0.17	480
	100	10*16	0.08	0.11	600
	120	10*20	0.08	0.084	800
	150	10*25	0.08	0.069	900
		12.5*16	0.08	0.11	750
	220	12.5*20	0.08	0.062	1100
	330	12.5*25	0.08	0.047	1250
		16*20	0.08	0.048	1350
	390	12.5*30	0.08	0.042	1500
	470	12.5*35	0.08	0.036	1650
		16*25	0.08	0.038	1700
		18*20	0.08	0.045	1500
	560	12.5*40	0.08	0.032	1800
	680	16*30	0.08	0.032	1850
		18*25	0.08	0.036	1750
	820	16*35	0.08	0.029	2000
		18*30	0.08	0.03	1900
	1000	16*40	0.08	0.027	2200
		18*35	0.08	0.027	2200
	1200	18*40	0.08	0.026	2700

RS series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
100(1K)	6.8	5*11	0.08	1.4	125
		6.3*9	0.08	1.9	110
	15	6.3*12	0.08	0.57	205
		8*9	0.08	0.75	180
	27	8*12	0.08	0.36	355
		10*9	0.08	0.45	310
	39	8*16	0.08	0.25	450
	47	10*12.5	0.08	0.17	480
	56	8*20	0.08	0.19	565
	68	10*16	0.08	0.11	600
	82	10*20	0.08	0.084	800
	100	12.5*16	0.08	0.11	750
	120	10*25	0.08	0.069	900
	150	12.5*20	0.08	0.062	1100
	220	12.5*25	0.08	0.047	1250
		16*20	0.08	0.048	1350
	270	12.5*30	0.08	0.042	1500
	330	12.5*35	0.08	0.036	1650
		16*25	0.08	0.038	1700
		18*20	0.08	0.045	1500
	390	12.5*40	0.08	0.032	1800
	470	16*30	0.08	0.032	1850
		18*25	0.08	0.036	1750
	560	16*35	0.08	0.029	2000
		18*30	0.08	0.03	1900
	680	16*40	0.08	0.027	2200
		18*35	0.08	0.027	2200
	820	18*40	0.08	0.026	2700

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
120(2B)	10	6.3*11	0.12	6	85
	15	6.3*12	0.12	5	110
	18	8*9	0.12	4.5	125
	22	8*12	0.12	4	140
	33	8*16	0.12	3.5	245
		10*12.5	0.12	3.5	245
	47	8*20	0.12	2.8	300
		10*16	0.12	2.8	315
	56	10*16	0.12	2.5	315
	68	10*16	0.12	2.2	315
	82	10*20	0.12	2	330
	100	10*25	0.12	1.7	410
	120	12.5*20	0.12	1.5	470
	150	12.5*25	0.12	1.0	620
	220	13*30	0.12	0.85	760
		16*20	0.12	0.85	760
	270	16*25	0.12	0.6	860
		18*20	0.12	0.6	860
	330	16*30	0.12	0.46	930
		18*25	0.12	0.46	930
	470	16*40	0.12	0.33	1035
		18*30	0.12	0.33	1035

RN series

- Miniaturized,high performance, high reliability
- Low impedance, high ripple current, long life
- Endurance: +105°C 5,000~10,000 hours
- **RoHS Compliant**

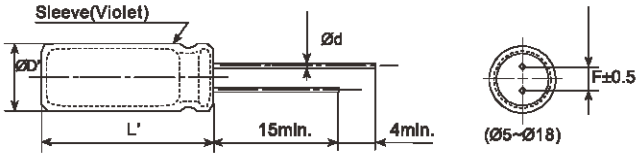
New

SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	-40~+105°C								
Rated Voltage Range	25~120 Vdc								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
Leakage Current	I≤0.01 CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)								(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	25	35	50	63	80	100	120	
	tanδ (max.)	0.14	0.12	0.10	0.09	0.08	0.08	0.12	
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.								(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	25	35	50	63	80	100	120	
	Z(-25°C)/Z(+20°C)	2						3	
	Z(-40°C)/Z(+20°C)	4						6	(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105 °C.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤The initial specified value							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤200% of the initial specified value							

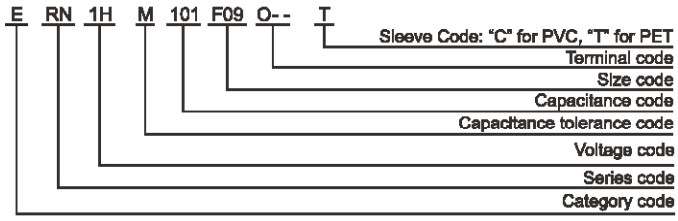
Dia.	Load life (hours)
ØD≤6.3	5,000
ØD=8&10	7,000
ØD≥12.5	10,000

DIMENSIONS[mm]



ØD	5	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k≤
Cap.<47	0.40	0.75	0.90	1.00
47≤Cap.<330	0.50	0.85	0.94	1.00
330≤Cap.<820	0.75	0.90	0.95	1.00
Cap.≥820	0.85	0.95	0.98	1.00

RN series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
25(1E)	10	5*9	0.14	3.5	80
	15	5*9	0.14	3.5	80
	22	5*9	0.14	3.5	80
	33	5*9	0.14	0.81	150
	47	5*9	0.14	0.65	180
	56	5*11	0.14	0.57	200
	68	5*11	0.14	0.57	200
		6.3*9	0.14	0.74	180
	100	5*11	0.14	0.57	200
	120	6.3*9	0.14	0.74	180
	180	6.3*11	0.14	0.21	350
		8*9	0.14	0.27	310
	220	6.3*11	0.14	0.21	350
		8*9	0.14	0.27	310
	330	8*12	0.14	0.13	660
		10*9	0.14	0.17	590
	390	8*14	0.14	0.15	885
	470	8*16	0.14	0.086	850
		10*12.5	0.14	0.08	870
	560	8*20	0.14	0.069	1050
		10*12.5	0.14	0.08	870
	680	8*20	0.14	0.069	1050
		10*16	0.14	0.06	1230
	820	10*16	0.14	0.06	1230
	1000	10*20	0.14	0.046	1400
	1200	10*25	0.14	0.042	1650
	1500	12.5*20	0.14	0.035	1910
35(1V)	10	5*9	0.12	3.5	80
	15	5*9	0.12	3.5	80
	22	5*9	0.12	3.5	80
	33	5*9	0.12	0.81	150
	47	5*11	0.12	0.57	200
	56	5*11	0.12	0.57	200
	68	6.3*9	0.12	0.74	180
	100	6.3*11	0.12	0.21	350
		8*9	0.12	0.27	310
	120	8*9	0.12	0.27	310
	180	8*12	0.12	0.13	660
		10*9	0.12	0.17	590
	220	8*12	0.12	0.13	660
		10*9	0.12	0.17	590
	330	8*16	0.12	0.086	850
		10*12.5	0.12	0.08	870
	390	8*20	0.12	0.069	1050
		10*12.5	0.12	0.08	870
	470	8*20	0.12	0.069	1050
		10*16	0.12	0.06	1230
	560	10*16	0.12	0.06	1230
	680	10*20	0.12	0.046	1400
		12.5*16	0.12	0.049	1450
	820	10*20	0.12	0.046	1400
		12.5*16	0.12	0.049	1450
	1000	12.5*20	0.12	0.035	1910
	1200	12.5*20	0.12	0.035	1910

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
50(1H)	10	5*9	0.10	2.8	100
	15	5*9	0.10	2.8	100
	22	5*9	0.10	2.8	100
	33	5*11	0.10	0.68	190
	47	6.3*9	0.10	0.89	170
	56	6.3*11	0.10	0.3	300
		8*9	0.10	0.39	270
	68	6.3*11	0.10	0.3	300
		8*9	0.10	0.39	270
	100	8*9	0.10	0.39	270
	120	8*12	0.10	0.17	560
		10*9	0.10	0.22	500
	150	8*12	0.10	0.17	560
		10*9	0.10	0.22	500
	180	8*16	0.10	0.12	740
		10*12.5	0.10	0.12	760
	220	8*16	0.10	0.12	740
		10*12.5	0.10	0.12	760
	330	10*16	0.10	0.084	1050
	470	10*20	0.10	0.058	1230
	560	12.5*16	0.10	0.061	1260
	680	12.5*20	0.10	0.045	1660
	820	12.5*25	0.10	0.034	1960
	1000	12.5*30	0.10	0.03	2310
		16*20	0.10	0.034	2210
63(1J)	10	5*9	0.09	3	100
	15	5*9	0.09	3	100
	18	5*9	0.09	3	100
	22	5*11	0.09	2.2	125
	39	6.3*9	0.09	2.8	110
	47	6.3*11	0.09	0.85	200
		8*9	0.09	1.1	175
	68	8*9	0.09	1.1	175
	82	8*12	0.09	0.56	300
	100	8*12	0.09	0.5	375
	150	8*16	0.09	0.32	500
	180	10*12.5	0.09	0.22	520
	220	10*16	0.09	0.18	650
	270	10*16	0.09	0.16	720
		12.5*13	0.09	0.15	780
	330	10*20	0.09	0.12	860
	390	12.5*16	0.09	0.144	860
	470	12.5*20	0.09	0.082	1120
	560	12.5*25	0.09	0.062	1420
	680	12.5*30	0.09	0.056	1730
		16*20	0.09	0.064	1500
	820	12.5*30	0.09	0.056	1730
		16*20	0.09	0.064	1500

RN series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
80(1B)	27	6.3*11	0.08	0.9	180
		8*9	0.08	1.2	160
	33	6.3*11	0.08	0.9	180
		8*9	0.08	1.2	160
	39	8*9	0.08	1.2	160
	47	8*12	0.08	0.65	260
	56	8*12	0.08	0.65	260
		10*9	0.08	0.85	220
	68	8*12	0.08	0.65	260
		10*9	0.08	0.85	220
	82	8*16	0.08	0.48	350
		10*12.5	0.08	0.34	380
	100	8*16	0.08	0.48	350
		10*12.5	0.08	0.34	380
	150	10*14	0.08	0.34	380
	180	10*16	0.08	0.22	480
	220	10*20	0.08	0.18	640
		12.5*16	0.08	0.22	600
	330	12.5*20	0.08	0.13	880
	390	12.5*25	0.08	0.094	1000
	470	13*25	0.08	0.094	1000
		16*20	0.08	0.096	1080
	560	12.5*30	0.08	0.084	1200
		16*25	0.08	0.076	1360
	680	12.5*35	0.08	0.072	1320
		16*25	0.08	0.076	1360
100(1K)	2.7	5*9	0.08	4.5	80
	3.3	5*9	0.08	3	80
	4.7	5*9	0.08	3	80
	5.6	5*11	0.08	3	80
	6.8	5*11	0.08	3	80
	10	5*11	0.08	3	80
	15	6.3*9	0.08	2	70
	22	6.3*12	0.08	0.9	180
		8*9	0.08	1.2	160
	33	8*9	0.08	1.2	160
	47	8*12	0.08	0.65	260
		10*9	0.08	0.85	220
	56	8*16	0.08	0.48	350
		10*12.5	0.08	0.34	380
	68	8*20	0.08	0.36	430
	82	8*20	0.08	0.36	430
		10*12.5	0.08	0.34	380
	100	10*16	0.08	0.22	480
	120	10*16	0.08	0.22	480
	150	10*20	0.08	0.18	640
		12.5*16	0.08	0.22	600
	220	12.5*20	0.08	0.13	880
	270	12.5*25	0.08	0.094	1000
	330	12.5*30	0.08	0.084	1200
		16*20	0.08	0.096	1080
	390	12.5*35	0.08	0.072	1320
		16*25	0.08	0.076	1360
	470	16*25	0.08	0.076	1360

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
100(1K)	470	18*20	0.08	0.096	1080
	560	16*30	0.08	0.064	1480
		18*25	0.08	0.072	1400
120(2B)	10	6.3*11	0.12	5.5	94
	15	6.3*12	0.12	4.5	120
	18	8*9	0.12	4.0	140
	22	8*12	0.12	3.5	154
	33	8*16	0.12	3.0	266
		10*12.5	0.12	3.0	266
	47	8*20	0.12	2.5	320
		10*16	0.12	2.5	338
	56	10*16	0.12	2.2	338
	68	10*16	0.12	2.0	338
	82	10*20	0.12	1.8	360
	100	10*25	0.12	1.5	450
	120	12.5*20	0.12	1.3	620
	150	12.5*25	0.12	1.0	675
	220	13*30	0.12	0.75	825
		16*20	0.12	0.75	825
	270	16*25	0.12	0.55	938
		18*20	0.12	0.55	938
	330	16*30	0.12	0.42	1013
		18*25	0.12	0.42	1013
	470	16*40	0.12	0.30	1125
		18*30	0.12	0.30	1125

RZ series

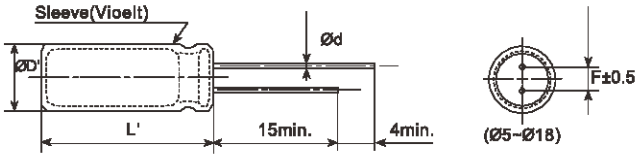
- Miniaturized,long life, low impedance
- High ripple current, high reliability
- Endurance: +105°C 6,000~10,000 hours
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-40~+105°C							
Rated Voltage Range	6.3~50 V_{dc}							
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)							
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)							
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	6.3	10	16	25	35	50	
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)							
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	6.3	10	16~50				
	Z(-25°C)/Z(+20°C)	2						
	Z(-40°C)/Z(+20°C)	6	4	3 (at 120Hz)				
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for a specified period of time at 105 °C.							
	Capacitance Change	≤±25% of the initial value (6.3,10V:≤±30%)						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤The initial specified value						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.							
	Capacitance Change	≤±25% of the initial value (6.3,10V:≤±30%)						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤200% of the initial specified value						

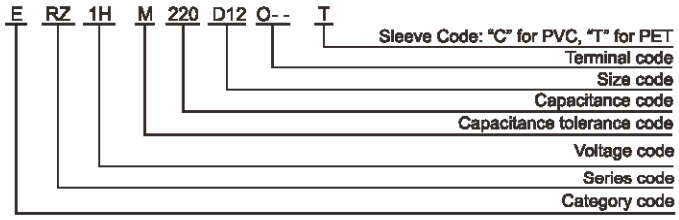
Case Dia.	Load life (hours)
ØD≤6.3	6,000
ØD=8	8,000
ØD≥10	10,000

DIMENSIONS[mm]



ØD	5	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<220	0.40	0.75	0.90	1.00
220≤Cap.<680	0.50	0.85	0.94	1.00
680≤Cap.<2200	0.60	0.87	0.95	1.00
2200≤Cap.<4700	0.75	0.90	0.95	1.00
Cap.≥4700	0.85	0.95	0.98	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RZ series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
6.3(0J)	220	5*12	0.22	0.22	345
		6.3*9	0.22	0.30	310
	470	6.3*12	0.22	0.094	540
		8*9	0.22	0.120	485
	820	8*12	0.22	0.056	945
		10*9	0.22	0.072	850
	1200	8*16	0.22	0.045	1250
		10*12.5	0.22	0.039	1330
	1500	8*20	0.22	0.029	1500
	1800	10*16	0.22	0.028	1760
	2200	10*20	0.24	0.020	1960
	2700	10*25	0.24	0.018	2250
	3900	12.5*20	0.26	0.017	2480
	4700	12.5*25	0.28	0.015	2900
	5600	12.5*30	0.30	0.013	3450
	6800	12.5*35	0.32	0.012	3570
		16*20	0.32	0.015	3250
	8200	16*25	0.36	0.013	3630
	10000	18*25	0.40	0.012	3650
10(1A)	150	5*12	0.19	0.22	345
		6.3*9	0.19	0.30	310
	330	6.3*12	0.19	0.094	540
		8*9	0.19	0.120	485
	680	8*11	0.19	0.056	945
		10*9	0.19	0.072	850
	1000	8*16	0.19	0.045	1250
		10*12.5	0.19	0.039	1330
	1500	8*20	0.19	0.029	1500
		10*16	0.19	0.028	1760
	1800	10*20	0.19	0.020	1960
	2200	10*25	0.21	0.018	2250
	3300	12.5*20	0.23	0.017	2480
	3900	12.5*25	0.23	0.015	2900
	4700	12.5*30	0.25	0.013	3450
		16*20	0.25	0.015	3250
	5600	12.5*35	0.27	0.012	3570
	6800	16*25	0.29	0.013	3630
	8200	18*25	0.33	0.012	3650
16(1C)	100	5*12	0.16	0.22	345
		6.3*9	0.16	0.30	310
	220	6.3*12	0.16	0.094	540
		8*9	0.16	0.120	485
	470	8*12	0.16	0.056	945
		10*9	0.16	0.072	850
	680	8*16	0.16	0.045	1250
		10*12.5	0.16	0.039	1330
	1000	8*20	0.16	0.029	1500
		10*16	0.16	0.028	1760
	1500	10*20	0.16	0.020	1960
	1800	10*25	0.16	0.018	2250
	2200	12.5*20	0.18	0.017	2480
	2700	12.5*25	0.18	0.015	2900
	3300	12.5*30	0.20	0.013	3450
		16*20	0.20	0.015	3250
	3900	12.5*35	0.20	0.012	3570
	4700	16*25	0.22	0.013	3630
	5600	18*25	0.24	0.012	3650

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
25(1E)	68	5*12	0.14	0.22	345
		6.3*9	0.14	0.30	310
	150	6.3*12	0.14	0.094	540
		8*9	0.14	0.120	485
	330	8*12	0.14	0.056	945
		10*9	0.14	0.072	850
	390	8*16	0.14	0.045	1250
	470	10*12.5	0.14	0.039	1330
	560	8*20	0.14	0.029	1500
	680	10*16	0.14	0.028	1760
	820	10*20	0.14	0.020	1960
	1000	10*25	0.14	0.018	2250
	1500	12.5*20	0.14	0.017	2480
	1800	12.5*25	0.14	0.015	2900
	2200	12.5*30	0.16	0.013	3450
		16*20	0.16	0.015	3250
	2700	12.5*35	0.16	0.012	3570
	3300	16*25	0.18	0.013	3630
	3900	18*25	0.18	0.012	3650
35(1V)	47	5*12	0.12	0.22	345
		6.3*9	0.12	0.30	310
	100	6.3*12	0.12	0.094	540
		8*9	0.12	0.120	485
	220	8*16	0.12	0.056	945
	270	8*20	0.12	0.045	1250
	330	10*12.5	0.12	0.039	1330
	390	8*20	0.12	0.029	1500
	470	10*16	0.12	0.028	1760
	560	10*20	0.12	0.020	1960
	680	10*25	0.12	0.018	2250
	1000	12.5*20	0.12	0.017	2480
	1200	12.5*25	0.12	0.015	2900
	1500	12.5*30	0.12	0.013	3450
		16*20	0.12	0.015	3250
	1800	12.5*35	0.12	0.012	3570
	2200	16*25	0.14	0.013	3630
	2700	18*25	0.14	0.012	3650
50(1H)	22	5*12	0.10	0.34	238
		6.3*9	0.10	0.44	214
	56	6.3*12	0.10	0.14	385
		8*9	0.10	0.18	345
	100	8*12	0.10	0.074	724
		10*9	0.10	0.096	650
	120	8*16	0.10	0.061	950
	150	10* 12.5	0.10	0.061	979
	180	8*20	0.10	0.046	1190
	220	10*16	0.10	0.042	1370
	270	10*20	0.10	0.030	1580
	330	10*25	0.10	0.028	1870
	470	12.5*20	0.10	0.027	2050
	560	12.5*25	0.10	0.023	2410
	680	12.5*30	0.10	0.021	2860
	820	12.5*35	0.10	0.019	2960
		16*20	0.10	0.023	2730
	1000	16*25	0.10	0.021	3010
	1500	18*25	0.10	0.019	3290

RJ series

- Miniaturized
- Low impedance, high ripple current,long life
- Endurance: +105°C 8,000 ~12,000 hours
- **RoHS Compliant**

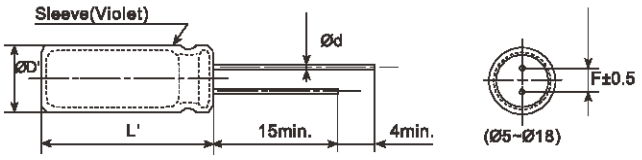
Upgrade

SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	-40~+105°C									
Rated Voltage Range	10~120 Vdc									
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)									
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)									
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	10	16	25	35	50	63	80	100	120
	tanδ (max.)	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08	0.12
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)									
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	10	16	25	35	50	63	80	100	120
	Z(-25°C)/Z(+20°C)	2	2							3
	Z(-40°C)/Z(+20°C)	4	3							6 (at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105 °C,the peak voltage shall not exceed the rated voltage.									
	Capacitance Change: ≤±25% of the initial value (10V:≤±30%)									
	D.F. (tanδ): ≤200% of the initial specified value									
	Leakage Current: ≤The initial specified value									
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.									
	Capacitance Change: ≤±25% of the initial value (10V:≤±30%)									
	D.F. (tanδ): ≤200% of the initial specified value									
	Leakage Current: ≤200% of the initial specified value									

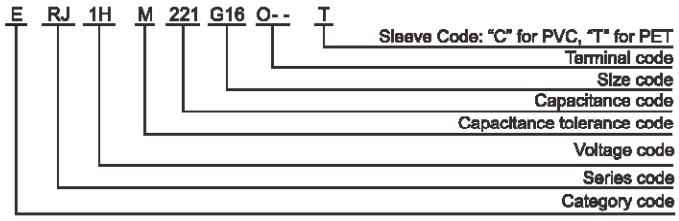
Case Dia.	Load life (hours)
	10~120V
ØD≤6.3	8,000
ØD=8&10	10,000
ØD≥12.5	12,000

DIMENSIONS[mm]



ØD	5	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k≤
Cap.<47	0.42	0.70	0.90	1.00
47≤Cap.<330	0.50	0.73	0.92	1.00
330≤Cap.<820	0.55	0.77	0.94	1.00
820≤Cap.<2200	0.60	0.80	0.96	1.00
Cap.≥2200	0.70	0.85	0.98	1.00

RJ series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
10(1A)	150	5*11	0.19	0.4	450
		6.3*9	0.19	0.52	380
	330	6.3*11	0.19	0.17	700
		8*9	0.19	0.22	590
	560	8*12	0.19	0.075	1200
		10*9	0.19	0.097	1020
	680	8*16	0.19	0.059	1600
	820	10*12.5	0.19	0.053	1700
	1000	8*20	0.19	0.041	1960
	1200	10*16	0.19	0.038	2000
	1800	10*20	0.19	0.028	2500
	2200	10*25	0.21	0.024	2900
	2700	12.5*20	0.21	0.025	2600
	3300	12.5*25	0.23	0.019	3200
	4700	12.5*30	0.25	0.018	3660
		16*20	0.25	0.021	3330
	5600	12.5*35	0.27	0.016	4120
		16*25	0.27	0.017	3810
16(1C)	120	5*11	0.16	0.4	450
		6.3*9	0.16	0.52	380
	270	6.3*11	0.16	0.17	700
		8*9	0.16	0.22	590
	470	8*12	0.16	0.075	1200
		10*9	0.16	0.097	1020
	560	8*16	0.16	0.059	1600
	680	10*12.5	0.16	0.053	1700
	820	8*20	0.16	0.041	1960
	1000	10*16	0.16	0.038	2000
	1500	10*20	0.16	0.028	2500
	1800	10*25	0.16	0.024	2900
	2200	12.5*20	0.18	0.025	2600
	2700	12.5*25	0.18	0.019	3200
	3300	12.5*30	0.20	0.018	3660
		16*20	0.20	0.021	3330
	3900	12.5*35	0.20	0.016	4120
	4700	16*25	0.22	0.017	3810
25(1E)	68	5*11	0.14	0.4	450
		6.3*9	0.14	0.52	380
	150	6.3*11	0.14	0.17	700
		8*9	0.14	0.22	590
	330	8*12	0.14	0.075	1200
		10*9	0.14	0.097	1020
	390	8*16	0.14	0.059	1600
	470	10*12.5	0.14	0.053	1700
	560	8*20	0.14	0.041	1960
	680	10*16	0.14	0.038	2000
	1000	10*20	0.14	0.028	2500
	1200	10*25	0.14	0.024	2900
	1500	12.5*20	0.14	0.025	2600
	1800	12.5*25	0.14	0.019	3200
	2200	12.5*30	0.16	0.018	3660
		16*20	0.16	0.021	3330
	2700	12.5*35	0.16	0.016	4120
	3300	16*25	0.18	0.017	3810

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
35(1V)	47	5*11	0.12	0.4	450
		6.3*9	0.12	0.52	380
	100	6.3*11	0.12	0.17	700
		8*9	0.12	0.22	590
	180	8*12	0.12	0.075	1200
		10*9	0.12	0.097	1020
	220	8*16	0.12	0.059	1600
	270	10*12.5	0.12	0.053	1700
	330	8*20	0.12	0.041	1960
	390	10*16	0.12	0.038	2000
	560	10*20	0.12	0.028	2500
	680	10*25	0.12	0.024	2900
	820	12.5*20	0.12	0.025	2600
	1200	12.5*25	0.12	0.019	3200
	1500	12.5*30	0.12	0.018	3660
		16*20	0.12	0.021	3330
	1800	12.5*35	0.12	0.016	4120
		16*25	0.12	0.017	3810
50(1H)	27	5*11	0.10	0.48	310
		6.3*9	0.10	0.63	260
	56	6.3*11	0.10	0.22	500
		8*9	0.10	0.29	425
	100	8*12	0.10	0.12	950
		10*9	0.10	0.16	800
	120	8*16	0.10	0.082	1230
	150	10*12.5	0.10	0.073	1280
	180	8*20	0.10	0.058	1580
	220	10*16	0.10	0.053	1650
	330	10*20	0.10	0.038	2060
	390	10*25	0.10	0.032	2420
	470	12.5*20	0.10	0.032	2300
	680	12.5*25	0.10	0.025	2800
	820	12.5*30	0.10	0.023	3370
		16*20	0.10	0.026	3070
	1000	12.5*35	0.10	0.021	3810
		16*25	0.10	0.022	3510
63(1J)	18	5*11	0.09	0.71	240
		6.3*9	0.09	0.92	200
	47	6.3*11	0.09	0.28	420
		8*9	0.09	0.36	350
	82	8*12	0.09	0.18	720
		10*9	0.09	0.24	610
	100	8*16	0.09	0.13	990
	120	10*12.5	0.09	0.11	990
	150	8*20	0.09	0.096	1200
	180	10*16	0.09	0.076	1200
	270	10*20	0.09	0.056	1570
		12.5*16	0.09	0.072	1570
	330	10*25	0.09	0.046	1990
	390	12.5*20	0.09	0.041	1990
	470	12.5*25	0.09	0.031	2460
	560	12.5*30	0.09	0.028	2760
		16*20	0.09	0.032	2380
	680	12.5*35	0.09	0.024	3040
	820	16*25	0.09	0.025	2890

RJ series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
80(1B)	12	5*11	0.09	1.2	220
		6.3*9	0.09	1.6	180
	27	6.3*11	0.09	0.46	370
		8*9	0.09	0.6	310
	47	8*12	0.09	0.29	620
		10*9	0.09	0.38	520
	56	8*16	0.09	0.2	780
	68	10*12.5	0.09	0.17	780
	82	8*20	0.09	0.16	1040
	100	10*16	0.09	0.11	1040
	150	10*20	0.09	0.084	1430
		12.5*16	0.09	0.11	1430
	180	10*25	0.09	0.069	1620
	220	12.5*20	0.09	0.062	1750
	270	12.5*25	0.09	0.047	2210
	330	12.5*30	0.09	0.042	2400
		16*20	0.09	0.048	1950
	390	12.5*35	0.09	0.036	2600
	470	12.5*40	0.09	0.032	2860
		16*25	0.09	0.038	2430
		18*20	0.09	0.045	2270
	560	16*30	0.09	0.032	2640
	680	16*35	0.09	0.029	2860
		18*25	0.09	0.036	2500
	820	16*40	0.09	0.027	3510
		18*30	0.09	0.03	2860
	1000	18*35	0.09	0.027	3510
	1200	18*40	0.09	0.026	3860
100(1K)	8.2	5*11	0.08	1.2	220
		6.3*9	0.08	1.6	180
	18	6.3*11	0.08	0.46	370
		8*9	0.08	0.6	310
	33	8*12	0.08	0.29	620
		10*9	0.08	0.38	520
	47	8*16	0.08	0.2	780
	56	10*12.5	0.08	0.17	780
	68	8*20	0.08	0.16	1040
	82	10*16	0.08	0.11	1040
	100	10*20	0.08	0.084	1430
		12.5*16	0.08	0.11	1430
	120	10*25	0.08	0.069	1620
	150	12.5*20	0.08	0.062	1750
	220	12.5*25	0.08	0.047	2210
	270	12.5*30	0.08	0.042	2400
		16*20	0.08	0.048	1950
	330	12.5*35	0.08	0.036	2600
	390	12.5*40	0.08	0.032	2860
		16*25	0.08	0.038	2430
		18*20	0.08	0.045	2270
	470	16*30	0.08	0.032	2640
		18*25	0.08	0.036	2500
	560	16*35	0.08	0.029	2860
		18*30	0.08	0.03	2860
	680	16*40	0.08	0.027	3510
		18*35	0.08	0.027	3510
	820	18*40	0.08	0.026	3860

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
120(2B)	10	6.3*11	0.12	4.6	110
	15	6.3*12	0.12	3.8	145
	18	8*9	0.12	3.5	165
	22	8*12	0.12	3.0	180
	33	8*16	0.12	2.5	320
		10*12.5	0.12	2.5	320
	47	8*20	0.12	2.2	385
		10*16	0.12	2.0	400
	56	10*16	0.12	1.9	410
	68	10*16	0.12	1.8	420
	82	10*20	0.12	1.6	435
	100	10*25	0.12	1.3	540
	120	12.5*20	0.12	1.1	750
	150	12.5*25	0.12	0.85	810
	220	13*30	0.12	0.65	990
		16*20	0.12	0.65	990
	270	16*25	0.12	0.47	1125
		18*20	0.12	0.47	1125
	330	16*30	0.12	0.36	1215
		18*25	0.12	0.36	1215
	470	16*40	0.12	0.26	1350
		18*30	0.12	0.26	1350

RH series

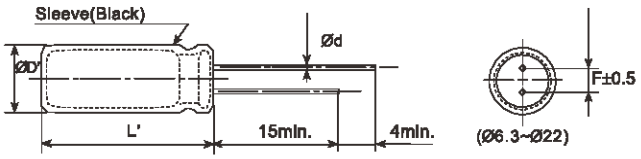
- High frequency,low impedance
- Endurance: +105°C 2,000~3,000 hours
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-40~+105°C(160 ~400 Vdc) -25~+105°C(450 Vdc)							
Rated Voltage Range	160~450 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
Leakage Current	I≤0.02CV or 10μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)							(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160	200	250	350	400	450	
	tanδ (max.)	0.12	0.12	0.12	0.15	0.15	0.20	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160	200	250	350	400	450	
	Z(-25°C)/Z(+20°C)	3	5				6	
	Z(-40°C)/Z(+20°C)	4	7				-	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for a specified period of time at 105°C.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤The initial specified value						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤200% of the initial specified value						

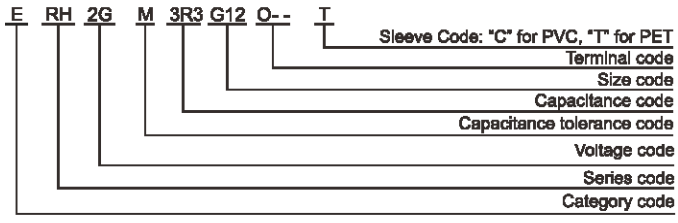
Case Dia.	Load life (hours)
ØD≤8	2,000
ØD≥10	3,000

DIMENSIONS[mm]



ØD	6.3	8		10	12.5	16	18	22
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5	10.0
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<10	0.40	0.70	0.92	1.00
10≤Cap.<100	0.56	0.83	0.95	1.00
100≤Cap.≤1000	0.67	0.87	0.96	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RH series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	2.2	6.3*11	0.12	80
	3.3	6.3*11	0.12	103
	4.7	8*12	0.12	121
	10	10*12	0.12	150
	22	10*16	0.12	228
	33	10*20	0.12	293
	47	12.5*20	0.12	368
	100	12.5*25	0.12	587
	220	16*30	0.12	883
200(2D)	1	5*11	0.12	50
	2.2	6.3*11	0.12	77
	3.3	6.3*11	0.12	103
	4.7	8*12	0.12	121
	10	10*12	0.12	152
	22	10*16	0.12	228
		10*20	0.12	238
	33	10*20	0.12	319
		12.5*20	0.12	365
	47	12.5*20	0.12	405
	56	12.5*25	0.12	476
	68	12.5*25	0.12	540
	82	10*30	0.12	574
	100	16*25	0.12	774
	120	16*25	0.12	801
	150	18*25	0.12	908
	180	12.5*35	0.12	948
	220	18*30	0.12	1032
250(2E)	0.47	6.3*11	0.12	32
	1	6.3*11	0.12	59
	2.2	6.3*11	0.12	77
	3.3	8*12	0.12	106
	4.7	8*12	0.12	124
	10	10*12	0.12	152
	22	10*20	0.12	244
	33	12.5*20	0.12	371
	47	12.5*25	0.12	423
	56	12.5*25	0.12	472
	82	16*25	0.12	637
	100	16*30	0.12	795
	220	18*35	0.12	1085
	330	18*45	0.12	1182
	470	22*46	0.12	1290
350(2V)	0.47	6.3*11	0.15	32
	1	6.3*11	0.15	59
	2.2	8*12	0.15	80
	3.3	8*12	0.15	109
		10*12	0.15	118
	4.7	10*16	0.15	153
	10	10*16	0.15	179
	22	12.5*25	0.15	316
	33	16*25	0.15	365
	47	16*30	0.15	532

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
400(2G)	1	8*12	0.15	59
	2.2	8*12	0.15	91
	3.3	8*12	0.15	125
		10*12	0.15	133
	4.7	10*12	0.15	156
	10	10*16	0.15	184
		10*20	0.15	211
	22	12.5*20	0.15	332
	27	10*30	0.15	426
	33	10*35	0.15	498
		16*20	0.15	487
	39	10*40	0.15	543
	47	12.5*30	0.15	659
		16*25	0.15	647
	56	10*45	0.15	725
		12.5*35	0.15	720
	68	12.5*40	0.15	902
		16*30	0.15	864
	82	12.5*40	0.15	941
		18*30	0.15	924
	100	12.5*50	0.15	956
		18*30	0.15	935
	120	22*31	0.15	962
	150	12.5*60	0.15	1021
		22*31	0.15	1010
450(2W)	1	8*12	0.20	59
	2.2	10*12	0.20	96
	3.3	10*16	0.20	136
	4.7	10*20	0.20	159
	10	12.5*20	0.20	169
	18	10*30	0.20	221
	22	16*20	0.20	338
	27	10*30	0.20	426
	33	10*35	0.20	509
		16*25	0.20	504
	39	10*40	0.20	554
	47	10*45	0.20	703
		12.5*30	0.20	698
		18*25	0.20	686
	56	12.5*35	0.20	781
		18*25	0.20	769
	68	12.5*40	0.20	830
		18*30	0.20	808
	82	12.5*45	0.20	886
		18*30	0.20	853
	100	18*35	0.20	924
	120	18*40	0.20	1128
	150	22*40	0.20	1354
	220	22*46	0.20	1537

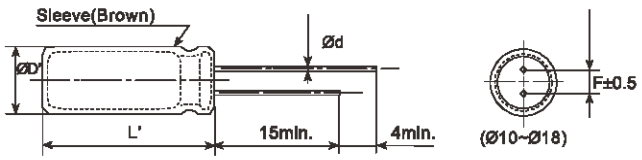
HH series

- High ripple current
- Endurance: +105°C 2,000 hours
- **RoHS Compliant**

SPECIFICATIONS

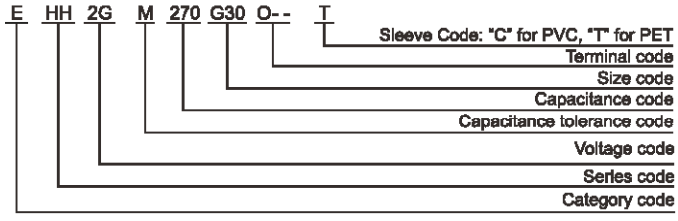
Items	Characteristics				
Category Temperature Range	-40~+105°C(400 Vdc) -25~+105°C(420~450 Vdc)				
Rated Voltage Range	400~450 Vdc				
Capacitance Tolerance	±20%(M)				(at 20°C,120Hz)
Leakage Current		After 1 minute	After 5 minutes		Where,I:Max.leakage current (μA), C:Nominal capacitance (μF), V: Rated voltage (V) (at 20°C)
	CV≤1000	I≤0.1CV+40μA	I≤0.03CV+15μA		
	CV>1000	I≤0.04CV+100μA	I≤0.02CV+25μA		
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	400	420	450	
	tanδ (max.)	0.15	0.20	0.20	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	400	420	450	
	Z(-25°C)/Z(+20°C)	5	6	6	
	Z(-40°C)/Z(+20°C)	6	-	-	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 105°C.				
	Capacitance Change	≤±20% of the initial value			
	D.F. (tanδ)	≤200% of the initial specified value			
	Leakage Current	≤The initial specified value			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.				
	Capacitance Change	≤±20% of the initial value			
	D.F. (tanδ)	≤200% of the initial specified value			
	Leakage Current	≤200% of the initial specified value			

DIMENSIONS[mm]



ØD	10	12.5	16	18
Ød	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.			
L'	L+2max.			

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
18≤Cap.<100	1.00	1.50	1.75	1.80
100≤Cap.≤1000	1.00	1.30	1.40	1.50

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

HH series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
400(2G)	27	10*30	0.15	270
	33	10*30	0.15	335
	39	10*35	0.15	390
	47	10*40	0.15	445
		12.5*30	0.15	430
	56	10*45	0.15	510
		12.5*30	0.15	480
	68	10*55	0.15	560
		12.5*35	0.15	520
		12.5*40	0.15	535
	82	12.5*40	0.15	640
	100	12.5*45	0.15	730
		16*30	0.15	715
	120	12.5*55	0.15	815
		16*35	0.15	800
		18*30	0.15	800
420(2T)	27	10*30	0.20	270
	33	10*30	0.20	335
	39	10*35	0.20	390
	47	10*40	0.20	445
		12.5*30	0.20	430
	56	10*50	0.20	520
		12.5*30	0.20	485
	68	12.5*35	0.20	560
		12.5*40	0.20	570
	82	12.5*40	0.20	640
	100	12.5*50	0.20	750
		16*35	0.20	725
	120	12.5*60	0.20	825
		16*35	0.20	810
		18*30	0.20	810

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
450(2W)	22	10*30	0.20	195
	27	10*30	0.20	300
	33	10*35	0.20	350
		12.5*30	0.20	340
	39	10*40	0.20	405
		12.5*35	0.20	380
	47	10*45	0.20	460
		12.5*30	0.20	440
	56	12.5*35	0.20	505
		16*30	0.20	480
	68	12.5*40	0.20	530
		18*30	0.20	500
	82	12.5*45	0.20	660
		16*35	0.20	655
	100	12.5*55	0.20	760
		16*35	0.20	740
	120	12.5*60	0.20	835
		16*40	0.20	820
		18*31	0.20	815

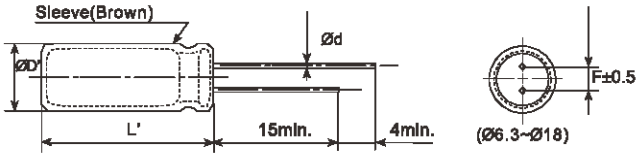
HS series

- High ripple current; For power supply applications
- Endurance: +105°C 3,000~5,000 hours
- **RoHS Compliant**

SPECIFICATIONS

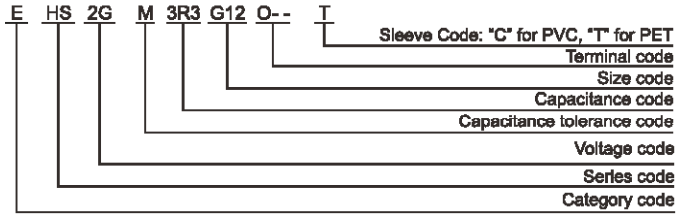
Items	Characteristics
Category Temperature Range	-25~+105°C
Rated Voltage Range	160~450 Vdc
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)
Leakage Current	After 1 minute / After 5 minutes CV≤1000: I≤0.1CV+40μA / I≤0.03CV+15μA CV>1000: I≤0.04CV+100μA / I≤0.02CV+25μA Where, I:Max.leakage current (μA), C:Nominal capacitance (μF), V: Rated voltage (V) (at 20°C)
Dissipation Factor (tanδ)	Rated Voltage(Vdc): 160 200 250 350 400 450 tanδ (max.): 0.15 0.15 0.15 0.20 0.20 0.20 (at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc): 160 200 250 350 400 450 Z(-25°C)/Z(+20°C): 3 3 3 6 6 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for a specified period of time at 105°C. Capacitance Change: ≤±20% of the initial value D.F. (tanδ): ≤200% of the initial specified value Leakage Current: ≤The initial specified value Case Dia. / Load life (hours): ØD≤8: 3,000; ØD≥10: 5,000
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Capacitance Change: ≤±20% of the initial value D.F. (tanδ): ≤200% of the initial specified value Leakage Current: ≤200% of the initial specified value

DIMENSIONS[mm]



ØD	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.						
L'	L+2max.						

