NIPPON CHEMI-CON

ALUMINUM ELECTROLYTIC CAPACITORS

CAT. No. E1001D (Ver.2)

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CAPACITOR SERIES TABLE, CONTENTS

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Series			Features	Endurance (+R=With ripple)	Standard type	Low impedance	Solvent-proof	Terminal type	Rated voltage range (Vdc)	Capacitance range (μF)
Conductive Polymer Electrolyte Type		PXC (NEW!)	Vertical type, Pb-free, super low ESR	105℃ 1,000 hours		●	●	SMD	2.5 to 16	27 to 470
		PXA (Upgrade!)	Vertical type, Pb-free, super low ESR	105℃ 2,000 hours		●	●	SMD	2.5 to 25	10 to 1,500
		PXH (NEW!)	125℃ Vertical type (Ask Engineering Bulletin in detail)	125℃ 1,000 hours		●	●	SMD	2.5 to 20	22 to 1,000
		PX	Horizontal type (Ask Engineering Bulletin in detail)	105℃ 2,000 hours		●	●	SMD	4 to 25	6.8 to 68
		PSA (NEW!)	Super low ESR, high ripple, Pb-free	105℃ 2,000 hours		●	●	Radial	2.5 to 10	270 to 1,000
		PS (Upgrade!)	Super low ESR, high ripple, Pb-free	105℃ 2,000 hours		●	●	Radial	2.5 to 25	68 to 1,500
Surface Mount	Horizontal Type	MFS/MFA	3.5 to 4.5mm height (Ask Engineering Bulletin in detail)	85℃ 1,000 to 2,000hours			●	SMD	4 to 35	0.1 to 100
		MF	3.2 to 4.7mm max. height	85℃ 2,000 hours	●		●	SMD	4 to 50	0.1 to 150
		MFK	3.7 to 4.7mm max. height	105℃ 1,000 hours	●		●	SMD	6.3 to 50	0.1 to 100
		MFK-Large	9.2mm max. height	105℃ 2,000 hours	●		●	SMD	10 to 50	47 to 1,000
	Vertical Type	MVS	4.5mm height	85℃ 2,000 hours	●		●	SMD	4 to 50	0.1 to 220
		MVA	5.5 to 22.0mm max. height, downsized	85℃ 2,000 hours			▲	SMD	4 to 450	0.1 to 10,000
		MV	5.5 to 10.5mm max. height	85℃ 1,000 to 2,000 hours	●		●	SMD	4 to 63	0.1 to 1,000
		MVE	5.5 to 22.0mm max. height, downsized	105℃ 1,000 to 2,000 hours			▲	SMD	6.3 to 450	0.47 to 6,800
		MVK	5.5 to 10.5mm max. height	105℃ 1,000 to 2,000 hours	●		●	SMD	6.3 to 50	0.1 to 1,000
		MKA	5.5 to 10.5mm max. height, Pb-free	105℃ 1,000 to 2,000 hours	●		●	SMD	6.3 to 50	0.1 to 1,000
		MZA (NEW!)	6.1 to 10.5mm max. height, very low ESR	105℃ 2,000 hours		●	●	SMD	6.3 to 50	4.7 to 1,500
		MVZ	6.0 to 10.5mm max. height, very low ESR	105℃ 1,000 to 2,000 hours		●	●	SMD	6.3 to 25	10 to 1,500
		MVY	5.5 to 22.0mm max. height	105℃ 1,000 to 5,000 hours		●	▲	SMD	6.3 to 100	1.0 to 8,200
		MLA (NEW!)	Low Z, long life (Ask Engineering Bulletin in detail)	105℃ 3,000 hours		●	●	SMD	6.3 to 50	10 to 470
		MVJ	6.0mm max. height	105℃ 2,000 hours	●		●	SMD	6.3 to 50	0.1 to 100
		MVL	6.0 to 10.5mm max. height	105℃ 3,000 to 5,000 hours			●	SMD	6.3 to 50	0.1 to 1,000
		MVH	6.0 to 22.0mm max. height	125℃ 1,000 to 5,000 hours			▲	SMD	10 to 450	3.3 to 4,700
		MV-BP	5.5mm max. height, bi-polar	85℃ 2,000 hours			●	SMD	4 to 50	0.1 to 47
		MVK-BP	6.0mm max. height, bi-polar	105℃ 1,000 hours			●	SMD	6.3 to 50	0.1 to 47
Miniature	Low Profile	SRM	5mm height, downsized	85℃ 1,000 hours			●	Radial	4 to 50	0.1 to 330
		SRE	5mm height	85℃ 1,000 hours	●			Radial	4 to 50	0.1 to 100
		KRE	5mm height	105℃ 1,000 hours	●		●	Radial	6.3 to 50	0.1 to 100
		SRA	7mm height	85℃ 1,000 hours	●			Radial	4 to 63	0.1 to 470
		KMA	7mm height	105℃ 1,000 hours	●		●	Radial	4 to 63	0.1 to 220
		SRG	φ4×7 to φ18×25mm, low profile	85℃ 1,000 to 2,000 hours			●	Radial	4 to 50	0.1 to 10,000
		KRG	φ4×7 to φ18×25mm, low profile	105℃ 1,000 hours			●	Radial	6.3 to 50	0.1 to 10,000
	General Purpose	SMQ	Downsized	85℃ 2,000 hours	●			Radial	6.3 to 450	0.1 to 47,000
		KMQ	Downsized	105℃ 1,000 to 2,000 hours +R	●		▲	Radial	6.3 to 450	0.1 to 47,000
		SMG	General, downsized	85℃ 2,000 hours	●		▲	Radial	6.3 to 450	0.1 to 39,000
		KMG	General, downsized	105℃ 1,000 to 2,000 hours +R	●		▲	Radial	6.3 to 450	0.1 to 22,000
		SME	General (Ask Engineering Bulletin in detail)	85℃ 2,000 hours			▲	Radial	6.3 to 450	0.1 to 15,000
		KME	General	105℃ 1,000 hours +R			▲	Radial	6.3 to 400	0.1 to 15,000
		SME-BP	Bi-polar, general	85℃ 2,000 hours	●		●	Radial	6.3 to 100	0.47 to 6,800
		KME-BP	Bi-polar, general	105℃ 1,000 hours	●		●	Radial	6.3 to 100	0.47 to 6,800
	High Frequency Use	KZE (Upgrade!)	Lowest impedance, long life	105℃ 2,000 to 5,000 hours +R		●		Radial	6.3 to 100	6.8 to 6,800
		KZH (NEW!)	Lowest impedance, long life	105℃ 5,000 to 6,000 hours +R		●		Radial	6.3 to 35	47 to 8,200
		KY	Low impedance, long life	105℃ 4,000 to 10,000 hours +R		●		Radial	6.3 to 50	0.47 to 18,000
		LXZ	Low impedance, downsized	105℃ 2,000 to 8,000 hours +R		●	●	Radial	6.3 to 63	12 to 18,000
		LXY	Low impedance, high reliability	105℃ 2,000 to 8,000 hours +R	●	●	●	Radial	10 to 63	10 to 8,200
		LXV	Low impedance	105℃ 2,000 to 5,000 hours +R	●	●	●	Radial	6.3 to 100	5.6 to 15,000
		KMY	Long life, general (Ask Engineering Bulletin in detail)	105℃ 4,000 to 7,000 hours +R		●		Radial	10 to 50	0.47 to 10,000
		KMF	Low impedance, high CV, general	105℃ 2,000 to 5,000 hours +R	●	●	▲	Radial	6.3 to 450	0.47 to 15,000

: Promotional products

▲ : Some of range are solvent-proof.

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CAPACITOR SERIES TABLE, CONTENTS

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Series			Features	Endurance (+R=With ripple)	Standard type	Low impedance	Solvent-proof	Terminal type	Rated voltage range (Vdc)	Capacitance range (μF)
Miniature	High Reliability	KXG	Downsized, long life, for input filtering	105℃ 8,000 to 10,000 hours +R		●		Radial	160 to 450	6.8 to 330
		KMX	Long life, for input filtering	105℃ 8,000 to 10,000 hours +R		●		Radial	160 to 450	3.3 to 680
		SMH	φ20×20 to φ22×50mm	85℃ 2,000 hours +R	●			Radial	160 to 450	33 to 470
		KMH	φ20×20 to φ22×50mm	105℃ 2,000 hours +R	●			Radial	160 to 450	33 to 470
		PAG (NEW!)	Low profile, for input filtering	105℃ 2,000 hours +R				Radial	200 to 450	18 to 560
		PA	Low profile, for input filtering	105℃ 2,000 hours +R				Radial	200 & 400	10 to 150
		KLG	No sparks with DC overvoltage	105℃ 2,000 hours +R				Radial	200 & 400	22 to 330
		FL	Long life	105℃ 3,000 to 6,000 hours +R			●	Radial	6.3 to 50	0.47 to 1,500
		LXA	Long life (Ask Engineering Bulletin in detail)	105℃ 5,000 to 7,000 hours			●	Radial	10 to 63	0.47 to 4,700
		GXE	125℃, downsize, low impedance	125℃ 2,000 to 5,000 hours +R		●	▲	Radial	10 to 450	4.7 to 4,700
		GXL (NEW!)	125℃ Long life	125℃ 5,000/10,000 hours +R			●	Radial	10 to 50	100 to 4,700
		GHA (NEW!)	150℃ (Ask Engineering Bulletin in detail)	150℃ 1,000 hours			●	Radial	10 to 100	10 to 10,000
	Special Application	LBG	For airbag	105℃ 5,000 hours +R		●	●	Radial	16 to 35	820 to 6,800
		KZJ (NEW!)	For PC motherboard (Ask Engineering Bulletin in detail)	105℃ 2,000 hours +R		●		Radial	6.3 to 16	470 to 3,300
		KZG	For PC motherboard (Ask Engineering Bulletin in detail)	105℃ 2,000 hours +R		●		Radial	6.3 to 16	470 to 3,300
		LLA	Low DC leakage, general	85℃ 1,000 hours			●	Radial	6.3 to 50	0.1 to 15,000
		PH	For photo flash	55℃ 5,000 times charging				Radial	300 & 330	50 to 240
Large Sized	General Purpose	SMQ	Snap-in terminal, more downsized	85℃ 2,000 hours +R	●			Pin	160 to 450	82 to 3,900
		KMQ	Snap-in terminal, more downsized	105℃ 2,000 hours +R	●			Pin	160 to 450	68 to 3,300
		SMM	Snap-in terminal, downsized	85℃ 3,000 hours +R	●			Pin	160 to 450	47 to 3,300
		KMM	Snap-in terminal, downsized	105℃ 2,000 to 3,000 hours +R	●			Pin	160 to 450	39 to 3,300
		SMH	Snap-in terminal, general	85℃ 2,000 hours +R	●			Pin	6.3 to 450	56 to 100,000
		KMH	Snap-in terminal, general	105℃ 2,000 hours +R	●			Pin	6.3 to 450	47 to 82,000
	Low Profile	SLM	15mm height	85℃ 2,000 hours +R				Pin	160 to 400	47 to 560
		KLM	15mm height	105℃ 2,000 hours +R				Pin	160 to 400	39 to 390
	High Reliability	LXM	Long life	105℃ 7,000 hours +R				Pin	160 to 450	47 to 2,200
		LXQ	Long life, downsized	105℃ 5,000 hours +R				Pin	160 to 450	82 to 2,700
		LXG	Long life	105℃ 5,000 hours +R				Pin	10 to 100	390 to 47,000
		CHA	No sparks with DC overvoltage, downsized	105℃ 2,000 hours +R				Pin	200 & 400	56 to 1,200
		LXH	No sparks with DC overvoltage	105℃ 3,000/5,000 hours +R				Pin	200 & 400	68 to 1,500
		KLG	No sparks with DC overvoltage	105℃ 2,000 hours +R				Pin	200 & 400	33 to 1,500
		KSL	Mechanically open mode cap	105℃ 2,000 hours +R				Pin	200 & 400	180 to 1,500
		RWE-LR	For air-conditioning	85℃ 3,000 hours +R				Lug	250 to 450	330 to 2,200
Screw-mount Terminal Type	General Purpose	SME	Screw terminal, general	85℃ 2,000 hours +R	●			Screw	10 to 250	560 to 680,000
		KMH	Screw terminal, general	105℃ 2,000 hours +R	●			Screw	10 to 400	180 to 680,000
	For Inverter	FTP	Ellips can shape, high ripple	85℃ 5,000 hours +R				Screw	63 to 450	270 to 21,000
		RWE	High ripple	85℃ 2,000 hours +R	●			Screw	350 to 550	100 to 12,000
		RWY	High ripple, long life, low cost	85℃ 5,000 hours +R				Screw	350 to 450	500 to 14,000
		RWF	High ripple, long life	85℃ 5,000 hours +R				Screw	350 to 450	1,200 to 22,000
		RWL	High ripple, long life	85℃ 20,000 hours +R				Screw	350 to 450	2,200 to 12,000
		LXA	Long life	105℃ 2,000/5,000 hours +R				Screw	10 to 525	330 to 390,000
		LXR	High ripple, long life	105℃ 5,000 hours +R				Screw	350 to 450	2,200 to 15,000
		LWY	Low cost (Ask Technical Bulletin in detail)	105℃ 5,000 hours +R				Screw	350 to 450	500 to 14,000
		KW	Low impedance	105℃ 2,000 hours		●		Screw	10 to 100	1,000 to 100,000

: Promotional products

▲ : Some of range are solvent-proof.

GROUP CHART

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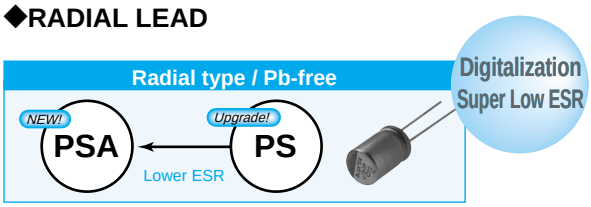
CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

◆SURFACE MOUNT

◆RADIAL LEAD



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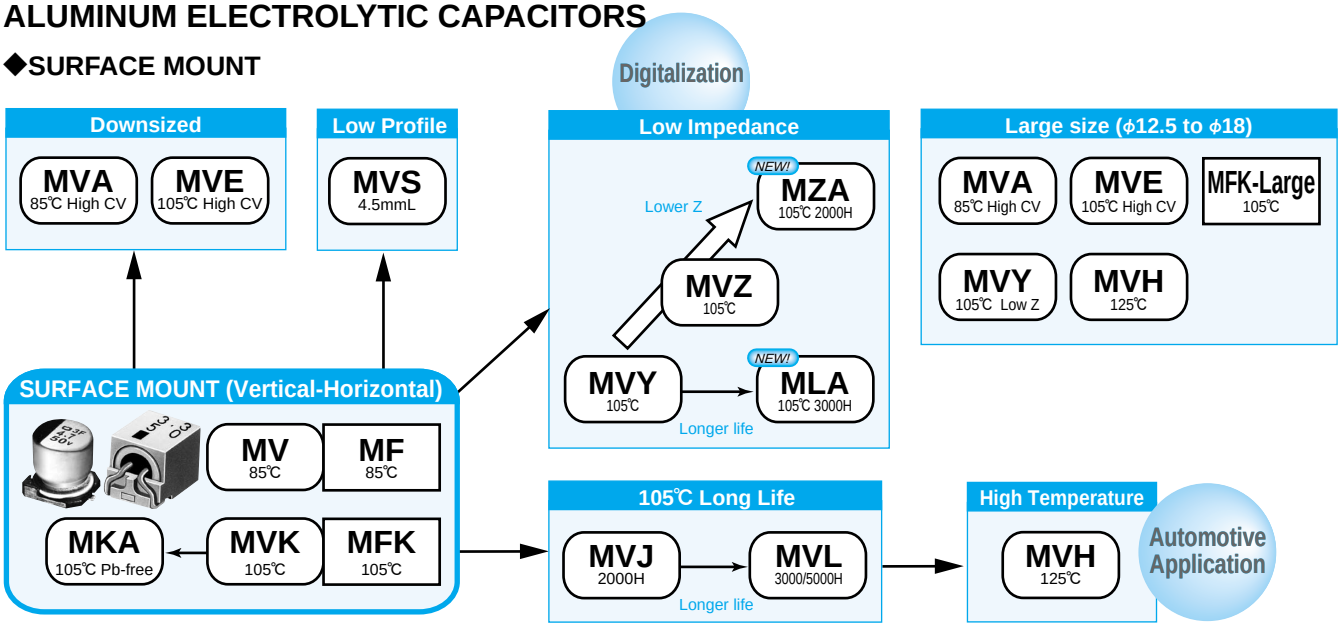
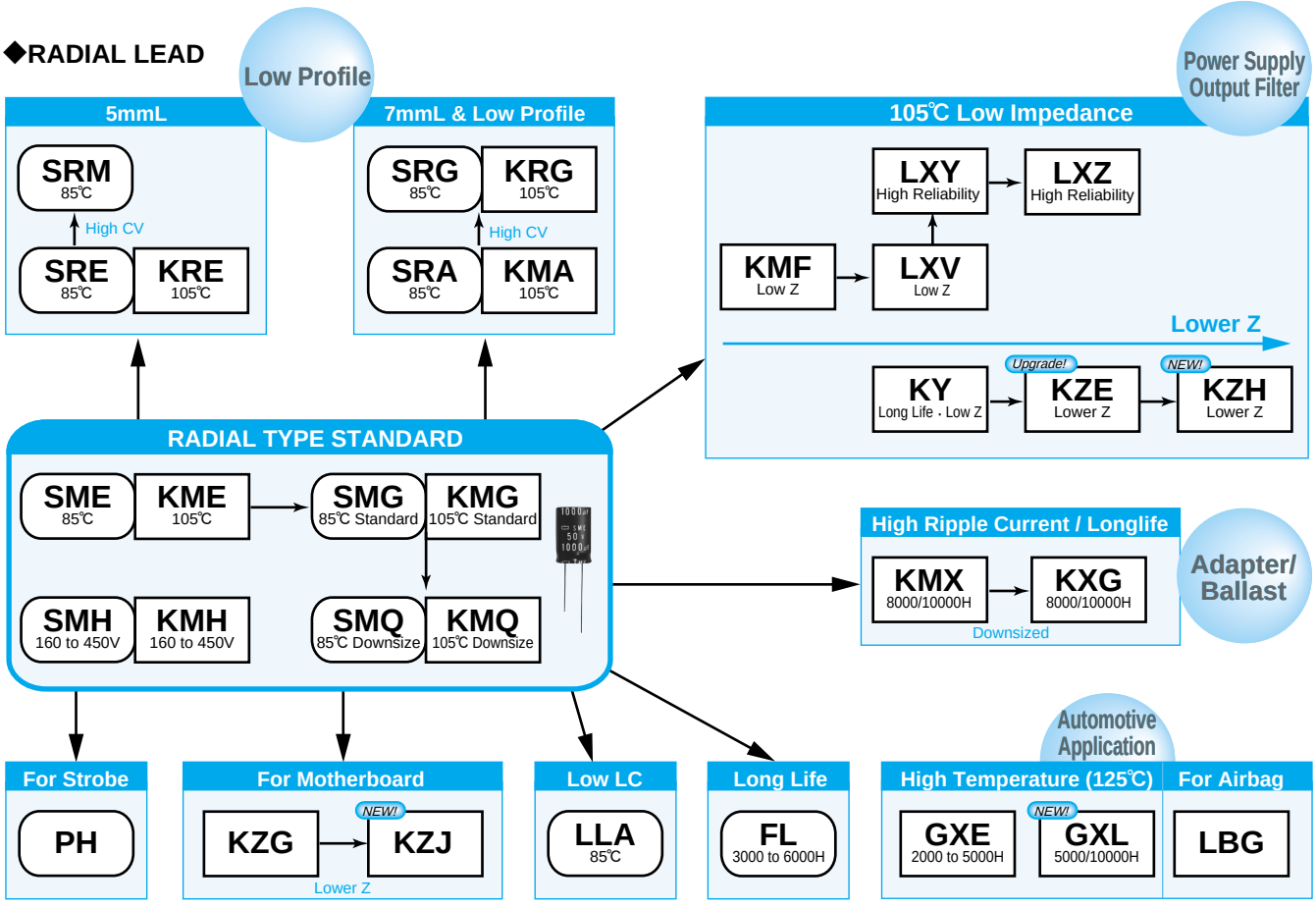
◆SURFACE MOUNT



◆RADIAL LEAD



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GROUP CHART

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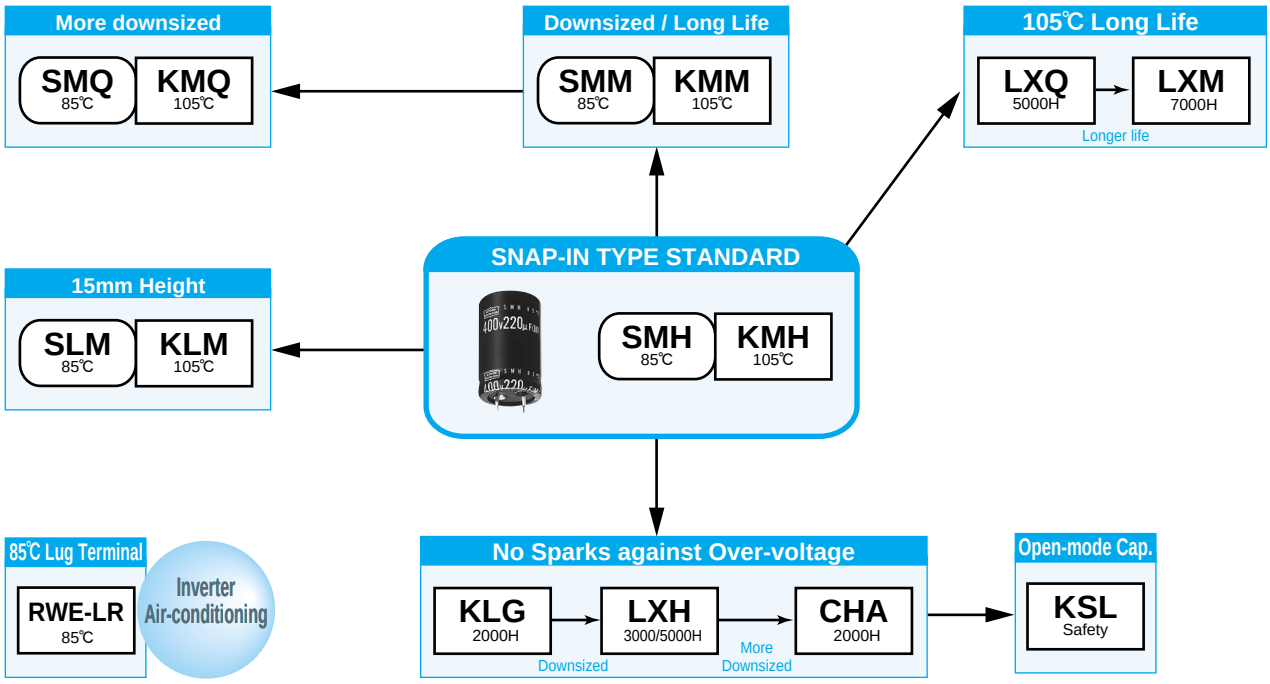
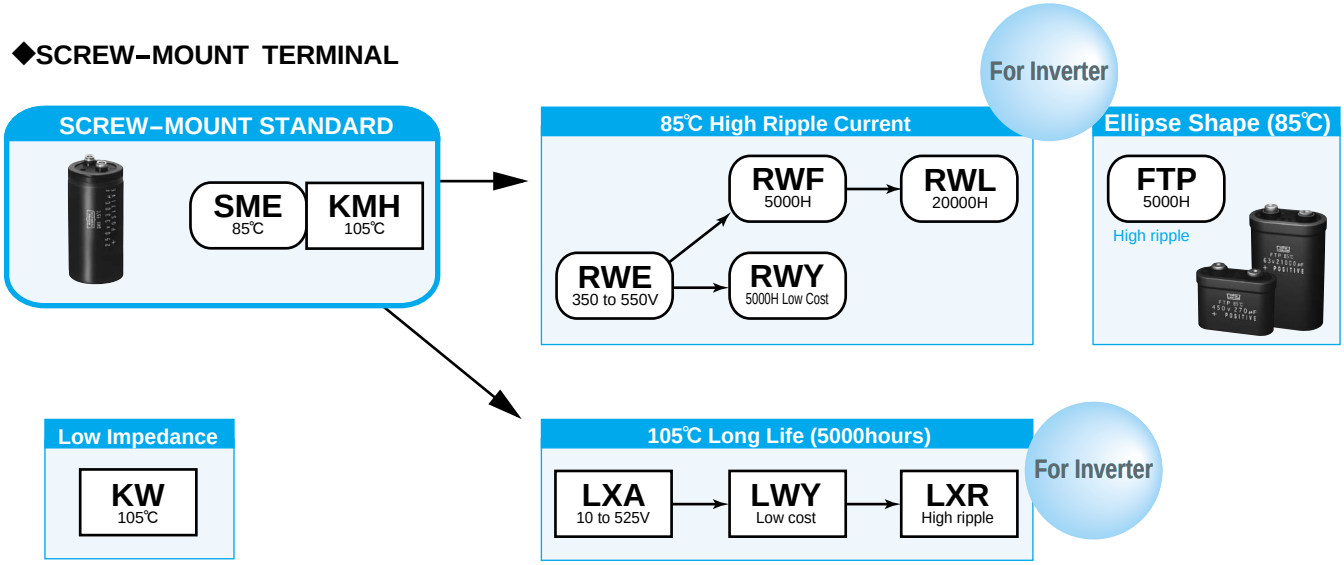
ALUMINUM ELECTROLYTIC CAPACITORS

◆SNAP-IN



◆SCREW–MOUNT TERMINAL



PRECAUTIONS AND GUIDELINES

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 current) 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. For more details, refer to the paragraph of Life of Aluminum Electrolytic Capacitors.

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℃ 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 meet the requirements of charging-discharging cycles, frequency, operating temperature, etc.

8 Failure mode 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 capacitor.
- The dummy terminal of a non-solid aluminum capacitor, which is designed for mounting stability.
- The dummy terminal of a surface mount type capacitor such as non-solid type MF/MFK series capacitors.

b) The outer sleeve of a capacitor is not assured as an insulator. For applications that require an insulated outer sleeve, a custom-design capacitor is recommended to.

10 Condition

Do not use/expose capacitors to the following conditions.
a) Oil, water, salty water take care to avoid storage in damp locations.
b) Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or its compounds, and ammonium
c) Ozone, ultraviolet rays or radiation
d) Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalogs or the product specification.

11 Mounting

a) The paper separators and the electrolytic-conductive electrolytes 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 short-circuiting 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
φ6.3 to φ16mm	2mm minimum
φ18 to φ35mm	3mm minimum
φ40mm and up	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 any 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 production specification.
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.

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PRECAUTIONS AND GUIDELINES

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 in the capacitors through a resistor of approximately 1kΩ before use.
c) If capacitors are stored at a temperature of 35℃ 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 voltages of the capacitors when installing.
f) Verify the polarity of the capacitors.
g) Do not use the capacitors if they have been dropped on the floor.
h) Do not deform the cases of capacitors.
g) Verify that the lead spacing of the capacitor fits the hole spacing in the PC board before installing the capacitors. Some standard pre-formed leads are available.
h) 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.
i) 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
- 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 you need to twice, be sure to consult us.
- 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.

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

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 expose the capacitors under solvent rich conditions or keep capacitors inside a closed 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 voltages applied. This corrsion causes ; extremely high leakage current, which causes in line with, venting, and an open circuit.
Global environmental warnings (Greenhouse effects and other environmental destruction by depletion of the ozone layer), new types of cleaning agents have been developed and commercialized as substitutes for CFC-113,1,1,2-trichloroethlene and 1,1,1-trichloroethylene. The following are recommended as cleaning conditions for some of new cleaning agents.

–Higher alcohol system cleaning agents
Recommended cleaning agents:
Pine Alpha ST-100S (Arakawa Chemical)
Clean Through 750H, 750K, 750L, and 710M (Kao)
Technocare FRW-14 through 17 (Toshiba)
Cleaning conditions:
Using these cleaning agents capacitors are capable of withstanding immersion or ultrasonic cleaning for 10 minutes at a maximum liquid temperature of 60℃. Find optimum condition for washing, rinsing, and drying. Be sure not to rub the marking off the capacitor by contacting any other components

PRECAUTIONS AND GUIDELINES

or the PC board. Note that shower cleaning adversely affects the markings on the sleeve.

–Non-Halogenated Solvent Cleaning
AK225AES (Asahi Glass)
Cleaning conditions:
Solvent-proof capacitors are capable of withstanding any one of immersion, ultrasonic or vapor cleaning for 5 minutes; exception is 2 minutes max. for KRE, and KRE-BP series capacitors and 3 minutes for SRM series capacitors. However, from a view of the global environmental problems, these types of solvent will be banned in near future. We would recommended not using them as much as possible.

Isopropyl alcohol cleaning agents
IPA (Isopropyl Alcohol) is one of the most acceptable cleaning agents; it is necessary to maintain a flux content in the cleaning liquid at a maximum limit of 2 Wt.%.

5 Precautions for using adhesives and coating materials

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 release 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 curred over the capacitor.

6 Fumigation

In many cases when exporting or importing electronic devices, such as capacitors, wooden packaging is used. In order to control insects, many times, 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 halogenide 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 electric-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 exist or expose.
- 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, turnoff 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 catalogs 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 expells 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℃. (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 should 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℃ and a humidity of less than 75%RH.
b) Store the capacitors in places free from water, oil or salt water.
c) Store the capacitors in places free from toxic gasses (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 a local specialist regarding the disposal of industrial waste when disposing aluminum electrolytic capacitors.

Catalogs

Specifications in catalogs may be subject to change without notice. For more details of precautions and guidelines for aluminum electrolytic capacitors, please refer to Engineering Bulletin No. 634A.

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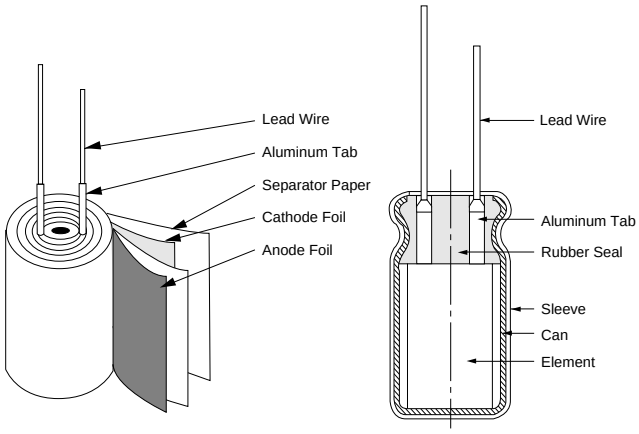
Structure of Aluminum Electrolytic Capacitors

The aluminum electrolytic capacitor contains an internal element of an anode foil, a cathode foil and paper separator rolled together, impregnated with an electrolyte, then attached to external terminals connecting the tabs with the anode or the cathode foils, and sealed in a can case.



Among various types of capacitors, an aluminum electrolytic capacitor offers large CV to volume and features low cost. The capacitance (C) of aluminum electrolytic capacitors, as well as other capacitors, is expressed by the following equation:

$$C=8.855\times10^{-8}\times\varepsilon S/d\ (\mu F)$$

Where : ε=Dielectric constant
S=Surface area of dielectric (cm^2)
d=Thickness of dielectric (cm)

This equation shows that the capacitance increases in proportion as the dielectric constant becomes high, its surface area becomes large and the thickness of dielectric becomes thin. In aluminum electrolytic capacitors the dielectric constant of an aluminum oxide (Al_2O_3) layer is 8 to 10, which is not as high as compared with the other types of capacitors. However, the dielectric layer of the aluminum oxide is extremely thin (about 15Å per volt) and the surface area is very large. An electrochemical formed electrode foil makes the dielectric on the etched surface of aluminum electrode foil. Electrochemical etching creates 20 to 100 times more surface area as plain foil. Therefore, an aluminum electrolytic capacitor can offer a large capacitance compared with other types.

Primary of Composition Material

Anode aluminum foil:
First, the etching process is carried out electromechanically with a chloride solution which dissolves metal and increases the surface area of the foil; forming a dense network like innumerable microscopic channels. Secondly, the formation process is carried out with a solution such as ammonium borate which forms the aluminum oxide layer (Al_2O_3) as a dielectric at a thickness of 15Å / volt. The process needs to charge 140 to 200% of the rated voltage into the foil.

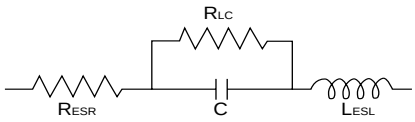
Cathode aluminum foil:
As in the first manufacturing process of the positive foil, the cathode foil requires etching process. Generally, it does not require the formation process; therefore, the natural oxide layer of Al_2O_3, which gives a characteristic dielectric voltage of 0.2 to 1.0 volts, is formed.

Electrolyte and separator:
In a non-solid aluminum electrolytic capacitor, the electrolyte, an electrically conductive liquid, functions as a true cathode by contacting the dielectric oxide layer. Accordingly, the “cathode foil” serves as an electrical connection between the electrolyte and terminal.
The separator functions to retain the electrolyte and prevent the anode and cathode foils from short-circuiting.

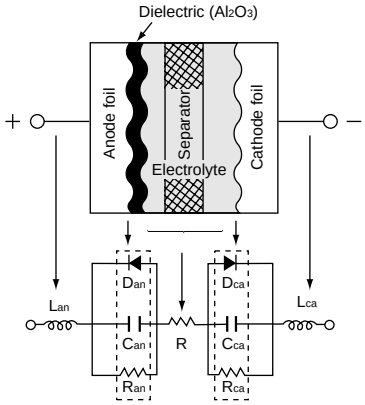
Can case and sealing materials:
The foils and separator are wound into a cylinder to make an internal element, which is impregnated with the electrolyte, inserted into an aluminum can case and sealed. During the service life of a capacitor, electrolyte slowly and naturally vaporizes by electrochemical reaction on the boundary of the aluminum foils. The gas will increase the pressure inside the case and finally cause the pressure relief vent to open or the sealing materials to bulge. The sealing material functions not only to prevent electrolyte from drying out but also to allow the gas to escape out of the can case in a controlled manner.

The Equivalent Circuit

As the equivalent circuit of an aluminum electrolytic capacitor is shown below, it forms a capacitance, a series resistance, an inductance, and a parallel resistance.



R_{ESR}=Equivalent series resistance (ESR)
R_{LC} =Resistance due to leakage current
C =Capacitance
L_{ESL} =Equivalent series inductance



From a composition material point wise, the equivalent circuit is subdivided as follows.

C_{an}, C_{Ca}=Capacitance due to anode and cathodes foils
R =Resistance of electrolyte and separator
R_{an}, R_{Ca}=Internal resistance of oxide layer on anode and cathode foils
D_{an}, D_{Ca}=Diode effects due to oxide layer on anode and cathode foils
L_{an}, L_{Ca} =Inductance due to anode and cathode terminals

Basic Electrical Characteristics

Capacitance:
The capacitance of capacitor is expressed as AC capacitance

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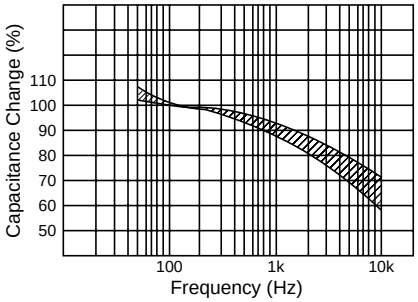
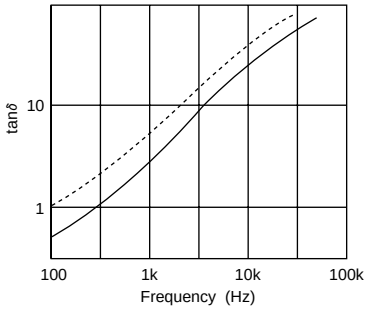
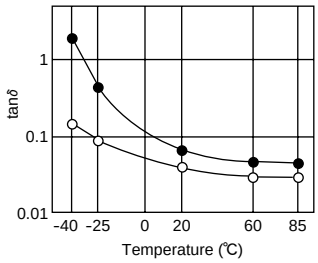
by measuring impedance and separating factors. Also, the AC capacitance depends upon frequency, voltage and other measuring methods. In fact, JIS C 5101 prescribes that the series capacitive factor of an equivalent series( ) circuit shall be the capacitance measured at a frequency of 120Hz and applying a maximum AC voltage of 0.5V rms with a DC bias voltage of 1.5 or 2.0V to aluminum electrolytic capacitors. The capacitance of an aluminum electrolytic capacitor becomes smaller with increasing frequency. See the typical behavior shown below.



Capacitance VS. Frequency

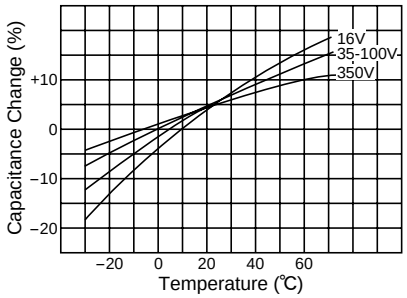


tanδ VS. Frequency



Temperature Characteristics of tanδ

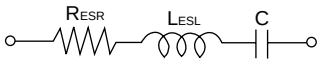
The capacitance value is highly dependent upon temperature and frequency. As the temperature decreases, the capacitance becomes smaller. See the typical behavior shown below.

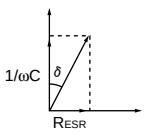


Temperature Characteristics of Capacitance

On the other hand, DC capacitance, which can be measured by applying a DC voltage, shows a slightly larger value than the AC capacitance at a normal temperature and has the flatter characteristic over the temperature range.

tanδ(tangent of loss angle or dissipation factor):
The tanδ is expressed as the ratio of the resistive component (Res_R) to the capacitive reactance ($1/\omega C$) in the equivalent series circuit. Its measuring conditions are the same as the capacitance.





$\tan\delta = R_{ESR} / (1/\omega C) = \omega C R_{ESR}$

Where : R_{ESR}=ESR at 120Hz
ω =2πf
f =120Hz

The tanδ shows higher values as the measured frequency increases and the measured temperature decreases.

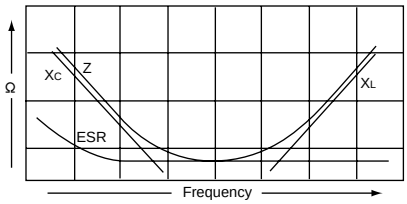
Equivalent series resistance (ESR):
The ESR is the series resistance consisting of the aluminum oxide layer, electrolyte/separator combination, and other resistance related factors, foil length, foil surface area and others. The ESR value depends upon the temperature. Decreasing the temperature makes the resistivity of the electrolyte increase and leads to increasing ESR.
As the measuring frequency increases, the ESR decreases and reaches an almost constant value that mainly dominates the frequency-independent resistance relating electrolyte/separator combination.

Impedance (Z):
The impedance is the resistance of the alternating current at a specific frequency. It is related to capacitance (C) and inductance (L) in terms of capacitive and inductive reactance, and also related to the ESR. It is expressed as follows:

$$Z = \sqrt{ESR^2 + (X_L - X_C)^2}$$

Where : $X_C = 1/\omega C = 1/2\pi fC$
$X_L = \omega L = 2\pi fL$

As shown below, the capacitive reactance (Xc) dominates at the range of low frequencies, and the impedance decreases with increasing frequency until it reaches the ESR in the middle frequency range. At the range of the higher frequencies the inductive reactance (XL) comes to dominate, so that the impedance increases when increasing the measuring frequency.



Impedance VS.Frequency

As shown at the next page, the impedance value varies with temperature because the resistance of the electrolyte is strongly affected by temperature.

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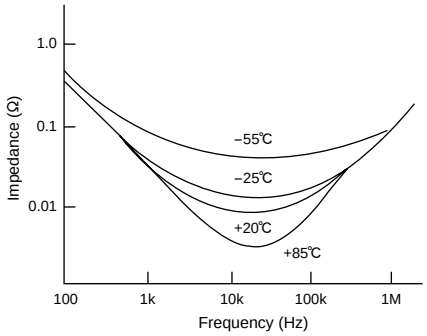
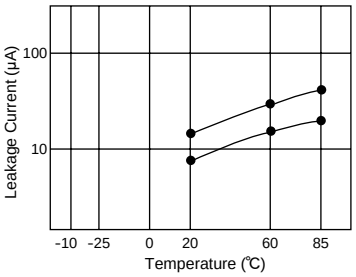


Temperature Characteristics of Impedance

Leakage current:
The dielectric of a capacitor has a very high resistance that does not allow DC current to flow. However, due to the characteristics of the aluminum oxide layer that functions as a dielectric in contact with electrolyte, a small amount of current, called leakage current, will flow to reform and repair the oxide layer when a voltage is being applied. As shown below, a high leakage current flows to charge voltage to the capacitor for the first seconds, and then the leakage current will decrease and reach an almost steady-state value with time.

Leakage Current VS. Time

Measuring temperature and voltage influences the leakage current. The leakage current shows higher values as the temperature and voltage increase.

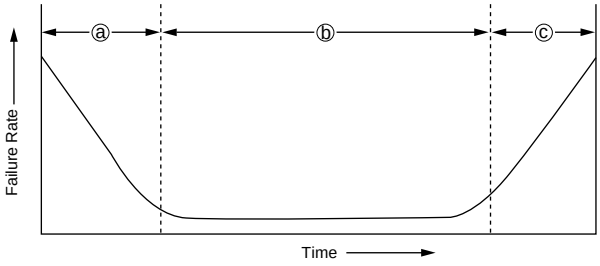


Typical Temperature Characteristics

In general, the leakage current is measured at 20℃ by applying the rated voltage to capacitor through a resistor of 1000Ω in series. The leakage current is the value several minutes later after the capacitor has reached the rated voltage. The catalog prescribes the measuring temperature and time.

Reliability

The bathtub curve:
Aluminum electrolytic capacitors feature failure rates shown by the following bathtub curve.



a) Infant failure period
This initial period accounts for the failures caused by deficiencies in design, structure, the manufacturing process or severe misapplications. In other words the initial failures occur as soon as the components are installed in a circuit. In the case of aluminum electrolytic capacitors, these failures do not occur at customers' field because aging process reforms an incomplete oxide layer, or eliminate the defective parts at the aging process and the sorting process.
Misapplication of the capacitor such as inappropriate ambient conditions, over-voltage, reverse voltage, or excessive ripple current should be avoided for proper use of the capacitor in a circuit.

b) Useful life period
This random failure period exhibits an extremely low failure rate. These failures are not related to operating time but to application conditions. During this period, non-solid aluminum electrolytic capacitors lose a small amount of electrolyte. The electrolyte loss shows as a slow decrease in capacitance and a slow increase in tanδ and ESR. Non-solid aluminum electrolytic capacitors still exhibit lower catastrophic failures than semiconductors and solid tantalum capacitors.

c) Wear-out failure period
This period reflects a deterioration in the component properties of the capacitor ; the failure rate increases with time. Non-solid aluminum electrolytic capacitors end their useful life during this period.

Failure types:
The two types of failures are classified as catastrophic failures and wear-out failures as follows.

1) Catastrophic failures
This is a failure mode that destroys the function of the capacitor like a short circuit or open circuit failure.

2) Wear-out failures
This is a failure mode where gradually deteriorates; the electrical parameters of the capacitor. The criteria of judging the failures, vary with application and design factors. Capacitance decreases and tanδ increases are caused by the loss of electrolyte in the wear-out failure period. This is primary due to loss of electrolyte by diffusion (as vapor) through the sealing material. Gas molecules can diffuse out through the material of the end seal. High temperature increase the electrolyte vapor pressure within the capacitor and the diffusion rate is therefore increased. This increases internal pressure may cause the seal to bulge caused by elevated temperatures. This bulging may accelerate diffusion and mechanically degrade the seal. Factors that can increase the capacitor temperature, such as ambient temperature and ripple current, can accelerate the wear-out phase of a capacitor.

Failure modes:
Aluminum electrolytic capacitors show various failure modes in different applications. (See Table 1.)

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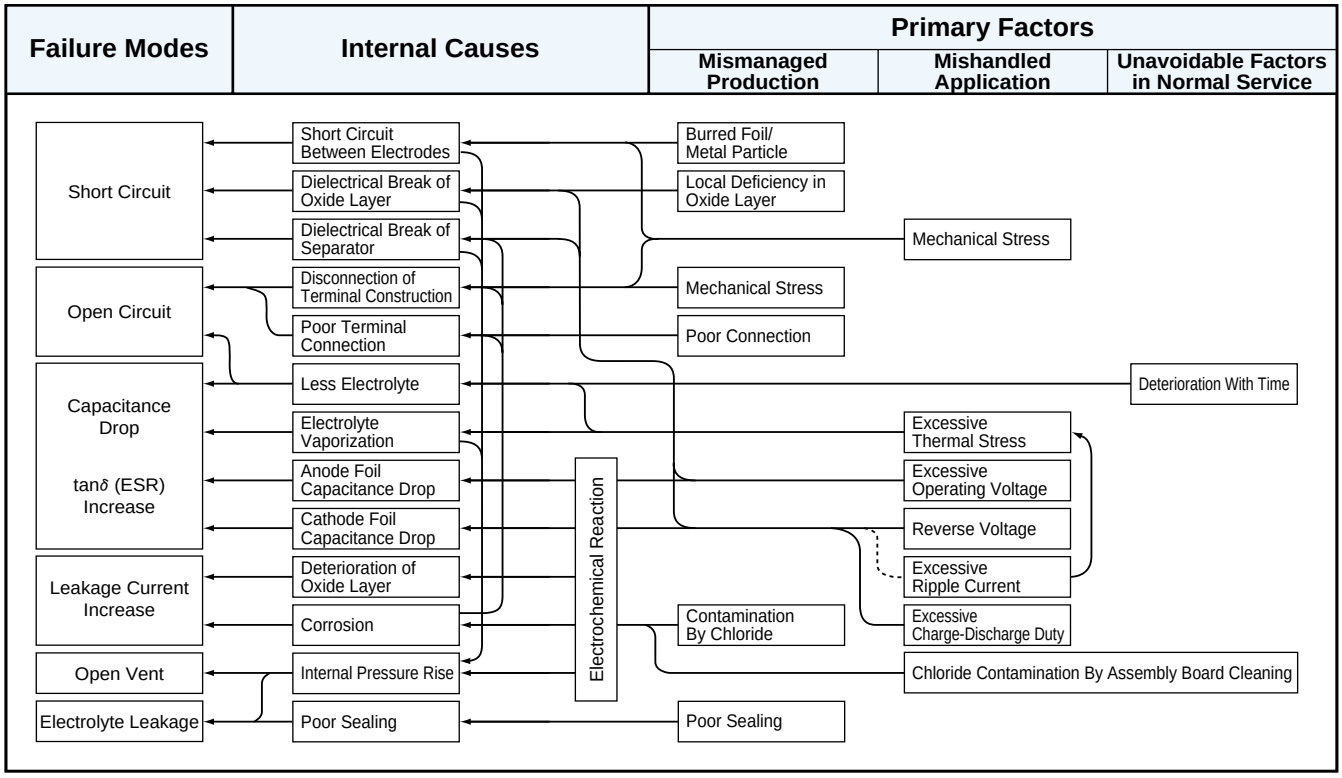

Table1

Life of Aluminum Electrolytic Capacitors

The life of aluminum electrolytic capacitors is largely dependent on environmental and electrical factors. Environmental factors include temperature, humidity, atmospheric pressure and vibration. Electrical factors include operating voltage, ripple current and charge-discharge duty cycles. The factor of temperature (ambient temperature and internal heating due to ripple current) is the most critical to the life of aluminum electrolytic capacitors.