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
<100	1.0	1.75	2.25	2.50
≥100	1.0	1.67	2.05	2.25

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

HS series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
160(2C)	1	6.3*12	0.15	21
	2.2	6.3*12	0.15	32
	3.3	6.3*12	0.15	40
	4.7	6.3*12	0.15	47
	6.8	8*12	0.15	62
	10	8*12	0.15	75
	15	10*16	0.15	115
	22	10*20	0.15	140
	33	10*20	0.15	175
	47	12.5*20	0.15	240
	68	12.5*25	0.15	370
	100	16*25	0.15	430
	150	16*25	0.15	500
	220	16*30	0.15	815
	270	18*30	0.15	880
	330	18*40	0.15	980
200(2D)	0.47	6.3*12	0.15	13
	1	6.3*12	0.15	19
	2.2	6.3*12	0.15	32
	3.3	6.3*12	0.15	40
	4.7	8*12	0.15	47
	6.8	10*12	0.15	70
	10	10*12	0.15	80
	15	10*16	0.15	118
	22	10*20	0.15	140
	33	10*20	0.15	160
	47	12.5*20	0.15	250
	68	12.5*25	0.15	330
	100	16*25	0.15	440
	150	16*25	0.15	600
	220	18*30	0.15	680
	270	18*40	0.15	1040
250(2E)	0.47	6.3*12	0.15	13
	1	6.3*12	0.15	19
	2.2	6.3*12	0.15	37
	3.3	8*12	0.15	50
	4.7	8*12	0.15	58
	6.8	10*12	0.15	72
	10	10*16	0.15	100
	15	10*16	0.15	120
	22	10*20	0.15	168
	33	12.5*20	0.15	210
	47	12.5*25	0.15	320
	68	16*25	0.15	410
	100	16*30	0.15	530
	150	18*25	0.15	550
	220	18*35	0.15	710

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
350(2V)	0.47	6.3*12	0.20	20
	1	6.3*12	0.20	24
	2.2	8*12	0.20	40
	3.3	8*12	0.20	52
	4.7	10*12	0.20	65
	6.8	10*20	0.20	88
	10	10*20	0.20	105
	15	12.5*20	0.20	130
	22	12.5*20	0.20	182
	33	12.5*25	0.20	240
	47	16*25	0.20	305
	68	16*30	0.20	390
	100	18*30	0.20	480
400(2G)	1	8*12	0.20	25
	2.2	8*12	0.20	40
	3.3	10*12	0.20	55
	4.7	10*16	0.20	76
	6.8	10*20	0.20	80
	10	12.5*20	0.20	110
	15	12.5*20	0.20	135
	22	12.5*25	0.20	205
	33	16*20	0.20	255
	47	16*25	0.20	330
	68	16*35	0.20	400
	82	18*30	0.20	420
	100	18*35	0.20	495
	120	18*40	0.20	520
450(2W)	1	8*12	0.20	35
	2.2	10*12	0.20	40
	3.3	10*16	0.20	65
	4.7	10*16	0.20	85
	6.8	10*20	0.20	90
	10	12.5*20	0.20	140
	15	16*20	0.20	160
	22	16*25	0.20	200
	33	16*25	0.20	320
	47	18*25	0.20	350
	68	18*30	0.20	440
	82	18*35	0.20	500
	100	18*40	0.20	560

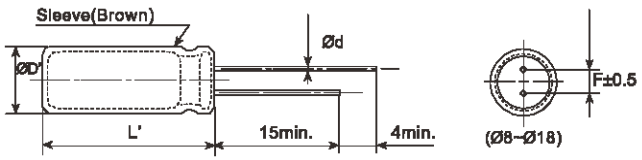
HF series

- Long life, high ripple current; For power supply applications
- Endurance: +105°C 5,000~10,000 hours
- **RoHS Compliant**

SPECIFICATIONS

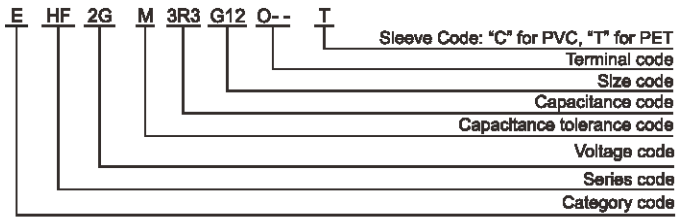
Items	Characteristics
Category Temperature Range	-25~+105°C
Rated Voltage Range	160~450 Vdc
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)
Leakage Current	CV≤1000: I≤0.1CV+40μA (After 1 minute); I≤0.03CV+15μA (After 5 minutes) CV>1000: I≤0.04CV+100μA (After 1 minute); I≤0.02CV+25μA (After 5 minutes) Where, I:Max.leakage current (μA), C:Nominal capacitance (μF), V: Rated voltage (V) (at 20°C)
Dissipation Factor (tanδ)	Rated Voltage(Vdc): 160 200 250 350 400 450 tanδ (max.): 0.15 0.15 0.15 0.20 0.20 0.20 (at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc): 160 200 250 350 400 450 Z(-25°C)/Z(+20°C): 3 3 3 6 6 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for a specified period of time at 105°C. Capacitance Change: ≤±20% of the initial value D.F. (tanδ): ≤200% of the initial specified value Leakage Current: ≤The initial specified value Case Dia. / Load life (hours): ØD≤8: 5,000; ØD=10: 8,000; ØD≥12.5: 10,000
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Capacitance Change: ≤±20% of the initial value D.F. (tanδ): ≤200% of the initial specified value Leakage Current: ≤200% of the initial specified value

DIMENSIONS[mm]



ØD	8		10	12.5	16	18
Ød	0.5	0.6	0.6	0.6	0.8	0.8
F	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.					
L'	L+2max.					

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
<100	1.0	1.75	2.25	2.50
≥100	1.0	1.67	2.05	2.25

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

HF series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
160(2C)	10	10*16	0.15	128
	12	10*16	0.15	145
	15	10*20	0.15	175
	22	10*20	0.15	205
	33	10*20	0.15	250
	39	10*20	0.15	275
	47	10*20	0.15	300
		12.5*20	0.15	310
	56	12.5*20	0.15	350
	68	12.5*20	0.15	478
	82	12.5*20	0.15	510
		16*20	0.15	525
	100	12.5*25	0.15	630
		16*20	0.15	635
	150	16*20	0.15	770
		16*25	0.15	790
	220	16*25	0.15	1020
		18*25	0.15	1045
	330	18*30	0.15	1402
200(2D)	10	10*16	0.15	126
	12	10*16	0.15	140
	15	10*20	0.15	170
	22	10*20	0.15	205
	33	10*20	0.15	255
		12.5*20	0.15	265
	39	12.5*20	0.15	310
	47	12.5*20	0.15	392
	68	12.5*20	0.15	470
		12.5*25	0.15	485
	82	16*20	0.15	554
	100	16*20	0.15	632
		16*25	0.15	655
	150	16*25	0.15	840
		16*30	0.15	865
		18*25	0.15	870
	220	18*25	0.15	1050
		18*30	0.15	1080
	330	18*35	0.15	1430
		18*40	0.15	1460
250(2E)	4.7	8*12	0.15	70
	5.6	10*12	0.15	85
	6.8	10*12	0.15	110
	10	10*20	0.15	140
	22	10*20	0.15	205
	33	12.5*20	0.15	325
	39	12.5*20	0.15	345
	47	12.5*20	0.15	390
		12.5*25	0.15	405
	68	16*20	0.15	528
	82	16*20	0.15	550
		16*30	0.15	570
	100	16*25	0.15	680
		18*25	0.15	700
	150	18*25	0.15	866
	220	18*31	0.15	1130
		18*40	0.15	1160

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
350(2V)	4.7	10*12	0.20	70
	5.6	10*12	0.20	90
	6.8	10*16	0.20	112
	10	10*20	0.20	140
	22	12.5*20	0.20	265
	33	16*20	0.20	364
	39	16*20	0.20	385
	47	16*20	0.20	430
		16*25	0.20	445
	68	16*25	0.20	560
		18*20	0.20	550
		18*25	0.20	570
	82	18*25	0.20	618
	100	18*25	0.20	700
		18*30	0.20	725
	120	18*30	0.20	836
	150	18*35	0.20	970
400(2G)	1	8*12	0.20	30
	2.2	8*12	0.20	45
	3.3	10*12	0.20	80
	4.7	10*16	0.20	100
	6.8	10*16	0.20	112
	10	10*20	0.20	144
	15	12.5*20	0.20	222
	22	12.5*20	0.20	260
		12.5*25	0.20	275
	33	16*20	0.20	368
	39	16*25	0.20	410
	47	16*25	0.20	470
		18*20	0.20	455
		16*30	0.20	480
	56	10*50	0.20	520
	68	12.5*40	0.20	600
		18*25	0.20	590
	82	12.5*45	0.20	625
		18*25	0.20	610
		18*30	0.20	630
	100	12.5*50	0.20	790
		18*31	0.20	765
		18*35	0.20	785
	120	18*35	0.20	870
	150	18*40	0.20	985
450(2W)	6.8	10*20	0.20	112
	10	12.5*20	0.20	185
	15	12.5*25	0.20	248
	22	16*20	0.20	295
	33	10*40	0.20	405
		16*25	0.20	398
		18*20	0.20	385
	39	10*45	0.20	425
		18*25	0.20	415
	47	12.5*40	0.20	505
		18*25	0.20	496
	56	12.5*40	0.20	550
	68	18*30	0.20	640
	82	12.5*50	0.20	730
		18*35	0.20	720
	100	18*40	0.20	808

HL series

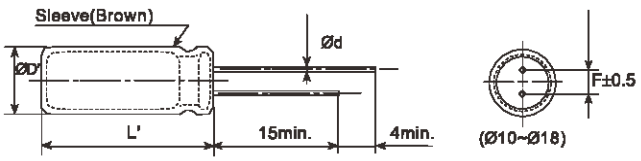
- Long life, downsized, high ripple current; For power supply applications
- Endurance: +105°C 8,000~12,000 hours
- **RoHS Compliant**

Upgrade

SPECIFICATIONS

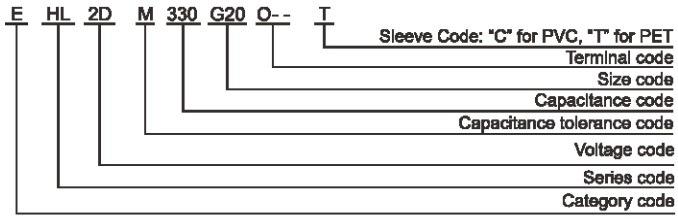
Items	Characteristics
Category Temperature Range	-25~+105°C
Rated Voltage Range	160~500 Vdc
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)
Leakage Current	After 1 minute: CV≤1000 I≤0.1CV+40μA; CV>1000 I≤0.04CV+100μA. After 5 minutes: I≤0.03CV+15μA; I≤0.02CV+25μA. Where,I:Max.leakage current (μA), C:Nominal capacitance (μF), V: Rated voltage (V) (at 20°C)
Dissipation Factor (tanδ)	Rated Voltage(Vdc): 160 200 250 350 400 450 500; tanδ (max.): 0.18 0.18 0.18 0.24 0.24 0.24 0.24 (at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc): 160 200 250 350 400 450 500; Z(-25°C)/Z(+20°C): 3 3 3 6 6 6 6 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for a specified period of time at 105°C. Capacitance Change: ≤±20% of the initial value; D.F. (tanδ): ≤200% of the initial specified value; Leakage Current: ≤The initial specified value. Life time: Rated Voltage 160 to 400Vdc: L≤20: 10,000 hours, L>20: 12,000 hours; 500Vdc: Φ10: 8,000 hours, Φ≥12.5: 10,000 hours
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Capacitance Change: ≤±20% of the initial value; D.F. (tanδ): ≤200% of the initial specified value; Leakage Current: ≤200% of the initial specified value

DIMENSIONS[mm]



ØD	10	12.5	16	18
Ød	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.			
L'	L+2max.			

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
<100	1.0	1.75	2.25	2.50
≥100	1.0	1.67	2.05	2.25

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

HL series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
160(2C)	33	10*16	0.18	210
	47	10*20	0.18	300
	56	10*20	0.18	318
	68	10*25	0.18	345
	82	10*25	0.18	416
		10*30	0.18	448
	100	12.5*20	0.18	575
	120	10*35	0.18	572
	150	10*40	0.18	668
		10*45	0.18	696
		12.5*25	0.18	767
	180	10*50	0.18	788
		12.5*30	0.18	885
		16*20	0.18	858
	220	12.5*35	0.18	1044
		16*25	0.18	1022
		18*20	0.18	992
	270	12.5*40	0.18	1196
		12.5*45	0.18	1230
	330	12.5*50	0.18	1404
		16*30	0.18	1355
		18*25	0.18	1292
	390	16*35	0.18	1505
	470	16*40	0.18	1708
		16*45	0.18	1730
		18*30	0.18	1665
		18*35	0.18	1722
	560	16*50	0.18	1924
		18*40	0.18	1910
	680	18*45	0.18	2135
		18*50	0.18	2148
200(2D)	33	10*20	0.18	255
	39	10*20	0.18	268
	47	10*20	0.18	302
	56	10*25	0.18	346
	68	10*30	0.18	406
	82	12.5*20	0.18	522
	100	10*35	0.18	520
		12.5*25	0.18	628
	120	10*40	0.18	595
		10*45	0.18	624
		12.5*30	0.18	728
		16*20	0.18	698
	150	10*50	0.18	720
		12.5*35	0.18	862
	180	16*25	0.18	928
		18*20	0.18	895
	220	12.5*40	0.18	1078
		12.5*45	0.18	1116
		18*25	0.18	1050
	270	12.5*50	0.18	1268
		16*30	0.18	1225
		16*35	0.18	1252
	330	16*40	0.18	1428
		18*30	0.18	1402
	390	16*45	0.18	1575
		18*35	0.18	1570
	470	16*50	0.18	1762
		18*40	0.18	1748
		18*45	0.18	1775
	560	18*50	0.18	1952

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
250(2E)	27	10*20	0.18	205
	33	10*20	0.18	242
	47	10*25	0.18	316
		10*30	0.18	342
	56	12.5*20	0.18	430
	68	10*35	0.18	432
	82	10*40	0.18	495
		10*45	0.18	518
		12.5*25	0.18	565
		12.5*30	0.18	575
	100	10*50	0.18	586
		12.5*30	0.18	662
		16*20	0.18	638
	120	12.5*35	0.18	770
		16*25	0.18	758
		18*20	0.18	732
	150	12.5*40	0.18	892
		12.5*45	0.18	922
	180	12.5*50	0.18	1040
		16*30	0.18	995
		18*25	0.18	955
	220	16*35	0.18	1130
		18*30	0.18	1138
	270	16*40	0.18	1290
		16*45	0.18	1315
		18*35	0.18	1300
	330	16*50	0.18	1480
		18*40	0.18	1466
		18*45	0.18	1488
	390	18*50	0.18	1630
350(2V)	15	10*16	0.24	150
	18	10*20	0.24	165
	22	10*20	0.24	200
	27	10*25	0.24	242
		10*30	0.24	256
	33	12.5*20	0.24	332
	39	10*35	0.24	326
	47	10*40	0.24	376
		12.5*25	0.24	425
	56	10*45	0.24	426
		12.5*30	0.24	498
		16*20	0.24	476
	68	10*50	0.24	486
		12.5*35	0.24	583
		18*20	0.24	550
	82	12.5*40	0.24	658
		16*25	0.24	628
	100	12.5*45	0.24	752
		12.5*50	0.24	772
		16*30	0.24	744
		18*25	0.24	710
	120	16*35	0.24	832
	150	16*40	0.24	964
		16*45	0.24	978
		18*30	0.24	944
	180	16*50	0.24	1095
		18*35	0.24	1065
		18*40	0.24	1086
	220	18*45	0.24	1215
		18*50	0.24	1222

HL series

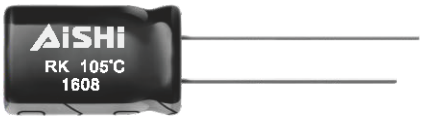
■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
400(2G)	12	10*16	0.24	135
	15	10*20	0.24	155
	18	10*20	0.24	180
	22	10*25	0.24	216
	27	10*30	0.24	256
		12.5*20	0.24	300
	33	10*35	0.24	300
	39	10*40	0.24	342
		10*45	0.24	358
		12.5*25	0.24	390
	47	12.5*30	0.24	456
		16*20	0.24	438
	56	10*50	0.24	440
		12.5*35	0.24	528
		18*20	0.24	502
	68	12.5*40	0.24	600
		16*25	0.24	572
	82	12.5*45	0.24	684
		12.5*50	0.24	700
		16*30	0.24	672
		18*25	0.24	644
	100	16*35	0.24	760
	120	16*40	0.24	864
		16*45	0.24	880
		18*30	0.24	842
		18*35	0.24	875
	150	16*50	0.24	1000
		18*40	0.24	985
	180	18*45	0.24	1098
	220	18*50	0.24	1225

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
450(2W)	10	10*16	0.24	120
	12	10*20	0.24	150
	15	10*25	0.24	186
	18	10*30	0.24	216
		12.5*20	0.24	256
	22	10*35	0.24	252
	27	10*40	0.24	292
		10*45	0.24	306
		12.5*25	0.24	342
	33	12.5*30	0.24	400
		16*20	0.24	386
	39	10*50	0.24	378
		12.5*35	0.24	462
		18*20	0.24	440
	47	12.5*40	0.24	528
		16*25	0.24	500
	56	12.5*45	0.24	592
		16*30	0.24	588
		18*25	0.24	562
	68	12.5*50	0.24	672
		16*35	0.24	664
	82	16*40	0.24	750
		16*45	0.24	762
		18*30	0.24	734
	100	16*50	0.24	858
		18*35	0.24	836
	120	18*40	0.24	935
		18*45	0.24	948
	150	18*50	0.24	1065
500(2H)	6.8	10*20	0.24	90
	10	10*30	0.24	130
		12.5*20	0.24	125
	12	12.5*20	0.24	135
	15	10*35	0.24	170
		12.5*25	0.24	170
		16*20	0.24	165
	18	10*45	0.24	190
		12.5*30	0.24	190
	22	10*50	0.24	230
		12.5*35	0.24	225
		16*20	0.24	220
	33	18*25	0.24	285
	47	18*30	0.24	400

RK series

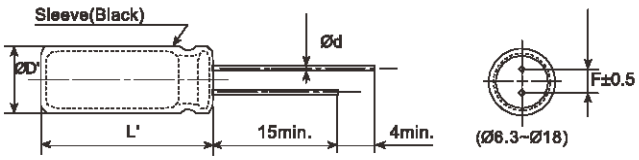
- Endurance: +105°C 2,000 hours
- Especially designed for charger
- Miniaturized,high voltage
- **RoHS Compliant**



SPECIFICATIONS

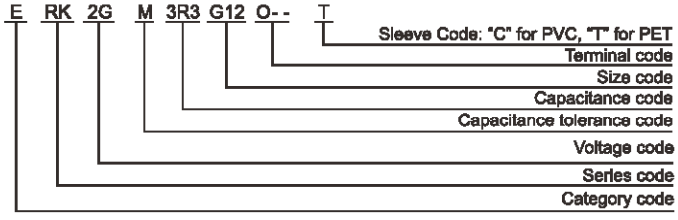
Items	Characteristics				
Category Temperature Range	-40~+105°C(400 Vdc) -25~+105°C(450~500 Vdc)				
Rated Voltage Range	400~500 Vdc				
Capacitance Tolerance	±20%(M)				(at 20°C,120Hz)
Leakage Current	400~450 Vdc	500 Vdc	Where, I:Max.leakage current (μA),C:Nominal capacitance (μF), V: Rated voltage (V)		
	I≤0.02CV+10μA	I≤0.03CV+10μA			(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	400	450	500	
	tanδ (max.)	0.15	0.20	0.24	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	400	450	500	
	Z(-25°C)/Z(+20°C)	3	5	6	
	Z(-40°C)/Z(+20°C)	6	-	-	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 105°C.				
	Capacitance Change	≤±20% of the initial value			
	D.F. (tanδ)	≤200% of the initial specified value			
	Leakage Current	≤The initial specified value			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.				
	Capacitance Change	≤±20% of the initial value			
	D.F. (tanδ)	≤200% of the initial specified value			
	Leakage Current	≤200% of the initial specified value			

DIMENSIONS[mm]



ØD	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.						
L'	L+2max.						

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

WV(Vdc) \ Freq.(Hz)	120	1k	10k	100k
400~500	0.50	0.80	0.90	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RK series

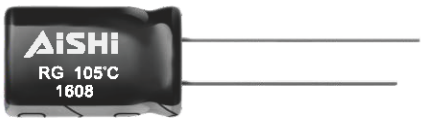
STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
400(2G)	1	6.3*9	0.15	46
		6.3*12	0.15	52
	1.8	6.3*9	0.15	56
		6.3*12	0.15	60
	2.2	6.3*12	0.15	64
		8*9	0.15	66
	3.3	6.3*12	0.15	74
		8*9	0.15	76
		8*12	0.15	80
	4.7	6.3*12	0.15	90
		8*9	0.15	94
		8*12	0.15	98
		10*9	0.15	102
	6.8	8*12	0.15	126
		10*9	0.15	132
	8.2	8*12	0.15	145
		10*9	0.15	150
		10*12	0.15	158
	10	8*12	0.15	165
		8*16	0.15	180
		10*9	0.15	172
	15	10*16	0.15	210
	22	12.5*20	0.15	250
	33	12.5*20	0.15	520
	47	16*20	0.15	670
	56	12.5*30	0.15	780
	68	16*25	0.15	880
		18*20	0.15	880
		18*25	0.15	920
	82	16*25	0.15	920
		18*25	0.15	950
		18*30	0.15	1000
	100	18*25	0.15	1060
		18*30	0.15	1120
	120	18*31	0.15	1170
		18*35	0.15	1300

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
450(2W)	1	6.3*9	0.20	46
		8*12	0.20	54
	1.8	6.3*12	0.20	62
		8*12	0.20	70
	2.2	8*9	0.20	65
		8*12	0.20	72
	3.3	8*12	0.20	82
	4.7	10*12	0.20	100
	6.8	10*12	0.20	130
		10*16	0.20	148
	8.2	10*16	0.20	190
		10*20	0.20	210
	10	10*16	0.20	220
	15	12.5*16	0.20	230
		12.5*20	0.20	250
	22	16*18	0.20	295
	33	12.5*25	0.20	495
		16*20	0.20	495
		16*25	0.20	550
	47	16*25	0.20	640
		16*30	0.20	710
		18*20	0.20	640
	68	18*25	0.20	870
		18*30	0.20	970
	82	18*30	0.20	1065
	100	18*30	0.20	1120
		18*35	0.20	1240
	120	18*35	0.20	1300
		18*40	0.20	1400
	150	18*45	0.20	1800
500(2H)	3.3	8*16	0.24	85
	4.7	8*16	0.24	110
	5.6	10*16	0.24	130
	6.8	10*16	0.24	150
	8.2	10*16	0.24	190
	10	10*20	0.24	225

RG series

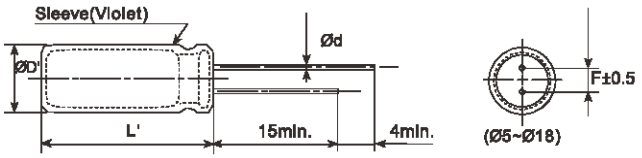
- "GBL" system, high reliability
- Low impedance and high ripple current
- Endurance: +105°C 2,000 ~ 8,000 hours
- **RoHS Compliant**



SPECIFICATIONS

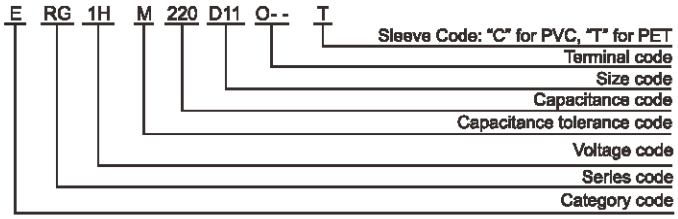
Items	Characteristics								
Category Temperature Range	-55~+105°C								
Rated Voltage Range	6.3~63 V_{dc}								
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)								
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)								
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	6.3	10	16	25	35	50	63	
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)								
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	6.3	10	16	25	35	50	63	
	Z(-25°C)/Z(+20°C)	4	3	2					
	Z(-55°C)/Z(+20°C)	8	6	4	3				(at 120Hz)
Endurance	The following specifications shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 105°C, the peak voltage shall not exceed the rated voltage.								
	Capacitance Change: ≤±25% of the initial value D.F. (tanδ): ≤200% of the initial specified value Leakage Current: ≤The initial specified value								
	Dia. / Load life (hours): ØD≤6.3: 2,000; ØD=8: 3,000; ØD=10: 5,000; ØD=12.5: 7,000; ØD≥16: 8,000								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20 °C after leaving them under no load at 105°C for 1,000 hours.								
	Capacitance Change: ≤±25% of the initial value D.F. (tanδ): ≤200% of the initial specified value Leakage Current: ≤200% of the initial specified value								

DIMENSIONS[mm]



ØD	5	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<220	0.40	0.75	0.90	1.00
220≤Cap.<680	0.50	0.85	0.94	1.00
680≤Cap.<2200	0.60	0.87	0.95	1.00
2200≤Cap.<4700	0.75	0.90	0.95	1.00
Cap.≥4700	0.85	0.95	0.98	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RG series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
6.3(0J)	100	5*11	0.22	0.65	155
	220	6.3*11	0.22	0.40	255
	330	6.3*11	0.22	0.25	290
	470	8*11	0.22	0.18	400
	560	8*11	0.22	0.17	460
	680	8*11	0.22	0.13	550
	820	8*16	0.22	0.095	730
	1000	8*16	0.22	0.09	730
	1200	8*20	0.22	0.08	810
	1500	10*20	0.22	0.052	1220
	2200	10*20	0.24	0.045	1440
	2700	10*30	0.24	0.037	1690
	3300	12.5*20	0.26	0.038	1660
	3900	12.5*25	0.26	0.03	1950
	4700	12.5*30	0.28	0.025	2310
	5600	12.5*35	0.30	0.022	2510
	6800	12.5*40	0.32	0.017	2870
	8200	16*30	0.36	0.019	3010
	10000	16*35	0.40	0.017	3150
10(1A)	100	5*11	0.19	0.58	175
	220	6.3*11	0.19	0.25	290
	330	8*11	0.19	0.21	410
	470	8*11	0.19	0.13	555
	560	816	0.19	0.12	675
	680	8*16	0.19	0.09	730
	820	8*20	0.19	0.085	875
	1000	10*16	0.19	0.068	1050
	1200	10*20	0.19	0.052	1220
	1500	10*20	0.19	0.045	1440
	2200	12.5*20	0.21	0.038	1660
	2700	12.5*25	0.21	0.034	1945
	3300	12.5*25	0.23	0.03	1950
	3900	12.5*30	0.23	0.025	2310
	4700	12.5*35	0.25	0.022	2510
	5600	12.5*40	0.27	0.017	2870
	6800	16*30	0.29	0.019	3010
	8200	16*35	0.33	0.017	3150
	10000	16*40	0.37	0.015	3710
16(1C)	47	5*11	0.16	0.80	120
	68	6.3*11	0.16	0.56	220
	100	6.3*11	0.16	0.52	255
	150	8*11	0.16	0.21	350
	220	8*11	0.16	0.20	405
	330	8*11	0.16	0.13	555
	470	816	0.16	0.09	730
	560	8*20	0.16	0.085	810
	680	8*20	0.16	0.069	1050
	820	10*20	0.16	0.058	1220
	1000	10*20	0.16	0.052	1220
	1200	10*25	0.16	0.045	1440
	1500	12.5*20	0.16	0.038	1660
	2200	12.5*25	0.18	0.03	1950
	2700	12.5*30	0.18	0.025	2310
	3300	12.5*35	0.20	0.022	2510
	3900	12.5*40	0.20	0.017	2870
	4700	16*30	0.22	0.019	3010
	5600	16*35	0.24	0.017	3150
	6800	16*40	0.26	0.015	3710

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
25(1E)	47	5*11	0.14	0.58	175
	68	6.3*11	0.14	0.36	230
	100	6.3*11	0.14	0.35	290
	150	8*11	0.14	0.20	405
	220	8*12	0.14	0.19	555
	330	8*16	0.14	0.12	730
	470	10*16	0.14	0.08	1050
	560	10*20	0.14	0.058	1220
	680	10*20	0.14	0.052	1220
	820	10*25	0.14	0.045	1440
	1000	12.5*20	0.14	0.038	1660
	1200	12.5*25	0.14	0.034	1936
	1500	12.5*25	0.14	0.03	1950
	2200	12.5*35	0.16	0.022	2510
	2700	12.5*40	0.16	0.017	2870
	3300	16*30	0.18	0.019	3010
	3900	16*35	0.18	0.017	3150
	4700	16*40	0.20	0.015	3710
35(1V)	10	5*11	0.12	1.50	100
	22	5*11	0.12	0.75	160
	33	5*11	0.12	0.58	210
	47	6.3*11	0.12	0.49	215
	68	8*11	0.12	0.21	350
	100	8*11	0.12	0.20	405
	150	8*12	0.12	0.13	555
	220	8*16	0.12	0.09	730
	330	10*16	0.12	0.08	1050
	470	10*20	0.12	0.065	1220
	560	10*25	0.12	0.045	1440
	680	10*30	0.12	0.037	1690
	820	12.5*25	0.12	0.035	1938
	1000	12.5*25	0.12	0.03	1950
	1200	12.5*30	0.12	0.025	2310
	1500	12.5*35	0.12	0.022	2510
	2200	16*30	0.14	0.019	3010
	2700	16*35	0.14	0.017	3150
	3300	16*40	0.16	0.015	3710
	3900	18*40	0.16	0.015	3800
50(1H)	10	5*11	0.10	2.0	105
	22	5*11	0.10	1.10	155
	33	6.3*11	0.10	0.48	215
	47	6.3*11	0.10	0.40	220
	68	8*11	0.10	0.35	355
	100	8*12	0.10	0.23	485
	150	8*16	0.10	0.16	635
	220	10*16	0.10	0.088	1050
	330	10*25	0.10	0.073	1250
	470	12.5*20	0.10	0.059	1480
	560	12.5*25	0.10	0.044	1840
	680	12.5*30	0.10	0.039	2220
	820	12,5*35	0.10	0.033	2290
	1000	16*25	0.10	0.034	2240
	1200	16*30	0.10	0.028	2700
	1500	16*35	0.10	0.025	2800
	2200	18*35	0.12	0.023	3100
	2700	18*40	0.12	0.02	3400

RG series

STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Size ΦDxL (mm)	tanδ	Impedance (Ωmax/20°C,100kHz)	Rated ripple current (mArms/105°C,100kHz)
63(1J)	12	5*11	0.08	1.9	145
	22	6.3*11	0.08	1.0	240
	39	6.3*14	0.08	0.61	330
	68	8*12	0.08	0.34	405
	100	8*16	0.08	0.27	535
		10*12.5	0.08	0.255	540
	120	10*16	0.08	0.19	600
	150	8*20	0.08	0.21	690
	180	10*20	0.08	0.145	890
	220	10*25	0.08	0.13	1050
	330	10*30	0.08	0.09	1300
		12.5*20	0.08	0.085	1290
	390	12.5*25	0.08	0.07	1720
	470	12.5*30	0.08	0.055	2090
		16*20	0.08	0.059	1770
	680	12.5*35	0.08	0.047	2270
		16*25	0.08	0.05	2160
		18*20	0.08	0.055	2290
	820	12.5*40	0.08	0.042	2560
		16*30	0.08	0.043	2670
		18*25	0.08	0.043	2590
	1000	16*35	0.08	0.036	2770
	1200	16*40	0.08	0.03	2850
		18*30	0.08	0.032	2950
	1500	18*35	0.08	0.03	3100
	1800	18*40	0.08	0.025	3210

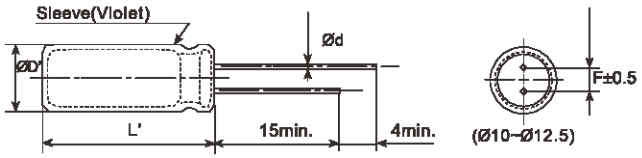
RV series

- High stability, high conductivity, high reliability
- Low impedance, small size
- Endurance: +105°C 4,000~5,000 hours
- **RoHS Compliant**

SPECIFICATIONS

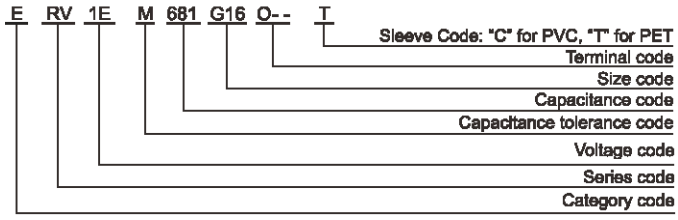
Items	Characteristics						
Category Temperature Range	-55~+105°C						
Rated Voltage Range	6.3~35 V_{dc}						
Capacitance Tolerance	±20%(M)						(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)						(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	6.3	10	16	25	35	
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.						(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	6.3	10	16	25	35	
	Z(-55°C)/Z(+20°C)	8	6	4	3		(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for a specified period of time (Ø10: 4,000h; Ø12.5: 5,000h) at 105°C.						
	Capacitance Change	≤±20% of the initial value (6.3V,10V:≤±30%)					
	D.F. (tanδ)	≤200% of the initial specified value					
	Leakage Current	≤The initial specified value					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.						
	Capacitance Change	≤±20% of the initial value(6.3V,10V:≤±30%)					
	D.F. (tanδ)	≤200% of the initial specified value					
	Leakage Current	≤200% of the initial specified value					

DIMENSIONS[mm]



ØD	10	12.5
Ød	0.6	0.6
F	5.0	5.0
ØD'	ØD+0.5max.	
L'	L+2max.	

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<680	0.50	0.85	0.94	1.00
680≤Cap.<2200	0.60	0.87	0.95	1.00
2200≤Cap.<4700	0.75	0.90	0.95	1.00
Cap.≥4700	0.85	0.95	0.98	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RV series

STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C,100kHz)	Rated ripple current (mArms/105°C,100kHz)
6.3(0J)	1500	10*12.5	0.22	0.063	960
	1800	10*16	0.22	0.049	1240
	2700	10*20	0.24	0.035	1550
	3300	10*25	0.26	0.033	1740
	4700	12.5*20	0.28	0.029	1890
	6800	12.5*25	0.32	0.022	2350
10(1A)	1000	10*12.5	0.19	0.063	960
	1500	10*16	0.19	0.049	1240
	2200	10*20	0.21	0.035	1550
	2700	10*25	0.21	0.033	1740
	3300	12.5*20	0.23	0.029	1890
	4700	12.5*25	0.25	0.022	2350
16(1C)	820	10*12.5	0.16	0.063	960
	1000	10*16	0.16	0.049	1240
	1500	10*20	0.16	0.035	1550
	1800	10*25	0.16	0.033	1740
	2200	12.5*20	0.18	0.029	1890
	3300	12.5*25	0.20	0.022	2350
25(1E)	470	10*12.5	0.14	0.063	960
	680	10*16	0.14	0.049	1240
	1000	10*20	0.14	0.035	1550
	1200	10*25	0.14	0.033	1740
	1500	12.5*20	0.14	0.029	1890
	2200	12.5*25	0.16	0.022	2350
35(1V)	330	10*12.5	0.12	0.063	960
	470	10*16	0.12	0.049	1240
	680	10*20	0.12	0.035	1550
	820	10*25	0.12	0.033	1740
	1000	12.5*20	0.12	0.029	1890
	1500	12.5*25	0.12	0.022	2350

ML series

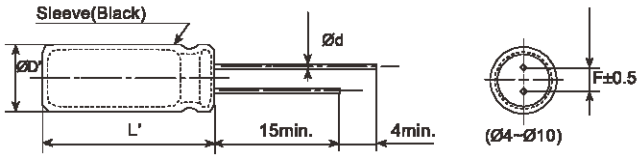
- Long life with 5mm to 9mm height.
- Endurance: +105°C 3,000~5,000 hours
- RoHS Compliant

SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-40~+105°C							
Rated Voltage Range	6.3~50 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)							(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	
	tanδ (max.)	0.40	0.35	0.30	0.25	0.20	0.20	
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.							(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	
	Z(-25°C)/Z(+20°C)	6	4	4	3	2	2	
	Z(-40°C)/Z(+20°C)	12	10	8	6	4	4	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for a specified period of time at 105°C.							
	Capacitance Change	≤±30% of the initial value						
	D.F. (tanδ)	≤300% of the initial specified value						
	Leakage Current	≤The initial specified value						
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.							
	Capacitance Change	≤±30% of the initial value						
	D.F. (tanδ)	≤300% of the initial specified value						
	Leakage Current	≤200% of the initial specified value						

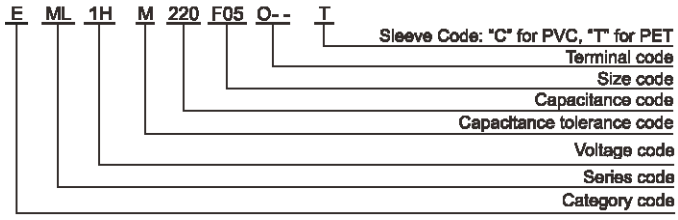
Size	Load life (hours)
L=5mm	3,000
L≥7mm	5,000

DIMENSIONS[mm]



ØD	4	5	6.3		8			10*9
			6.3*5	6.3*7	8*5	8*7	8*9	
Ød	0.45	0.45	0.45	0.5	0.45	0.5	0.5	0.6
F	1.5	2.0	2.5	2.5	3.5	3.5	3.5	5.0
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	60(50)	120	500	1k	10k≤
Cap.<2.2	0.50	1.00	1.20	1.30	1.50
2.2≤Cap.<10	0.65	1.00	1.20	1.30	1.50
10≤Cap.<100	0.80	1.00	1.20	1.30	1.50
Cap.≥100	0.80	1.00	1.10	1.15	1.20

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

ML series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
6.3(0J)	27	4*5	0.40	25
	47	4*7	0.40	47
	56	5*5	0.40	50
	82	5*7	0.40	75
	120	6.3*5	0.40	80
	180	6.3*7	0.40	110
	220	8*5	0.40	125
	270	8*7	0.40	165
	470	8*7	0.40	190
	560	8*9	0.40	230
	1000	10*9	0.40	480
10(1A)	22	4*5	0.35	22
	33	4*7	0.35	43
	47	5*5	0.35	48
	56	5*7	0.35	68
	100	6.3*5	0.35	75
	120	6.3*7	0.35	100
	180	8*5	0.35	120
	220	8*7	0.35	160
	330	8*7	0.35	180
	470	8*9	0.35	210
	680	10*9	0.35	470
16(1C)	18	4*5	0.30	20
	22	4*7	0.30	40
	33	5*5	0.30	45
	39	5*7	0.30	65
	68	6.3*5	0.30	70
	100	6.3*7	0.30	95
	120	8*5	0.30	110
	150	8*7	0.30	125
	220	8*7	0.30	170
	330	8*9	0.30	195
	470	10*9	0.30	460
25(1E)	10	4*5	0.25	18
	15	4*7	0.25	35
	22	5*5	0.25	42
	27	5*7	0.25	57
	47	6.3*5	0.25	65
	56	6.3*7	0.25	85
	82	8*5	0.25	100
	100	8*7	0.25	112
	150	8*7	0.25	140
	220	8*9	0.25	190
	330	10*9	0.25	450

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
35(1V)	6.8	4*5	0.20	17
	10	4*7	0.20	28
	12	5*5	0.20	34
	18	5*7	0.20	48
	27	6.3*5	0.20	58
	39	6.3*7	0.20	76
	47	8*5	0.20	80
	56	8*7	0.20	105
	100	8*7	0.20	125
	150	8*9	0.20	180
	220	10*9	0.20	360
50(1H)	1	4*5	0.20	8
	2.2	4*5	0.20	11
	3.3	4*5	0.20	14
	4.7	4*7	0.20	23
	6.8	5*5	0.20	25
	10	5*7	0.20	30
	12	6.3*5	0.20	37
	18	6.3*7	0.20	50
	22	8*5	0.20	62
	33	8*7	0.20	75
	56	8*7	0.20	115
	82	8*9	0.20	160
	120	10*9	0.20	315

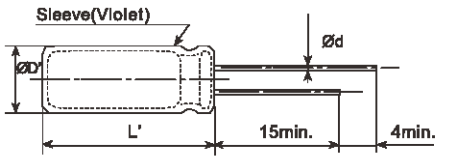
RM series

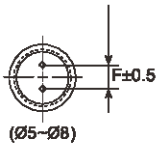
- Endurance: +105°C 10,000 hours
- Miniaturized,long life
- RoHS Compliant

SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	-40~+105°C								
Rated Voltage Range	10~100 Vdc								
Capacitance Tolerance	±20%(M)								(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where,I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)								(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	10	16	25	35	50	63	100	
	tanδ (max.)	0.45	0.35	0.30	0.22	0.19	0.17	0.15	
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.								(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	10	16	25	35	50	63	100	
	Z(-25°C)/Z(+20°C)	8	6	4		3			
	Z(-40°C)/Z(+20°C)	13	10	8		7			(at 120Hz)
Endurance	The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 10,000 hours at 105°C.								
	Capacitance Change	≤±25% of the initial value							
	D.F. (tanδ)	≤300% of the initial specified value							
	Leakage Current	≤The initial specified value							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 105°C for 1,000 hours.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤200% of the initial specified value							

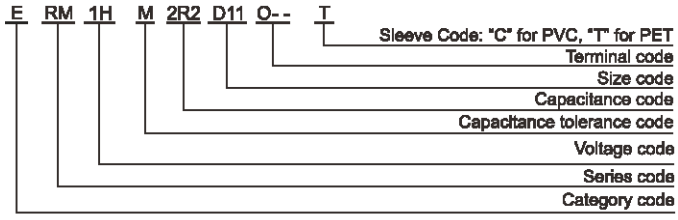
DIMENSIONS[mm]





ØD	5	6.3	8
Ød	0.5	0.5	0.5
F	2.0	2.5	3.5
ØD'	ØD+0.5max.		
L'	L+1.5max.		

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<22	0.42	0.60	0.80	1.00
22≤Cap.<47	0.55	0.75	0.90	1.00
Cap.≥47	0.70	0.85	0.95	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

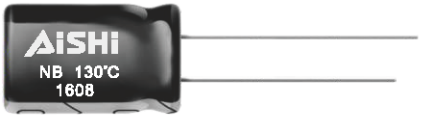
RM series

STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
10(1A)	100	5*11	0.45	130
	220	6.3*11	0.45	210
	330	8*11	0.45	330
16(1C)	47	5*11	0.35	130
	100	6.3*11	0.35	210
	220	8*11	0.35	330
25(1E)	33	5*11	0.30	130
	47	5*11	0.30	130
	100	6.3*11	0.30	210
35(1V)	33	5*11	0.22	130
	47	6.3*11	0.22	210
	100	8*11	0.22	330
50(1H)	0.47	5*11	0.19	12
	1	5*11	0.19	25
	2.2	5*11	0.19	35
	3.3	5*11	0.19	70
	4.7	5*11	0.19	80
	10	5*11	0.19	90
	22	5*12	0.19	110
	33	6.3*11	0.19	190
	47	6.3*11	0.19	190
	100	8*12	0.19	270
63(1J)	10	5*11	0.17	80
	22	6.3*11	0.17	170
	33	6.3*12	0.17	170
	47	8*12	0.17	240
100(1K)	0.47	5*11	0.15	20
	1	5*11	0.15	40
	2.2	5*11	0.15	50
	3.3	5*11	0.15	60
	4.7	5*11	0.15	70
	10	6.3*12	0.15	150
	22	8*12	0.15	230

NB series

- High reliability, withstand high temperature
- Endurance: +130°C 2,000~5,000 hours
- **RoHS Compliant**



SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	-40~+130°C									
Rated Voltage Range	10~120 Vdc									
Capacitance Tolerance	±20%(M)									(at 20°C,120Hz)
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)									(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	10	16	25	35	50	63	100	120	
	tanδ (max.)	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.12	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	10	16	25	35	50	63	100	120	
	Z(-25°C)/Z(+20°C)	3	2						3	
	Z(-40°C)/Z(+20°C)	6	4	3					6	(at 120Hz)

Endurance

The specifications listed below shall be met when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for a specified period of time at 130°C.

Capacitance Change	≤±30% of the initial value
D.F. (tanδ)	≤300% of the initial specified value
Leakage Current	≤The initial specified value

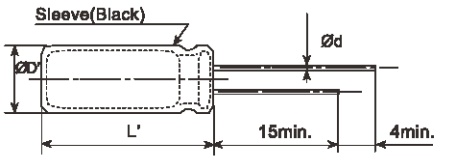
Dia.	Load life (hours)
ØD=8	2,000
ØD=10	3,000
ØD≥12.5	5,000

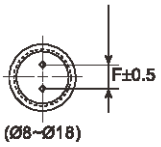
Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20°C after leaving them under no load at 130°C for 1,000 hours.

Capacitance Change	≤±30% of the initial value
D.F. (tanδ)	≤300% of the initial specified value
Leakage Current	≤500% of the initial specified value

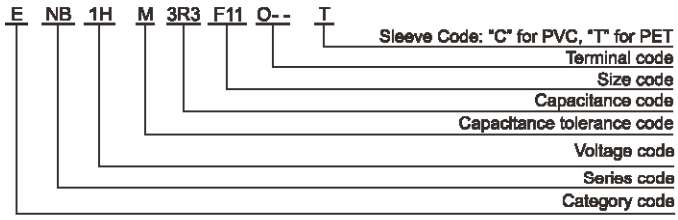
DIMENSIONS[mm]





ØD	8		10	12.5	16	18
Ød	0.5	0.6	0.6	0.6	0.8	0.8
F	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.					
L'	L+2max.					

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	50/60	120	1k	10k	100k
Cap.<10	0.35	0.42	0.60	0.80	1.00
10≤Cap.<47	0.45	0.55	0.75	0.90	1.00
47≤Cap.<470	0.60	0.70	0.85	0.95	1.00
470≤Cap.<2200	0.65	0.75	0.90	0.98	1.00
Cap.≥2200	0.75	0.80	0.95	1.00	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

NB series

STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/130°C,100kHz)
10(1A)	330	8*11	0.20	360
	470	10*12.5	0.20	620
	1000	10*20	0.20	960
	2200	12.5*25	0.22	1430
	3300	16*25	0.24	1900
	4700	16*30	0.26	2300
16(1C)	330	8*12	0.16	360
	470	10*12.5	0.16	620
	1000	10*20	0.16	960
	2200	12.5*25	0.18	1430
	3300	16*30	0.20	2300
	4700	16*35	0.22	2550
25(1E)	220	8*12	0.14	360
	330	10*12.5	0.14	620
	470	10*16	0.14	800
	1000	12.5*20	0.14	1100
	2200	16*30	0.16	2300
	3300	16*35	0.18	2550
35(1V)	100	8*11	0.12	360
	220	10*12.5	0.12	620
	330	10*16	0.12	800
	470	10*20	0.12	960
	1000	12.5*25	0.12	1430
	2200	16*35	0.14	2550
	3300	18*35	0.16	2800
50(1H)	1	8*11	0.10	35
	2.2	8*11	0.10	50
	3.3	8*11	0.10	70
	4.7	8*11	0.10	100
	10	8*11	0.10	200
	22	8*11	0.10	260
	33	8*11	0.10	300
	47	8*11	0.10	300
	100	10*12.5	0.10	520
	220	10*20	0.10	890
	330	12.5*20	0.10	1000
	470	12.5*25	0.10	1200
	1000	16*30	0.10	2180
	2200	18*40	0.12	2800

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/130°C,100kHz)
63(1J)	33	8*11	0.09	250
	47	10*12.5	0.09	400
	100	10*16	0.09	450
	220	12.5*20	0.09	820
	330	12.5*25	0.09	1000
	470	16*25	0.09	1500
	1000	16*30	0.09	1850
	1500	18*40	0.09	2350
100(1K)	4.7	8*11	0.08	100
	10	8*11	0.08	200
	22	8*12	0.08	220
	33	10*12.5	0.08	260
	47	10*16	0.08	330
	100	12.5*20	0.08	670
	220	16*25	0.08	1100
	330	16*30	0.08	1300
	470	18*30	0.08	1600
120(2B)	22	8*12	0.12	115
	33	8*16	0.12	200
		10*12.5	0.12	200
	47	8*20	0.12	240
		10*16	0.12	240
	56	10*16	0.12	255
	68	10*16	0.12	255
	82	10*20	0.12	270
	100	10*25	0.12	340
	120	12.5*20	0.12	465
	150	12.5*25	0.12	515
	220	13*30	0.12	630
		16*20	0.12	630
	270	16*25	0.12	720
		18*20	0.12	720
	330	16*30	0.12	775
		18*25	0.12	775
	470	16*40	0.12	865
		18*30	0.12	865

RD series

- Endurance: +105°C 2,000~5,000 hours
- High frequency and low impedance; moisture content: under 40%
- **RoHS Compliant**

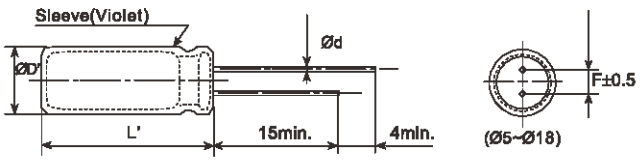
SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	-40~+105°C(6.3~100 Vdc)								
Rated Voltage Range	6.3~100 Vdc								
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)								
Leakage Current	I≤0.01CV or 3μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)								
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)								
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100
	Z(-25°C)/Z(+20°C)	4	3	2	2	2			
	Z(-40°C)/Z(+20°C)	8	6	4	3	3			(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for a specified period of time at 105 °C.								
	Capacitance Change	≤±25% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤The initial specified value							

Dia.	Load life (hours)
ØD≤6.3	2,000
ØD=8	3,000
ØD≥10	5,000

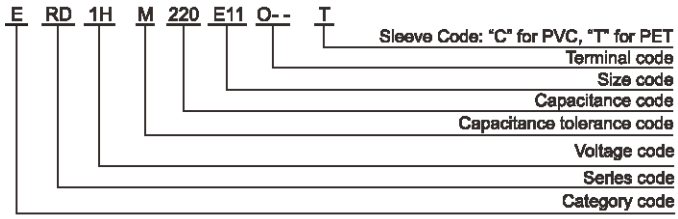
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.
	Capacitance Change: ≤±25% of the initial value
	D.F. (tanδ): ≤200% of the initial specified value
	Leakage Current: ≤200% of the initial specified value

DIMENSIONS[mm]



ØD	5	6.3	8	10	12.5	16	18
Ød	0.5	0.5	0.5 0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.						
L'	L+2max.						

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<220	0.40	0.75	0.90	1.00
220≤Cap.<680	0.50	0.85	0.94	1.00
680≤Cap.<2200	0.60	0.87	0.95	1.00
2200≤Cap.<4700	0.75	0.90	0.95	1.00
Cap.≥4700	0.85	0.95	0.98	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

RD series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
6.3(0J)	100	5*11	0.22	1.00	170
	120	5*11	0.22	0.92	175
	150	6.3*11	0.22	0.81	220
	180	6.3*11	0.22	0.76	210
	220	6.3*11	0.22	0.65	310
	270	6.3*11	0.22	0.54	320
	330	8*11	0.22	0.42	390
	470	8*11	0.22	0.25	450
	560	8*11	0.22	0.23	490
	680	8*11	0.22	0.21	520
	820	8*16	0.22	0.20	620
	1000	10*12.5	0.22	0.17	750
	1200	10*16	0.22	0.16	860
	1500	10*16	0.22	0.14	1100
	1800	10*20	0.22	0.11	1250
	2200	10*25	0.24	0.095	1470
	2700	12.5*20	0.24	0.075	1500
	3300	12.5*20	0.26	0.036	1650
	4700	12.5*30	0.28	0.036	2100
	5600	12.5*30	0.30	0.034	2340
	6800	16*25	0.32	0.032	2450
	8200	16*30	0.36	0.027	2650
	10000	16*35	0.40	0.024	2700
	15000	18*35	0.50	0.023	2950
10(1A)	22	5*11	0.19	2.70	98
	33	5*11	0.19	2.60	100
	47	5*11	0.19	1.34	150
	56	5*11	0.19	1.23	160
	68	5*11	0.19	1.05	170
	100	5*11	0.19	0.80	210
	120	6.3*11	0.19	0.75	250
	150	6.3*11	0.19	0.61	290
	180	6.3*11	0.19	0,46	320
	220	6.3*11	0.19	0.35	340
	270	8*11	0.19	0.30	400
	330	8*11	0.19	0.27	460
	470	8*11	0.19	0.25	580
	560	10*12.5	0.19	0.16	635
	680	10*12.5	0.19	0.11	765
	820	10*16	0.19	0.10	890
	1000	10*16	0.19	0.076	1040
	1200	10*16	0.19	0.067	1200
	1500	10*20	0.19	0.062	1400
	1800	10*25	0.19	0.058	1550
	2200	12.5*20	0.21	0.041	1750
	2700	12.5*20	0.21	0.035	1900
	3300	12.5*25	0.23	0.031	2000
	4700	16*25	0.25	0.030	2100
	5600	16*25	0.27	0.028	2290
	6800	16*30	0.29	0.026	2650
	8200	16*35	0.33	0.026	2770
	10000	18*35	0.37	0.024	2580
16(1C)	10	5*11	0.16	4.7	74
	22	5*11	0.16	2.6	100
	33	5*11	0.16	2.0	114
	47	5*11	0.16	1.1	155

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
16(1C)	56	5*11	0.16	0.82	180
	68	5*11	0.16	0.69	195
	100	6.3*11	0.16	0.50	265
	120	6.3*11	0.16	0.47	270
	150	6.3*11	0.16	0.41	290
	180	8*11	0.16	0.34	370
	220	8*11	0.16	0.25	480
	270	8*11	0.16	0.21	520
	330	8*12	0.16	0.156	290
	470	10*12.5	0.16	0.124	750
	560	10*12.5	0.16	0.105	785
	680	10*16	0.16	0.092	1100
	820	10*16	0.16	0.078	1140
	1000	10*20	0.16	0.065	1350
	1200	10*25	0.16	0.061	1500
	1500	12.5*20	0.16	0.060	1380
	1800	12.5*20	0.16	0.047	1800
	2200	12.5*25	0.18	0.038	2000
	2700	12.5*25	0.18	0.033	2450
	3300	16*25	0.20	0.030	2790
	4700	16*30	0.22	0.026	2880
	5600	16*35	0.24	0.025	2990
	6800	18*35	0.26	0.024	3200
	8200	18*35	0.30	0.024	3320
	10000	18*40	0.34	0.024	3550
25(1E)	4.7	5*11	0.14	3.95	68
	5.6	5*11	0.14	3.25	75
	6.8	5*11	0.14	2.98	80
	10	5*11	0.14	2.56	85
	22	5*11	0.14	1.95	125
	33	5*11	0.14	1.42	155
	47	6.3*11	0.14	1.00	220
	56	6.3*11	0.14	0.79	250
	68	6.3*11	0.14	0.65	280
	100	6.3*11	0.14	0.35	370
	120	6.3*11	0.14	0.33	380
	150	8*11	0.14	0.31	410
	180	8*11	0.14	0.25	455
	220	8*11	0.14	0.15	550
	270	10*12.5	0.14	0.125	720
	330	10*12.5	0.14	0.114	820
	470	10*16	0.14	0.076	1200
	560	10*16	0.14	0.072	1250
	680	10*20	0.14	0.065	1320
	820	10*25	0.14	0.052	1530
	1000	12.5*20	0.14	0.045	1650
	1200	12.5*25	0.14	0.041	1980
	1500	12.5*25	0.14	0.038	2210
	1800	16*25	0.14	0.032	2510
	2200	16*25	0.16	0.036	2650
	2700	16*25	0.16	0.031	2820
	3300	16*30	0.18	0.026	3240
	4700	16*35	0.20	0.024	3650
	5600	18*35	0.22	0.024	3720
	6800	18*40	0.24	0.024	3850

RD series

STANDARD RATINGS

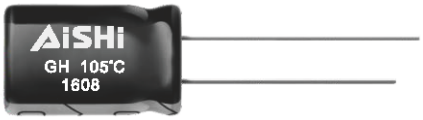
WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
35(1V)	4.7	5*11	0.12	3.65	85
	5.6	5*11	0.12	3.09	92
	6.8	5*11	0.12	2.82	97
	10	5*11	0.12	2.37	105
	22	5*11	0.12	1.50	150
	33	5*11	0.12	1.21	180
	47	6.3*11	0.12	0.80	280
	56	6.3*11	0.12	0.64	310
	68	8*11	0.12	0.52	350
	100	8*11	0.12	0.25	450
	120	8*11	0.12	0.22	510
	150	8*12	0.12	0.191	540
	180	10*12.5	0.12	0.172	650
	220	10*12.5	0.12	0.114	750
	270	10*16	0.12	0.095	910
	330	10*16	0.12	0.079	1050
	470	10*20	0.12	0.065	1200
	560	10*25	0.12	0.061	1500
	680	12.5*20	0.12	0.056	1570
	820	12.5*20	0.12	0.048	1700
	1000	12.5*25	0.12	0.042	1900
	1200	12.5*30	0.12	0.039	2130
	1500	16*25	0.12	0.036	2270
	1800	16*30	0.12	0.035	2700
	2200	16*30	0.14	0.034	2780
	2700	16*35	0.14	0.029	2850
	3300	18*35	0.16	0.026	3100
	4700	18*40	0.18	0.024	3500
50(1H)	0.47	5*11	0.10	5.40	25
	1	5*11	0.10	4.00	40
	2.2	5*11	0.10	2.80	55
	3.3	5*11	0.10	2.20	60
	4.7	5*11	0.10	2.00	90
	5.6	5*11	0.10	1.93	105
	6.8	5*11	0.10	1.89	110
	10	5*11	0.10	1.82	120
	22	6.3*11	0.10	1.25	150
	33	6.3*11	0.10	0.80	250
	47	6.3*11	0.10	0.65	290
	56	8*11	0.10	0.49	310
	68	8*11	0.10	0.33	375
	100	10*12.5	0.10	0.17	480
	120	10*12.5	0.10	0.156	530
	150	10*12.5	0.10	0.132	590
	180	10*16	0.10	0.114	860
	220	10*16	0.10	0.096	830
	270	10*20	0.10	0.078	960
	330	10*25	0.10	0.065	1150
	470	12.5*20	0.10	0.055	1590
	560	12.5*20	0.10	0.050	1660
	680	12.5*25	0.10	0.044	1930
	820	12.5*30	0.10	0.039	2100
	1000	16*25	0.10	0.036	2300
	1200	16*30	0.10	0.036	2650
	1500	16*35	0.10	0.034	2750
	1800	16*35	0.10	0.034	2850
	2200	18*35	0.12	0.032	3040
	2700	18*40	0.14	0.027	3070
	3300	18*40	0.16	0.025	3100

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/105°C, 100kHz)
63(1J)	0.47	5*11	0.09	5.4	25
	1	5*11	0.09	4.0	33
	2.2	5*11	0.09	2.8	45
	3.3	5*11	0.09	2.2	58
	4.7	5*11	0.09	2.0	65
	5.6	5*11	0.09	1.9	95
	6.8	5*11	0.09	1.82	100
	10	5*11	0.09	1.75	110
	22	6.3*11	0.09	0.80	240
	33	8*11	0.09	0.61	270
	47	8*12	0.09	0.56	300
	56	8*12	0.09	0.38	330
	68	10*12.5	0.09	0.21	480
	100	10*16	0.09	0.14	610
	120	10*16	0.09	0.13	620
	150	10*16	0.09	0.11	700
	180	10*20	0.09	0.10	800
	220	10*20	0.09	0.08	1100
	270	12.5*20	0.09	0.065	1150
	330	12.5*20	0.09	0.055	1250
	470	12.5*25	0.09	0.053	1620
	560	12.5*25	0.09	0.049	1630
	680	12.5*30	0.09	0.043	1950
	820	16*25	0.09	0.038	2150
	1000	16*30	0.09	0.034	2350
	1200	16*35	0.09	0.032	2550
	1500	18*35	0.09	0.031	2710
	1800	18*40	0.09	0.027	3000
100(1K)	0.47	5*11	0.08	5.9	20
	1	5*11	0.08	4.4	30
	2.2	5*11	0.08	3.3	42
	3.3	5*11	0.08	2.8	55
	4.7	5*11	0.08	2.6	72
	5.6	5*11	0.08	2.33	100
	6.8	6.3*11	0.08	1.95	115
	10	6.3*11	0.08	1.77	130
	22	8*12	0.08	0.85	220
	33	10*12.5	0.08	0.69	320
	47	10*12.5	0.08	0.58	370
	56	10*16	0.08	0.42	440
	68	10*16	0.08	0.35	470
	100	10*25	0.08	0.30	560
	120	10*25	0.08	0.22	660
	150	12.5*20	0.08	0.174	780
	180	12.5*20	0.08	0.142	820
	220	12.5*25	0.08	0.130	880
	270	12.5*30	0.08	0.110	1120
	330	16*25	0.08	0.100	1440
	470	16*30	0.08	0.090	1650
	560	16*35	0.08	0.085	1720
	680	18*35	0.08	0.080	1790
	820	18*35	0.08	0.071	1840
	1000	18*40	0.08	0.066	1930

GH series

- Endurance: +105°C 5,000~10,000 hours
- Especially designed for electronic ballast, intelligent instrument, etc.
- **RoHS Compliant**

Upgrade



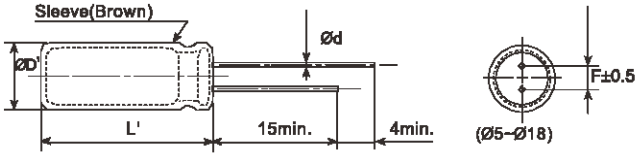
SPECIFICATIONS

Items	Characteristics										
Category Temperature Range	-40~+105°C										
Rated Voltage Range	6.3~450 Vdc										
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)										
Leakage Current	6.3~100Vdc: I≤0.01CV or 3μA (2 minutes) Whichever is greater.	160~450Vdc: CV≤1,000: I≤0.1CV+40μA (After 1 minute); I≤0.03CV+15μA (After 5 minutes); CV>1,000: I≤0.04CV+100μA; I≤0.02CV+25μA									Where, I:Max.leakage current (μA), C:Nominal capacitance (μF), V: Rated voltage (V) (at 20°C)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100	160~250	350~450
	tanδ(max.)	0.30	0.24	0.20	0.18	0.16	0.14	0.12	0.10	0.15	0.20
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)										
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100	160~250	350~450
	Z(-25°C)/Z(+20°C)	5	4	3	2					3	6
	Z(-40°C)/Z(+20°C)	12	10	8	5	4	3			7	7 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for a specified period of time at 105°C.										
	Capacitance Change: ≤±20% of the initial value(6.3V,10V:≤± 30%)										
	D.F. (tanδ): ≤200% of the initial specified value										
	Leakage Current: ≤The initial specified value										

Case Dia.	Load life (hours)		
	6.3~10V	16~100V	160~450V
ØD≤6.3	5,000		-
ØD=8&10	6,000	7,000	10,000
ØD≥12.5	8,000		

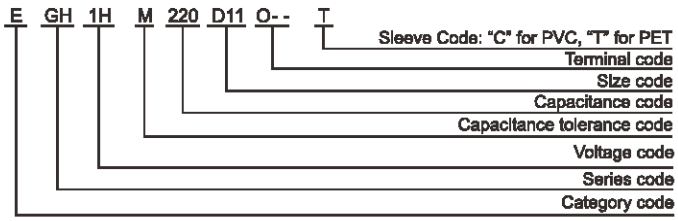
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.
	Capacitance Change: ≤±20% of the initial value(6.3V,10V:≤±30%)
	D.F. (tanδ): ≤200% of the initial specified value
	Leakage Current: ≤200% of the initial specified value

DIMENSIONS[mm]



ØD	5	6.3	8		10	12.5	16	18
Ød	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5		5.0	5.0	7.5	7.5
ØD'	ØD+0.5max.							
L'	L+2max.							

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Rated Voltage(V)	Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
6.3~100	Cap.<100	0.40	0.68	0.78	1.00
	100≤Cap.<220	0.50	0.76	0.87	1.00
	220≤Cap.<1000	0.70	0.85	0.90	1.00
	1000≤Cap.	0.85	0.95	0.98	1.00
160~450	Cap.<100	0.40	0.70	0.90	1.00
	Cap.≥100	0.44	0.74	0.91	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

GH series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
6.3(0J)	150	5*11	0.30	91
	330	6.3*11	0.30	151
	680	8*12	0.30	228
	820	10*12.5	0.30	256
	1000	8*16	0.30	272
	1200	8*20	0.30	386
		10*16	0.30	386
	1500	10*20	0.30	513
	1800	12.5*16	0.30	513
	2200	10*25	0.32	580
	2700	10*30	0.32	630
		16*15	0.32	630
	3300	12.5*20	0.34	665
	3900	12.5*25	0.34	807
		18*15	0.34	807
	4700	12.5*30	0.36	902
	5600	12.5*35	0.38	1034
		16*20	0.38	1034
	6800	12.5*40	0.40	1190
		16*25	0.40	1190
		18*20	0.40	1190
	8200	16*30	0.44	1400
	10000	16*35	0.48	1600
		18*25	0.48	1600
	12000	16*40	0.52	1850
		18*30	0.52	1850
	15000	18*35	0.58	1850
	18000	18*40	0.64	2000
10(1A)	100	5*11	0.24	91
	220	6.3*11	0.24	151
	470	8*12	0.24	228
	680	8*16	0.24	256
		10*12.5	0.24	272
	1000	8*20	0.24	400
		10*16	0.24	430
	1200	10*20	0.24	513
	1500	10*25	0.24	580
		12.5*16	0.24	580
	2200	10*30	0.26	630
		12.5*20	0.26	681
		16*15	0.26	681
	2700	18*15	0.26	807
	3300	12.5*25	0.28	807
	3900	12.5*30	0.28	902
		16*20	0.28	902
	4700	16*25	0.30	1116
	5600	12.5*40	0.32	1190
		16*25	0.32	1190
		18*20	0.32	1190
	6800	16*30	0.34	1400
		18*25	0.34	1400
	8200	16*35	0.38	1600
		18*30	0.38	1600
	10000	16*40	0.42	1850
		18*35	0.42	1850
	12000	18*40	0.46	2000

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
16(1C)	56	5*11	0.20	100
	120	6.3*11	0.20	118
	330	8*12	0.20	205
	470	8*16	0.20	256
		10*12.5	0.20	272
	680	8*20	0.20	386
		10*16	0.20	386
	1000	10*20	0.20	513
		12.5*16	0.20	513
	1200	10*25	0.20	580
	1500	10*30	0.20	630
		12.5*20	0.20	665
		16*15	0.20	665
	2200	12.5*25	0.22	807
		18*15	0.22	807
	2700	12.5*30	0.22	902
		16*20	0.22	902
	3300	12.5*35	0.24	1034
	3900	12.5*40	0.24	1190
		16*25	0.24	1190
		18*20	0.24	1190
	4700	16*30	0.26	1400
		18*25	0.26	1400
	5600	16*35	0.28	1600
		18*30	0.28	1600
	6800	16*40	0,30	1850
	8200	18*35	0.34	1850
	10000	18*40	0.38	2000
25(1E)	47	5*11	0.18	124
	100	6.3*11	0.18	138
	220	8*12	0.18	205
	330	8*16	0.18	225
		10*12.5	0.18	245
	470	8*20	0.18	320
		10*16	0.18	340
	680	10*20	0.18	345
		12.5*16	0.18	345
	820	10*25	0.18	450
	1000	10*30	0.18	540
		12.5*20	0.18	540
		16*15	0.18	540
	1200	18*15	0.18	560
	1500	12.5*25	0.18	665
	1800	12.5*30	0.18	790
		16*20	0.18	800
	2200	12.5*35	0.20	860
		18*20	0.20	880
	2700	12.5*40	0.20	960
		16*25	0.20	980
	3300	16*30	0.22	1190
		18*25	0.22	1190
	3900	16*35	0.22	1400
		18*30	0.22	1400
	4700	16*40	0.24	1600
		18*35	0.24	1600
	5600	18*40	0.26	1850

GH series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
35(1V)	33	5*11	0.16	90
	56	6.3*11	0.16	110
	150	8*12	0.16	180
	220	8*16	0.16	240
		10*12.5	0.16	252
	270	8*20	0.16	280
	330	10*16	0.16	312
	470	10*20	0.16	386
		12.5*16	0.16	394
	560	10*25	0.16	450
	680	10*30	0.16	496
		12.5*20	0.16	520
		16*15	0.16	520
	1000	12.5*25	0.16	810
		18*15	0.16	810
	1200	12.5*30	0.16	860
		16*25	0.16	880
	1500	12.5*35	0.16	880
	1800	12.5*40	0.16	960
		16*20	0.16	900
		18*20	0.16	960
	2200	16*30	0.18	1190
		18*25	0.18	1190
	2700	16*35	0.18	1400
		18*30	0.18	1400
	3300	16*40	0.20	1600
		18*35	0.20	1600
	3900	18*40	0.20	1850
50(1H)	22	5*11	0.14	84
	56	6.3*11	0.14	146
	100	8*12	0.14	152
	120	8*16	0.14	180
	150	10*12.5	0.14	215
	180	8*20	0.14	246
	220	10*16	0.14	291
	270	10*20	0.14	330
		12.5*16	0.14	330
	330	10*25	0.14	386
	470	10*30	0.14	460
		12.5*20	0.14	475
		16*15	0.14	475
	560	12.5*25	0.14	520
		18*15	0.14	520
	680	12.5*30	0.14	665
	820	12.5*35	0.14	800
		16*20	0.14	800
	1000	12.5*40	0.14	880
		16*25	0.14	880
		18*20	0.14	880
	1200	16*30	0.14	1190
		18*25	0.14	1190
	1500	16*35	0.14	1400
	1800	16*40	0.14	1600
		18*30	0.14	1600
	2200	18*35	0.16	1800
	2700	18*40	0.16	1850

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
63(1J)	15	5*11	0.12	62
	33	6.3*11	0.12	126
	56	8*12	0.12	198
	82	8*16	0.12	246
		10*12.5	0.12	252
	120	8*20	0.12	300
		10*16	0.12	310
	180	10*20	0.12	386
		12.5*16	0.12	394
	220	10*25	0.12	450
	270	12.5*20	0.12	520
	330	12.5*25	0.12	665
	470	12.5*30	0.12	790
		16*20	0.12	800
	560	12.5*35	0.12	860
		16*25	0.12	880
	680	12.5*40	0.12	960
		18*20	0.12	980
	820	16*30	0.12	1190
		18*25	0.12	1190
	1000	16*35	0.12	1400
		18*30	0.12	1400
	1200	16*40	0.12	1600
		18*35	0.12	1600
	1500	18*40	0.12	1850
100(1K)	6.8	5*11	0.10	62
	15	6.3*11	0.10	126
	27	8*12	0.10	198
	39	8*16	0.10	246
	47	10*12.5	0.10	252
	56	8*20	0.10	300
	68	10*16	0.10	330
	82	10*20	0.10	386
		12.5*16	0.10	394
	100	10*25	0.10	450
	120	12.5*20	0.10	520
	180	12.5*25	0.10	665
	220	16*20	0.10	800
		12.5*30	0.10	790
	270	12.5*35	0.10	860
		16*25	0.10	880
	330	18*20	0.10	980
		12.5*40	0.10	960
	390	16*30	0.10	1190
		18*25	0.10	1190
	470	16*35	0.10	1400
		18*30	0.10	1400
	560	16*40	0.10	1600
	680	18*35	0.10	1600
	820	18*40	0.10	1850

GH series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
160(2C)	10	8*12	0.15	320
	12	10*12	0.15	375
	15	10*16	0.15	438
	22	10*16	0.15	500
	33	10*20	0.15	663
	39	10*20	0.15	688
	47	10*20	0.15	750
		12.5*20	0.15	788
	56	12.5*20	0.15	950
	68	12.5*20	0.15	1195
	82	12.5*20	0.15	1275
		16*20	0.15	1313
	100	12.5*25	0.15	1432
		16*20	0.15	1443
	150	16*20	0.15	1750
		16*25	0.15	1795
	220	16*25	0.15	2318
		18*25	0.15	2375
	330	18*30	0.15	2959
200(2D)	10	10*16	0.15	290
	12	10*16	0.15	300
	15	10*16	0.15	413
	22	10*20	0.15	513
	33	10*20	0.15	638
		12.5*20	0.15	663
	39	12.5*20	0.15	795
	47	12.5*20	0.15	980
	68	12.5*20	0.15	1188
		12.5*25	0.15	1238
	82	16*20	0.15	1385
	100	16*20	0.15	1436
		16*25	0.15	1489
	150	16*25	0.15	1920
		16*30	0.15	1966
		18*25	0.15	1977
	220	18*25	0.15	2386
		18*30	0.15	2455
	330	18*35	0.15	2795
		18*40	0.15	2864
250(2E)	4.7	8*12	0.15	175
	5.6	10*12	0.15	213
	6.8	10*12	0.15	275
	10	10*20	0.15	350
	22	10*20	0.15	513
	33	12.5*20	0.15	763
	39	12.5*20	0.15	813
	47	12.5*20	0.15	950
		12.5*25	0.15	1013
	68	16*20	0.15	1295
	82	16*20	0.15	1375
		16*30	0.15	1425
	100	16*25	0.15	1545
		18*25	0.15	1591
	150	18*25	0.15	1968
	220	18*31	0.15	2341
		18*40	0.15	2591

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,100kHz)
350(2V)	4.7	8*12	0.20	163
	5.6	10*12	0.20	225
	6.8	10*12	0.20	265
	10	10*16	0.20	313
	22	12.5*20	0.20	563
	33	16*20	0.20	885
	39	16*20	0.20	963
	47	16*20	0.20	1075
		16*25	0.20	1113
	68	16*25	0.20	1413
		18*20	0.20	1375
		18*25	0.20	1425
	82	18*25	0.20	1520
	100	18*25	0.20	1591
		18*30	0.20	1648
	120	18*30	0.20	1877
	150	18*35	0.20	2045
400(2G)	1	8*12	0.20	75
	2.2	8*12	0.20	113
	3.3	10*12	0.20	200
	4.7	10*12	0.20	238
	6.8	10*12	0.20	255
	10	10*16	0.20	325
	15	12.5 *20	0.20	463
	22	12.5*20	0.20	613
		12.5*25	0.20	638
	33	16*20	0.20	870
	39	16*25	0.20	1013
	47	16*25	0.20	1150
		18*20	0.20	1138
		16*30	0.20	1200
	56	10*50	0.20	1300
	68	12.5*40	0.20	1500
		18*25	0.20	1475
	82	12.5*45	0.20	1563
		18*25	0.20	1525
		18*30	0.20	1575
	100	12.5*50	0.20	1795
		18*31	0.20	1739
		18*35	0.20	1784
	120	18*35	0.20	1932
	150	18*40	0.20	2080
450(2W)	6.8	10*16	0.20	240
	10	10*20	0.20	313
	15	12.5*20	0.20	500
	22	16*20	0.20	638
	33	10*40	0.20	888
		16*25	0.20	945
		18*20	0.20	938
	39	10*45	0.20	1038
		18*25	0.20	1013
	47	12.5*40	0.20	1263
		18*25	0.20	1240
	56	12.5*40	0.20	1375
	68	18*30	0.20	1525
	82	12.5*50	0.20	1825
		18*35	0.20	1800
	100	18*40	0.20	1830

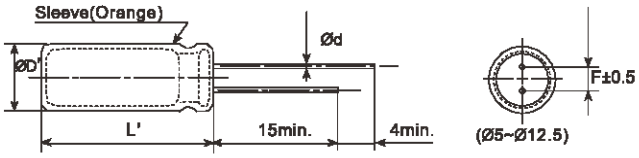
LL series

- Stable and extremely low leakage current characteristics
- Endurance: +105°C 2,000 hours
- Wide temperature range of -40°C~+105°C
- **RoHS Compliant**

SPECIFICATIONS

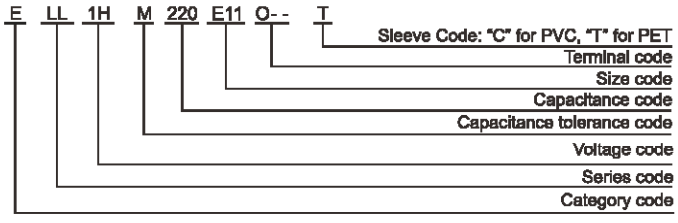
Items	Characteristics								
Category Temperature Range	-40~+105°C								
Rated Voltage Range	6.3~100 Vdc								
Capacitance Tolerance	±20%(M) (at 20°C,120Hz)								
Leakage Current	I≤0.002CV or 0.4μA, whichever is greater. Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V) (at 20°C after 2 minutes)								
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100
	tanδ (max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.10	0.10
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C,120Hz)								
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	6.3	10	16	25	35	50	63	100
	Z(-25°C)/Z(+20°C)	4	3	3	2	2	2	2	2
	Z(-40°C)/Z(+20°C)	8	6	6	4	4	3	3	3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20 °C after DC voltage plus the rated ripple current is applied for 2,000 hours at 105 °C.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤The initial specified value							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied.								
	Capacitance Change	≤±20% of the initial value							
	D.F. (tanδ)	≤200% of the initial specified value							
	Leakage Current	≤200% of the initial specified value							

DIMENSIONS[mm]



ØD	5	6.3	8	10	12.5
Ød	0.5	0.5	0.5	0.6	0.6
F	2.0	2.5	3.5	5.0	5.0
ØD'	ØD+0.5max.				
L'	L+2max.				

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	50(60)	120	1k	10k	100k
Cap.<100	0.80	1.00	1.45	1.65	1.70
100≤Cap.<1000	0.80	1.00	1.36	1.48	1.53
Cap.≥1000	0.85	1.00	1.25	1.35	1.38

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LL series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
6.3(0J)	22	5*11	0.22	36
	33	5*11	0.22	44
	47	5*11	0.22	53
	100	5*11	0.22	74
	220	6.3*11	0.22	131
	330	6.3*11	0.22	161
	470	8*11	0.22	242
	1000	10*12	0.22	390
	2200	12.5*20	0.24	665
10(1A)	22	5*11	0.19	50
	33	5*11	0.19	66
	47	5*11	0.19	75
	100	5*11	0.19	104
	220	8*11	0.19	193
	330	8*11	0.19	256
	470	8*11	0.19	319
	1000	10*16	0.19	605
	2200	12.5*20	0.21	860
16(1C)	10	5*11	0.16	39
	22	5*11	0.16	62
	33	5*11	0.16	68
	47	5*11	0.16	105
	100	6.3*11	0.16	138
	220	8*11	0.16	220
	330	8*11	0.16	268
	470	10*12	0.16	407
	1000	10*20	0.16	704
	2200	12.5*25	0.18	890
25(1E)	4.7	5*11	0.14	32
	10	5*11	0.14	43
	22	5*11	0.14	65
	33	5*11	0.14	76
	47	6.3*11	0.14	116
	100	8*11	0.14	149
	220	10*12	0.14	246
	330	10*12	0.14	352
	470	10*16	0.14	484
	1000	12.5*20	0.14	847
35(1V)	4.7	5*11	0.12	33
	10	5*11	0.12	48
	22	6.3*11	0.12	71
	33	6.3*11	0.12	83
	47	6.3*11	0.12	125
	100	8*11	0.12	187
	220	10*12	0.12	330
	330	10*16	0.12	440
	470	12.5*20	0.12	590
	1000	12.5*25	0.12	1012

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (mArms/105°C,120Hz)
50(1H)	0.47	5*11	0.10	12
	1	5*11	0.10	17
	2.2	5*11	0.10	24
	3.3	5*11	0.10	29
	4.7	5*11	0.10	36
	10	5*11	0.10	52
	22	6.3*11	0.10	77
	33	6.3*11	0.10	99
	47	8*11	0.10	138
	100	10*12	0.10	217
	220	10*20	0.10	380
	330	12.5*20	0.10	506
	470	12.5*25	0.10	705
63(1J)	0.47	5*11	0.10	12
	1	5*11	0.10	17
	2.2	5*11	0.10	24
	3.3	5*11	0.10	32
	4.7	5*11	0.10	39
	10	6.3*11	0.10	58
	22	6.3*11	0.10	94
	33	8*11	0.10	110
	47	8*11	0.10	152
	100	10*16	0.10	260
	220	10*20	0.10	440
	330	12.5*20	0.10	594
100(1K)	0.47	5*11	0.10	12
	1	5*11	0.10	17
	2.2	5*11	0.10	24
	3.3	5*11	0.10	32
	4.7	6.3*11	0.10	39
	10	8*11	0.10	61
	22	8*11	0.10	106
	33	10*12	0.10	142
	47	10*16	0.10	184
	100	12.5*20	0.10	300
	220	12.5*30	0.10	533

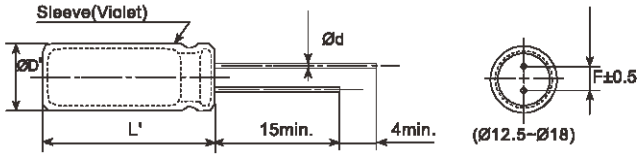
BG series

- SRS car assembly, high capacitance
- Low impedance, low temperature characteristics
- Endurance: +105°C 5,000 hours
- **RoHS Compliant**

SPECIFICATIONS

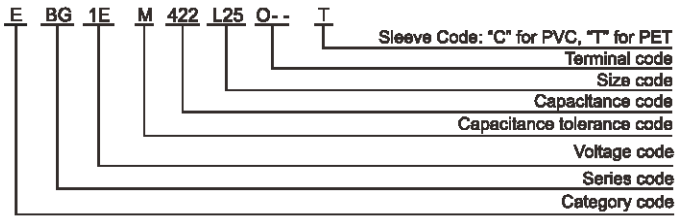
Items	Characteristics			
Category Temperature Range	-55~+105°C			
Rated Voltage Range	25 and 35 Vdc			
Capacitance Tolerance	±20%(M)			(at 20°C, 120Hz)
Leakage Current	I≤0.01CV or 3μA,whichever is greater. Where, I: Max.leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V)			(at 20°C after 2 minutes)
Dissipation Factor (tanδ)	Rated Voltage (Vdc)	25	35	
	tanδ (max.)	0.20	0.16	
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.			(at 20°C, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage (Vdc)	25	35	
	Z(-55°C)/Z(+20°C)	3	3	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 hours at 105°C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤200% of the initial specified value		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤200% of the initial specified value		
	Leakage Current	≤200% of the initial specified value		

DIMENSIONS [mm]



ØD	12.5	14.5	16	18
Ød	0.6	0.8	0.8	0.8
F	5.0	7.5	7.5	7.5
ØD'	ØD+0.5max.			
L'	L+2.0max.			