General formula to estimate lifetime:

The lifetime of non-solid aluminum electrolytic capacitors is generally expressed by using three elements representing the effects of ambient temperature, applying voltage and ripple current, which is shown by the following equation:

$$L_X = L \cdot K_{Temp} \cdot K_{Voltage} \cdot K_{Ripple}$$

Where : L_X =Lifetime of capacitor to be estimated
L_o =Base lifetime of capacitor
K_{Temp} =Ambient temperature accelation term
$K_{Voltage}$=Voltage accelation term
K_{Ripple} =Ripple current accelation term

K_{Temp} (Effects of ambient temperature on life):

Because an aluminum electrolytic capacitor is essentially an electrochemical component, increased temperatures accelerate the chemical reaction producing gas within the capacitor which is diffused through the end seal, and consequently accelerates a gradual decrease in capacitance and a gradual increase in tanδ and ESR. The following equation has been experimentally found to express the relationship between the temperature acceleration factor and the deterioration of the capacitor.

$$L_X = L_O \cdot K_{Temp} = L_O \cdot B^{(T_O - T_X)/10}$$

$$K_{Temp} = B^{(T_O - T_X)/10}$$

Where : L_X =Lifetime (hour) of capacitor to be estimated
L_o =Base lifetime (hour) of capacitor
T_o =Maximum rated category temperature (℃) of capacitor shown in catalog
T_X =Actual ambient temperature (℃) of capacitor
B =Temperature accelation factor (≃2)

This equation is similar to Arrhenius' equation that expresses a relationship between chemical reaction rates and temperature, and called Arrhenius' rule of aluminum electrolytic capacitors. The temperature acceleration factor (B) is approximately 2 over an ambient temperature range (Tx) from 40℃ to the maximum rated category temperature of each capacitor. It means that the lifetime is approximately halved with every 10℃ rise in ambient temperature and can be extended by using the capacitors at low temperatures. For an ambient temperature range (Tx) of 20℃ to 40℃, the factor B will be close to 2, and the lifetime will actually be extended. However, operating and surrounding conditions, especially the operating conditions influence ambient temperatures mutually. The ambient temperature in this range will be very changeable; therefore, lifetime estimation under 40℃ should use 40 as Tx.

$K_{voltage}$ (Effects of applying voltage to life):

Miniature and large sized aluminum electrolytic capacitors for popular applications, such as surface mount types, radial lead types, snap-in types and block types, have little voltage effect on their life. Other factors like temperature and ripple current determine the life in comparison with voltage, as long as the capacitors are used at voltages and temperatures within the specifications prescribed in the catalog. Consequently, $K_{voltage}$=1 is used for these capacitors. 350V and higher screw-mount terminal types of capacitors for customer-use power electronics applications allow the life time to extend by applying low voltage, relating to the characteristics of their aluminum oxide layer. RWE, RWY, RWL, RWF, LX(Screw-mount), LXA(Screw-mount) and LXR series are applicable to the method. For $K_{voltage}$ values of these products, please contact a representative of Nippon Chemi-Con.

K_{ripple} (Effects of ripple current to life):

Aluminum electrolytic capacitors have higher tanδ than any other types of capacitors; therefore, the ripple current gives aluminum electrolytic capacitors higher internal heat. Be sure to check the rated ripple current which is specified in the catalog for assuring the life.

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The ripple current through the capacitor produces heat by dissipating power from the capacitor. This leads to temperature increase. Internal heating produced by ripple currents can be expressed by:

$$W=(I_{Ripple})^2 \cdot R_{ESR}+V \cdot I_{Leakage}$$

Where : W = Internal power loss
I_{Ripple} = R.M.S. ripple current
R_{ESR} = Internal resistance (ESR) at ripple frequency
V = Applied voltage
$I_{Leakage}$ = Leakage current

Leakage current may be 5 to 10 times higher than the values measured at 20℃, but compared with Iripple , the leakage current value is very small and negligible.
Thus, the above equation can be simplified:

$$W=(I_{Ripple})^2 \cdot R_{ESR}$$

The following equation gives the internal heat rise; it is heat rise to stable condition. (It is necessary to input several factors.):

$$(I_{Ripple})^2 \cdot R_{ESR}=\beta \cdot A \cdot \Delta T$$

Where : β = Heat transfer constant
A = Surface area of can case
$A=(\pi/4) \cdot D \cdot (D+4L)$
Where : D=Can diameter
L=Can length
ΔT=An increase in core temperature by internal heating due to ripple current
(ΔT=Core temperature−Ambient temperature)

From the above equation, internal temperature rise (ΔT) produced by ripple current is given by:

$$\Delta T=(I_{Ripple})^2 \cdot R_{ESR} / (\beta \cdot A)$$

When the ripple frequency is 120Hz, R_{ESR} at 120Hz is expressed by

$$R_{ESR}=\tan\delta / (\omega \cdot C)$$

$$\Delta T=(I_{Ripple})^2 \cdot \tan\delta / (\beta \cdot A \cdot \omega \cdot C)$$

Where : tanδ=120Hz value
ω = $2\pi \cdot f=2\pi \cdot 120$Hz
C = 120Hz capacitance value

As above equation, ΔT varies with frequency of ripple, frequency and temperature dependent ESR, and application dependent β (even ripple current is constant). We really recommend that customers measure ΔT with a thermocouple at the actual operating conditions of the application in lieu of using the above equation. (Another approximation of ΔT will be stated later.)
As mentioned in the paragraph of K_{Temp}, aluminum electrolytic capacitors will slowly increase in tanδ and ESR during their service life. The application without ripple current has no influence on the life of the capacitor even though the ESR will increase during life. In other words, the application with ripple current makes ΔT increase; furthermore, a ΔT increase results in ESR increase. The ESR increase then makes ΔT increase. It is a chain reaction. Theoretically, the ripple current acceleration term (K_{Ripple}) cannot be simply expressed like the ambient temperature acceleration term (K_{Temp}). Practically, the ripple current acceleration term (K_{Ripple}) can be approximately expressed by an equation using a ΔT initially measured. The following table shows the ripple current acceleration term (K_{Ripple}) for each capacitor design group.

K_{Ripple}		Products Type	Products Series
$2^{(-\Delta T/5)}$		Surface mount (FC/FD/VC)	MFS, MFA, MF, MFK, MFY, MFJ, MF-BP, MFK-BP, MFK-Large, MVS, MVA, MV, MVE, MVK, MKA, MZA, MVZ, MVY, MVJ, MVL, MVH, MV-BP, MVK-BP
		Radial lead (VB)	KMA, KME-BP, KRE, KMY, KRG, LLA, LX, LXA, SME, SMQ, SME-BP, SMG, SRA, SRE, SRG, SRM, SXE
		Screw-mount terminal (LG)	KW
$2^{(\Delta To-\Delta T)/5}$	ΔTo=5 deg	Radial lead (VB)	FL, GXE(To≦105℃), KLG, KME, KMQ, KMF, KMG, KMH, KMX, KXG, LBG, LXJ, LXV, LXY, LXZ
		Pin terminal (VN/VS/VR)	KLG, KLH, KMH, KMM, KMQ, KSL, LXG, LXM, LXH, LXQ
		Screw-mount terminal (LG)	LXA (10 to 250Vdc), KMH
	ΔTo=5 to 10 deg Contact us for details	Radial lead (VB)	SMH
		Pin terminal (VN/VS/VR/LASN)	SMH, SMM, SMQ, SLM, RWE-LR
		Screw-mount terminal (LG)	SME
$2^{[-2+(25-\Delta T)/b]}$		Screw-insert terminal (LG)	LX, LXA (350 to 525Vdc), RWE, RWF, RWL, LXR, RWY

Note : ΔT = An increase (deg) in core temperature produced by internal heating due to actual operating ripple current. The ΔT is the difference between the core temperature and ambient temperature measured at the actual operating conditions.
ΔTo = An increase (deg) in core temperature by internal heating due to rated ripple current.
b = Factor b varies from 5 to 10 by the conditions of ripple frequency and ΔT. Please contact a representative of Nippon Chemi-Con for the details

Note that a ΔT over a certain maximum limit may over-heat the capacitors, though the lifetime estimation will not give you practical lifetime. For instance, the following shows a guide limit of ΔT at each ambient temperature for 105℃ maximum rated products.

Ambient temperature Tx (℃)	85	105
Guide limit of ΔT (deg)	15	5
Core temperature (=Tx+ΔT)	100	110

Approximation of ΔT

Estimation of the lifetime requires two temperature measurements; first obtain ΔT by actually measuring the core temperature, inserting the thermocouple inside the operating capacitor and secondary, the ambient temperature. A more convenient way to get the ΔT is to convert the surface temperature of the capacitor case and the ambient temperature by using a coefficient specified for each case diameter as follows:

$$\Delta T=Kc \cdot (Ts-Tx)$$

Where : Kc=Coefficient from table below
Ts=Surface temperature (deg) of capacitor can case
Tx=Ambient temperature (deg)

No air flow conditions.

Diameter (mm)	φ5 to φ8		φ10	φ12.5	φ16	φ18	φ22	φ25
Kc	1.10		1.15	1.20	1.25	1.30	1.35	1.40
Diameter (mm)	φ30	φ35	φ40	φ50	φ63.5	φ76	φ89	φ100
Kc	1.50	1.65	1.75	1.90	2.20	2.50	2.80	3.10

Also, you can roughly estimate a ΔT by using the following equation without need to measure.

PRECAUTIONS AND GUIDELINES

$$\Delta T=\Delta T\cdot(Ix/Io)^2$$

Where : ΔT=5 deg for 105℃ maximum rated capacitors.
Io =Rated ripple current (A_{RMS}) : if its frequency is different from operating ripple current Ix, it needs converting by using a frequency multiplier prescribed in the catalog.
Ik =Operating ripple current (A_{RMS}) actually flowing into a capacitor

Like switching power supplies, if the operating ripple current consists of commercial frequency element and switching frequency element(s), an internal power loss is expressed by the following equation.

$$W=(If_1)^2\cdot ESR_{f1}+(If_2)^2\cdot ESR_{f2}+\cdots+(If_n)^2\cdot ESR_{fn}$$

Where : W =Internal power loss
$I_{f1}\cdots I_{fn}$ =Ripple currents at every frequencies f1···fn
$ESR_{f1}\cdots ESR_{fn}$=ESR's at every frequencies f 1···fn

The above equation can be transformed into another equation to get a ripple current value in accordance with the frequency of the rated ripple current, each of $ESR_{f1},\cdots ESR_{fn}$ is approximately equal to ESR_{f0} divided by square value of the frequency multiplier ($F_{f1}\cdots F_{fn}$). Here ESR_{f0} is the value at the frequency of the rated ripple current and $F_{f1}\cdots F_{fn}$ is a conversion coefficient from one frequency to another in accordance with the frequency f1···fn.

$$ESR_{f1}=ESR_{f0}/(Ff_1)^2$$
$$\vdots \qquad \vdots$$
$$ESR_{fn}=ESR_{f0}/(Ff_n)^2$$

Relationship of $w=(L_{Ripple})^2\cdot R_{ESR}$ leads Ix as follows:

$$Ix=\sqrt{W/ESR_{f0}}$$

The above is rewritten in the following equation:

$$Ix=\sqrt{(If_1/F_{f1})^2+(If_2/F_{f2})^2+\cdots\cdots(If_n/F_{fn})^2}$$

Where : Ix =Ripple current in accordance with the frequency of the rated ripple current
$I_{f1}\cdots\cdots I_{fn}$ =Operating ripple currents at every frequencyf1···fn
$F_{f1}\cdots\cdots F_{fn}$=Frequency multipliers for every frequencyf1···fn prescribed in the catalog, based on the fact that the internal resistance of a capacitor varies with frequency.

Cleaning Agents

a. Cleaning agents penetrate into a capacitor.
Solvent contacts the rubber seal of a capacitor. Some percentage of solvent does not penetrate but a percentage suceeds in entering and defusing inside the capacitor.

b. Cleaning agents decompose and release halogen ions.
In the electrolyte of the inside element, the halides in the cleaning agents become hydrolyzed and release halogen ions as follows,

$$RX+H_2O\rightarrow ROH+H^++X^-$$

RX : Halide
X^- : Halogen ion

c. Corrosion
The halogen ions attack the aluminum foil by the following anodic half-cell reaction:

$$Al+3X^-\rightarrow AlX_3+3e$$

The AlX3 further becomes hydrolyzed and release the halogen ion again:

$$AlX_3+3H_2O\rightarrow Al(OH)^3+3H^++3X^-$$

The halogen ions release by this hydrolysis reaction further attacks the aluminum according to the previous reaction formula, and these reactions are repeated and accelerated when voltage and temperature is applied. Also, the hydrogen ions increase the local acidity which causes the oxide dielectric to dissolve. Thus, localized corrosion accelerates to corrode both the aluminum metal and the dielectric. In addition, a terpene or petroleum system cleaning solvent will be absorbed into the rubber seal of the capacitor. The rubber seal finally weakens. An alkaline saponification detergent will damage the aluminum metal and marking. In summary, recommended cleaning agents are halogen free. Terpene, petroleum, alkali detergent and any solvent making the rubber seal material deteriorate are not recommended.

Compatible cleaning agents:
In line with recent global environmental warnings (Greenhouse effect and other environmental destruction by depletion of the ozone layer), new types of cleaning agents have been commercialized and substituted as CFC-113,1,1,2-trichloroethlene and 1,1,1-trichloroethylene. The following are recommended cleaning conditions for some of new cleaning agents.

Higher alcohol system cleaning agents
Recommended cleaning agents:
Pine Alpha ST-100S (Arakawa Chemical)
Clean Through 750H, 750K, 750L, and 710M (Kao)
Technocare FRW-14 through 17 (Toshiba)
Cleaning conditions:
1) Capacitors are capable of withstanding immersion or ultrasonic cleaning for 10 minutes at a maximum liquid temperature of 60℃ using the above cleaning agents. Find the optimum conditions for washing, rinsing, and drying. Be sure not to rub the marking off the capacitor by contact with any other components on the PC board. Note that shower cleaning adversely affects the marking.
2) To rinse by water, control the conditions such as temperature and water pressure to avoid sleeve shrinkage.
3) Clean Through 750H and similar are weak-alkaline solvents. Do not leave the alkaline on the capacitor after cleaning process.

CFCs substitute solvents (HCFC system)
Asahi Glass AK225AES solvent is usable only with solvent-proof type capacitors, which are designed with reinforced seal constructions and modified electrolyte. This product does not penetrate the capacitor and deactivate halogen ions. However, AK225AES is one of the solvents which will have a restricted usage in future from the environmental point of view.

PRECAUTIONS AND GUIDELINES

Non-Halogenated Solvent Cleaning

HCFC solvents: AK225AES (Asahi Glass)
Cleaning conditions:
Solvent-proof type capacitors are capable of withstanding immersion, ultrasonic or vapor cleaning for 5 minutes; exception is 2 minutes max. for KRE and KRE-BP series capacitors for 3 minutes and SRM and KRF series capacitors.
Applicable series (only for solvent-proof products):

Surface mount :	MFS, MFA, MF, MFK, MFY, MFJ, MF-BP, MFK-BP, MFK-Large, MVS, MVA(4 to 63Vdc), MV, MVE(6.3 to 63Vdc), MVK, MKA, MZA, MVZ, MVY(6.3 to 63Vdc), MVJ, MVL, MVH(10 to 50Vdc), MV-BP, MVK-BP, PX, PXA, PXC
Radial lead :	SRM, KRE, KMA, SRG, KRG , SMG(6.3 to 250Vdc), SME(6.3 to 250Vdc), SME-BP, KMQ(6.3 to 100Vdc), KMG(6.3 to 250Vdc), KME(6.3 to 250Vdc), KME-BP, LXZ, LXY, LXV, LXJ, SXE, KMF(6.3 to 100Vdc), FL, LXA, LX, GXE(10 to 50Vdc), GXL, LBG, LLA

Isopropyl alcohol cleaning agents
IPA (Isopropyl Alcohol) is one of the most acceptable cleaning agents; it is necessary to maintain a flux content in the cleaning liquid at a maximum limit of 2 Wt. %, because chlorides in flux dissolves in the cleaning liquid during the cleaning process.
Xylene -additive IPA may make the rubber seal deteriorate.

Non-clean flux
Both ionic halogen and non-ionic halogens damage the capacitor when they penetrate in through the rubber seal. Note that some of the fluxes called non-halogenated flux contains less ionic halogen activator but actually a large amount of non-ionic halogen.
Per our analysis, AHQ3100K(Asahi) and POZ6(Senjyu) minimize ionic and non-ionic halogens.

Other Precautions to wash capacitors
c) Monitor conductivity, pH, specific gravity and water content of cleaning agents. Contamination adversely affects the characteristics.
d) The solvent may stay between the end seal and the PC board if the capacitor is mounted directly onto the PCB without a small gap. The residual solvent can cause defects. Also, washing for more than the specified time causes solvent residual. Therefore, wash the assembly board for at least 10 minutes at the recommended temperature. Be sure not to expose the capacitors under solvent rich conditions or keep capacitors inside a closed container.
e) Reforming the leads of the capacitor to fit lead spacing on the PC board causes cleaning agents to get into the inside capacitor. This may result in corrosion to the foil. Therefore, use the capacitors, which fit the hole spacing on the PC board or reform the lead wires in a manner which will not cause mechanical stress to the capacitor body.

PART NUMBERING SYSTEM

TC04R	SMG	6.3	VB	1000	M	F50
Taping code (If necessary)	Series	Rated voltage	Terminal type	Nominal capacitance	Capacitance tolerance	Supplement (If necessary)

Indicates a basic capacitor design.

Expressed in microfarads.

Capacitance		Code
0.1μF	=	R1
4.7μF	=	4R7
10μF	=	10
100μF	=	100
1000μF	=	1000

Indicates the tolerance of a nominal capacitance value.

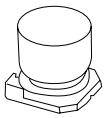
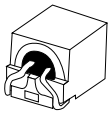
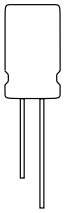
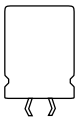
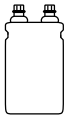
Tolerance	Code
±10%	= K
±20%	= M
−10 to +30%	= Q
−10 to +50%	= T
0 to +30%	= S

Expressed in Volts.

Voltage	Code
6.3Vdc	= 6.3
10Vdc	= 10
100Vdc	= 100

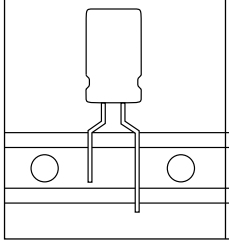
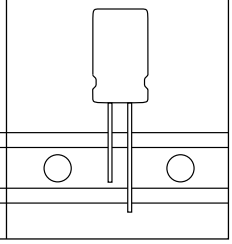
Indicates options or designs deviated from the standard.
Bi-polar=BP
Bracket=B, C
Case code=22A
Lead forming=FC
Taping lead spacing=F25
SMT tray=TR

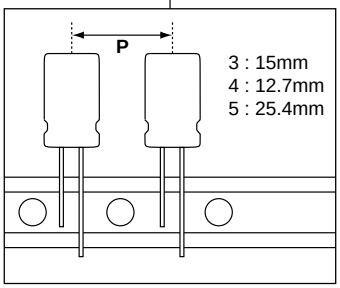
Indicates basic terminal type of capacitors.

Type code=VC	Type code=FC	Type code=VB	Type code=VSSN	Type code=LGSN
Vertical SMT	**Horizontal SMT**	**Radial lead**	**Snap-in terminal for large-sized capacitors**	**Screw-mount terminal**
				
Dummy terminals=VE (φ16 & 18)	**Dummy terminal=FD**			

◆TAPING CODE (only applicable for radial type)

T	C	0	4	R
Taping	Lead forming code	Radial lead type	P dimension	Polarization

C	D
Formed	**Straight**
	



3 : 15mm
4 : 12.7mm
5 : 25.4mm

R : Polarized
N : Non-(Bi) polarized

Information

Nippon Chemi-Con Corporation has decided that effective with the 2004 fiscal year we will introduce our "New Part Numbering System". We will publish the details and parameters of this new part numbering system in advance of its inception.

CAT. No. E1001D

ENVIRONMENTAL CONSIDERATION

Environmental friendly capacitors

As you are very concerned about world-wide environmental protection, Nippon Chemi-Con also think about this issue and contribute to minimize banned materials.
Now we offer completely non-lead free products and non Polyvinyl Chloride (PVC) sleeve products.
Please note that these products are commercialized as optional products.

◆Conductive polymer aluminum solid capacitor

Type	Series	Lead-Free	Non-PVC sleeve
Surface Mount	PXC, PXA	Lead free standard	Non-PVC standard
Radial Lead	PSA, PS	Lead free standard	Non-PVC standard

◆Aluminum electrolytic capacitor

Type	Series	Lead-Free	Non-PVC sleeve
Surface Mount (Type : VC)	MV, MVK, MVJ, MVA, MVE, MVY, MVZ, MV-BP, MVK-BP	Option	Non-PVC standard
	MKA, MZA	Lead free standard	Non-PVC standard
Surface Mount (Type : FC)	MF, MFK	Option	Non-PVC standard
Radial Lead (Type : VB)	SRE, KRE, SRG, KMA, SMQ, KMQ, SMG, KMG, LXV, LXY, LXZ, KY, KZE, KZH, KXG, KMX, GXE, GXL SRE-BP, KRE-BP, SRA-BP, KMA-BP, SME-BP, KME-BP	Option	Option
Snap-in (Type : VSSN, VNSN, LISN)	SMQ, KMQ, SMM, KMM, SMH, KMH	Option	Option
Screw-Mount (Type : LGSN)	SME, KMH, RWF, RWL	Lead free standard	Option

*Regarding to the other series, please consult us.
For more details of precautions and part numbering system for Environmentally friendly capacitors, please refer to Engineering Bulletin.

CAT. No. E1001D

PACKAGING

MINIMUM ORDER QUANTITY

Please order by units of minimum order quantity.

◆SURFACE MOUNT

●Horizontal

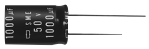
Series	Case code	Quantity (pcs)
Alchip® MF/MFK	A6	3,000
	B6	3,000
	C6	2,500
	D6, D8, D10, D13	2,500
	H15, H20, H25	500

●Vertical

Series	Case code	Quantity (pcs)	
		Taping	Tray
Alchip® MVS/MVA/MV/ MVK/MVY/MVJ MVH/MVE/MVL MKA/MVZ/MZA NP CAP™ PXC/PXA	B55	2,000	–
	D46, D55, D60	2,000	–
	E46, E55, E60	1,000	–
	F46, F55, F60	1,000	–
	F80	900	–
	H63, H70	1,000	–
	H10	500	–
	H12	400	–
	J80, J10	500	–
	J12	400	–
	K14	200	120
	K16	150	120
	L17, L22	*	80
	M17, M22	*	60

* Regarding to taping for L17/L22/M17/M22, please consult us.

◆RADIAL



Size		Quantity (pcs)	
		Bulk	Taping
φ3 (φ3.5)		200	3,000
φ4		200	2,000
φ5		200	2,000
φ6.3		200	2,000
φ8 (φ7)		200	1,000
φ10	Height≦25mm	200	800
	Height≧30mm	200	500
φ12.5		100	500
φ16		50	250
φ18		50	250

* The quantity of bulk is a typical example.
* Regarding to minimum order quantity for PSA/ PS series, please consult us.

◆SNAP-INS

200 pieces

NIPPON CHEMI-CON

PACKAGING

TAPING SPECIFICATIONS

SURFACE MOUNT TYPE (TAPING)


◆CARRIER TAPE [mm]

Fig.1

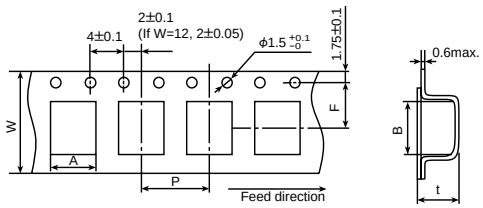


Fig.2

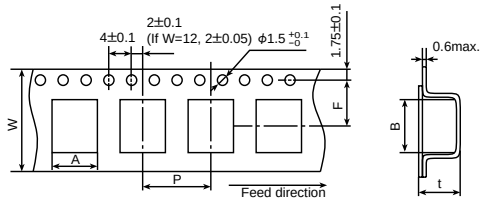


Fig.3

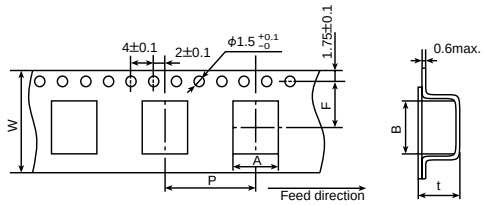


Fig.4

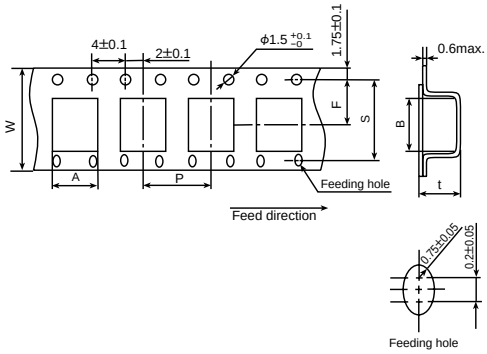
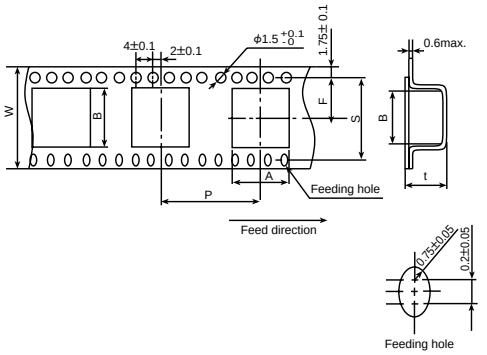


Fig.5



[mm]

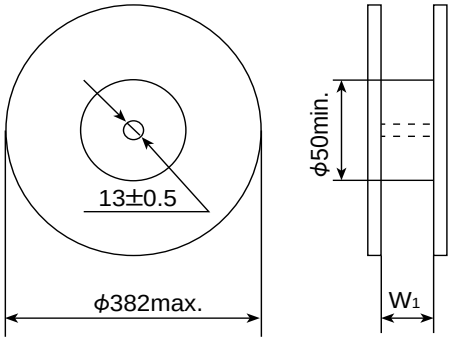
Series \ Items		W	A	B	F	P	t	S	Fig.
		±0.3	±0.2	±0.2	±0.1	±0.1	±0.2	±0.1	
Alchip® MF/MFK	A6	12.0	3.7	6.7	5.5	8.0	3.5	—	1
	B6	12.0	4.2	6.7	5.5	8.0	4.0	—	1
	C6	12.0	4.7	6.7	5.5	8.0	4.5	—	1
	D6	12.0	5.2	6.7	5.5	8.0	5.0	—	1
	D8	16.0	5.2	8.7	7.5	8.0	5.0	—	1
	D10	16.0	5.2	10.7	7.5	8.0	5.0	—	1
	D13	24.0	5.2	13.7	11.5	8.0	5.0	—	1
	H15	24.0	9.2	17.3	11.5	16.0	9.9	—	3
	H20	32.0	9.2	21.8	14.2	16.0	9.9	28.4	4
	H25	44.0	9.2	26.8	20.2	16.0	9.9	40.4	4
Alchip® MVS/MVA MVE/MV MVK/MVY MVJ/MVH MVL/MKA MVZ/MZA NP CAP™ PXC/PXA	B55	12.0	3.5	3.5	5.5	8.0	5.9	—	1
	D46	12.0	4.7	4.7	5.5	8.0	4.9	—	1
	D55	12.0	4.7	4.7	5.5	8.0	5.7	—	1
	D60	12.0	4.7	4.7	5.5	8.0	6.3	—	1
	E46	12.0	5.7	5.7	5.5	12.0	4.9	—	2
	E55	12.0	5.7	5.7	5.5	12.0	5.7	—	2
	E60	12.0	5.7	5.7	5.5	12.0	6.3	—	2
	F46	16.0	7.0	7.0	7.5	12.0	4.9	—	2
	F55	16.0	7.0	7.0	7.5	12.0	5.7	—	2
	F60	16.0	7.0	7.0	7.5	12.0	6.3	—	2
	F80	16.0	7.0	7.0	7.5	12.0	8.2	—	2
	H63	16.0	8.7	8.7	7.5	12.0	6.8	—	2
	H70	24.0	8.7	8.7	11.5	12.0	7.2	—	2
	H10	24.0	8.7	8.7	11.5	16.0	11.0	—	3
	H12	24.0	8.7	8.7	11.5	16.0	12.8	—	3
	J80	24.0	10.7	10.7	11.5	16.0	8.2	—	3
	J10	24.0	10.7	10.7	11.5	16.0	11.0	—	3
	J12	24.0	10.7	10.7	11.5	16.0	12.8	—	3
	K14	32.0	13.4	13.4	14.2	24.0	14.0	28.4	5
	K16	32.0	13.4	13.4	14.2	24.0	16.5	28.4	5

* Regarding to taping for L17/L22/M17/M22, please consult us.

CAT. No. E1001D

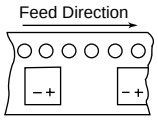
PACKAGING

◆REEL DIMENSIONS [mm]

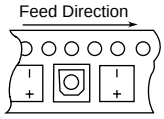


◆POLARITY

Alchip® MF/MFK
(Horizontal)



Alchip® MVS/MV/MVK
(Vertical) MVY/MVJ/MVH/
MVE/MVL/MKA/
MVZ/MZA
NP CAP™ PXC/PXA

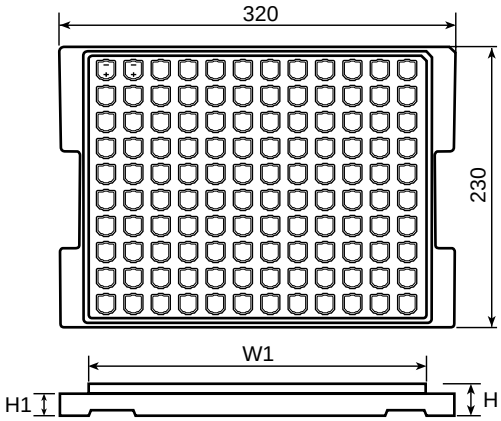


◆QUANTITY PER REEL/BOX

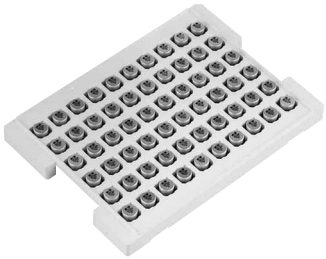
Series	Case code	Quantity (pcs/reel)	Quantity (pcs/box)	W1 (mm)
Alchip® MF/MFK	A6	3,000	15,000	14
	B6	3,000	15,000	14
	C6	2,500	12,500	14
	D6	2,500	12,500	14
	D8, D10	2,500	12,500	18
	D13	2,500	7,500	26
	H15	500	1,500	26
	H20	500	1,000	34
	H25	500	1,000	46
Alchip® MVS/MVA MV/MVK MVY/MVJ MVH/MVE MVL/MKA MVZ/MZA NP CAP™ PXC/PXA	B55	2,000	10,000	14
	D46, D55, D60	2,000	10,000	14
	E46, E55, E60	1,000	5,000	14
	F46, F55, F60	1,000	5,000	18
	F80	900	4,500	18
	H63	1,000	5,000	18
	H70	1,000	3,000	26
	H10	500	1,500	26
	H12	400	1,200	26
	J80, J10	500	1,500	26
	J12	400	1,200	26
	K14	200	600	34
	K16	150	450	34

SURFACE MOUNT TYPE (TRAY)

◆DIMENSIONS [mm]



◆TRAY CODE



Example

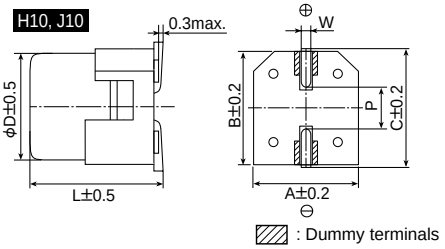
Capacitor's P/N TR

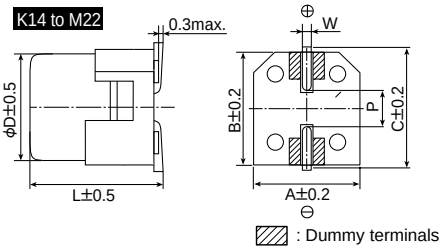
MVE6.3VE 4700M L22 TR

Case code	H [mm]	W1 [mm]	H1 [mm]	Quantity [pcs/tray]	Quantity [pcs/box]
K14 & K16	21.0	284	18.5	120	600
L17 & L22	28.0	284	24.0	80	400
M17 & M22	28.0	284	24.0	60	300

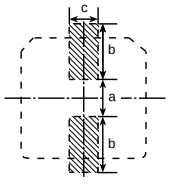
VIBRATION PROOF STRUCTURE (Type : VE)

◆DIMENSIONS [mm]





◆RECOMMENDED SOLDER LAND



Solder land on PC board

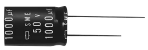
Case code	Dimensions of products							Solder land		
	D	L	A	B	C	W	P	a	b	c
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1	3.1	4.2	3.5
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5	4.5	4.4	3.5
K14	12.5	13.5	13.0	13.0	13.7	1.0 to 1.3	4.2	3.4	6.3	5.1
K16	12.5	16.0	13.0	13.0	13.7	1.0 to 1.3	4.2	3.4	6.3	5.1
L17	16	16.5	17.0	17.0	18.0	1.0 to 1.3	6.5	4.7	7.8	6.5
L22	16	21.5	17.0	17.0	18.0	1.0 to 1.3	6.5	4.7	7.8	6.5
M17	18	16.5	19.0	19.0	20.0	1.0 to 1.3	6.5	4.7	8.8	6.5
M22	18	21.5	19.0	19.0	20.0	1.0 to 1.3	6.5	4.7	8.8	6.5

NIPPON CHEMI-CON

PACKAGING

TAPING SPECIFICATIONS

RADIAL LEAD TYPE (TAPING)



◆CARRIER TAPE [mm]

Fig.1
ϕD=ϕ3 to 8

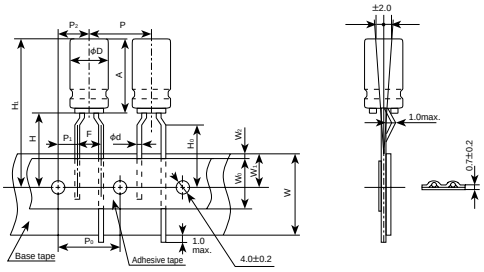


Fig.2
ϕD=ϕ5
ϕD×L=ϕ4×7

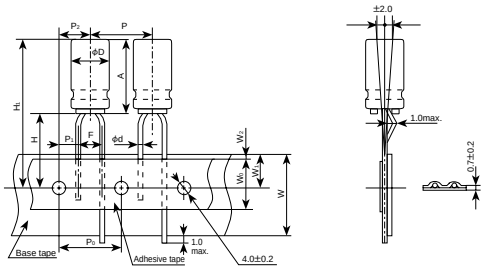


Fig.3
ϕD=ϕ6.3 to 8
ϕD=ϕ10 & 12.5

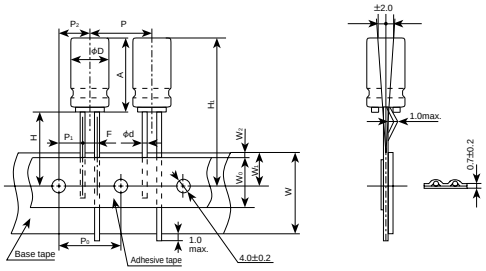
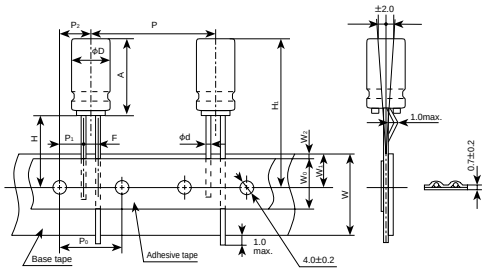


Fig.4
ϕD=ϕ12.5



Code	Case size ϕD	Case size A	ϕd	P	P0	P1	P2	F	W	W0	W1	W2	H	H0	H1	Fig.	Taping code
tol.	—	—	±0.05	±1.0	±0.2	±0.7	±1.0	+0.8 −0.2	±0.5	min.	±0.5	max.	±0.75	±0.5			
Nominal	3	5	0.4	12.7	12.7	5.1	6.35	2.5	18.0	6.0	9.0	1.5	17.5	16.0	H1=H+A Check insertion machine specs.	1	TC04R F25
	3.5	5	0.4	12.7	12.7	5.1	6.35	2.5	18.0	6.0	9.0	1.5	17.5	16.0		1	TC04R F25
	4	5 to 7	0.45	12.7	12.7	5.1 3.85	6.35	2.5 5	18.0	6.0	9.0	1.5	*1 17.5	16.0		2 1	TD04R F25 TC04R F50
		9 to 11.5	0.45	12.7	12.7	5.1 3.85	6.35	2.5 5	18.0	10.0	9.0	1.5	17.5	16.0		1	TC04R F25 TC04R F50
	5	5 to 7	0.45	12.7	12.7	5.1 3.85	6.35	2.5 5	18.0	6.0	9.0	1.5	18.5 17.5	— 16.0		2 1	TD04R F25 TC04R F50
		9 to 15	0.5	12.7	12.7	5.1 3.85	6.35	2.5 5	18.0	10.0	9.0	1.5	18.5	— 16.0		2 1	TD04R F25 TC04R F50
	6.3	5 to 7	0.45	12.7	12.7	5.1 3.85	6.35	2.5 5	18.0	6.0	9.0	1.5	18.5 17.5	— 16.0		3 1	TD04R F25 TC04R F50
		9 to 15	0.5	12.7	12.7	5.1 3.85	6.35	2.5 5	18.0	10.0	9.0	1.5	18.5	— 16.0		3 1	TD04R F25 TC04R F50
	7	7	0.45	12.7	12.7	5.1 3.85	6.35	2.5 5	18.0	6.0	9.0	1.5	18.5 17.5	— 16.0		3 1	TD04R F25 TC04R F50
	8	5	0.45	12.7	12.7	5.1 3.85	6.35	2.5 5	18.0	6.0	9.0	1.5	18.5 17.5	— 16.0		3 1	TD04R F25 TC04R F50
		7	0.45	12.7	12.7	3.85	6.35	5	18.0	6.0	9.0	1.5	17.5	16.0		1	TC04R F50
		9 to 20	0.6	12.7	12.7	3.85	6.35	5	18.0	10.0	9.0	1.5	20.0	16.0		1	TC04R F50
tol.	±0.5	max.	±0.05	±1.0	±0.3	±0.7	±1.3	+0.8 −0.2	±0.5	min.	±0.5	max.	+2.0 −0	—			
Nominal	10	21	0.6	12.7	12.7	3.85	6.35	5	18.0	12.5	9.0	1.5	18.0	—		3	TD04R F50 H18
	12.5	26	0.6	*2 15	15	5.0	7.5	5	18.0	12.5	9.0	1.5	18.0	—		3	TD03R F50 H18
			0.6	25.4	12.7	3.85	6.35	5	18.0	12.5	9.0	1.5	18.0	—		4	TD05R F50 H18

* 1 : For ϕ4X7 (A=7, F=25), shall be $18.5^{-0.5/+0.75}$ (code : TD04R F25) at Fig.2.

* 2 : P=15 taping is not standard. Use P=25.4 taping.

TAPING CODE

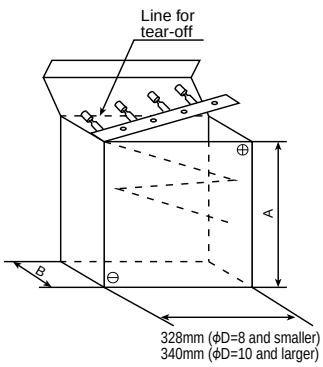
Example

T D 0 4 R Capacitor's P/N F50

- Lead spacing code: F25 : F=2.5, F50 : F=5.0
- R : Polarized (Right lead is positive.), N : Non (Bi)-Polarized
- P dimension: 3 : 15mm, 4 : 12.7mm, 5 : 25.4mm
- Radial lead type
- Lead forming code: C : Formed lead, D : Straight lead
- Taping

QUANTITY PER AMMO PACK

Ammo pack box



Typical example

Case size ϕD×L(mm)		A (mm)	B (mm)	Quantity (pcs.)
ϕ3		216	42	3,000
ϕ3.5		216	42	3,000
ϕ4	L=5 & 7mm	183	42	2,000
	L=11.5mm	183	51	
ϕ5	L=5 & 7mm	232	42	2,000
	L=9 to 15mm	232	51	
	L=17mm	235	53	
ϕ6.3	L=5 & 7mm	282	42	2,000
	L=9 to 15mm	284	51	
	L=17mm	284	55	
ϕ7		183	42	1,000
ϕ8	L=5 & 7mm	232	42	1,000
	L=9 to 15mm	232	51	
	L=17 & 20mm	235	53	
ϕ10	L≦25mm	308	62	800
	L≧30mm	308	67	500
ϕ12.5		308	67	500

* Regarding to taping specifications for PSA/PS series, please consult us.

CAT. No. E1001D

PACKAGING

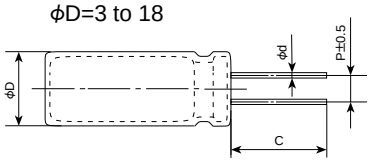
RADIAL LEAD TYPE (CUT/FORMED LEAD)

The following lead configurations are available upon request. When ordering, please indicate the type of lead configurations by using the appropriate supplement code, such as C5, FC, MC or RC in the product part number.

[mm]

●Lead Configuration : C5

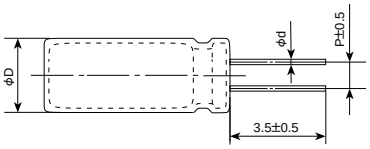
ϕD=3 to 18



Case diameter	C:Lead length
ϕD=3 to 8	: 5.0±0.5
ϕD=10 to 18	: $5.0^{+1.0}_{-0}$

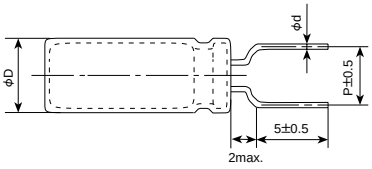
●Lead Configuration : C3.5

ϕD=3 to 18



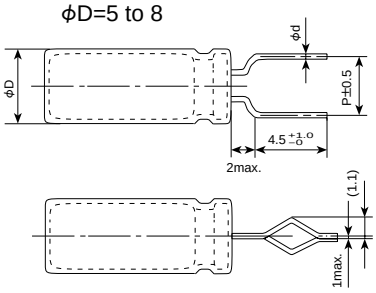
●Lead Configuration : FC

ϕD=5 to 8



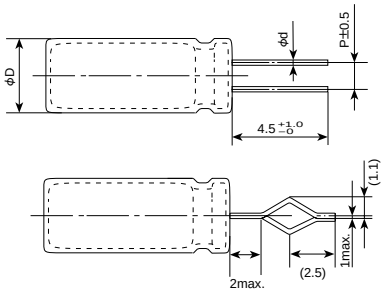
●Lead Configuration : FM

ϕD=5 to 8



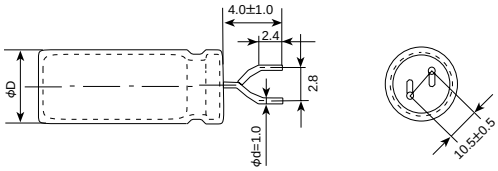
●Lead Configuration : MC

ϕD=10 to 18



●Lead Configuration : RC

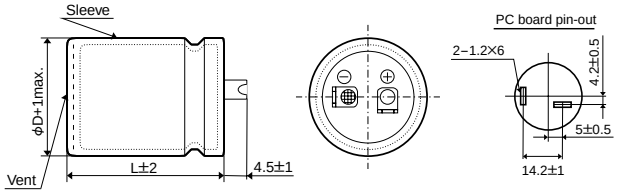
ϕD=20 & 22



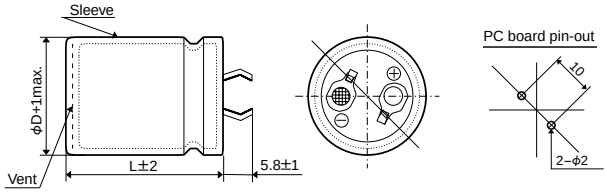
* Regarding to cut/formed lead for PSA/PS series, please consult us.

AVAILABLE TERMINALS FOR SNAP-IN TYPE [mm]

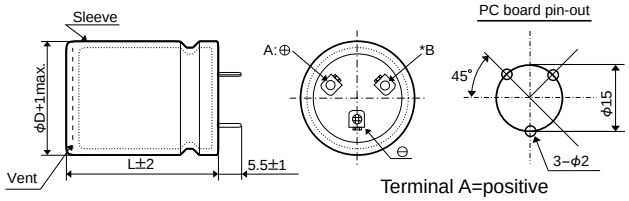
D=ϕ30 to ϕ40mm **Type : LISN**



D=ϕ22 to ϕ35mm **Type : VNSN**

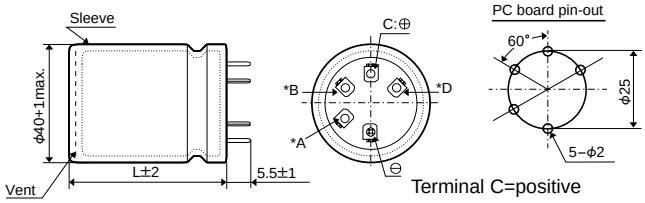


D=ϕ35 & ϕ40mm **Type : VRSS**



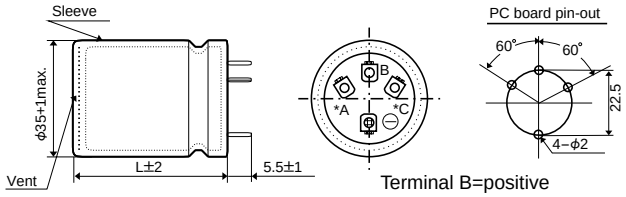
Terminal A=positive
Terminal B=blank

D=ϕ40mm **Type : VRST**

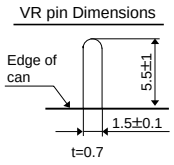


Terminal C=positive
Terminal A, B & D=blank

D=ϕ35 & ϕ40mm **Type : VRSD**



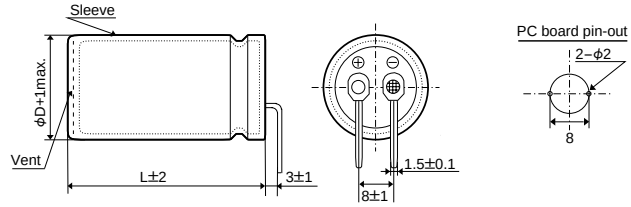
Terminal B=positive
Terminal A & C=blank



CAUTION

* Use the blank terminals for mechanical support only.
The blank terminals must not be connected to any copper trace on PC board.
Be sure to electrically isolate from the negative and the positive terminals.

D=ϕ20X30 to ϕ50 ℓ mm, ϕ22X30 to ϕ50 ℓ mm **Type : LCSN**



NIPPON CHEMI-CON

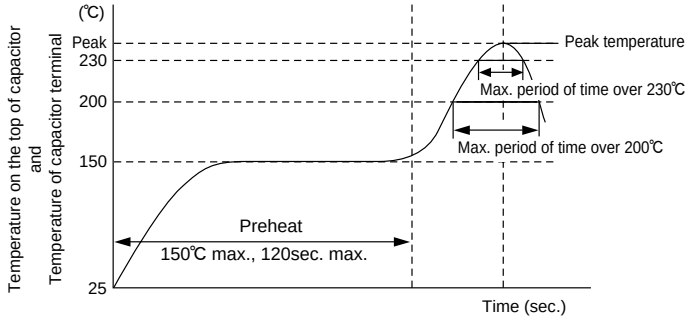
CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

RECOMMENDED REFLOW SOLDERING CONDITION

NP CAP™-PXC/PXA Series

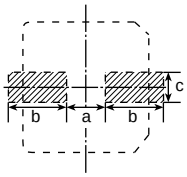
The following conditions are recommended for air or infrared reflow soldering PXC/PXA series onto a glass epoxy circuit board of 90×50×0.8mm (with resist) by cream solder. The temperatures shown are the surface temperature values on the top of the can and temperature of capacitor terminal.



Series	Peak temp.	Max.Period of time over 230℃	Max.Period of time over 200℃	Remarks
PXC PXA	250℃ (240℃)	40sec (30sec)	60sec (50sec)	The times of reflow soldering : once
	250℃ (240℃)	30sec	50sec	The times of reflow soldering : twice

( ) : Applies for 20V 82µF(J80) and 25V 39µF(J80)

●Recommended Solder Land on PC Board



Solder land on PC board

Case code	a	b	c
F55	1.9	3.5	1.6
F60	1.9	3.5	1.6
H70, H12	3.1	4.2	2.2
J80, J12	4.5	4.4	2.2

◆PRECAUTIONS FOR USERS

Soldering method

The capacitors of NP CAP™-PXC/PXA series have no capability to withstand such dip or wave soldering as totally immersing components into a solder bath.

Reflow soldering

Reflow the capacitors within Recommended Reflow Soldering Conditions. Verify no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically. Please consult us if other reflow conditions are employed.

1.Location of components ; Temperature increases at the edge of PC board more than the center.
2.Population of PC board ; The less the component population is, the more temperature rises.
3.Material of PC board ; A ceramic-made board needs more heat than a glass epoxy-made board. The heat increase may cause damage of the capacitors.
4.Thickness of PC board ; A thicker board needs heat than a thinner board. The heat may damage the capacitors.
5.Size of PC board ; A larger board needs heat than a smaller board. The heat may damage the capacitors.
6.Location of infrared ray lamps ; IR reflow as well as hot plate reflow applies heat only on the reverse side of the PC board to lessen heat stress to the capacitors.

Rework of soldering

Use a soldering iron for rework. Do not exceed an iron tip temperature of 300℃ and an exposure time of 5 seconds.

Mechanical stress

Do not grab the capacitors to lift the PC board and give stress to the capacitor. Avoid bending the PC board. These may damage the capacitors.

Cleaning assembly board

Immediately after solvent cleaning, remove residual solvent for at least 10 minutes with an air knife. The solvent is so insufficiently dry that the capacitors may be corroded.

Coating on assembly board

1.Before curing coating material, remove the cleaning solvents from the assembly board.
2.Before conformal coating, a chloride free pre-coat material is recommended to use for lessening stress to the capacitors.

Molding with resin

Internal chemical reaction gradually produces gas in the capacitor; then, internal pressure is increasing. If the end seal of the capacitor is completely molded with a resin, the gas stays inside the capacitor. It will face dangerous situation. The chlorine in resin will penetrate into the end seal, reach the inside element, and cause damage of the capacitor.

Glue

The followings are requirements of glue.

1.A low curing temperature for short period of time
2.Strong adhension and heat resistance after curing
3.Long shelf life
4.No corrosion

Others

Precautions for users for Aluminum Electrolytic Capacitors shall be referred.

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

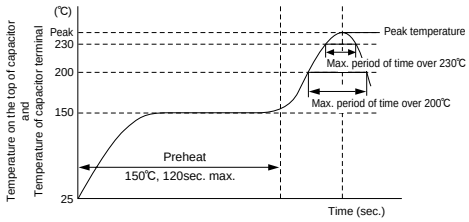
Surface Mount

RECOMMENDED REFLOW SOLDERING CONDITIONS

AIchip®-MF/MFK/MFK-Large

The following conditions are recommended for air or infrared reflow soldering of the surface mount capacitors onto a glass epoxy circuit board of 90×50×0.8mm (with resist) by cream solder. The temperatures shown are the surface temperature values on the top of the can and temperature of capacitor terminal.

●Reflow Profile
Method : Air or Infrated Reflow



Size	Peak temp.	Max.period of time over 200℃
A6～D13	240℃	20sec
	230℃	30sec
	220℃	35sec
H15～H25	230℃	20sec
	220℃	30sec

●Recommended Solder Land on PC Board
Series : MF/MFK/MFK-Large (Horizontal SMT)

Without dummy terminal (FC)

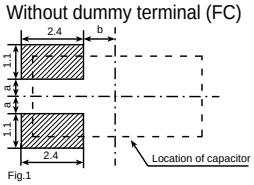


Fig.1

MFK-large

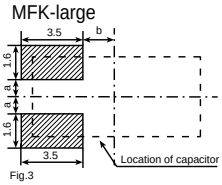


Fig.3

With dummy terminal (FD)

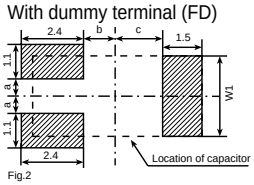


Fig.2

: Solder land on PC board

Case code	a	b	c	W1	Fig.
A6	0.75	1.2	1.65	3.1	Fig.1 or Fig.2
B6	1.0	1.2	1.65	3.6	
C6	1.3	1.2	1.65	4.1	
D6	1.5	1.2	1.65	4.6	
D8	1.5	2.2	2.65	4.6	
D10	1.5	3.2	3.65	4.6	
D13	1.5	4.7	5.15	4.6	
H15	2.9	5.4	—	—	Fig.3
H20	2.9	7.9	—	—	
H25	2.9	10.4	—	—	

◆PRECAUTIONS FOR USERS

Soldering method
The capacitors of Alchip-series have no capability to withstand such dip or wave soldering as totally immerses components into a solder bath.

Reflow soldering
Reflow the capacitors within Recommended Reflow Soldering Conditions. Verify no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically. Please consult us if other reflow conditions are employed.
1.Location of components ; Temperature increases at the edge of PC board more than the center.
2.Population of PC board ; The less the component population is, the more temperature rises.
3.Material of PC board ; A ceramic made board needs more heat than a glass epoxy made board. The heat increase may cause damage of the capacitors.
4.Thickness of PC board ; A thicker board needs more heat than a thinner board. The heat increase may damage the capacitors.
5.Size of PC board ; A larger board needs more heat than a smaller board. The heat increase may damage the capacitors.
6.Location of infrared ray lamps ; IR reflow as well as hot plate reflow applies heat only on the reverse side of the PC board to lessen heat stress to the capacitors.

Rework of soldering
Avoid reflow soldering more than once. Use a soldering iron for rework. Do not exceed an iron tip temperature of 300℃ and an exposure time of 5 seconds.

Mechanical stress
Do not use the capacitors for lifting the PC board and give stress to the capacitor. Avoid bending the PC board. These may damage the capacitors.

Glue
Glue is recommended to fix the FC type without dummy terminal on PC board. The followings are requirements of glue.
1.A low curing temperature for short period of time
2.Strong adhension and heat resistance after curing
3.Long shell life
4.No corrosion

Cleaning assembly board
Immediately after solvent cleaning, remove residual solvent for at least 10 minutes with an air knife. The solvent is so insufficiently dry for a long period of time that the capacitors may be corroded.

Coating on assembly board
1.Before curing coating material, remove the cleaning solvents from the assembly board.
2.Before conformal coating, a chloride free pre-coat material is recommended to use for lessening stress to the capacitors.

Molding with resin
Internal chemical reaction gradually produces gas in the capacitor; then, internal pressure is increasing. If the end seal of the capacitor is completely molded with a resin, the gas stays inside the capacitor. It will face dangerous situation. The chlorine contained resin will penetrate into the end seal, reach the inside element, and cause damage of the capacitor.

Dummy terminal (FD type)
The dummy terminal is purpose for preventing the capacitor body from sliding or lifting up the PC board during reflow soldering.
The following mechanical stresses to the capacitor after the soldering causes peeling off the dummy terminal from the PC board or from the body of the capacitor.
1.Mechanical shock when bending or cutting a multi-board.
2.Transportation shock
3.Mechanical shock when grabbing, poking or hitting the body of the capacitor.

Others
Precautions and Guidelines for Aluminum Electrolytic Capacitors shall be referred.

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Surface Mount

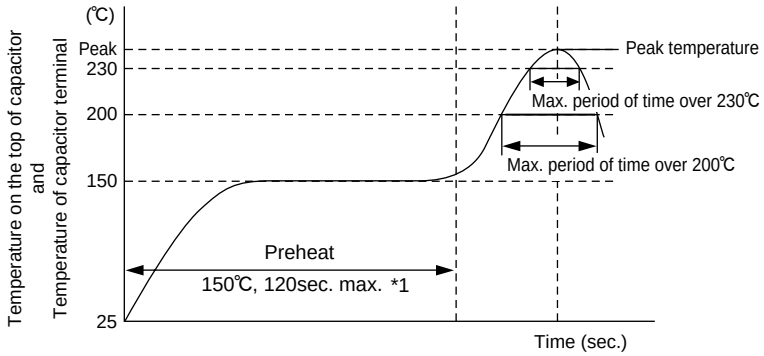
RECOMMENDED REFLOW SOLDERING CONDITIONS

Alchip®-MVS/MV/MVA/MVE/MVK/MVY/MVJ/MVH/MVL/MKA/MVZ/MZA

The following conditions are recommended for air or infrared reflow soldering of the surface mount capacitors onto a glass epoxy circuit board of 90×50×0.8mm (with resist) by cream solder. The temperatures shown are the surface temperature values on the top of the can and temperature of capacitor terminal.

●Reflow Profile

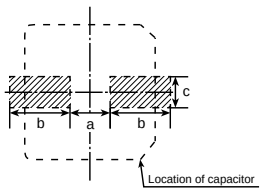
Method : Air or Infrated Reflow



*1 : MKA series : 150～180℃, 90sec. max.

●Recommended Solder Land on PC Board

Series : MVS/MVA/MV/MVE/MVK/MVY/MVJ/ MVH/MVL/MKA/MVZ/MZA (Vertical SMT)



: Solder land on PC board

Series	Size	Peak temp.	Max.period of time over 230℃	Max.period of time over 200℃
MVS/MVA	B55 to F80	240℃max.	—	20sec
MV/MVE		230℃max.	—	30sec
MVK/MVY		220℃max.	—	35sec
MVJ/MVH	H63 to M22	230℃max.	—	20sec
MVL/MVZ		220℃max.	—	30sec
MZA	D61 to F80	250℃max.	30sec	60sec
	H10, J10	240℃max.	20sec	50sec
MKA	D55 to F80	250℃max.	40sec	70sec
	H63 to J10	240℃max.	20sec	50sec

Case code	a	b	c
B55	0.8	2.2	1.6
D46, D55, D60	1.0	2.6	1.6
E46, E55, E60	1.4	3.0	1.6
F46, F55, F60, F80	1.9	3.5	1.6
H63	2.3	4.5	1.6
H10	3.1	4.2	2.2
J10	4.5	4.4	2.2
K14, K16	4.0	5.7	2.5
L17, L22	4.7	7.8	6.5
M17, M22	4.7	8.8	6.5

◆PRECAUTIONS FOR USERS

Soldering method

The capacitors of Alchip-series have no capability to withstand such dip or wave soldering as totally immerses components into a solder bath.

Reflow soldering

Reflow the capacitors within Recommended Reflow Soldering Conditions. Verify no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically. Please consult us if other reflow conditions are employed.

1.Location of components ; Temperature increases at the edge of PC board more than the center.
2.Population of PC board ; The less the component population is, the more temperature rises.
3.Material of PC board ; A ceramic made board needs more heat than a glass epoxy made board. The heat increase may cause damage of the capacitors.
4.Thickness of PC board ; A thicker board needs more heat than a thinner board. The heat increase may damage the capacitors.
5.Size of PC board ; A larger board needs more heat than a smaller board. The heat increase may damage the capacitors.
6.Location of infrared ray lamps ; IR reflow as well as hot plate reflow applies heat only on the reverse side of the PC board to lessen heat stress to the capacitors.

Rework of soldering

Avoid reflow soldering more than once. Use a soldering iron for rework. Do not exceed an iron tip temperature of 300℃ and an exposure time of 5 seconds.

Mechanical stress

Do not use the capacitors for lifting the PC board and give stress to the capacitor. Avoid bending the PC board. These may damage the capacitors.

Cleaning assembly board

Immediately after solvent cleaning, remove residual solvent for at least 10 minutes with an air knife. The solvent is so insufficiently dry for a long period of time that the capacitors may be corroded.

Coating on assembly board

1.Before curing coating material, remove the cleaning solvents from the assembly board.
2.Before conformal coating, a chloride free pre-coat material is recommended to use for lessening stress to the capacitors.

Molding with resin

Internal chemical reaction gradually produces gas in the capacitor; then, internal pressure is increasing. If the end seal of the capacitor is completely molded with a resin, the gas stays inside the capacitor. It will face dangerous situation. The chlorine contained resin will penetrate into the end seal, reach the inside element, and cause damage of the capacitor.

Others

Precautions and Guidelines for Aluminum Electrolytic Capacitors shall be referred.

STANDARDIZATION

The following series are discontinued. Please use the recommended replacements in the table.

◆LEAD TYPE REPLACEMENTS

Discontinued series	Characteristics	Replacements
SL	85℃ standard	SMG
SM		
SMC		
KM	105℃ standard	KME
KMC		
SM-BP	85℃ bi-polarized	SME-BP
KM-BP	105℃ bi-polarized	KME-BP
SR	85℃ low profile	SRG
SRC		
SRJ		
SX	Low impedance	LXV
SXA		
SXC		
RX		
RXC		
LXE		
SXF	Low impedance Long life	LXY
LXF		
TXF		
LX (10 to 63Vdc)	Long life	LXA
KX	High heat resistance	GXE
KXC		
GX		
EU	High temperature performance	LXY
LL	Low leakage current	LLA
LR		
KHA	High ripple current	KMF / KMX
KXB		
BX	JIS B X-characteristices	KMG
SM (VP-type)	85℃ large radial	SMG / SMH
SRF		
GX-VH	High operating temperature	*
SD	2 volt	
KRL	105℃ low leakage current	
KSA	Bi-polarized high ripple	

◆SNAP-IN REPLACEMENTS

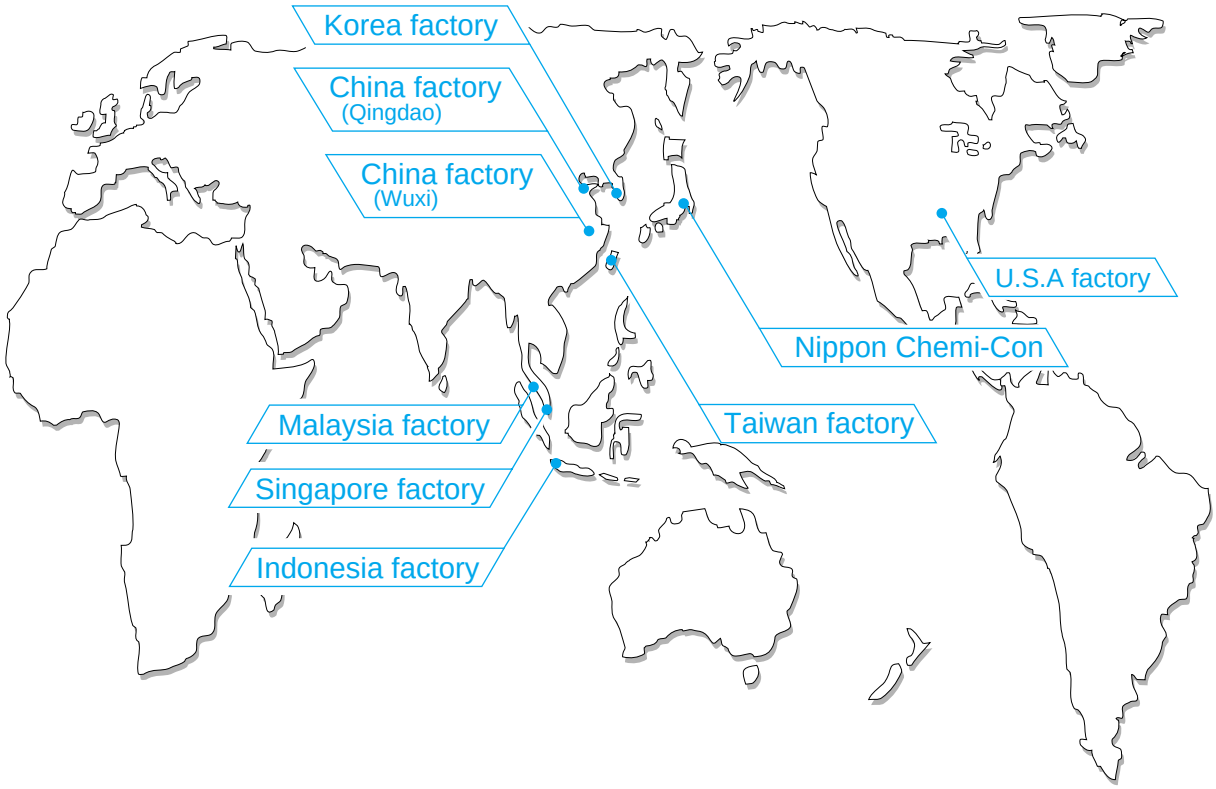
Discontinued series	Characteristics	Replacements
SM	85℃ standard	SMH / SMM
SME		
SMG		
KM	105℃ standard	KMH / KMM
KME		
KMG		
NM	Long case size	SMH
NMA		
BK	Long height	
NM-HR	High ripple current	KMH / KMM
BX	JIS B X-characteristics	
LX	Long life	LXG / LXQ
LXA		
RZ	Low impedance	*

◆SCREW-MOUNT TERMINAL REPLACEMENTS

Discontinued series	Characteristics	Replacements
EW	85℃ standard	SME
PW		
MW		
GW		
SW	100℃	KMH
RW	For inverter	RWE / RWF
RWA		
KM	High reliability	KMH
KME		
FW	Low impedance	KW

*Please consult us GX-VH, SD, KRL, KSA, and RZ series.

WORLD-WIDE MANUFACTURING LOCATIONS



◆AVAILABLE ITEMS BY MANUFACTURING LOCATIONS

Classification	Series	Korea factory	China factory (Qingdao)	China factory (Wuxi)	Singapore factory	Indonesia factory	Taiwan factory	Malaysia factory	U.S.A. factory
SMD	MV				●	●			
	MVK				●				
Low Profile	SRE				●	●			
	KRE				●				
	SRA	●	●			●	●		
	KMA	●				●	●		
	SRG	●				●			
General purpose	SMG	●	●	●	●	●	●		
	KMG	●	●	●	●	●	●		
	KME	●	●	●	●	●	●		
Bi-polar	SME-BP	●	●		●	●	●		
	KME-BP	●	●		●	●	●		
Low impedance, High ripple	KMF			●	●	●	●		
	LXV			●	●		●		
	KY			●	●	●	●		
	KZE			●	●	●	●		
	KMX			●			●		
Snap-in	SMH			●				●	●
	KMH			●				●	●
	SMM			●				●	●
	KMM			●				●	●
Screw-mount Terminal	KMH								●
	RWE								●
	RWF								●
	RWL								●
	LXA								●
	LX								●

CAT. No. E1001D

Conductive Polymer Aluminum Solid Capacitors

NIPPON CHEMI-CON

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

New!

NP CAP™-PXC Series

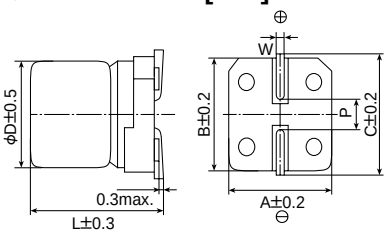
- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
  (ESR and rated ripple current values are improved from PXA series.)
- Rated voltage range : 2.5 to 16Vdc, Capacitance range : 27 to 470μF
- Case size range : φ5×6.0mm to φ8×7.0mm
- Suitable for DC-DC converters, voltage regulators and decoupling applications used to computer motherboards etc.

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃
Rated Voltage Range	2.5 to 16Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Surge Voltage	Rated voltage×1.15V (at 105℃)
Leakage Current	I=0.2CV (max.) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (Vdc) (at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	0.12 max. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Z(−25℃)/Z(+20℃)≦1.15 Z(−55℃)/Z(+20℃)≦1.25 (at 100kHz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 105℃.
	Appearance: No significant damage
	Capacitance change: ≦±20% of the initial value
	DF (tanδ): ≦150% of the initial specified value
	ESR: ≦150% of the initial specified value
	Leakage current: ≦The initial specified value
Bias Humidity	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 60℃, 90 to 95% RH for 500 hours.
	Appearance: No significant damage
	Capacitance change: ≦±20% of the initial value
	DF (tanδ): ≦150% of the initial specified value
	ESR: ≦150% of the initial specified value
	Leakage current: ≦The initial specified value
Surge Voltage	The capacitors shall be subjected to 1000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds.
	Appearance: No significant damage
	Capacitance change: ≦±20% of the initial value
	DF (tanδ): ≦150% of the initial specified value
	ESR: ≦150% of the initial specified value
	Leakage current: ≦The initial specified value
Failure Rate	1% per 1000 hours maximum (Confidence level 60% at 105℃)

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

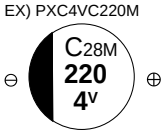
◆DIMENSIONS [mm]



Case code	φD	L	A	B	C	W	P
E60	5	5.7	5.3	5.3	5.9	0.5 to 0.8	1.4
F60	6.3	5.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H70	8	6.7	8.3	8.3	9.0	0.7 to 1.1	3.1

◆MARKING

EX) PXC4VC220M



◆PART NUMBERING SYSTEM

PXC 4 VC 220 M F60

- PXC : Series name
- 4 : Rated voltage in volts
- VC : Terminal type (VC)
- 220 : Nominal cap code
- M : Cap tolerance (±20%)
- F60 : Case code

Capacitance	Code
39μF	39
100μF	100
220μF	220

CAT. No. E1001D

NIPPON CHEMI-CON

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

New!
NP CAP™-PXC Series

◆STANDARD RATINGS

Case code	Rated voltage (V_{dc})	Nominal Capacitance (μF)	ESR (mΩmax./20℃)		Rated ripple current (mArms/100k to 300kHz) –55 to +105℃
			100kHz	300kHz**	
E60	2.5	180	30	22	2,000
	4	150	30	22	2,000
	6.3	100	35	26	1,780
	10	56	40	31	1,660
	16	27	45	35	1,570
F60	2.5	270	20	18	2,700
	4	220	21	19	2,640
	6.3	180	22	19	2,580
	10	82	23	21	2,400
	16	39	25	23	2,300
H70	2.5	470	17	16	3,420
	4	330	18	17	3,300
	6.3	220	18	17	3,300
	10	150	20	19	3,160
	16	82	25	23	2,830

** ESR(300kHz) : Reference value

CAT. No. E1001D

NIPPON CHEMI-CON

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

Upgrade!

NP CAP™-PXA Series

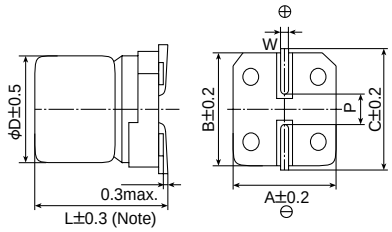
- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte
- Rated voltage range : 2.5 to 25Vdc, case size range : φ6.3×5.5mm to φ10×12.2mm (Case code H12 and J12 newly added)
- Suitable for DC-DC converters, voltage regulators and decoupling applications used to computer motherboards etc.
- High heat resistance to reflow soldering (See reflow soldering conditions)

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃
Rated Voltage Range	2.5 to 25Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Surge Voltage	Rated voltage×1.15V (at 105℃)
Leakage Current	Shall not exceed values shown in STANDARD RATINGS. (at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	0.12 max. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Z(−25℃)/Z(+20℃)≦1.15 Z(−55℃)/Z(+20℃)≦1.25 (at 100kHz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 105℃.
	Appearance: No significant damage
	Capacitance change: ≦±20% of the initial value
	DF (tanδ): ≦150% of the initial specified value
	ESR: ≦150% of the initial specified value
	Leakage current: ≦The initial specified value
Bias Humidity	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 60℃, 90 to 95% RH for 500 hours.
	Appearance: No significant damage
	Capacitance change: ≦±20% of the initial value
	DF (tanδ): ≦150% of the initial specified value
	ESR: ≦150% of the initial specified value
	Leakage current: ≦The initial specified value
Surge Voltage	The capacitors shall be subjected to 1000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds.
	Appearance: No significant damage
	Capacitance change: ≦±20% of the initial value
	DF (tanδ): ≦150% of the initial specified value
	ESR: ≦150% of the initial specified value
	Leakage current: ≦The initial specified value
Failure Rate	1% per 1000 hours maximum (Confidence level 60% at 105℃)

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

◆DIMENSIONS (Terminal Type=VC) [mm]



Note : L±0.5 for H12 and J12

Case code	φD	L	A	B	C	W	P
F55	6.3	5.2	6.6	6.6	7.2	0.5 to 0.8	1.9
F60	6.3	5.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H70	8	6.7	8.3	8.3	9.0	0.7 to 1.1	3.1
J80	10	7.7	10.3	10.3	11.0	0.7 to 1.1	4.5
H12	8	12.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J12	10	12.2	10.3	10.3	11.0	0.7 to 1.1	4.5

◆MARKING

EX) PXA16VC39M

◆PART NUMBERING SYSTEM

PXA 16 VC 39 M F60

- F60 : Case code
- M : Cap tolerance (±20%)
- 39 : Nominal cap code
- VC : Terminal type (VC)
- 16 : Rated voltage in volts
- PXA : Series name

Capacitance	Code
39μF	39
100μF	100
1000μF	1000

CAT. No. E1001D

NIPPON CHEMI-CON

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

Upgrade!

NP CAP™-PXA Series

◆STANDARD RATINGS

Case code	Rated voltage (Vdc)	Nominal Capacitance (μF)	Leakage current (μAmax. after 2 min.)	ESR (mΩmax./ 20℃, 100kHz)	Rated ripple current (mArms/100k to 300kHz) −55 to +105℃
F55	2.5	220	110	25	2,500
	4	100	80.0	26	2,450
		150	120		
	6.3	82	103	27	2,400
		100	126		
	10	56	112	31	2,250
	16	39	125	37	2,050
	20	22	88.0	50	1,650
F60	2.5	220	110	25	2,500
	4	100	80.0	26	2,450
		150	120		
	6.3	68	85.7	27	2,400
		82	103		
		100	126		
		120	151		
	10	47	94.0	31	2,250
		56	112		
	16	33	106	37	2,050
		39	125		
	20	22	88.0	50	1,650
	25	10	125	65	1,500
H70	2.5	560	280	23	3,100
	4	220	176	25	3,020
		330	264		
	6.3	150	189	25	3,020
		220	277		
	10	120	240	27	2,800
		150	300		
	16	82	262	30	2,700
	20	39	156	45	2,000
		47	188		
	25	22	275	50	1,800
J80	2.5	1,000	500	19	4,240
	4	470	376	20	4,130
		680	544		
	6.3	330	416	20	4,130
		470	592		
	10	270	540	24	3,770
		330	660		
	16	150	480	26	3,430
		180	576		
	20	82	328	40	2,500
	25	39	488	45	2,100
H12	2.5	680	340	12	4,770
	4	560	448		
	6.3	390	491		
		470	592		
	10	270	540	14	4,420
		330	660		
	16	180	576	16	4,360
J12	2.5	1,500	750	10	5,500
	4	820	656		
		1,200	960		
	6.3	680	857		
		820	1,033		
	10	470	940	12	5,300
		560	1,120		
	16	220	704	14	5,050
		330	1,056		

NIPPON CHEMI-CON

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

New! NP CAP™-PSA Series

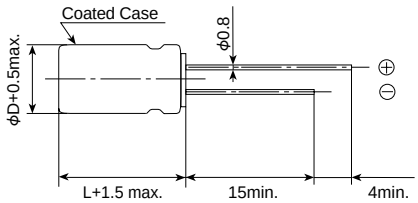
- Super low ESR, high temperature resistance and high ripple current capability
- Rated voltage range : 2.5 to 10Vdc
- 2000 hours at 105℃
- Suitable for DC-DC converters, voltage regulators and decoupling applications for computer motherboards

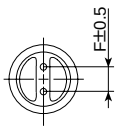
◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃
Rated Voltage Range	2.5 to 10Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Surge Voltage	Rated voltage×1.15V (at 105℃)
Leakage Current *Note	I=0.2CV (max.) Where, I : Leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (Vdc) (at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	0.08 max. (at 20℃, 120Hz)
Low Temperature Characteristics	Max. impedance ratio at 100kHz to the 20℃ value Z(−25℃)/Z(+20℃)≦1.15 Z(−55℃)/Z(+20℃)≦1.25
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 105℃.
	Appearance: No significant damage
	Capacitance change: ≦±20% of the initial measured value
	D.F. (tanδ): ≦150% of the initial specified value
	ESR: ≦150% of the initial specified value
	Leakage current: ≦The initial specified value
Bias Humidity Test	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to DC voltage at 60℃, 90 to 95% RH for 1000 hours.
	Appearance: No significant damage
	Capacitance change: ≦±20% of the initial measured value
	D.F. (tanδ): ≦150% of the initial specified value
	ESR: ≦150% of the initial specified value
	Leakage current: ≦The initial specified value
Surge Voltage Test	The capacitors shall be subjected to 1000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds.
	Appearance: No significant damage
	Capacitance change: ≦±20% of the initial measured value
	D.F. (tanδ): ≦150% of the initial specified value
	ESR: ≦150% of the initial specified value
	Leakage current: ≦The initial specified value
Failure Rate	1% per 1000 hours maximum (Confidence level 60% at 105℃)

*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℃.

◆DIMENSIONS [mm]

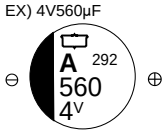




φD	8	10
L	11.5	11.5
F	3.5	5.0

◆MARKING

EX) 4V560μF



CAT. No. E1001D

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

New!
NP CAP™-PSA Series

◆PART NUMBERING SYSTEM

PSA 4 VB 560 M ___ H11 T15

- T15 — Lead configuration code
- H11 — Case code (H11 : 8×11.5, J12 : 10×11.5)
- ___ — Design change code
- M — Capacitance tolerance (±20%)
- 560 — Nominal Capacitance code
- VB — Terminal type (VB)
- 4 — Rated voltage in volts
- PSA — Series name

Capacitance	Code
270µF	270
560µF	560
820µF	820

Lead configuration code

T14: Ammo pack for ϕ10(F=5.0)
T15: Ammo pack for ϕ8(F=3.5)
E5 : Cut lead (Lead length C=3.5±0.5mm)
*Regarding to taping specifications and cut/formed lead, please consult us.

◆STANDARD RATINGS

Case size ϕD×L(mm)	Rated voltage (V_{dc})	Nominal Capacitance (µF) ±20%	ESR (mΩmax./20℃, 100k to 300kHz)	Ripple current (mArms max./ 105℃,100kHz)	Part Number
8×11.5	2.5	680	7	5,580	PSA2.5VB680MH11
	2.5	820	7	5,580	PSA2.5VB820MH11
	4	560	7	5,580	PSA4VB560MH11
	6.3	390	8	5,080	PSA6.3VB390MH11
	10	270	9	4,710	PSA10VB270MH11
10×11.5	2.5	1,000	6	5,860	PSA2.5VB1000MJ11
	4	820	6	5,860	PSA4VB820MJ11
	6.3	680	7	5,860	PSA6.3VB680MJ11
	10	470	8	5,650	PSA10VB470MJ11

NIPPON CHEMI-CON

CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

Upgrade!

NP CAP™-PS Series

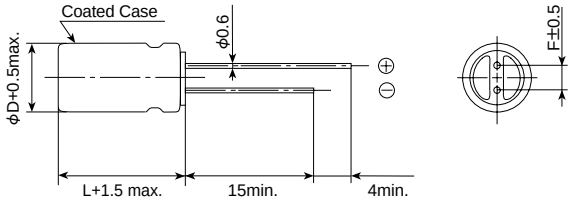
- Super low ESR, high temperature resistance
- Large capacitance & Improved high ripple current capability
- Rated voltage range : 2.5 to 25Vdc (20/25V newly added)
- 2000 hours at 105℃
- Suitable for DC-DC converters, voltage regulators and decoupling applications
  For computer motherboards

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃
Rated Voltage Range	2.5 to 25Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Surge Voltage	Rated voltage×1.15V (at 105℃)
Leakage Current *Note	I=0.2CV (max.) Where, I : Leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (Vdc) (at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	0.12 max. (at 20℃, 120Hz)
Low Temperature Characteristics	Max. impedance ratio at 100kHz to the 20℃ value Z(−25℃)/Z(+20℃)≦1.15 Z(−55℃)/Z(+20℃)≦1.25
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 105℃.
	Appearance: No significant damage Capacitance change: ≦±20% of the initial measured value D.F. (tanδ): ≦150% of the initial specified value ESR: ≦150% of the initial specified value Leakage current: ≦The initial specified value
Bias Humidity Test	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to DC voltage at 60℃, 90 to 95% RH for 500 hours.
	Appearance: No significant damage Capacitance change: ≦±20% of the initial measured value D.F. (tanδ): ≦150% of the initial specified value ESR: ≦150% of the initial specified value Leakage current: ≦The initial specified value
Surge Voltage Test	The capacitors shall be subjected to 1000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds.
	Appearance: No significant damage Capacitance change: ≦±20% of the initial measured value D.F. (tanδ): ≦150% of the initial specified value ESR: ≦150% of the initial specified value Leakage current: ≦The initial specified value
Failure Rate	1% per 1000 hours maximum (Confidence level 60% at 105℃)

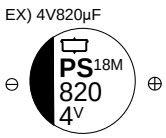
*Note : If any doubt arises, measure the leakage current after the following voltage treatment.
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105℃.

◆DIMENSIONS [mm]



ϕD	8	10
L	11.5	12.5
F	3.5	5.0

◆MARKING



CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

Upgrade!
NP CAP™-PS Series

◆PART NUMBERING SYSTEM

4 PS 820 M ___ J12 -T14

- Lead configuration code
- Case code (H11 : 8×11.5, J12 : 10×12.5)
- Design change number
- Capacitance tolerance (±20%)
- Nominal capacitance code
- Series name
- Rated voltage code

Capacitance	Code
270μF	270
560μF	560
820μF	820

Rated voltage	Code
2.5V	2R5
4V	4
6.3V	6
10V	10
16V	16
20V	20
25V	25

Lead configuration code

T14: Ammo pack for ϕ10(F=5.0)
T15: Ammo pack for ϕ8(F=3.5)
E5 : Cut lead (Lead length C=3.5±0.5mm)
*Regarding to taping specifications and cut/formed lead, please consult us.

◆STANDARD RATINGS

Case size ϕD×L(mm)	Rated voltage (Vdc)	Nominal Capacitance (μF)	ESR (mΩmax./20℃, 100k to 300kHz)	Ripple current (mArms max./ 105℃,100kHz)	Part Number
8×11.5	2.5	680	10	5,230	2R5PS680MH11
	4	560	10	5,230	4PS560MH11
	6.3	390	12	4,770	6PS390MH11
	10	270	14	4,420	10PS270MH11
	16	180	16	4,360	16PS180MH11
	20	100	24	3,320	20PS100MH11
	25	68	24	3,320	25PS68MH11
10×12.5	2.5	1,500	8	5,500	2R5PS1500MJ12
	4	820	8	5,500	4PS820MJ12
	6.3	680	10	5,500	6PS680MJ12
	10	470	12	5,300	10PS470MJ12
	16	330	14	5,050	16PS330MJ12
	20	150	20	4,320	20PS150MJ12
	25	100	20	4,320	25PS100MJ12

Surface Mount Aluminum Electrolytic Capacitors

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Standard, 85℃

Alchip® MF Series

- Wide variety of case sizes (7 sizes)
- Suitable to fit for downsized equipment
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

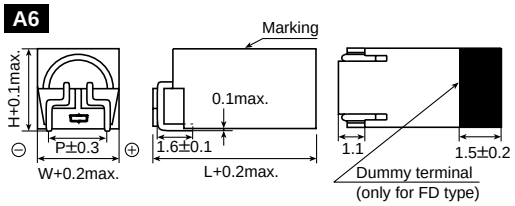
MF → MFK 105℃

◆SPECIFICATIONS

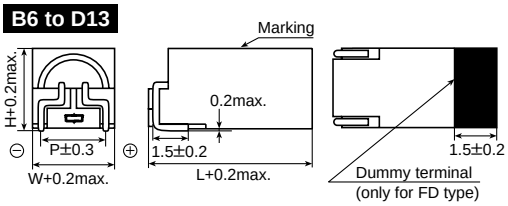
Items	Characteristics								
Category Temperature Range	−40 to +85℃								
Rated Voltage Range	4 to 50Vdc								
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)								
Leakage Current	I=0.01CV or 3μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)								
Dissipation Factor (tanδ)	See STANDARD RATINGS.								
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)		4V	6.3V	10V	16V	25V	35V	50V
	Z(−25℃)/Z(+20℃)	A6	10	7	5	4	3	2	2
		B6 & C6	9	6	4	3	2	2	2
		D6 to D13	7	4	3	2	2	2	2
	Z(−40℃)/Z(+20℃)	A6	18	13	10	8	6	5	5
		B6 & C6	17	12	9	7	5	4	4
		D6 to D13	15	10	8	6	4	3	3
	(at 120Hz)								
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 85℃.								
	Case code	A6	B6 & C6	D6 to D13					
	Capacitance change	≦±30% of the initial value	≦±25% of the initial value	≦±20% of the initial value					
	D.F. (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value	≦200% of the initial specified value					
	Leakage current	≦The initial specified value	≦The initial specified value	≦The initial specified value					
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 85℃ 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 (Terminal Type=FC or FD <dummy terminal>) [mm]

A6

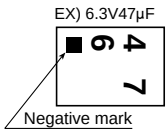


B6 to D13



Case code	L	W	H	P
A6	6.3	3.1	3.0	2.4
B6	6.3	3.6	3.5	3.0
C6	6.3	4.1	4.0	3.5
D6	6.3	4.6	4.5	4.0
D8	8.3	4.6	4.5	4.0
D10	10.3	4.6	4.5	4.0
D13	13.3	4.6	4.5	4.0

◆MARKING



◆PART NUMBERING SYSTEM

MF 6.3 FC 10 M B6

- B6 : Case code
- M : Cap tolerance (±20%)
- 10 : Nominal cap code
- FC : Terminal type (FC or FD)
- 6.3 : Rated voltage in volts
- MF : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	4			6.3			10			16			25			35			50		
0.1																			A6/B6	0.16/0.14	1.3/1.3
0.22																			A6/B6	0.16/0.14	2.2/2.2
0.33																			A6/B6	0.16/0.14	2.6/2.6
0.47																			A6/B6	0.16/0.14	3.2/3.2
1.0																			A6/B6	0.16/0.14	4.6/4.6
1.5																A6	0.18	5.3	B6	0.14	6.4
2.2																A6/B6	0.18/0.16	5.3/7.2	B6	0.16	7.7
3.3													A6/B6	0.20/0.18	6.1/8.3	B6	0.18	8.8	C6	0.16	10
4.7										A6/B6	0.35/0.24	6.8/9.0	B6	0.20	9.9	C6	0.18	11	D6	0.16	14
6.8							A6/B6	0.45/0.30	7.5/10	B6	0.35	10	C6	0.20	13	D6	0.18	16	D8	0.12	19
10				A6/B6	0.55/0.40	8.2/11	→			B6	0.35	12	D6	0.20	18	D8	0.14	22	D10	0.12	26
15	→			→			B6	0.45	14	C6	0.35	17	D8	0.16	25	D10	0.14	30	D13	0.12	38
22	→			B6	0.55	16	C6	0.45	19	D8	0.35	24	D10	0.16	34	D13	0.14	43			
33	→			C6	0.55	21	D6	0.45	24	D10	0.24	37	D13	0.16	51						
47	C6	0.65	21	D6	0.55	29	D10	0.28	41	D13	0.24	53									
68	D8	0.50	35	D10	0.32	44	D13	0.28	58												
100	D10	0.50	46	D13	0.32	63															
150	D13	0.50	67																		

Case code / Max. tanδ at 20℃, 120Hz / Rated ripple current (mArms) at 85℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Standard, 105℃

Alchip® MFK Series

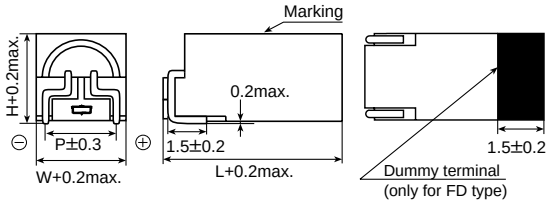
- Wide variety of case sizes (6 sizes)
- Suitable to fit for downsized equipment
- From 3.5mm height
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

MF → MFK (105℃)

◆SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	−40 to +105℃								
Rated Voltage Range	6.3 to 50Vdc								
Capacitance Tolerance	±20% (M)								(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)		6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	B6 & C6	0.40	0.30	0.24	0.18	0.16	0.14	
		D6 to D13	0.32	0.28	0.24	0.16	0.14	0.12	(at 20℃,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)		6.3V	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	B6 & C6	6	4	3	2	2	2	
		D6 to D13	4	3	2	2	2	2	
	Z(−40℃)/Z(+20℃)	B6 & C6	12	9	7	5	4	4	
		D6 to D13	10	8	6	4	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 105℃.								
	Case code		B6 & C6			D6 to D13			
	Capacitance change		≦±30% of the initial value			≦±20% of the initial value			
	D.F. (tanδ)		≦200% 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℃ after exposing them for 500 hours at 105℃ without voltage applied.								
	Case code		B6 & C6			D6 to D13			
	Capacitance change		≦±25% of the initial value			≦±15% of the initial value			
	D.F. (tanδ)		≦200% of the initial specified value			≦150% of the initial specified value			
	Leakage current		≦The initial specified value			≦The initial specified value			

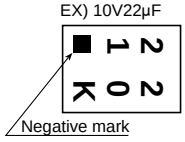
◆DIMENSIONS (Terminal Type=FC or FD <dummy terminal>) [mm]



Case code	L	W	H	P
B6	6.3	3.6	3.5	3.0
C6	6.3	4.1	4.0	3.5
D6	6.3	4.6	4.5	4.0
D8	8.3	4.6	4.5	4.0
D10	10.3	4.6	4.5	4.0
D13	13.3	4.6	4.5	4.0

◆MARKING

EX) 10V22μF



◆PART NUMBERING SYSTEM

MFK 25 FC 4R7 M C6

- C6 — Case code
- M — Cap tolerance (±20%)
- 4R7 — Nominal cap code
- FC — Terminal type (FC or FD)
- 25 — Rated voltage in volts
- MFK — Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
0.1											B6	1.3
0.15											B6	2.0
0.22											B6	2.4
0.33											B6	3.0
0.47											B6	3.5
0.68											B6	4.3
1.0											B6	5.2
1.5											B6	6.4
2.2									B6	7.2	C6	8.4
3.3							B6	8.3	C6	9.7	D6	13
4.7					B6	9.0	C6	11	D6	14	D8	16
6.8			B6	10	C6	12	D6	16	D8	18	D10	20
10	B6	11	→		C6	14	D8	21	→		D10	26
15	C6	15	D6	19	D8	23	→		D10	30	D13	38
22	D6	20	D8	25	→		D10	34	D13	43		
33	D8	27	→		D10	37	D13	51				
47	→		D10	41	D13	53						
68	D10	44	D13	58								
100	D13	63										

Case code

Rated ripple current (mArms) at 105℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Large capacitance, 105℃

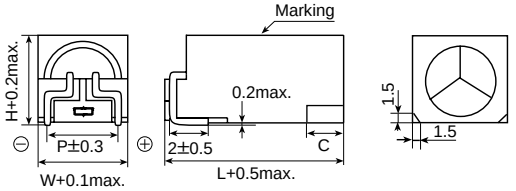
Alchip®-MFK Large Capacitance

- Endurance : 105℃ 2000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

◆SPECIFICATIONS

Items	Characteristics						
Category Temperature Range	−40 to +105℃						
Rated Voltage Range	10 to 50Vdc						
Capacitance Tolerance	±20% (M)						(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.30	0.25	0.22	0.18	0.18	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	3	2	2	2	2	
	Z(−40℃)/Z(+20℃)	8	6	4	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 105℃.						
	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℃ after exposing them for 500 hours at 105℃ 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					

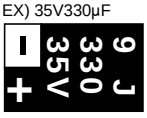
◆DIMENSIONS (Terminal Type=FC) [mm]



Case code	L	W	H	P	C
H15	17.1	9.0	9.0	7.4	0
H20	21.5	9.0	9.0	7.4	5
H25	26.5	9.0	9.0	7.4	10

◆MARKING

EX) 35V330μF



◆PART NUMBERING SYSTEM

MFK 10 FC 1000 M H25

- H25 : Case code
- M : Cap tolerance (±20%)
- 1000 : Nominal cap in μF
- FC : Terminal type (FC)
- 10 : Rated voltage in volts
- MFK : Series name

◆STANDARD RATINGS

μF \ Vdc	10			16			25			35			50		
47													H15	0.40	330
100													H15	0.40	330
180										H15	0.40	330	H20	0.27	440
220							H15	0.40	330	H20	0.27	440	H25	0.20	570
330				H15	0.40	330	H20	0.27	440	H25	0.20	570			
470	H15	0.40	330	H20	0.27	440	H25	0.20	570						
680	H20	0.27	440	H25	0.20	570									
1,000	H25	0.20	570												

- Rated ripple current (mArms) at 105℃, 100kHz
- Max. impedance (Ω) at 20℃, 100kHz
- Case code

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

4.5mm height, 85℃

Alchip® MVS Series

- 4.5mm height
- Endurance : 85℃ 2000 hours
- Reflow capability
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

MVS
↑ downsized
MV

◆SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	−40 to +85℃								
Rated Voltage Range	4 to 50Vdc								
Capacitance Tolerance	±20% (M)								(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.50	0.30	0.24	0.19	0.16	0.14	0.14	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	7	4	3	2	2	2	2	
	Z(−40℃)/Z(+20℃)	15	8	8	4	4	3	3	(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 85℃.

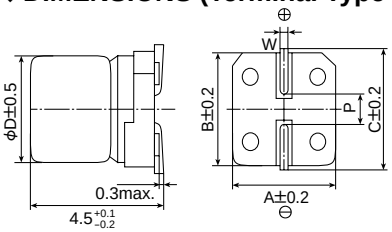
Rated voltage	4 & 6.3Vdc	10 to 50Vdc
Capacitance change	≦±30% of the initial value	≦±25% of the initial value
DF (tanδ)	≦300% of the initial specified value	≦300% of the initial specified value
Leakage current	≦The initial specified value	≦The initial specified value

Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1000 hours at 85℃ without voltage applied.