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Freq.(Hz) / Cap.(μF)	120	1k	10k	100k
Cap.<2100	0.60	0.87	0.95	1.00
2100≤Cap.<4000	0.75	0.90	0.95	1.00
Cap.≥4000	0.85	0.95	0.98	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use,the rms ripple current has to be reduced.

BG series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C,100kHz)	Rated ripple current (mArms/105°C,100kHz)
25(1E)	1700	12.5*20	0.20	0.057	1700
	2400	12.5*25	0.22	0.045	2000
		14.5*20	0.22	0.051	2000
	2800	12.5*30	0.22	0.039	2300
	3000	16*20	0.24	0.044	2250
	3400	14.5*25	0.24	0.041	2400
	3500	12.5*35	0.24	0.033	2700
	4200	16*25	0.26	0.033	2600
		18*20	0.26	0.042	2500
	4500	12.5*40	0.26	0.027	3100
	4600	14.5*30	0.26	0.032	2700
	5400	14.5*35	0.28	0.028	3100
	5600	16*30	0.28	0.026	3200
	6000	18*25	0.30	0.030	2800
	6400	14.5*40	0.30	0.025	3400
	6600	16*35	0.30	0.023	3500
	7800	16*40	0.32	0.021	3800
	7900	18*30	0.32	0.024	3500
	9200	18*35	0.36	0.022	3700
	11000	18*40	0.38	0.020	4000
35(1V)	1000	12.5*20	0.16	0.057	1700
	1400	12.5*25	0.16	0.045	2000
		14.5*20	0.16	0.051	2000
	1600	12.5*30	0.16	0.039	2300
	1800	16*20	0.16	0.044	2250
	2000	14.5*25	0.18	0.041	2400
	2100	12.5*35	0.18	0.033	2700
	2500	16*25	0.18	0.033	2600
		18*20	0.18	0.042	2500
	2700	12.5*40	0.18	0.027	3100
	2800	14.5*30	0.18	0.032	2700
	3200	14.5*35	0.20	0.028	3100
	3400	16*30	0.20	0.026	3200
	3600	18*25	0.20	0.030	2800
	3800	14.5*40	0.20	0.025	3400
	4000	16*35	0.22	0.023	3500
	4700	16*40	0.22	0.021	3800
	4800	18*30	0.22	0.024	3500
	5600	18*35	0.24	0.022	3700
	6700	18*40	0.24	0.020	4000

BH series

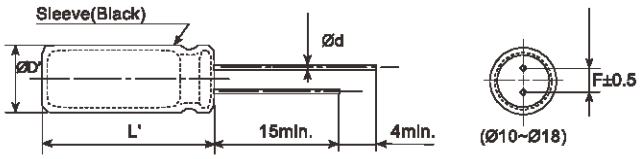
- Endurance: +130°C 3,000 hours
- High reliability, suited for automobile electronics
- Miniaturized,long life,low impedance
- **RoHS Compliant**

New

SPECIFICATIONS

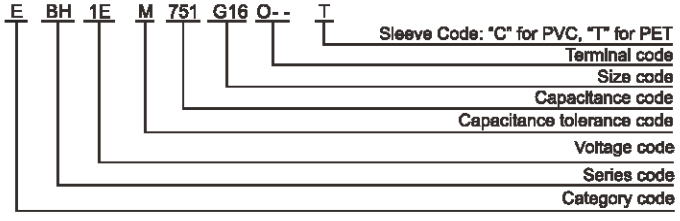
Items	Characteristics							
Category Temperature Range	-40~+130°C							
Rated Voltage Range	25~400 Vdc							
Capacitance Tolerance	±20%(M)							(at 20°C, 120Hz)
Leakage Current	25~100 Vdc			160~400 Vdc				
	I≤0.03CV or 4μA.(after 2 minutes) whichever is greater.			CV≤1,000	I≤0.1CV+40μA. (after 1 minute)			
				CV >1,000	I≤0.04CV+100μA. (after 1 minute)			
	Where, I: Max.leakage current (μA), C :nominal capacitance (μF), V : Rated voltage (V)							(at 20°C)
Dissipation Factor (tanδ)	Rated Voltage (Vdc)	25	35	50	63	100	160~250	350~400
	tanδ (max.)	0.14	0.12	0.10	0.09	0.08	0.15	0.20
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.							(at 20°C, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage (Vdc)	25	35	50	63	100	160~250	350~400
	Z(-25°C)/Z(+20°C)	2	2	2	2	2	3	6
	Z(-40°C)/Z(+20°C)	4	4	4	4	4	6	12 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 3,000 hours at 130°C.							
	Rated Voltage (Vdc)	25~100			160~400			
	Capacitance Change	≤±30% of the initial value			≤±20% of the initial value			
	D.F. (tanδ)	≤300% of the initial specified value			≤200% of the initial specified value			
	Leakage Current	≤The initial specified value			≤The initial specified value			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.							
	Capacitance Change	≤±20% of the initial value						
	D.F. (tanδ)	≤200% of the initial specified value						
	Leakage Current	≤200% of the initial specified value						

DIMENSIONS [mm]



ØD	10	12.5	14.5	16	18
Ød	0.6	0.6	0.8	0.8	0.8
F	5.0	5.0	7.5	7.5	7.5
ØD'	ØD+0.5max.				
L'	L+2max.				

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

6.3 to 100 Vdc

Cap.(μF) \ Freq.(Hz)	120	1k	10k	100k
130 to 240	0.40	0.82	0.93	1.00
270 to 560	0.50	0.85	0.94	1.00
620 to 2000	0.60	0.87	0.95	1.00
2200 to 4300	0.75	0.90	0.95	1.00
4700 to 11000	0.85	0.95	0.98	1.00

160 to 400 Vdc

Cap.(μF) \ Freq.(Hz)	50	120	300	1k	10k	100k
12 to 33	0.15	0.30	0.45	0.65	0.95	1.00
36 to 270	0.25	0.35	0.50	0.70	0.96	1.00

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use,the rms ripple current has to be reduced.

BH series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
25(1E)	510	10*12.5	0.14	0.14	900
	750	10*16	0.14	0.094	1300
	910	12.5*16	0.14	0.082	1220
	1200	10*20	0.14	0.073	1540
		14.5*15	0.14	0.067	1320
	1500	10*25	0.14	0.042	1880
	1600	16*15	0.14	0.063	1430
	1800	12.5*20	0.14	0.038	1590
	2000	10*30	0.16	0.033	2150
	2200	14.5*20	0.16	0.030	1780
	2400	18*15	0.16	0.053	1630
	2700	12.5*25	0.16	0.030	2280
	3000	16*20	0.18	0.029	1890
	3300	12.5*30	0.18	0.025	2760
	3600	14.5*25	0.18	0.025	2760
	4300	12.5*35	0.20	0.022	3120
		16*25	0.20	0.022	3030
		18*20	0.20	0.028	1930
	4700	14.5*30	0.20	0.020	3090
	5100	12.5*40	0.22	0.019	3610
		14.5*35	0.22	0.018	3430
		16*30	0.22	0.018	3330
	5600	18*25	0.24	0.020	3200
	6800	14.5*40	0.24	0.016	3820
		16*35	0.24	0.016	3630
	7500	18*30	0.26	0.016	3480
	8200	16*40	0.28	0.015	3930
	9100	18*35	0.30	0.015	3750
	11000	18*40	0.32	0.014	4040
35(1V)	300	10*12.5	0.12	0.14	900
	510	10*16	0.12	0.094	1300
	560	12.5*16	0.12	0.082	1220
	680	10*20	0.12	0.073	1540
	750	14.5*15	0.12	0.067	1320
	820	10*25	0.12	0.042	1880
	1100	12.5*20	0.12	0.038	1590
		16*15	0.12	0.063	1430
	1200	10*30	0.12	0.033	2150
	1500	12.5*25	0.12	0.030	2280
		14.5*20	0.12	0.030	1780
		18*15	0.12	0.053	1630
	2000	12.5*30	0.14	0.025	2760
		16*20	0.14	0.029	1890
	2200	14.5*25	0.14	0.025	2760
	2400	12.5*35	0.14	0.022	3120
		16*25	0.14	0.022	3030
		18*20	0.14	0.028	1930
	2700	12.5*40	0.14	0.019	3610
		14.5*30	0.14	0.020	3090
	3000	14.5*35	0.16	0.018	3430
	3300	16*30	0.16	0.018	3330
		18*25	0.16	0.020	3200
	3900	14.5*40	0.16	0.016	3820
	4300	16*35	0.18	0.016	3630
		18*30	0.18	0.016	3480
	4700	16*40	0.18	0.015	3930
	5100	18*35	0.20	0.015	3750
	8200	18*40	0.26	0.014	4040

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
50(1H)	160	10*12.5	0.10	0.24	730
	240	10*16	0.10	0.16	1080
	270	12.5*16	0.10	0.14	1020
	330	10*20	0.10	0.12	1290
	390	14.5*15	0.10	0.12	1090
	430	10*25	0.10	0.055	1740
	510	12.5*20	0.10	0.049	1410
	560	10*30	0.10	0.041	2020
		16*15	0.10	0.11	1190
	680	14.5*20	0.10	0.038	1610
	750	12.5*25	0.10	0.038	2030
		18*15	0.10	0.085	1370
	910	16*20	0.10	0.037	1740
	1000	12.5*30	0.10	0.031	2510
		14.5*25	0.10	0.031	2480
	1200	12.5*35	0.10	0.027	2900
		18*20	0.10	0.036	1830
	1300	14.5*30	0.10	0.026	2870
		16*35	0.10	0.027	2690
	1500	12.5*40	0.10	0.023	3260
		14.5*35	0.10	0.023	3160
	1600	16*30	0.10	0.023	3150
	1800	18*25	0.10	0.025	2900
	2000	14.5*40	0.12	0.020	3560
		16*35	0.12	0.020	3470
	2200	18*30	0.12	0.021	3330
	2400	16*40	0.12	0.018	3800
	2700	18*35	0.12	0.019	3590
	3300	18*40	0.14	0.017	3850
63(1J)	390	12.5*20	0.10	0.097	1310
	510	12.5*25	0.10	0.072	1880
		14.5*20	0.10	0.072	1510
	620	16*20	0.10	0.062	1630
	680	12.5*30	0.10	0.052	2410
		14.5*25	0.10	0.054	2130
	820	12.5*35	0.10	0.044	2760
		18*20	0.10	0.055	1750
	910	14.5*30	0.10	0.042	2700
		16*25	0.10	0.047	2300
	1000	12.5*40	0.10	0.038	3080
	1100	14.5*35	0.10	0.037	2940
		16*30	0.10	0.037	2940
	1200	18*25	0.10	0.044	2440
	1300	14.5*40	0.10	0.032	3350
		16*35	0.10	0.031	3220
	1500	18*30	0.10	0.037	3100
	1800	16*40	0.10	0.028	3590
	2000	18*35	0.12	0.028	3450
	2400	18*40	0.12	0.023	3690

BH series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
80(1B)	240	12.5*20	0.08	0.097	1310
	330	12.5*25	0.08	0.072	1880
		14.5*20	0.08	0.072	1510
	390	16*20	0.08	0.062	1630
	430	12.5*30	0.08	0.052	2410
	470	14.5*25	0.08	0.054	2130
	560	12.5*35	0.08	0.044	2760
		16*25	0.08	0.047	2300
		18*20	0.08	0.055	1750
	620	12.5*40	0.08	0.038	3080
		14.5*30	0.08	0.042	2700
	680	14.5*35	0.08	0.037	2940
		16*30	0.08	0.037	2940
	750	18*25	0.08	0.044	2440
	820	14.5*40	0.08	0.032	3350
	910	16*35	0.08	0.031	3220
		18*30	0.08	0.037	3100
	1100	16*40	0.08	0.028	3590
	1300	18*35	0.08	0.028	3450
	1500	18*40	0.08	0.023	3690
100(1K)	130	12.5*20	0.08	0.12	1210
	180	14.5*20	0.08	0.082	1450
	200	12.5*25	0.08	0.082	1800
	240	12.5*30	0.08	0.062	2290
		16*20	0.08	0.071	1580
	270	14.5*25	0.08	0.064	2050
	330	12.5*35	0.08	0.051	2680
		16*25	0.08	0.057	2190
		18*20	0.08	0.069	1690
	360	14.5*30	0.08	0.050	2620
	390	12.5*40	0.08	0.044	2970
		14.5*35	0.08	0.044	2850
		16*30	0.08	0.044	2770
	430	18*25	0.08	0.054	2310
	510	14.5*40	0.08	0.038	3230
		16*35	0.08	0.037	3010
	560	18*30	0.08	0.043	2830
	620	16*40	0.08	0.032	3320
	680	18*35	0.08	0.034	3210
	820	18*40	0.08	0.029	3410

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Impedance (Ωmax/20°C, 100kHz)	Rated ripple current (mArms/130°C, 100kHz)
160(2C)	47	12.5*25	0.15	–	590
	68	16*25	0.15	–	750
	82	16*25	0.15	–	825
	100	16*25	0.15	–	960
		18*20	0.15	–	960
	150	18*30	0.15	–	1050
	220	18*35	0.15	–	1500
200(2D)	33	12.5*20	0.15	–	500
	47	12.5*25	0.15	–	650
		16*20	0.15	–	650
	68	16*25	0.15	–	750
	82	16*30	0.15	–	900
		18*25	0.15	–	900
	100	16*30	0.15	–	1100
		18*25	0.15	–	1100
	150	18*35	0.15	–	1350
250(2E)	22	12.5*20	0.15	–	430
	33	12.5*25	0.15	–	530
		16*20	0.15	–	530
	47	16*25	0.15	–	690
		18*20	0.15	–	690
	68	16*30	0.15	–	780
		18*25	0.15	–	780
	82	18*25	0.15	–	900
	100	18*30	0.15	–	970
350(2V)	15	12.5*25	0.20	–	335
		16*20	0.20	–	335
	22	16*25	0.20	–	450
	33	16*30	0.20	–	535
		16*35	0.20	–	555
	47	18*30	0.20	–	700
		18*35	0.20	–	750
	68	18*40	0.20	–	900
400(2G)	12	12.5*25	0.20	–	280
	15	12.5*25	0.20	–	335
		16*20	0.20	–	335
	22	16*25	0.20	–	480
		16*30	0.20	–	500
	33	18*30	0.20	–	635
	47	18*35	0.20	–	750
	68	18*40	0.20	–	900

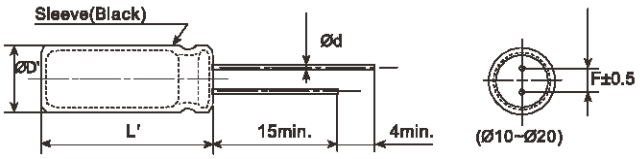
FP series

- Low dissipation factor, low leakage current
- For photo flash with lead wire
- **RoHS Compliant**

SPECIFICATIONS

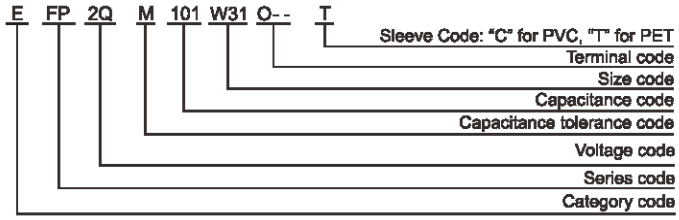
Items	Characteristics	
Category Temperature Range	-20~+55°C	
Rated Voltage Range	330 Vdc	
Capacitance Tolerance	-10~+20%(V)	(at 20°C, 120Hz)
Leakage Current	I≤1°C Where,I:Max.leakage current (μA),C:Nominal capacitance (μF)	(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	0.06max.	(at 20°C, 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after charge and discharge are repeated for 5,000 times at room temperature(5 to 35°C).Discharge resistance of Xenon tube: 0.7 to 1.0Ω.	
	Capacitance Change	≤±10% of the initial value
	D.F. (tanδ)	≤150% of the initial specified value
	Leakage Current	≤150% of the initial specified value
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 55°C without voltage applied.	
	Capacitance Change	≤±10% of the initial value
	D.F. (tanδ)	≤150% of the initial specified value
	Leakage Current	≤150% of the initial specified value

DIMENSIONS [mm]



ØD	10 to 11	12 to 14	14.5 to 20
Ød	0.6	0.8	0.8
F	5.0	5.0	7.5
ØD'	ØD+0.5max.		
L'	L+2max.		

PART NUMBERING SYSTEM



Capacitance (μF)	ØD (mm)	10	12.5	13	13.5	14	14.5	16	18	20
22	L (mm)	20								
50		30								
60		30								
80			27	25	23					
100			31	28	27	25				
120			35	32	30	28	27			
140			40	36	33	31	29	26		
160			44	40	37	34	32	29	25	
180			48	44	41	38	35	30	27	
200				48	44	41	38	33	29	26
220				52	47	44	41	35	31	29
250						49	45	39	34	30
300								45	40	34

LK series

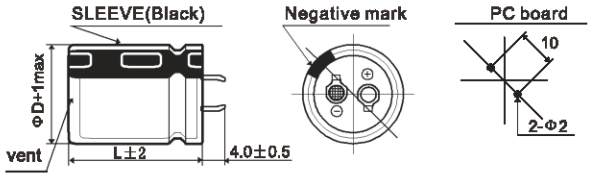
- Standard series for general purpose
- Endurance: 2,000 hours at 85°C
- **RoHS Compliant**

SPECIFICATIONS

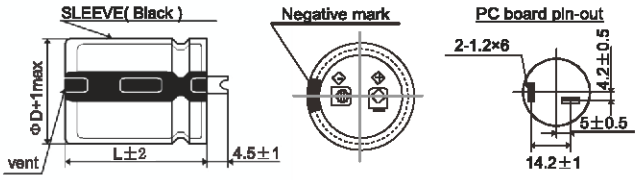
Items	Characteristics										
Category Temperature Range	-40~+85°C							-25~ +85°C			
Rated Voltage Range	10~100V.DC							160~500V.DC			
Capacitance Tolerance	±20% (M)										(at 20°C, 120Hz)
Leakage Current	I≤3√CV Where, I: Max.leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V)										(at 20 °C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage (V_{dc})	10	16	25	35	50	63	80	100	160 to 400	420 to 500	(at 20°C, 120Hz)
	tanδ (max.)	0.50	0.40	0.30	0.25	0.20	0.15	0.15	0.15	0.15	0.15	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage (V_{dc})	10	16	25	35	50	63	80	100	160 to 400	420 to 500	
	Z(-25°C)/Z(+20°C)	4	4	3	3	2	2	2	2	4	8	
	Z(-40°C)/Z(+20°C)	15	15	10	8	6	6	5	5	-	-	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 85°C.										
	Capacitance Change	≤±20% of the initial value									
	D.F. (tanδ)	≤200% of the initial specified value									
	Leakage Current	≤The initial specified value									
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied.										
	Capacitance Change	≤±20% of the initial value									
	D.F. (tanδ)	≤150% of the initial specified value									
	Leakage Current	≤200% of the initial specified value									

DIMENSIONS [mm]

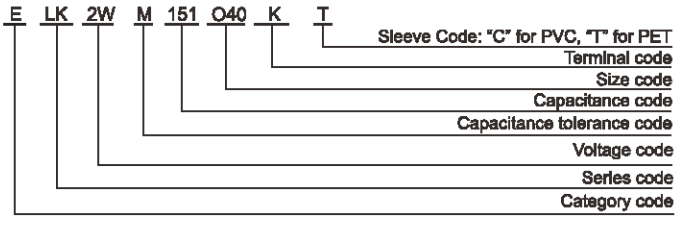
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
10~50	1.00	1.03	1.05	1.08
63~100	1.00	1.07	1.13	1.19
160~250	1.00	1.32	1.45	1.50
315~500	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use,the rms ripple current has to be reduced.

LK series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
10(1A)	12000	22*25	0.50	2.41
	15000	22*30	0.50	2.88
		25*25	0.50	2.88
	18000	22*35	0.50	3.22
		25*30	0.50	3.08
	22000	22*40	0.50	3.79
		25*30	0.50	3.66
		30*25	0.50	3.53
	27000	22*45	0.50	4.04
		25*35	0.50	4.04
		30*30	0.50	3.99
	33000	22*50	0.50	4.58
		25*40	0.50	4.56
		30*30	0.50	4.58
	39000	25*45	0.50	5.29
		30*35	0.50	5.21
		35*30	0.50	5.05
	47000	25*50	0.50	5.78
		30*40	0.50	5.78
		35*35	0.50	5.55
	56000	30*45	0.50	6.59
		35*35	0.50	6.40
	68000	30*50	0.50	7.50
		35*40	0.50	7.48
	82000	35*50	0.50	8.50
16(1C)	8200	22*25	0.40	2.56
	10000	22*30	0.40	2.81
	12000	22*30	0.40	3.31
		25*25	0.40	2.96
	15000	22*35	0.40	3.69
		25*30	0.40	3.64
		30*25	0.40	3.73
	18000	22*40	0.40	3.98
		25*35	0.40	3.98
		30*30	0.40	3.88
	22000	22*50	0.40	4.52
		25*40	0.40	4.44
		30*30	0.40	4.38
	27000	25*45	0.40	4.98
		30*35	0.40	4.82
		35*30	0.40	4.82
	33000	25*50	0.40	5.49
		30*40	0.40	5.38
		35*35	0.40	5.33
	39000	30*45	0.40	6.11
		35*35	0.40	6.01
	47000	30*50	0.40	6.80
		35*40	0.40	6.80
	56000	35*45	0.40	7.62

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
25(1E)	5600	22*25	0.30	2.31
	6800	22*30	0.30	2.56
	8200	22*35	0.30	2.81
		25*25	0.30	2.78
	10000	22*35	0.30	3.18
		25*30	0.30	3.16
		22*40	0.30	3.53
	12000	25*35	0.30	3.48
		30*25	0.30	3.53
	15000	22*50	0.30	4.08
		25*40	0.30	4.00
		30*30	0.30	4.00
	18000	25*45	0.30	4.68
		30*35	0.30	4.66
		35*30	0.30	4.68
	22000	30*40	0.30	5.19
		35*35	0.30	5.20
	27000	30*45	0.30	6.02
		35*40	0.30	6.02
	33000	35*45	0.30	6.75
	39000	35*50	0.30	7.56
35(1V)	3900	22*25	0.25	2.22
	4700	22*30	0.25	2.46
		25*25	0.25	2.43
	5600	22*35	0.25	2.79
		25*30	0.25	2.75
	6800	22*40	0.25	2.89
		25*30	0.25	2.89
		30*25	0.25	3.09
	8200	22*45	0.25	3.47
		25*35	0.25	3.33
		30*30	0.25	3.29
	10000	22*50	0.25	3.59
		25*40	0.25	3.59
		30*30	0.25	3.61
	12000	25*45	0.25	4.01
		30*35	0.25	4.01
		35*30	0.25	4.02
	15000	30*40	0.25	4.80
		35*35	0.25	4.80
	18000	30*45	0.25	5.18
		35*40	0.25	5.71
	22000	35*45	0.25	6.38
	27000	35*50	0.25	6.90

LK series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
50(1H)	2200	22*25	0.20	1.93
	2700	22*30	0.20	2.21
	3300	22*30	0.20	2.41
		25*25	0.20	2.38
	3900	22*35	0.20	2.72
		25*30	0.20	2.68
	4700	22*40	0.20	3.01
		25*30	0.20	3.03
		30*25	0.20	3.01
	5600	22*45	0.20	3.43
		25*35	0.20	3.37
		30*30	0.20	3.43
	6800	22*50	0.20	3.94
		25*40	0.20	3.87
		30*35	0.20	3.87
	8200	25*45	0.20	4.37
		30*35	0.20	4.42
		35*30	0.20	4.41
	10000	30*40	0.20	5.02
		35*35	0.20	4.92
	12000	30*50	0.20	5.60
		35*40	0.20	5.60
	15000	35*45	0.20	6.44
	18000	35*50	0.20	6.71
63(1J)	1800	22*25	0.15	1.90
	2200	22*30	0.15	2.35
		25*25	0.15	2.30
	2700	22*35	0.15	2.50
		25*30	0.15	2.49
	3300	22*40	0.15	2.69
		25*30	0.15	2.69
		30*25	0.15	2.78
	3900	22*45	0.15	3.10
		25*35	0.15	3.09
		30*30	0.15	3.09
	4700	22*50	0.15	3.49
		25*40	0.15	3.37
		30*30	0.15	3.37
	5600	25*45	0.15	3.80
		30*35	0.15	3.81
		35*30	0.15	3.75
	6800	25*50	0.15	4.41
		30*40	0.15	4.41
		35*35	0.15	4.33
	8200	30*45	0.15	4.90
		35*35	0.15	4.80
	10000	30*50	0.15	5.49
		35*40	0.15	5.47
	12000	35*50	0.15	6.30

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
80(1B)	1200	22*25	0.15	1.77
	1500	22*30	0.15	2.01
	1800	22*35	0.15	2.25
		25*25	0.15	2.26
	2200	22*40	0.15	2.53
		25*30	0.15	2.53
		30*25	0.15	2.50
	2700	22*45	0.15	2.93
		25*35	0.15	2.93
		30*30	0.15	2.91
	3300	22*50	0.15	3.25
		25*40	0.15	3.25
		30*30	0.15	3.23
	3900	25*45	0.15	3.62
		30*35	0.15	3.62
	4700	25*50	0.15	4.28
		30*40	0.15	4.15
		35*30	0.15	4.10
	5600	30*45	0.15	4.55
		35*35	0.15	4.51
	6800	30*50	0.15	5.18
		35*40	0.15	5.14
	8200	35*45	0.15	5.83
100(1K)	820	22*25	0.15	1.86
	1000	22*30	0.15	2.02
	1200	22*30	0.15	2.12
		25*25	0.15	2.10
	1500	22*35	0.15	2.45
		25*30	0.15	2.43
	1800	22*40	0.15	2.77
		25*35	0.15	2.77
		30*25	0.15	2.65
	2200	22*45	0.15	3.12
		25*40	0.15	3.20
		30*30	0.15	3.10
	2700	25*45	0.15	3.61
		30*35	0.15	3.60
		35*30	0.15	3.71
	3300	25*50	0.15	4.06
		30*40	0.15	4.05
		35*35	0.15	4.07
	3900	30*45	0.15	4.60
		35*35	0.15	4.50
	4700	30*50	0.15	5.13
		35*40	0.15	5.12
	5600	35*45	0.15	5.75
	6800	35*50	0.15	6.01

LK series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
160(2C)	390	22*25	0.15	1.55
	470	22*30	0.15	1.77
		25*25	0.15	1.77
	560	22*35	0.15	2.05
		25*30	0.15	2.05
	680	22*40	0.15	2.24
		25*30	0.15	2.22
		30*25	0.15	2.22
	820	22*45	0.15	2.55
		25*35	0.15	2.52
		30*30	0.15	2.51
	1000	22*50	0.15	2.88
		25*40	0.15	2.86
		30*30	0.15	2.82
	1200	25*45	0.15	3.27
		30*35	0.15	3.25
		35*30	0.15	3.24
	1500	30*40	0.15	3.77
		35*35	0.15	3.75
	1800	30*45	0.15	4.10
		35*35	0.15	4.08
	2200	35*45	0.15	4.72
	2700	35*50	0.15	5.30
180(2L)	330	22*25	0.15	1.42
	390	22*30	0.15	1.61
	470	22*30	0.15	1.80
		25*25	0.15	1.80
	560	22*35	0.15	2.09
		25*30	0.15	2.05
	680	22*40	0.15	2.36
		25*35	0.15	2.34
		30*25	0.15	2.27
	820	22*45	0.15	2.72
		25*35	0.15	2.58
		30*30	0.15	2.56
	1000	25*45	0.15	2.91
		30*35	0.15	2.95
	1200	25*50	0.15	3.46
		30*40	0.15	3.38
		35*30	0.15	3.32
	1500	30*45	0.15	3.90
		35*35	0.15	3.83
	1800	30*50	0.15	4.33
		35*40	0.15	4.32
	2200	35*45	0.15	4.60
	2700	35*50	0.15	5.05

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
200(2D)	270	22*25	0.15	1.30
	330	22*25	0.15	1.44
	390	22*30	0.15	1.65
		25*25	0.15	1.63
	470	22*25	0.15	1.88
		25*35	0.15	1.86
	560	22*40	0.15	2.08
		25*30	0.15	2.05
		30*25	0.15	2.05
	680	22*45	0.15	2.36
		25*35	0.15	2.36
		30*30	0.15	2.36
	820	22*50	0.15	2.68
		25*40	0.15	2.66
		30*30	0.15	2.62
	1000	25*45	0.15	3.12
		30*35	0.15	3.00
		35*30	0.15	2.96
	1200	25*50	0.15	3.44
		30*40	0.15	3.44
		35*35	0.15	3.40
	1500	30*50	0.15	3.93
		35*40	0.15	3.87
	1800	35*45	0.15	4.37
	2200	35*50	0.15	5.00
220(2N)	220	22*25	0.15	1.18
	270	22*25	0.15	1.31
	330	22*30	0.15	1.58
		25*25	0.15	1.49
	390	22*35	0.15	1.69
		25*30	0.15	1.71
	470	22*40	0.15	1.99
		25*30	0.15	1.95
		30*25	0.15	1.89
	560	22*45	0.15	2.28
		25*35	0.15	2.22
		30*30	0.15	2.19
	680	22*50	0.15	2.46
		25*40	0.15	2.40
		30*30	0.15	2.39
	820	25*45	0.15	2.81
		30*35	0.15	2.70
		35*30	0.15	2.62
	1000	25*50	0.15	3.13
		30*40	0.15	3.08
		35*35	0.15	3.05
	1200	30*45	0.15	3.60
		35*40	0.15	3.51
	1500	35*45	0.15	3.92

LK series

STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
250(2E)	220	22*25	0.15	1.18
	270	22*30	0.15	1.43
	330	22*30	0.15	1.58
		25*25	0.15	1.53
	390	22*25	0.15	1.79
		25*30	0.15	1.79
	470	22*40	0.15	2.05
		25*35	0.15	2.05
		30*25	0.15	1.94
	560	22*45	0.15	2.36
		25*35	0.15	2.24
		30*30	0.15	2.24
	680	25*40	0.15	2.54
		30*35	0.15	2.58
	820	25*50	0.15	2.87
		30*35	0.15	2.84
		35*30	0.15	2.82
	1000	30*45	0.15	3.39
		35*35	0.15	3.31
	1200	30*50	0.15	3.80
		35*40	0.15	3.66
	1500	35*45	0.15	4.12
	1800	35*50	0.15	4.31
315(2F)	180	22*30	0.15	1.23
		25*25	0.15	1.31
	220	22*35	0.15	1.34
		25*30	0.15	1.40
	270	22*40	0.15	1.60
		25*30	0.15	1.62
	330	22*45	0.15	1.82
		25*35	0.15	1.85
		30*30	0.15	1.89
	390	22*50	0.15	1.97
		25*40	0.15	2.01
		30*30	0.15	2.05
	470	25*45	0.15	2.20
		30*35	0.15	2.27
		35*30	0.15	2.25
	560	30*40	0.15	2.50
		35*35	0.15	2.56
	680	30*45	0.15	2.67
		35*40	0.15	2.90
	820	30*50	0.15	3.12
		35*45	0.15	3.29
	1000	35*50	0.15	3.40

WV (V_{dc})	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
350(2V)	120	22*25	0.15	0.99
	150	22*30	0.15	1.44
		25*25	0.15	1.16
	180	22*35	0.15	1.28
		25*30	0.15	1.30
	220	22*40	0.15	1.40
		25*35	0.15	1.46
		30*25	0.15	1.47
	270	22*45	0.15	1.62
		25*35	0.15	1.65
		30*30	0.15	1.71
	330	22*50	0.15	1.78
		25*40	0.15	1.88
		30*35	0.15	1.93
	390	25*45	0.15	2.04
		30*35	0.15	2.12
		35*30	0.15	2.19
	470	30*40	0.15	2.41
		35*35	0.15	2.43
	560	30*45	0.15	2.60
		35*35	0.15	2.62
	680	35*40	0.15	3.00
	820	35*50	0.15	3.30
385(2P)	82	22*25	0.15	0.70
	100	22*30	0.15	0.82
	120	22*30	0.15	0.91
		25*25	0.15	0.95
	150	22*35	0.15	1.04
		25*30	0.15	1.08
	180	22*40	0.15	1.18
		25*35	0.15	1.20
		30*25	0.15	1.28
	220	22*45	0.15	1.33
		25*35	0.15	1.44
		30*30	0.15	1.40
	270	25*40	0.15	1.56
		30*35	0.15	1.62
	330	25*50	0.15	1.80
		30*40	0.15	1.85
		35*30	0.15	1.85
	390	30*40	0.15	2.04
		35*35	0.15	2.06
	470	30*50	0.15	2.27
		35*40	0.15	2.30
	560	35*45	0.15	2.57
	680	35*50	0.15	2.80

LK series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
400(2G)	82	22*25	0.15	0,80
	100	22*30	0.15	0.94
	120	22*30	0.15	1.04
		25*25	0.15	1.08
	150	22*35	0.15	1.18
		25*30	0.15	1.21
	180	22*40	0.15	1.34
		25*35	0.15	1.37
		30*25	0.15	1.45
	220	22*50	0.15	1.50
		25*35	0.15	1.56
		30*30	0.15	1.58
	270	25*40	0.15	1.70
		30*35	0.15	1.73
	330	25*50	0.15	1.90
		30*40	0.15	1.95
		35*30	0.15	1.95
	390	30*40	0.15	2.15
		35*35	0.15	2.17
	470	30*50	0.15	2.39
		35*40	0.15	2.42
	560	35*45	0.15	2.71
	680	35*50	0.15	2.95
420(2T)	82	22*25	0.15	0.75
	100	22*30	0.15	0.87
		25*25	0.15	0.92
	120	22*30	0.15	1.01
		25*25	0.15	1.03
	150	22*35	0.15	1.19
		25*30	0.15	1.19
		30*25	0.15	1.14
	180	22*45	0.15	1.36
		25*35	0.15	1.37
		30*25	0.15	1.35
	220	22*50	0.15	1.69
		25*40	0.15	1.58
		30*30	0.15	1.56
	270	25*45	0.15	1.83
		30*35	0.15	1.72
		35*30	0.15	1.76
	330	25*50	0.15	2.18
		30*40	0.15	1.98
		35*35	0.15	2.04
	390	30*45	0.15	2.34
		35*35	0.15	2.26
	470	30*50	0.15	2.67
		35*40	0.15	2.60
	560	35*45	0.15	2.93

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
450(2W)	68	22*25	0.15	0.68
	82	22*30	0.15	0.82
	100	22*35	0.15	0.90
		25*25	0.15	0.92
	120	22*35	0.15	1.02
		25*30	0.15	1.04
		30*25	0.15	1.07
	150	22*40	0.15	1.12
		25*35	0.15	1.19
		30*30	0.15	1.23
	180	22*50	0.15	1.26
		25*40	0.15	1.33
		30*30	0.15	1.38
	220	25*45	0.15	1.51
		30*35	0.15	1.56
		35*30	0.15	1.58
	270	25*50	0.15	1.65
		30*40	0.15	1.80
		35*35	0.15	1.81
	330	30*45	0.15	2.02
		35*35	0.15	2.05
	390	30*50	0.15	2.24
		35*40	0.15	2.27
	470	35*45	0.15	2.55
500(2H)	56	22*25	0.15	0.63
	68	22*30	0.15	0.69
		25*25	0.15	0.68
	82	22*35	0.15	0.85
		25*30	0.15	0.88
	100	22*40	0.15	0.94
		25*35	0.15	0.96
	120	22*45	0.15	1.06
		25*40	0.15	1.09
		30*35	0.15	1.13
	150	22*50	0.15	1.19
		25*45	0.15	1.23
		30*40	0.15	1.26
	180	25*50	0.15	1.39
		30*45	0.15	1.43
	220	30*50	0.15	1.60
		35*35	0.15	1.62
	270	35*40	0.15	1.85
	330	35*50	0.15	2.08
	390	35*55	0.15	2.31
	470	35*60	0.15	2.61

LH series

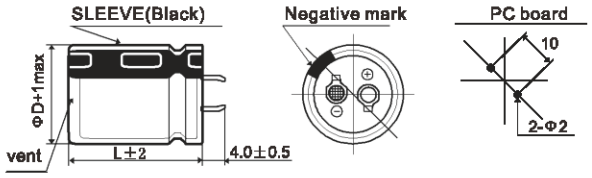
- Withstand high temperature, for general purpose
- Endurance: 2,000 hours at 105°C
- **RoHS Compliant**

SPECIFICATIONS

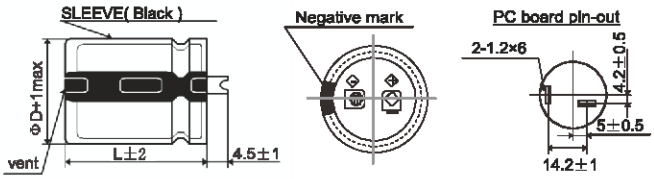
Items	Characteristics											
Category Temperature Range	-40~+105°C								-25~+105°C			
Rated Voltage Range	10~100V.DC								160~500V.DC			
Capacitance Tolerance	±20% (M)											(at 20°C, 120Hz)
Leakage Current	I≤3√CV Where, I: Max.leakage current (μA), C: Nominal capacitance (μF), V: Rated voltage (V)											(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage (Vdc)	10	16	25	35	50	63	80	100	160 to 250	315 to 450	500	
	tanδ (max.)	0.55	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.15	0.20	(at 20°C, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage (Vdc)	10	16	25	35	50	63	80	100	160 to 250	315 to 400	420 to 500	
	Z(-25°C)/Z(+20°C)	4	4	3	3	2	2	2	2	4	8	8	
	Z(-40°C)/Z(+20°C)	15	15	10	8	6	6	5	5	-	-	-	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 105°C.												
	Capacitance Change	≤±20% of the initial value											
	D.F. (tanδ)	≤200% of the initial specified value											
	Leakage Current	≤The initial specified value											
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.												
	Capacitance Change	≤±20% of the initial value											
	D.F. (tanδ)	≤150% of the initial specified value											
	Leakage Current	≤200% of the initial specified value											

DIMENSIONS [mm]

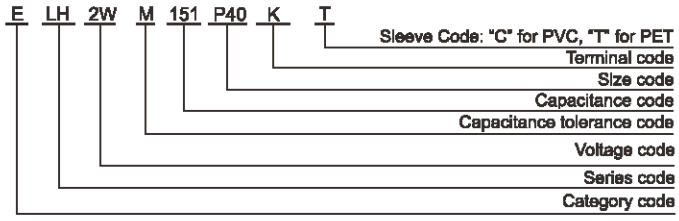
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
10~50	1.00	1.03	1.05	1.08
63~100	1.00	1.07	1.13	1.19
160~250	1.00	1.32	1.45	1.50
315~500	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use,the rms ripple current has to be reduced.