Rated voltage	4 & 6.3Vdc	10 to 50Vdc
Capacitance change	≦±30% of the initial value	≦±25% of the initial value
DF (tanδ)	≦300% of the initial specified value	≦300% of the initial specified value
Leakage current	≦The initial specified value	≦The initial specified value

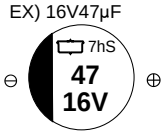
◆DIMENSIONS (Terminal Type=VC) [mm]



Case code	D	A	B	C	W	P
D46	4	4.3	4.3	5.1	0.5 to 0.8	1.0
E46	5	5.3	5.3	5.9	0.5 to 0.8	1.4
F46	6.3	6.6	6.6	7.2	0.5 to 0.8	1.9

◆MARKING

EX) 16V47μF



◆PART NUMBERING SYSTEM

MVS 16 VC 47 M F46

- F46 : Case code
- M : Cap tolerance (±20%)
- 47 : Nominal cap code
- VC : Terminal type (VC)
- 16 : Rated voltage in volts
- MVS : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	4		6.3		10		16		25		35		50	
0.1													D46	1.0
0.22													D46	2.0
0.33													D46	2.8
0.47													D46	4.0
1.0													D46	8.4
2.2													D46	13
3.3													D46	17
4.7									→		D46	18	E46	20
10							D46	23	→		E46	29	F46	33
22			D46	28	→		E46	37	→		F46	46		
33	D46	28	→		E46	41	→		F46	52				
47	D46	33	E46	45	→		F46	58						
100	E46	56	F46	70										
220	F46	96												

Case code
Rated ripple current (mArms) at 85℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 85℃

Alchip® MVA Series

- ϕ4 through ϕ18 case sizes are fully lined up
- Endurance : 85℃ 2000 hours
- Suitable to fit for downsized equipment
- Solvent-proof type except 100 to 450Vdc (see PRECAUTIONS AND GUIDELINES)

MVA
↑ downsized size extended
MV

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +85℃
Rated Voltage Range	4 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	Rated voltage (Vdc) | 4 to 100V | 160 to 450V D55 to J10 | I=0.01CV or 3μA, whichever is greater.(after 2 minutes) | – K14 to M22 | I=0.03CV or 4μA, whichever is greater.(after 1 minute) | I=0.04CV+100μA max.(after 1 minute) Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃)

Dissipation Factor (tanδ)

Rated voltage (Vdc)		4V	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	400 & 450V
tanδ (Max.)	D55 to J10	0.42	0.35	0.30	0.26	0.16	0.14	0.12	0.12	0.12	–	–
	K14 to M22	–	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.10	0.20	0.25

When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)

Low Temperature Characteristics (Max. Impedance Ratio)

Rated voltage (Vdc)		4V	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	400 & 450V
D55 to J10	Z(−25℃)/Z(+20℃)	7	4	3	2	2	2	2	2	3	–	–
	Z(−40℃)/Z(+20℃)	17	10	8	6	4	3	3	3	4	–	–
K14 to M22	Z(−25℃)/Z(+20℃)	–	5	4	3	2	2	2	2	2	3	6
	Z(−40℃)/Z(+20℃)	–	12	10	8	5	4	3	3	3	6	10

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 85℃.

Case code	D55 to J10	D55 to J10	K14 to M22
Rated voltage (Vdc)	4V & 6.3V	10 to 100V	6.3 to 450V
Capacitance change	≦±30% of the initial value	≦±20% of the initial value	
DF (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value	
Leakage current	≦The initial specified value	≦The initial specified value	

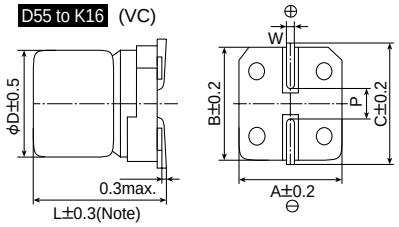
Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1000 hours at 85℃ without voltage applied.

Case code	D55 to J10	D55 to J10	K14 to M22
Rated voltage	4V & 6.3V	10 to 100V	6.3 to 450V
Capacitance change	≦±30% of the initial value	≦±20% of the initial value	
DF (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value	
Leakage current	≦The initial specified value	≦The initial specified value	

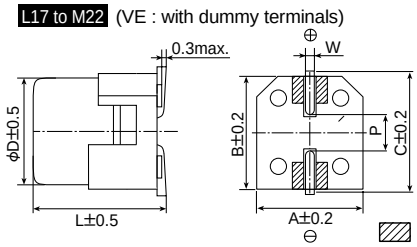
◆DIMENSIONS (Terminal Type=VC or VE) [mm]

D55 to K16 (VC)



Note : L±0.5 for H10, J10, K14 and K16

L17 to M22 (VE : with dummy terminals)



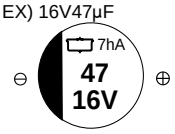
: Dummy terminals

Case code	D	L	A	B	C	W	P
D55	4	5.2	4.3	4.3	5.1	0.5 to 0.8	1.0
E55	5	5.2	5.3	5.3	5.9	0.5 to 0.8	1.4
F55	6.3	5.2	6.6	6.6	7.2	0.5 to 0.8	1.9
F60	6.3	5.7	6.6	6.6	7.2	0.5 to 0.8	1.9
F80	6.3	7.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5
K14	12.5	13.5	13.0	13.0	13.7	1.0 to 1.3	4.2
K16	12.5	16.0	13.0	13.0	13.7	1.0 to 1.3	4.2
L17	16	16.5	17.0	17.0	18.0	1.0 to 1.3	6.5
L22	16	21.5	17.0	17.0	18.0	1.0 to 1.3	6.5
M17	18	16.5	19.0	19.0	20.0	1.0 to 1.3	6.5
M22	18	21.5	19.0	19.0	20.0	1.0 to 1.3	6.5

◆MARKING

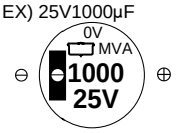
D55 to J10

EX) 16V47μF



K14 to H22

EX) 25V1000μF



◆PART NUMBERING SYSTEM

MVA 16 VC 47 M E55 ___

- Tray code (TR : If necessary)
- Case code
- Cap tolerance (±20%)
- Nominal cap code
- Terminal type (VC or VE)
- Rated voltage in volts
- Series name

Capacitance	Code
0.1μF	R1
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100
1000μF	1000

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 85℃

Alchip® MVA Series

◆STANDARD RATINGS

μF \ Vdc	4		6.3		10		16		25		35		50	
3.3													D55	15
4.7											D55	18	D55	18
10									D55	24	D55	24	E55	30
22					D55	26	D55	26	E55	41	E55	41	F55	47
33	D55	25	D55	30	D55	30	E55	37	E55	47	F55	54	F80	70
47	D55	30	D55	33	E55	44	E55	44	F55	60	F60	64	F80	85
56									F55	66				
100	E55	50	E55	55	F55	70	F55	70	F80	120	F80	120	H10	190
150					F55	79	F80	110	H10	210	H10	210		
220	F55	80	F55	88	F80	130	F80	130	H10	260	H10	260	J10	320
330	F80	135	F80	135	H10	270	H10	270	H10	300	J10	360	K14	600
470	F80	150	H10	280	H10	280	H10	280	J10	400	K14	600	K16 L17	740 850
680			H10	290			J10	380						
820			H10	320										
1,000	H10	320	J10	430	J10	430	K14	710	K14	820	L17	1100	L22 M22	1300 1400
1,500			J10	480										
2,200			K14	890	K14	960	L17	1150	L22 M17	1450 1400	M22	1700		
3,300			K16 L17	1000 1200	L17	1300	L22 M17	1450 1450	M22	1800				
4,700			L17	1400	L22 M17	1550 1600	M22	1750						
6,800			L22 M17	1750 1700	M22	1850								
10,000			M22	2000										

Rated ripple current (mArms) at 85℃, 120Hz
Case code

Non solvent-proof

μF \ Vdc	63		100		160		200		250		400		450	
0.10	D55	1.3												
0.22	D55	3												
0.33	D55	4												
0.47	D55	5												
1.0	D55	8												
2.2	D55	12												
3.3	E55	17												
4.7	E55	20									K14	120	K14	120
10	F55	32							K14	150	L17	140	L17	140
22	F80	60	H10	90			K14	240	K16	240	L22 M17	280 280	L22	280
33	H10	110	J10	120			K16	310	L17	340	M22	350	M22	350
47	H10	130			K16	370	L17	420	L22 M17	420 420				
56	J10	160												
68	J10	170	K14	380	L17	500	L22 M17	510 510	M22	490				
100	K14	380	K14	440	L22 M17	590 590	M22	590						
220	K14	580	L22 M17	850 800										
330	K16 L17	720 820	M22	1000										
470	L17 M17	950 1000												

Rated ripple current (mArms) at 85℃, 120Hz
Case code

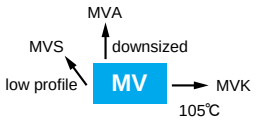
NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Standard, 85℃

Alchip® MV Series

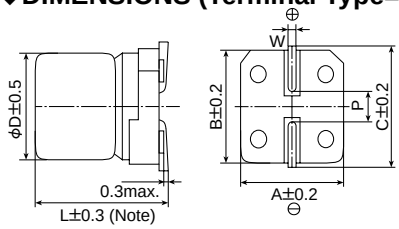
- From 5.5mm height
- Suitable to fit for downsized equipment
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)



◆SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	−40 to +85℃									
Rated Voltage Range	4 to 63Vdc									
Capacitance Tolerance	±20% (M)									(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)		4V	6.3V	10V	16V	25V	35V	50V	63V	
	tanδ (Max.)	B55	0.42	0.27	0.23	0.19	0.16	0.14	0.12	—	
		D55 to F60	0.42	0.24	0.20	0.16	0.14	0.12	0.10	0.12	
		H63 to J10	—	0.40	0.30	0.26	0.16	0.14	0.12	0.12	(at 20℃,120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)		4V	6.3V	10V	16V	25V	35V	50V	63V	
	Z(−25℃)/Z(+20℃)		7	4	3	2	2	2	2	2	
	Z(−40℃)/Z(+20℃)	B55	17	10	8	6	4	3	3	—	
		D55 to F60	15	10	8	6	4	3	3	3	
		H63 to J10	—	10	8	6	4	3	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours (B55 size 1000 hours) at 85℃.									
	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℃ after exposing them for 500 hours at 85℃ without voltage applied.									
	Case code	B55	D55 to J10							
	Capacitance change	≦±20% of the initial value	≦±15% of the initial value							
	D.F. (tanδ)	≦200% of the initial specified value	≦150% of the initial specified value							
	Leakage current	≦The initial specified value	≦The initial specified value							

◆DIMENSIONS (Terminal Type=VC) [mm]

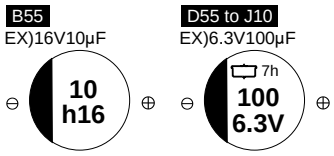


Case code	D	L	A	B	C	W	P
B55	3	5.2	3.3	3.3	3.7	0.45 to 0.75	0.8
D55 & D60	4	*5.2	4.3	4.3	5.1	0.5 to 0.8	1.0
E55 & E60	5	*5.2	5.3	5.3	5.9	0.5 to 0.8	1.4
F55 & F60	6.3	*5.2	6.6	6.6	7.2	0.5 to 0.8	1.9
H63	8	6.3	8.3	8.3	9.0	0.5 to 0.8	2.3
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5

* : L=5.7 for D60, E60 and F60.

Note : L±0.5 for H63. H10 and J10

◆MARKING



◆PART NUMBERING SYSTEM

MV 50 VC R1 M D55

- D55 — Case code
- M — Cap tolerance (±20%)
- R1 — Nominal cap code
- VC — Terminal type (VC)
- 50 — Rated voltage in volts
- MV — Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100
1000μF	1000

◆STANDARD RATINGS

μF \ Vdc	4		6.3		10		16		25		35		50		63	
0.1													B55	D55 1.0	1.3	D55 1.3
0.15													B55	D55 2.0	2.0	D55 2.0
0.22													B55	D55 2.0	2.9	D55 2.9
0.33													B55	D55 3.0	3.5	D55 3.5
0.47													B55	D55 3.8	4.2	D55 4.2
0.68													B55	D55 4.6	5.1	D55 5.1
1.0													B55	D55 5.6	6.2	D60 7.0
1.5													B55	D55 6.9	7.5	D60 8.4
2.2											B55	7.7	B55	D55 8.3	10	D60 10
3.3											B55	9.4	D55	14	E60	13
4.7									B55	10.5	D55	15	E55	19	F60	18.5
6.8							B55	11.6	D55	16	E55	20	F55	24	F60	21
10					B55	12.8	B55 D55	14 17	→		E55	25	F55	29	H10	46
15			B55	14.5	D55	20	E55	26	→		F55	33	F60	32	H10	52
22	B55	14	B55 D55	17.5 23	→		E55	32	→		F55	40	F60	45	H10	69
33	D55	23	→		E55	35	→		F55	45	F60	55	H63	95	H10	85
47	D55	27	E55	38	→		F55	50	F60	65	H63	105	H10	140	H10	101
68	E55	38	→		F55	54	F60	78	H63	115	H10	157	J10	170	J10	125
100	E55	46	F55	60	F60	70	→		H63	145	H10	175	J10	195		
220	F55	74	→		H63	175	H10	215	→		J10	265				
330			H63	190	→		H10	270	J10	305						
470			H10	265	→		J10	330								
1,000			J10	400												

Case code

Rated ripple current (mArms) at 85℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 105℃

Alchip®-MVE Series

- Rated voltage range : 6.3 to 450V, capacitance range : 0.47 to 6800μF
- Endurance : 1000 to 2000 hours at 105℃
- Case size range : φ4×5.5 to φ18×21.5
- Solvent-proof type except 100 to 450Vdc (see PRECAUTIONS AND GUIDELINES)

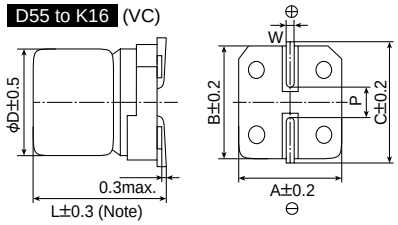
MVE
↑ downsized size extended
MVK

◆SPECIFICATIONS

Items	Characteristics											
Category Temperature Range	-40 to +105℃											
Rated Voltage Range	6.3 to 450Vdc											
Capacitance Tolerance	±20%(M) (20℃, 120Hz)											
Leakage Current	Rated voltage(Vdc)		6.3 to 100V					160 to 450V				
	D55 to J10		I=0.01CV or 3μA, whichever is greater (2 minutes)					—				
	K14 to M22		I=0.03CV or 4μA, whichever is greater (1 minute)					I=0.04CV+100μA (1minute)				
	Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (20℃)											
Dissipation Factor (tanδ)	See STANDARD RATINGS (20℃, 120Hz)											
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)		6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	400 to 450V
	D55 to J10	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	2	3	—	—
		Z(-40℃)/Z(+20℃)	12	8	6	4	3	3	3	4	—	—
	K14 to M22	Z(-25℃)/Z(+20℃)	5	4	3	2	2	2	2	2	3	6
		Z(-40℃)/Z(+20℃)	10	8	6	4	3	3	3	3	6	10 (120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for the specified period of time at 105℃.											
	Case code		D55 to F80					H10 to M22				
	Time		1000 hours					2000 hours				
	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℃ after exposing them for 1000 hours (500 hours for B55 to F80 size) at 105℃ without voltage applied.											
	Case code		D55 to F80					H10 to H22				
	Capacitance change		≦±25% of the initial value					≦±20% of the initial value				
	D.F. (tanδ)		≦200% of the initial specified value					≦200% of the initial specified value				
	Leakage current		≦The initial specified value					≦The initial specified value				

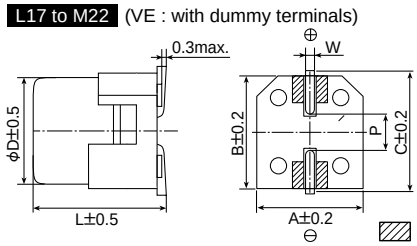
◆DIMENSIONS (Terminal Type=VC or VE) [mm]

D55 to K16 (VC)



Note : L±0.5 for H10, J10, K14 and K16

L17 to M22 (VE : with dummy terminals)



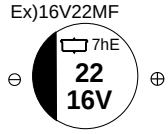
: Dummy terminals

Case code	D	L	A	B	C	W	P
D55	4	5.2	4.3	4.3	5.1	0.5 to 0.8	1.0
E55	5	5.2	5.3	5.3	5.9	0.5 to 0.8	1.4
F55	6.3	5.2	6.6	6.6	7.2	0.5 to 0.8	1.9
F60	6.3	5.7	6.6	6.6	7.2	0.5 to 0.8	1.9
F80	6.3	7.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5
K14	12.5	13.5	13.0	13.0	13.7	1.0 to 1.3	4.2
K16	12.5	16.0	13.0	13.0	13.7	1.0 to 1.3	4.2
L17	16	16.5	17.0	17.0	18.0	1.0 to 1.3	6.5
L22	16	21.5	17.0	17.0	18.0	1.0 to 1.3	6.5
M17	18	16.5	19.0	19.0	20.0	1.0 to 1.3	6.5
M22	18	21.5	19.0	19.0	20.0	1.0 to 1.3	6.5

◆MARKING

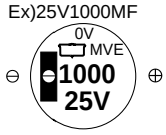
D55 to J10

Ex)16V22MF



K14 to M22

Ex)25V1000MF



◆PART NUMBERING SYSTEM

MVE 50 VC 220 M J10 ___

- Tray code (TR : If necessary)
- Case code
- Cap tolerance (±20%)
- Nominal cap code
- Terminal type (VC or VE)
- Rated voltage in volts
- Series name

Capacitance	Code
10μF	10
100μF	100
1000μF	1000

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 105℃

Alchip® MVE Series

◆STANDARD RATINGS

μF \ Vdc	6.3			10			16			25			35			50			63		
0.47																D55	5	0.12	D55	5	0.12
1.0																D55	8	0.12	D55	8	0.12
2.2																D55	12	0.12	D55	12	0.12
3.3																D55	15	0.12	E55	17	0.12
4.7													D55	16	0.14	E55	20	0.12	F55	22	0.12
10							D55	17	0.20	E55	27	0.16	E55	27	0.14	F55	32	0.12	F55	32	0.12
22	D55	22	0.30	E55	30	0.24	E55	30	0.20	F55	44	0.16	F55	44	0.14	F60	47	0.12	F80	58	0.12
33	E55	34	0.30	E55	34	0.24	F55	45	0.20	F55	50	0.16	F60	54	0.14	F80	65	0.14	H10	140	0.12
47	E55	38	0.30	F55	48	0.24	F55	48	0.20	F55	60	0.16	F80	80	0.16	F80	80	0.14	H10	170	0.12
100	F55	69	0.30	F55	69	0.30	F55	69	0.26	F80	100	0.18	F80	100	0.16	H10	230	0.14	J10	310	0.12
150				F80	100	0.35	F80	100	0.28	H10	240	0.18	H10	260	0.16						
220	F80	120	0.45	F80	120	0.35	F80	120	0.28	H10	320	0.18	J10	375	0.16	J10	375	0.14	K14	470	0.14
																			L17	560	0.14
330	H10	290	0.40	H10	290	0.35	H10	290	0.28	J10	450	0.16	J10	450	0.16	K14	500	0.18	L17	700	0.14
																L17	600	0.18	M17	750	0.14
470	H10	320	0.45	H10	320	0.35	H10	320	0.28	J10	490	0.18	K14	520	0.22	L17	700	0.18	L22	900	0.14
													L17	650	0.22	M17	750	0.18	M17	900	0.14
680	H10	340	0.45				J10	470	0.28												
1,000	J10	410	0.40	J10	410	0.35	K14	550	0.30	L17	820	0.26	L17	750	0.22	M22	1200	0.18			
							L17	650	0.30	M17	880	0.26	M17	1000	0.22						
1,500	J10	550	0.45																		
2,200	K14	680	0.40	K16	750	0.36	L17	950	0.32	L22	1250	0.28	M22	1450	0.24						
	L17	840	0.40	L17	850	0.36	M17	1000	0.32	M22	1300	0.28									
3,300	K16	850	0.42	L17	1000	0.38	L22	1200	0.34												
	M17	1000	0.42	M17	1100	0.38	M17	1200	0.34												
4,700	L22	1200	0.44	L22	1300	0.40															
	M17	1200	0.44	M22	1350	0.40															
6,800	L22	1200	0.48																		
	M22	1350	0.48																		

DF (tanδ at 20℃, 120Hz)
Rated ripple current (mArms at 105℃, 120Hz)
Case code

Non solvent-proof

μF \ Vdc	100			160			200			250			400			450		
3.3																K14	40	0.20
4.7										K14	65	0.15	K16	50	0.20	K16	50	0.20
10							K14	80	0.15	K16	105	0.15	L17	85	0.20	L17	85	0.20
22	H10	100	0.12				K16	110	0.15	L17	180	0.15	M22	130	0.20	M22	130	0.20
33	J10	150	0.12	K14	95	0.15	L17	220	0.15	L22	230	0.15						
										M17	230	0.15						
47	K14	250	0.10	L17	260	0.15	L22	270	0.15	M22	280	0.15						
							M17	270	0.15									
68	K14	300	0.10	L22	320	0.15	M22	330	0.15									
				M17	320	0.15												
100	K14	380	0.10	L22	380	0.15												
	L17	450	0.10															
220	L22	750	0.10															
	M17	750	0.10															
330	M22	980	0.10															

DF (tanδ at 20℃, 120Hz)
Rated ripple current (mArms at 105℃, 120Hz)
Case code

CAT. No. E1001D

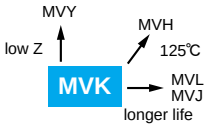
NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Standard, 105℃

Alchip® MVK Series

- Endurance : 105℃ 1000 to 2000 hours
- Suitable to fit for downsized equipment
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)



◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +105℃
Rated Voltage Range	6.3 to 50Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 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℃ after 2 minutes)

Dissipation Factor (tanδ)

Rated voltage (Vdc)		6.3V	10V	16V	25V	35V	50V
tanδ (Max.)	D55 to F55	0.30	0.24	0.20	0.16	0.14	0.12
	H63 to J10	0.40	0.30	0.26	0.16	0.14	0.12

(at 20℃,120Hz)

Low Temperature Characteristics (Max. Impedance Ratio)

Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V
Z(−25℃)/Z(+20℃)	4	3	2	2	2	2
Z(−40℃)/Z(+20℃)	10	8	6	4	3	3

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for the specified period of time at 105℃.

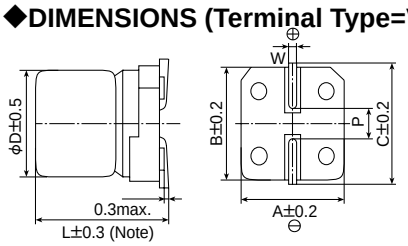
Case code	D55 to F55	H63 to J10
Time	1000hours	2000hours
Capacitance change	≦±30% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦300% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦The initial specified value

Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for the specified time at 105℃ without voltage applied.

Case code	D55 to F55	H63 to J10
Time	500hours	1000hours
Capacitance change	≦±25% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦The initial specified value

◆DIMENSIONS (Terminal Type=VC) [mm]

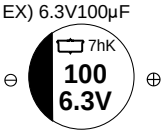


Case code	D	L	A	B	C	W	P
D55	4	5.2	4.3	4.3	5.1	0.5 to 0.8	1.0
E55	5	5.2	5.3	5.3	5.9	0.5 to 0.8	1.4
F55	6.3	5.2	6.6	6.6	7.2	0.5 to 0.8	1.9
H63	8	6.3	8.3	8.3	9.0	0.5 to 0.8	2.3
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5

Note : L±0.5 for H63, H10 and J10

◆MARKING

EX) 6.3V100μF



◆PART NUMBERING SYSTEM

MVK 50 VC R47 M D55

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100
1000μF	1000

Case code
Cap tolerance (±20%)
Nominal cap code
Terminal type (VC)
Rated voltage in volts
Series name

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
0.1											D55	1.3
0.22											D55	2.6
0.33											D55	3.2
0.47											D55	3.8
1.0											D55	5.6
2.2											D55	10
3.3											D55	14
4.7									D55	15	E55	19
10					D55	16	→		E55	25	F55	29
22	D55	21	→		E55	30	→		F55	40	H63	70
33	→		E55	34	→		F55	45	H63	80	H10	140
47	E55	36	→		F55	48	H63	80	→		H10	170
100	F55	56	H63	90	→		H10	180	→		J10	310
220	→		H10	180	→		→		J10	375		
330	H10	290	→		→		J10	450				
470	→		→		J10	460						
1000	J10	410										

Case code
Rated ripple current (mArms) at 105℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Pb Free, 105℃

Alchip®-MKA Series

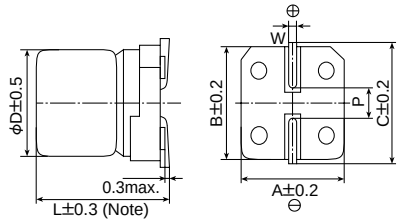
- Endurance at 105℃ 1000 to 2000 hours assured
- Rated voltage : 6.3V to 50V, Nominal capacitance : 0.1 to 1000μF
- Case sizes : φ4×5.5 to φ10×10.5mm
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

MKA
Pb Free
MVK

◆SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-40 to +105℃							
Capacitance Tolerance	±20%(M)							(at 20℃, 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℃, 2 minute)
Dissipation Factor (tanδ)	Rated voltage(Vdc)		6.3V	10V	16V	25V	35V	50V
	tanδ(Max.)	D55 to F55	0.30	0.24	0.20	0.16	0.14	0.12
		F80 to J10	0.40	0.30	0.26	0.16	0.14	0.12
								(20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage(Vdc)		6.3	10	16	25	35	50
	Z(-25℃)/Z(+20℃)		4	3	2	2	2	2
	Z(-40℃)/Z(+20℃)		10	8	6	4	3	3
								(120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for the specified period of time at 105℃.							
	Sizes		D55 to F55		F80,H63,H10,J10			
	Time		1000 hours		2000 hours			
	Capacitance change		≦±30% of the initial measured value		≦±20% of the initial measured 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			

◆DIMENSIONS (Terminal Type = VC) [mm]

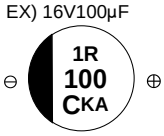


Note : L±0.5 for H63, H10 and J10

Case code	D	L	A	B	C	W	P
D55	4	5.2	4.3	4.3	5.1	0.5 to 0.8	1.0
E55	5	5.2	5.3	5.3	5.9	0.5 to 0.8	1.4
F55	6.3	5.2	6.6	6.6	7.2	0.5 to 0.8	1.9
F80	6.3	7.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H63	8	6.3	8.3	8.3	9.0	0.5 to 0.8	2.3
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5

◆MARKING

EX) 16V100μF



◆PART NUMBERING SYSTEM

MKA 35 VC 220 M J10

- J10 : Case code
- M : Capacitance tolerance (±20%)
- 220 : Nominal capacitance code
- VC : Terminal type (VC)
- 35 : Rated voltage in volts
- MKA : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100
1000μF	1000

◆RATED VOLTAGE CODE

Rated voltage (Vdc)	Code
6.3	j
10	A
16	C
25	E
35	V
50	H

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
0.1											D55	1.3
0.22											D55	2.6
0.33											D55	3.2
0.47											D55	3.8
1.0											D55	5.6
2.2											D55	10
3.3											D55	14
4.7	Case code	Rated ripple current (mArms) at 105℃, 120Hz							D55	15	E55	19
10					D55	16	→		E55	25	F55	29
22	D55	21	→		E55	30	→		F55	40	F80 (H63)	70 70
33	→		E55	34	→		F55	45	F80 (H63)	80 80	H10	140
47	E55	36	→		F55	48	F80 (H63)	80 80	→		H10	170
100	F55	56	F80 (H63)	90 90	→		H10	180	→		J10	310
220	→		H10	180	→		→		J10	375		
330	H10	290	→		→		J10	450				
470	→		→		J10	460						
1,000	J10	410										

Note : Parenthesized capacitances are sub-standard parts.

Note : → Use next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Lower impedance, 105℃

New! Alchip® MZA Series

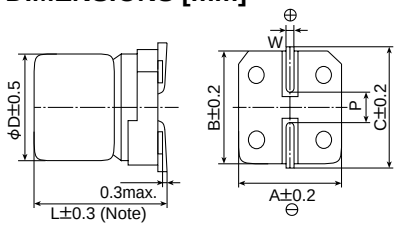
- Very low impedance, 105℃ 2000 hour-life
- Pb-free design : Sn-Bi plating terminal
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

MZA
↑ lower Z
MVZ
↑ lower Z
MVY

◆SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-55 to +105℃							
Rated Voltage Range	6.3 to 50Vdc							
Capacitance Tolerance	±20%(M)							(20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage(Vdc)	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.26	0.19	0.16	0.14	0.12	0.10	(20℃, 120Hz)
Low Temperature Characteristics (Max. impedance Ratio)	Rated voltage(Vdc)	6.3V	10V	16V	25V	35V	50V	
	Z(-25℃)/Z(+20℃)	2	2	2	2	2	2	
	Z(-40℃)/Z(+20℃)	3	3	3	3	3	3	
	Z(-55℃)/Z(+20℃)	4	4	4	3	3	3	(120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 105℃.							
	Capacitance change	≦±30% of the initial measured value						
	D.F. (tanδ)	≦200% of the initial specified value						
	Leakage current	≦The initial specified value						

◆DIMENSIONS [mm]

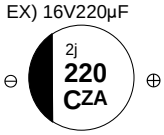


Note : L±0.5 for H10 and J10

Case code	D	L	A	B	C	W	P
D61	4	5.8	4.3	4.3	5.1	0.5 to 0.8	1.0
E61	5	5.8	5.3	5.3	5.9	0.5 to 0.8	1.4
F61	6.3	5.8	6.6	6.6	7.2	0.5 to 0.8	1.9
F80	6.3	7.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5

◆MARKING

EX) 16V220μF



◆PART NUMBERING SYSTEM

MZA 16 VC 220 M F80

- F80 : Case code
- M : Capacitance tolerance (±20%)
- 220 : Nominal capacitance code
- VC : Terminal type (VC)
- 16 : Rated voltage in volts
- MZA : Series name

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
1000μF	1000

◆RATED VOLTAGE CODE

Rated voltage (Vdc)	Code
6.3	j
10	A
16	C
25	E
35	V
50	H

◆STANDARD RATINGS

μF \ Vdc	6.3			10			16			25			35			50		
4.7													D61	1.35	90	D61	2.90	60
10							D61	1.35	90	D61	1.35	90	D61	1.35	90	E61	1.52	85
													E61	0.70	160	F61	0.88	165
22	D61	1.35	90	D61	1.35	90	D61	1.35	90	E61	0.70	160	E61	0.70	160	F61	0.88	165
							E61	0.70	160									
33	→			D61	1.35	90	→			E61	0.70	160	F61	0.36	240	F80	0.68	195
				E61	0.70	160				F61	0.36	240						
47	D61	1.35	90	→			E61	0.70	160	F61	0.36	240	F61	0.36	240	F80	0.68	195
	E61	0.70	160				F61	0.36	240									
100	E61	0.70	160	→			F61	0.36	240	F80	0.34	280	F80	0.34	280	H10	0.34	350
	F61	0.36	240										H10	0.16	600			
220	F61	0.36	240	F80	0.34	280	F80	0.34	280	H10	0.16	600	H10	0.16	600	J10	0.18	670
330	F80	0.34	280	H10	0.16	600	H10	0.16	600	H10	0.16	600	J10	0.08	850			
470	H10	0.16	600	H10	0.16	600	H10	0.16	600	J10	0.08	850						
680	→			H10	0.16	600	J10	0.08	850									
1000	H10	0.16	600	J10	0.08	850												
1500	J10	0.08	850															

Note : → Use next higher voltage part.

- Rated ripple current (mArms) at 105℃, 100kHz
- Impedance (Ω max.) at 20℃, 100kHz
- Case code

CAT. No. E1001D

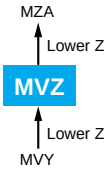
NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

Alchip®-MVZ Series

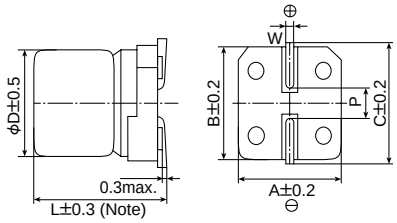
- Very low impedance, 105℃ 1000-2000 hour-life
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)



◆SPECIFICATIONS

Items	Characteristics						
Category Temperature Range	-55 to +105℃						
Rated Voltage Range	6.3 to 25Vdc						
Capacitance Tolerance	±20%(M)						(20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage(Vdc)		6.3V	10V	16V	25V	
	tanδ (Max.)	D60 to F80	0.24	0.20	0.16	0.14	
		H10, J10	0.28	0.24	0.20	0.16	(20℃, 120Hz)
Low Temperature Characteristics (Max. impedance Ratio)	Rated voltage(Vdc)		6.3V	10V	16V	25V	
	Z(-25℃)/Z(+20℃)		3	2	2	2	
	Z(-55℃)/Z(+20℃)		5	4	4	3	(120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours (H10/J10 sizes 2,000 hours) at 105℃.						
	Rated voltage (Vdc)	6.3V		10 to 25V			
	Capacitance change	≦±30% of the initial value		≦±25% of the initial value			
	D.F. (tanδ)	≦200% of the initial specified value		≦200% of the initial specified value			
	Leakage current	≦The initial specified value		≦The initial specified value			

◆DIMENSIONS [mm]

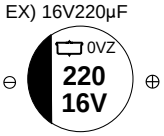


Note : L±0.5 for H10 and J10

Case code	D	L	A	B	C	W	P
D60	4	5.7	4.3	4.3	5.1	0.5 to 0.8	1.0
E60	5	5.7	5.3	5.3	5.9	0.5 to 0.8	1.4
F60	6.3	5.7	6.6	6.6	7.2	0.5 to 0.8	1.9
F80	6.3	7.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5

◆MARKING

EX) 16V220μF



◆PART NUMBERING SYSTEM

MVZ 16 VC 220 M F80

- F80 : Case code
- M : Capacitance tolerance (±20%)
- 220 : Nominal capacitance code
- VC : Terminal type (VC)
- 16 : Rated voltage in volts
- MVZ : Series name

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
1000μF	1000

◆STANDARD RATINGS

μF \ Vdc	6.3			10			16			25		
1.0	Case code / Impedance (Ω) at 20℃, 100kHz / Rated ripple current (mArms) at 105℃, 100kHz											
2.2												
3.3												
4.7												
10										D60	1.80	80
15							D60	1.80	80	E60	0.76	150
22	D60	1.8	80	D60	1.80	80				E60	0.76	150
27							E60	0.76	150	F60	0.44	230
33	E60	0.76	150	E60	0.76	150				F60	0.44	230
47										F60	0.44	230
56	E60	0.76	150							F60	0.44	230
68										F60	0.44	230
100							F60	0.44	230	F80	0.34	280
150				F60	0.44	230	F80	0.34	280	H10	0.17	450
220	F60	0.44	230				F80	0.34	280	H10	0.17	450
330	F80	0.34	280							H10	0.17	450
470							H10	0.17	450	J10	0.09	670
680	H10	0.17	450				J10	0.09	670			
1,000	H10	0.17	450	J10	0.09	670						
1,500	J10	0.09	670									

Note : → Use next higher voltage part.

CAT. No. E1001D

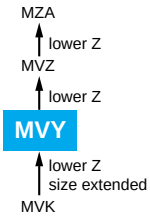
NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

Alchip®MVY Series

- Expand up to φ18 case size
- Expand up to 100Vdc
- Low impedance, 105℃ 1000 to 5000-hours-life
- For digital equipment, especially DC-DC converters and VRM
- Solvent-proof type except 80 & 100Vdc (see PRECAUTIONS AND GUIDELINES)

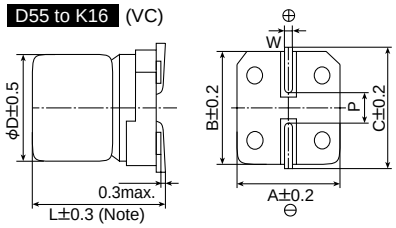


◆SPECIFICATIONS

Items	Characteristics											
Category Temperature Range	−55 to +105℃ (6.3 to 63Vdc) -40 to +105℃ (80 & 100Vdc)											
Rated Voltage Range	6.3 to 100Vdc											
Capacitance Tolerance	±20% (M)											(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)		6.3V	10V	16V	25V	35V	50V	63V	80V	100V	When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
	tanδ (Max.)	D55 to F80	0.24	0.20	0.16	0.14	0.12	0.12	—	—	—	
		H10 & J10	0.28	0.24	0.20	0.16	0.14	0.12	—	—	—	
		K14 to M22	0.26	0.22	0.18	0.16	0.14	0.12	0.14	0.10	0.10	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)		6.3V	10V	16V	25V	35V	50V	63V	80V	100V	
	Z(−40℃)/Z(+20℃)	D55 to J10	3	2	2	2	2	2	—	—	—	
		K14 to M22	10	8	6	4	3	3	3	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for specified time at 105℃.											
	Time	D55 to F80 : 1000 hours H10 & J10 : 2000 hours K14 to M22 : 5000 hours										
	Rated voltage	6.3Vdc (D55 to J10)	6.3 to 100Vdc									
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.											
	Rated voltage	6.3Vdc (D55 to J10)	6.3 to 100Vdc									
	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									

◆DIMENSIONS (Terminal Type=VC or VE) [mm]

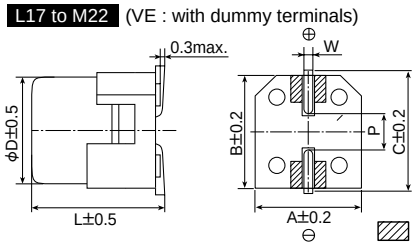
D55 to K16 (VC)



Note : L±0.5 for H10, J10, K14 and K16

Case code	φD	L	A	B	C	W	P
D55	4	5.2	4.3	4.3	5.1	0.5 to 0.8	1.0
E55	5	5.2	5.3	5.3	5.9	0.5 to 0.8	1.4
F55	6.3	5.2	6.6	6.6	7.2	0.5 to 0.8	1.9
F80	6.3	7.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5
K14	12.5	13.5	13.0	13.0	13.7	1.0 to 1.3	4.2
K16	12.5	16.0	13.0	13.0	13.7	1.0 to 1.3	4.2
L17	16	16.5	17.0	17.0	18.0	1.0 to 1.3	6.5
L22	16	21.5	17.0	17.0	18.0	1.0 to 1.3	6.5
M17	18	16.5	19.0	19.0	20.0	1.0 to 1.3	6.5
M22	18	21.5	19.0	19.0	20.0	1.0 to 1.3	6.5

L17 to M22 (VE : with dummy terminals)

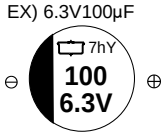


: Dummy terminals

◆MARKING

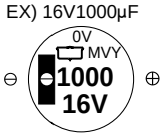
D55 to J10

EX) 6.3V100μF



K14 to M22

EX) 16V1000μF



◆PART NUMBERING SYSTEM

MVY 50 VC 220 M J10 ___

- Tray code (TR : If necessary)
- Case code
- Cap tolerance (±20%)
- Nominal cap code
- Terminal type (VC or VE)
- Rated voltage in volts
- Series name

Capacitance	Code
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100
1000μF	1000

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

Alchip® MVY Series

◆STANDARD RATINGS

μF \ Vdc	6.3			10			16			25			35		
4.7													D55	3.0	60
10							D55	3.0	60	E55	1.8	95	E55	1.8	95
22	D55	3.0	60	E55	1.8	95	E55	1.8	95	F55	1.0	140	F55	1.0	140
33	E55	1.8	95	E55	1.8	95	F55	1.0	140	F55	1.0	140	F55	1.0	140
47	E55	1.8	95	F55	1.0	140	F55	1.0	140	F55	1.0	140	F55	1.0	140
68													F80	0.34	280
100	F55	1.0	140	F55	1.0	140	F55	1.0	140	F80	0.34	280	H10	0.30	450
220	F55	1.0	140	F80	0.34	280	F80	0.34	280	H10	0.30	450	H10	0.30	450
330	F80	0.34	280	H10	0.30	450	H10	0.30	450	H10	0.30	450	J10	0.15	670
470	H10	0.30	450	H10	0.30	450	H10	0.30	450	J10	0.15	670	K14	0.070	820
													L17	0.054	1,260
680	H10	0.30	450	J10	0.15	670	J10	0.15	670						
1,000	H10	0.30	450	J10	0.15	670	K14	0.070	820	L17	0.054	1,260	L17	0.054	1,260
							L17	0.054	1,260	M17	0.054	1,350	M17	0.054	1,350
1,500	J10	0.15	670												
2,200	K14	0.070	820	K16	0.060	950	L17	0.054	1,260	L22	0.038	1,630	M22	0.038	1,750
	L17	0.054	1,260	L17	0.054	1,260	M17	0.054	1,350	M22	0.038	1,750			
3,300	K16	0.060	950	L17	0.054	1,260	L22	0.038	1,630	M22	0.038	1,750			
	M17	0.054	1,350	M17	0.054	1,350	M17	0.054	1,350						
4,700	L22	0.038	1,630	L22	0.038	1,630	M22	0.038	1,750						
	M17	0.054	1,350	M22	0.038	1,750									
6,800	L22	0.038	1,630	M22	0.038	1,750									
	M22	0.038	1,750												
8,200	M22	0.038	1,750												

Rated ripple current (mArms) at 105℃, 100kHz
Impedance (Ω) at 20℃, 100kHz
Case code

Non solvent-proof

μF \ Vdc	50			63			80			100		
1.0	D55	5.0	30									
2.2	D55	5.0	30									
3.3	D55	5.0	30									
4.7	E55	3.0	50									
10	F55	2.0	70									
22	F55	2.0	70									
33	F80	0.60	170									
47	F80	0.60	170							K14	0.33	450
68	H10	0.60	300	K14	0.19	500				K14	0.33	450
100	H10	0.60	300	K14	0.19	500	K14	0.33	450	K14	0.33	450
										L17	0.24	650
220	J10	0.30	500	K14	0.19	500	K16	0.26	550	L22	0.16	900
				L17	0.12	845				M17	0.24	700
330	K14	0.11	650	L17	0.12	845	L22	0.16	900	M22	0.16	950
	L17	0.087	900	M17	0.12	905	M17	0.24	700			
470	L17	0.087	900	L22	0.085	1,100	M22	0.16	950			
	M17	0.087	1,060	M17	0.12	905						
1,000	M22	0.050	1,520									

Case code
Impedance (Ω) at 20℃, 100kHz
Rated ripple current (mArms) at 105℃, 100kHz

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Long life, 105℃

Alchip® MVJ Series

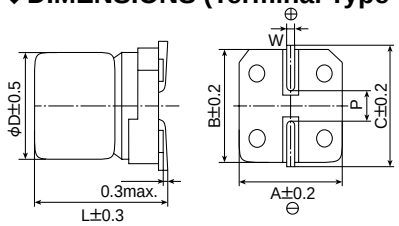
- Endurance : 105℃ 2000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

MVJ
↑ longer life
MVK

◆SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	−40 to +105℃							
Rated Voltage Range	6.3 to 50Vdc							
Capacitance Tolerance	±20% (M)							(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.30	0.24	0.20	0.16	0.14	0.12	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	4	3	2	2	2	2	
	Z(−40℃)/Z(+20℃)	12	8	6	4	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 105℃.							
	Rated voltage	6.3Vdc		10 & 16Vdc		25 to 50Vdc		
	Capacitance change	≦±30% of the initial value		≦±25% of the initial value		≦±20% of the initial value		
	D.F. (tanδ)	≦300% of the initial specified value		≦300% of the initial specified value		≦200% of the initial specified value		
	Leakage current	The initial specified value		≦The initial specified value		≦The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1000 hours at 105℃ without voltage applied.							
	Rated voltage	6.3Vdc		10 & 16Vdc		25 to 50Vdc		
	Capacitance change	≦±30% of the initial value		≦±25% of the initial value		≦±20% of the initial value		
	D.F. (tanδ)	≦300% of the initial specified value		≦300% of the initial specified value		≦200% of the initial specified value		
	Leakage current	≦The initial specified value		≦The initial specified value		≦The initial specified value		

◆DIMENSIONS (Terminal Type=VC) [mm]



Case code	D	L	A	B	C	W	P
D60	4	5.7	4.3	4.3	5.1	0.5 to 0.8	1.0
E60	5	5.7	5.3	5.3	5.9	0.5 to 0.8	1.4
F60	6.3	5.7	6.6	6.6	7.2	0.5 to 0.8	1.9

◆MARKING

EX) 6.3V100μF

◆PART NUMBERING SYSTEM

MVJ 16 VC 22 M E60

- MVJ : Series name
- 16 : Rated voltage in volts
- VC : Terminal type (VC)
- 22 : Nominal cap code
- M : Cap tolerance (±20%)
- E60 : Case code

Capacitance	Code
0.1μF	R1
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
0.1											D60	1.3
0.22											D60	2.6
0.33											D60	3.2
0.47											D60	3.8
1.0											D60	5.6
2.2											D60	10
3.3											D60	14
4.7									D60	15	E60	19
10					D60	16	→		E60	25	F60	29
22	D60	21	→		E60	30	→		F60	40		
33	→		E60	34	→		F60	45				
47	E60	36	→		F60	48						
100	F60	56										

Case code

Rated ripple current (mArms) at 105℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

3000 to 5000-hours-life, 105℃

Alchip®-MVL Series

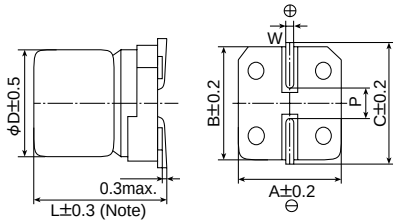
- Endurance : 105℃ 3000 to 5000 hours (F80 to J10 added)
- Suitable for applications requiring long life such as continuously operating equipment, industrial applications, etc
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

MVL
↑ Longer life
MVJ

◆SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-40 to +105℃							
Rated Voltage Range	6.3 to 50Vdc							
Capacitance Tolerance	±20%(M)							(at 20℃,120Hz)
Leakage Current	I=0.03CV or 4μA, whichever is greater Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)							(at 20℃, after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	
	Max. tanδ	0.28	0.24	0.20	0.16	0.13	0.12	(at 20℃,120Hz)
Low Temperature Characteristics (Max. impedance Ratio)	Rated voltage(Vdc)	6.3V	10V	16V	25V	35V	50V	
	Z(-25℃)/Z(+20℃)	4	3	2	2	2	2	
	Z(-40℃)/Z(+20℃)	10	7	5	3	3	3	(120Hz)
Endurance	After the capacitors are subjected to the rated DC voltage for 3000 hours (H10 & J10 sizes 5000 hours) at 105℃, the following specifications shall be satisfied when the capacitors are restored to 20℃.							
	Capacitance change	≦±30% of the initial measured 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℃ after exposing them for 1000 hours at 105℃ without voltage applied.							
	Capacitance change	≦±30% of the initial measured value						
	D.F. (tanδ)	≦300% of the initial specified value						
	Leakage current	≦The initial specified value						

◆DIMENSIONS (Terminal Type=VC) [mm]

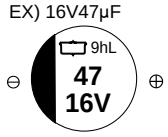


Note : L±0.5 for H63 to J10

Outer dimensions							
Case code	D	L	A	B	C	W	P
D60	4	5.7	4.3	4.3	5.1	0.5 to 0.8	1.0
E60	5	5.7	5.3	5.3	5.9	0.5 to 0.8	1.4
F60	6.3	5.7	6.6	6.6	7.2	0.5 to 0.8	1.9
F80	6.3	7.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H63	8	6.3	8.3	8.3	9.0	0.5 to 0.8	2.3
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5

◆MARKING

EX) 16V47μF



◆PART NUMBERING SYSTEM

MVL 35 VC 10 M E60

- E60 : Case code
- M : Capacitance tolerance (±20%)
- 10 : Nominal capacitance code
- VC : Terminal type (VC)
- 35 : Rated voltage in volts
- MVL : Series name

Capacitance	Code
0.1μF	R1
2.2μF	2R2
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
0.1											D60	1.0
0.22											D60	2.6
0.33											D60	3.2
0.47											D60	3.8
1.0											D60	6.2
2.2											D60	11
3.3											D60	14
4.7									D60	15	E60	19
10					D60	18	→		E60	25	F60	30
22	D60	22	→		E60	30	→		F60	42	F80	49
33	→		E60	35	→		F60	48	F80	57	H10	77
47	E60	36	→		F60	50	F80	63	→		H10	92
100	F60	60	→		F80	81	H10	116	→		J10	151
220	F80	101	H10	141	→		→		J10	216		
330	H10	160	→		→		J10	238				
470	→		→		J10	254						
1,000	J10	313										

Case code
Rated ripple current (mArms) at 105℃, 120Hz

Note : → Use a next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

High heat resistance, 125℃

Alchip® MVH Series

- Endurance : 125℃ 1000 to 5000 hours
- Suitable to fit for automotive equipment
- Solvent-proof type (10 to 50V) (see PRECAUTIONS AND GUIDELINES)

MVH
125℃ size extended
MVK

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	-40 to +125℃
Rated Voltage Range	10 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	10 to 100Vdc: I=0.03CV or 4μA, whichever is greater. 160 to 450Vdc: I=0.04CV+100 (160 to 450Vdc) Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)

Dissipation Factor (tanδ)

Rated voltage (Vdc)		10V	16V	25V	35V	50V	63V	100V	160 to 250V	400 & 450V
tanδ (Max.)	F60 to J10	0.24	0.20	0.16	0.14	0.14	0.18	0.18	—	—
	K14 to M22	0.22	0.18	0.16	0.14	0.12	0.14	0.10	0.20	0.24

When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)

Low Temperature Characteristics (Max. Impedance Ratio)

Rated voltage (Vdc)		10V	16V	25V	35V	50V	63V	100V	160 to 250V	400 & 450V
F60 to J10	Z(−25℃)/Z(+20℃)	4	3	2	2	2	2	2	—	—
	Z(−40℃)/Z(+20℃)	10	8	6	4	4	4	4	—	—
K14 to M22	Z(−25℃)/Z(+20℃)	4	3	2	2	2	2	2	3	6
	Z(−40℃)/Z(+20℃)	8	6	4	3	3	3	3	6	10

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for the specified time at 125℃.