LH series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
10(1A)	10000	22*25	0.55	1.77
	12000	22*30	0.55	2.10
		25*25	0.55	1.94
	15000	22*35	0.55	2.23
		25*30	0.55	2.10
	18000	22*40	0.55	2.41
		25*30	0.55	2.34
		30*25	0.55	2.25
	22000	22*45	0.55	2.58
		25*35	0.55	2.54
		30*30	0.55	2.50
	27000	22*50	0.55	3.17
		25*40	0.55	3.07
		30*30	0.55	2.95
	33000	25*45	0.55	3.39
		30*35	0.55	3.33
		35*30	0.55	3.21
	39000	30*40	0.55	3.70
		35*35	0.55	3.68
	47000	30*45	0.55	4.22
		35*40	0.55	4.16
	56000	35*45	0.55	5.00
16(1C)	6800	22*25	0.50	1.75
	8200	22*30	0.50	2.00
	10000	22*30	0.50	2.10
		25*25	0.50	2.05
	12000	22*35	0.50	2.31
		25*30	0.50	2.30
		30*25	0.50	2.30
	15000	22*40	0.50	2.68
		25*35	0.50	2.58
		30*30	0.50	2.57
	18000	22*50	0.50	3.20
		25*40	0.50	3.16
		30*30	0.50	2.98
	22000	25*45	0.50	3.36
		30*35	0.50	3.30
		35*30	0.50	3.25
	27000	25*50	0.50	3.85
		30*40	0.50	3.80
		35*35	0.50	3.93
	33000	30*45	0.50	4.30
		35*35	0.50	4.27
	39000	30*50	0.50	4.81
		35*40	0.50	4.80
	47000	35*45	0.50	5.53

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
25(1E)	4700	22*25	0.45	1.61
	5600	22*30	0.45	1.80
	6800	22*35	0.45	2.09
		25*25	0.45	1.87
	8200	22*40	0.45	2.31
		25*30	0.45	2.34
		30*25	0.45	2.16
	10000	22*45	0.45	2.65
		25*35	0.45	2.61
		30*30	0.45	2.61
	12000	22*50	0.45	2.80
		25*40	0.45	2.81
		30*30	0.45	2.74
	15000	25*45	0.45	3.27
		30*35	0.45	3.13
		35*30	0.45	3.26
	18000	30*40	0.45	3.56
		35*35	0.45	3.84
	22000	30*45	0.45	4.04
		35*35	0.45	3.75
	27000	35*45	0.45	4.74
	33000	35*50	0.45	5.50
35(1V)	3300	22*25	0.40	1.45
	3900	22*30	0.40	1.69
	4700	22*35	0.40	2.02
		25*25	0.40	1.62
	5600	22*35	0.40	2.13
		25*30	0.40	2.00
	6800	22*40	0.40	2.41
		25*35	0.40	2.31
		30*25	0.40	2.31
	8200	22*50	0.40	2.85
		25*40	0.40	2.73
		30*30	0.40	2.75
	10000	25*45	0.40	3.05
		30*35	0.40	3.05
	12000	25*50	0.40	3.37
		30*40	0.40	3.23
		35*30	0.40	3.19
	15000	30*45	0.40	3.72
		35*35	0.40	3.67
	18000	35*40	0.40	4.37
	22000	35*45	0.40	4.92

LH series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
50(1H)	1800	22*25	0.35	1.34
	2200	22*30	0.35	1.60
	2700	22*30	0.35	1.70
		25*25	0.35	1.70
	3300	22*35	0.35	1.97
		25*30	0.35	1.88
	3900	22*40	0.35	2.22
		25*30	0.35	2.20
		30*25	0.35	1.95
	4700	22*45	0.35	2.43
		25*35	0.35	2.43
		30*30	0.35	2.25
	5600	22*50	0.35	2.75
		25*40	0.35	2.72
		30*30	0.35	2.64
	6800	25*45	0.35	3.30
		30*35	0.35	3.30
		35*30	0.35	3.25
	8200	30*40	0.35	3.60
		35*35	0.35	3.60
	10000	30*50	0.35	4.05
		35*40	0.35	4.04
	12000	35*45	0.35	4.56
	15000	35*50	0.35	4.77
63(1J)	1200	22*25	0.30	1.20
	1500	22*30	0.30	1.47
	1800	22*30	0.30	1.58
		25*25	0.30	1.52
	2200	22*35	0.30	1.82
		25*30	0.30	1.75
	2700	22*40	0.30	2.07
		25*35	0.30	2.11
		30*25	0.30	1.72
	3300	22*45	0.30	2.33
		25*35	0.30	2.27
		30*30	0.30	2.24
	3900	25*40	0.30	2.51
		30*35	0.30	2.55
	4700	25*50	0.30	2.97
		30*40	0.30	2.86
		35*30	0.30	2.80
	5600	30*40	0.30	3.22
		35*35	0.30	3.20
	6800	30*50	0.30	3.65
		35*40	0.30	3.65
	8200	35*45	0.30	4.04
	10000	35*50	0.30	4.48

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
80(1B)	1000	22*25	0.25	1.19
	1200	22*30	0.25	1.44
	1500	22*30	0.25	1.59
		25*52	0.25	1.59
	1800	22*35	0.25	1.79
		25*30	0.25	1.71
	2200	22*40	0.25	2.03
		25*35	0.25	1.98
		30*25	0.25	1.98
	2700	22*45	0.25	2.39
		25*40	0.25	2.35
		30*30	0.25	2.35
	3300	25*45	0.25	2.64
		30*35	0.25	2.61
		35*30	0.25	2.74
	3900	25*50	0.25	2.92
		30*40	0.25	2.82
		35*30	0.25	2.97
	4700	30*45	0.25	3.34
		35*35	0.25	3.38
	5600	30*50	0.25	3.80
		35*40	0.25	3.80
	6800	35*45	0.25	3.90
	8200	35*50	0.25	4.20
100(1K)	680	22*25	0.20	1.09
	820	22*30	0.20	1.32
	1000	22*30	0.20	1.47
		25*25	0.20	1.45
	1200	22*35	0.20	1.69
		25*30	0.20	1.68
	1500	22*40	0.20	1.97
		25*35	0.20	1.98
		30*25	0.20	1.95
	1800	22*45	0.20	2.23
		25*40	0.20	2.20
		30*30	0.20	2.20
	2200	25*45	0.20	2.53
		30*35	0.20	2.55
		35*30	0.20	2.50
	2700	25*50	0.20	2.82
		30*40	0.20	2.86
		35*35	0.20	2.89
	3300	30*45	0.20	3.30
		35*35	0.20	3.25
	3900	30*50	0.20	3.60
		35*40	0.20	3.67
	4700	35*45	0.20	3.80
	5600	35*50	0.20	4.05

LH series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
160(2C)	220	22*25	0.15	0.92
	330	22*25	0.15	1.03
	390	22*30	0.15	1.17
	470	22*30	0.15	1.28
		25*25	0.15	1.29
	560	22*35	0.15	1.45
		25*30	0.15	1.49
	680	22*40	0.15	1.64
		25*35	0.15	1.70
		30*25	0.15	1.63
	820	22*45	0.15	1.85
		25*40	0.15	1.92
		30*30	0.15	1.91
	1000	25*45	0.15	2.17
		30*35	0.15	2.19
	1200	25*50	0.15	2.43
		30*40	0.15	2.48
		35*30	0.15	2.25
	1500	30*45	0.15	2.82
		35*35	0.15	2.62
	1800	30*50	0.15	3.13
		35*40	0.15	2.97
	2200	35*45	0.15	3.34
180(2L)	270	22*25	0.15	0.97
	330	22*30	0.15	1.13
	390	22*30	0.15	1.32
		25*25	0.15	1.33
	470	22*35	0.15	1.39
		25*30	0.15	1.43
	560	22*40	0.15	1.56
		25*30	0.15	1.53
		30*25	0.15	1.56
	680	22*45	0.15	1.76
		25*35	0.15	1.76
		30*30	0.15	1.74
	820	22*50	0.15	1.97
		25*40	0.15	1.99
		30*30	0.15	1.93
	1000	25*45	0.15	2.24
		30*35	0.15	2.24
		35*30	0.15	2.20
	1200	30*40	0.15	2.53
		35*35	0.15	2.54
	1500	30*50	0.15	3.03
		35*40	0.15	2.91
	1800	35*45	0.15	3.25
	2200	35*50	0.15	3.62

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
200(2D)	270	22*25	0.15	0.99
	330	22*30	0.15	1.20
		25*25	0.15	1.20
	390	22*35	0.15	1.30
		25*30	0.15	1.34
	470	22*40	0.15	1.44
		25*30	0.15	1.44
		30*25	0.15	1.48
	560	22*45	0.15	1.60
		25*35	0.15	1.60
		30*30	0.15	1.60
	680	22*50	0.15	1.75
		25*40	0.15	1.76
		30*30	0.15	1.74
	820	25*45	0.15	2.10
		30*35	0.15	2.11
		35*30	0.15	2.10
	1000	25*50	0.15	2.36
		30*40	0.15	2.40
		35*35	0.15	2.30
	1200	30*45	0.15	2.69
		35*35	0.15	2.53
	1500	35*40	0.15	2.97
	1800	35*50	0.15	3.45
220(2N)	220	22*25	0.15	0.94
	270	22*30	0.15	1.09
	330	22*35	0.15	1.24
		25*25	0.15	1.14
	390	22*35	0.15	1.30
		25*25	0.15	1.26
	470	22*40	0.15	1.41
		25*30	0.15	1.39
		30*25	0.15	1.37
	560	22*45	0.15	1.60
		25*35	0.15	1.56
		30*30	0.15	1.61
		35*25	0.15	1.52
	680	25*40	0.15	1.75
		30*35	0.15	1.76
		35*30	0.15	1.72
	820	25*45	0.15	1.97
		30*40	0.15	2.06
		35*30	0.15	1.95
	1000	30*45	0.15	2.44
		35*35	0.15	2.20
	1200	35*40	0.15	2.37
	1500	30*45	0.15	2.64

LH series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
250(2E)	180	22*25	0.15	0.84
	220	22*30	0.15	0.97
		25*25	0.15	0.99
	270	22*35	0.15	1.11
		25*30	0.15	1.15
	330	22*40	0.15	1.26
		25*30	0.15	1.26
		30*25	0.15	1.31
	390	22*45	0.15	1.41
		25*35	0.15	1.42
		30*30	0.15	1.50
	470	22*50	0.15	1.58
		25*40	0.15	1.61
		30*30	0.15	1.61
	560	25*45	0.15	1.80
		30*35	0.15	1.84
	680	25*50	0.15	2.03
		30*40	0.15	2.09
		35*30	0.15	1.96
	820	30*45	0.15	2.35
		35*35	0.15	2.26
	1000	30*50	0.15	2.64
		35*40	0.15	2.57
	1200	35*45	0.15	2.88
315(2F)	120	22*25	0.15	0.56
	150	22*30	0.15	0.66
		25*25	0.15	0.65
	180	22*35	0.15	0.78
		25*30	0.15	0.71
	220	22*40	0.15	0.89
		25*30	0.15	0.85
		30*25	0.15	0.83
	270	22*45	0.15	1.01
		25*35	0.15	0.98
		30*30	0.15	1.01
	330	22*50	0.15	1.14
		25*40	0.15	1.12
		30*35	0.15	1.21
	390	25*45	0.15	1.31
		30*35	0.15	1.30
		35*30	0.15	1.23
	470	30*40	0.15	1.53
		35*35	0.15	1.47
	560	30*45	0.15	1.65
		35*40	0.15	1.66
	680	35*45	0.15	1.96
	820	35*50	0.15	2.19

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
350(2V)	100	22*25	0.15	0.53
	120	22*30	0.15	0.61
		25*25	0.15	0.62
	150	22*35	0.15	0.73
		25*30	0.15	0.73
	180	22*40	0.15	0.83
		25*30	0.15	0.80
		30*25	0.15	0.81
	220	22*45	0.15	0.94
		25*35	0.15	0.92
		30*30	0.15	0.98
	270	22*50	0.15	1.07
		25*40	0.15	1.05
		30*30	0.15	1.03
	330	25*45	0.15	1.24
		30*35	0.15	1.24
		35*30	0.15	1.18
	390	25*50	0.15	1.38
		30*40	0.15	1.39
		35*35	0.15	1.39
	470	30*45	0.15	1.57
		35*35	0.15	1.50
	560	30*50	0.15	1.75
		35*40	0.15	1.69
	680	35*45	0.15	1.96
385(2P)	68	22*25	0.15	0.45
	82	22*30	0.15	0.52
	100	22*30	0.15	0.58
		25*25	0.15	0.57
	120	22*35	0.15	0.68
		25*30	0.15	0.68
	150	22*40	0.15	0.79
		25*30	0.15	0.78
		30*25	0.15	0.75
	180	22*45	0.15	0.89
		25*35	0.15	0.86
		30*30	0.15	0.88
	220	22*50	0.15	1.01
		25*40	0.15	1.00
		30*30	0.15	1.00
	270	25*45	0.15	1.13
		30*40	0.15	1.14
		35*30	0.15	1.10
	330	30*45	0.15	1.31
		35*35	0.15	1.32
	390	30*50	0.15	1.48
		35*40	0.15	1.48
	470	35*45	0.15	1.76
	560	35*50	0.15	1.95

LH series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
400(2G)	68	22*25	0.15	0.49
	82	22*30	0.15	0.56
	100	22*30	0.15	0.62
		25*25	0.15	0.61
	120	22*35	0.15	0.73
		25*30	0.15	0.73
	150	22*40	0.15	0.85
		25*35	0.15	0.85
		30*25	0.15	0.79
	180	22*45	0.15	0.95
		25*35	0.15	0.92
		30*30	0.15	0.95
	220	22*50	0.15	1.08
		25*40	0.15	1.05
		30*35	0.15	1.24
	270	25*50	0.15	1.29
		30*40	0.15	1.30
		35*30	0.15	1.18
	330	30*45	0.15	1.47
		35*35	0.15	1.40
	390	30*50	0.15	1.64
		35*40	0.15	1.59
	470	35*45	0.15	1.68
	560	35*50	0.15	1.90
420(2T)	68	22*25	0.15	0.50
	82	22*30	0.15	0.56
		25*25	0.15	0.56
	100	22*30	0.15	0.63
		25*25	0.15	0.63
	120	22*35	0.15	0.73
		25*30	0.15	0.72
		30*25	0.15	0.75
	150	22*45	0.15	0.86
		25*35	0.15	0.83
		30*25	0.15	0.83
	180	22*50	0.15	1.02
		25*40	0.15	0.94
		30*30	0.15	0.95
		35*25	0.15	0.90
	220	25*45	0.15	1.13
		30*35	0.15	1.09
		35*30	0.15	1.05
	270	25*50	0.15	1.37
		30*40	0.15	1.25
		35*35	0.15	1.25
	330	30*45	0.15	1.49
		35*35	0.15	1.42
	390	30*50	0.15	1.67
		35*40	0.15	1.61
	470	35*45	0.15	1.86

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
450(2W)	56	22*25	0.15	0.42
	68	22*30	0.15	0.50
		25*25	0.15	0.50
	82	22*35	0.15	0.56
		25*30	0.15	0.57
	100	22*40	0.15	0.64
		25*30	0.15	0.63
		30*25	0.15	0.67
	120	22*45	0.15	0.72
		25*35	0.15	0.71
		30*30	0.15	0.77
	150	22*50	0.15	0.80
		25*40	0.15	0.82
		30*30	0.15	0.85
	180	25*45	0.15	0.93
		30*35	0.15	0.97
	220	25*50	0.15	1.05
		30*40	0.15	1.10
		35*30	0.15	1.01
	270	30*45	0.15	1.25
		35*35	0.15	1.26
	330	30*50	0.15	1.42
		35*40	0.15	1.44
	390	35*45	0.15	1.61
	470	35*50	0.15	1.80
500(2H)	47	22*25	0.20	0.41
	56	22*30	0.20	0.43
	68	22*30	0.20	0.52
		25*25	0.20	0.55
	82	22*35	0.20	0.62
		25*30	0.20	0.57
	100	22*45	0.20	0.68
		25*30	0.20	0.72
	120	22*50	0.20	0.76
		25*35	0.20	0.79
		30*30	0.20	0.91
	150	25*45	0.20	1.08
		30*35	0.20	1.04
		35*25	0.20	0.99
	180	25*50	0.20	1.20
		30*40	0.20	1.17
		35*30	0.20	1.10
	220	30*45	0.20	1.33
		35*35	0.20	1.23
	270	30*50	0.20	1.50
		35*40	0.20	1.42
	330	35*45	0.20	1.60
	390	35*50	0.20	1.78
	470	35*60	0.20	2.03

LC series

- Wide temperature range
- Miniaturized
- Endurance: 2,000 hours at 105°C
- Suitable for charging pile
- **RoHS Compliant**

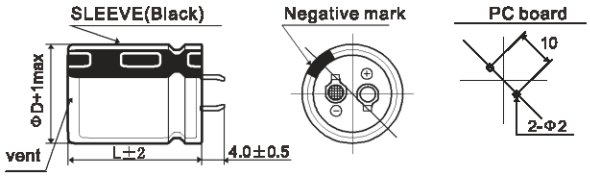
New

SPECIFICATIONS

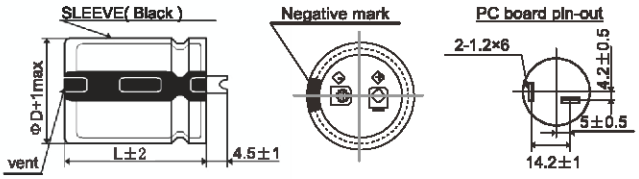
Items	Characteristics			
Category Temperature Range	-40~+105°C			
Rated Voltage Range	400~500V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	I≤3$\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)			(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	400	450,500	(at 20°C,120Hz)
	tanδ (max.)	0.15	0.20	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	400~500		(at 120Hz)
	Z(-25°C)/Z(+20°C)	6		
	Z(-40°C)/Z(+20°C)	8		
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 105 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤200% of the initial specified value		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.			
	Capacitance Change	≤±15% of the initial value		
	D.F. (tanδ)	≤150% of the initial specified value		
	Leakage Current	≤200% of the initial specified value		

DIMENSIONS[mm]

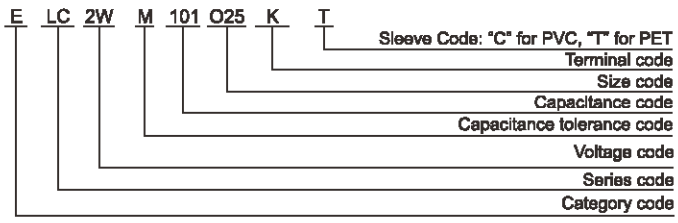
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current(Hz)

W.V	120	1k	10k	100k
400~500	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LC series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
400(2G)	100	22*25	0.15	0.70
	120	22*30	0.15	0.75
	150	22*30	0.15	0.88
		25*25	0.15	0.88
	180	22*35	0.15	0.95
		25*30	0.15	0.95
	220	22*45	0.15	1.10
		25*35	0.15	1.10
		30*25	0.15	1.10
	270	22*50	0.15	1.22
		25*40	0.15	1.22
		30*30	0.15	1.22
		35*25	0.15	1.22
	330	25*45	0.15	1.44
		30*35	0.15	1.44
		35*30	0.15	1.44
	390	25*50	0.15	1.55
		30*40	0.15	1.55
		35*30	0.15	1.55
	470	30*45	0.15	1.68
		35*35	0.15	1.68
	560	30*50	0.15	1.90
		35*40	0.15	1.90
	680	35*45	0.15	2.12
450(2W)	100	22*25	0.20	0.71
	120	22*30	0.20	0.82
	150	22*35	0.20	0.94
		25*30	0.20	0.89
	180	22*40	0.20	1.05
		25*30	0.20	1.00
	220	22*45	0.20	1.19
		25*35	0.20	1.16
		30*30	0.20	1.11
	270	22*50	0.20	1.36
		25*40	0.20	1.32
		30*30	0.20	1.26
		35*25	0.20	1.26
	330	25*50	0.20	1.52
		30*35	0.20	1.45
		35*30	0.20	1.45
	390	30*40	0.20	1.63
	470	30*45	0.20	1.85
		30*50	0.20	1.90
		35*35	0.20	1.77
	560	35*40	0.20	2.02
	680	35*50	0.20	2.36

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
500(2H)	47	22*25	0.20	0.51
	56	22*25	0.20	0.58
	68	25*25	0.20	0.65
	82	22*35	0.20	0.72
		25*30	0.20	0.74
	100	22*40	0.20	0.83
		25*30	0.20	0.82
	120	22*45	0.20	0.93
		25*35	0.20	0.93
		30*30	0.20	0.91
	150	25*40	0.20	1.08
		30*35	0.20	1.04
		35*25	0.20	0.99
	180	25*50	0.20	1.20
		30*40	0.20	1.17
		35*30	0.20	1.10
	220	30*45	0.20	1.33
		35*35	0.20	1.23
	270	30*50	0.20	1.50
		35*40	0.20	1.42
	330	35*45	0.20	1.60
	390	35*50	0.20	1.78
	470	35*60	0.20	2.03

LS series

- Downsized,longer life series
- Endurance: 3,000 hours at 85°C
- Non solvent-proof type
- **RoHS Compliant**

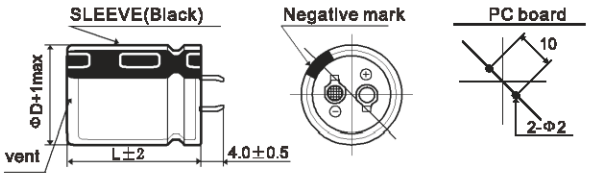
Upgrade

SPECIFICATIONS

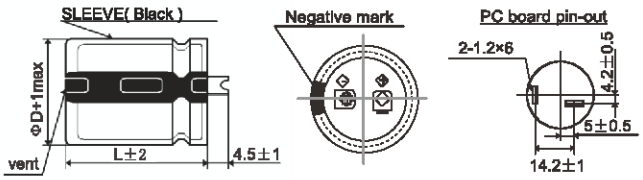
Items	Characteristics				
Category Temperature Range	-25~+85°C				
Rated Voltage Range	160~600V.DC				
Capacitance Tolerance	±20%(M)				(at 20°C,120Hz)
Leakage Current	I≤3$\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)				(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160 to 400	420 to 550	600	(at 20°C,120Hz)
	tanδ (max.)	0.15	0.20	0.30	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160 to 400	420 to 550	600	(at 120Hz)
	Z(-25°C)/Z(+20°C)	4	8	10	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 3,000 hours at 85°C.				
	Capacitance Change	≤±20% of the initial value			
	D.F. (tanδ)	≤200% of the initial specified value			
	Leakage Current	≤The initial specified value			
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85 °C without voltage applied .				
	Capacitance Change	≤±15% of the initial value			
	D.F. (tanδ)	≤150% of the initial specified value			
	Leakage Current	≤200% of the initial specified value			

DIMENSIONS[mm]

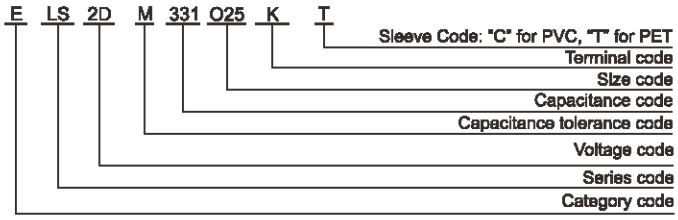
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current(Hz)

W.V	120	1k	10k	100k
160~250	1.00	1.32	1.45	1.50
315~600	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LS series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
160(2C)	270	22*20	0.15	1.30
	330	22*25	0.15	1.55
	390	22*25	0.15	1.63
		25*20	0.15	1.62
	470	22*30	0.15	1.86
		25*25	0.15	1.86
	560	22*30	0.15	2.15
		25*25	0.15	2.15
		30*20	0.15	2.05
	680	22*35	0.15	2.35
		25*30	0.15	2.33
		30*25	0.15	2.33
		35*20	0.15	2.26
	820	22*40	0.15	2.68
		25*30	0.15	2.65
		30*25	0.15	2.64
		35*20	0.15	2.49
	1000	22*45	0.15	3.02
		25*35	0.15	3.00
		30*30	0.15	3.96
		35*25	0.15	3.13
	1200	22*50	0.15	3.47
		25*40	0.15	3.43
		30*30	0.15	3.41
		35*25	0.15	3.40
	1500	25*50	0.15	3.96
		30*35	0.15	3.96
		35*30	0.15	3.94
	1800	30*40	0.15	4.31
		35*35	0.15	4.28
	2200	30*50	0.15	4.96
		35*40	0.15	4.96
	2700	35*45	0.15	5.57
	3300	35*50	0.15	6.21
180(2L)	220	22*20	0.15	1.18
	330	22*25	0.15	1.77
		25*20	0.15	1.49
	390	22*25	0.15	1.84
	470	22*30	0.15	1.91
		25*25	0.15	2.08
		30*20	0.15	1.88
	560	22*35	0.15	2.25
		25*25	0.15	2.25
	680	22*35	0.15	2.48
		25*30	0.15	2.50
		30*25	0.15	2.46
		35*20	0.15	2.26
	820	22*40	0.15	2.86
		25*35	0.15	2.75
		30*25	0.15	2.69
	1000	22*50	0.15	3.10
		25*40	0.15	3.06
		30*30	0.15	3.10
		35*25	0.15	2.98
	1200	25*45	0.15	3.63
		30*35	0.15	3.55
		35*30	0.15	3.49
	1500	30*40	0.15	4.10
		35*35	0.15	4.02
	1800	30*45	0.15	4.55
		35*35	0.15	4.54
	2200	35*40	0.15	4.83
	2700	35*50	0.15	5.30

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
200(2D)	220	22*20	0.15	1.18
	270	22*25	0.15	1.37
		25*20	0.15	1.35
	330	22*25	0.15	1.51
		25*20	0.15	1.49
	390	22*30	0.15	1.73
		25*25	0.15	1.71
		30*20	0.15	1.71
	470	22*30	0.15	1.97
		25*25	0.15	1.95
		30*20	0.15	1.88
	560	22*35	0.15	2.18
		25*30	0.15	2.15
		30*25	0.15	2.15
		35*20	0.15	2.05
	680	22*40	0.15	2.48
		25*30	0.15	2.48
		30*25	0.15	2.48
		35*20	0.15	2.36
	820	22*45	0.15	2.81
		25*35	0.15	2.79
		30*30	0.15	2.80
		35*25	0.15	2.83
	1000	22*50	0.15	3.28
		25*40	0.15	3.28
		30*35	0.15	3.15
		35*30	0.15	3.26
	1200	25*45	0.15	3.61
		30*35	0.15	3.61
		35*30	0.15	3.57
	1500	30*45	0.15	4.13
		35*35	0.15	4.06
	1800	30*50	0.15	4.60
		35*40	0.15	4.59
	2200	35*45	0.15	5.25
220(2N)	180	22*20	0.15	1.06
	270	22*25	0.15	1.47
		25*20	0.15	1.35
	330	22*30	0.15	1.70
		25*25	0.15	1.69
		30*20	0.15	1.58
	390	22*30	0.15	1.89
		25*25	0.15	1.84
		30*20	0.15	1.71
	470	22*35	0.15	2.08
		25*30	0.15	2.08
		30*25	0.15	2.12
		35*20	0.15	1.88
	560	22*40	0.15	2.33
		25*35	0.15	2.38
		30*25	0.15	2.31
		35*20	0.15	2.14
	680	22*45	0.15	2.63
		25*35	0.15	2.68
		30*30	0.15	2.62
		35*25	0.15	2.58
	820	25*45	0.15	3.01
		30*35	0.15	2.99
		35*30	0.15	2.79
	1000	25*50	0.15	3.40
		30*35	0.15	3.42
		35*30	0.15	3.29
	1200	30*40	0.15	3.88
		35*35	0.15	3.68
	1500	30*50	0.15	4.44
		35*40	0.15	4.10
	1800	35*45	0.15	4.52

LS series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
250(2E)	150	22*20	0.15	0.97
	180	22*20	0.15	1.06
	220	22*25	0.15	1.24
		25*20	0.15	1.22
	270	22*25	0.15	1.50
	330	22*30	0.15	1.66
		25*25	0.15	1.61
		30*20	0.15	1.58
	390	22*35	0.15	1.88
		25*30	0.15	1.88
		30*25	0.15	1.86
		35*20	0.15	1.71
	470	22*35	0.15	2.15
		25*35	0.15	2.15
		30*25	0.15	2.05
		35*20	0.15	1.88
	560	22*40	0.15	2.48
		25*35	0.15	2.35
		30*25	0.15	2.35
	680	22*50	0.15	2.61
		25*40	0.15	2.67
		30*30	0.15	2.71
		35*25	0.15	2.58
	820	25*45	0.15	3.01
		30*35	0.15	2.98
		35*30	0.15	2.96
	1000	30*40	0.15	3.56
		35*35	0.15	3.48
	1200	30*45	0.15	3.99
		35*35	0.15	3.84
	1500	35*40	0.15	4.33
	1800	35*50	0.15	4.54
315(2F)	100	22*20	0.15	0.79
	120	25*20	0.15	0.90
	150	22*25	0.15	1.06
		25*20	0.15	1.00
	180	22*30	0.15	1.29
		25*25	0.15	1.38
		30*20	0.15	1.16
	220	22*30	0.15	1.41
		25*25	0.15	1.47
		30*20	0.15	1.28
	270	22*35	0.15	1.68
		25*30	0.15	1.70
		30*25	0.15	1.55
		35*20	0.15	1.43
	330	22*40	0.15	1.91
		25*35	0.15	1.94
		30*25	0.15	1.98
	390	22*45	0.15	2.07
		25*40	0.15	2.11
		30*30	0.15	2.15
		35*25	0.15	1.95
	470	25*45	0.15	2.31
		30*35	0.15	2.38
		35*30	0.15	2.46
	560	25*50	0.15	2.46
		30*35	0.15	2.63
		35*30	0.15	2.69
	680	30*45	0.15	2.82
		35*35	0.15	3.05
	820	30*50	0.15	3.28
		35*40	0.15	3.45
	1000	35*45	0.15	3.59

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
350(2V)	82	22*20	0.15	0.72
	120	22*25	0.15	1.04
		25*20	0.15	0.90
	150	22*30	0.15	1.20
		25*25	0.15	1.22
		30*20	0.15	1.06
	180	22*30	0.15	1.34
		25*25	0.15	1.37
		30*20	0.15	1.16
	220	22*35	0.15	1.47
		25*30	0.15	1.53
		30*25	0.15	1.54
		35*20	0.15	1.29
	270	22*40	0.15	1.70
		25*35	0.15	1.73
		30*25	0.15	1.80
		35*20	0.15	1.49
	330	22*45	0.15	1.87
		25*35	0.15	1.97
		30*30	0.15	2.03
		35*25	0.15	1.80
	390	25*40	0.15	2.14
		30*35	0.15	2.23
		35*30	0.15	2.30
	470	25*50	0.15	2.55
		30*35	0.15	2.53
		35*30	0.15	2.55
	560	30*40	0.15	2.73
		35*35	0.15	2.75
	680	30*50	0.15	3.15
		35*40	0.15	3.15
	820	35*45	0.15	3.47
	1000	35*50	0.15	3.60
400(2G)	68	22*20	0.15	0.65
	82	22*25	0.15	0.84
		25*20	0.15	0.74
	100	22*25	0.15	0.99
		25*20	0.15	0.82
	120	22*30	0.15	1.09
		25*25	0.15	1.13
		30*20	0.15	0.95
	150	22*35	0.15	1.24
		25*30	0.15	1.27
		30*25	0.15	1.20
	180	22*40	0.15	1.41
		25*30	0.15	1.44
		30*25	0.15	1.52
		35*20	0.15	1.16
	220	22*45	0.15	1.58
		25*35	0.15	1.64
		30*30	0.15	1.66
		35*25	0.15	1.47
	270	22*50	0.15	1.65
		25*40	0.15	1.79
		30*30	0.15	1.82
		35*25	0.15	1.63
	330	25*45	0.15	2.00
		30*35	0.15	2.05
		35*30	0.15	2.05
	390	25*50	0.15	2.12
		30*40	0.15	2.26
		35*35	0.15	2.28
	470	30*45	0.15	2.51
		35*35	0.15	2.54
	560	30*50	0.15	2.85
		35*40	0.15	2.85
	680	35*50	0.15	3.10

LS series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
420(2T)	47	22*20	0.20	0.54
	56	22*20	0.20	0.59
	68	25*20	0.20	0.68
	82	22*25	0.20	0.85
		25*20	0.20	0.74
	100	22*30	0.20	0.97
		25*25	0.20	0.98
		30*20	0.20	0.87
	120	22*30	0.20	1.07
		25*25	0.20	1.08
		30*20	0.20	0.95
	150	22*35	0.20	1.21
		25*30	0.20	1.26
		30*25	0.20	1.30
		35*20	0.20	1.11
	180	22*40	0.20	1.33
		25*35	0.20	1.42
		30*25	0.20	1.48
		35*20	0.20	1.16
	220	22*45	0.20	1.55
		25*35	0.20	1.58
		30*30	0.20	1.65
		35*25	0.20	1.47
	270	25*40	0.20	1.74
		30*35	0.20	1.90
		35*30	0.20	1.94
	330	25*50	0.20	2.20
		30*35	0.20	1.98
		35*35	0.20	2.17
	390	30*40	0.20	2.22
		35*35	0.20	2.27
	470	30*45	0.20	2.50
		35*40	0.20	2.61
	560	35*45	0.20	2.95
	680	35*50	0.20	3.15
450(2W)	47	22*20	0.20	0.54
	56	22*20	0.20	0.59
	68	22*25	0.20	0.71
		25*20	0.20	0.68
	82	22*25	0.20	0.86
		25*20	0.20	0.74
		30*20	0.20	0.79
	100	22*30	0.20	0.95
		25*25	0.20	0.97
		30*20	0.20	0.87
	120	22*35	0.20	1.07
		25*30	0.20	1.09
		30*25	0.20	1.12
		35*20	0.20	0.99
	150	22*40	0.20	1.18
		25*30	0.20	1.25
		30*25	0.20	1.29
		35*20	0.20	1.06
	180	22*45	0.20	1.32
		25*35	0.20	1.40
		30*30	0.20	1.45
		35*25	0.20	1.33
	220	22*50	0.20	1.48
		25*40	0.20	1.59
		30*30	0.20	1.64
		35*25	0.20	1.66
	270	25*45	0.20	1.73
		30*35	0.20	1.89
		35*30	0.20	1.90
	330	25*50	0.20	2.12
		30*40	0.20	2.12
		35*35	0.20	2.15
	390	30*45	0.20	2.35
		35*40	0.20	2.38
	470	30*50	0.20	2.65
		35*45	0.20	2.68
	560	35*50	0.20	2.88

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
500(2H)	47	22*20	0.20	0.59
	56	22*25	0.20	0.61
		25*20	0.20	0.62
	68	22*30	0.20	0.75
		25*25	0.20	0.78
	82	22*30	0.20	0.92
		25*25	0.20	0.95
	100	22*35	0.20	1.02
		25*30	0.20	1.06
		30*25	0.20	1.01
	120	22*40	0.20	1.12
		25*35	0.20	1.23
		30*30	0.20	1.20
	150	22*45	0.20	1.22
		25*40	0.20	1.26
		30*30	0.20	1.34
	180	22*50	0.20	1.39
		25*45	0.20	1.45
		30*35	0.20	1.47
	220	25*50	0.20	1.52
		30*40	0.20	1.60
	270	30*45	0.20	1.98
		35*35	0.20	2.02
	330	30*50	0.20	2.25
		35*40	0.20	2.27
	390	35*45	0.20	2.45
	470	35*50	0.20	2.76
	560	35*60	0.20	2.90
550(2J)	47	22*25	0.20	0.59
	56	22*30	0.20	0.63
	68	22*30	0.20	0.76
		25*25	0.20	0.72
	82	22*35	0.20	0.91
		25*30	0.20	0.89
		30*25	0.20	0.88
	100	22*40	0.20	0.97
		25*35	0.20	0.97
		30*25	0.20	0.92
	120	22*45	0.20	1.07
		25*40	0.20	1.16
		30*30	0.20	1.12
	150	25*45	0.20	1.25
		30*35	0.20	1.29
		35*30	0.20	1.29
	180	25*50	0.20	1.40
		30*40	0.20	1.45
		35*30	0.20	1.36
	220	30*45	0.20	1.61
		35*35	0.20	1.60
	270	35*40	0.20	2.00
	330	35*45	0.20	2.26
	390	35*50	0.20	2.45
	470	35*60	0.20	2.80
600(2K)	47	22*30	0.30	0.59
	56	22*35	0.30	0.63
		25*30	0.30	0.62
	68	22*40	0.30	0.76
		25*35	0.30	0.76
	82	22*45	0.30	0.92
		25*40	0.30	0.90
	100	25*45	0.30	1.01
		30*35	0.30	1.01
	120	25*50	0.30	1.16
		30*40	0.30	1.16
	150	30*45	0.30	1.29
	180	30*50	0.30	1.45
		35*40	0.30	1.45
	220	35*45	0.30	1.61
	270	35*50	0.30	2.02
	330	35*60	0.30	2.27

LM series

- Downsized, longer life, high ripple current series
- Endurance: 3,000 hours at 105°C
- **RoHS Compliant**

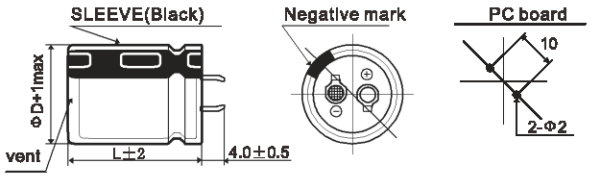
Upgrade

SPECIFICATIONS

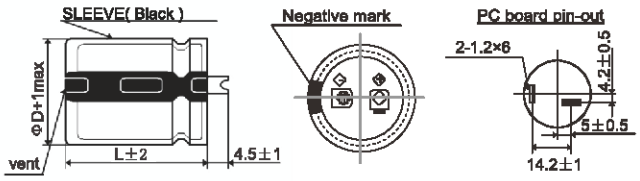
Items	Characteristics			
Category Temperature Range	-25~+105°C			
Rated Voltage Range	160~550V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	I≤3$\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)			(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(Vdc)	160 to 400	420 to 550	
	tanδ (max.)	0.15	0.20	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(Vdc)	160 to 250	315 to 550	
	Z(-25°C)/Z(+20°C)	4	8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 3,000 hours at 105 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤200% of the initial specified value		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.			
	Capacitance Change	≤±15% of the initial value		
	D.F. (tanδ)	≤150% of the initial specified value		
	Leakage Current	≤200% of the initial specified value		

DIMENSIONS[mm]

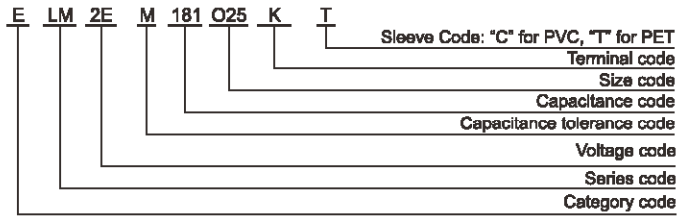
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current(Hz)