Time	F60 to H63 (10 to 100Vdc) : 1000hours H10 to J10 (10 to 100Vdc) : 2000hours K14 to M22 (10 to 100Vdc) : 5000hours K14 to M22 (160 to 450Vdc) : 2000hours
Capacitance change	≦±30% of the initial value
D.F. (tanδ)	≦300% of the initial specified value
Leakage current	≦The initial specified value

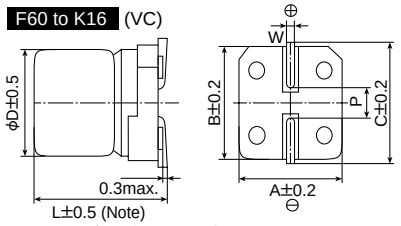
Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1000 hours (500 hours for 350 to 450WV) at 125℃ without voltage applied.

Rated voltage(Vdc)	10 to 50Vdc	63 to 450Vdc
Capacitance change	≦±30% of the initial value	≦±30% of the initial value
D.F. (tanδ)	≦300% of the initial specified value	≦300% of the initial specified value
Leakage current	≦The initial specified value	≦500% of the initial specified value

◆DIMENSIONS (Terminal Type=VC or VE) [mm]

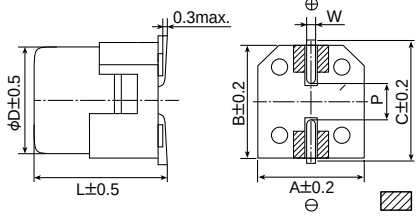
F60 to K16 (VC)



Note : L±0.3 for F60 and F80

Case code	D	L	A	B	C	W	P
F60	6.3	5.7	6.6	6.6	7.2	0.5 to 0.8	1.9
F80	6.3	7.7	6.6	6.6	7.2	0.5 to 0.8	1.9
H63	8	6.3	8.3	8.3	9.0	0.5 to 0.8	2.3
H10	8	10.0	8.3	8.3	9.0	0.7 to 1.1	3.1
J10	10	10.0	10.3	10.3	11.0	0.7 to 1.1	4.5
K14	12.5	13.5	13.0	13.0	13.7	1.0 to 1.3	4.2
K16	12.5	16.0	13.0	13.0	13.7	1.0 to 1.3	4.2
L17	16	16.5	17.0	17.0	18.0	1.0 to 1.3	6.5
L22	16	21.5	17.0	17.0	18.0	1.0 to 1.3	6.5
M17	18	16.5	19.0	19.0	20.0	1.0 to 1.3	6.5
M22	18	21.5	19.0	19.0	20.0	1.0 to 1.3	6.5

L17 to M22 (VE : with dummy terminals)



: Dummy terminals

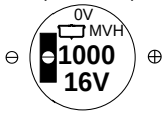
◆MARKING

F60 to J10

EX) 35V47μF

K14 to M22

EX) 16V1000μF



◆PART NUMBERING SYSTEM

MVH 35 VC 47 M H10 ___

- Tray code (TR : If necessary)
- Case code
- Cap tolerance (±20%)
- Nominal cap code
- Terminal type (VC or VE)
- Rated voltage in volts
- Series name

Capacitance	Code
10μF	10
100μF	100
1000μF	1000

CAT. No. E1001D

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

High heat resistance, 125℃

Alchip® MVH Series

◆STANDARD RATINGS

Vdc / Items / μF	10				16				25				35			
	Case Code	ESR (Ωmax/100kHz)		Rated ripple current (mArms/ 125℃, 100kHz)	Case Code	ESR (Ωmax/100kHz)		Rated ripple current (mArms/ 125℃, 100kHz)	Case Code	ESR (Ωmax/100kHz)		Rated ripple current (mArms/ 125℃, 100kHz)	Case Code	ESR (Ωmax/100kHz)		Rated ripple current (mArms/ 125℃, 100kHz)
		20℃	-40℃			20℃	-40℃			20℃	-40℃			20℃	-40℃	
10													F60	3.3	66.0	27
22													F60	3.3	66.0	39
33									F60	3.3	66.0	45	H63	2.3	46.0	62
													F80	2.3	46.0	62
47					F60	3.3	66.0	43	H63	2.3	46.0	68	H10	1.0	20.0	92
									F80	2.3	46.0	68				
100	H63	2.3	46.0	72					H10	1.0	20.0	126	J10	0.7	13.4	151
	F80	2.3	46.0	72												
220	H10	1.0	20.0	136					J10	0.7	13.4	211				
330	J10	0.7	13.4	188					K14	0.14	2.1	750	K14	0.14	2.1	750
													L17	0.10	1.5	1,000
470					K14	0.14	2.1	750	K14	0.14	2.1	750	K16	0.11	1.5	900
									L17	0.10	1.5	1,000	L17	0.10	1.5	1,000
680					K14	0.14	2.1	750	L17	0.10	1.5	1,000	M17	0.10	1.5	1,200
					L17	0.10	1.5	1,000	M17	0.10	1.5	1,200				
1,000	K14	0.14	2.1	750	M17	0.10	1.5	1,200	M22	0.058	0.87	1,550				
2,200	L17	0.10	1.5	1,000	M17	0.10	1.5	1,200								
	M17	0.10	1.5	1,200												
3,300	M17	0.10	1.5	1,200												
4,700	M22	0.058	0.87	1,550												

Non-solvent proof

Vdc / Items / μF	50				63				100			
	Case Code	ESR (Ωmax/100kHz)		Rated ripple current (mArms/ 125℃, 100kHz)	Case Code	ESR (Ωmax/100kHz)		Rated ripple current (mArms/ 125℃, 100kHz)	Case Code	ESR (Ωmax/100kHz)		Rated ripple current (mArms/ 125℃, 100kHz)
		20℃	-40℃			20℃	-40℃			20℃	-40℃	
10	F60	3.3	66.0	38	H63	2.3	115	42	H10	1.0	50	53
					F80	2.3	115	42				
22	H63	2.3	46.0	50	H10	1.0	50.0	56	J10	0.70	35	63
	F80	2.3	46.0	50								
33	H10	1.0	20.0	83	J10	0.7	35.0	71				
47	J10	0.7	13.4	111					K14	0.33	16.5	450
68									K16	0.26	13.0	550
100	K14	0.23	3.5	550	K14	0.25	12.5	500	L17	0.24	12.0	650
220	K14	0.23	3.5	550	K16	0.20	10.0	600	M22	0.16	8.0	950
	L17	0.15	2.3	850								
330	K16	0.18	2.7	700	L17	0.18	9.0	820				
	L17	0.15	2.3	850								
470	M17	0.15	2.3	920	L22	0.11	5.5	1,100				

Non-solvent proof

Vdc / Items / μF	160		200		250		400		450	
	Case Code	Rated ripple current (mArms/ 125℃, 120Hz)	Case Code	Rated ripple current (mArms/ 125℃, 120Hz)	Case Code	Rated ripple current (mArms/ 125℃, 120Hz)	Case Code	Rated ripple current (mArms/ 125℃, 120Hz)	Case Code	Rated ripple current (mArms/ 125℃, 120Hz)
3.3									K16	65
4.7							K14	70	L17	85
6.8							L17	100		
10	K14	100	K14	100	K16	110	L22	140	M22	145
							M17	135		
22	L17	180	L17	180	L22	205				
					M17	200				
33	M17	245	L22	250	M22	260				
			M17	245						
47			M22	315						
68	M22	380								

NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Bi-polarized 85℃

Alchip® MV-BP Series

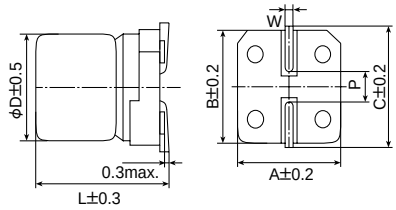
- Bi-polarized chip type for the circuit, of which polarity is frequently reversed
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

MV-BP
↑ bi-polarized
MV

◆SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	−40 to +85℃								
Rated Voltage Range	4 to 50Vdc								
Capacitance Tolerance	±20% (M)								(at 20℃, 120Hz)
Leakage Current	I=0.05CV or 10μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)								(at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.45	0.32	0.26	0.24	0.22	0.20	0.20	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	7	4	3	2	2	2	2	
	Z(−40℃)/Z(+20℃)	15	10	8	6	4	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 85℃, however the polarization shall be reversed every 250 hours.								
	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℃ after exposing them for 500 hours at 85℃ 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 (Terminal Type=VC) [mm]



Case code	D	L	A	B	C	W	P
D55	4	5.2	4.3	4.3	5.1	0.5 to 0.8	1.0
E55	5	5.2	5.3	5.3	5.9	0.5 to 0.8	1.4
F55	6.3	5.2	6.6	6.6	7.2	0.5 to 0.8	1.9

◆MARKING

EX) 35V4.7μF

◆PART NUMBERING SYSTEM

MV 50 VC R47 M BP D55

- D55 : Case code
- BP : Bi-polar type
- M : Cap tolerance (±20%)
- R47 : Nominal cap code
- VC : Terminal type (VC)
- 50 : Rated voltage in volts
- MV : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10

◆STANDARD RATINGS

μF \ Vdc	4		6.3		10		16		25		35		50	
0.1													D55	1.3
0.15													D55	1.9
0.22													D55	2.3
0.33													D55	2.8
0.47													D55	3.4
0.68													D55	4.1
1.0													D55	5.5
1.5													D55	6.5
2.2											D55	8	E55	9
3.3									D55	9	→	→	E55	11
4.7							D55	11	→	→	E55	13	F55	14
6.8					D55	12	→	→	E55	15	F55	17		
10			D55	13	→	→	E55	18	→	→	F55	21		
15	D55	14	→	→	E55	21	→	→	F55	24				
22	→	→	E55	23	→	→	F55	28						
33	→	→	→	→	F55	33								
47	→	→	F55	36										

Case code
Rated ripple current (mArms) at 85℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

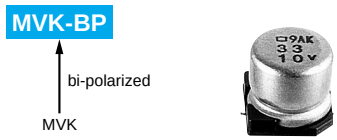
NIPPON CHEMI-CON

SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Bi-polarized, 105℃

Alchip® MVK-BP Series

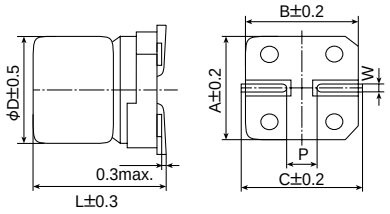
- Bi-polarized chip type for the circuit, of which polarity is frequently reversed
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)



◆SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	−40 to +105℃							
Rated Voltage Range	6.3 to 50Vdc							
Capacitance Tolerance	±20% (M)							(at 20℃, 120Hz)
Leakage Current	I=0.05CV or 10μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)							(at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.35	0.26	0.24	0.20	0.18	0.18	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	4	3	2	2	2	2	
	Z(−40℃)/Z(+20℃)	10	8	6	4	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 105℃, however the polarization shall be reversed every 250 hours.							
	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℃ after exposing them for 500 hours at 105℃ without voltage applied.							
	Capacitance change	≦±25% of the initial value						
	D.F. (tanδ)	≦200% of the initial specified value						
	Leakage current	≦The initial specified value						

◆DIMENSIONS (Terminal Type=VC) [mm]



Case code	D	L	A	B	C	W	P
D60	4	5.7	4.3	4.3	5.1	0.5 to 0.8	1.0
E60	5	5.7	5.3	5.3	5.9	0.5 to 0.8	1.4
F60	6.3	5.7	6.6	6.6	7.2	0.5 to 0.8	1.9

◆MARKING

EX) 35V4.7μF

◆PART NUMBERING SYSTEM

MVK 50 VC R1 M BP D60

- D60 : Case code
- BP : Bi-polar type
- M : Cap tolerance (±20%)
- R1 : Nominal cap code
- VC : Terminal type (VC)
- 50 : Rated voltage in volts
- MVK : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
0.10											D60	1.3
0.15											D60	1.9
0.22											D60	2.3
0.33											D60	2.8
0.47											D60	3.4
0.68											D60	4.1
1.0											D60	5.5
1.5											D60	7.5
2.2									D60	8.8	E60	10
3.3							D60	10	→		E60	13
4.7					D60	12	→		E60	15	F60	16
6.8			D60	13	→		E60	17	→		F60	20
10	D60	14	→		E60	20	→		F60	23		
15	→		E60	22	→		F60	28				
22	E60	25	→		F60	32						
33	→		F60	35								
47	F60	39										

Case code

Rated ripple current (mArms) at 105℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

Miniature Aluminum Electrolytic Capacitors

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 5mm height, 85℃

SRM Series

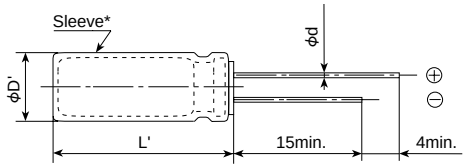
- Coating case covered products are also available
- Downsized from current standard SRE series
- 5mm height, 1000-hours-life at 85℃
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

SRM ↑ downsized
SRE

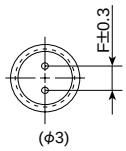
◆SPECIFICATIONS

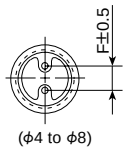
Items	Characteristics								
Category Temperature Range	−40 to +85℃								
Rated Voltage Range	4 to 50Vdc								
Capacitance Tolerance	±20% (M)								(at 20℃, 120Hz)
Leakage Current	I=0.01CV or 3μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)								(at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.40	0.38	0.30	0.23	0.17	0.15	0.13	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	7	4	3	2	2	2	2	
	Z(−40℃)/Z(+20℃)	15	8	8	6	4	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 85℃.								
	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℃ after exposing them for 1000 hours at 85℃ without voltage applied.								
	Capacitance change	≦±20% of the initial value							
	D.F. (tanδ)	≦200% of the initial specified value							
	Leakage current	≦The initial specified value							

◆DIMENSIONS (Radial Lead Type=VB) [mm]



*φ8 : coating case





φD	3	4	5	6.3	8
φd	0.4	0.45	0.45	0.45	0.45
F	1.0	1.5	2.0	2.5	2.5
φD'	φD+0.5max.				
L'	L+1.0max.				

◆PART NUMBERING SYSTEM

SRM 10 VB 100 M

- M : Cap tolerance (±20%)
- 100 : Nominal cap code
- VB : Radial lead type
- 10 : Rated voltage in volts
- SRM : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	4		6.3		10		16		25		35		50	
0.1													3×5	1.3
0.22													3×5	2.9
0.33													3×5	4.2
0.47													3×5	5.0
1.0													3×5	7.2
2.2													3×5	10
3.3											3×5	12	4×5	14
4.7									3×5	13	→		4×5	19
10			→		→		3×5	18	4×5	25	→		5×5	31
22	→		3×5	22	→		4×5	33	5×5	41	→		6.3×5	49
33	→		→		4×5	36	5×5	47	→		6.3×5	56	8×5	76
47	→		4×5	40	→		5×5	55	6.3×5	63	8×5	85		
100	5×5	55	→		6.3×5	78	→		8×5	116				
220	6.3×5	88	→		8×5	148								
330	→		8×5	141										

Case size φD×L (mm)
Rated ripple current (mArms) at 85℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

5mm height, 85℃

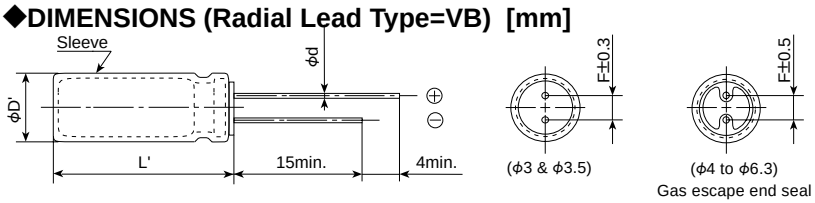
SRE Series

- Coating case covered products are also available
- 5mm height, 1000-hours-life at 85℃
- Non solvent-proof type

◆SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	−40 to +85℃								
Rated Voltage Range	4 to 50Vdc								
Capacitance Tolerance	±20% (M)								(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.35	0.24	0.20	0.16	0.14	0.12	0.10	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	7	4	3	2	2	2	2	
	Z(−40℃)/Z(+20℃)	15	10	8	6	4	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 85℃.								
	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℃ after exposing them for 1000 hours at 85℃ without voltage applied.								
	Capacitance change	≦±20% of the initial value							
	D.F. (tanδ)	≦200% of the initial specified value							
	Leakage current	≦The initial specified value							

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	3	3.5	4	5	6.3
φd	0.4	0.4	0.45	0.45	0.45
F	1.0	1.0	1.5	2.0	2.5
φD'	φD+0.5max.				
L'	L+1.0max.				

◆PART NUMBERING SYSTEM

SRE 6.3 VB 100 M

- M : Cap tolerance (±20%)
- 100 : Nominal cap code
- VB : Radial lead type
- 6.3 : Rated voltage in volts
- SRE : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	4		6.3		10		16		25		35		50	
0.1													3×5	1.3
0.15													3×5	2.0
0.22													3×5	2.9
0.33													3×5	3.5
0.47													3×5	4.2
0.68													3×5	5.1
1.0													3×5	6.2
1.5													3×5	7.5
2.2											3×5	8.3	3.5×5	10
3.3									3×5	9.3	3.5×5	11	4×5	14
4.7							3×5	10	3.5×5	12	4×5	15	5×5	19
6.8					3×5	11	3.5×5	14	4×5	16	5×5	20	6.3×5	24
10			3×5	12	→		3.5×5	17	→		5×5	25	6.3×5	29
15	→		3.5×5	17	4×5	20	5×5	26	→		6.3×5	33		
22	→		4×5	23	→		5×5	32	→		6.3×5	40		
33	4×5	23	→		5×5	35	→		6.3×5	45				
47	→		5×5	38	→		6.3×5	50						
68	→		→		6.3×5	54								
100	→		6.3×5	60										

Case size φD×L (mm)

Rated ripple current (mArms) at 85℃, 120Hz

Note1 : → Use next higher voltage part.
Note2 : The parts of φ3.5×5 will be unified to φ4×5.

CAT. No. E1001D

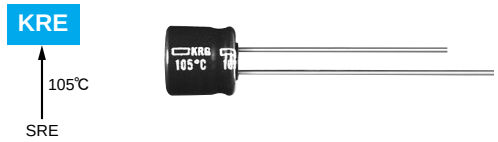
NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

5mm height, 105℃

KRE Series

- Coating case covered products are also available
- 5mm height, 1000-hours-life at 105℃
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)



◆SPECIFICATIONS

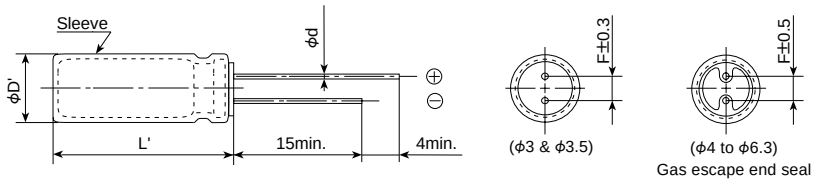
Items	Characteristics
Category Temperature Range	−55 to +105℃
Rated Voltage Range	6.3 to 50Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.01CV or 3μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc) 6.3V 10V 16V 25V 35V 50V tanδ (Max.) 0.27 0.23 0.19 0.15 0.13 0.11 Add 0.02 for φ3 products. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc) 6.3V 10V 16V 25V 35V 50V Z(−25℃)/Z(+20℃) 3 3 2 2 2 2 Z(−40℃)/Z(+20℃) 9 7 5 3 3 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 105℃.

φD	φ3 & φ3.5	φ4 to φ6.3
Capacitance change	≦±25% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦200% 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℃ after exposing them for 500 hours at 105℃ without voltage applied.

φD	φ3 & φ3.5	φ4 to φ6.3
Capacitance change	≦±25% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦The initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	3	3.5	4	5	6.3
φd	0.4	0.4	0.45	0.45	0.45
F	1.0	1.0	1.5	2.0	2.5
φD'	φD+0.5max.				
L'	L+1.0max.				

◆PART NUMBERING SYSTEM

KRE 16 VB 47 M

- M : Cap tolerance (±20%)
- 47 : Nominal cap code
- VB : Radial lead type
- 16 : Rated voltage in volts
- KRE : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
0.1											3×5	1.3
0.15											3×5	2.0
0.22											3×5	2.6
0.33											3×5	3.2
0.47											3×5	3.8
0.68											3×5	4.6
1.0											3×5	5.6
1.5											3×5	6.9
2.2									3×5	7.7	3.5×5	10
3.3							3×5	8.8	3.5×5	11	4×5	14
4.7					3×5	9.4	3.5×5	12	4×5	15	5×5	19
6.8			3×5	11	3.5×5	13	4×5	16	5×5	20	6.3×5	24
10	3×5	12	→		3.5×5	16	→		5×5	25	6.3×5	29
15	3.5×5	16	4×5	20	5×5	25	→		6.3×5	33		
22	4×5	21	→		5×5	30	→		6.3×5	40		
33	→		5×5	34	→		6.3×5	45				
47	5×5	36	→		6.3×5	48						
68	→		6.3×5	52								
100	6.3×5	56										

Case size φD×L (mm)

Rated ripple current (mArms) at 105℃, 120Hz

Note1 : → Use next higher voltage part.

Note2 : The parts of φ3.5×5 will be unified to φ4×5.

CAT. No. E1001D

NIPPON CHEMI-CON

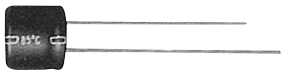
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

7mm height, 85℃

SRA Series

- 7mm height, 1000-hours-life at 85℃
- Non solvent-proof type

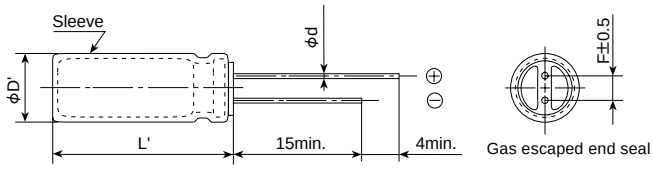
SRG → downsized → SRA



◆SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	−40 to +85℃									
Rated Voltage Range	4 to 63Vdc									
Capacitance Tolerance	±20% (M)									(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	63V	
	tanδ (Max.)	0.35	0.24	0.20	0.16	0.14	0.12	0.10	0.08	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	63V	
	Z(−25℃)/Z(+20℃)	4	4	3	2	2	2	2	2	
	Z(−40℃)/Z(+20℃)	10	10	8	6	4	3	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 85℃.									
	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℃ after exposing them for 500 hours at 85℃ without voltage applied.									
	Capacitance change	≦±20% of the initial value								
	D.F. (tanδ)	≦200% of the initial specified value								
	Leakage current	≦The initial specified value								

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	4	5	6.3	8
φd	0.45	0.45	0.45	0.45
F	1.5	2.0	2.5	3.5
φD'	φD+0.5max.			
L'	L+1.0max.			

◆PART NUMBERING SYSTEM

SRA 50 VB R1 M

- M : Cap tolerance (±20%)
- R1 : Nominal cap code
- VB : Radial lead type
- 50 : Rated voltage in volts
- SRA : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	4		6.3		10		16		25		35		50		63	
0.1													4×7	1.3	4×7	1.3
0.22													4×7	2.9	4×7	2.9
0.33													4×7	3.5	4×7	4.4
0.47													4×7	5.0	4×7	7.9
1.0													4×7	10	4×7	11
2.2													4×7	15	4×7	17
3.3													4×7	18	5×7	21
4.7									→		4×7	20	5×7	23	6.3×7	26
10							4×7	25	→		5×7	30	6.3×7	34	6.3×7	47
22			4×7	31	→		5×7	39	→		6.3×7	47	6.3×7	57		
33	4×7	26	→		5×7	43	→		6.3×7	53	6.3×7	64	8×7	76		
47	4×7	34	5×7	47	→		6.3×7	59	6.3×7	71	8×7	83				
100	5×7	61	→		6.3×7	80	6.3×7	97								
220	6.3×7	95	→		8×7	140										
330	→		8×7	156												
470	8×7	154														

Case size φD×L (mm)
Rated ripple current (mArms) at 85℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

7mm height, 105℃

KMA Series

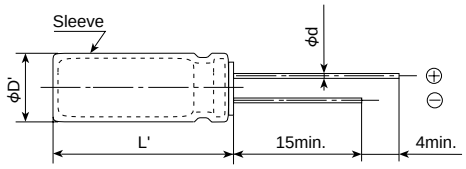
- 7mm height, 1000-hours-life at 105℃
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

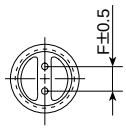
KMA
105℃
SRA

◆SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	−55 to +105℃									
Rated Voltage Range	4 to 63Vdc									
Capacitance Tolerance	±20% (M)									(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	63V	
	tanδ (Max.)	0.35	0.22	0.19	0.16	0.14	0.12	0.10	0.08	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	63V	
	Z(−25℃)/Z(+20℃)	4	3	2	2	2	2	2	2	
	Z(−40℃)/Z(+20℃)	10	6	5	3	3	3	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 105℃.									
	Rated voltage	4 to 16Vdc				25 to 63Vdc				
	Capacitance change	≦±25% of the initial value				≦±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℃ after exposing them for 1000 hours at 105℃ without voltage applied.									
	Rated voltage	4 to 16Vdc				25 to 63Vdc				
	Capacitance change	≦±25% of the initial value				≦±20% of the initial value				
	D.F. (tanδ)	≦200% of the initial specified value								
	Leakage current	≦The initial specified value								

◆DIMENSIONS (Radial Lead Type=VB) [mm]





Gas escape end seal

φD	4	5	6.3
φd	0.45	0.45	0.45
F	1.5	2.0	2.5
φD'	φD+0.5max.		
L'	L+1.0max.		

◆PART NUMBERING SYSTEM

KMA 6.3 VB 47 M

- M — Cap tolerance (±20%)
- 47 — Nominal cap code
- VB — Radial lead type
- 6.3 — Rated voltage in volts
- KMA — Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	4		6.3		10		16		25		35		50		63	
0.1													4×7	1.3	4×7	1.3
0.15													4×7	2.0	4×7	1.9
0.22													4×7	2.9	4×7	2.9
0.33													4×7	3.5	4×7	4.4
0.47													4×7	5.0	4×7	7.9
0.68													4×7	7.1	4×7	9.2
1.0													4×7	10	4×7	11
1.5													4×7	12	4×7	13
2.2													4×7	15	4×7	17
3.3												→	4×7	18	5×7	21
4.7										→	4×7	20	5×7	23	6.3×7	26
6.8							4×7	20		→	5×7	24	6.3×7	28		
10							4×7	25		→	5×7	30	6.3×7	34	6.3×7	43
15					4×7	28	5×7	31		→	6.3×7	37				
22			4×7	31		→	5×7	39		→	6.3×7	47	6.3×7	57		
33	4×7	26		→	5×7	43		→	6.3×7	53	6.3×7	64				
47	4×7	34	5×7	47		→	6.3×7	59	6.3×7	71						
68				→	6.3×7	63										
100	5×7	61		→	6.3×7	80	6.3×7	97								
220	6.3×7	95														

Case size φD×L (mm)

Rated ripple current (mArms) at 105℃, 120Hz

Note : → Use next higher voltage part.

CAT. No. E1001D

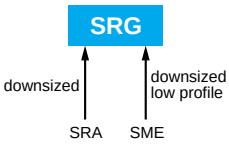
NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low profile, 85℃

SRG Series

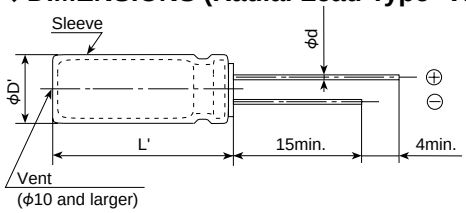
- Low profile : φ4×7mm to φ18×25mm
- Endurance : 85℃ 1000 to 2000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

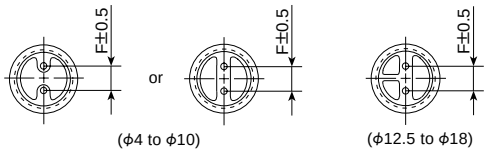


◆SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	−40 to +85℃								
Rated Voltage Range	4 to 50Vdc								
Capacitance Tolerance	±20% (M)								(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.38	0.28	0.24	0.20	0.16	0.14	0.12	
	When nominal capacitance exceeds 1000μF, add 0.03 to the value above for each 1000μF increase.								(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	4V	6.3V	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	6	5	4	3	2	2	2	
	Z(−40℃)/Z(+20℃)	12	12	10	8	5	4	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours (1000 hours for φ8 and smaller) at 85℃.								
	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℃ after exposing them for 1000 hours at 85℃ without voltage applied.								
	Capacitance change	≦±20% of the initial value							
	D.F. (tanδ)	≦200% of the initial specified value							
	Leakage current	≦The initial specified value							

◆DIMENSIONS (Radial Lead Type=VB) [mm]





φD		4	5	6.3	8	10 & 12.5	16 & 18
φd	7L	0.45	0.45	0.45	0.45	—	—
	≧9L	–	0.5	0.5	0.6	0.6	0.8
F		1.5	2.0	2.5	3.5	5.0	7.5
φD'		φD+0.5max.					
L'		L+1.5max. (7L : L+1.0max.)					

◆PART NUMBERING SYSTEM

SRG 10 VB 220 M H07

- H07 : Case code
- M : Cap tolerance (±20%)
- 220 : Nominal cap code
- VB : Radial lead type
- 10 : Rated voltage in volts
- SRG : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆CASE CODE

φD (mm) \ L (mm)	7	9	12.5	13	15	20	25
4	D07						
5	E07	E09					
6.3	F07	F09					
8	H07	H09					
10		J09	J12				
12.5				K13	K15		
16					L15		
18					M15	M20	M25

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low profile, 85℃

SRG Series 9 to 25mm-length

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
1.0											5×9	13
2.2											5×9	26
3.3											5×9	32
4.7											5×9	38
10											5×9	64
22											5×9	86
33									5×9	94	6.3×9	113
47							5×9	105	→	→	6.3×9	135
100			5×9	132	→	→	6.3×9	172	8×9	220	10×9	240
220			6.3×9	218	8×9	290	→	→	10×9	335	10×12.5	415
330	6.3×9	247	→	→	8×9	355	10×9	380	10×12.5	475	12.5×13	525
470	→	→	8×9	385	10×9	410	10×12.5	525	12.5×13	585	16×15	745
1,000	10×9	505	10×12.5	625	12.5×13	715	12.5×15	830	16×15	1,010	18×20	1,160
2,200	→	→	12.5×15	970	16×15	1,160	18×15	1,360	18×20	1,560		
3,300	→	→	16×15	1,310	18×15	1,460	18×20	1,720				
4,700	16×15	1,410	18×15	1,560	18×20	1,770	18×25	2,070				
6,800	18×15	1,660	18×20	1,870	18×25	2,170						
10,000	18×20	2,020	18×25	2,370								

Rated ripple current (mArms) at 85℃, 120Hz
Case size φD×L (mm)

Note : → Use next higher voltage part.

SRG Series 7mm-length

◆STANDARD RATINGS

μF \ Vdc	4		6.3		10		16		25		35		50	
0.1													4×7	1.3
0.22													4×7	2.9
0.33													4×7	3.5
0.47													4×7	5.0
1.0													4×7	10
2.2													4×7	15
3.3											→	→	4×7	19
4.7									→	→	→	→	4×7	24
10							→	→	→	→	4×7	32	5×7	42
22			→	→	→	→	4×7	42	→	→	5×7	57	6.3×7	64
33	→	→	→	→	4×7	46	→	→	5×7	66	6.3×7	73	8×7	93
47	→	→	4×7	50	→	→	5×7	73	6.3×7	80	8×7	101		
100	→	→	5×7	87	→	→	6.3×7	110						
220	→	→	6.3×7	133	8×7	171								
330	→	→	8×7	191										
470	8×7	154												

Rated ripple current (mArms) at 85℃, 120Hz
Case size φD×L (mm)

Note : → Use next higher voltage part.

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	50	120	300	1k	10k	100k
to 4.7	0.65	1.00	1.35	1.75	2.30	2.50
10 to 47	0.75	1.00	1.25	1.50	1.75	1.80
100 to 1,000	0.80	1.00	1.15	1.30	1.40	1.50
2,200 to	0.85	1.00	1.03	1.05	1.08	1.08

CAT. No. E1001D

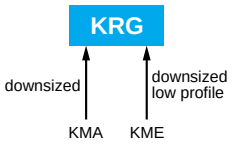
NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low profile, 105℃

KRG Series

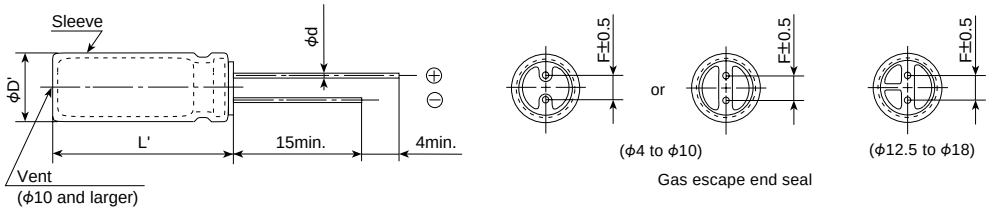
- Low profile : φ4×7mm to φ18×25mm
- Endurance : 105℃ 1000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)



◆SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	−55 to +105℃							
Rated Voltage Range	6.3 to 50Vdc							
Capacitance Tolerance	±20% (M)							(at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.28	0.24	0.20	0.16	0.14	0.12	
	When nominal capacitance exceeds 1000μF, add 0.03 to the value above for each 1000μF increase.							(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	5	4	3	2	2	2	
	Z(−40℃)/Z(+20℃)	10	8	6	4	3	3	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 105℃.							
	Rated voltage	6.3 to 16Vdc				25 to 50Vdc		
	Capacitance change	≦±25% of the initial value				≦±20% of the initial value		
	D.F. (tanδ)	≦200% 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℃ after exposing them for 500 hours at 105℃ without voltage applied.							
	Rated voltage	6.3 to 16Vdc				25 to 50Vdc		
	Capacitance change	≦±25% of the initial value				≦±20% of the initial value		
	D.F. (tanδ)	≦200% of the initial specified value				≦200% of the initial specified value		
	Leakage current	≦The initial specified value				≦The initial specified value		

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD		4	5	6.3	7	8	10 & 12.5	16 & 18
φd	7L	0.45	0.45	0.45	0.45	–	—	—
	≧9L	–	0.5	0.5	–	0.6	0.6	0.8
F		1.5	2.0	2.5	2.5	3.5	5.0	7.5
φD'		φD+0.5max.						
L'		L+1.5max. (7L : L+1.0max.)						

◆PART NUMBERING SYSTEM

KRG 6.3 VB 1000 M J09

- J09 : Case code
- M : Cap tolerance (±20%)
- 1000 : Nominal cap code
- VB : Radial lead type
- 6.3 : Rated voltage in volts
- KRG : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆CASE CODE

φD (mm) \ L (mm)	7	9	12.5	13	15	20	25
4	D07						
5	E07	E09					
6.3	F07	F09					
7	G07						
8		H09					
10		J09	J12				
12.5				K13	K15		
16					L15		
18					M15	M20	M25

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low profile, 105℃

KRG Series 9 to 25mm-length

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
1.0											5×9	12
2.2											5×9	18
3.3											5×9	22
4.7											5×9	27
10	Case size φD×L (mm)										5×9	46
22	Rated ripple current (mArms) at 105℃, 120Hz										5×9	61
33							→		5×9	67	6.3×9	80
47					→		5×9	75	→		6.3×9	95
100	→		5×9	93	→		6.3×9	121	8×9	155	10×9	170
220	→		6.3×9	154	8×9	205	→		10×9	235	10×12.5	290
330	6.3×9	175	→		8×9	251	10×9	270	10×12.5	340	12.5×13	370
470	→		8×9	272	10×9	290	10×12.5	370	12.5×13	415	16×15	535
1,000	10×9	365	10×12.5	445	12.5×13	515	12.5×15	590	16×15	720	18×20	830
2,200	→		12.5×15	690	16×15	830	18×15	970	18×20	1,110		
3,300	→		16×15	940	18×15	1,050	18×20	1,220				
4,700	16×15	1,010	18×15	1,120	18×20	1,260	18×25	1,470				
6,800	18×15	1,190	18×20	1,330	18×25	1,560						
10,000	18×20	1,440	18×25	1,700								

Note : → Use next higher voltage part.

KRG Series 7mm-length

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50	
0.1											4×7	1.3
0.22											4×7	2.9
0.33											4×7	3.5
0.47											4×7	5
1.0	Case size φD×L (mm)										4×7	10
2.2	Rated ripple current (mArms) at 105℃, 120Hz										4×7	15
3.3									→		4×7	18
4.7							→		→		4×7	25
10					→		4×7	30	5×7	36	6.3×7	44
22	→		4×7	35	→		5×7	46	6.3×7	57	6.3×7	57
33	→		→		5×7	53	6.3×7	63	6.3×7	64		
47	5×7	50	→		6.3×7	68	6.3×7	71				
100	→		6.3×7	80	6.3×7	97						

Note : → Use next higher voltage part.

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	50	120	300	1k	10k	100k
0.1 to 4.7	0.65	1.00	1.35	1.75	2.30	2.50
10 to 47	0.75	1.00	1.25	1.50	1.75	1.80
100 to 1,000	0.80	1.00	1.15	1.30	1.40	1.50
2,200 to	0.85	1.00	1.03	1.05	1.08	1.08

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 85℃

SMQ Series

- Downsized from current standard SMG series
- Endurance : 85℃ 2000 hours
- Non Solvent-proof type

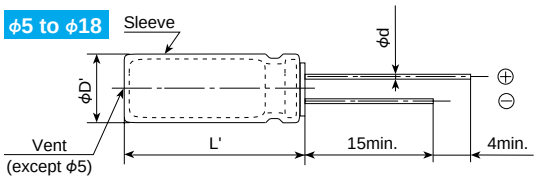
SMQ ↑ downsized SMG

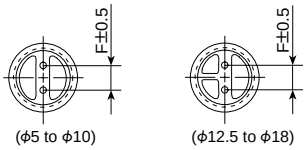
◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +85℃(6.3 to 400Vdc)　−25 to +85℃(450Vdc)
Rated Voltage Range	6.3 to 450Vdc
Capacitance Tolerance	±20% (M)　(at 20℃, 120Hz)
Leakage Current	6.3 to 100Vdc / 160 to 450Vdc ≦φ18: I=0.03CV or 4μA, whichever is greater. (at 20C after 1 minute) CV≦1000: I=0.1CV+40 max. CV>1000: I=0.04CV+100 max. (at 20℃) ≧φ20: I=0.03CV (at 20℃ after 3 minutes) Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)
Dissipation Factor (tanδ)	Rated voltage (Vdc): 6.3V / 10V / 16V / 25V / 35V / 50V / 63V / 100V / 160 to 250V / 315 to 400V / 450V tanδ (Max.): 0.28 / 0.24 / 0.20 / 0.16 / 0.14 / 0.12 / 0.09 / 0.08 / 0.20 / 0.24 / 0.24 When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc): 6.3V / 10V / 16V / 25V / 35V / 50V / 63V / 100V / 160 to 200V / 250V / 350V / 400V / 450V Z(−25℃)/Z(+20℃) ≦φ8: 5 / 4 / 3 / 2 / 2 / 2 / 2 / 2 / 3 / 3 / 4 / 4 / 6 Z(−25℃)/Z(+20℃) ≧φ10: 5 / 4 / 3 / 2 / 2 / 2 / 2 / 2 / 3 / 3 / 4 / 4 / 6 Z(−40℃)/Z(+20℃) ≦φ8: 12 / 10 / 8 / 5 / 4 / 3 / 3 / 3 / 8 / 10 / 8 / 8 / — Z(−40℃)/Z(+20℃) ≧φ10: 12 / 10 / 8 / 5 / 4 / 3 / 3 / 3 / 4 / 4 / 6 / 6 / — (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 85℃. 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℃ after exposing them for 1000 hours at 85℃ without voltage applied. Rated voltage: 6.3 to 100Vdc / 160 to 450Vdc Capacitance change: ≦±20% of the initial value / ≦±20% of the initial value D.F. (tanδ): ≦200% of the initial specified value / ≦200% of the initial specified value Leakage current: ≦The initial specified value / ≦500% of the initial specified value

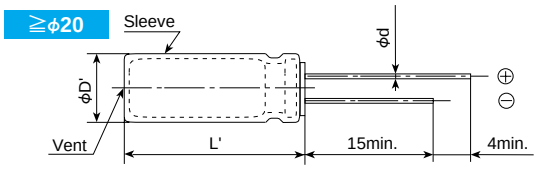
◆DIMENSIONS (Radial Lead Type=VB) [mm]

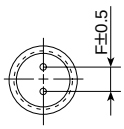
φ5 to φ18





≧φ20





φD	5	6.3	8	10	12.5	16	18	20	22
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0
φD'	φD+0.5max.							φD+0.5max.	
L'	L+1.5max.							L+2.0max.	

◆PART NUMBERING SYSTEM

SMQ 6.3 VB 1000 M

- M: Cap tolerance (±20%)
- 1000: Nominal cap code
- VB: Radial lead type
- 6.3: Rated voltage in volts
- SMQ: Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 85℃

SMQ Series

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50		63	
0.1											5×11	1.3		
0.22											5×11	2.9		
0.33											5×11	4.3		
0.47											5×11	6.2		
1.0											5×11	17		
2.2											5×11	28		
3.3											5×11	35		
4.7											5×11	41		
10											5×11	60		
22											5×11	95	5×11	100
33											5×11	125	6.3×11	140
47									5×11	130	6.3×11	155	6.3×11	170
68									6.3×11	160	6.3×11	210	8×11.5	220
100							5×11	180	6.3×11	210	8×11.5	260	8×11.5	280
220			5×11	240	6.3×11	260	6.3×11	280	8×11.5	385	10×12.5	430	10×16	490
330			6.3×11	290	6.3×11	320	8×11.5	440	10×12.5	490	10×16	590	10×20	710
470			6.3×11	350	8×11.5	440	10×12.5	550	10×16	650	10×20	760	12.5×20	900
1,000	8×11.5	540	10×12.5	650	10×12.5	700	10×16	860	12.5×20	1,150	12.5×25	1,350	16×25	1,300
2,200	10×16	890	10×16	990	10×20	1,000	12.5×25	1,550	16×25	1,800	16×31.5	1,980	18×35.5	2,300
3,300	10×20	1,190	12.5×20	1,450	12.5×25	1,700	16×25	1,980	16×31.5	2,100	18×35.5	2,500	20×40	2,700
4,700	12.5×20	1,550	12.5×25	1,800	16×25	2,100	16×25	2,200	16×35.5	2,500	20×40	2,900	22×50	3,400
6,800	12.5×25	1,920	16×25	2,250	16×25	2,250	16×35.5	2,600	18×40	2,800	22×50	3,500		
10,000	16×25	2,350	16×31.5	2,550	16×35.5	2,710	18×40	2,800	22×50	3,700				
15,000	16×31.5	2,550	16×35.5	2,880	18×40	3,100	22×50	3,800						
22,000	18×35.5	3,200	18×40	3,400	22×40	3,800								
33,000	20×40	3,500	22×50	4,500										
47,000	22×50	3,900												

Rated ripple current (mArms) at 85℃, 120Hz
Case size ϕD×L (mm)

μF \ Vdc	100		160		200		250		350		400		450	
0.1	5×11	2.1												
0.22	5×11	4.7												
0.33	5×11	7.0												
0.47	5×11	10									6.3×11	12		
1.0	5×11	21			6.3×11	22					6.3×11	22		
2.2	5×11	30			6.3×11	33			6.3×11	30	8×11.5	38	8×11.5	28
3.3	5×11	40			6.3×11	40	6.3×11	40	8×11.5	46	8×11.5	48	10×12.5	40
4.7	5×11	45			6.3×11	50	6.3×11	50	8×11.5	55	10×12.5	60	10×12.5	46
10	5×11	70	8×11.5	80	8×11.5	80	10×12.5	100	10×12.5	90	10×16	90	10×20	80
22	6.3×11	130	10×12.5	130	10×16	150	10×20	170	12.5×20	185	12.5×25	205	12.5×25	140
33	8×11.5	180	10×16	180	10×20	205	10×20	200	12.5×25	240	16×25	275	16×25	180
47	8×11.5	200	10×20	210	12.5×20	270	12.5×20	270	16×25	325	16×25	280	16×31.5	220
68	10×12.5	270	12.5×20	350	12.5×25	350	16×25	380	16×25	400	16×31.5	340	18×35.5	260
100	10×16	340	12.5×25	430	16×25	475	16×25	440	18×31.5	530	18×35.5	440	18×40	280
220	12.5×20	550	16×31.5	760	16×35.5	700	18×35.5	680						
330	12.5×25	760	18×35.5	995	18×40	950								
470	16×25	1,000	18×40	1,200										
1,000	18×35.5	1,350												
2,200	22×50	2,400												

Rated ripple current (mArms) at 85℃, 120Hz
Case size ϕD×L (mm)

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

(ϕ5 to ϕ18)

Capacitance (μF) \ Frequency (Hz)	50	120	300	1k	10k	100k
0.1 to 4.7	0.65	1.00	1.35	1.75	2.30	2.50
10 to 68	0.75	1.00	1.25	1.50	1.75	1.80
100 to 1,000	0.80	1.00	1.15	1.30	1.40	1.50
2,200 to	0.85	1.00	1.03	1.05	1.08	1.08

(ϕ20 to ϕ22)

Rated Voltage (Vdc) \ Frequency (Hz)	50	120	300	1k	10k	100k
6.3 to 50	0.95	1.00	1.03	1.05	1.08	1.08
63 to 100	0.92	1.00	1.07	1.13	1.19	1.20

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 105℃

KMQ Series

- Downsized from current standard KMG series
- Solvent-proof type except 160 to 450Vdc
  (see PRECAUTIONS AND GUIDELINES)

KMQ ↑ downsized
KMG

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃(6.3 to 100Vdc) −40 to +105℃(160 to 400Vdc) -25 to +105℃(450Vdc)
Rated Voltage Range	6.3 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	6.3 to 100Vdc / 160 to 450Vdc ≦φ18: I=0.03CV or 4μA, whichever is greater. (at 20℃ after 1 minute) CV\Time: CV≦1000 → After 1minute: I=0.1CV+40 max.; CV>1000 → I=0.04CV+100 max. (at 20℃) ≧φ20: I=0.03CV max. (at 20℃ after 3 minutes) Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)

Dissipation Factor (tanδ)

Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	350 to 400V	450V
tanδ (Max.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.24	0.24

When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)

Low Temperature Characteristics (Max. Impedance Ratio)

Rated voltage (Vdc)		6.3V	10V	16V	25V	35V	50V	63 to 100V	160 to 200V	250V	350V	400V	450V
Z(-25℃)/Z(+20℃)	≦φ8	5	4	3	2	2	2	2	3	3	4	4	6
	≧φ10	5	4	3	2	2	2	2	3	3	4	4	6
Z(-40℃)/Z(+20℃)	≦φ8	10	8	6	4	3	3	3	8	10	8	8	—
	≧φ10	10	8	6	4	3	3	3	4	4	6	6	—

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 1000 hours (2000 hours for φ10 and more at 105℃).

Capacitance change	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value
Leakage current	≦The initial specified value

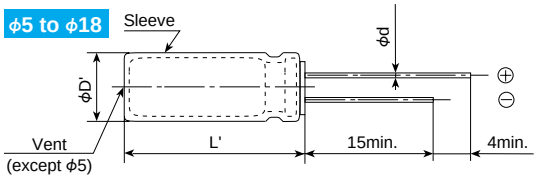
Shelf Life

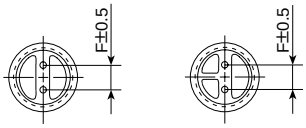
The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1000 hours at 105℃ without voltage applied.

Rated voltage	6.3 to 100Vdc	160 to 450Vdc
Capacitance change	≦±20% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦500% of the initial specified value

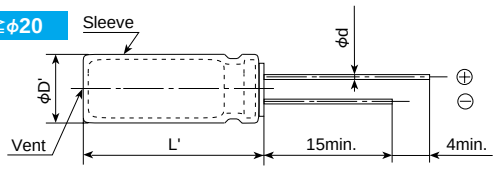
◆DIMENSIONS (Radial Lead Type=VB) [mm]

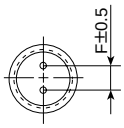
φ5 to φ18





≧φ20





φD	5	6.3	8	10	12.5	16	18	20	22
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0
φD'	φD+0.5max.							φD+0.5max.	
L'	L+1.5max.							L+2.0max.	

◆PART NUMBERING SYSTEM

KMQ 6.3 VB 1000 M

- M: Capacitance tolerance (±20%)
- 1000: Nominal capacitance code
- VB: Radial lead type
- 6.3: Rated voltage in volts
- KMQ: Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 105℃

KMQ Series

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50		63	
0.1											5×11	1.3		
0.22											5×11	2.9		
0.33											5×11	4.3		
0.47											5×11	7.0		
1.0											5×11	13		
2.2											5×11	20		
3.3											5×11	25		
4.7											5×11	30		
10											5×11	46		
22											5×11	68	5×11	71
33											5×11	90	6.3×11	100
47									5×11	93	6.3×11	115	6.3×11	120
68									6.3×11	110	6.3×11	150	8×11.5	155
100							5×11	125	6.3×11	150	8×11.5	190	8×11.5	200
220			5×11	155	6.3×11	190	6.3×11	200	8×11.5	270	10×12.5	300	10×16	335
330			6.3×11	210	6.3×11	225	8×11.5	310	10×12.5	350	10×16	410	10×20	510
470			6.3×11	250	8×11.5	315	10×12.5	380	10×16	460	10×20	540	12.5×20	640
1,000	8×11.5	390	10×12.5	460	10×12.5	500	10×16	610	12.5×20	810	12.5×25	950	16×25	930
2,200	10×16	635	10×16	705	10×20	710	12.5×25	1,090	16×25	1,260	16×31.5	1,410	18×35.5	1,650
3,300	10×20	840	12.5×20	1,000	12.5×25	1,170	16×25	1,400	16×31.5	1,500	18×35.5	1,770	20×40	1,950
4,700	12.5×20	1,090	12.5×25	1,260	16×25	1,500	16×25	1,570	16×35.5	1,780	20×40	2,100	22×50	2,450
6,800	12.5×25	1,350	16×25	1,570	16×25	1,600	16×35.5	1,850	18×40	2,000	22×50	2,500		
10,000	16×25	1,650	16×31.5	1,820	16×35.5	1,930	18×40	2,000	22×50	2,650				
15,000	16×31.5	1,820	16×35.5	2,050	18×40	2,210	22×50	2,750						
22,000	18×35.5	2,280	18×40	2,420	22×40	2,710								
33,000	20×40	2,500	22×50	3,210										
47,000	22×50	2,780												

Rated ripple current (mArms) at 105℃, 120Hz
Case size ϕD×L (mm)

Non solvent-proof

μF \ Vdc	100		160		200		250		350		400		450	
0.1	5×11	1.5												
0.22	5×11	3.4												
0.33	5×11	5.0												
0.47	5×11	7.1									6.3×11	8.5		
1.0	5×11	15			6.3×11	16					6.3×11	15		
2.2	5×11	21			6.3×11	25			6.3×11	21	8×11.5	27	8×11.5	20
3.3	5×11	29			6.3×11	30	6.3×11	28	8×11.5	30	8×11.5	34	10×12.5	28
4.7	5×11	32			6.3×11	35	6.3×11	35	8×11.5	39	10×12.5	42	10×12.5	32
10	5×11	50	8×11.5	41	8×11.5	57	10×12.5	71	10×12.5	64	10×16	64	10×20	56
22	6.3×11	93	10×12.5	92	10×16	105	10×20	105	12.5×20	130	12.5×25	145	12.5×25	100
33	8×11.5	130	10×16	125	10×20	140	10×20	140	12.5×25	170	16×25	195	16×25	125
47	8×11.5	140	10×20	150	12.5×20	195	12.5×20	190	16×25	230	16×25	200	16×31.5	155
68	10×12.5	190	12.5×20	250	12.5×25	250	16×25	270	16×25	285	16×31.5	240	18×35.5	185
100	10×16	240	12.5×25	310	16×25	335	16×25	310	18×31.5	375	18×35.5	310	18×40	200
220	12.5×20	390	16×31.5	540	16×35.5	500	18×35.5	485						
330	12.5×25	540	18×35.5	705	18×40	675								
470	16×25	715	18×40	855										
1,000	18×35.5	960												
2,200	22×50	1,750												

Rated ripple current (mArms) at 105℃, 120Hz
Case size ϕD×L (mm)

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

(ϕ5 to ϕ18)

Capacitance (μF) \ Frequency (Hz)	50	120	300	1k	10k	100k
0.1 to 4.7	0.65	1.00	1.35	1.75	2.30	2.50
10 to 68	0.75	1.00	1.25	1.50	1.75	1.80
100 to 1,000	0.80	1.00	1.15	1.30	1.40	1.50
2,200 to	0.85	1.00	1.03	1.05	1.08	1.08

(ϕ20 to ϕ22)

Rated Voltage (Vdc) \ Frequency (Hz)	50	120	300	1k	10k	100k
6.3 to 50	0.95	1.00	1.03	1.05	1.08	1.08
63 to 100	0.92	1.00	1.07	1.13	1.19	1.20

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 85℃

SMG Series

- Downsized from current standard SME series
- Endurance : 85℃ 2000 hours
- Solvent-proof type except 315 to 450Vdc
  (see PRECAUTIONS AND GUIDELINES)

SMQ
↑ downsized
SMG
↑ downsized
SME

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +85℃(6.3 to 400Vdc)　−25 to +85℃(450Vdc)
Rated Voltage Range	6.3 to 450Vdc
Capacitance Tolerance	±20% (M)　(at 20℃, 120Hz)
Leakage Current	6.3 to 100Vdc: ≦φ18: I=0.03CV or 4μA, whichever is greater. (at 20℃ after 1 minute); ≧φ20: I=0.03CV (at 20℃ after 3 minutes) 160 to 450Vdc (at 20℃): CV≦1000: After 1minute I=0.1CV+40; After 5minutes I=0.03CV+15 CV>1000: After 1minute I=0.04CV+100; After 5minutes I=0.02CV+25 Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)

Dissipation Factor (tanδ)

Rated voltage (Vdc)		6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	315 to 400V	450V
tanδ (Max.)	≦φ18	0.34	0.24	0.20	0.16	0.14	0.12	0.09	0.08	0.20	0.24	0.24
	≧φ20	0.28	0.24	0.20	0.16	0.14	0.12	0.09	0.08	0.15	0.15	0.20

When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)

Low Temperature Characteristics (Max. Impedance Ratio)

Rated voltage (Vdc)		6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	315 to 400V	450V
Z(−25℃)/Z(+20℃)	≦φ18	5	4	3	2	2	2	2	2	3	6	6
	≧φ20	5	4	3	2	2	2	2	2	4	6	6
Z(−40℃)/Z(+20℃)	≦φ18	12	10	8	5	4	3	3	3	4	6	—

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 85℃.

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℃ after exposing them for 1000 hours at 85℃ without voltage applied.

Rated voltage	6.3 to 100Vdc	160 to 450Vdc
Capacitance change	≦±20% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦500% of the initial specified value

◆PART NUMBERING SYSTEM

SMG 6.3 VB 1000 M ___

- ___ : Case code (≧φ20)
- M : Cap tolerance (±20%)
- 1000 : Nominal cap code
- VB : Radial lead type
- 6.3 : Rated voltage in volts
- SMG : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆CASE CODE [mm]

Case code	Case size φD×L	Case code	Case size φD×L	Case code	Case size φD×L
20S	20×20	—	—	—	—
20A	20×25	—	—	—	—
20B	20×30	22B	22×30	—	—
20C	20×35	22C	22×35	—	—
20D	20×40	22D	22×40	25D	25.4×40

NIPPON CHEMI-CON

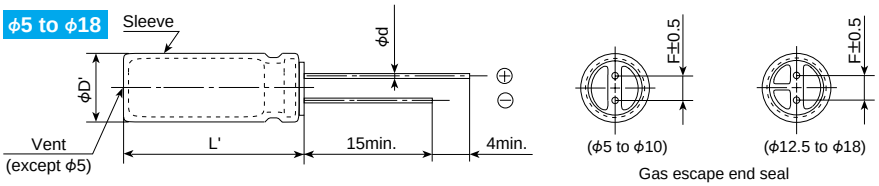
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 85℃

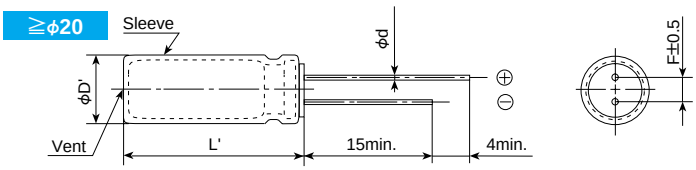
SMG Series

◆DIMENSIONS (Radial Lead Type=VB) [mm]

ϕ5 to ϕ18



≧ϕ20



ϕD	5	6.3	8	10	12.5	16	18	20	22	25.4
ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
ϕD'	ϕD+0.5max.							ϕD+0.5max.		
L'	L+1.5max.							L+2.0max.		

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

(ϕ5 to ϕ18)

Capacitance (μF) \ Frequency (Hz)	50	120	300	1k	10k	100k
0.1 to 4.7	0.65	1.00	1.35	1.75	2.30	2.50
10 to 47	0.75	1.00	1.25	1.50	1.75	1.80
100 to 1,000	0.80	1.00	1.15	1.30	1.40	1.50
2,200 to	0.85	1.00	1.03	1.05	1.08	1.08

(ϕ20 to ϕ25.4)

Rated Voltage (Vdc) \ Frequency (Hz)	50	120	300	1k	10k	100k
6.3 to 50	0.95	1.00	1.03	1.05	1.08	1.08
63 to 100	0.92	1.00	1.07	1.13	1.19	1.20
160 to 250	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 85℃

SMG Series

◆STANDARD RATINGS

Case size ϕD×L (mm)
Rated ripple current (mArms) at 85℃, 120Hz

μF \ Vdc	6.3		10		16		25		35		50		63		100	
0.1											5×11	1.3			5×11	2.1
0.22											5×11	2.9			5×11	4.7
0.33											5×11	4.3			5×11	7
0.47											5×11	6.2			5×11	10
1.0											5×11	17			5×11	21
2.2											5×11	28			5×11	30
3.3											5×11	35			5×11	40
4.7											5×11	41			5×11	45
10											5×11	60	5×11	65	6.3×11	75
22											5×11	95	5×11	100	8×11.5	130
33											5×11	125	6.3×11	140	8×11.5	180
47							5×11	115	5×11	130	6.3×11	155	6.3×11	170	10×12.5	230
100					5×11	160	6.3×11	190	6.3×11	210	8×11.5	260	10×12.5	300	10×20	370
220	5×11	200	5×11	240	6.3×11	260	8×11.5	330	8×11.5	385	10×12.5	430	10×16	490	12.5×25	620
330	6.3×11	270	6.3×11	290	8×11.5	370	8×11.5	440	10×12.5	490	10×16	585	10×20	710	12.5×25	760
															20×20	870
470	6.3×11	320	6.3×11	350	8×11.5	440	10×12.5	545	10×16	645	10×20	755	12.5×20	900	16×25	1,000
680															20×30	1,360
820													20×20	1,370	22×30	1,540
1,000	8×11.5	540	10×12.5	650	10×16	785	10×20	955	12.5×20	1,145	12.5×25	1,340	16×25	1,300	18×40	1,380
													20×25	1,600	20×35	1,720
1,200															22×40	1,980
1,500											20×20	1,570	20×30	1,850		
1,800															25.4×40	2,490
2,200	10×20	1,000	10×20	1,070	12.5×20	1,295	12.5×25	1,540	16×25	1,785	16×35.5	2,075	20×35	2,330		
									20×20	1,670	20×25	1,880	22×30	2,190		
2,700											20×30	2,150	20×40	2,640		
3,300	10×20	1,185	12.5×20	1,420	12.5×25	1,655	16×25	1,975	16×35.5	2,275	18×35.5	2,500				
							20×20	1,850	20×25	2,050	20×35	2,420				
											22×30	2,420	22×40	2,810		
3,900											20×40	2,590				
									20×30	2,310	22×35	2,590	25.4×40	3,100		
4,700	12.5×20	1,545	12.5×25	1,780	16×25	2,090	16×31.5	2,420	18×35.5	2,700						
					20×20	1,960	20×25	2,420	20×35	2,510						
									22×30	2,380	22×40	2,960				
5,600							20×30	2,430	20×40	2,690						
									22×35	2,690						
6,800	12.5×25	1,915	16×25	2,220	16×31.5	2,520	18×35.5	2,880								
			20×20	2,080	20×25	2,330	20×35	2,680								
							22×30	2,510	22×40	3,090	25.4×40	3,360				
8,200					20×30	2,500	20×40	2,810								
							22×35	2,810								
10,000	16×25	2,330	16×35.5	2,670	18×35.5	2,920										
	20×25	2,310	20×25	2,410	20×35	2,720										
					22×30	2,660	22×40	3,240	25.4×40	3,480						
12,000			20×30	2,620	20×40	2,900										
					22×35	2,900	22×40	3,240								
15,000	16×35.5	2,845	18×35.5	3,080												
	20×30	2,660	20×35	2,870												
			22×30	2,660	22×40	3,380	25.4×40	3,610								
18,000	20×35	2,890														
	22×30	2,860	22×35	3,050												
22,000	18×40	3,320														
	20×40	3,130														
	22×35	3,130	22×40	3,480	25.4×40	3,720										
27,000	22×40	3,280														
33,000			25.4×40	3,560												
39,000	25.4×40	3,560														

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized, 85℃

SMG Series

◆STANDARD RATINGS

Case size φD×L (mm)
Rated ripple current (mArms) at 85℃, 120Hz

μF \ Vdc	160		200		250		Non solvent-proof 315		350		400		450	
0.47									6.3×11	15			10×12.5	13
1.0									6.3×11	22	6.3×11	22	10×12.5	19
2.2					6.3×11	32			8×11.5	38	8×11.5	38	10×12.5	32
3.3	6.3×11	40	6.3×11	40	8×11.5	46			8×11.5	46	10×12.5	54	10×16	44
4.7	6.3×11	48	8×11.5	55	8×11.5	55			10×12.5	65	10×16	71	10×20	56
10	10×12.5	94	10×12.5	94	10×16	105			10×20	115	10×20	115	12.5×20	91
22	10×20	170	10×20	170	10×20	170			12.5×20	185	12.5×25	205	16×25	165
													20×20	180
33	10×20	205	10×20	205	12.5×20	230			16×25	275	16×25	275	16×31.5	215
											20×20	260	20×25	240
47	12.5×20	270	12.5×20	270	12.5×25	295	20×20	310	16×25	325	16×31.5	350	16×35.5	265
									20×20	310			20×25	290
56											20×25	350	20×30	320
68							20×25	400	20×25	400	20×30	420	20×35	370
													22×30	370
82					20×20	420	20×25	440					20×40	420
													22×35	420
100	12.5×25	430	16×25	475	16×31.5	515			18×31.5	530				
			20×20	460	20×25	490	20×30	500	20×30	500	20×35	520	22×40	470
											22×30	520		
120					20×25	530	20×30	550	20×35	560	20×40	580	25.4×40	520
											22×35	580		
180			20×25	660	20×30	680	20×40	720			25.4×40	790		
							22×35	720						
220					18×40	825								
	16×31.5	760	20×30	750	20×35	780	22×40	810	25.4×40	890				
	20×25	730	18×35.5	810	22×30	820								
270			20×30	830	20×40	880	25.4×40	920						
					22×35	880								
330	18×35.5	995	20×35	1,070	22×40	1,060								
	20×30	920	22×30	1,070										
390	20×35	1,160	20×40	1,190	25.4×40	1,200								
	22×30	1,160	22×30	1,160										
470	20×40	1,340	22×40	1,350										
	22×35	1,340												
560	22×40	1,470	22×40	1,430										
680	25.4×40	1,570	25.4×40	1,620										

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Standard, Downsized, 105℃

KMG Series

- Downsized from current standard KME series
- Solvent-proof type except 350 to 450Vdc
  (see PRECAUTIONS AND GUIDELINES)

KMQ ↑ downsized
KMG
↑ downsized KME

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃(6.3 to 100Vdc) −40 to +105℃(160 to 400Vdc) -25 to +105℃(450Vdc)
Rated Voltage Range	6.3 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	6.3 to 100Vdc: I=0.03CV or 4μA, whichever is greater. (at 20℃ after 1 minute) 160 to 450Vdc: CV≦1000 → I=0.1CV+40 (After 1minute), I=0.03CV+15 (After 5minutes); CV>1000 → I=0.04CV+100 (After 1minute), I=0.02CV+25 (After 5minutes) (at 20℃) Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)

Dissipation Factor (tanδ)

Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	350 to 400V	450V
tanδ (Max.)	0.34	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.24	0.24

When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)

Low Temperature Characteristics (Max. Impedance Ratio)

Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	350 to 400V	450V
Z(−25℃)/Z(+20℃)	5	4	3	2	2	2	2	2	3	6	6
Z(−40℃)/Z(+20℃)	12	10	8	5	4	3	3	3	4	6	—

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 1000 hours (2000 hours to meet the following two conditions 1) : 160Vdc and larger, 2) : φ12.5 and larger) at 105℃.

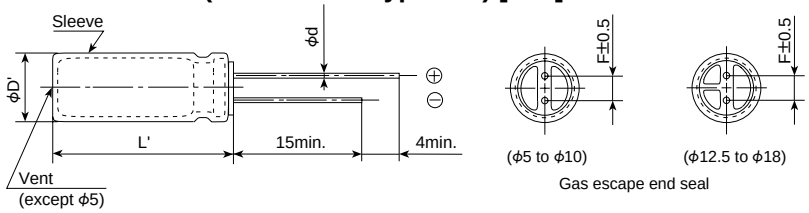
Capacitance change	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value
Leakage current	≦The initial specified value

Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1000 hours at 105℃ without voltage applied.

Rated voltage	6.3 to 100Vdc	160 to 450Vdc
Capacitance change	≦±20% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦500% of the initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16	18
φd	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
φD'	φD+0.5max.						
L'	L+1.5max						

◆PART NUMBERING SYSTEM

KMG 6.3 VB 1000 M

- M : Capacitance tolerance (±20%)
- 1000 : Nominal capacitance code
- VB : Radial lead type
- 6.3 : Rated voltage in volts
- KMG : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Standard, Downsized, 105℃

KMG Series

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50		63		100	
0.1											5×11	1.3			5×11	1.5
0.22											5×11	2.9			5×11	3.4
0.33											5×11	4.3			5×11	5.0
0.47											5×11	6.2			5×11	7.1
1.0											5×11	13			5×11	15
2.2											5×11	20			5×11	21
3.3											5×11	25			5×11	29
4.7											5×11	30			5×11	32
10											5×11	40	5×11	46	6.3×11	54
22											5×11	65	5×11	71	8×11.5	93
33											5×11	90	6.3×11	100	8×11.5	130
47							5×11	80	5×11	90	6.3×11	110	6.3×11	120	10×12.5	165
100					5×11	110	6.3×11	130	6.3×11	150	8×11.5	180	10×12.5	215	10×20	265
220	5×11	140	6.3×11	170	6.3×11	180	8×11.5	230	8×11.5	270	10×12.5	300	10×16	335	12.5×25	440
330	6.3×11	190	6.3×11	200	8×11.5	260	8×11.5	310	10×12.5	350	10×16	410	10×20	510	16×25	540
470	6.3×11	230	8×11.5	250	8×11.5	310	10×12.5	380	10×16	460	10×20	530	12.5×20	640	16×31.5	715
1,000	8×11.5	380	10×12.5	460	10×16	560	10×20	680	12.5×20	810	12.5×25	950	16×25	930	18×40	985
2,200	10×20	710	10×20	760	12.5×20	920	12.5×25	1,090	16×25	1,260	16×35.5	1,470				
3,300	10×20	840	12.5×20	1,000	12.5×25	1,170	16×25	1,400	16×35.5	1,610	18×35.5	1,770				
4,700	12.5×20	1,090	12.5×25	1,260	16×25	1,480	16×31.5	1,710	18×35.5	1,910						
6,800	12.5×25	1,350	16×25	1,570	16×31.5	1,780	18×35.5	2,040								
10,000	16×25	1,650	16×35.5	1,890	18×35.5	2,060										
15,000	16×35.5	2,010	18×35.5	2,180												
22,000	18×40	2,350														

Case size ϕD×L (mm)

Rated ripple current (mArms) at 105℃, 120Hz

Non solvent-proof

μF \ Vdc	160		200		250		350		400		450	
0.47							6.3×11	11			10×12.5	9
1.0							6.3×11	15	6.3×11	15	10×12.5	13
2.2					6.3×11	23	8×11.5	26	8×11.5	26	10×12.5	23
3.3	6.3×11	28	6.3×11	28	8×11.5	32	10×12.5	38	10×12.5	38	10×16	31
4.7	6.3×11	34	8×11.5	39	8×11.5	39	10×16	50	10×16	50	10×20	40
10	10×12.5	67	10×16	74	10×16	74	10×20	80	10×20	80	12.5×20	65
22	10×20	120	10×20	120	12.5×20	130	12.5×20	130	12.5×25	145	16×25	115
33	10×20	145	12.5×20	160	12.5×20	160	16×25	195	16×25	195	16×31.5	155
47	12.5×20	195	12.5×20	195	12.5×25	210	16×25	230	16×31.5	250	16×35.5	185
100	16×25	335	16×25	335	16×31.5	365	18×31.5	375	16×40	350		
220	16×31.5	540	18×35.5	575	18×40	585						
330	18×35.5	705										

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	50	120	300	1k	10k	100k
0.1 to 4.7	0.65	1.00	1.35	1.75	2.30	2.50
10 to 47	0.75	1.00	1.25	1.50	1.75	1.80
100 to 1,000	0.80	1.00	1.15	1.30	1.40	1.50
2,200 to	0.85	1.00	1.03	1.05	1.08	1.08

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Standard, 105℃

KME Series

- Endurance with ripple current : 105℃ 1000 hours
- Solvent-proof type except 350 to 400Vdc
  (see PRECAUTIONS AND GUIDELINES)

KMG ← KME
downsized

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃(6.3 to 100Vdc) −40 to +105℃(160 to 400Vdc)
Rated Voltage Range	6.3 to 400Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	6.3 to 100Vdc: I=0.03CV or 4μA, whichever is greater. (at 20℃ after 1 minute); I=0.01CV or 3μA, whichever is greater. (at 20℃ after 2 minutes) 160 to 400Vdc: CV≦1000: After 1minute I=0.1CV+40, After 5minutes I=0.03CV+15; CV>1000: After 1minute I=0.04CV+100, After 5minutes I=0.02CV+25 (at 20℃) Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)

Dissipation Factor (tanδ)

Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	350 to 400V
tanδ (Max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.20	0.24

When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)

Low Temperature Characteristics (Max. Impedance Ratio)

Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	350 to 400V
Z(−25℃)/Z(+20℃)	4	3	2	2	2	2	2	2	3	6
Z(−40℃)/Z(+20℃)	8	6	4	3	3	3	3	3	4	6

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 1000 hours at 105℃.

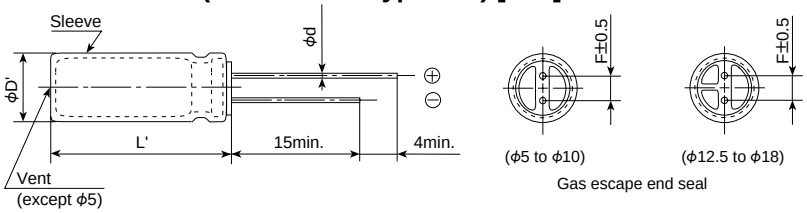
Capacitance change	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value
Leakage current	≦The initial specified value

Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1000 hours at 105℃ without voltage applied.

Rated voltage	6.3 to 100Vdc	160 to 400Vdc
Capacitance change	≦±20% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦500% of the initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16	18
φd	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
φD'	φD+0.5max.						
L'	L+1.5max						

◆PART NUMBERING SYSTEM

KME 50 VB R1 M

- M : Cap tolerance (±20%)
- R1 : Nominal cap code
- VB : Radial lead type
- 50 : Rated voltage in volts
- KME : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	50	120	300	1k	10k	100k
0.1 to 4.7	0.65	1.00	1.35	1.75	2.30	2.50
10 to 47	0.75	1.00	1.25	1.50	1.75	1.80
100 to 1,000	0.80	1.00	1.15	1.30	1.40	1.50
2,200 to	0.85	1.00	1.03	1.05	1.08	1.08

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Standard, 105℃

KME Series

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50		63		100	
0.1											5×11	1.3			5×11	2.6
0.22											5×11	2.9			5×11	5.8
0.33											5×11	4.4			5×11	7.8
0.47											5×11	7			5×11	10
1.0											5×11	13			5×11	15
2.2											5×11	20			5×11	23
3.3											5×11	25			5×11	29
4.7											5×11	30	5×11	32	5×11	34
10											5×11	46	5×11	50	6.3×11	56
22											5×11	68	6.3×11	82	8×11.5	96
33									5×11	75	6.3×11	90	6.3×11	100	10×12.5	140
47					5×11	77	5×11	82	6.3×11	100	6.3×11	110	8×11.5	135	10×16	180
100	5×11	95	5×11	105	6.3×11	125	6.3×11	135	8×11.5	170	8×11.5	180	10×12.5	225	12.5×20	320
220	6.3×11	160	6.3×11	175	8×11.5	215	8×11.5	230	10×12.5	300	10×16	345	10×20	400	16×25	570
330	6.3×11	195	8×11.5	245	8×11.5	260	10×12.5	335	10×16	400	10×20	460	12.5×20	540	16×25	700
470	8×11.5	270	8×11.5	290	10×12.5	370	10×16	440	10×20	520	12.5×20	610	12.5×25	700	16×31.5	880
1,000	10×12.5	460	10×16	550	10×20	640	12.5×20	770	12.5×25	920	16×25	1,080	16×31.5	1,210		
2,200	12.5×20	810	12.5×20	860	12.5×25	1,000	16×25	1,170	16×31.5	1,340	18×35.5	1,530				
3,300	12.5×20	960	12.5×25	1,100	16×25	1,300	16×31.5	1,460	18×35.5	1,650						
4,700	16×25	1,330	16×25	1,400	16×31.5	1,600	18×35.5	1,780	18×40	1,900						
6,800	16×25	1,500	16×31.5	1,690	18×35.5	1,900	18×40	1,950								
10,000	16×31.5	1,765	18×35.5	1,950	18×40	2,060										
15,000	18×35.5	2,075														

Case size ϕD×L (mm)

Rated ripple current (mArms) at 105℃, 120Hz

Non solvent-proof

μF \ Vdc	160		200		250		350		400	
0.47	6.3×11	9	6.3×11	9	6.3×11	9	8×11.5	10		
1.0	6.3×11	12	6.3×11	12	6.3×11	12	10×12.5	18	10×12.5	18
2.2	6.3×11	19	6.3×11	19	8×11.5	21	10×16	30	10×16	30
3.3	8×11.5	26	8×11.5	26	10×12.5	30	10×16	37	10×20	40
4.7	8×11.5	31	10×12.5	36	10×12.5	36	10×20	48	10×25	52
10	10×16	59	10×16	59	10×20	64	12.5×20	79	12.5×25	79
22	10×20	95	10×20	95	12.5×25	110	16×20	130	16×25	145
33	12.5×20	125	12.5×25	140	12.5×25	140	16×25	175	16×31.5	185
47	12.5×25	165	12.5×25	165	16×25	180	16×35.5	230	18×31.5	230
100	16×25	270	16×31.5	285	18×35.5	310	18×40	330		
220	18×35.5	450	18×40	470						

◆MAXIMUM ESR

(Ω) at 20℃, 120Hz

μF \ Vdc	6.3	10	16	25	35	50	63	100	160 to 250	350 to 400
0.1						1,660		1,330		
0.22						754		603		
0.33						503		402		
0.47						353		282	706	847
1.0						166		133	332	398
2.2						75.4		60.3	151	181
3.3						50.3		40.3	101	121
4.7						35.3	31.8	28.2	70.6	84.7
10						16.6	14.9	13.3	33.2	39.8
22						7.54	6.79	6.03	15.1	18.1
33					6.03	5.03	4.52	4.02	10.1	12.1
47			5.65	4.94	4.23	3.53	3.18	2.82	7.06	8.47
100	3.70	3.15	2.65	2.32	1.99	1.66	1.49	1.33	3.32	3.98
220	1.66	1.43	1.21	1.06	0.905	0.754	0.679	0.603	1.51	
330	1.11	0.955	0.804	0.704	0.603	0.503	0.452	0.402		
470	0.776	0.671	0.565	0.494	0.423	0.353	0.318	0.282		
1,000	0.370	0.315	0.265	0.232	0.199	0.166	0.149			
2,200	0.181	0.158	0.136	0.121	0.106	0.0905				
3,300	0.131	0.116	0.101	0.0905	0.0804					
4,700	0.0988	0.0882	0.0776	0.0706	0.0635					
6,800	0.0781	0.0707	0.0634	0.0585						
10,000	0.0630	0.0581	0.0531							
15,000	0.0531									

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Bi-polarized, 85℃

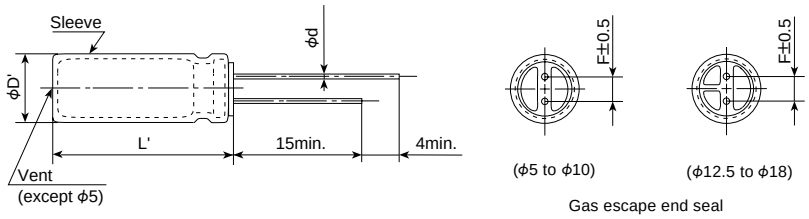
SME-BP Series

- Standard Bi-polarized type
- Endurance : 85℃ 2000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +85℃
Rated Voltage Range	6.3 to 100Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.06CV or 10μA, whichever is greater. (at 20℃ after 2 minutes) I=0.03CV or 3μA, whichever is greater. (at 20℃ after 5 minutes) Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)
Dissipation Factor (tanδ)	Rated voltage (Vdc): 6.3V 10V 16V 25V 35V 50V 63V 80V 100V tanδ (Max.): 0.24 0.24 0.20 0.20 0.16 0.14 0.12 0.12 0.10 When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc): 6.3V 10V 16V 25V 35V 50V 63V 80V 100V Z(−25℃)/Z(+20℃): 4 3 2 2 2 2 2 2 2 Z(−40℃)/Z(+20℃): 10 8 6 4 3 3 3 3 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2000 hours at 85℃, however the polarization shall be reversed every 250 hours. Rated voltage: 6.3 to 16Vdc / 25 to 100Vdc Capacitance change: ≦±25% of the initial value / ≦±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℃ after exposing them for 1000 hours at 85℃ without voltage applied. Rated voltage: 6.3 to 16Vdc / 25 to 100Vdc Capacitance change: ≦±25% of the initial value / ≦±20% of the initial value D.F. (tanδ): ≦150% of the initial specified value Leakage current: ≦The initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16	18
φd	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
φD'	φD+0.5max.						
L'	L+1.5max.						

◆PART NUMBERING SYSTEM

SME 6.3 VB 1000 M BP

- BP: Bi-polar type
- M: Cap tolerance (±20%)
- 1000: Nominal cap code
- VB: Radial lead type
- 6.3: Rated voltage in volts
- SME: Series name

Capacitance	Code
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50		63		80		100	
0.47											5X11	11					5X11	14
1.0											5X11	17					5X11	21
2.2											5X11	25			5X11	29	6.3X11	34
3.3											5X11	27	5X11	28	6.3X11	39	6.3X11	39
4.7											5X11	34	6.3X11	34	6.3X11	47	6.3X11	47
10									5X11	43	6.3X11	52	6.3X11	57	8X11.5	65	8X11.5	71
22					5X11	57	6.3X11	65	6.3X11	73	8X11.5	89	8X11.5	95	10X16	125	10X16	135
33					5X11	70	6.3X11	80	8X11.5	100	8X11.5	105	10X12.5	135	10X16	150	12.5X20	220
47			5X11	76	6.3X11	95	6.3X11	95	8X11.5	120	10X12.5	150	10X16	180	10X20	195	12.5X20	240
100	6.3X11	125	6.3X11	125	8X11.5	160	8X11.5	160	10X16	230	10X20	265	12.5X20	320	12.5X25	350	16X25	425
220	8X11.5	215	8X11.5	215	10X12.5	275	10X16	305	12.5X20	410	12.5X25	480	16X25	575	16X31.5	615	18X35.5	720
330	8X11.5	265	10X16	345	10X16	375	12.5X20	450	12.5X20	505	16X25	650	16X31.5	655	18X35.5	755		
470	10X12.5	370	10X16	410	10X20	485	12.5X20	540	12.5X25	655	16X31.5	835	18X35.5	965				
1,000	10X20	650	12.5X20	720	12.5X25	855	16X25	950	16X31.5	1,140								
2,200	12.5X25	1,160	16X25	1,280	16X31.5	1,510	18X35.5	1,620										
3,300	16X25	1,570	16X31.5	1,690	18X35.5	1,980												
4,700	16X31.5	2,020	18X35.5	2,160														
6,800	18X35.5	2,600																

Case size φDXL (mm)
Rated ripple current (mArms) at 85℃, 120Hz

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Bi-polarized, 105℃

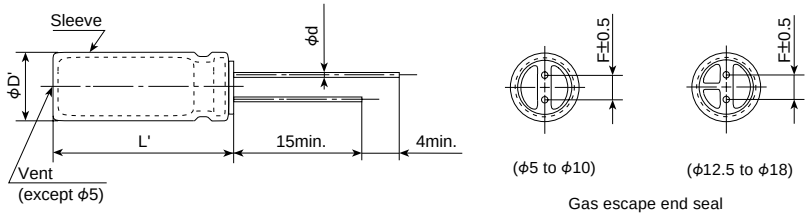
KME-BP Series

- Standard Bi-polarized type
- Endurance : 105℃ 1000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃
Rated Voltage Range	6.3 to 100Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.06CV or 10μA, whichever is greater. (at 20℃ after 2 minutes) I=0.03CV or 3μA, whichever is greater. (at 20℃ after 5 minutes) Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)
Dissipation Factor (tanδ)	Rated voltage (Vdc): 6.3V / 10V / 16V / 25V / 35V / 50V / 63V / 80V / 100V tanδ (Max.): 0.24 / 0.24 / 0.20 / 0.20 / 0.16 / 0.14 / 0.12 / 0.12 / 0.10 When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc): 6.3V / 10V / 16V / 25V / 35V / 50V / 63V / 80V / 100V Z(−25℃)/Z(+20℃): 4 / 3 / 2 / 2 / 2 / 2 / 2 / 2 / 2 Z(−40℃)/Z(+20℃): 10 / 8 / 6 / 4 / 3 / 3 / 3 / 3 / 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 105℃, however the polarization shall be reversed every 250 hours. Rated voltage: 6.3 to 16Vdc / 25 to 100Vdc Capacitance change: ≦±25% of the initial value / ≦±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℃ after exposing them for 500 hours at 105℃ without voltage applied. Rated voltage: 6.3 to 16Vdc / 25 to 100Vdc Capacitance change: ≦±25% of the initial value / ≦±20% of the initial value D.F. (tanδ): ≦150% of the initial specified value Leakage current: ≦The initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16	18
φd	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
φD'	φD+0.5max.						
L'	L+1.5max.						

◆PART NUMBERING SYSTEM

KME 6.3 VB 1000 M BP

- BP: Bi-polar type
- M: Cap tolerance (±20%)
- 1000: Nominal cap code
- VB: Radial lead type
- 6.3: Rated voltage in volts
- KME: Series name

Capacitance	Code
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

μF \ Vdc	6.3		10		16		25		35		50		63		80		100	
0.47											5X11	7					5X11	8
1.0											5X11	10					5X11	12
2.2											5X11	15			5X11	16	6.3X11	20
3.3											5X11	18	5X11	20	6.3X11	23	6.3X11	25
4.7											5X11	22	6.3X11	24	6.3X11	27	6.3X11	30
10									5X11	30	6.3X11	37	6.3X11	40	8X11.5	46	8X11.5	50
22					5X11	40	6.3X11	46	6.3X11	51	8X11.5	63	8X11.5	68	10X16	89	10X16	97
33					5X11	49	6.3X11	56	8X11.5	72	8X11.5	77	10X12.5	98	10X16	105	12.5X20	140
47			5X11	54	6.3X11	67	6.3X11	67	8X11.5	86	10X12.5	105	10X16	130	10X20	140	12.5X20	170
100	6.3X11	90	6.3X11	90	8X11.5	110	8X11.5	110	10X16	160	10X20	190	12.5X20	225	12.5X25	245	16X25	300
220	8X11.5	150	8X11.5	150	10X12.5	195	10X16	215	12.5X20	290	12.5X25	340	16X25	405	16X31.5	435	18X35.5	510
330	8X11.5	185	10X16	240	10X16	265	12.5X20	320	12.5X20	350	16X25	460	16X31.5	535	18X35.5	570		
470	10X12.5	260	10X16	290	10X20	345	12.5X20	380	12.5X25	465	16X31.5	590	18X35.5	680				
1,000	10X20	460	12.5X20	510	12.5X25	605	16X25	670	16X31.5	805								
2,200	12.5X25	820	16X25	910	16X31.5	1,070	18X35.5	1,140										
3,300	16X25	1,110	16X31.5	1,200	18X35.5	1,400												
4,700	16X31.5	1,430	18X35.5	1,520														
6,800	18X35.5	1,830																

Case size φD×L (mm)
Rated ripple current (mArms) at 105℃, 120Hz

CAT. No. E1001D

NIPPON CHEMI-CON

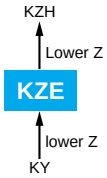
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

Upgrade!

KZE Series

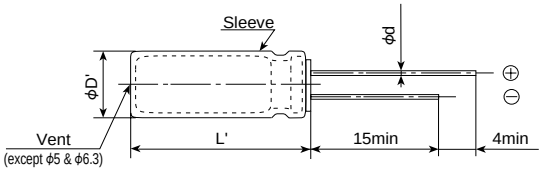
- Ultra Low impedance for Personal Computer and Storage Equipment
- Rated voltage 63 to 100V newly added Upgrade!
- Endurance with ripple current: 105℃ 2000 to 5000 hours
- Non solvent-proof type

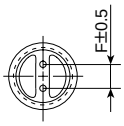


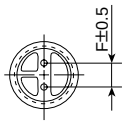
◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +105℃
Rated Voltage Range	6.3 to 100Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc) 6.3V 10V 16V 25V 35V 50V 63V 80V 100V tanδ (Max.) 0.22 0.19 0.16 0.14 0.12 0.10 0.09 0.09 0.08 When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Z (-25℃) / Z (+20℃) 2max. Z (-40℃) / Z (+20℃) 3max. (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105℃. Time: φ5 & φ6.3 : 2000hours φ8 : 3000hours φ10 : 4000hours φ12.5 & φ16 : 5000hours 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℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change: ≦±25% of the initial value D.F. (tanδ): ≦200% of the initial specified value Leakage current: ≦The initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]







Gas escaped end seal

φD	5	6.3	8	10	12.5	16
φd	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
φD'	φD+0.5max.					
L'	L+1.5max.					

◆PART NUMBERING SYSTEM

KZE 6.3 VB 1500 M J20

- KZE — Series name
- 6.3 — Rated voltage in volts
- VB — Radial lead type
- 1500 — Nominal cap code
- M — Cap tolerance (±20%)
- J20 — Case code

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
2200μF	2200

◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

Capacitance(μF) \ Frequency (Hz)	120	1k	10k	100k
6.8 to 180	0.40	0.75	0.90	1.00
220 to 560	0.50	0.85	0.94	1.00
680 to 1,800	0.60	0.87	0.95	1.00
2,200 to 3,900	0.75	0.90	0.95	1.00
4,700 to	0.85	0.95	0.98	1.00

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

Upgrade!

KZE Series

◆STANDARD RATINGS

Case size φD×L(mm)	Case code	Vdc	6.3			10			16		
		Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)
5×11	E11	150	0.30	1.0	250	100	0.30	1.0	250	56	0.30	1.0	250
6.3×11	F11	330	0.13	0.41	405	220	0.13	0.41	405	120	0.13	0.41	405
8×11.5	H11	560	0.072	0.22	760	470	0.072	0.22	760	330	0.072	0.22	760
8×15	H15	820	0.056	0.17	995	680	0.056	0.17	995	470	0.056	0.17	995
8×20	H20	1,200	0.041	0.13	1,250	1,000	0.041	0.13	1,250	680	0.041	0.13	1,250
10×12.5	J12	1,000	0.053	0.16	1,030	680	0.053	0.16	1,030	470	0.053	0.16	1,030
10×16	J16	1,200	0.038	0.12	1,430	1,000	0.038	0.12	1,430	680	0.038	0.12	1,430
10×20	J20	1,500	0.023	0.069	1,820	1,200	0.023	0.069	1,820	1,000	0.023	0.069	1,820
10×25	J25	2,200	0.022	0.066	2,150	1,500	0.022	0.066	2,150	1,200	0.022	0.066	2,150
12.5×20	K20	3,300	0.021	0.053	2,360	2,200	0.021	0.053	2,360	1,500	0.021	0.053	2,360
12.5×25	K25	3,900	0.018	0.045	2,770	3,300	0.018	0.045	2,770	2,200	0.018	0.045	2,770
12.5×30	K30	4,700	0.016	0.041	3,290	3,900	0.016	0.041	3,290	2,700	0.016	0.041	3,290
12.5×35	K35	5,600	0.015	0.039	3,400	4,700	0.015	0.039	3,400	3,300	0.015	0.039	3,400
16×20	L20	5,600	0.018	0.045	3,140	3,900	0.018	0.045	3,140	2,700	0.018	0.045	3,140
16×25	L25	6,800	0.016	0.043	3,460	5,600	0.016	0.043	3,460	3,900	0.016	0.043	3,460

Case size φD×L (mm)	Case code	Vdc	25			35			50		
		Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)
5×11	E11	47	0.30	1.0	250	33	0.30	1.0	250	22	0.34	1.18	238
6.3×11	F11	100	0.13	0.41	405	56	0.13	0.41	405	56	0.14	0.50	385
8×11.5	H11	220	0.072	0.22	760	150	0.072	0.22	760	100	0.074	0.22	724
8×15	H15	330	0.056	0.17	995	220	0.056	0.17	995	120	0.061	0.18	950
8×20	H20	470	0.041	0.13	1,250	270	0.041	0.13	1,250	180	0.046	0.14	1,190
10×12.5	J12	330	0.053	0.16	1,030	220	0.053	0.16	1,030	150	0.061	0.18	979
10×16	J16	470	0.038	0.12	1,430	330	0.038	0.12	1,430	220	0.042	0.12	1,370
10×20	J20	680	0.023	0.069	1,820	470	0.023	0.069	1,820	270	0.030	0.090	1,580
10×25	J25	820	0.022	0.066	2,150	560	0.022	0.066	2,150	330	0.028	0.085	1,870
12.5×20	K20	1,000	0.021	0.053	2,360	680	0.021	0.053	2,360	470	0.027	0.068	2,050
12.5×25	K25	1,500	0.018	0.045	2,770	1,000	0.018	0.045	2,770	560	0.023	0.059	2,410
12.5×30	K30	1,800	0.016	0.041	3,290	1,200	0.016	0.041	3,290	680	0.021	0.052	2,860
12.5×35	K35	2,200	0.015	0.039	3,400	1,500	0.015	0.039	3,400	820	0.019	0.051	2,960
16×20	L20	1,800	0.018	0.045	3,140	1,200	0.018	0.045	3,140	820	0.023	0.059	2,730
16×25	L25	2,700	0.016	0.043	3,460	1,800	0.016	0.043	3,460	1,000	0.021	0.056	3,010

Case size φD×L (mm)	Case code	Vdc	63			80			100		
		Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)
5×11	E11	15	0.88	3.5	165					6.8	1.4	5.6	125
6.3×11	F11	33	0.35	1.4	265					15	0.57	2.3	205
8×11.5	H11	56	0.22	0.88	500					27	0.36	1.4	355
8×15	H15	82	0.16	0.64	665					39	0.25	1.0	450
8×20	H20	120	0.12	0.48	820					56	0.19	0.76	565
10×12.5	J12	82	0.11	0.44	690	68	0.17	0.66	480	47	0.17	0.66	480
10×16	J16	120	0.076	0.31	950	100	0.11	0.47	600	68	0.11	0.47	600
10×20	J20	180	0.056	0.23	1,150	120	0.084	0.34	800	82	0.084	0.34	800
10×25	J25	220	0.046	0.19	1,350	150	0.069	0.28	900	120	0.069	0.28	900
12.5×16	K16	180	0.072	0.29	1,150	150	0.11	0.34	750	100	0.11	0.34	750
12.5×20	K20	270	0.041	0.13	1,500	220	0.062	0.18	1,100	150	0.062	0.18	1,100
12.5×25	K25	390	0.031	0.093	1,900	330	0.047	0.14	1,250	220	0.047	0.14	1,250
12.5×30	K30	470	0.028	0.084	2,300	390	0.042	0.13	1,500	270	0.042	0.13	1,500
12.5×35	K35	560	0.024	0.072	2,500	470	0.036	0.11	1,650	330	0.036	0.11	1,650
12.5×40	K40	680	0.021	0.063	2,800	560	0.032	0.095	1,800	390	0.032	0.095	1,800
16×20	L20	470	0.032	0.096	2,000	330	0.048	0.15	1,350	220	0.048	0.15	1,350
16×25	L25	680	0.025	0.075	2,600	470	0.038	0.12	1,700	330	0.038	0.12	1,700
16×31.5	L31	820	0.021	0.063	2,850	680	0.032	0.095	1,850	470	0.032	0.095	1,850
16×35.5	L35	1,000	0.019	0.057	2,900	820	0.029	0.086	2,000	560	0.029	0.086	2,000
16×40	L40	1,200	0.018	0.054	3,400	1,000	0.027	0.081	2,200	680	0.027	0.081	2,200
18×20	M20	680	0.030	0.090	2,500	470	0.045	0.14	1,500	330	0.045	0.14	1,500
18×25	M25	820	0.024	0.072	2,800	680	0.036	0.11	1,750	470	0.036	0.11	1,750
18×31.5	M31	1,200	0.020	0.060	3,300	820	0.030	0.090	1,900	560	0.030	0.090	1,900
18×35.5	M35	1,500	0.018	0.054	3,400	1,000	0.027	0.081	2,200	680	0.027	0.081	2,200
18×40	M40	1,800	0.017	0.051	3,500	1,200	0.026	0.077	2,700	820	0.026	0.077	2,700

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

New!