W.V	120	1k	10k	100k
160~250	1.00	1.32	1.45	1.50
315~550	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LM series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
160(2C)	220	22*20	0.15	0.81
	270	25*20	0.15	0.98
	330	22*25	0.15	1.20
		25*20	0.15	1.02
	390	22*25	0.15	1.30
		25*25	0.15	1.26
		30*20	0.15	1.25
	470	22*30	0.15	1.55
		25*25	0.15	1.55
		30*20	0.15	1.30
	560	22*35	0.15	1.67
		25*30	0.15	1.67
		30*25	0.15	1.67
		35*20	0.15	1.46
	680	22*40	0.15	1.82
		25*30	0.15	1.82
		30*25	0.15	1.82
		35*20	0.15	1.51
	820	22*45	0.15	2.04
		25*35	0.15	2.04
		30*30	0.15	2.04
		35*25	0.15	2.04
	1000	22*50	0.15	2.25
		25*40	0.15	2.25
		30*30	0.15	2.25
		35*25	0.15	2.25
	1200	25*45	0.15	2.49
		30*35	0.15	2.49
		35*30	0.15	2.49
	1500	25*60	0.15	2.97
		30*40	0.15	2.84
		35*30	0.15	2.84
	1800	30*45	0.15	3.32
		35*35	0.15	3.00
	2200	30*60	0.15	3.86
		35*45	0.15	3.50
	2700	35*50	0.15	4.00
	3300	35*60	0.15	4.63
180(2L)	180	22*20	0.15	0.80
	220	25*20	0.15	0.90
	270	22*25	0.15	1.00
		25*20	0.15	0.95
	330	22*25	0.15	1.20
		25*25	0.15	1.16
		30*20	0.15	1.15
	390	22*30	0.15	1.35
		25*25	0.15	1.35
		30*20	0.15	1.20
	470	22*35	0.15	1.50
		25*30	0.15	1.50
		30*25	0.15	1.50
		35*20	0.15	1.36
	560	22*40	0.15	1.67
		25*30	0.15	1.67
		30*25	0.15	1.67
		35*20	0.15	1.43
	680	22*45	0.15	1.78
		25*35	0.15	1.78
		30*30	0.15	1.78
		35*25	0.15	1.83
	820	22*50	0.15	2.04
		25*40	0.15	2.04
		30*30	0.15	2.04
		35*25	0.15	2.04
	1000	25*45	0.15	2.30
		30*35	0.15	2.30
		35*30	0.15	2.30
	1200	25*50	0.15	2.55
		30*40	0.15	2.55
		35*30	0.15	2.55
	1500	30*45	0.15	2.90
		35*35	0.15	2.90
	1800	30*60	0.15	3.49
		35*40	0.15	3.30
	2200	35*50	0.15	3.65
	2700	35*60	0.15	4.19

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
200(2D)	150	22*20	0.15	0.73
	180	22*20	0.15	0.80
	220	25*20	0.15	0.85
	270	22*25	0.15	1.10
		30*20	0.15	1.05
	330	22*30	0.15	1.25
		25*25	0.15	1.25
		30*20	0.15	1.10
	390	22*30	0.15	1.35
		25*25	0.15	1.35
		35*20	0.15	1.30
	470	22*35	0.15	1.50
		25*30	0.15	1.50
		30*25	0.15	1.50
		35*20	0.15	1.41
	560	22*40	0.15	1.67
		25*30	0.15	1.67
		30*25	0.15	1.67
	680	22*45	0.15	1.78
		25*35	0.15	1.78
		30*30	0.15	1.78
		35*25	0.15	1.78
	820	25*45	0.15	2.04
		30*30	0.15	2.04
		35*25	0.15	2.04
	1000	25*50	0.15	2.30
		30*35	0.15	2.30
		35*30	0.15	2.30
	1200	25*60	0.15	2.66
		30*40	0.15	2.65
		35*35	0.15	2.65
	1500	30*50	0.15	3.08
		35*40	0.15	3.08
	1800	30*60	0.15	3.49
		35*45	0.15	3.48
	2200	35*50	0.15	3.78
220(2N)	150	22*20	0.15	0.67
	180	25*20	0.15	0.76
	220	22*25	0.15	1.00
		25*20	0.15	0.84
	270	22*30	0.15	1.15
		25*25	0.15	1.08
		30*20	0.15	0.98
	330	22*35	0.15	1.25
		25*25	0.15	1.25
		35*20	0.15	1.13
	390	22*35	0.15	1.40
		25*30	0.15	1.40
		30*25	0.15	1.36
		35*20	0.15	1.23
	470	22*40	0.15	1.51
		25*35	0.15	1.54
		30*25	0.15	1.50
	560	22*45	0.15	1.70
		25*40	0.15	1.72
		30*30	0.15	1.70
		35*25	0.15	1.71
	680	25*45	0.15	1.94
		30*35	0.15	1.93
		35*25	0.15	1.89
	820	25*50	0.15	2.18
		30*40	0.15	2.19
		35*30	0.15	2.16
	1000	25*60	0.15	2.54
		30*45	0.15	2.50
		35*35	0.15	2.44
	1200	30*50	0.15	2.81
		35*40	0.15	2.79
	1500	30*60	0.15	3.30
		35*45	0.15	3.22
	1800	35*50	0.15	3.63
	2200	35*60	0.15	4.23

LM series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
250(2E)	120	22*20	0.15	0.60
	150	25*20	0.15	0.74
	180	22*25	0.15	0.78
		25*20	0.15	0.75
	220	22*25	0.15	1.00
		25*25	0.15	0.95
		30*20	0.15	0.95
	270	22*30	0.15	1.18
		25*25	0.15	1.18
		30*20	0.15	1.00
	330	22*35	0.15	1.30
		25*30	0.15	1.30
		30*25	0.15	1.30
		35*20	0.15	1.16
	390	22*40	0.15	1.49
		25*35	0.15	1.49
		30*25	0.15	1.49
	470	22*45	0.15	1.65
		25*35	0.15	1.65
		30*30	0.15	1.65
		35*25	0.15	1.65
	560	22*50	0.15	1.67
		25*40	0.15	1.80
		30*30	0.15	1.80
		35*25	0.15	1.80
	680	25*50	0.15	2.00
		30*35	0.15	2.00
		35*30	0.15	2.00
	820	25*60	0.15	2.20
		30*40	0.15	2.30
		35*35	0.15	2.30
	1000	30*50	0.15	2.47
		35*40	0.15	2.47
	1200	30*60	0.15	2.85
		35*45	0.15	2.60
	1500	35*50	0.15	3.00
	1800	35*60	0.15	3.42
315(2F)	68	22*20	0.15	0.45
	82	22*20	0.15	0.47
	100	22*25	0.15	0.61
		25*20	0.15	0.56
	120	22*25	0.15	0.75
		25*20	0.15	0.62
		30*20	0.15	0.65
	150	22*30	0.15	0.82
		25*25	0.15	0.82
		30*20	0.15	0.70
		35*20	0.15	0.76
	180	22*35	0.15	0.92
		25*25	0.15	0.92
		30*25	0.15	0.90
		35*20	0.15	0.85
	220	22*40	0.15	1.04
		25*30	0.15	1.04
		30*25	0.15	1.04
		35*20	0.15	0.90
	270	22*45	0.15	1.16
		25*35	0.15	1.16
		30*25	0.15	1.16
		35*25	0.15	1.15
	330	22*50	0.15	1.33
		25*40	0.15	1.33
		30*30	0.15	1.33
		35*25	0.15	1.33
	390	25*45	0.15	1.47
		30*35	0.15	1.47
		35*30	0.15	1.47
	470	25*50	0.15	1.70
		30*40	0.15	1.70
		35*30	0.15	1.70
	560	30*45	0.15	2.05
		35*35	0.15	2.05
	680	30*50	0.15	2.17
		35*40	0.15	2.17
	820	35*45	0.15	2.20
	1000	35*60	0.15	2.55

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
350(2V)	56	22*20	0.15	0.41
	68	25*20	0.15	0.46
	82	22*25	0.15	0.55
		25*20	0.15	0.51
	100	22*30	0.15	0.69
		30*20	0.15	0.60
	120	22*30	0.15	0.75
		25*25	0.15	0.75
		30*20	0.15	0.65
	150	22*35	0.15	0.82
		25*30	0.15	0.83
		30*25	0.15	0.82
		35*20	0.15	0.76
	180	22*40	0.15	0.92
		25*30	0.15	0.92
		30*25	0.15	0.90
	220	22*45	0.15	1.05
		25*35	0.15	1.04
		30*30	0.15	1.02
		35*25	0.15	1.04
	270	22*50	0.15	1.16
		25*40	0.15	1.18
		30*30	0.15	1.17
		35*25	0.15	1.20
	330	25*45	0.15	1.29
		30*35	0.15	1.34
		35*30	0.15	1.22
	390	25*50	0.15	1.51
		30*40	0.15	1.51
		35*35	0.15	1.47
	470	25*60	0.15	1.66
		30*45	0.15	1.65
		35*35	0.15	1.69
	560	30*50	0.15	1.85
		35*40	0.15	1.90
	680	30*60	0.15	2.15
		35*50	0.15	1.99
	820	35*60	0.15	2.31
400(2G)	47	22*20	0.15	0.37
	56	25*20	0.15	0.42
	68	22*50	0.15	0.50
		25*20	0.15	0.46
	82	22*25	0.15	0.64
		30*20	0.15	0.55
	100	22*30	0.15	0.70
		25*25	0.15	0.70
		30*20	0.15	0.60
	120	22*35	0.15	0.75
		25*25	0.15	0.75
		30*25	0.15	0.73
		35*20	0.15	0.75
	150	22*40	0.15	0.88
		25*30	0.15	0.88
		30*25	0.15	0.88
		35*20	0.15	0.80
	180	22*45	0.15	0.98
		25*35	0.15	0.98
		30*30	0.15	0.98
		35*25	0.15	0.98
	220	22*50	0.15	1.10
		25*40	0.15	1.10
		30*30	0.15	1.10
		35*25	0.15	1.10
	270	25*45	0.15	1.22
		30*35	0.15	1.22
		35*30	0.15	1.22
	330	25*50	0.15	1.44
		30*40	0.15	1.44
		35*30	0.15	1.44
	390	25*60	0.15	1.51
		30*45	0.15	1.60
		35*35	0.15	1.60
	470	30*50	0.15	1.90
		35*40	0.15	1.90
	560	30*60	0.15	2.10
		35*45	0.15	2.12
	680	35*60	0.15	2.27

LM series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
420(2T)	47	22*20	0.20	0.37
	56	25*20	0.20	0.42
	68	22*25	0.20	0.50
		25*20	0.20	0.46
	82	22*25	0.20	0.64
		25*25	0.20	0.58
		30*20	0.20	0.53
	100	22*30	0.20	0.70
		25*25	0.20	0.70
		30*20	0.20	0.59
	120	22*35	0.20	0.75
		25*30	0.20	0.75
		30*25	0.20	0.73
		35*20	0.20	0.67
	150	22*40	0.20	0.88
		25*35	0.20	0.88
		30*25	0.20	0.88
	180	22*45	0.20	0.95
		25*35	0.20	0.95
		30*30	0.20	0.95
		35*25	0.20	0.94
	220	22*50	0.20	1.10
		25*45	0.20	1.10
		30*35	0.20	1.10
		35*25	0.20	1.10
	270	25*50	0.20	1.22
		30*40	0.20	1.22
		35*30	0.20	1.22
	330	25*60	0.20	1.41
		30*45	0.20	1.45
		35*35	0.20	1.45
	390	30*50	0.20	1.55
		35*40	0.20	1.55
	470	30*60	0.20	1.79
		35*45	0.20	1.90
	560	35*50	0.20	2.15
	680	35*60	0.20	2.27
450(2W)	56	22*25	0.20	0.40
	68	22*30	0.20	0.53
		25*25	0.20	0.50
	82	22*30	0.20	0.64
		25*25	0.20	0.64
	100	22*35	0.20	0.69
		25*30	0.20	0.69
		30*25	0.20	0.64
	120	22*40	0.20	0.80
		25*30	0.20	0.80
		30*25	0.20	0.80
		35*25	0.20	0.73
	150	22*45	0.20	0.88
		25*35	0.20	0.88
		30*30	0.20	0.88
		35*25	0.20	0.75
	180	22*50	0.20	1.00
		25*40	0.20	1.00
		30*30	0.20	1.00
	220	25*45	0.20	1.12
		30*35	0.20	1.12
		35*30	0.20	1.12
	270	25*60	0.20	1.18
		30*40	0.20	1.28
		35*35	0.20	1.28
	330	30*50	0.20	1.45
		35*40	0.20	1.45
	390	30*60	0.20	1.51
		35*40	0.20	1.55
	470	35*50	0.20	1.85
	560	35*60	0.20	1.91

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
500(2H)	47	22*25	0.20	0.51
	56	22*30	0.20	0.58
	68	25*25	0.20	0.65
	82	22*35	0.20	0.72
		25*30	0.20	0.74
	100	22*45	0.20	0.83
		30*25	0.20	0.82
	120	22*50	0.20	0.93
		25*35	0.20	0.93
		30*30	0.20	0.91
	150	25*45	0.20	1.08
		30*35	0.20	1.04
		35*25	0.20	0.99
	180	25*50	0.20	1.20
		30*40	0.20	1.17
		35*30	0.20	1.10
	220	30*45	0.20	1.33
		35*35	0.20	1.23
	270	30*50	0.20	1.50
		35*40	0.20	1.42
	330	35*45	0.20	1.60
	390	35*50	0.20	1.78
	470	35*60	0.20	2.03
550(2J)	82	22*35	0.20	0.72
		25*30	0.20	0.74
	100	22*45	0.20	0.83
		25*35	0.20	0.85
		30*25	0.20	0.82
	120	22*50	0.20	0.93
		25*40	0.20	0.95
		30*30	0.20	0.91
		35*25	0.20	0.88
	150	25*45	0.20	1.08
		30*35	0.20	1.04
	180	25*50	0.20	1.20
		30*40	0.20	1.17
		35*30	0.20	1.10
	220	30*45	0.20	1.33
		35*35	0.20	1.23
	270	30*50	0.20	1.50
		35*40	0.20	1.42
	330	35*45	0.20	1.60
	390	35*50	0.20	1.64
	470	35*60	0.20	2.03

LP series

- Longer life, high ripple current series
- Endurance: 3,000 hours at 105°C
- **RoHS Compliant**

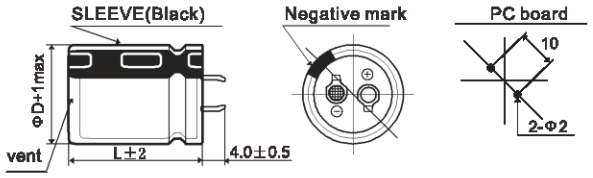
New

SPECIFICATIONS

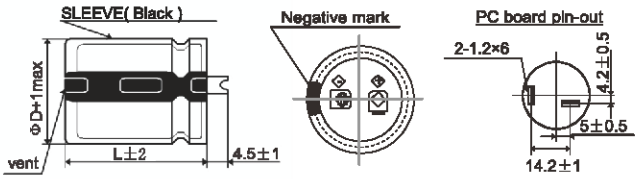
Items	Characteristics			
Category Temperature Range	-40~+105°C			
Rated Voltage Range	400~450V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	I≤3$\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)			(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	400	420,450	(at 20°C,120Hz)
	tanδ (max.)	0.15	0.20	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	400~450		
	Z(-25°C)/Z(+20°C)	6		
	Z(-40°C)/Z(+20°C)	8		(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 3,000 hours at 105 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤200% of the initial specified value		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.			
	Capacitance Change	≤±15% of the initial value		
	D.F. (tanδ)	≤150% of the initial specified value		
	Leakage Current	≤200% of the initial specified value		

DIMENSIONS[mm]

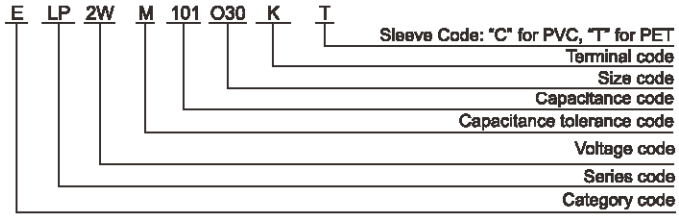
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current(Hz)

W.V	120	1k	10k	100k
400~450	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LP series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
400(2G)	100	22*25	0.15	0.85
	120	22*30	0.15	1.01
		25*25	0.15	1.04
	150	22*35	0.15	1.15
	180	22*40	0.15	1.27
		25*30	0.15	1.22
		30*25	0.15	1.35
	220	22*45	0.15	1.40
		25*35	0.15	1.40
		30*30	0.15	1.56
	270	22*50	0.15	1.55
		25*40	0.15	1.55
		30*35	0.15	1.78
		35*25	0.15	1.78
	330	25*50	0.15	1.83
		30*40	0.15	2.00
		35*30	0.15	1.95
	390	30*45	0.15	2.20
		35*35	0.15	2.20
	470	30*50	0.15	2.38
		35*40	0.15	2.49
	560	35*45	0.15	2.74
	680	35*50	0.15	2.95
420(2T)	100	22*25	0.20	0.89
	120	22*30	0.20	1.06
		25*25	0.20	1.09
	150	22*35	0.20	1.21
	180	22*40	0.20	1.34
		25*30	0.20	1.28
		30*25	0.20	1.42
	220	22*45	0.20	1.47
		22*50	0.20	1.60
		25*35	0.20	1.47
		30*30	0.20	1.64
		35*25	0.20	1.64
	270	25*40	0.20	1.63
		25*45	0.20	1.79
		30*35	0.20	1.87
	330	25*50	0.20	1.93
		30*40	0.20	2.10
		35*30	0.20	2.05
	390	30*45	0.20	2.32
		35*35	0.20	2.32
	470	30*50	0.20	2.51
		35*40	0.20	2.62
	560	35*45	0.20	2.88
	680	35*50	0.20	3.10
	820	35*60	0.20	3.50

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
450(2W)	82	22*25	0.20	0.81
	100	22*30	0.20	0.97
		25*25	0.20	1.04
	120	22*35	0.20	1.08
	150	22*40	0.20	1.22
		25*35	0.20	1.31
		30*25	0.20	1.31
	180	22*45	0.20	1.35
		22*50	0.20	1.42
		25*40	0.20	1.35
		30*30	0.20	1.49
		35*25	0.20	1.60
	220	25*45	0.20	1.55
		30*35	0.20	1.71
	270	25*50	0.20	1.74
		30*40	0.20	1.90
		35*30	0.20	1.90
	330	30*45	0.20	2.20
		35*35	0.20	2.20
	390	30*50	0.20	2.40
		35*40	0.20	2.42
	470	35*45	0.20	2.67
	560	35*50	0.20	2.85
	680	35*60	0.20	3.15
	820	35*70	0.20	3.48

AiSHi LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

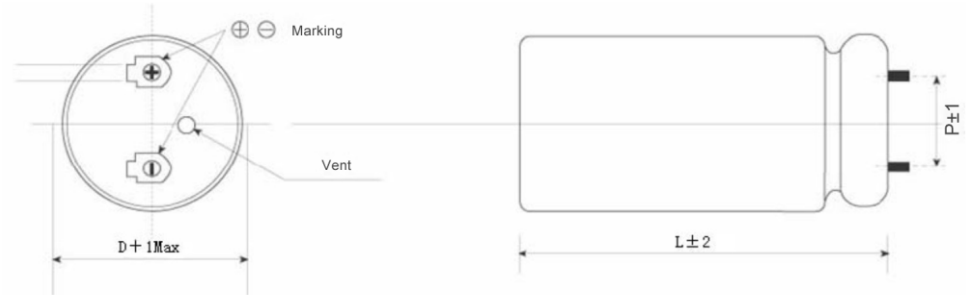
KX series

- High stability
- Compact and light weight
- Especially for photo flash
- **RoHS Compliant**

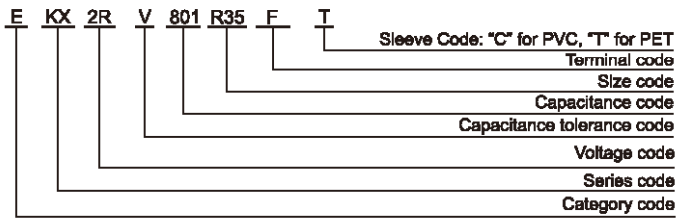
SPECIFICATIONS

Items	Characteristics		
Operating Temperature Range	-20~+55°C		
Rated Voltage	330WV.DC	360WV.DC	
Surge Voltage	350SV.DC	390SV.DC	
Capacitance Tolerance	-10%~+20%		(at 20°C,120Hz)
Dissipation Factor (tanδ)	Capacitance: 150~600μF ≤ 0.10	601~1500μF≤ 0.15	(at 20°C,120Hz)
Leakage Current	I≤1*C Max. I: Leakage current(μA) C: Nominal capacitance(μF)		(at 20°C after 5 minutes)

DIMENSIONS[mm]



PART NUMBERING SYSTEM



KX series

STANDARD RATINGS

330WV.DC(350SV.DC)

Capacitance (μF)	ΦD(mm)	14.0	14.5	15.5	16.0	18.0	20.0	22.0	25.0	30.0	35.0
	P	5.5	5.5	6.0	6.0	7.0	7.0	8.0	9.0	12.0	14.0
150	L(mm)	29.5	28.5	25.5							
180		35.5	33.0	29.5	27.5						
200		37.5	35.5	31.5	29.5						
250		45.5	42.0	35.5	35.5	28.5					
300		53.5	50.5	44.5	42.0	33.0	28.0				
350			61.0	50.5	47.5	37.5	30.5				
400				56.0	53.5	42.0	34.0	30.0			
450						47.5	38.0	33.0			
500						52.0	40.0	36.0	30.0		
600						61.0	48.0	41.0	34.0		
700							54.0	47.0	38.0	30.0	
800							61.0	52.0	43.0	34.0	
900								61.0	48.0	36.0	
1000									56.0	40.0	32.0
1200									63.0	48.0	38.0
1300									70.0	52.0	40.0
1500										57.0	46.0

360WV.DC(390SV.DC)

Capacitance (μF)	ΦD(mm)	14.0	14.5	15.5	16.0	18.0	20.0	22.0	25.0	30.0	35.0
	P	5.5	5.5	6.0	6.0	7.0	7.0	8.0	9.0	12.0	14.0
150	L(mm)	37.5	37.5	31.5	29.5						
180		44.5	42.0	35.5	33.0	27.5					
200		47.5	44.5	39.5	37.5	31.5	26.0				
250		56.0	52.0	47.5	44.5	37.5	30.0	27.0			
300				56.0	52.0	42.0	34.0	31.0	27.0		
350					56.0	47.5	38.0	35.0	29.0		
400						52.0	43.0	37.0	33.0		
450						61.0	45.0	41.0	35.0		
500							52.0	46.0	39.0	31.0	
600							57.0	52.0	44.0	33.0	
700								62.0	53.0	37.0	
800									62.0	44.0	35.0
900									73.0	49.0	38.0
1000										53.0	46.0
1200										62.0	50.0
1300										69.0	54.0
1500											60.0

LQ series

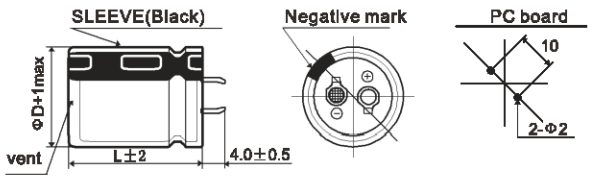
- Longer life series
- Endurance: 5,000 hours at 85°C
- Non solvent-proof type
- **RoHS Compliant**

SPECIFICATIONS

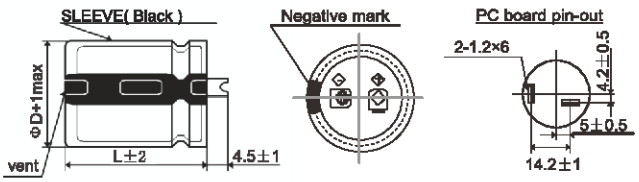
Items	Characteristics			
Category Temperature Range	-25~+85°C			
Rated Voltage Range	160~450V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	I≤3$\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)			(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	160~400	420~450	(at 20°C,120Hz)
	tanδ (max.)	0.15	0.20	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	160~400	420~450	(at 120Hz)
	Z(-25°C)/Z(+20°C)	4	8	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 5,000 hours at 85 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤200% of the initial specified value		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied.			
	Capacitance Change	≤±15% of the initial value		
	D.F. (tanδ)	≤150% of the initial specified value		
	Leakage Current	≤The initial specified value		

DIMENSIONS[mm]

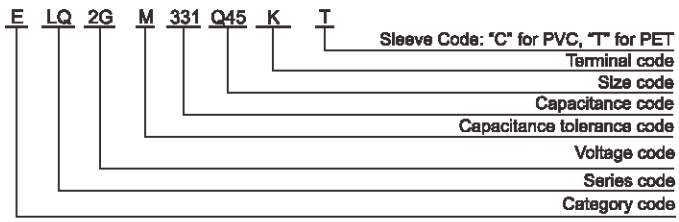
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
160~250	1.00	1.32	1.45	1.50
315~450	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LQ series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
160(2C)	220	22*25	0.15	1.00
	270	22*25	0.15	1.10
	330	22*25	0.15	1.30
	390	22*30	0.15	1.50
		25*25	0.15	1.51
	470	22*30	0.15	1.65
		25*25	0.15	1.70
	560	22*35	0.15	1.91
		25*30	0.15	1.90
		30*25	0.15	2.01
	680	22*40	0.15	2.10
		25*35	0.15	2.20
		30*30	0.15	2.22
	820	22*50	0.15	2.48
		25*40	0.15	2.43
		30*30	0.15	2.49
		35*25	0.15	2.45
	1000	25*45	0.15	2.69
		30*35	0.15	2.79
		35*30	0.15	2.71
	1200	25*50	0.15	3.09
		30*40	0.15	3.11
		35*35	0.15	3.05
	1500	30*45	0.15	3.68
		35*40	0.15	3.51
	1800	35*45	0.15	3.88
	2200	35*50	0.15	4.52
180(2L)	270	22*25	0.15	1.19
	330	22*30	0.15	1.38
	390	22*30	0.15	1.45
		25*25	0.15	1.49
	470	22*35	0.15	1.68
		25*30	0.15	2.69
		30*25	0.15	1.81
	560	22*40	0.15	1.89
		25*35	0.15	2.01
		30*30	0.15	2.10
	680	22*50	0.15	2.29
		25*40	0.15	2.21
		30*30	0.15	2.31
		35*25	0.15	2.22
	820	25*45	0.15	2.51
		30*35	0.15	2.60
		35*30	0.15	2.66
	1000	25*50	0.15	2.91
		30*40	0.15	2.90
		35*35	0.15	2.94
	1200	30*45	0.15	3.29
		35*35	0.15	3.19
	1500	35*45	0.15	3.60
	1800	35*50	0.15	4.11

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
200(2D)	220	22*25	0.15	1.11
	270	22*25	0.15	1.21
	330	22*30	0.15	1.41
		25*25	0.15	1.40
	390	22*35	0.15	1.59
		25*30	0.15	1.61
	470	22*40	0.15	1.78
		25*35	0.15	1.85
		30*25	0.15	1.88
	560	22*45	0.15	2.11
		25*35	0.15	2.13
		30*30	0.15	2.10
		35*25	0.15	2.05
	680	25*40	0.15	2.33
		30*35	0.15	2.40
		35*30	0.15	2.48
	820	25*50	0.15	2.59
		30*40	0.15	2.78
		35*30	0.15	2.59
	1000	30*45	0.15	3.06
		35*35	0.15	2.80
	1200	30*50	0.15	3.41
		35*40	0.15	3.18
	1500	35*50	0.15	3.80
220(2N)	180	22*25	0.15	1.06
	220	22*25	0.15	1.10
	270	22*30	0.15	1.19
		25*25	0.15	1.20
	330	22*35	0.15	1.40
		25*30	0.15	1.42
		30*25	0.15	1.42
	390	22*40	0.15	1.57
		25*35	0.15	1.58
		30*30	0.15	1.55
	470	22*45	0.15	1.77
		25*40	0.15	1.79
		30*30	0.15	1.81
	560	22*50	0.15	2.12
		25*45	0.15	2.22
		30*35	0.15	2.28
		35*30	0.15	2.26
	680	25*50	0.15	2.35
		30*40	0.15	2.30
		35*30	0.15	2.36
	820	30*45	0.15	2.81
		35*35	0.15	2.79
	1000	30*50	0.15	3.12
		35*40	0.15	3.29
	1200	35*45	0.15	3.40
	1500	35*50	0.15	3.86

LQ series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
250(2E)	180	22*25	0.15	0.94
	220	22*30	0.15	1.09
		25*25	0.15	1.10
	270	22*35	0.15	1.19
		25*30	0.15	1.21
	330	22*40	0.15	1.38
		25*30	0.15	1.39
		30*25	0.15	1.48
	390	22*45	0.15	1.61
		25*35	0.15	1.60
		30*30	0.15	1.63
	470	22*50	0.15	1.79
		25*40	0.15	1.78
		30*30	0.15	1.81
	560	25*45	0.15	2.01
		30*35	0.15	2.10
	680	30*40	0.15	2.25
		35*35	0.15	2.39
	820	30*45	0.15	2.61
		35*40	0.15	2.59
	1000	35*45	0.15	2.87
	1200	35*50	0.15	3.32
315(2F)	100	22*25	0.15	0.79
	120	22*30	0.15	0.90
	150	22*30	0.15	1.06
		25*25	0.15	1.00
	180	22*35	0.15	1.29
		25*30	0.15	1.32
	220	22*40	0.15	1.41
		25*35	0.15	1.45
		30*25	0.15	1.28
	270	22*45	0.15	1.68
		25*40	0.15	1.62
		30*30	0.15	1.55
		35*25	0.15	1.43
	330	25*45	0.15	1.94
		30*35	0.15	1.98
		35*30	0.15	1.91
	390	25*50	0.15	2.11
		30*40	0.15	2.15
		35*30	0.15	1.95
	470	30*45	0.15	2.38
		35*35	0.15	2.46
	560	30*50	0.15	2.63
		35*40	0.15	2.69
	680	35*45	0.15	3.05

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
350(2V)	82	22*25	0.15	0.64
	100	22*25	0.15	0.86
	120	22*30	0.15	1.04
		25*25	0.15	0.90
	150	22*35	0.15	1.20
		25*30	0.15	1.22
	180	22*40	0.15	1.34
		25*30	0.15	1.37
	220	22*45	0.15	1.47
		25*35	0.15	1.53
		30*30	0.15	1.54
		35*25	0.15	1.29
	270	25*45	0.15	1.73
		30*35	0.15	1.80
		35*30	0.15	1.49
	330	25*50	0.15	1.97
		30*40	0.15	2.03
		35*30	0.15	1.80
	390	30*40	0.15	2.23
		35*35	0.15	2.30
	470	30*45	0.15	2.53
		35*40	0.15	2.55
	560	35*45	0.15	2.75
	680	35*50	0.15	3.15
400(2G)	68	22*25	0.15	0.65
	82	22*25	0.15	0.84
	100	22*30	0.15	0.99
		25*25	0.15	0.82
	120	22*35	0.15	1.09
		25*30	0.15	1.13
	150	22*40	0.15	1.24
		25*30	0.15	1.27
		30*25	0.15	1.20
	180	22*45	0.15	1.41
		25*35	0.15	1.44
		30*30	0.15	1.52
		35*25	0.15	1.16
	220	22*50	0.15	1.58
		25*40	0.15	1.64
		30*35	0.15	1.66
		35*30	0.15	1.47
	270	25*45	0.15	1.79
		30*40	0.15	1.82
		35*30	0.15	1.63
	330	30*45	0.15	2.05
		35*35	0.15	2.05
	390	30*50	0.15	2.26
		35*40	0.15	2.28
	470	35*45	0.15	2.54
	560	35*50	0.15	2.85

LQ series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
420(2T)	100	22*30	0.20	0.97
		25*25	0.20	0.98
	120	22*30	0.20	1.07
		25*30	0.20	1.08
	150	22*40	0.20	1.21
		25*35	0.20	1.26
	180	25*35	0.20	1.42
		30*30	0.20	1.48
	220	25*40	0.20	1.58
		30*35	0.20	1.65
	270	30*35	0.20	1.90
		35*30	0.20	1.94
	330	35*35	0.20	2.17
	390	30*50	0.20	2.22
		35*45	0.20	2.23
	560	35*50	0.20	2.93

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
450(2W)	68	22*30	0.20	0.71
	82	22*35	0.20	0.86
	100	22*35	0.20	0.95
		25*30	0.20	0.97
	120	22*40	0.20	1.07
		25*35	0.20	1.09
	150	22*50	0.20	1.18
		25*40	0.20	1.25
		30*30	0.20	1.29
	180	25*45	0.20	1.40
		30*35	0.20	1.45
		35*25	0.20	1.30
	220	25*50	0.20	1.59
		30*40	0.20	1.64
		35*30	0.20	1.60
	270	30*45	0.20	1.88
		35*35	0.20	1.89
	330	30*50	0.20	2.12
		35*40	0.20	2.15
	390	35*45	0.20	2.35
	470	35*50	0.20	2.65

LG series

- Longer life, high ripple current series
- Endurance: 12,000 hours at 85°C
- **RoHS Compliant**

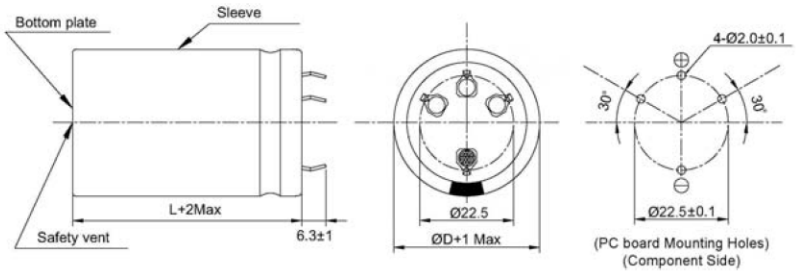
New

SPECIFICATIONS

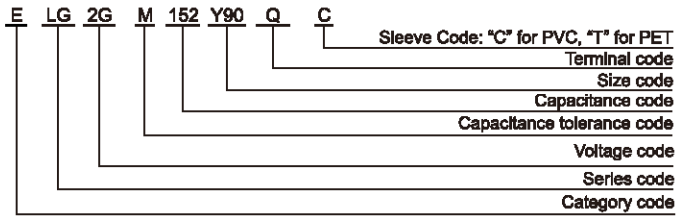
Items	Characteristics		
Category Temperature Range	-25~+85°C		
Rated Voltage Range	350~450V.DC		
Capacitance Tolerance	±20%(M)		(at 20°C,120Hz)
Leakage Current	I≤3√CV Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)		(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	350~450	
	tanδ (max.)	0.20	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	350~450	
	Z(-25°C)/Z(+20°C)	8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 12,000 hours at 85 °C.		
	Capacitance Change	≤±20% of the initial value	
	D.F. (tanδ)	≤200% of the initial specified value	
	Leakage Current	≤The initial specified value	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied.		
	Capacitance Change	≤±15% of the initial value	
	D.F. (tanδ)	≤150% of the initial specified value	
	Leakage Current	≤200% of the initial specified value	

DIMENSIONS[mm]

- Terminal Code : Q (Φ35 to Φ45) : Standard



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	50	120	300	1k	10k	100k
350~450	0.77	1.00	1.16	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LG series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
350(2V)	680	35*50	0.20	3.62
	820	35*55	0.20	3.97
		40*50	0.20	4.08
	1000	35*65	0.20	4.54
		40*55	0.20	4.46
	1200	35*75	0.20	5.09
		40*60	0.20	4.82
		45*50	0.20	4.43
	1500	35*95	0.20	5.98
		40*70	0.20	5.47
		45*60	0.20	5.20
	1800	40*90	0.20	6.51
		45*65	0.20	5.53
	2200	45*85	0.20	6.73
	2700	45*100	0.20	7.62
400(2G)	560	35*50	0.20	3.45
	680	35*60	0.20	3.98
		40*50	0.20	3.90
	820	35*65	0.20	4.32
		40*55	0.20	4.25
		45*50	0.20	4.27
	1000	35*80	0.20	5.02
		40*65	0.20	4.88
		45*55	0.20	4.64
	1200	35*90	0.20	5.54
		40*75	0.20	5.47
		45*60	0.20	4.99
	1500	40*90	0.20	6.30
		45*70	0.20	5.65
	1800	45*80	0.20	6.28
	2200	45*95	0.20	7.18

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/85°C,120Hz)
420(2T)	560	35*50	0.20	3.39
	680	35*60	0.20	3.92
		40*50	0.20	3.85
	820	35*65	0.20	4.26
		40*55	0.20	4.21
	1000	35*80	0.20	4.94
		40*65	0.20	4.82
		45*50	0.20	4.23
	1200	35*95	0.20	5.58
		40*75	0.20	5.42
		45*60	0.20	4.97
	1500	40*90	0.20	6.19
		45*70	0.20	5.63
	1800	45*85	0.20	6.50
	2200	45*100	0.20	7.36
450(2W)	470	35*50	0.20	3.25
	560	35*55	0.20	3.56
		40*50	0.20	3.70
	680	35*65	0.20	4.07
		40*55	0.20	4.06
	820	35*75	0.20	4.55
		40*60	0.20	4.41
		45*50	0.20	4.14
	1000	35*85	0.20	5.07
		40*70	0.20	5.00
		45*60	0.20	4.84
	1200	35*100	0.20	5.71
		40*80	0.20	5.57
		45*65	0.20	5.18
	1500	40*95	0.20	6.36
		45*80	0.20	6.13
	1800	45*90	0.20	6.71

LT series

- Downsize and long life series
- Endurance: 5,000 hours at 105°C
- **RoHS Compliant**

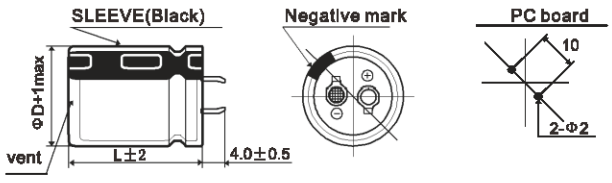
Upgrade

SPECIFICATIONS

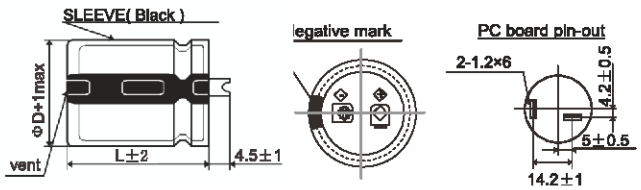
Items	Characteristics			
Category Temperature Range	-25~+105°C			
Rated Voltage Range	160~550V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	I≤3√CV Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)			(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	160~400	420~550	(at 20°C,120Hz)
	tanδ (max.)	0.15	0.20	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	160~250	315~550	(at 120Hz)
	Z(-25°C)/Z(+20°C)	4	8	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 5,000 hours at 105 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤200% of the initial specified value (500V_{dc}:≤250%;550V_{dc}:≤300%)		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.			
	Capacitance Change	≤±15% of the initial value		
	D.F. (tanδ)	≤150% of the initial specified value		
	Leakage Current	≤200% of the initial specified value		

DIMENSIONS[mm]

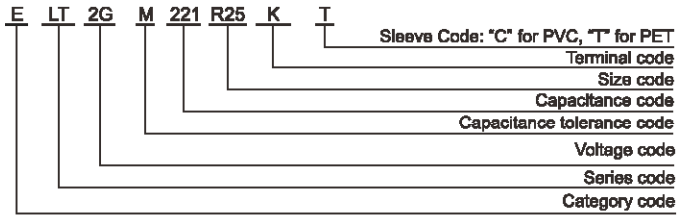
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
160~250	1.00	1.32	1.45	1.50
315~550	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LT series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
160(2C)	390	22*25	0.15	1.32
	560	22*30	0.15	1.66
		25*25	0.15	1.68
	680	22*35	0.15	1.87
		25*30	0.15	1.88
		30*25	0.15	1.96
	820	22*40	0.15	2.09
	1000	22*50	0.15	2.41
		25*35	0.15	2.38
		30*30	0.15	2.40
		35*25	0.15	2.55
	1200	25*45	0.15	2.71
		30*40	0.15	2.77
		35*30	0.15	2.86
	1500	25*50	0.15	3.08
		30*45	0.15	3.17
		35*35	0.15	3.22
	1800	30*50	0.15	3.53
		35*40	0.15	3.66
	2200	35*45	0.15	4.14
	2700	35*50	0.15	4.68
180(2L)	330	22*25	0.15	1.21
	470	22*30	0.15	1.52
		25*25	0.15	1.52
	560	22*35	0.15	1.70
		25*30	0.15	1.78
	680	22*40	0.15	1.91
		25*30	0.15	1.88
	820	22*45	0.15	1.99
		25*35	0.15	2.16
		30*30	0.15	2.17
		35*25	0.15	2.31
	1000	22*50	0.15	2.25
		25*45	0.15	2.47
		30*35	0.15	2.46
	1200	25*50	0.15	2.75
		30*40	0.15	2.77
		35*30	0.15	2.86
	1500	30*50	0.15	3.22
		35*35	0.15	3.22
	1800	35*45	0.15	3.74
	2200	35*50	0.15	4.22