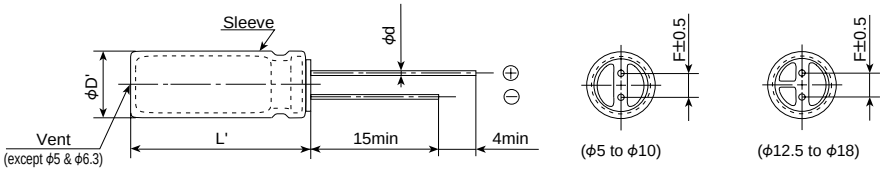
KZH Series

- Ultra Low impedance for Personal Computer and Storage Equipment
- Endurance with ripple current: 105℃ 5000 to 6000 hours
- Non solvent-proof type

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +105℃
Rated Voltage Range	6.3 to 35Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc) 6.3V 10V 16V 25V 35V tanδ (Max.) 0.22 0.19 0.16 0.14 0.12 When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Z (-25℃) / Z (+20℃) 2max. Z (-40℃) / Z (+20℃) 3max. (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105℃. Time: φ5 & φ6.3 : 5000hours φ8 to φ16 : 6000hours 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℃ after exposing them for 500 hours at 105℃ 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: ≦The initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16
φd	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
φD'	φD+0.5max.					
L'	L+1.5max.					

◆PART NUMBERING SYSTEM

KZH 6.3 VB 1500 M H20

- H20 : Case code
- M : Cap tolerance (±20%)
- 1500 : Nominal cap code
- VB : Radial lead type
- 6.3 : Rated voltage in volts
- KZH : Series name

Capacitance	Code
47μF	47
100μF	100
2200μF	2200

◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

Capacitance(μF) \ Frequency (Hz)	120	1k	10k	100k
0.47 to 150	0.40	0.75	0.90	1.00
220 to 560	0.50	0.85	0.94	1.00
680 to 1,800	0.60	0.87	0.95	1.00
2,200 to 3,900	0.75	0.90	0.95	1.00
4,700 to 8,200	0.85	0.95	0.98	1.00

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

New!

KZH Series

◆STANDARD RATINGS

Case size φD×L(mm)	Case code	Vdc: 6.3 Capacitance (μF)	6.3 Impedance (Ωmax/100kHz) 20℃	6.3 Impedance (Ωmax/100kHz) -10℃	6.3 Rated ripple current (mArms/105℃ 100kHz)	10 Capacitance (μF)	10 Impedance (Ωmax/100kHz) 20℃	10 Impedance (Ωmax/100kHz) -10℃	10 Rated ripple current (mArms/105℃ 100kHz)	16 Capacitance (μF)	16 Impedance (Ωmax/100kHz) 20℃	16 Impedance (Ωmax/100kHz) -10℃	16 Rated ripple current (mArms/105℃ 100kHz)
5×11	E11	220	0.24	0.80	330	150	0.24	0.80	330	100	0.24	0.80	330
6.3×11	F11	470	0.11	0.35	500	330	0.11	0.35	500	220	0.11	0.35	500
8×11.5	H11	820	0.062	0.19	900	680	0.062	0.19	900	470	0.062	0.19	900
8×15	H15	1,200	0.048	0.15	1,210	1,000	0.048	0.15	1,210	680	0.048	0.15	1,210
8×20	H20	1,500	0.033	0.11	1,410	1,500	0.033	0.11	1,410	1,000	0.033	0.11	1,410
10×12.5	J12	1,200	0.045	0.14	1,240	1,000	0.045	0.14	1,240	680	0.045	0.14	1,240
10×16	J16	1,800	0.032	0.10	1,650	1,500	0.032	0.10	1,650	1,000	0.032	0.10	1,650
10×20	J20	2,200	0.020	0.060	1,960	1,800	0.020	0.060	1,960	1,500	0.020	0.060	1,960
10×25	J25	2,700	0.018	0.054	2,250	2,200	0.018	0.054	2,250	1,800	0.018	0.054	2,250
12.5×20	K20	3,900	0.017	0.043	2,480	3,300	0.017	0.043	2,480	2,200	0.017	0.043	2,480
12.5×25	K25	4,700	0.015	0.038	2,900	3,900	0.015	0.038	2,900	2,700	0.015	0.038	2,900
12.5×30	K30	5,600	0.013	0.033	3,450	4,700	0.013	0.033	3,450	3,300	0.013	0.033	3,450
12.5×35	K35	6,800	0.012	0.031	3,570	5,600	0.012	0.031	3,570	3,900	0.012	0.031	3,570
16×20	L20	6,800	0.015	0.038	3,250	4,700	0.015	0.038	3,250	3,300	0.015	0.038	3,250
16×25	L25	8,200	0.013	0.035	3,630	6,800	0.013	0.035	3,630	4,700	0.013	0.035	3,630

Case size φD×L (mm)	Case code	Vdc: 25 Capacitance (μF)	25 Impedance (Ωmax/100kHz) 20℃	25 Impedance (Ωmax/100kHz) -10℃	25 Rated ripple current (mArms/105℃ 100kHz)	35 Capacitance (μF)	35 Impedance (Ωmax/100kHz) 20℃	35 Impedance (Ωmax/100kHz) -10℃	35 Rated ripple current (mArms/105℃ 100kHz)
5×11	E11	68	0.24	0.80	330	47	0.24	0.80	330
6.3×11	F11	150	0.11	0.35	500	100	0.11	0.35	500
8×11.5	H11	330	0.062	0.19	900	220	0.062	0.19	900
8×15	H15	390	0.048	0.15	1,210	270	0.048	0.15	1,210
8×20	H20	560	0.033	0.11	1,410	390	0.033	0.11	1,410
10×12.5	J12	470	0.045	0.14	1,240	330	0.045	0.14	1,240
10×16	J16	680	0.032	0.10	1,650	470	0.032	0.10	1,650
10×20	J20	820	0.020	0.060	1,960	560	0.020	0.060	1,960
10×25	J25	1,000	0.018	0.054	2,250	680	0.018	0.054	2,250
12.5×20	K20	1,500	0.017	0.043	2,480	1,000	0.017	0.043	2,480
12.5×25	K25	1,800	0.015	0.038	2,900	1,200	0.015	0.038	2,900
12.5×30	K30	2,200	0.013	0.033	3,450	1,500	0.013	0.033	3,450
12.5×35	K35	2,700	0.012	0.031	3,570	1,800	0.012	0.031	3,570
16×20	L20	2,200	0.015	0.038	3,250	1,500	0.015	0.038	3,250
16×25	L25	3,300	0.013	0.035	3,630	2,200	0.013	0.035	3,630

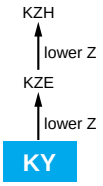
NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

KY Series

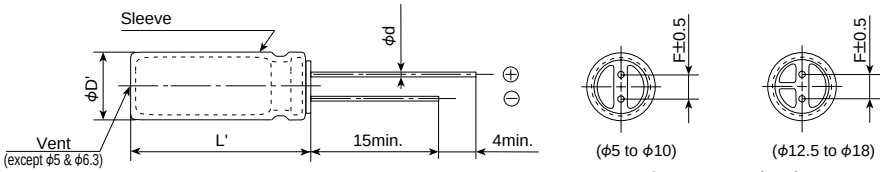
- Newly innovative electrolyte is employed to minimize ESR
- Endurance with ripple current : 4000 to 10000 hours at 105℃
- Non solvent-proof type



◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +105℃
Rated Voltage Range	6.3 to 50Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc) 6.3V 10V 16V 25V 35V 50V tanδ (Max.) 0.22 0.19 0.16 0.14 0.12 0.10 When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc) 6.3V 10V 16V 25V 35V 50V Z(−25℃)/Z(+20℃) 4 3 2 2 2 2 Z(−40℃)/Z(+20℃) 8 6 4 3 3 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105℃. Time 6.3 to 10Vdc: φ5 & 6.3 : 4000hours φ8 & 10 : 6000hours φ12.5 to 18 : 8000hours Time 16 to 50Vdc: φ5 & 6.3 : 5000hours φ8 & 10 : 7000hours φ12.5 to 18 : 10000hours 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℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change: ≦±25% of the initial value D.F. (tanδ): ≦200% of the initial specified value Leakage current: ≦The initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16	18
φd	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
φD'	φD+0.5max.						
L'	L+1.5max.						

◆PART NUMBERING SYSTEM

KY 10 VB 1000 M H20

- H20 : Case code
- M : Capacitance tolerance (±20%)
- 1000 : Nominal capacitance code
- VB : Radial lead type
- 10 : Rated voltage in volts
- KY : Series name

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
2200μF	2200

◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
22 to 180	0.40	0.75	0.90	1.00
220 to 560	0.50	0.85	0.94	1.00
680 to 1,800	0.60	0.87	0.95	1.00
2,200 to 3,900	0.75	0.90	0.95	1.00
4,700 to	0.85	0.95	0.98	1.00

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

KY Series

◆STANDARD RATINGS

Case size φD×L (mm)	Case code	Vdc	6.3			10			16		
		Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)
5×11	E11	150	0.58	2.3	210	100	0.58	2.3	210	56	0.58	2.3	210
6.3×11	F11	330	0.22	0.87	340	220	0.22	0.87	340	120	0.22	0.87	340
8×11.5	H11	680	0.13	0.52	640	470	0.13	0.52	640	330	0.13	0.52	640
8×15	H15	1,000	0.087	0.35	840	680	0.087	0.35	840	470	0.087	0.35	840
8×20	H20	1,200	0.069	0.27	1,050	1,000	0.069	0.27	1,050	680	0.069	0.27	1,050
10×12.5	J12	820	0.080	0.32	865	680	0.080	0.32	865	470	0.080	0.32	865
10×16	J16	1,200	0.060	0.24	1,210	1,000	0.060	0.24	1,210	680	0.060	0.24	1,210
10×20	J20	1,500	0.046	0.18	1,400	1,200	0.046	0.18	1,400	1,000	0.046	0.18	1,400
10×25	J25	2,200	0.042	0.17	1,650	1,500	0.042	0.17	1,650	1,200	0.042	0.17	1,650
10×30	J30	2,700	0.031	0.12	1,910	2,200	0.031	0.12	1,910	1,500	0.031	0.12	1,910
12.5×15	K15	1,800	0.049	0.16	1,450	1,500	0.049	0.16	1,450	1,000	0.049	0.16	1,450
12.5×20	K20	3,300	0.035	0.12	1,900	2,200	0.035	0.12	1,900	1,500	0.035	0.12	1,900
12.5×25	K25	3,900	0.027	0.089	2,230	3,300	0.027	0.089	2,230	2,200	0.027	0.089	2,230
12.5×30	K30	4,700	0.024	0.078	2,650	3,900	0.024	0.078	2,650	2,700	0.024	0.078	2,650
12.5×35	K35	5,600	0.020	0.065	2,880	4,700	0.020	0.065	2,880	3,300	0.020	0.065	2,880
12.5×40	K40	6,800	0.017	0.056	3,350	5,600	0.017	0.056	3,350	3,900	0.017	0.056	3,350
16×15	L15	2,700	0.042	0.12	1,940	2,200	0.042	0.12	1,940	1,500	0.042	0.12	1,940
16×20	L20	5,600	0.027	0.078	2,530	3,900	0.027	0.078	2,530	2,700	0.027	0.078	2,530
16×25	L25	6,800	0.021	0.060	2,930	5,600	0.021	0.060	2,930	3,900	0.021	0.060	2,930
16×31.5	L31	8,200	0.017	0.050	3,450	6,800	0.017	0.050	3,450	4,700	0.017	0.050	3,450
16×35.5	L35	10,000	0.015	0.044	3,610	8,200	0.015	0.044	3,610	5,600	0.015	0.044	3,610
16×40	L40	12,000	0.013	0.038	4,080	10,000	0.013	0.038	4,080	6,800	0.013	0.038	4,080
18×15	M15	3,900	0.043	0.11	2,210	2,700	0.043	0.11	2,210	2,200	0.043	0.11	2,210
18×20	M20	6,800	0.026	0.067	2,860	5,600	0.026	0.067	2,860	3,900	0.026	0.067	2,860
18×25	M25	10,000	0.019	0.049	3,140	6,800	0.019	0.049	3,140	4,700	0.019	0.049	3,140
18×31.5	M31	12,000	0.015	0.040	4,170	8,200	0.015	0.040	4,170	5,600	0.015	0.040	4,170
18×35.5	M35	15,000	0.014	0.038	4,220	10,000	0.014	0.038	4,220	8,200	0.014	0.038	4,220
18×40	M40	18,000	0.012	0.032	4,280	12,000	0.012	0.032	4,280	10,000	0.012	0.032	4,280

Case size φD×L (mm)	Case code	Vdc	25			35			50		
		Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) -10℃	Rated ripple current (mArms/105℃ 100kHz)
5×11	E11									0.47	5.5	22.0	17
5×11	E11									1.0	4.0	16.0	30
5×11	E11									2.2	2.5	10.0	43
5×11	E11									3.3	2.2	8.8	53
5×11	E11									4.7	1.9	7.6	88
5×11	E11									10	1.5	6.0	100
5×11	E11	47	0.58	2.3	210	33	0.58	2.3	210	22	0.70	2.8	180
6.3×11	F11	100	0.22	0.87	340	56	0.22	0.87	340	56	0.30	1.2	295
8×11.5	H11	220	0.13	0.52	640	150	0.13	0.52	640	100	0.17	0.68	555
8×15	H15	330	0.087	0.35	840	220	0.087	0.35	840	120	0.12	0.48	730
8×20	H20	470	0.069	0.27	1,050	270	0.069	0.27	1,050	180	0.091	0.36	910
10×12.5	J12	330	0.080	0.32	865	220	0.080	0.32	865	150	0.12	0.48	760
10×16	J16	470	0.060	0.24	1,210	330	0.060	0.24	1,210	220	0.084	0.34	1,050
10×20	J20	680	0.046	0.18	1,400	470	0.046	0.18	1,400	270	0.060	0.24	1,220
10×25	J25	820	0.042	0.17	1,650	560	0.042	0.17	1,650	330	0.055	0.22	1,440
10×30	J30	1,000	0.031	0.12	1,910	680	0.031	0.12	1,910	470	0.043	0.17	1,690
12.5×15	K15	680	0.049	0.16	1,450	470	0.049	0.16	1,450	270	0.061	0.20	1,260
12.5×20	K20	1,000	0.035	0.12	1,900	680	0.035	0.12	1,900	470	0.045	0.15	1,660
12.5×25	K25	1,500	0.027	0.089	2,230	1,000	0.027	0.089	2,230	560	0.034	0.11	1,950
12.5×30	K30	1,800	0.024	0.078	2,650	1,200	0.024	0.078	2,650	680	0.030	0.10	2,310
12.5×35	K35	2,200	0.020	0.065	2,880	1,500	0.020	0.065	2,880	820	0.025	0.083	2,510
12.5×40	K40	2,700	0.017	0.056	3,350	1,800	0.017	0.056	3,350	1,000	0.021	0.069	2,920
16×15	L15	1,000	0.042	0.12	1,940	680	0.042	0.12	1,940	470	0.055	0.17	1,690
16×20	L20	1,800	0.027	0.078	2,530	1,200	0.027	0.078	2,530	820	0.034	0.10	2,210
16×25	L25	2,700	0.021	0.060	2,930	1,800	0.021	0.060	2,930	1,000	0.025	0.075	2,555
16×31.5	L31	3,300	0.017	0.050	3,450	2,200	0.017	0.050	3,450	1,200	0.022	0.066	3,010
16×35.5	L35	3,900	0.015	0.044	3,610	2,700	0.015	0.044	3,610	1,500	0.019	0.057	3,150
16×40	L40	4,700	0.013	0.038	4,080	3,300	0.013	0.038	4,080	1,800	0.016	0.048	3,710
18×15	M15	1,200	0.043	0.11	2,210	1,000	0.043	0.11	2,210	560	0.054	0.15	1,930
18×20	M20	2,200	0.026	0.067	2,860	1,800	0.026	0.067	2,860	1,000	0.036	0.097	2,490
18×25	M25	3,300	0.019	0.049	3,140	2,200	0.019	0.049	3,140	1,200	0.026	0.070	2,740
18×31.5	M31	3,900	0.015	0.040	4,170	2,700	0.015	0.040	4,170	1,800	0.021	0.057	3,635
18×35.5	M35	4,700	0.014	0.038	4,220	3,300	0.014	0.038	4,220	2,200	0.017	0.046	3,680
18×40	M40	5,600	0.012	0.032	4,280	3,900	0.012	0.032	4,280	2,700	0.014	0.038	3,800

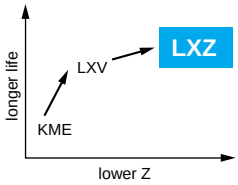
NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, Downsized, 105℃

LXZ Series

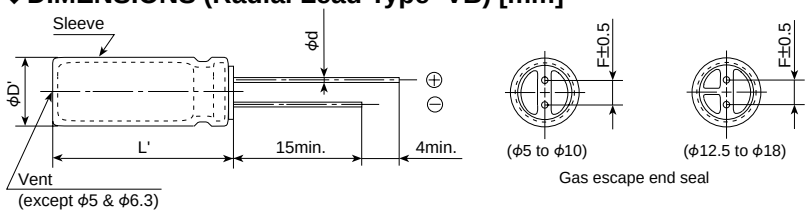
- Newly innovative electrolyte and internal architecture are employed
- Very low impedance at high frequency range
- Endurance with ripple current: 105℃ 2000 to 8000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)



◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃
Rated Voltage Range	6.3 to 63Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc) 6.3V 10V 16V 25V 35V 50V 63V tanδ (Max.) 0.22 0.19 0.16 0.14 0.12 0.10 0.08 When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105℃. Time: φ5 & 6.3 : 2000hours φ8 : 3000hours φ10 : 5000hours φ12.5 : 7000hours φ16 & 18 : 8000hours 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℃ after exposing them for 1000 hours at 105℃ without voltage applied. Capacitance change: ≦±20% of the initial value D.F. (tanδ): ≦200% of the initial specified value Leakage current: ≦The initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16	18
φd	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
φD'	φD+0.5max.						
L'	L+1.5max.						

◆PART NUMBERING SYSTEM

LXZ 16 VB 2200 M K25

- K25: Case code
- M: Capacitance tolerance (±20%)
- 2200: Nominal capacitance code
- VB: Radial lead type
- 16: Rated voltage in volts
- LXZ: Series name

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
2200μF	2200

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MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, Downsized, 105℃

LXZ Series

◆STANDARD RATINGS

ϕD×L	Case code	Vdc	6.3				10				16				25			
		Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃ 100kHz)
			20℃	−10℃			20℃	−10℃			20℃	−10℃			20℃	−10℃	
5×11.5	E11	150	0.50	1.0	175	100	0.50	1.0	175	47	0.50	1.0	175	47	0.50	1.0	175
6.3×11.5	F11	330	0.25	0.50	290	220	0.25	0.50	290	100	0.25	0.50	290	100	0.25	0.50	290
6.3×15	F15	470	0.18	0.36	400	330	0.18	0.36	400	220	0.18	0.36	400	150	0.18	0.36	400
8×12	H12	680	0.12	0.24	555	470	0.12	0.24	555	330	0.12	0.24	555	220	0.12	0.24	555
8×15	H15	1,000	0.090	0.18	730	680	0.090	0.18	730	470	0.090	0.18	730	330	0.090	0.18	730
8×20	H20	1,200	0.080	0.16	810	1,000	0.080	0.16	810	560	0.080	0.16	810	390	0.080	0.16	810
10×12.5	J12	820	0.090	0.18	760	680	0.090	0.18	760	470	0.090	0.18	760	330	0.090	0.18	760
10×16	J16	1,200	0.068	0.136	1,050	1,000	0.068	0.136	1,050	680	0.068	0.136	1,050	470	0.068	0.136	1,050
10×20	J20	1,500	0.052	0.104	1,220	1,200	0.052	0.104	1,220	1,000	0.052	0.104	1,220	680	0.052	0.104	1,220
10×25	J25	2,200	0.045	0.090	1,440	1,500	0.045	0.090	1,440	1,200	0.045	0.090	1,440	820	0.045	0.090	1,440
10×30	J30	2,700	0.037	0.074	1,690	1,800	0.037	0.074	1,690	1,500	0.037	0.074	1,690	1,000	0.037	0.074	1,690
12.5×20	K20	3,300	0.038	0.076	1,660	2,200	0.038	0.076	1,660	1,500	0.038	0.076	1,660	1,000	0.038	0.076	1,660
12.5×25	K25	3,900	0.030	0.060	1,950	3,300	0.030	0.060	1,950	2,200	0.030	0.060	1,950	1,500	0.030	0.060	1,950
12.5×30	K30	4,700	0.025	0.050	2,310	3,900	0.025	0.050	2,310	2,700	0.025	0.050	2,310	1,800	0.025	0.050	2,310
12.5×35	K35	5,600	0.022	0.044	2,510	4,700	0.022	0.044	2,510	3,300	0.022	0.044	2,510	2,200	0.022	0.044	2,510
12.5×40	K40	6,800	0.017	0.034	2,870	5,600	0.017	0.034	2,870	3,900	0.017	0.034	2,870	2,700	0.017	0.034	2,870
16×20	L20	5,600	0.029	0.058	2,210	3,900	0.029	0.058	2,210	2,700	0.029	0.058	2,210	1,800	0.029	0.058	2,210
16×25	L25	6,800	0.022	0.044	2,560	5,600	0.022	0.044	2,560	3,900	0.022	0.044	2,560	2,700	0.022	0.044	2,560
16×30	L30	8,200	0.019	0.038	3,010	6,800	0.019	0.038	3,010	4,700	0.019	0.038	3,010	3,300	0.019	0.038	3,010
16×35	L35	10,000	0.017	0.034	3,150	8,200	0.017	0.034	3,150	5,600	0.017	0.034	3,150	3,900	0.017	0.034	3,150
16×40	L40	12,000	0.015	0.030	3,710	10,000	0.015	0.030	3,710	6,800	0.015	0.030	3,710	4,700	0.015	0.030	3,710
18×20	M20	6,800	0.028	0.056	2,490	5,600	0.028	0.056	2,490	3,900	0.028	0.056	2,490	2,200	0.028	0.056	2,490
18×25	M25	10,000	0.020	0.040	2,740	6,800	0.020	0.040	2,740	4,700	0.020	0.040	2,740	3,300	0.020	0.040	2,740
18×30	M30	12,000	0.018	0.036	3,330	8,200	0.018	0.036	3,330	5,600	0.018	0.036	3,330	3,900	0.018	0.036	3,330
18×35	M35	15,000	0.016	0.032	3,680	10,000	0.016	0.032	3,680	8,200	0.016	0.032	3,680	4,700	0.016	0.032	3,680
18×40	M40	18,000	0.015	0.030	3,800	12,000	0.015	0.030	3,800	10,000	0.015	0.030	3,800	5,600	0.015	0.030	3,800

ϕD×L	Case code	Vdc	35			50			63			
		Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃ 100kHz)
			20℃	−10℃			20℃	−10℃			20℃	−10℃	
5×11.5	E11	33	0.50	1.0	175	22	0.90	1.8	155	12	1.9	4.0	145
6.3×11.5	F11	56	0.25	0.50	290	47	0.45	0.90	260	22	1.0	2.0	240
6.3×15	F15	100	0.18	0.36	400	68	0.31	0.62	360	39	0.61	1.4	330
8×12	H12	150	0.12	0.24	555	100	0.22	0.44	485	68	0.34	0.75	405
8×15	H15	220	0.090	0.18	730	120	0.16	0.32	635	100	0.27	0.65	535
8×20	H20	270	0.080	0.16	810	180	0.12	0.24	730	150	0.21	0.52	690
10×12.5	J12	220	0.090	0.18	760	120	0.16	0.32	620	100	0.255	0.510	540
10×16	J16	330	0.068	0.136	1,050	180	0.13	0.26	850	120	0.190	0.380	600
10×20	J20	470	0.052	0.104	1,220	220	0.088	0.18	1,050	180	0.145	0.290	890
10×25	J25	560	0.045	0.090	1,440	330	0.073	0.15	1,250	220	0.130	0.260	1,050
10×30	J30	680	0.037	0.074	1,690	390	0.054	0.11	1,500	330	0.090	0.180	1,300
12.5×20	K20	680	0.038	0.076	1,660	390	0.059	0.12	1,480	330	0.085	0.170	1,290
12.5×25	K25	1,000	0.030	0.060	1,950	560	0.044	0.088	1,840	390	0.070	0.140	1,720
12.5×30	K30	1,200	0.025	0.050	2,310	680	0.039	0.078	2,220	470	0.055	0.110	2,090
12.5×35	K35	1,500	0.022	0.044	2,510	820	0.033	0.066	2,290	680	0.047	0.094	2,270
12.5×40	K40	1,800	0.017	0.034	2,870	1,000	0.029	0.058	2,500	820	0.042	0.084	2,560
16×20	L20	1,200	0.029	0.058	2,210	680	0.048	0.096	1,840	470	0.059	0.120	1,770
16×25	L25	1,800	0.022	0.044	2,560	1,000	0.034	0.068	2,240	680	0.050	0.100	2,160
16×30	L30	2,200	0.019	0.038	3,010	1,200	0.028	0.056	2,700	820	0.043	0.086	2,670
16×35	L35	2,700	0.017	0.034	3,150	1,500	0.025	0.050	2,800	1,000	0.036	0.072	2,770
16×40	L40	3,300	0.015	0.030	3,710	1,800	0.021	0.042	3,200	1,200	0.030	0.060	2,850
18×20	M20	1,800	0.028	0.056	2,490	820	0.042	0.084	1,980	680	0.055	0.110	2,290
18×25	M25	2,200	0.020	0.040	2,740	1,200	0.029	0.058	2,610	820	0.043	0.086	2,590
18×30	M30	2,700	0.018	0.036	3,330	1,800	0.025	0.050	3,000	1,200	0.032	0.064	2,950
18×35	M35	3,300	0.016	0.032	3,680	2,200	0.023	0.046	3,100	1,500	0.030	0.060	3,100
18×40	M40	3,900	0.015	0.030	3,800	2,700	0.020	0.040	3,400	1,800	0.025	0.050	3,210

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
12 to 180	0.40	0.75	0.90	1.00
220 to 560	0.50	0.85	0.94	1.00
680 to 1,800	0.60	0.87	0.95	1.00
2,200 to 3,900	0.75	0.90	0.95	1.00
4,700 to 18,000	0.85	0.95	0.98	1.00

NIPPON CHEMI-CON

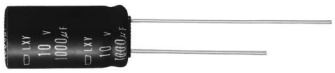
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

High reliability, Low impedance, 105℃

LXY Series

- Newly innovative electrolyte and internal architecture are employed
- Endurance with ripple current : 105℃ 2000 to 8000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

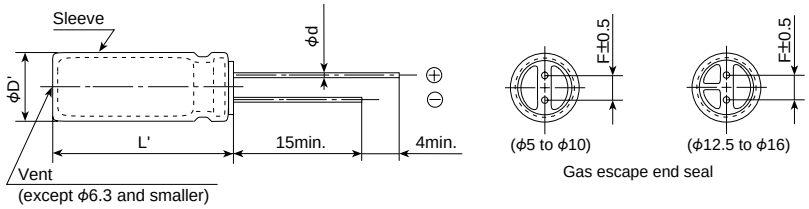
LXZ
↑ lower Z downsized
LXY



◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃
Rated Voltage Range	10 to 63Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 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℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc): 10V / 16V / 25V / 35V / 50V / 63V tanδ (Max.): 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.10 When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Z(−55℃)/Z(+20℃) 10Vdc to 50Vdc : 3max. 63Vdc : 6max. (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105℃. Time: φ5 & 6.3 : 2000hours φ8 : 3000hours φ10 : 5000hours φ12.5 : 7000hours φ16 & 18 : 8000hours 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℃ after exposing them for 1000 hours at 105℃ without voltage applied. Capacitance change: ≦±20% of the initial value D.F. (tanδ): ≦200% of the initial specified value Leakage current: ≦The initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16
φd	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
φD'	φD+0.5max.					
L'	L+1.5max.					

◆PART NUMBERING SYSTEM

LXY 16 VB 2200 M K30

- K30 : Case code
- M : Cap tolerance (±20%)
- 2200 : Nominal cap code
- VB : Radial lead type
- 16 : Rated voltage in volts
- LXY : Series name

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
2200μF	2200

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

High reliability, Low impedance, 105℃

LXY Series

◆STANDARD RATINGS

Vdc / Items / Case code / ϕDXL (mm)		10				16				25				35			
		Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/ 105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/ 105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/ 105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/ 105℃ 100kHz)
			20℃	−10℃			20℃	−10℃			20℃	−10℃			20℃	−10℃	
5X11.5	E11	82	0.75	1.5	163	56	0.75	1.5	163	39	0.75	1.5	163	27	0.75	1.5	163
6.3X11.5	F11	180	0.35	0.70	273	120	0.35	0.70	273	82	0.35	0.70	273	56	0.35	0.70	273
6.3X15	F15	220	0.25	0.50	390	180	0.25	0.50	390	120	0.25	0.50	390	82	0.25	0.50	390
8X12	H12	330	0.17	0.34	445	270	0.17	0.34	445	150	0.17	0.34	445	120	0.17	0.34	445
8X15	H15	470	0.13	0.26	555	330	0.13	0.26	555	220	0.13	0.26	555	180	0.13	0.26	555
8X20	H20	680	0.095	0.19	740	470	0.095	0.19	740	330	0.095	0.19	740	220	0.095	0.19	740
10X12.5	J12	390	0.12	0.24	625	270	0.12	0.24	625	180	0.12	0.24	625	120	0.12	0.24	625
10X16	J16	680	0.084	0.17	825	470	0.084	0.17	825	330	0.084	0.17	825	220	0.084	0.17	825
10X20	J20	1,000	0.062	0.13	1,040	680	0.062	0.13	1,040	470	0.062	0.13	1,040	330	0.062	0.13	1,040
10X25	J25	1,200	0.052	0.11	1,260	820	0.052	0.11	1,260	560	0.052	0.11	1,260	390	0.052	0.11	1,260
10X30	J30	1,500	0.044	0.088	1,440	1,200	0.044	0.088	1,440	820	0.044	0.088	1,440	560	0.044	0.088	1,440
12.5X20	K20	1,800	0.046	0.092	1,340	1,200	0.046	0.092	1,340	820	0.046	0.092	1,340	560	0.046	0.092	1,340
12.5X25	K25	2,200	0.034	0.068	1,690	1,500	0.034	0.068	1,690	1,000	0.034	0.068	1,690	680	0.034	0.068	1,690
12.5X30	K30	2,700	0.030	0.060	1,950	2,200	0.030	0.060	1,950	1,500	0.030	0.060	1,950	1,000	0.030	0.060	1,950
12.5X35	K35	3,300	0.024	0.048	2,220	2,700	0.024	0.048	2,220	1,800	0.024	0.048	2,220	1,200	0.024	0.048	2,220
12.5X40	K40	3,900	0.022	0.044	2,390	3,300	0.022	0.044	2,390	2,200	0.022	0.044	2,390	1,500	0.022	0.044	2,390
16X20	L20	3,300	0.038	0.076	1,630	2,200	0.038	0.076	1,630	1,500	0.038	0.076	1,630	1,000	0.038	0.076	1,630
16X25	L25	3,900	0.028	0.056	2,070	2,700	0.028	0.056	2,070	1,800	0.028	0.056	2,070	1,200	0.028	0.056	2,070
16X30	L30	5,600	0.025	0.050	2,350	3,900	0.025	0.050	2,350	2,700	0.025	0.050	2,350	1,800	0.025	0.050	2,350
16X35	L35	6,800	0.022	0.044	2,550	4,700	0.022	0.044	2,550	3,300	0.022	0.044	2,550	2,200	0.022	0.044	2,550
16X40	L40	8,200	0.018	0.036	2,900	5,600	0.018	0.036	2,900	3,900	0.018	0.036	2,900	2,700	0.018	0.036	2,900

Vdc / Items / Case code / ϕDXL (mm)		50				63			
		Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/ 105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/ 105℃ 100kHz)
			20℃	−10℃			20℃	−10℃	
5X11.5	E11	18	1.2	2.4	129	10	1.9	4.8	103
6.3X11.5	F11	39	0.54	1.1	219	18	1.0	2.5	161
6.3X15	F15	56	0.34	0.68	310	33	0.61	1.6	233
8X12	H12	68	0.30	0.60	340	47	0.47	1.2	274
8X15	H15	82	0.20	0.40	470	68	0.34	0.85	360
8X20	H20	120	0.14	0.28	610	82	0.21	0.53	500
10X12.5	J12	82	0.20	0.40	480	56	0.27	0.68	418
10X16	J16	120	0.13	0.26	755	68	0.21	0.53	525
10X20	J20	180	0.088	0.18	945	120	0.16	0.40	650
10X25	J25	220	0.073	0.15	1,150	150	0.13	0.33	783
10X30	J30	330	0.054	0.11	1,260	180	0.10	0.25	960
12.5X20	K20	330	0.059	0.12	1,190	220	0.11	0.28	870
12.5X25	K25	470	0.044	0.088	1,490	270	0.074	0.19	1,150
12.5X30	K30	560	0.039	0.078	1,720	390	0.068	0.17	1,280
12.5X35	K35	680	0.033	0.066	1,890	470	0.063	0.16	1,390
12.5X40	K40	820	0.029	0.058	2,030	560	0.051	0.13	1,530
16X20	L20	680	0.050	0.10	1,420	330	0.085	0.22	1,100
16X25	L25	820	0.034	0.068	1,880	470	0.055	0.14	1,480
16X30	L30	1,000	0.030	0.060	2,150	680	0.046	0.12	1,720
16X35	L35	1,200	0.027	0.054	2,320	820	0.040	0.10	1,910
16X40	L40	1,500	0.024	0.048	2,540	1,000	0.036	0.090	2,070

The following case sizes are also available upon request : ϕ4X7mm, ϕ5X7mm, ϕ5X15mm, ϕ6.3X7mm ϕ12.5X15mm, ϕ16X15mm, and ϕ18X15mm.

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
10 to 180	0.40	0.75	0.90	1.00
220 to 560	0.50	0.85	0.94	1.00
680 to 1800	0.60	0.87	0.95	1.00
2200 to 3900	0.75	0.90	0.95	1.00
4700 to 8200	0.85	0.95	0.98	1.00

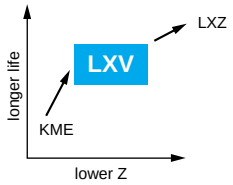
NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

LXV Series

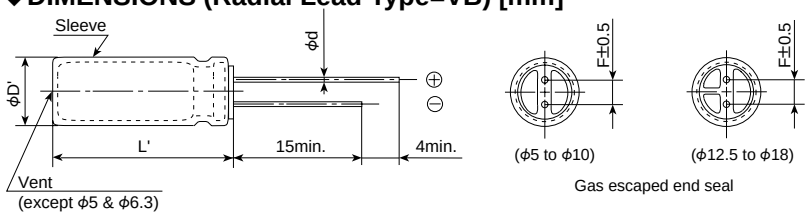
- Low impedance
- Endurance with ripple current: 105℃ 2000 to 5000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)



◆SPECIFICATIONS

Items	Characteristics									
Category Temperature Range	−55 to +105℃									
Rated Voltage Range	6.3 to 100Vdc									
Capacitance Tolerance	±20% (M) (at 20℃, 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℃ after 2 minutes)									
Dissipation Factor (tanδ)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	80V	100V
	tanδ (Max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.10	0.09	0.08
	When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)									
Low Temperature Characteristics	Capacitance change ΔC (−55℃ /+20℃)	0.7min.								
	Max. impedance ratio (−55℃ /+20℃)	3max.(6.3Vdc : 4max.)								(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105℃.									
	Time	φ5 to 6.3 : 2000hours φ8 & 10 : 3000hours φ12.5 to φ18 : 5000hours								
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.									
	Capacitance change	≦±20% of the initial value								
	D.F. (tanδ)	≦200% of the initial specified value								
	Leakage current	≦The initial specified value								

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16	18
φd	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
φD'	φD+0.5max.						
L'	L+1.5max.						

◆PART NUMBERING SYSTEM

LXV 6.3 VB 1200 M J20

- LXV — Series name
- 6.3 — Rated voltage in volts
- VB — Radial lead type
- 1200 — Nominal cap code
- M — Cap tolerance (±20%)
- J20 — Case code

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
2200μF	2200

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

LXV Series

◆STANDARD RATINGS

ϕD×L	Case code	Vdc	6.3			10			16		
		Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) −10℃	Rated ripple current (mArms / 105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) −10℃	Rated ripple current (mArms / 105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) −10℃	Rated ripple current (mArms / 105℃ 100kHz)
5×11.5	E11	120	0.72	1.8	165	82	0.72	1.8	165	56	0.72	1.8	165
6.3×11.5	F11	220	0.38	0.95	255	180	0.38	0.95	255	120	0.38	0.95	255
6.3×15	F15	330	0.27	0.68	330	270	0.27	0.68	330	180	0.27	0.68	330
8×12	H12	390	0.20	0.50	415	330	0.20	0.50	415	270	0.20	0.50	415
8×15	H15	560	0.16	0.40	495	470	0.16	0.40	495	330	0.16	0.40	495
8×20	H20	820	0.11	0.28	640	680	0.11	0.28	640	470	0.11	0.28	640
10×12.5	J12	470	0.12	0.30	635	390	0.12	0.30	635	270	0.12	0.30	635
10×16	J16	680	0.084	0.21	825	680	0.084	0.21	825	470	0.084	0.21	825
10×20	J20	1,200	0.062	0.16	1,060	1,000	0.062	0.16	1,060	680	0.062	0.16	1,060
10×25	J25	1,500	0.052	0.13	1,260	1,200	0.052	0.13	1,260	820	0.052	0.13	1,260
10×30	J30	2,200	0.044	0.11	1,450	1,500	0.044	0.11	1,450	1,200	0.044	0.11	1,450
12.5×20	K20	2,200	0.046	0.12	1,360	1,800	0.046	0.12	1,360	1,200	0.046	0.12	1,360
12.5×25	K25	2,700	0.034	0.085	1,700	2,200	0.034	0.085	1,700	1,500	0.034	0.085	1,700
12.5×30	K30	3,900	0.030	0.075	1,980	2,700	0.030	0.075	1,980	2,200	0.030	0.075	1,980
12.5×35	K35	4,700	0.027	0.068	2,230	3,300	0.027	0.068	2,230	2,700	0.027	0.068	2,230
12.5×40	K40	5,600	0.024	0.060	2,460	3,900	0.024	0.060	2,460	3,300	0.024	0.060	2,460
16×20	L20	3,900	0.038	0.095	1,770	3,300	0.038	0.095	1,770	2,200	0.038	0.095	1,770
16×25	L25	5,600	0.028	0.070	2,190	3,900	0.028	0.070	2,190	2,700	0.028	0.070	2,190
16×30	L30	6,800	0.025	0.063	2,510	5,600	0.025	0.063	2,510	3,900	0.025	0.063	2,510
16×35	L35	8,200	0.022	0.055	2,770	6,800	0.022	0.055	2,770	4,700	0.022	0.055	2,770
16×40	L40	10,000	0.018	0.045	3,110	8,200	0.018	0.045	3,110	5,600	0.018	0.045	3,110
18×20	M20	5,600	0.036	0.090	1,940	3,900	0.036	0.090	1,940	3,300	0.036	0.090	1,940
18×25	M25	6,800	0.027	0.068	2,350	4,700	0.027	0.068	2,350	3,900	0.027	0.068	2,350
18×30	M30	10,000	0.024	0.060	2,720	6,800	0.024	0.060	2,720	4,700	0.024	0.060	2,720
18×35	M35	12,000	0.021	0.053	3,050	8,200	0.021	0.053	3,050	6,800	0.021	0.053	3,050
18×40	M40	15,000	0.017	0.043	3,300	10,000	0.017	0.043	3,300	8,200	0.017	0.043	3,300

ϕD×L	Case code	Vdc	25			35			50		
		Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) −10℃	Rated ripple current (mArms / 105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) −10℃	Rated ripple current (mArms / 105℃ 100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz) 20℃	Impedance (Ωmax/100kHz) −10℃	Rated ripple current (mArms / 105℃ 100kHz)
5×11.5	E11	39	0.72	1.8	165	27	0.72	1.8	165	18	1.1	3.3	165
6.3×11.5	F11	82	0.38	0.95	255	56	0.38	0.95	255	39	0.56	1.6	255
6.3×15	F15	120	0.27	0.68	330	82	0.27	0.68	330	56	0.41	1.2	310
8×12	H12	150	0.20	0.50	415	120	0.20	0.50	415	68	0.29	0.84	415
8×15	H15	220	0.16	0.40	495	180	0.16	0.40	495	82	0.24	0.72	505
8×20	H20	330	0.11	0.28	640	220	0.11	0.28	640	120	0.18	0.52	610
10×12.5	J12	180	0.12	0.30	635	120	0.12	0.30	635	82	0.16	0.40	530
10×16	J16	330	0.084	0.21	825	220	0.084	0.21	825	120	0.12	0.30	755
10×20	J20	470	0.062	0.16	1,060	330	0.062	0.16	1,060	180	0.088	0.22	945
10×25	J25	560	0.052	0.13	1,260	390	0.052	0.13	1,260	220	0.068	0.17	1,150
10×30	J30	820	0.044	0.11	1,450	560	0.044	0.11	1,450	330	0.059	0.15	1,260
12.5×20	K20	820	0.046	0.12	1,360	560	0.046	0.12	1,360	330	0.059	0.15	1,190
12.5×25	K25	1,000	0.034	0.085	1,700	680	0.034	0.085	1,700	470	0.045	0.11	1,500
12.5×30	K30	1,500	0.030	0.075	1,980	1,000	0.030	0.075	1,980	560	0.039	0.098	1,720
12.5×35	K35	1,800	0.027	0.068	2,230	1,200	0.027	0.068	2,230	680	0.033	0.083	1,900
12.5×40	K40	2,200	0.024	0.060	2,460	1,500	0.024	0.060	2,460	820	0.029	0.073	2,120
16×20	L20	1,500	0.038	0.095	1,770	1,000	0.038	0.095	1,770	680	0.043	0.11	1,500
16×25	L25	1,800	0.028	0.070	2,190	1,200	0.028	0.070	2,190	820	0.033	0.083	1,880
16×30	L30	2,700	0.025	0.063	2,510	1,800	0.025	0.063	2,510	1,000	0.029	0.073	2,150
16×35	L35	3,300	0.022	0.055	2,770	2,200	0.022	0.055	2,770	1,200	0.025	0.063	2,320
16×40	L40	3,900	0.018	0.045	3,110	2,700	0.018	0.045	3,110	1,500	0.021	0.053	2,650
18×20	M20	2,200	0.036	0.090	1,940	1,500	0.036	0.090	1,940	820	0.039	0.098	1,660
18×25	M25	2,700	0.027	0.068	2,350	1,800	0.027	0.068	2,350	1,000	0.030	0.075	2,020
18×30	M30	3,300	0.024	0.060	2,720	2,200	0.024	0.060	2,720	1,500	0.026	0.065	2,340
18×35	M35	3,900	0.021	0.053	3,050	2,700	0.021	0.053	3,050	1,800	0.023	0.058	2,620
18×40	M40	4,700	0.017	0.043	3,300	3,300	0.017	0.043	3,300	2,200	0.020	0.050	2,790

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

LXV Series

◆STANDARD RATINGS

ϕD×L	Case code	Vdc: 63 Capacitance (μF)	63 Impedance (Ωmax/100kHz) 20℃	63 Impedance (Ωmax/100kHz) −10℃	63 Rated ripple current (mArms / 105℃ 100kHz)	80 Capacitance (μF)	80 Impedance (Ωmax/100kHz) 20℃	80 Impedance (Ωmax/100kHz) −10℃	80 Rated ripple current (mArms / 105℃ 100kHz)	100 Capacitance (μF)	100 Impedance (Ωmax/100kHz) 20℃	100 Impedance (Ωmax/100kHz) −10℃	100 Rated ripple current (mArms / 105℃ 100kHz)
5×11.5	E11	12	1.9	4.8	100	8.2	1.9	5.1	100	5.6	1.9	5.1	100
6.3×11.5	F11	27	1.1	2.8	160	18	1.1	3.0	150	12	1.1	3.0	150
6.3×15	F15	39	0.62	1.6	230	27	0.62	1.7	220	18	0.62	1.7	220
8×12	H12	47	0.49	1.3	275	33	0.53	1.5	275	22	0.53	1.5	275
8×15	H15	68	0.34	0.85	360	47	0.35	0.97	360	33	0.35	0.97	360
8×20	H20	82	0.21	0.53	500	56	0.27	0.74	490	39	0.27	0.74	490
10×12.5	J12	56	0.27	0.68	420	39	0.47	1.3	380	27	0.47	1.3	380
10×16	J16	68	0.21	0.53	523	56	0.33	0.90	500	33	0.33	0.90	500
10×20	J20	120	0.16	0.40	650	82	0.26	0.70	620	56	0.26	0.70	620
10×25	J25	150	0.13	0.33	780	100	0.19	0.52	795	68	0.19	0.52	795
10×30	J30	180	0.10	0.25	960	150	0.15	0.41	955	100	0.15	0.41	955
12.5×20	K20	220	0.11	0.28	870	150	0.15	0.41	890	100	0.15	0.41	890
12.5×25	K25	270	0.074	0.19	1,150	180	0.11	0.30	1,040	120	0.11	0.30	1,040
12.5×30	K30	390	0.068	0.17	1,280	270	0.094	0.26	1,270	180	0.094	0.26	1,270
12.5×35	K35	470	0.063	0.16	1,390	330	0.087	0.24	1,450	220	0.087	0.24	1,450
12.5×40	K40	560	0.051	0.13	1,530	390	0.060	0.17	1,610	270	0.060	0.17	1,610
16×20	L20	390	0.085	0.22	1,100	270	0.11	0.30	1,240	180	0.11	0.30	1,240
16×25	L25	470	0.055	0.14	1,480	330	0.081	0.22	1,440	220	0.081	0.22	1,440
16×30	L30	680	0.046	0.12	1,720	470	0.058	0.16	1,790	330	0.058	0.16	1,790
16×35	L35	820	0.040	0.10	1,910	560	0.052	0.14	2,000	390	0.052	0.14	2,000
16×40	L40	1,000	0.036	0.090	2,070	680	0.041	0.11	2,200	470	0.041	0.11	2,200
18×20	M20	560	0.085	0.22	1,170	390	0.085	0.23	1,450	270	0.085	0.23	1,450
18×25	M25	680	0.055	0.14	1,520	470	0.070	0.19	1,650	330	0.070	0.19	1,650
18×30	M30	820	0.046	0.12	1,770	680	0.058	0.16	1,850	390	0.058	0.16	1,850
18×35	M35	1,000	0.040	0.10	1,970	820	0.052	0.14	1,990	560	0.052	0.14	1,990
18×40	M40	1,200	0.036	0.090	2,130	1,000	0.041	0.11	2,370	680	0.041	0.11	2,370

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Rated voltage (Vdc)	Case size ϕD (mm)	Frequency (Hz) 120	1k	10k	100k
6.3 & 10	5 to 8	0.65	0.83	0.95	1.00
	10 & 12.5	0.70	0.85	0.96	1.00
	16 & 18	0.85	0.92	0.97	1.00
16 & 25	5 to 8	0.55	0.76	0.91	1.00
	10 & 12.5	0.65	0.83	0.93	1.00
	16 & 18	0.70	0.87	0.96	1.00
35 & 50	5 to 8	0.40	0.66	0.85	1.00
	10 & 12.5	0.50	0.73	0.89	1.00
	16 & 18	0.60	0.81	0.94	1.00
63 to 100	5 to 8	0.20	0.55	0.80	1.00
	10 & 12.5	0.35	0.65	0.85	1.00
	16 & 18	0.50	0.75	0.90	1.00

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

6.3 to 450Vdc low impedance, 105℃

KMF Series

- Endurance with ripple current: 105℃ 2000 to 5000 hours
- Solvent-proof type except 160 to 450Vdc
  (see PRECAUTIONS AND GUIDELINES)

KMF
↑ lower Z, longer life
KME

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−55 to +105℃(6.3 to 100Vdc) −40 to +105℃(160 to 400Vdc) -25 to +105℃(450Vdc)
Rated Voltage Range	6.3 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	6.3 to 100Vdc: I=0.03CV or 4μA, whichever is greater. (at 20℃ after 1 minute) I=0.01CV or 3μA, whichever is greater. (at 20℃ after 2 minutes) 160 to 450Vdc: CV≦1000 → I=0.1CV+40 (After 1minute), I=0.03CV+15 (After 5minutes); CV>1000 → I=0.04CV+100 (After 1minute), I=0.02CV+25 (After 5minutes) Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃)

Dissipation Factor (tanδ)

Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	400V	450V
tanδ (Max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.20	0.24	0.24

When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)

Low Temperature Characteristics (Max. Impedance Ratio)

Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	400V	450V
Z(−25℃)/Z(+20℃)	4	3	2	2	2	2	2	2	3	5	6
Z(−40℃)/Z(+20℃)	8	6	4	3	3	3	3	3	6	6	-

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105℃.