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
200(2D)	270	22*25	0.15	1.10
	390	22*30	0.15	1.38
		25*25	0.15	1.39
	470	22*35	0.15	1.55
	560	22*40	0.15	1.73
		25*30	0.15	1.71
		30*25	0.15	1.78
	680	22*45	0.15	1.81
		25*35	0.15	1.87
		30*30	0.15	1.98
		35*25	0.15	2.10
	820	22*50	0.15	2.18
		25*40	0.15	2.09
		30*35	0.15	2.22
	1000	25*50	0.15	2.39
		30*40	0.15	2.53
		35*30	0.15	2.61
	1200	30*50	0.15	2.88
		35*35	0.15	2.88
	1500	35*40	0.15	3.34
	1800	35*50	0.15	3.82
220(2N)	270	22*25	0.15	1.10
	330	22*30	0.15	1.19
	390	25*25	0.15	1.39
	470	22*35	0.15	1.55
		25*30	0.15	1.56
		30*25	0.15	1.63
	560	22*40	0.15	1.73
		30*30	0.15	1.79
	680	22*50	0.15	1.99
		25*35	0.15	1.96
		30*35	0.15	2.02
		35*25	0.15	2.10
	820	25*45	0.15	2.24
		30*40	0.15	2.29
		35*30	0.15	2.36
	1000	25*50	0.15	2.51
		30*45	0.15	2.59
		35*35	0.15	2.63
	1200	30*50	0.15	2.88
		35*40	0.15	2.98
	1500	35*45	0.15	3.41
	1800	35*50	0.15	3.82

LT series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
250(2E)	220	22*25	0.15	1.01
	270	22*30	0.15	1.20
	330	25*25	0.15	1.32
	390	22*35	0.15	1.44
		25*30	0.15	1.43
		30*25	0.15	1.51
	470	22*40	0.15	1.62
	560	22*50	0.15	1.84
		25*35	0.15	1.78
		30*30	0.15	1.83
		35*25	0.15	1.91
	680	25*45	0.15	2.04
		30*35	0.15	2.06
		35*30	0.15	2.15
	820	25*50	0.15	2.28
		30*45	0.15	2.39
		35*35	0.15	2.38
	1000	30*50	0.15	2.68
		35*40	0.15	2.72
	1200	35*45	0.15	3.05
	1500	35*50	0.15	3.49
315(2F)	150	22*25	0.15	0.80
	180	22*30	0.15	0.92
		25*25	0.15	0.94
	220	22*35	0.15	1.04
		30*25	0.15	1.17
	270	22*40	0.15	1.18
		25*30	0.15	1.19
	330	22*45	0.15	1.33
		25*35	0.15	1.37
		30*30	0.15	1.40
		35*25	0.15	1.49
	390	22*50	0.15	1.48
		25*40	0.15	1.52
	470	25*45	0.15	1.70
		30*35	0.15	1.71
		35*30	0.15	1.82
	560	25*50	0.15	1.88
		30*45	0.15	1.97
		35*35	0.15	2.00
	680	30*50	0.15	2.21
		35*40	0.15	2.29
	820	35*45	0.15	2.57
	1000	35*50	0.15	2.89

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
350(2V)	120	22*25	0.15	0.72
	150	22*30	0.15	0.84
	180	25*25	0.15	0.94
	220	22*40	0.15	1.06
		25*30	0.15	1.07
		30*25	0.15	1.13
	270	22*45	0.15	1.20
		25*35	0.15	1.24
		30*30	0.15	1.27
		35*25	0.15	1.35
	330	22*50	0.15	1.36
		25*40	0.15	1.39
		30*35	0.15	1.43
	390	25*45	0.15	1.55
		30*40	0.15	1.60
		35*30	0.15	1.66
	470	25*50	0.15	1.72
		30*45	0.15	1.81
		35*35	0.15	1.83
	560	30*50	0.15	2.00
		35*40	0.15	2.07
	680	35*45	0.15	2.34
	820	35*50	0.15	2.62
400(2G)	100	22*25	0.15	0.66
	120	22*30	0.15	0.75
	150	22*35	0.15	0.86
		25*25	0.15	0.86
	180	22*40	0.15	0.96
		25*30	0.15	0.97
		30*25	0.15	1.02
	220	22*45	0.15	1.09
		25*35	0.15	1.12
		30*25	0.15	1.22
	270	22*50	0.15	1.23
		25*45	0.15	1.29
		30*30	0.15	1.27
		25*50	0.15	1.44
	330	30*35	0.15	1.43
		35*30	0.15	1.52
	390	30*40	0.15	1.60
		35*35	0.15	1.67
	470	30*50	0.15	1.84
		35*40	0.15	1.90
	560	35*45	0.15	2.12
	680	35*50	0.15	2.39

LT series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
420(2T)	100	22*25	0.20	0.66
	120	22*30	0.20	0.75
		25*25	0.20	0.77
	150	22*35	0.20	0.86
	180	22*45	0.20	0.98
		25*35	0.20	1.01
		30*25	0.20	1.02
	220	22*50	0.20	1.11
		25*40	0.20	1.14
		30*30	0.20	1.14
		35*25	0.20	1.22
	270	25*45	0.20	1.29
		30*35	0.20	1.30
		35*30	0.20	1.38
	330	25*50	0.20	1.44
		30*40	0.20	1.48
		35*35	0.20	1.54
	390	30*45	0.20	1.64
		35*40	0.20	1.73
	470	30*50	0.20	1.84
		35*45	0.20	1.94
	560	35*50	0.20	2.17
450(2W)	82	22*25	0.20	0.59
	100	22*30	0.20	0.69
		25*25	0.20	0.70
	120	22*35	0.20	0.77
	150	22*45	0.20	0.90
		25*35	0.20	0.92
		30*25	0.20	0.93
	180	22*50	0.20	1.01
		25*40	0.20	1.03
		30*30	0.20	1.03
		35*25	0.20	1.10

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
450(2W)	220	25*45	0.20	1.16
		30*35	0.20	1.17
		35*30	0.20	1.24
	270	25*50	0.20	1.31
		30*40	0.20	1.33
		35*35	0.20	1.39
	330	30*45	0.20	1.51
	390	30*50	0.20	1.67
		35*45	0.20	1.77
	470	35*50	0.20	1.98
500(2H)	100	30*25	0.20	0.82
	120	30*30	0.20	0.91
		35*25	0.20	0.88
	150	30*35	0.20	1.04
	180	30*40	0.20	1.17
		35*30	0.20	1.10
	220	30*45	0.20	1.33
		35*35	0.20	1.23
	270	30*50	0.20	1.50
		35*40	0.20	1.42
	330	35*45	0.20	1.60
	390	35*50	0.20	1.78
	470	35*60	0.20	2.03
550(2J)	120	30*30	0.20	0.91
	150	30*35	0.20	1.04
	180	30*40	0.20	1.17
		35*30	0.20	1.10
	220	30*50	0.20	1.35
		35*40	0.20	1.28
	270	35*45	0.20	1.45
	330	35*50	0.20	1.64
	390	35*60	0.20	1.85

LX series

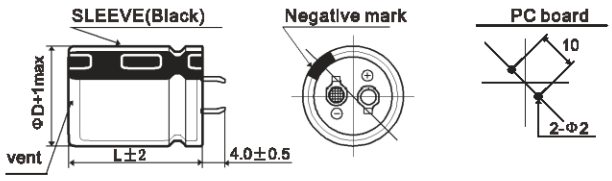
- Extremely long life
- Endurance: 7,000 hours at 105°C
- **RoHS Compliant**

SPECIFICATIONS

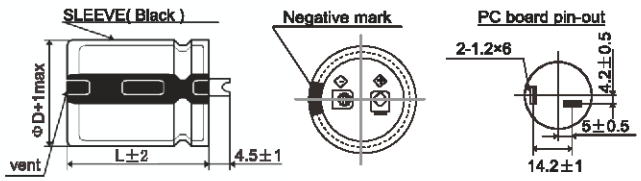
Items	Characteristics			
Category Temperature Range	-25~+105°C			
Rated Voltage Range	160~450V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	$I \leq 3\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)			(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	160~400	420~450	(at 20°C,120Hz)
	tanδ (max.)	0.15	0.20	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	160~400	420~450	(at 120Hz)
	Z(-25°C)/Z(+20°C)	4	8	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 7,000 hours at 105 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤250% of the initial specified value		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.			
	Capacitance Change	≤±15% of the initial value		
	D.F. (tanδ)	≤150% of the initial specified value		
	Leakage Current	≤150% of the initial specified value		

DIMENSIONS[mm]

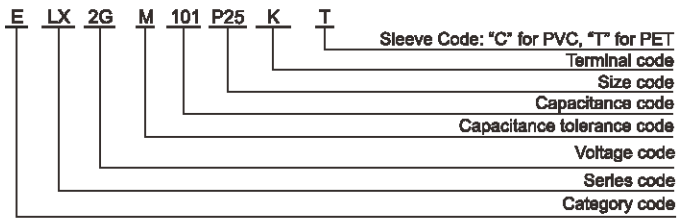
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
160~250	1.00	1.32	1.45	1.50
315~450	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LX series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
160(2C)	330	22*25	0.15	1.11
	390	22*30	0.15	1.26
	470	22*30	0.15	1.39
		25*25	0.15	1.38
	560	22*35	0.15	1.55
		25*30	0.15	1.55
	680	22*40	0.15	1.75
		25*35	0.15	1.78
		30*25	0.15	1.74
	820	22*50	0.15	1.97
		25*40	0.15	2.01
		30*30	0.15	1.96
	1000	25*45	0.15	2.27
		30*35	0.15	2.26
	1200	25*50	0.15	2.54
		30*40	0.15	2.56
		35*30	0.15	2.52
	1500	30*45	0.15	2.96
		35*35	0.15	2.89
	1800	30*50	0.15	3.32
		35*40	0.15	3.30
	2200	35*50	0.15	3.87
180(2L)	270	22*25	0.15	1.00
	330	22*30	0.15	1.16
	390	22*30	0.15	1.26
		25*25	0.15	1.26
	470	22*35	0.15	1.42
		25*30	0.15	1.42
	560	22*40	0.15	1.59
		25*30	0.15	1.55
		30*25	0.15	1.58
	680	22*45	0.15	1.79
		25*35	0.15	1.78
		30*30	0.15	1.79
	820	25*40	0.15	2.01
		30*35	0.15	2.04
	1000	25*50	0.15	2.32
		30*35	0.15	2.26
		35*30	0.15	2.30
	1200	30*45	0.15	2.65
		35*35	0.15	2.58
	1500	30*50	0.15	3.03
		35*40	0.15	3.01
	1800	35*45	0.15	3.41
	2200	35*50	0.15	3.87
200(2D)	220	22*25	0.15	0.90
	270	22*30	0.15	1.05
	330	22*30	0.15	1.16
		25*25	0.15	1.16
	390	22*35	0.15	1.29
		25*30	0.15	1.29
	470	22*40	0.15	1.46
		25*30	0.15	1.42
		30*25	0.15	1.45
	560	22*45	0.15	1.63
		25*35	0.15	1.62
		30*30	0.15	1.62

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
200(2D)	680	25*40	0.15	1.83
		30*30	0.15	1.79
	820	25*45	0.15	2.06
		30*35	0.15	2.04
	1000	30*45	0.15	2.42
		35*30	0.15	2.30
	1200	30*50	0.15	2.71
		35*40	0.15	2.70
	1500	35*45	0.15	3.11
	1800	35*50	0.15	3.50
220(2N)	220	22*25	0.15	0.90
	270	22*30	0.15	1.05
	330	22*35	0.15	1.19
		25*25	0.15	1.16
	390	22*40	0.15	1.33
		25*30	0.15	1.29
	470	22*45	0.15	1.49
		25*35	0.15	1.48
		30*25	0.15	1.45
	560	22*50	0.15	1.63
		25*40	0.15	1.71
		30*30	0.15	1.62
	680	25*45	0.15	1.87
		30*35	0.15	1.86
	820	25*50	0.15	2.10
		30*40	0.15	2.12
		35*30	0.15	2.08
	1000	30*50	0.15	2.48
		35*40	0.15	2.46
	1200	35*45	0.15	2.78
	1500	35*50	0.15	3.20
250(2E)	180	22*25	0.15	0.82
	220	22*30	0.15	0.95
	270	22*35	0.15	1.08
		25*25	0.15	1.05
	330	22*40	0.15	1.22
		25*30	0.15	1.19
	390	22*45	0.15	1.36
		25*35	0.15	1.35
		30*25	0.15	1.32
	470	22*50	0.15	1.49
		25*40	0.15	1.52
		30*30	0.15	1.49
	560	25*45	0.15	1.70
		30*35	0.15	1.69
	680	25*50	0.15	1.91
		30*40	0.15	1.93
		35*30	0.15	1.90
	820	30*45	0.15	2.19
		35*35	0.15	2.13
	1000	35*40	0.15	2.46
	1200	35*50	0.15	2.86
315(2F)	100	22*25	0.15	0.67
	120	22*30	0.15	0.77
	150	22*30	0.15	0.86
		25*25	0.15	0.85

LX series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
315(2F)	180	22*35	0.15	0.96
		25*30	0.15	0.96
	220	22*40	0.15	1.09
		25*30	0.15	1.06
		30*25	0.15	1.08
	270	22*45	0.15	1.24
		25*35	0.15	1.23
		30*30	0.15	1.23
	330	25*40	0.15	1.40
		30*35	0.15	1.42
		35*30	0.15	1.45
	390	25*50	0.15	1.59
		30*35	0.15	1.54
		35*30	0.15	1.57
	470	30*45	0.15	1.81
		35*35	0.15	1.77
	560	30*50	0.15	2.03
		35*40	0.15	2.02
	680	35*45	0.15	2.29
	820	35*50	0.15	2.59
350(2V)	100	22*25	0.15	0.67
	120	22*30	0.15	0.77
		25*25	0.15	0.76
	150	22*35	0.15	0.88
		25*30	0.15	0.88
	180	22*40	0.15	0.99
		25*30	0.15	0.96
		30*25	0.15	0.98
	220	22*45	0.15	1.12
		25*35	0.15	1.11
		30*30	0.15	1.11
	270	25*40	0.15	1.26
		30*35	0.15	1.28
	330	25*45	0.15	1.40
		30*35	0.15	1.42
		35*30	0.15	1.45
	390	30*40	0.15	1.60
		35*35	0.15	1.61
	470	30*50	0.15	1.86
		35*40	0.15	1.85
	560	35*40	0.15	2.02
	680	35*50	0.15	2.36
400(2G)	68	22*25	0.15	0.55
	82	22*30	0.15	0.63
	100	22*30	0.15	0.70
		25*25	0.15	0.70
	120	22*35	0.15	0.79
		25*30	0.15	0.79
	150	22*40	0.15	0.90
		25*30	0.15	0.88
		30*25	0.15	0.90
	180	22*45	0.15	0.99
		25*35	0.15	1.01
		30*30	0.15	1.01
	220	25*40	0.15	1.14
		30*35	0.15	1.16

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
400(2G)	270	25*50	0.15	1.32
		30*40	0.15	1.33
		35*30	0.15	1.31
	330	30*45	0.15	1.52
		35*35	0.15	1.48
	390	30*50	0.15	1.69
		35*40	0.15	1.68
	470	35*45	0.15	1.91
	560	35*50	0.15	2.14
420(2T)	56	22*25	0.20	0.50
	68	22*30	0.20	0.58
	82	22*30	0.20	0.63
		25*25	0.20	0.63
	100	22*35	0.20	0.72
		25*30	0.20	0.72
	120	22*40	0.20	0.81
		25*30	0.20	0.79
		30*25	0.20	0.80
	150	22*45	0.20	0.92
		25*35	0.20	0.92
		30*30	0.20	0.92
	180	25*40	0.20	1.03
		30*35	0.20	1.05
	220	25*50	0.20	1.19
		30*35	0.20	1.16
		35*30	0.20	1.18
	270	30*45	0.20	1.38
		35*35	0.20	1.34
	330	30*50	0.20	1.56
		35*40	0.20	1.55
	390	35*45	0.20	1.74
	470	35*50	0.20	1.96
450(2W)	47	22*25	0.20	0.46
	56	22*30	0.20	0.52
	68	22*30	0.20	0.58
		25*25	0.20	0.58
	82	22*35	0.20	0.65
		25*30	0.20	0.65
	100	22*40	0.20	0.74
		25*30	0.20	0.72
		30*25	0.20	0.73
	120	22*45	0.20	0.83
		25*35	0.20	0.82
		30*30	0.20	0.82
	150	25*40	0.20	0.94
		30*35	0.20	0.96
	180	25*45	0.20	1.06
		30*35	0.20	1.05
		35*30	0.20	1.07
	220	30*40	0.20	1.20
		35*35	0.20	1.21
	270	30*50	0.20	1.41
		35*40	0.20	1.40
	330	35*45	0.20	1.60
	390	35*50	0.20	1.79

LB series

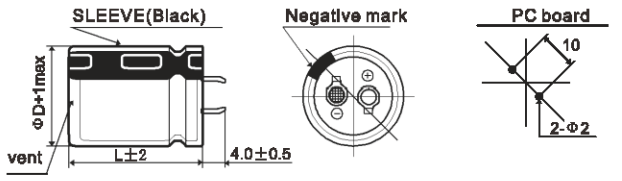
- High reliability. Extremely long life series
- Endurance with ripple current: 10,000 hours at 105°C
- **RoHS Compliant**

SPECIFICATIONS

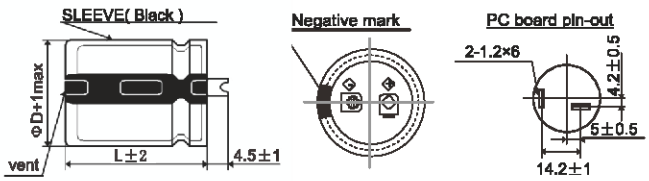
Items	Characteristics			
Category Temperature Range	-25~+105°C			
Rated Voltage Range	200~450V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	$I \leq 3\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage (V)			(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	Rated Voltage(V_{dc})	200~400	450	(at 20°C,120Hz)
	tanδ (max.)	0.15	0.20	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V_{dc})	200~400	450	(at 120Hz)
	Z(-25°C)/Z(+20°C)	4	8	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 10,000 hours at 105 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤250% of the initial specified value		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.			
	Capacitance Change	≤±15% of the initial value		
	D.F. (tanδ)	≤150% of the initial specified value		
	Leakage Current	≤200% of the initial specified value		

DIMENSIONS[mm]

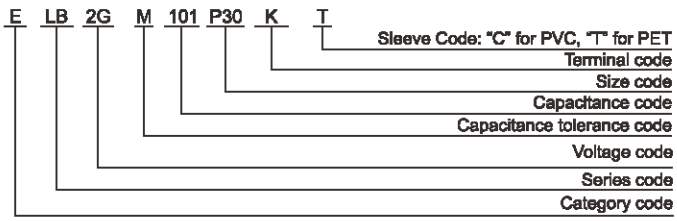
- Terminal Code : K (Φ22 to Φ35) : Standard



- Terminal Code : L (Φ35)



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
200, 250	1.00	1.32	1.45	1.50
400, 450	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

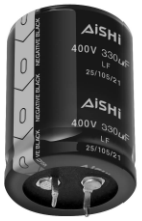
LB series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
200(2D)	220	22*25	0.15	1.01
	270	22*30	0.15	1.09
		25*25	0.15	1.12
	330	22*30	0.15	1.21
		25*25	0.15	1.21
	390	22*35	0.15	1.32
		25*30	0.15	1.29
		30*25	0.15	1.31
	470	22*40	0.15	1.41
		25*35	0.15	1.42
		30*30	0.15	1.40
	560	22*45	0.15	1.52
		25*35	0.15	1.51
		30*30	0.15	1.52
	680	25*40	0.15	1.72
		30*35	0.15	1.71
	820	25*50	0.15	2.01
		30*40	0.15	2.02
		35*30	0.15	2.01
	1000	30*45	0.15	2.20
		35*35	0.15	2.21
	1200	30*50	0.15	2.32
		35*40	0.15	2.31
	1500	35*50	0.15	2.51
250(2E)	180	22*30	0.15	0.91
		25*25	0.15	0.90
	220	22*30	0.15	1.01
		25*25	0.15	1.00
	270	22*35	0.15	1.11
		25*30	0.15	1.10
		30*25	0.15	1.12
	330	22*40	0.15	1.20
		25*35	0.15	1.21
		30*25	0.15	1.20
	390	22*45	0.15	1.30
		25*35	0.15	1.32
		30*30	0.15	1.33
	470	25*45	0.15	1.40
		30*35	0.15	1.42
		35*30	0.15	1.40
	560	25*50	0.15	1.51
		30*35	0.15	1.50
		35*30	0.15	1.52
	680	30*45	0.15	1.72
		35*35	0.15	1.71
	820	30*50	0.15	2.01
		35*40	0.15	2.01
	1000	35*45	0.15	2.22
	1200	35*50	0.15	2.32

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
400(2G)	56	22*25	0.15	0.51
	68	22*30	0.15	0.55
		25*25	0.15	0.56
	82	22*35	0.15	0.64
		25*25	0.15	0.65
	100	22*35	0.15	0.70
		25*30	0.15	0.69
	120	22*40	0.15	0.75
		25*35	0.15	0.76
		30*25	0.15	0.75
	150	22*50	0.15	0.82
		25*40	0.15	0.83
		30*30	0.15	0.82
	180	25*45	0.15	0.90
		30*35	0.15	0.91
		35*25	0.15	0.90
	220	25*50	0.15	1.01
		30*40	0.15	1.02
		35*30	0.15	1.00
	270	30*45	0.15	1.10
		35*35	0.15	1.10
	330	30*50	0.15	1.20
		35*40	0.15	1.21
	390	35*45	0.15	1.29
	470	35*50	0.15	1.35
450(2W)	39	22*25	0.20	0.37
	47	22*30	0.20	0.40
	56	22*35	0.20	0.47
		25*25	0.20	0.48
	68	22*40	0.20	0.53
		25*30	0.20	0.53
	82	22*45	0.20	0.56
		25*35	0.20	0.56
		30*25	0.20	0.56
	100	22*50	0.20	0.64
		25*40	0.20	0.64
		30*30	0.20	0.64
	120	25*45	0.20	0.72
		30*30	0.20	0.72
	150	25*50	0.20	0.79
		30*40	0.20	0.79
		35*30	0.20	0.78
	180	30*45	0.20	0.87
		35*35	0.20	0.87
	220	30*50	0.20	1.00
		35*40	0.20	1.01
	270	35*45	0.20	1.19
	330	35*50	0.20	1.38

LF series



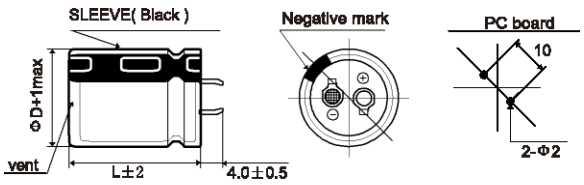
- No sparks against DC over-voltage
- Endurance with ripple current: 5,000 hours at 105°C
- **RoHS Compliant**

SPECIFICATIONS

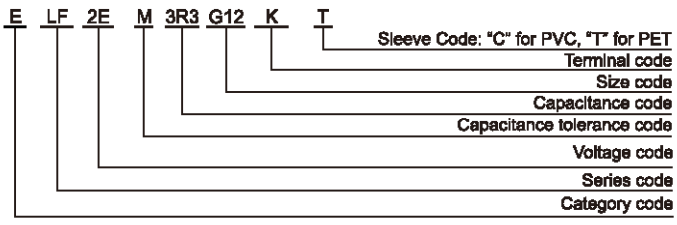
Items	Characteristics	
Category Temperature Range	-25~+105°C	
Rated Voltage Range	200&400V.DC	
Capacitance Tolerance	±20%(M)	(at 20°C,120Hz)
Leakage Current	I≤3$\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage(V)	(at 20°C after 5 minutes)
DC Overvoltage Test	When an excessive DC voltage is applied to the capacitors under the test conditions on next page, the vent shall operate and then the capacitors shall become open-circuit without burning materials.	
Dissipation Factor (tanδ)	0.15 max.	(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	200V:Z(-25°C)/Z(+20°C) ≤4 400V: Z(-25°C)/Z(+20°C) ≤8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 5,000 hours at 105 °C.	
	Capacitance Change	≤±20% of the initial value
	D.F. (tanδ)	≤200% of the initial specified value
	Leakage Current	≤The initial specified value
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.	
	Capacitance Change	≤±15% of the initial value
	D.F. (tanδ)	≤150% of the initial specified value
	Leakage Current	≤200% of the initial specified value

DIMENSIONS[mm]

- Terminal Code : K (Φ22 to Φ35) : Standard



PART NUMBERING SYSTEM



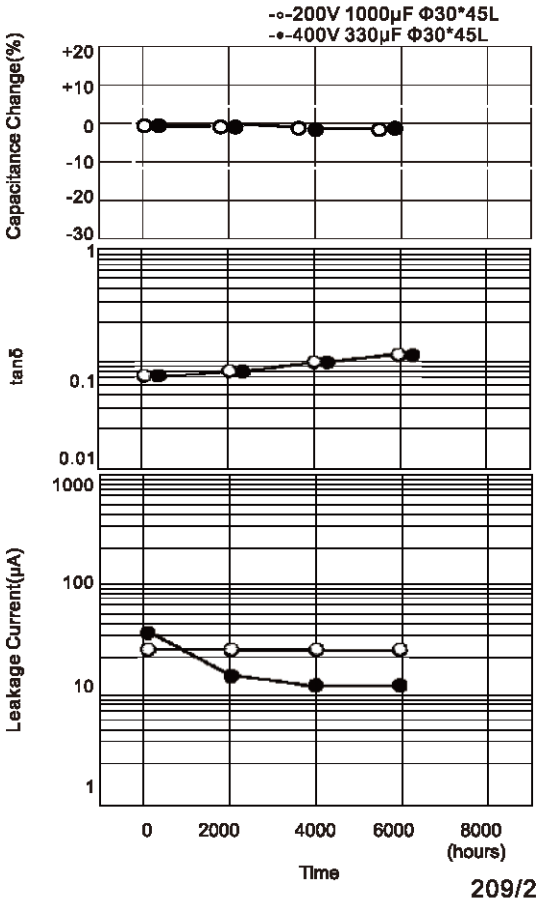
RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
200	1.00	1.32	1.45	1.50
400	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

- 105°C Endurance with Rated Ripple Current



LF series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
200(2D)	270	22*25	0.15	0.45
	330	22*30	0.15	0.62
		25*25	0.15	0.62
	390	22*35	0.15	0.67
		25*30	0.15	0.66
	470	22*40	0.15	0.72
		25*30	0.15	0.72
		30*25	0.15	0.77
	560	22*45	0.15	0.80
		25*35	0.15	0.78
		30*30	0.15	0.81
	680	22*50	0.15	0.89
		25*40	0.15	0.89
		30*30	0.15	0.89
		35*25	0.15	0.88
	820	25*50	0.15	1.05
		30*35	0.15	1.03
		35*30	0.15	1.05
	1000	30*45	0.15	1.18
		35*35	0.15	1.18
	1200	30*50	0.15	1.33
		35*40	0.15	1.36
	1500	35*45	0.15	1.57
400(2G)	68	22*25	0.15	0.26
		25*20	0.15	0.24

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
400(2G)	82	22*30	0.15	0.30
		25*25	0.15	0.30
	100	22*35	0.15	0.34
		25*30	0.15	0.34
	120	22*40	0.15	0.37
		25*30	0.15	0.37
		30*25	0.15	0.39
	150	22*45	0.15	0.42
		25*35	0.15	0.43
		30*30	0.15	0.43
	180	22*50	0.15	0.49
		25*40	0.15	0.48
		30*30	0.15	0.47
		35*25	0.15	0.48
	220	25*45	0.15	0.55
		30*35	0.15	0.54
		35*30	0.15	0.55
	270	25*50	0.15	0.62
		30*40	0.15	0.62
		35*30	0.15	0.59
	330	30*45	0.15	0.71
		35*35	0.15	0.69
	390	30*50	0.15	0.80
		35*40	0.15	0.79
	470	35*45	0.15	0.89

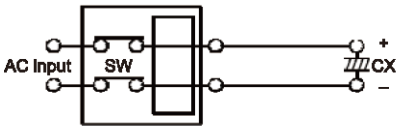
DC OVERVOLTAGE TEST CONDITIONS

The vent will operate and the capacitor shall become open-circuited without burning materials when the following excess DC voltage is applied.

Test DC voltage

Rated Voltage	Capacitance	Current Limit	Test DC Voltage
200Vdc	<330μF	4A	300/375Vdc
	330μF≤C<470μF	5A	
	≥470μF	7A	
400Vdc	<100μF	2A	500/600Vdc
	100μF≤C<220μF	4A	
	≥220μF	7A	

Test Circuit



Constant DC voltage/current power supply

LU series

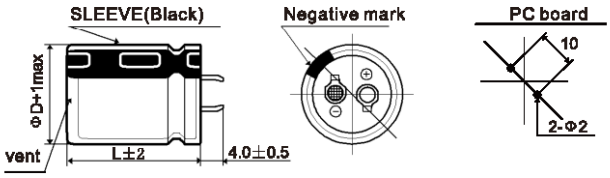
- No sparks against DC over-voltage
- Endurance: 2,000 hours at 105°C
- **RoHS Compliant**

SPECIFICATIONS

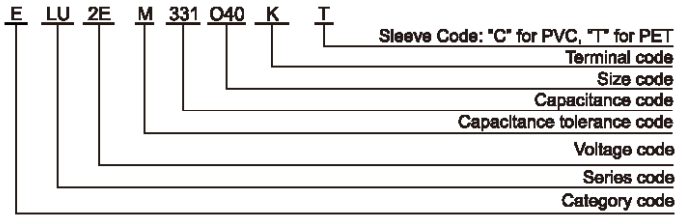
Items	Characteristics			
Category Temperature Range	-25~+105°C			
Rated Voltage Range	200~450V.DC			
Capacitance Tolerance	±20%(M)			(at 20°C,120Hz)
Leakage Current	$I \leq 3\sqrt{CV}$ Where, I:Max.leakage current (μA),C:Nominal capacitance (μF),V: Rated voltage(V)			(at 20°C after 5 minutes)
ESL	50nH max.			(at 20°C,1MHz)
Dissipation Factor (tanδ)	200V.DC:0.15 max.(0.02 max. for ΦD=35mm) 400V.DC:0.15 max.			(at 20°C,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V.DC)	200~250	400~450	
	Z(-25°C)/Z(+20°C)	4	8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 105 °C.			
	Capacitance Change	≤±20% of the initial value		
	D.F. (tanδ)	≤200% of the initial specified value		
	Leakage Current	≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.			
	Capacitance Change	≤±15% of the initial value		
	D.F. (tanδ)	≤150% of the initial specified value		
	Leakage Current	≤200% of the initial specified value		

DIMENSIONS[mm]

- Terminal Code : K (Φ22 to Φ35) : Standard



PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current (Hz)

W.V	120	1k	10k	100k
200~250	1.00	1.32	1.45	1.50
400~450	1.00	1.30	1.41	1.43

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LU series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
200(2D)	180	22*20	0.15	0.82
	220	22*20	0.15	0.90
	270	22*25	0.15	1.02
	330	22*30	0.15	1.20
		25*25	0.15	1.20
	390	22*30	0.15	1.35
		25*25	0.15	1.35
	470	22*35	0.15	1.45
		25*30	0.15	1.45
		30*25	0.15	1.47
	560	22*40	0.15	1.62
		25*30	0.15	1.60
		30*25	0.15	1.60
	680	25*35	0.15	1.82
		30*30	0.15	1.81
		35*25	0.20	1.86
	820	25*45	0.15	2.11
		30*35	0.15	2.11
		35*25	0.20	2.11
	1000	30*35	0.15	2.40
		35*30	0.20	2.40
	1200	30*45	0.15	2.69
		35*35	0.20	2.65
250(2E)	120	22*20	0.15	0.68
	180	22*25	0.15	0.87
		25*20	0.15	0.93
	220	22*30	0.15	1.00
	270	22*35	0.15	1.14
		25*25	0.15	1.13
		30*20	0.15	1.25
	330	22*40	0.15	1.28
		25*30	0.15	1.29
	390	22*45	0.15	1.42
		25*35	0.15	1.46
		30*25	0.15	1.52

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	tanδ	Rated ripple current (Arms/105°C,120Hz)
250(2E)	390	35*20	0.20	1.62
	470	25*40	0.15	1.64
		30*30	0.15	1.67
	560	25*45	0.15	1.82
		30*35	0.15	1.87
		35*25	0.20	1.99
	680	30*40	0.15	2.12
		35*30	0.20	2.19
	820	30*45	0.15	2.39
		35*35	0.20	2.42
400(2G)	56	22*20	0.15	0.45
	68	22*20	0.15	0.51
	82	22*25	0.15	0.58
	100	22*25	0.15	0.66
		25*25	0.15	0.66
	120	22*30	0.15	0.76
		25*25	0.15	0.76
	150	22*35	0.15	0.85
		25*30	0.15	0.85
		30*25	0.15	0.85
	180	22*40	0.15	0.94
		25*35	0.15	0.95
		30*25	0.15	0.95
	220	25*35	0.15	1.24
		30*30	0.15	1.24
		35*25	0.15	1.24
	270	25*45	0.15	1.30
		30*35	0.15	1.30
		35*25	0.15	1.30
	330	30*40	0.15	1.47
		35*30	0.15	1.47
450(2W)	180	30*35	0.20	1.00
	220	30*40	0.20	1.20
	390	35*40	0.20	1.60

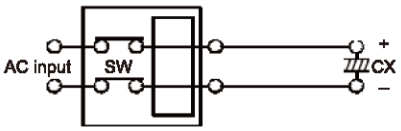
DC OVERVOLTAGE TEST CONDITIONS

The vent will operate and the capacitor shall become open-circuited without burning materials when the following excess DC voltage is applied.

Test DC voltage

Rated Voltage	Nominal Capacitance	Current Limit	Test DC Voltage
200Vdc	<330μF	4A	300/375Vdc
	330μF≤C<470μF	5A	
	≥470μF	7A	
250Vdc	<100μF	4A	350/450Vdc
	100μF≤C<220μF	5A	
	≥220μF	7A	
400Vdc	<100μF	2A	500/600Vdc
	100μF≤C<220μF	4A	
	≥220μF	7A	
450Vdc	<100μF	2A	550/675Vdc
	100μF≤C<220μF	4A	
	≥220μF	7A	

Test Circuit



Constant DC voltage/current power supply

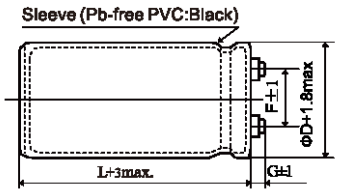
NR series

- Endurance with ripple current: 2,000 hours at 85°C
- Applications: Uninterruptible power supplies and frequency converters
- Detail specification: IEC 60384-4
- **RoHS Compliant**

SPECIFICATIONS

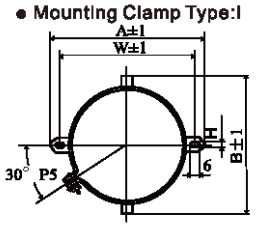
Items	Characteristics	
Category Temperature Range	-25~+85°C(350~550 Vdc)	
Surge Voltage	1.10* V_R	
Rated Capacitance Range	1000~15000μF	
Rated Voltage Range	350~550 Vdc	
Capacitance Tolerance	±20% (M)	(at 20°C, 120Hz)
Leakage Current	I=0.02CV [μA] or 5mA, whichever is smaller. Where, I: Max.leakage current (μA), C : Rated capacitance (μF), V : Rated voltage (V)	(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	0.20	(at 20°C, 120Hz)
Low Temperature Characteristics	Capacitance Change C(-25°C)/C(+20°C)≥0.7	(at 120Hz)
Insulation Resistance	When measured between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500Vdc, the insulation resistance shall not be less than 100MΩ.	
Insulation Withstanding Voltage	When a voltage of 2,000Vac is applied for 1 minute between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 85°C.	
	Capacitance Change	≤±20% of the initial value
	D.F. (tanδ)	≤200% of the initial specified value
	Leakage Current	≤The initial specified value
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied.	
	Capacitance Change	≤±20% of the initial value
	D.F. (tanδ)	≤150% of the initial specified value
	Leakage Current	≤The initial specified value

DIMENSIONS(Screw-Mount)[mm]



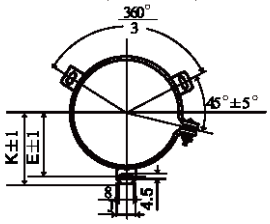
Ø35 to Ø51.6:G=7
Ø64.3 to Ø91:G=6.5

● Mounting Clamp Type:I



ØD	A	B	W	F
35	58.0	44.0	48.0	12.7
51.6	80.0	62.0	68.0	22.2
64.3	93.0	82.0	81.0	28.5
77	106.0	94.0	93.5	31.7

● Mounting Clamp Type:Y



ØD	E	K	J	F
51.6	32.5	35.8	14.0	22.2
64.3	38.4	42.5	14.0	28.5
77	44.5	47.5	14.0	31.7
91	50.8	54.7	14.0	31.7

<Screw specifications>
Plus hexagon-headed screw:
M5x0.8x10 or M6x1.0x12
Maximum screw tightening torque:
3.23Nm

* The screw and the mounting clamp are separately supplied and not attached to the product.

PART NUMBERING SYSTEM

E NR 2G M 562 UD0 S ** C

- C: Sleeve Code: "C" for PVC, "T" for PET
- **: Internal code
- S: Terminal code
- UD0: Size code
- 562: Capacitance code
- M: Capacitance tolerance code
- 2G: Voltage code
- NR: Series code
- E: Category code

RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Coefficient

Frequency(Hz)	50	120	300	1k	3k
Coefficient	0.8	1.0	1.1	1.3	1.4

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 or 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

NR series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size ΦD*L(mm)	tanδ	ESR typ. 120Hz 20°C mΩ	ESR max. 120Hz 20°C mΩ	Rated ripple current (Arms/85°C,120Hz)	Part NO.
350(2V)	1000	51.6*65	0.20	82	123	3.6	ENR2VM102S65*00C
	2200	51.6*105	0.20	51	77	7.6	ENR2VM222SA5*00C
	2700	64.3*96	0.20	46	68	8.9	ENR2VM272T96*00C
	3300	64.3*105	0.20	35	52	10.0	ENR2VM332TA5*00C
	3900	64.3*115	0.20	31	46	11.4	ENR2VM392TB5*00C
	4700	76.9*105	0.20	28	42	13.5	ENR2VM472UA5*00C
	5600	76.9*115	0.20	24	35	15.4	ENR2VM562UB5*00C
	6800	76.9*143	0.20	21	31	17.3	ENR2VM682UE3*00C
	8200	76.9*168	0.20	18	27	19.8	ENR2VM822UG8*00C
	10000	91*157	0.20	15	22	23.7	ENR2VM103VF7*00C
	12000	91*168	0.20	13	19	24.3	ENR2VM123VG8*00C
	15000	91*196	0.20	11	16	29.2	ENR2VM153VJ6*00C
400(2G)	1000	51.6*65	0.20	88	131	3.7	ENR2GM102S65*00C
	2200	51.6*115	0.20	58	87	7.5	ENR2GM222SB5*00C
	2700	64.3*96	0.20	47	71	9.0	ENR2GM272T96*00C
	3300	64.3*115	0.20	39	58	10.6	ENR2GM332TB5*00C
	3900	64.3*130	0.20	33	49	12.5	ENR2GM392TD0*00C
	4700	76.9*115	0.20	30	45	14.1	ENR2GM472UB5*00C
	5600	76.9*130	0.20	26	39	16.8	ENR2GM562UD0*00C
	6800	76.9*155	0.20	24	35	17.6	ENR2GM682UF5*00C
	8200	91*157	0.20	19	29	21.5	ENR2GM822VF7*00C
	10000	91*168	0.20	17	26	22.8	ENR2GM103VG8*00C
	12000	91*196	0.20	15	22	26.6	ENR2GM123VJ6*00C
	15000	91*220	0.20	13	18	27.4	ENR2GM153VM0*00C
450(2W)	1800	51.6*130	0.20	68	102	6.5	ENR2WM182SD0*00C
	2200	64.3*96	0.20	56	83	7.8	ENR2WM222T96*00C
	2700	64.3*115	0.20	45	68	8.8	ENR2WM272TB5*00C
	3300	64.3*130	0.20	37	55	10.7	ENR2WM332TD0*00C
	3900	76.9*115	0.20	31	46	12.0	ENR2WM392UB5*00C
	4700	76.9*130	0.20	27	41	14.1	ENR2WM472UD0*00C
	5600	76.9*155	0.20	25	38	16.0	ENR2WM562UF5*00C
	6800	91*157	0.20	21	31	18.8	ENR2WM682VF7*00C
	8200	91*157	0.20	17	28	19.1	ENR2WM822VF7*00C
	10000	91*196	0.20	13	25	21.2	ENR2WM103VJ6*00C
	12000	91*220	0.20	11	22	23.7	ENR2WM123VM0*00C
500(2H)	2200	64.3*115	0.25	54	80	7.3	ENR2HM222TB5*00C
	2700	64.3*130	0.25	43	64	8.5	ENR2HM272TD0*00C
	3300	76.9*115	0.25	36	53	10.0	ENR2HM332UB5*00C
	3900	76.9*130	0.25	30	47	11.4	ENR2HM392UD0*00C
	4700	76.9*155	0.25	27	40	13.3	ENR2HM472UF5*00C
	5600	91*157	0.25	25	38	14.8	ENR2HM562VF7*00C
	8200	91*196	0.25	16	26	18.1	ENR2HM822VJ6*00C
	10000	91*220	0.25	15	24	22.2	ENR2HM103VM0*00V
550(2J)	1500	64.3*115	0.30	60	95	7.0	ENR2JM152TB5*00C
	2200	76.9*105	0.30	52	78	8.1	ENR2JM222UA5*00C
	2700	76.9*115	0.30	42	62	9.0	ENR2JM272UB5*00C
	3300	76.9*130	0.30	35	51	10.5	ENR2JM332UD0*00C
	3900	76.9*155	0.30	29	45	11.0	ENR2JM392UF5*00C
	4700	91*157	0.30	26	38	12.9	ENR2JM472VF7*00C

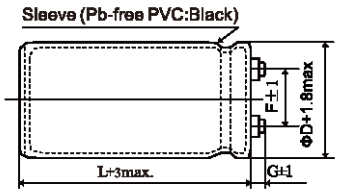
NS series

- Endurance with ripple current: 2,000 hours at 105°C
- Applications: Uninterruptible power supplies and frequency converters
- Detail specification: IEC 60384-4
- **RoHS Compliant**

SPECIFICATIONS

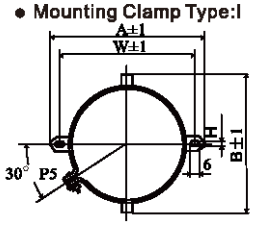
Items	Characteristics		
Category Temperature Range	-25~+105°C(350~450 Vdc)		
Surge Voltage	1.10* V_R		
Rated Capacitance Range	1000~15000μF		
Rated Voltage Range	350~450 Vdc		
Capacitance Tolerance	±20% (M)		(at 20°C, 120Hz)
Leakage Current	I=0.02CV [μA] or 5mA, whichever is smaller. Where, I: Max.leakage current (μA), C : Rated capacitance (μF), V : Rated voltage (V)		(at 20°C after 5 minutes)
Dissipation Factor (tanδ)	0.20		(at 20°C, 120Hz)
Low Temperature Characteristics	Capacitance Change	C(-25°C)/C(+20°C)≥0.7	(at 120Hz)
Insulation Resistance	When measured between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500Vdc, the insulation resistance shall not be less than 100MΩ.		
Insulation Withstanding Voltage	When a voltage of 2,000Vac is applied for 1 minute between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.		
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 2,000 hours at 105°C.		
	Capacitance Change	≤±20% of the initial value	
	D.F. (tanδ)	≤200% of the initial specified value	
	Leakage Current	≤The initial specified value	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.		
	Capacitance Change	≤±20% of the initial value	
	D.F. (tanδ)	≤150% of the initial specified value	
	Leakage Current	≤The initial specified value	

DIMENSIONS(Screw-Mount)[mm]



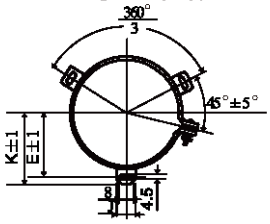
Ø35 to Ø51.6:G=7
Ø64.3 to Ø91:G=6.5

● Mounting Clamp Type:I



ØD	A	B	W	F
35	58.0	44.0	48.0	12.7
51.6	80.0	62.0	68.0	22.2
64.3	93.0	82.0	81.0	28.5
77	106.0	94.0	93.5	31.7

● Mounting Clamp Type:Y



ØD	E	K	J	F
51.6	32.5	35.8	14.0	22.2
64.3	38.4	42.5	14.0	28.5
77	44.5	47.5	14.0	31.7
91	50.8	54.7	14.0	31.7

<Screw specifications>
Plus hexagon-headed screw:
M5x0.8x10 or M6x1.0x12
Maximum screw tightening torque:
3.23Nm

* The screw and the mounting clamp are separately supplied and not attached to the product.

PART NUMBERING SYSTEM

E NS 2G M 562 UD0 S ** C

- C: Sleeve Code: "C" for PVC, "T" for PET
- **: Internal code
- S: Terminal code
- UD0: Size code
- 562: Capacitance code
- M: Capacitance tolerance code
- 2G: Voltage code
- NS: Series code
- E: Category code

RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Coefficient

Frequency(Hz)	50	120	300	1k	3k
Coefficient	0.8	1.0	1.1	1.3	1.4

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 or 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

NS series

■ STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Case size ΦD*L(mm)	tanδ	ESR typ. 120Hz 20°C mΩ	ESR max. 120Hz 20°C mΩ	Rated ripple current (Arms/105°C,120Hz)	Part NO.
350(2V)	1000	51.6*80	0.20	108	157	2.6	ENS2VM102S80*00C
	1500	51.6*80	0.20	79	116	3.2	ENS2VM152S80*00C
	2200	51.6*96	0.20	57	81	4.2	ENS2VM222S96*00C
	3300	64.3*105	0.20	43	59	5.1	ENS2VM332TA5*00C
	3900	64.3*115	0.20	39	54	6.7	ENS2VM392TB5*00C
	4700	64.3*143	0.20	35	48	7.2	ENS2VM472TE3*00C
	5600	76.9*130	0.20	30	40	8.5	ENS2VM562UD0*00C
	6800	76.9*143	0.20	27	36	10.0	ENS2VM682UE3*00C
	8200	76.9*168	0.20	23	31	11.7	ENS2VM822UG8*00C
	10000	76.9*196	0.20	19	28	14.3	ENS2VM103UJ6*00C
	12000	76.9*220	0.20	17	25	16.8	ENS2VM123UM0*00C
	15000	91.0*196	0.20	16	24	18.3	ENS2VM153VJ6*00C
400(2G)	1000	51.6*80	0.20	109	158	3.0	ENS2GM102S80*00C
	1500	51.6*96	0.20	75	107	3.7	ENS2GM152S96*00C
	2200	64.3*105	0.20	35	76	4.6	ENS2GM222TA5*00C
	3300	64.3*130	0.20	31	53	6.4	ENS2GM332TD0*00C
	3900	76.9*115	0.20	28	46	7.9	ENS2GM392UB5*00C
	4700	76.9*130	0.20	23	40	8.0	ENS2GM472UD0*00C
	5600	76.9*143	0.20	21	36	9.8	ENS2GM562UE3*00C
	6800	76.9*168	0.20	14	31	10.5	ENS2GM682UG8*00C
	8200	76.9*196	0.20	14	30	13.3	ENS2GM822UJ6*00C
	10000	76.9*220	0.20	12	25	17.5	ENS2GM103UM0*00C
	12000	91.0*196	0.20	11	23	21.3	ENS2GM123VJ6*00C
450(2W)	1000	51.6*105	0.20	95	153	4.3	ENS2WM102SA5*00C
	1500	51.6*115	0.20	63	102	5.8	ENS2WM152SB5*00C
	2200	64.3*115	0.20	43	75	7.3	ENS2WM222TB5*00C
	3300	76.9*130	0.20	27	51	10.1	ENS2WM332UD0*00C
	3900	76.9*143	0.20	23	45	10.9	ENS2WM392UE3*00C
	4700	76.9*168	0.20	20	40	12.7	ENS2WM472UG8*00C
	5600	76.9*196	0.20	17	36	15.9	ENS2WM562UJ6*00C
	6800	76.9*220	0.20	14	32	16.4	ENS2WM682UM0*00C
	8200	91.0*196	0.20	11	24	17.0	ENS2WM822VJ6*00C
	10000	91.0*220	0.20	9	21	18.8	ENS2WM103VM0*00C

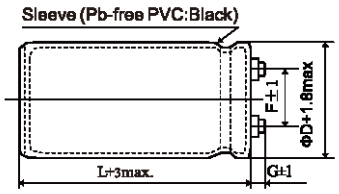
NX series

- Endurance with ripple current: 5,000 hours at 85°C
- Applications: Professional power supplies, Solar and wind generator and frequency converters
- Detail specification: IEC 60384-4
- **RoHS Compliant**

SPECIFICATIONS

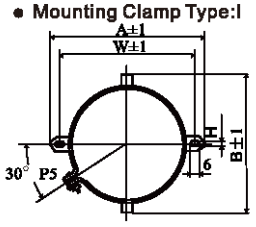
Items	Characteristics		
Category Temperature Range	-25~+85°C(350~500 Vdc)		
Surge Voltage	1.10* V_R		
Rated Capacitance Range	1000~12000μF		
Rated Voltage Range	350~500 Vdc		
Capacitance Tolerance	±20% (M)		(at 20°C, 120Hz)
Leakage Current	I=0.02CV [μA] or 5mA, whichever is smaller. Where, I: Max.leakage current (μA), C : Rated capacitance (μF), V : Rated voltage (V)		(at 20 after 5 minutes)
Dissipation Factor (tanδ)	0.20		(at 20°C, 120Hz)
Low Temperature Characteristics	Capacitance Change	C(-25°C)/C(+20°C)≥0.7	(at 120Hz)
Insulation Resistance	When measured between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500Vdc, the insulation resistance shall not be less than 100MΩ.		
Insulation Withstanding Voltage	When a voltage of 2,000Vac is applied for 1 minute between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.		
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 5,000 hours at 85°C.		
	Capacitance Change	≤±20% of the initial value	
	D.F. (tanδ)	≤200% of the initial specified value	
	Leakage Current	≤The initial specified value	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied.		
	Capacitance Change	≤±20% of the initial value	
	D.F. (tanδ)	≤150% of the initial specified value	
	Leakage Current	≤The initial specified value	

DIMENSIONS(Screw-Mount)[mm]



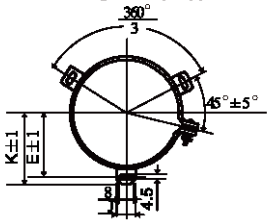
Ø35 to Ø51.6:G=7
Ø64.3 to Ø91:G=6.5

● Mounting Clamp Type:I



ØD	A	B	W	F
35	58.0	44.0	48.0	12.7
51.6	80.0	62.0	68.0	22.2
64.3	93.0	82.0	81.0	28.5
77	106.0	94.0	93.5	31.7

● Mounting Clamp Type:Y



ØD	E	K	J	F
51.6	32.5	35.8	14.0	22.2
64.3	38.4	42.5	14.0	28.5
77	44.5	47.5	14.0	31.7
91	50.8	54.7	14.0	31.7

<Screw specifications>
Plus hexagon-headed screw:
M5x0.8x10 or M6x1.0x12
Maximum screw tightening torque:
3.23Nm

* The screw and the mounting clamp are separately supplied and not attached to the product.

PART NUMBERING SYSTEM

E NX 2G M 562 UD0 S ** C

- C: Sleeve Code: "C" for PVC, "T" for PET
- **: Internal code
- S: Terminal code
- UD0: Size code
- 562: Capacitance code
- M: Capacitance tolerance code
- 2G: Voltage code
- NX: Series code
- E: Category code

RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Coefficient

Frequency(Hz)	50	120	300	1k	3k
Coefficient	0.8	1.0	1.1	1.3	1.4

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 or 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

NX series

STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Case size ΦD*L(mm)	tanδ	ESR typ. 120Hz 20°C mΩ	ESR max. 120Hz 20°C mΩ	Rated ripple current (Arms/85°C,120Hz)	Part NO.
350(2V)	1500	51.6*80	0.20	86	130	6.0	ENX2VM152S80*00C
	2200	51.6*105	0.20	59	89	7.9	ENX2VM222SA5*00C
	2700	64.3*96	0.20	47	70	9.3	ENX2VM272T96*00C
	3300	64.3*105	0.20	39	58	10.9	ENX2VM332TA5*00C
	3900	64.3*115	0.20	33	49	12.3	ENX2VM392TB5*00C
	4700	64.3*130	0.20	29	45	14.2	ENX2VM472TD0*00C
	5600	76.9*115	0.20	26	39	16.6	ENX2VM562UB5*00C
	6800	76.9*130	0.20	21	32	19.0	ENX2VM682UD0*00C
	8200	76.9*155	0.20	18	26	22.3	ENX2VM822UF5*00C
	10000	91*157	0.20	14	19	25.2	ENX2VM103VF7*00C
	12000	91*168	0.20	12	17	29.3	ENX2VM123VG8*00C
400(2G)	1000	51.6*75	0.20	92	153	4.7	ENX2GM102S75*00C
	1500	51.6*80	0.20	63	113	6.1	ENX2GM152S80*00C
	2200	51.6*115	0.20	41	85	8.9	ENX2GM222SB5*00C
	2700	64.3*96	0.20	31	69	10.3	ENX2GM272T96*00C
	3300	64.3*115	0.20	28	58	11.3	ENX2GM332TB5*00C
	3900	64.3*130	0.20	25	49	13.0	ENX2GM392TD0*00C
	4700	64.3*143	0.20	22	40	15.4	ENX2GM472TE3*00C
	5600	64.3*155	0.20	21	35	18.3	ENX2GM562TF5*00C
	6800	76.9*155	0.20	19	30	20.4	ENX2GM682UF5*00C
	8200	76.9*168	0.20	15	26	22.8	ENX2GM822UG8*00C
	10000	91*157	0.20	13	21	26.9	ENX2GM103VF7*00C
	12000	91*196	0.20	10	18	30.5	ENX2GM123VJ6*00C
450(2W)	1000	51.6*80	0.20	115	169	5.0	ENX2WM102S80*00C
	1500	51.6*105	0.20	75	112	6.5	ENX2WM152SA5*00C
	2200	64.3*105	0.20	58	90	8.9	ENX2WM222TA5*00C
	2700	64.3*115	0.20	39	74	10.3	ENX2WM272TB5*00C
	3300	64.3*130	0.20	28	58	12.0	ENX2WM332TD0*00C
	3900	76.9*115	0.20	23	48	13.9	ENX2WM392UB5*00C
	4700	76.9*130	0.20	20	39	16.0	ENX2WM472UD0*00C
	5600	76.9*155	0.20	16	36	18.5	ENX2WM562UF5*00C
	6800	76.9*168	0.20	14	30	20.8	ENX2WM682UG8*00C
	8200	91*157	0.20	13	25	24.5	ENX2WM822VF7*00C
	10000	91*196	0.20	11	22	28.0	ENX2WM103VJ6*00C
500(2H)	1000	51.6*105	0.25	110	165	4.9	ENX2HM102SA5*00C
	1500	64.3*105	0.25	74	110	7.8	ENX2HM152TA5*00C
	2200	64.3*130	0.25	56	88	10.0	ENX2HM222TD0*00C
	2700	64.3*143	0.25	48	72	11.6	ENX2HM272TE3*00C
	3300	76.9*130	0.25	37	56	13.1	ENX2HM332UD0*00C
	3900	76.9*155	0.25	32	46	14.5	ENX2HM392UF5*00C
	4700	76.9*168	0.25	25	38	16.6	ENX2HM472UG8*00C

NL series

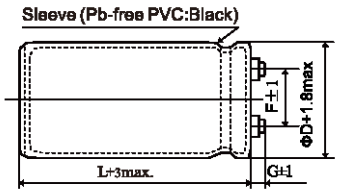
- Endurance with ripple current: 12,000 hours at 85°C
- Applications: Professional power supplies, Solar and wind generator and frequency converters
- Detail specification:IEC 60384-4
- **RoHS Compliant**

New

SPECIFICATIONS

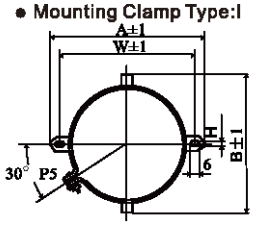
Items	Characteristics		
Category Temperature Range	-25~+85°C(350~450 Vdc)		
Surge Voltage	1.10* V_R		
Rated Capacitance Range	1500~15000μF		
Rated Voltage Range	350~450 Vdc		
Capacitance Tolerance	±20% (M)		(at 20°C, 120Hz)
Leakage Current	I=0.02CV [μA] or 5mA, whichever is smaller. Where, I: Max.leakage current (μA), C : Rated capacitance (μF), V : Rated voltage (V)		(at 20 after 5 minutes)
Dissipation Factor (tanδ)	0.20		(at 20°C, 120Hz)
Low Temperature Characteristics	Capacitance Change	C(-25°C)/C(+20°C)≥0.7	(at 120Hz)
Insulation Resistance	When measured between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500Vdc, the insulation resistance shall not be less than 100MΩ.		
Insulation Withstanding Voltage	When a voltage of 2,000Vac is applied for 1 minute between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.		
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 12,000 hours at 85°C.		
	Capacitance Change	≤±20% of the initial value	
	D.F. (tanδ)	≤200% of the initial specified value	
	Leakage Current	≤The initial specified value	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied.		
	Capacitance Change	≤±20% of the initial value	
	D.F. (tanδ)	≤150% of the initial specified value	
	Leakage current	≤The initial specified value	

DIMENSIONS(Screw-Mount)[mm]



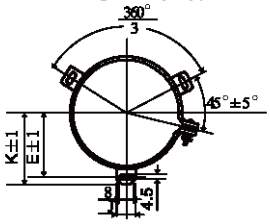
Ø35 to Ø51.6:G=7
Ø64.3 to Ø91:G=6.5

● Mounting Clamp Type:I



ØD	A	B	W	F
35	58.0	44.0	48.0	12.7
51.6	80.0	62.0	68.0	22.2
64.3	93.0	82.0	81.0	28.5
77	106.0	94.0	93.5	31.7

● Mounting Clamp Type:Y

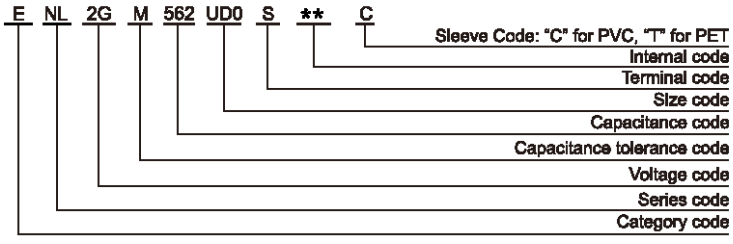


ØD	E	K	J	F
51.6	32.5	35.8	14.0	22.2
64.3	38.4	42.5	14.0	28.5
77	44.5	47.5	14.0	31.7
91	50.8	54.7	14.0	31.7

<Screw specifications>
Plus hexagon-headed screw:
M5x0.8x10 or M6x1.0x12
Maximum screw tightening torque:
3.23Nm

* The screw and the mounting clamp are separately supplied and not attached to the product.

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Coefficient

Frequency(Hz)	50	120	300	1k	3k
Coefficient	0.8	1.0	1.1	1.3	1.4

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 or 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

NL series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size ΦD*L(mm)	tanδ	ESR typ. 120Hz 20°C mΩ	ESR max. 120Hz 20°C mΩ	Rated ripple current (Arms/85°C,120Hz)	Part NO.
350(2V)	1500	51.6*80	0.20	57	98	6.0	ENL2VM152S80*00C
	2200	51.6*105	0.20	45	78	7.8	ENL2VM222SA5*00C
	3300	64.3*115	0.20	36	53	10.5	ENL2VM332TB5*00C
	3900	64.3*130	0.20	32	47	12.6	ENL2VM392TA5*00C
	4700	76.9*105	0.20	30	43	14.0	ENL2VM472UA5*00C
	5600	76.9*115	0.20	27	37	15.5	ENL2VM562UB5*00C
	6800	76.9*130	0.20	23	34	18.1	ENL2VM682UD0*00C
	8200	76.9*155	0.20	20	28	21.5	ENL2VM822UF5*00C
	10000	91.0*157	0.20	16	24	24.6	ENL2VM103VF7*00C
	12000	91.0*196	0.20	14	22	29.0	ENL2VM123VJ6*00C
	15000	91.0*220	0.20	11	18	34.1	ENL2VM153VM0*00C
400(2G)	1500	51.6*80	0.20	58	89	6.1	ENL2GM152S80*00C
	2200	51.6*115	0.20	56	81	8.2	ENL2GM222SB5*00C
	3300	64.3*130	0.20	37	55	11.6	ENL2GM332TD0*00C
	3900	64.3*155	0.20	29	49	15.5	ENL2GM392TF5*00C
	4700	76.9*115	0.20	26	43	19.4	ENL2GM472UB5*00C
	5600	76.9*130	0.20	25	40	21.3	ENL2GM562UD0*00C
	6800	76.9*155	0.20	20	34	23.4	ENL2GM682UF5*00C
	8200	91.0*57	0.20	19	29	24.2	ENL2GM822VF7*00C
	10000	91.0*168	0.20	13	23	30.3	ENL2GM103VG8*00C
	12000	91.0*196	0.20	11	19	35.5	ENL2GM123VJ6*00C
450(2W)	1500	51.6*115	0.20	56	97	7.1	ENL2WM152SB5*00C
	2200	64.3*115	0.20	43	65	10.5	ENL2WM222TB5*00C
	3300	64.3*143	0.20	33	49	14.8	ENL2WM332TE3*00C
	3900	64.3*155	0.20	29	41	16.5	ENL2WM392TF5*00C
	4700	76.9*143	0.20	22	39	19.8	ENL2WM472UE3*00C
	5600	76.9*168	0.20	20	35	21.9	ENL2WM562UG8*00C
	6800	76.9*196	0.20	18	30	26.4	ENL2WM682UJ6*00C
	8200	91.0*168	0.20	16	24	29.6	ENL2WM822VG8*00C
	10000	91.0*196	0.20	15	21	31.8	ENL2WM103VJ6*00C

NE series

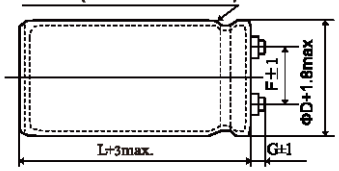
- Endurance of 20,000 hours application of rated ripple current at 85°C
- Applications: Professional power supplies, solar and wind generator and frequency converters
- Detail specification: IEC 60384-4
- **RoHS Compliant**

SPECIFICATIONS

Items	Characteristics	
Category Temperature Range	-25~+85°C(350~450 V_{dc})	
Surge Voltage	1.10* V_R	
Rated Capacitance Range	1500~15000μF	
Rated Voltage Range	350~450 V_{dc}	
Capacitance Tolerance	±20% (M)	(at 20°C, 120Hz)
Leakage Current	I=0.02CV [μA] or 5mA, whichever is smaller. Where, I: Max.leakage current (μA), C : Rated capacitance (μF), V : Rated voltage (V)	(at 20 after 5 minutes)
Dissipation Factor (tanδ)	0.20	(at 20°C, 120Hz)
Low Temperature Characteristics	Capacitance Change C(-25°C)/C(+20°C)≥0.7	(at 120Hz)
Insulation Resistance	When measured between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V_{dc}, the insulation resistance shall not be less than 100MΩ.	
Insulation Withstanding Voltage	When a voltage of 2,000Vac is applied for 1 minute between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 20,000 hours at 85°C.	
	Capacitance Change	≤±20% of the initial value
	D.F. (tanδ)	≤200% of the initial specified value
	Leakage Current	≤The initial specified value
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied.	
	Capacitance Change	≤±20% of the initial value
	D.F. (tanδ)	≤150% of the initial specified value
	Leakage Current	≤The initial specified value

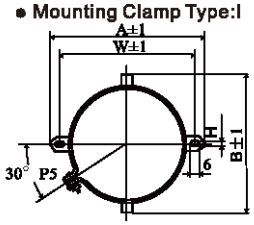
DIMENSIONS(Screw-Mount)[mm]

Sleeve (Pb-free PVC:Black)



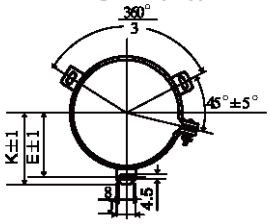
Ø35 to Ø51.6:G=7
Ø64.3 to Ø91:G=6.5

● Mounting Clamp Type:I



ØD	A	B	W	F
35	58.0	44.0	48.0	12.7
51.6	80.0	62.0	68.0	22.2
64.3	93.0	82.0	81.0	28.5
77	106.0	94.0	93.5	31.7

● Mounting Clamp Type:Y

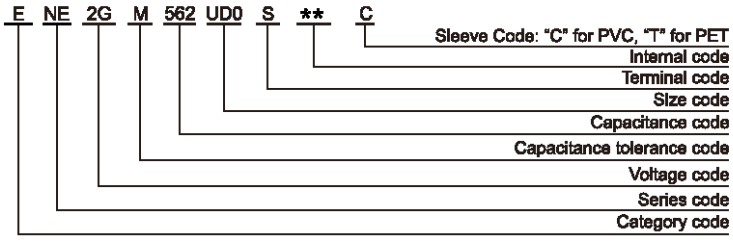


ØD	E	K	J	F
51.6	32.5	35.8	14.0	22.2
64.3	38.4	42.5	14.0	28.5
77	44.5	47.5	14.0	31.7
91	50.8	54.7	14.0	31.7

<Screw specifications>
Plus hexagon-headed screw:
M5x0.8x10 or M6x1.0x12
Maximum screw tightening torque:
3.23Nm

* The screw and the mounting clamp are separately supplied and not attached to the product.

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Coefficient

Frequency(Hz)	50	120	300	1k	3k
Coefficient	0.8	1.0	1.1	1.3	1.4

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 or 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

NE series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size ΦD*L(mm)	tanδ	ESR typ. 120Hz 20°C mΩ	ESR max. 120Hz 20°C mΩ	Rated ripple current (Arms/85°C,120Hz)	Part NO.
350(2V)	1500	51.6*96	0.20	67	98	5.4	ENE2VM152S96*00C
	2200	51.6*130	0.20	53	78	7.3	ENE2VM222SD0*00C
	3300	64.3*115	0.20	36	53	11.3	ENE2VM332TB5*00C
	3900	64.3*130	0.20	32	47	13.0	ENE2VM392TA5*00C
	4700	64.3*155	0.20	29	43	15.1	ENE2VM472TF5*00C
	5600	76.9*130	0.20	26	37	17.0	ENE2VM562UD0*00C
	6800	76.9*155	0.20	23	34	20.4	ENE2VM682UF5*00C
	8200	76.9*168	0.20	19	28	23.2	ENE2VM822UG8*00C
	10000	76.9*220	0.20	16	24	26.9	ENE2VM103VM0*00C
	12000	91.0*196	0.20	14	22	30.3	ENE2VM123VJ6*00C
	15000	91.0*220	0.20	11	18	32.1	ENE2VM153VM0*00C
400(2G)	1500	51.6*105	0.20	71	101	5.9	ENE2GM152SA5*00C
	2200	51.6*130	0.20	56	81	7.2	ENE2GM222SD0*00C
	3300	64.3*130	0.20	37	55	11.9	ENE2GM332TD0*00C
	3900	76.9*115	0.20	34	49	14.1	ENE2GM392UB5*00C
	4700	76.9*130	0.20	29	43	15.7	ENE2GM472UD0*00C
	5600	76.9*155	0.20	27	40	18.3	ENE2GM562UF5*00C
	6800	76.9*168	0.20	22	34	21.1	ENE2GM682UG8*00C
	8200	91.0*157	0.20	19	29	24.3	ENE2GM822VF7*00C
	10000	91.0*196	0.20	16	23	27.2	ENE2GM103VJ6*00C
	12000	91.0*220	0.20	14	19	30.2	ENE2GM123VM0*00C
450(2W)	1500	51.6*130	0.20	74	108	5.9	ENE2WM152SD0*00C
	2200	64.3*115	0.20	49	78	9.2	ENE2WM222TB5*00C
	3300	64.3*155	0.20	38	49	12.8	ENE2WM332TF5*00C
	3900	64.3*168	0.20	32	41	14.4	ENE2WM392TG8*00C
	4700	76.9*155	0.20	27	39	16.8	ENE2WM472UF5*00C
	5600	76.9*196	0.20	24	35	20.3	ENE2WM562UJ6*00C
	6800	91.0*196	0.20	21	30	23.1	ENE2WM682VF7*00C
	8200	91.0*196	0.20	18	26	26.6	ENE2WM822VJ6*00C
	10000	91.0*220	0.20	15	21	27.8	ENE2WM103VM0*00C

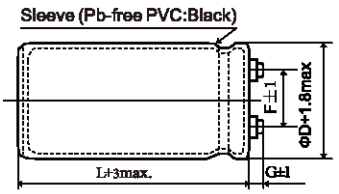
NF series

- Endurance with ripple current: 5,000 hours at 105°C
- Applications: Professional power supplies, Frequency converters and Traction
- Detail specification: IEC 60384-4
- **RoHS Compliant**

SPECIFICATIONS

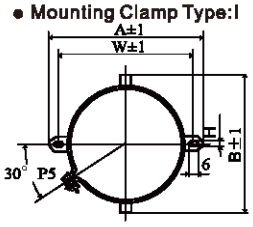
Items	Characteristics	
Category Temperature Range	-25~+105°C(350~450 V_{dc})	
Surge Voltage	1.10* V_R	
Rated Capacitance Range	1000~15000μF	
Rated Voltage Range	350~450 V_{dc}	
Capacitance Tolerance	±20% (M)	(at 20°C, 120Hz)
Leakage Current	I=0.02CV [μA] or 5mA, whichever is smaller. Where, I: Max.leakage current (μA), C : Rated capacitance (μF), V : Rated voltage (V)	(at 20 after 5 minutes)
Dissipation Factor (tanδ)	0.20	(at 20°C, 120Hz)
Low Temperature Characteristics	Capacitance Change C(-25°C)/C(+20°C)≥0.7	(at 120Hz)
Insulation Resistance	When measured between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V_{dc}, the insulation resistance shall not be less than 100MΩ.	
Insulation Withstanding Voltage	When a voltage of 2,000Vac is applied for 1 minute between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 5,000 hours at 105°C.	
	Capacitance Change	≤±20% of the initial value
	D.F. (tanδ)	≤200% of the initial specified value
	Leakage Current	≤The initial specified value
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.	
	Capacitance Change	≤±20% of the initial value
	D.F. (tanδ)	≤150% of the initial specified value
	Leakage Current	≤The initial specified value

DIMENSIONS(Screw-Mount)[mm]



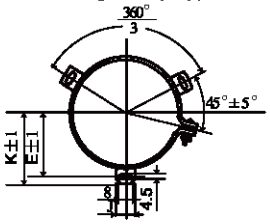
Ø35 to Ø51.6:G=7
Ø64.3 to Ø91:G=6.5

● Mounting Clamp Type:I



ØD	A	B	W	F
35	58.0	44.0	48.0	12.7
51.6	80.0	62.0	68.0	22.2
64.3	93.0	82.0	81.0	28.5
77	106.0	94.0	93.5	31.7

● Mounting Clamp Type:Y



ØD	E	K	J	F
51.6	32.5	35.8	14.0	22.2
64.3	38.4	42.5	14.0	28.5
77	44.5	47.5	14.0	31.7
91	50.8	54.7	14.0	31.7

<Screw specifications>
Plus hexagon-headed screw:
M5x0.8x10 or M6x1.0x12
Maximum screw tightening torque:
3.23Nm

* The screw and the mounting clamp are separately supplied and not attached to the product.

PART NUMBERING SYSTEM

E NF 2G M 562 UD0 S ** C

- C: Sleeve Code: "C" for PVC, "T" for PET
- **: Internal code
- S: Terminal code
- UD0: Size code
- 562: Capacitance code
- M: Capacitance tolerance code
- 2G: Voltage code
- NF: Series code
- E: Category code

RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Coefficient

Frequency(Hz)	50	120	300	1k	3k
Coefficient	0.8	1.0	1.1	1.3	1.4

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 or 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

NF series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size ΦD*L(mm)	tanδ	ESR typ. 120Hz 20°C mΩ	ESR max. 120Hz 20°C mΩ	Rated ripple current (Arms/105°C,120Hz)	Part NO.
350(2V)	1000	51.6*80	0.20	99	148	4.2	ENF2VM102S80*00C
	1500	51.6*96	0.20	71	107	5.3	ENF2VM152S96*00C
	2200	51.6*105	0.20	49	72	7.2	ENF2VM222SA5*00C
	3300	64.3*115	0.20	34	50	10.0	ENF2VM332TB5*00C
	3900	64.3*130	0.20	30	45	11.7	ENF2VM392TD0*00C
	4700	64.3*143	0.20	26	39	12.6	ENF2VM472TE3*00C
	5600	76.9*143	0.20	21	32	14.9	ENF2VM562UE3*00C
	6800	76.9*168	0.20	19	28	17.0	ENF2VM682UG8*00C
	8200	76.9*196	0.20	15	25	19.8	ENF2VM822UJ6*00C
	10000	76.9*220	0.20	13	20	23.2	ENF2VM103UM0*00C
	12000	91*196	0.20	11	16	26.9	ENF2VM123VJ6*00C
	15000	91*220	0.20	9	13	30.9	ENF2VM153VM0*00C
400(2G)	1000	51.6*80	0.20	101	151	4.4	ENF2GM102S80*00C
	1500	51.6*96	0.20	67	98	5.9	ENF2GM152S96*00C
	2200	64.3*105	0.20	48	68	7.4	ENF2GM222TA5*00C
	3300	64.3*130	0.20	30	45	10.5	ENF2GM332TD0*00C
	3900	76.9*115	0.20	27	39	11.3	ENF2GM392UB5*00C
	4700	76.9*130	0.20	22	32	14.0	ENF2GM472UD0*00C
	5600	76.9*143	0.20	20	28	15.1	ENF2GM562UE3*00C
	6800	76.9*168	0.20	17	23	18.0	ENF2GM682UG8*00C
	8200	76.9*196	0.20	15	21	21.3	ENF2GM822UJ6*00C
	10000	76.9*220	0.20	13	19	22.1	ENF2GM103UM0*00C
	12000	91*220	0.20	9	13	27.6	ENF2GM123VM0*00C
450(2W)	1000	51.6*105	0.20	97	145	4.3	ENF2WM102SA5*00C
	1500	51.6*130	0.20	65	97	6.1	ENF2WM152SD0*00C
	2200	64.3*115	0.20	45	67	7.8	ENF2WM222TB5*00C
	3300	76.9*130	0.20	29	43	10.8	ENF2WM332UD0*00C
	3900	76.9*143	0.20	25	37	12.9	ENF2WM392UE3*00C
	4700	76.9*168	0.20	22	32	14.3	ENF2WM472UG8*00C
	5600	76.9*196	0.20	19	28	14.7	ENF2WM562UJ6*00C
	6800	76.9*220	0.20	16	23	18.1	ENF2WM682UM0*00C
	8200	91*196	0.20	12	17	19.7	ENF2WM822VJ6*00C
	10000	91*220	0.20	10	15	23.5	ENF2WM103VM0*00C

NK series

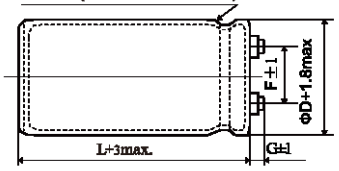
- Endurance with ripple current: 5,000 hours at 105°C
- High ripple and long life series
- Detail specification: IEC 60384-4
- RoHS Compliant

SPECIFICATIONS

Items	Characteristics	
Category Temperature Range	-25~+105°C(350~450 Vdc)	
Surge Voltage	1.10* V_R	
Rated Capacitance Range	1000~15000μF	
Rated Voltage Range	350~450 Vdc	
Capacitance Tolerance	±20% (M)	(at 20°C, 120Hz)
Leakage Current	I=0.02CV [μA] or 5mA, whichever is smaller. Where, I: Max.leakage current (μA), C : Rated capacitance (μF), V : Rated voltage (V)	(at 20 after 5 minutes)
Dissipation Factor (tanδ)	0.20	(at 20°C, 120Hz)
Low Temperature Characteristics	Capacitance Change C(-25°C)/C(+20°C)≥0.7	(at 120Hz)
Insulation Resistance	When measured between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500Vdc, the insulation resistance shall not be less than 100MΩ.	
Insulation Withstanding Voltage	When a voltage of 2,000Vac is applied for 1 minute between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after DC voltage plus the rated ripple current is applied for 5,000 hours at 105°C.	
	Capacitance Change	≤±20% of the initial value
	D.F. (tanδ)	≤200% of the initial specified value
	Leakage Current	≤The initial specified value
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.	
	Capacitance Change	≤±20% of the initial value
	D.F. (tanδ)	≤150% of the initial specified value
	Leakage Current	≤The initial specified value

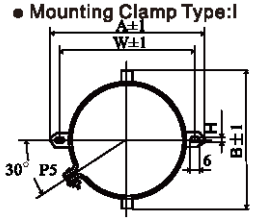
DIMENSIONS(Screw-Mount)[mm]

Sleeve (Pb-free PVC:Black)



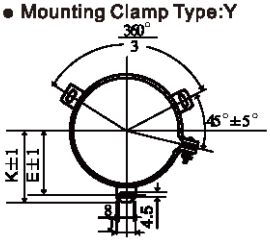
Ø35 to Ø51.6:G=7
Ø64.3 to Ø91:G=6.5

● Mounting Clamp Type:I



ØD	A	B	W	F
35	58.0	44.0	48.0	12.7
51.6	80.0	62.0	68.0	22.2
64.3	93.0	82.0	81.0	28.5
77	106.0	94.0	93.5	31.7

● Mounting Clamp Type:Y



ØD	E	K	J	F
51.6	32.5	35.8	14.0	22.2
64.3	38.4	42.5	14.0	28.5
77	44.5	47.5	14.0	31.7
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<Screw specifications>
Plus hexagon-headed screw:
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Maximum screw tightening torque:
3.23Nm

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RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Coefficient

Frequency(Hz)	50	120	300	1k	3k
Coefficient	0.8	1.0	1.1	1.3	1.4

The endurance of capacitors is shortened with internal heating produced by ripple current at the rate of halving the lifetime with every 5 or 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

NK series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size ΦD*L(mm)	tanδ	ESR typ. 120Hz 20°C mΩ	ESR max. 120Hz 20°C mΩ	Rated ripple current (Arms/105°C,120Hz)	Part NO.
350(2V)	1000	51.6*80	0.20	88	140	5.3	ENK2VM102S80*00C
	1500	51.6*80	0.20	65	99	7.9	ENK2VM152S80*00C
	2200	51.6*105	0.20	40	68	10.2	ENK2VM222SA5*00C
	3300	64.3*115	0.20	26	45	14.5	ENK2VM332TB5*00C
	3900	64.3*130	0.20	23	41	16.4	ENK2VM392TD0*00C
	4700	64.3*155	0.20	20	36	19.2	ENK2VM472TF5*00C
	5600	76.9*143	0.20	18	29	21.9	ENK2VM562UE3*00C
	6800	76.9*168	0.20	15	25	26.3	ENK2VM682UG8*00C
	8200	76.9*196	0.20	13	23	30.2	ENK2VM822UJ6*00C
	10000	76.9*220	0.20	11	18	33.7	ENK2VM103UM0*00C
	12000	100*196	0.20	10	14	38.0	ENK2VM123VJ6*00C
	15000	100*250	0.20	8	12	47.9	ENK2VM153VM0*00C
400(2G)	1000	51.6*80	0.20	90	141	5.2	ENK2GM102S80*00C
	1500	51.6*96	0.20	61	92	7.1	ENK2GM152S96*00C
	2200	64.3*105	0.20	45	61	10.4	ENK2GM222TA5*00C
	3300	64.3*130	0.20	29	42	15.2	ENK2GM332TD0*00C
	3900	76.9*130	0.20	25	35	18.0	ENK2GM392UD0*00C
	4700	76.9*143	0.20	20	29	20.6	ENK2GM472UE3*00C
	5600	76.9*168	0.20	19	26	23.9	ENK2GM562UG8*00C
	6800	76.9*196	0.20	16	21	27.5	ENK2GM682UJ6*00C
	8200	91*196	0.20	13	19	30.8	ENK2GM822VJ6*00C
	10000	100*196	0.20	11	17	34.9	ENK2GM103AJ6*00C
	12000	100*220	0.20	7	11	40	ENK2GM123AM0*00C
450(2W)	1000	51.6*105	0.20	87	138	5.3	ENK2WM102SA5*00C
	1500	51.6*115	0.20	60	92	7.1	ENK2WM152SB5*00C
	2200	64.3*115	0.20	41	62	11.9	ENK2WM222TB5*00C
	3300	76.9*130	0.20	25	39	16.7	ENK2WM332UD0*00C
	3900	76.9*143	0.20	23	34	18.9	ENK2WM392UE3*00C
	4700	76.9*168	0.20	20	29	21.9	ENK2WM472UG8*00C
	5600	76.9*196	0.20	17	26	24.4	ENK2WM562UJ6*00C
	6800	76.9*220	0.20	13	20	28.0	ENK2WM682UM0*00C
	8200	91*196	0.20	10	15	32.3	ENK2WM822VJ6*00C
	10000	100*220	0.20	8	13	36.9	ENK2WM103AM0*00C

AiSHi ALUMINUM ELECTROLYTIC CAPACITORS 2017-2018Y

AiSHi

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