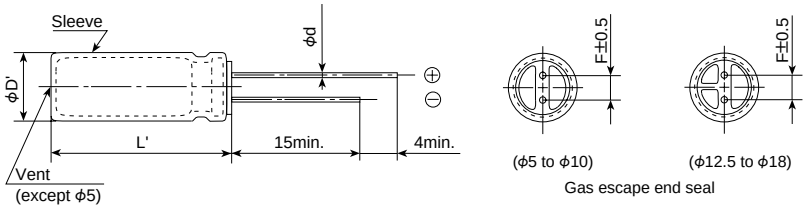
Time for 6.3 to 100Vdc	φ5 & 6.3 : 2000 hours φ8 & 10 : 3000 hours φ12.5 and larger : 5000 hours
Time for 160 to 450Vdc	2000 hours
Capacitance change	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value
Leakage current	≦The initial specified value

Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1000 hours at 105℃ without voltage applied.

Rated voltage	6.3 to 100Vdc	160 to 450Vdc
Capacitance change	≦±20% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦200% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦500% of the initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16	18
φd	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
φD'	φD+0.5max.						
L'	L+1.5max.						

◆PART NUMBERING SYSTEM

KMF 6.3 VB 1000 M

- M : Cap tolerance (±20%)
- 1000 : Nominal cap code
- VB : Radial lead type
- 6.3 : Rated voltage in volts
- KMF : Series name

Capacitance	Code
0.47μF	R47
4.7μF	4R7
10μF	10
100μF	100
470μF	470

◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

Rated Voltage(Vdc)	Case code \ Frequency(Hz)	120	1k	10k	100k
6.3 10	φ5 (to 47μF)	0.40	0.75	0.93	1.00
	φ5 (100μF), φ6.3, φ8	0.70	0.86	0.96	1.00
	φ10 to φ18	0.85	0.95	0.98	1.00
16 to 35	φ5 (to 22μF)	0.30	0.68	0.91	1.00
	φ5 (33μF to), φ6.3, φ8	0.50	0.80	0.94	1.00
	φ10 to φ18	0.70	0.88	0.97	1.00
50 63	φ5 (to 3.3μF)	0.20	0.66	0.90	1.00
	φ5 (4.7μF to), φ6.3, φ8	0.40	0.76	0.93	1.00
	φ10 to φ18	0.60	0.84	0.96	1.00
100	φ5 (to 1μF)	0.20	0.60	0.88	1.00
	φ5 (2.2μF to), φ6.3, φ8	0.30	0.65	0.90	1.00
	φ10 to φ18	0.40	0.75	0.93	1.00
160 to 450	φ10	0.25	0.61	0.88	1.00
	φ12.5 to φ18	0.35	0.66	0.89	1.00

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

6.3 to 450Vdc low impedance, 105℃

KMF Series

◆STANDARD RATINGS

Vdc / Cap (μF) / Items	6.3				10				16				25			
	Case size	Impedance		Rated ripple	Case size	Impedance		Rated ripple	Case size	Impedance		Rated ripple	Case size	Impedance		Rated ripple
4.7													5X11	3.0	9.0	100
10									5X11	2.0	6.0	124	5X11	2.0	6.0	124
22					5X11	1.3	3.9	154	5X11	1.3	3.9	154	5X11	1.3	3.9	154
33	5X11	1.3	3.9	154	5X11	1.3	3.9	154	5X11	1.3	3.9	154	5X11	1.3	3.9	154
47	5X11	1.3	3.9	154	5X11	1.3	3.9	154	5X11	1.3	3.9	154	5X11	1.3	3.9	154
100	5X11	1.3	3.9	154	5X11	1.3	3.9	154	6.3X11	0.60	1.8	260	6.3X11	0.60	1.8	260
220	6.3X11	0.60	1.8	260	6.3X11	0.60	1.8	260	8X11.5	0.33	0.99	400	8X11.5	0.33	0.99	400
330	6.3X11	0.60	1.8	260	8X11.5	0.33	0.99	400	8X11.5	0.33	0.99	400	10X12.5	0.25	0.75	510
470	8X11.5	0.33	0.99	400	8X11.5	0.33	0.99	400	10X12.5	0.25	0.75	510	10X16	0.19	0.57	635
1,000	10X12.5	0.25	0.75	510	10X16	0.19	0.57	635	10X20	0.14	0.42	860	12.5X20	0.085	0.26	1,120
2,200	12.5X20	0.085	0.26	1,120	12.5X20	0.085	0.26	1,120	12.5X25	0.070	0.21	1,320	16X25	0.060	0.18	1,570
3,300	12.5X20	0.085	0.26	1,120	12.5X25	0.070	0.21	1,320	16X25	0.060	0.18	1,570	16X31.5	0.048	0.14	1,810
4,700	16X25	0.060	0.18	1,570	16X25	0.060	0.18	1,570	16X31.5	0.048	0.14	1,810	18X35.5	0.037	0.11	2,240
6,800	16X25	0.060	0.18	1,570	16X31.5	0.048	0.14	1,810	18X35.5	0.037	0.11	2,240	18X40	0.034	0.10	2,460
10,000	16X31.5	0.048	0.14	1,810	18X35.5	0.037	0.11	2,240	18X40	0.034	0.10	2,460				
15,000	18X35.5	0.037	0.11	2,240												

Vdc / Cap (μF) / Items	35				50				63				100			
	Case size	Impedance		Rated ripple	Case size	Impedance		Rated ripple	Case size	Impedance		Rated ripple	Case size	Impedance		Rated ripple
0.47					5X11	7.0	21.0	66					5X11	10.0	35.0	55
1.0					5X11	5.0	15.0	78					5X11	7.0	25.0	66
2.2					5X11	4.0	12.0	88					5X11	6.0	21.0	72
3.3					5X11	3.5	11.0	94					5X11	5.0	18.0	78
4.7	5X11	3.0	9.0	100	5X11	3.0	9.0	100	5X11	4.0	14.0	88	5X11	4.0	14.0	88
10	5X11	2.0	6.0	124	5X11	2.0	6.0	124	5X11	2.5	8.8	124	6.3X11	1.2	4.2	180
22	5X11	1.3	3.9	154	5X11	1.3	3.9	154	6.3X11	1.2	4.2	180	8X11.5	0.66	2.3	282
33	5X11	1.3	3.9	154	6.3X11	0.60	1.8	260	6.3X11	1.2	4.2	180	10X12.5	0.50	1.8	380
47	6.3X11	0.60	1.8	260	6.3X11	0.60	1.8	260	8X11.5	0.56	2.0	305	10X16	0.32	1.1	500
100	8X11.5	0.33	0.99	400	8X11.5	0.33	0.99	400	10X12.5	0.50	1.8	380	12.5X20	0.16	0.56	890
220	10X12.5	0.25	0.75	510	10X16	0.19	0.57	635	10X20	0.27	0.95	620	16X25	0.090	0.32	1,440
330	10X16	0.19	0.57	635	10X20	0.14	0.42	860	12.5X20	0.16	0.56	890	16X25	0.090	0.32	1,440
470	10X20	0.14	0.42	860	12.5X20	0.085	0.26	1,120	12.5X25	0.14	0.49	1,040	16X31.5	0.060	0.21	1,790
1,000	12.5X25	0.070	0.21	1,320	16X25	0.060	0.18	1,570	16X31.5	0.060	0.21	1,790				
2,200	16X31.5	0.048	0.14	1,810	18X35.5	0.037	0.11	2,240								
3,300	18X35.5	0.037	0.11	2,240												
4,700	18X40	0.034	0.10	2,460												
6,800																

(mArms/105℃, 100kHz)
(Ωmax/-10℃, 100kHz)
(Ωmax/20℃, 100kHz)
ϕD×L (mm)

Non solvent-proof									
Vdc / Cap (μF) / Items	160			200			250		
	Case size	Impedance	Rated ripple	Case size	Impedance	Rated ripple	Case size	Impedance	Rated ripple
4.7							10X16	3.5	165
10	10X16	1.5	250	10X16	1.5	250	10X20	2.8	230
22	10X20	1.1	350	10X20	1.1	350	12.5X25	1.2	360
33	12.5X20	0.71	440	12.5X20	0.71	440	12.5X25	1.2	360
47	12.5X25	0.46	600	12.5X25	0.46	600	16X25	0.60	570
100	16X25	0.24	910	16X31.5	0.17	1,160	18X35.5	0.30	935
220	18X35.5	0.14	1,370	18X35.5	0.14	1,370	18X40	0.27	1,000

Non solvent-proof						
Vdc / Cap (μF) / Items	400			450		
	Case size	Impedance	Rated ripple	Case size	Impedance	Rated ripple
2.2				10X16	7.9	110
3.3	10X20	2.9	195	10X20	6.2	135
4.7	10X25	2.3	220	12.5X20	3.7	190
10	12.5X25	1.2	360	12.5X25	2.6	250
22	16X25	0.61	570	16X31.5	1.0	480
33	16X31.5	0.46	700	18X35.5	0.62	650
47	18X31.5	0.33	860			

(mArms/105℃, 100kHz)
(Ωmax/20℃, 100kHz)
ϕD×L (mm)

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

160 to 450Vdc long life, 105℃

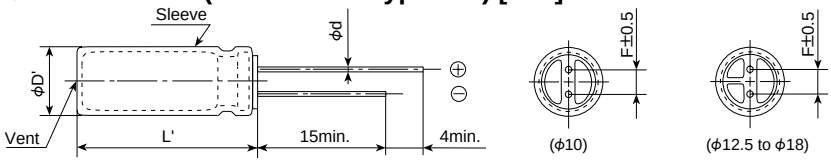
KXG Series

- Downsized from current KMX series
- For electronic ballast circuits and other long life required applications
- Endurance with ripple current : 105℃ 8000 to 10000hours
- Non solvent-proof type

◆SPECIFICATIONS

Items	Characteristics				
Category Temperature Range	−40 to +105℃ (160 to 400Vdc) −25 to+105℃ (450Vdc)				
Rated Voltage Range	160 to 450Vdc				
Capacitance Tolerance	±20% (M)				(at 20℃, 120Hz)
Leakage Current		After 1 minute	After 5 minutes		
	CV≦1000	I=0.1CV+40	I=0.03CV+15		
	CV>1000	I=0.04CV+100	I=0.02CV+25		
	Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)				(at 20℃)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	160 to 250V	350 & 400V	450V	
	tanδ (Max.)	0.20	0.24	0.24	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 250V	350 & 400V	450V	
	Z(−25℃)/Z(+20℃)	3	5	6	
	Z(−40℃)/Z(+20℃)	6	6	–	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 10000 hours (8000 hours for φ10) at 105℃.				
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.				
	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 (Radial Lead Type=VB) [mm]



Gas escaped end seal

φD	10	12.5	16	18
φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
φD'	φD+0.5max.			
L'	L+1.5max.			

◆PART NUMBERING SYSTEM

KXG 160 VB 47 M J20

- KXG — Series name
- 160 — Rated voltage in volts
- VB — Radial lead type
- 47 — Nominal cap code
- M — Cap tolerance (±20%)
- J20 — Case code

Capacitance	Code
6.8μF	6R8
10μF	10
100μF	100

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
6.8 to 82	1.0	1.75	2.25	2.50
100 to 330	1.0	1.67	1.75	2.25

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

160 to 450Vdc long life, 105℃

KXG Series

◆STANDARD RATINGS

Vdc	160				200				250			
Items / (μF)	Case size φD×L (mm)	Case code	Rated ripple current (mArms/105℃) 120Hz	100kHz	Case size φD×L (mm)	Case code	Rated ripple current (mArms/105℃) 120Hz	100kHz	Case size φD×L (mm)	Case code	Rated ripple current (mArms/105℃) 120Hz	100kHz
10	10×16	J16	125	315	10×16	J16	125	315	10×20	J20	140	350
22	10×20	J20	200	500	10×20	J20	200	500	10×20	J20	200	500
33	10×20	J20	250	625	10×20	J20	260	650	12.5×20	K20	320	800
47	10×20	J20	300	750	12.5×20	K20	390	975	12.5×20	K20	390	975
68	12.5×20	K20	470	1,175	12.5×20	K20	470	1,175	16×20	L20	520	1,300
82	12.5×20	K20	510	1,275	16×20	L20	550	1,375	16×20	L20	550	1,375
100	12.5×25	K25	620	1,395	16×20	L20	630	1,420	16×25	L25	680	1,530
	16×20	L20	630	1,420								
150	16×20	L20	770	1,735	16×25	L25	840	1,890	18×25	M25	860	1,935
220	16×25	L25	1,020	2,295	18×25	M25	1,050	2,365	18×31.5	M31	1,130	2,545
330	18×31.5	M31	1,390	3,130	18×35.5	M35	1,430	3,220				

Vdc	350				400				450			
Items / (μF)	Case size φD×L (mm)	Case code	Rated ripple current (mArms/105℃) 120Hz	100kHz	Case size φD×L (mm)	Case code	Rated ripple current (mArms/105℃) 120Hz	100kHz	Case size φD×L (mm)	Case code	Rated ripple current (mArms/105℃) 120Hz	100kHz
6.8	10×16	J16	110	275	10×16	J16	110	275	10×20	J20	110	275
10	10×20	J20	140	350	10×20	J20	140	350	12.5×20	K20	180	450
15					12.5×20	K20	220	550	12.5×25	K25	240	600
22	12.5×20	K20	260	650	12.5×20	K20	260	650	16×20	L20	290	725
33	16×20	L20	360	900	16×20	L20	360	900	16×25	L25	390	975
									18×20	M20	380	950
47	16×20	L20	430	1,075	16×25	L25	470	1,175	18×25	M25	480	1,200
					18×20	M20	450	1,125				
68	16×25	L25	560	1,400	18×25	M25	585	1,465	18×31.5	M31	630	1,575
	18×20	M20	550	1,375								
82	18×25	M25	610	1,525	18×25	M25	610	1,525	18×35.5	M35	715	1,785
100	18×25	M25	700	1,575	18×31.5	M31	765	1,720	18×40	M40	800	1,800
120	18×31.5	M31	830	1,865	18×35.5	M35	865	1,945				
150	18×35.5	M35	960	2,160	18×40	M40	985	2,215				

NIPPON CHEMI-CON

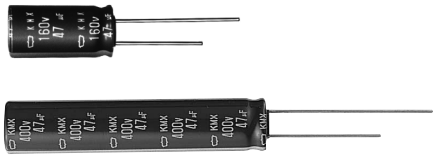
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

160 to 450Vdc long life, 105℃

KMX Series

- Slender case sizes are lined up for laying down small places on PC board
- For electronic ballast circuits and other long life required applications
- Endurance with ripple current : 105℃ 8000 to 10000 hours
- Non solvent-proof type

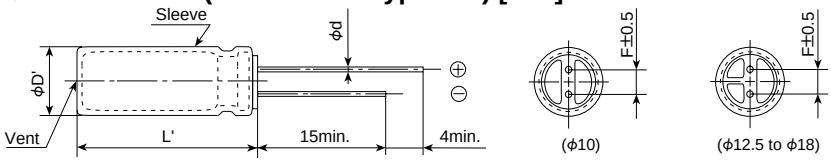
KXG ↑ downsized → KMX



◆SPECIFICATIONS

Items	Characteristics				
Category Temperature Range	−40 to +105℃ (160 to 400Vdc) −25 to+105℃ (450Vdc)				
Rated Voltage Range	160 to 450Vdc				
Capacitance Tolerance	±20% (M)				(at 20℃, 120Hz)
Leakage Current	CV \ time	After 1 minute	After 5 minutes		
	CV≦1000	I=0.1CV+40	I=0.03CV+15		
	CV>1000	I=0.04CV+100	I=0.02CV+25		
	Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)				(at 20℃)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	160 to 250V	350 & 400V	450V	
	tanδ (Max.)	0.20	0.24	0.24	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 250V	350 & 400V	450V	
	Z(−25℃)/Z(+20℃)	3	5	6	
	Z(−40℃)/Z(+20℃)	6	6	—	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 10000 hours (8000 hours for φ10) at 105℃.				
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.				
	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 (Radial Lead Type=VB) [mm]



φD	10	12.5	16	18
φd	0.6	0.6	0.8	0.8
F	5.0	5.0	7.5	7.5
φD'	φD+0.5max.			
L'	L+1.5max.			

◆PART NUMBERING SYSTEM

KMX 400 VB 33 M L20

- KMX — Series name
- 400 — Rated voltage in volts
- VB — Radial lead type
- 33 — Nominal cap code
- M — Cap tolerance (±20%)
- L20 — Case code

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
220μF	220

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

160 to 450Vdc long life, 105℃

KMX Series

◆STANDARD RATINGS

Vdc	160					200				
Items / Cap (μF)	Case size φDXL (mm)	Case code	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current 120Hz	Rated ripple current 100kHz	Case size φDXL (mm)	Case code	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current 120Hz	Rated ripple current 100kHz
22						10×20	J20	1.5	165	440
33	10×20	J20	1.3	210	565	12.5×20	K20	0.91	230	590
47	12.5×20	K20	0.91	270	725	12.5×20	K20	0.91	270	780
68	12.5×25	K25	0.63	350	950	12.5×25	K25	0.63	350	950
	16×20	L20	0.47	430	970	16×20	L20	0.47	430	970
100						10×50	J50	0.73	430	930
	16×25	L25	0.27	475	1,280	16×25	L25	0.27	425	1,280
	18×20	M20	0.31	465	1,180	18×20	M20	0.31	465	1,180
150	10×50	J50	0.77	545	1,020	12.5×40	K40	0.56	615	1,200
	16×25	L25	0.27	580	1,300	16×25	L25	0.27	580	1,300
220	12.5×45	K45	0.52	740	1,200	12.5×55	K55	0.39	790	1,420
	16×31.5	L31	0.22	750	1,300					
	18×25	M25	0.23	725	1,300	18×31.5	M31	0.22	780	1,700
330	16×40	L40	0.35	990	1,540	16×50	L50	0.28	1,020	1,870
	18×31.5	M31	0.22	960	1,700					
470	16×55	L55	0.25	1,220	1,870	18×50	M50	0.23	1,230	2,180
560	16×60	L60	0.23	1,350	2,140	18×60	M60	0.18	1,330	2,390
680	18×55	M55	0.20	1,480	2,330					

Vdc	250					350				
Items / Cap (μF)	Case size φDXL (mm)	Case code	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current 120Hz	Rated ripple current 100kHz	Case size φDXL (mm)	Case code	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current 120Hz	Rated ripple current 100kHz
10	10×20	J20	3.5	110	300	Use KMX400VB10MJ20				
22	12.5×20	K20	2.3	185	480	12.5×20	K20	2.1	185	270
33	12.5×25	K25	1.7	250	630	16×20	L20	0.91	250	600
47	12.5×25	K25	1.7	295	630	10×50	J50	1.2	270	705
	16×20	L20	1.1	300	750	16×25	L25	0.73	325	700
						18×20	M20	0.75	350	750
68	10×50	J50	0.73	340	840	12.5×40	K40	1.1	335	895
	16×25	L25	0.78	390	1,000	16×31.5	L31	0.49	420	1,100
	18×20	M20	0.90	385	900	18×25	M25	0.53	400	875
100	12.5×40	K40	0.56	500	1,200	12.5×55	K55	0.71	435	1,050
	16×31.5	L31	0.63	520	1,400					
	18×25	M25	0.63	500	1,345	18×31.5	M31	0.40	530	1,170
150	12.5×55	K55	0.39	650	1,420	16×50	L50	0.51	690	1,400
	18×31.5	M31	0.42	640	1,450					
220	16×50	L50	0.28	820	1,710	18×55	M55	0.32	840	1,610
	18×40	M40	0.35	820	1,485					
330	18×50	M50	0.23	1,030	2,140					

Vdc	400					450				
Items / Cap (μF)	Case size φDXL (mm)	Case code	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current 120Hz	Rated ripple current 100kHz	Case size φDXL (mm)	Case code	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current 120Hz	Rated ripple current 100kHz
3.3						10×20	J20	6.5	60	150
4.7						12.5×20	K20	3.6	80	200
10	10×20	J20	2.9	110	180	12.5×25	K25	2.5	125	315
22						10×45	J45	2.3	185	520
	12.5×25	K25	1.3	200	300	16×25	L25	1.7	210	570
	16×20	L20	0.91	200	600	18×20	M20	2.1	200	550
33	10×40	J40	1.7	215	640	12.5×40	K40	1.3	235	710
	16×20	L20	0.91	250	600	16×31.5	L31	1.1	275	620
						18×25	M25	1.1	280	590
47	12.5×40	K40	1.1	280	775	12.5×50	K50	0.95	300	845
	16×25	L25	0.73	325	700					
	18×20	M20	0.75	350	750	18×31.5	M31	0.93	340	900
68	12.5×50	K50	0.81	335	895					
	16×31.5	L31	0.49	420	1,100	16×40	L40	0.71	445	985
	18×25	M25	0.53	400	875	18×35.5	M35	0.71	420	980
100	16×40	L40	0.63	540	1,210	16×60	L60	0.45	570	1,300
	18×35.5	M35	0.34	545	1,250					
150	16×60	L60	0.41	695	1,490	18×60	M60	0.41	690	1,510

CAT. No. E1001D

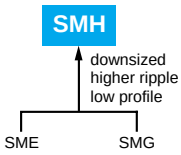
NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

ϕ20 & 22 radial lead, 85℃

SMH Series

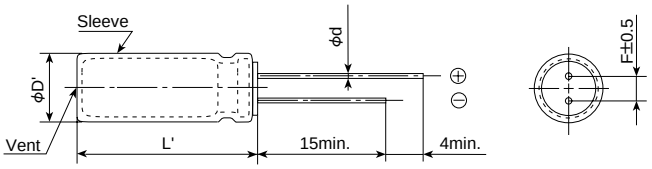
- Downsized from current standard SMG series
- Endurance with ripple current : 85℃ 2000 hours
- For input filtering of power supplies
- Non solvent-proof type



◆SPECIFICATIONS

Items	Characteristics			
Category Temperature Range	−25 to +85℃			
Rated Voltage Range	160 to 450Vdc			
Capacitance Tolerance	±20% (M)			(at 20℃, 120Hz)
Leakage Current	I=0.03CV or 3 mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)			(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.15max.			(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 250V	400 & 450V	(at 120Hz)
	Z(−25℃)/Z(+20℃)	4	6	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 85℃.			
	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℃ after exposing them for 1000 hours at 85℃ without voltage applied.			
	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 (Radial Lead Type=VB) [mm]



ϕD	20	22
ϕd	1.0	
F	10.0	
ϕD'	ϕD+0.5max.	
L'	L+2.0max.	

*Note : The snap-in forming type, RC-type, is available upon request, RC-type fits two ϕ2mm holes and 10.5mm spacing.

◆PART NUMBERING SYSTEM

SMH 200 VB 470 M 20D RC

- RC: If RC type lead is required
- 20D: Case code
- M: Cap tolerance (±20%)
- 470: Nominal cap in μF
- VB: Radial lead type
- 200: Rated voltage in volts
- SMH: Series name

◆CASE CODE [mm]

Case code	Case size ϕD×L	Case code	Case size ϕD×L
20S	20×20	22S	22×20
20A	20×25	22A	22×25
20B	20×30	22B	22×30
20C	20×35	22C	22×35
20D	20×40	22D	22×40
20E	20×45	22E	22×45
20F	20×50	22F	22×50

◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
400 & 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

ϕ20 & 22 radial lead, 85℃

SMH Series

◆STANDARD RATINGS

Vdc / μF \ ϕD	160		200		250		400		450	
	20	22	20	22	20	22	20	22	20	22
33									20×20 0.40	
47							20×20 0.48		20×25 0.52	22×25 0.57
56							20×25 0.57	22×25 0.62	20×30 0.62	22×25 0.65
68							20×25 0.64	22×25 0.69	20×35 0.72	22×30 0.69
82							20×30 0.75	22×25 0.78	20×35 0.79	22×30 0.80
100					20×20 0.67		20×35 0.87	22×30 0.90	20×40 0.92	22×35 0.94
120					20×25 0.85	22×20 0.83	20×40 1.02	22×35 1.03	20×45 1.07	22×40 1.11
150			20×20 0.82	22×20 0.87	20×25 0.94	22×25 1.03	20×45 1.20	22×40 1.24	20×50 1.24	22×45 1.29
180	20×20 0.90	22×20 0.95	20×25 0.97	22×25 1.05	20×30 1.12	22×25 1.12	20×50 1.36	22×45 1.41		22×50 1.44
220	20×25 1.07	22×25 1.16	20×25 1.07	22×25 1.16	20×30 1.24	22×30 1.33		22×50 1.59		
270	20×30 1.29	22×25 1.29	20×30 1.29	22×30 1.39	20×35 1.44	22×30 1.47				
330	20×30 1.43	22×30 1.53	20×35 1.49	22×30 1.53	20×40 1.70	22×35 1.71				
390	20×30 1.55	22×30 1.67	20×35 1.62	22×30 1.67	20×45 1.93	22×40 2.00	← Upper : Case size ϕD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz			
470	20×35 1.78	22×30 1.83	20×40 1.90	22×35 1.92	20×50 2.19	22×45 2.29				

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

ϕ20 & 22 radial lead, 105℃

KMH Series

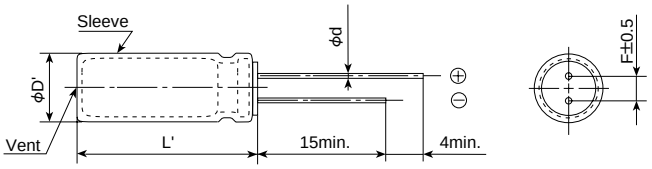
- Radial lead type ranging from ϕ20×20 to ϕ22×50mm
- For input filtering of power supplies
- Endurance with ripple current : 105℃ 2000 hours
- Non solvent-proof type

KMH
↑ downsized higher ripple
KRF

◆SPECIFICATIONS

Items	Characteristics			
Category Temperature Range	−25 to +105℃			
Rated Voltage Range	160 to 450Vdc			
Capacitance Tolerance	±20% (M)			(at 20℃, 120Hz)
Leakage Current	I=0.03CV or 3 mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)			(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.15max.			(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 250V	400 & 450V	
	Z(−25℃)/Z(+20℃)	4	6	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 105℃.			
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.			
	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 (Radial Lead Type=VB) [mm]



ϕD	20	22
ϕd	1.0	
F	10.0	
ϕD'	ϕD+0.5max.	
L'	L+2.0max.	

*Note : The snap-in forming type, RC-type, is available upon request, RC-type fits two ϕ2mm holes and 10.5mm spacing.

◆PART NUMBERING SYSTEM

KMH 160 VB 390 M 20C RC

- RC: If RC type lead is required
- 20C: Case code
- M: Cap tolerance (±20%)
- 390: Nominal cap in μF
- VB: Radial lead type
- 160: Rated voltage in volts
- KMH: Series name

◆CASE CODE [mm]

Case code	Case size ϕD×L	Case code	Case size ϕD×L
20S	20×20	22S	22×20
20A	20×25	22A	22×25
20B	20×30	22B	22×30
20C	20×35	22C	22×35
20D	20×40	22D	22×40
20E	20×45	22E	22×45
20F	20×50	22F	22×50

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
400 & 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

φ20 & 22 radial lead, 105℃

KMH Series

◆STANDARD RATINGS

Vdc / φD / μF	160		200		250		400		450	
	20	22	20	22	20	22	20	22	20	22
33							20×20 0.29		20×25 0.31	
47								22×20 0.37		22×25 0.42
56							20×25 0.41		20×30 0.44	
68							20×30 0.49	22×25 0.51	20×35 0.51	22×30 0.52
82					20×20 0.46				20×40 0.60	22×35 0.60
100							20×35 0.62	22×30 0.64	20×45 0.69	22×40 0.71
120			20×20 0.52		20×25 0.60	22×20 0.59	20×40 0.72	22×35 0.73	20×50 0.78	22×45 0.81
150	20×20 0.58		20×25 0.63	22×20 0.62			20×45 0.85	22×40 0.88		22×50 0.93
180	20×25 0.69	22×20 0.68	20×25 0.69	22×25 0.75	20×30 0.79	22×25 0.79	20×50 0.96	22×45 0.99		
220	20×25 0.76	22×25 0.82	20×30 0.82	22×25 0.82	20×35 0.92	22×30 0.95		22×50 1.13		
270	20×30 0.91	22×25 0.91	20×30 0.91	22×30 0.98	20×40 1.09	22×35 1.14				
330	20×30 1.01	22×30 1.16	20×35 1.05	22×35 1.20	20×45 1.26	22×40 1.30				
390	20×35 1.15	22×30 1.27	20×40 1.22	22×35 1.31	20×50 1.41	22×45 1.49	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			
470	20×40 1.34	22×35 1.40	20×45 1.34	22×40 1.45		22×50 1.65				

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

200 to 450Vdc, Downsized, 105℃

New!

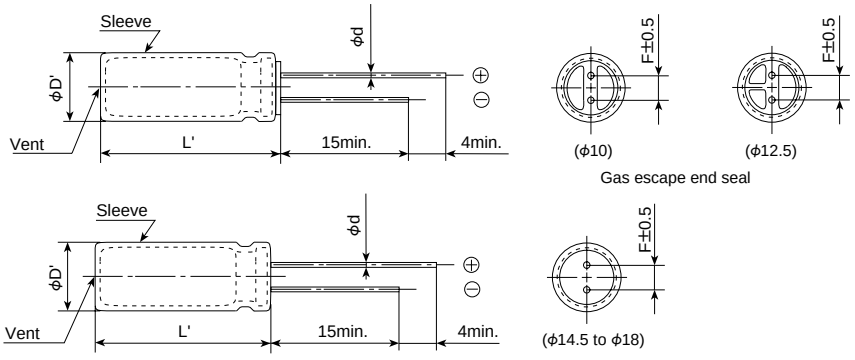
PAG Series

- Downsize, high ripple design (ϕ10 to 18)
- Rated voltage range : 200 to 450Vdc., Capacitance range : 18 to 560μF
- Endurance with ripple current : 105℃ 2000 hours
- Ideal for low profile power supply application
- Non solvent-proof type

◆SPECIFICATIONS

Items	Characteristics					
Category Temperature Range	−40 to +105℃ (200, 400Vdc) −25 to+105℃ (420, 450Vdc)					
Rated Voltage Range	200 to 450Vdc					
Capacitance Tolerance	±20% (M)					(at 20℃, 120Hz)
Leakage Current		After 1 minute		After 5 minutes		
	CV≦1000	I=0.1CV+40		I=0.03CV+15		
	CV>1000	I=0.04CV+100		I=0.02CV+25		
	Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)					(at 20℃)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	200V	400V	420V	450V	
	tanδ (Max.)	0.12	0.15	0.20	0.20	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	200V	400V	420V	450V	
	Z(−25℃)/Z(+20℃)	3	5	6	6	
	Z(−40℃)/Z(+20℃)	6	6	—	—	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 105℃.					
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.					
	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 (Radial Lead Type=VB) [mm]



ϕD	10	12.5	14.5	16	18
ϕd	0.6	0.6	0.8	0.8	0.8
F	5.0	5.0	7.5	7.5	7.5
ϕD'	ϕD+0.5 max.				
L'	L+2.0 max.				

◆PART NUMBERING SYSTEM

PAG 200 VB 120 M J40

- J40 : Case code
- M : Cap tolerance (±20%)
- 120 : Nominal cap code
- VB : Radial lead type
- 200 : Rated voltage in volts
- PAG : Series name

Capacitance	Code
10μF	10
100μF	100

◆CASE CODE [mm]

Case code	Case size ϕD×L	Case code	Case size ϕD×L
J30	10×30	L30	16×30
J35	10×35	L35	16×35
J40	10×40	L40	16×40
K30	12.5×30	M30	18×30
K35	12.5×35	M35	18×35
K40	12.5×40	M40	18×40
U30	14.5×30	M45	18×45
U35	14.5×35		
U40	14.5×40		

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
18 to 82	1.0	1.50	1.75	1.80
100 to 560	1.0	1.30	1.40	1.50

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

200 to 450Vdc, Downsized, 105℃

New!

PAG Series

◆STANDARD RATINGS

Vdc / Items / μF	200		400	
	Case size φD×L (mm)	Rated ripple current (Arms/105℃, 120Hz)	Case size φD×L (mm)	Rated ripple current (Arms/105℃, 120Hz)
27			10×30	0.26
33			10×35	0.30
39			10×40	0.34
47			12.5×30	0.37
56			12.5×35	0.42
68			12.5×40 14.5×30	0.48
82	10×30	0.44	14.5×35	0.53
100	10×35	0.51	14.5×40 16×30	0.58
120	10×40	0.59	16×35 18×30	0.67
150	12.5×30	0.65	16×40 18×35	0.77
180	12.5×35	0.75	18×40	0.88
220	12.5×40 14.5×30	0.83	18×45	1.00
270	14.5×35 16×30	0.96		
330	16×35 18×30	1.10		
390	16×40 18×35	1.24		
470	18×40	1.39		
560	18×45	1.56		

Vdc / Items / μF	420		450	
	Case size φD×L (mm)	Rated ripple current (Arms/105℃, 120Hz)	Case size φD×L (mm)	Rated ripple current (Arms/105℃, 120Hz)
18			10×30	0.21
22	10×30	0.23	10×35	0.24
27	10×35	0.27	10×40	0.28
33	10×40	0.31	12.5×30	0.31
39	12.5×30	0.33	12.5×35	0.35
47	12.5×35	0.39	12.5×40 14.5×30	0.39
56	12.5×40 14.5×30	0.43	14.5×35 16×30	0.44
68	14.5×35 16×30	0.51	14.5×40 16×35	0.50
82	14.5×40 16×35	0.57	16×40 18×30	0.55
100	16×40 18×30	0.61	18×35	0.65
120	18×35	0.69	18×40	0.74
150	18×40	0.79	18×45	0.81

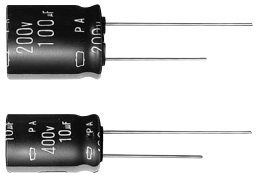
CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

200 & 400V high ripple, 105℃

PA Series

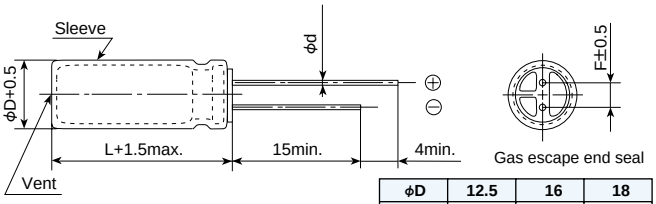


- Endurance with ripple current : 105℃ 2,000 hours
- Higher ripple current than KMG, general purpose series
- Suitable for low profile equipment such as AC adaptors
- Non solvent-proof type

◆SPECIFICATIONS

Items	Characteristics			
Category Temperature Range	−40 to 105℃			
Rated Voltage Range	200 & 400Vdc			
Capacitance Tolerance	±20%(M)			(at 20℃, 120Hz)
Leakage Current	I=0.04CV+100(after 1 minute at 20℃) I=0.02CV+25(after 5 minutes at 20℃) Where: I : Max. leakage current(μA), C : Nominal capacitance(μF), V : Rated voltage(V)			
Dissipation factor (tanδ)	Rated voltage(Vdc)	200	400	
	tanδ(Max.)	0.20	0.24	(at 20℃, 120Hz)
Low Temperature Characteristics	Rated voltage(Vdc)	200	400	
	Z(−25℃)/Z(20℃)	3	5	
	Z(−40℃)/Z(20℃)	6	6	(at 20℃, 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105℃.			
	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℃ after exposing them for 1,000 hours at 105℃ without voltage applied.			
	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 (Radial Lead Type=VB) [mm]



ϕD	12.5	16	18
ϕd	0.6	0.8	0.8
F	5.0	7.5	7.5

◆PART NUMBERING SYSTEM

PA 400 VB 33 M 16X20

- 16X20 : Case size
- M : Cap tolerance (±20%)
- 33 : Nominal cap code
- VB : Radial lead type
- 400 : Rated voltage in volts
- PA : Series name

Capacitance	Code
10μF	10
100μF	100

◆STANDARD RATINGS

Nominal capacitance (μF)	200Vdc		
	Case size ϕD×L (mm)	Part number	Rated ripple current (mArms) at 105℃, 120Hz
33	12.5×20	PA200VB33M12.5×20	203
47	12.5×20	PA200VB47M12.5×20	242
56	12.5×25	PA200VB56M12.5×25	288
68	12.5×25	PA200VB68M12.5×25	317
	16×20	PA200VB68RM16×20	323
82	16×20	PA200VB82M16×20	355
100	16×20	PA200VB100M16×20	392
120	16×25	PA200VB120M16×25	465
	18×20	PA200VB120M18×20	446
150	18×25	PA200VB150M18×25	536

Nominal capacitance (μF)	400Vdc		
	Case size ϕD×L (mm)	Part number	Rated ripple current (mArms) at 105℃, 120Hz
10	12.5×20	PA400VB10M12.5×20	110
22	12.5×25	PA400VB22M12.5×25	180
	16×20	PA400VB22M16×20	183
33	16×20	PA400VB33M16×20	225
47	16×25	PA400VB47M16×25	291
	18×20	PA400VB47M18×20	279
56	18×25	PA400VB56M18×25	327
68	18×25	PA400VB68M18×25	360

◆RATED RIPPLE CURRENT MULTIPLIERS

Frequency (Hz)	50	120	300	1k	10k	100k
10 to 47μF	0.45	1.00	1.25	1.50	1.75	1.80
56 to 150μF	0.50	1.00	1.15	1.30	1.40	1.50

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Overvoltage-proof design, 105℃

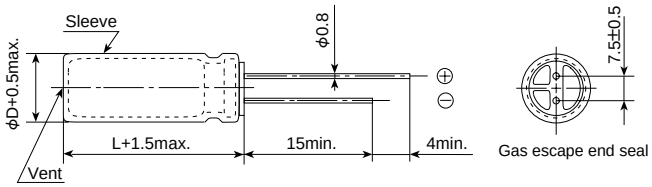
KLG Series

- No sparks against DC over-voltage
- Endurance with ripple current : 105℃ 2000 hours
- Non solvent-proof type

◆SPECIFICATIONS

Items	Characteristics			
Category Temperature Range	−25 to +105℃			
Rated Voltage Range	200 & 400Vdc			
Capacitance Tolerance	±20% (M)			(at 20℃, 120Hz)
Leakage Current	I=0.04CV+100 Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)			(at 20℃ after 1 minute)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	200V	400V	
	tanδ (Max.)	0.20	0.24	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	200V	400V	
	Z(−25℃)/Z(+20℃)	4	6	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 105℃.			
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.			
	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 (Radial Lead Type=VB) [mm]



◆PART NUMBERING SYSTEM

KLG 400 VB 33 M L25

- L25 : Case code
- M : Cap tolerance (±20%)
- 33 : Nominal cap code
- VB : Radial lead type
- 400 : Rated voltage in volts
- KLG : Series name

◆STANDARD RATINGS

Vdc / Items / μF	200 Case size φDXL (mm)	Case code	Rated ripple current (mArms/ 105℃, 120Hz)	Part number
82	16×20	L20	230	KLG200VB82ML20
100	16×25	L25	425	KLG200VB100ML25
	18×20	M20	250	KLG200VB100MM20
120	16×31.5	L31	500	KLG200VB120ML31
	18×25	M25	475	KLG200VB120MM25
130	18×20	M20	285	KLG200VB130MM20
150	16×31.5	L31	560	KLG200VB150ML31
	18×20	M20	315	KLG200VB150MM20
	18×25	M25	530	KLG200VB150MM25
180	16×40	L40	645	KLG200VB180ML40
	18×31.5	M31	630	KLG200VB180MM31
220	18×35.5	M35	725	KLG200VB220MM35
	18×40	M40	735	KLG200VB220MM40
270	18×45	M45	830	KLG200VB270MM45
330	18×45	M45	920	KLG200VB330MM45

Vdc / Items / μF	400 Case size φDXL (mm)	Case code	Rated ripple current (mArms/ 105℃, 120Hz)	Part number
22	16×20	L20	145	KLG400VB22ML20
	16×25	L25	200	KLG400VBML25
33	16×25	L25	220	KLG400VB33ML25
	18×20	M20	225	KLG400VB33MM20
39	16×31.5	L31	245	KLG400VB39MML31
	18×25	M25	250	KLG400VB39MM25
47	16×31.5	L31	275	KLG400VB47ML31
	18×25	M25	280	KLG400VB47MM25
56	16×40	L40	350	KLG400VB56ML40
	18×31.5	M31	315	KLG400VB56MM31
68	18×35.5	M35	350	KLG400VB68MM35
82	18×40	M40	395	KLG400VB82MM40
100	18×40	M40	450	KLG400VB100MM40

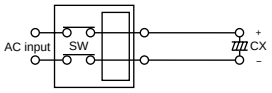
◆DC OVERVOLTAGE TEST CONDITIONS

The vent will be operated and the capacitor shall become an open circuit without burning materials when the following excess DC voltage is applied.

- Test DC voltage

Rated voltage	Current limit	Test DC voltage
200Vdc	4A	300/375Vdc
400Vdc	2A	500/600Vdc

- Test circuit



Constant DC voltage/current power supply

◆RATED RIPPLE CURRENT MULTIPLIERS

Frequency (Hz)	50	120	300	1k	10k	50k	100k
22 to 47μF	0.75	1.00	1.25	1.50	1.75	1.80	1.85
56 to 220μF	0.80	1.00	1.15	1.30	1.40	1.50	1.60

CAT. No. E1001D

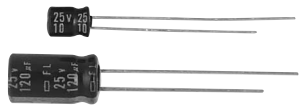
NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Long life for φ4 to φ8 product, 105℃

FL Series

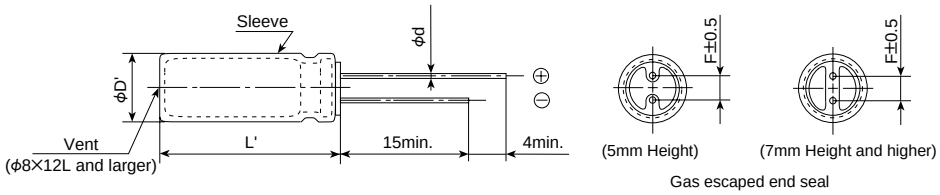
- Long life and high reliability for φ4×5 to φ8×20mm range
- Endurance with ripple current : 105℃ 3000 to 6000hours
- Suitable for long life and high reliability required products
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)



◆SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	−40 to +105℃							
Rated Voltage Range	6.3 to 50Vdc							
Capacitance Tolerance	±20% (M)							(at 20℃, 120Hz)
Leakage Current	I=0.03CV or 3μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)							(at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.50	0.40	0.35	0.30	0.25	0.25	(at 20℃, 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105℃.							
	Time	See STANDARD RATINGS						
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.							
	Capacitance change	≦±20% of the initial value						
	D.F. (tanδ)	≦200% of the initial specified value						
	Leakage current	≦The initial specified value						

◆DIMENSIONS (Radial Lead Type=VB) [mm]



5mm Height

φD	4	5	6.3	8
φd	0.45	0.45	0.45	0.45
F	1.5	2.0	2.5	2.5
φD'	φD+0.5max.			
L'	L+1.0max.			

7mm Height

φD	4	5	6.3	8
φd	0.45	0.45	0.45	0.45
F	1.5	2.0	2.5	3.5
φD'	φD+0.5max.			
L'	L+1.0max.			

11.5mm and larger

φD	4	5	6.3	8
φd	0.45	0.5	0.5	0.6
F	1.5	2.0	2.5	3.5
φD'	φD+0.5max.			
L'	L+1.5max.			

◆PART NUMBERING SYSTEM

FL 10 VB 33 M E05

- E05 : Case code
- M : Cap tolerance (±20%)
- 33 : Nominal cap code
- VB : Radial lead type
- 10 : Rated voltage in volts
- FL : Series name

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
2200μF	2200

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Long life for φ4 to φ8 product, 105℃

FL Series

◆STANDARD RATINGS

Vdc / Items / φDXL(mm) / Case code	6.3				10				16				25			
	Capacitance (μF)	Impedance 20℃, 100kHz (Ωmax.)	Rated ripple current (mArms/ 105℃, 100kHz)	Endurance 105℃ (hours)	Capacitance (μF)	Impedance 20℃, 100kHz (Ωmax.)	Rated ripple current (mArms/ 105℃, 100kHz)	Endurance 105℃ (hours)	Capacitance (μF)	Impedance 20℃, 100kHz (Ωmax.)	Rated ripple current (mArms/ 105℃, 100kHz)	Endurance 105℃ (hours)	Capacitance (μF)	Impedance 20℃, 100kHz (Ωmax.)	Rated ripple current (mArms/ 105℃, 100kHz)	Endurance 105℃ (hours)
4X5 / D05	33	5.4	37	3,000	22	5.4	37	3,000	15	5.4	37	3,000	10	5.4	37	3,000
4X7 / D07	47	4.5	44	3,000	33	4.5	44	3,000	22	4.5	44	3,000	15	4.5	44	3,000
4X11.5 / D11	120	2.2	83	5,000	100	2.2	83	5,000	68	2.2	83	5,000	39	2.2	83	5,000
5X5 / E05	56	3.1	57	3,000	33	3.1	57	3,000	22	3.1	57	3,000	15	3.1	57	3,000
5X7 / E07	82	2.5	70	3,000	47	2.5	70	3,000	33	2.5	70	3,000	22	2.5	70	3,000
5X11.5 / E11	220	1.5	115	5,000	180	1.5	115	5,000	120	1.5	115	5,000	68	1.5	115	5,000
5X15 / E15	270	1.2	149	6,000	220	1.2	149	6,000	180	1.2	149	6,000	100	1.2	149	6,000
6.3X5 / F05	100	1.7	82	3,000	68	1.7	82	3,000	47	1.7	82	3,000	33	1.7	82	3,000
6.3X7 / F07	150	1.3	116	3,000	100	1.3	116	3,000	68	1.3	116	3,000	56	1.3	116	3,000
6.3X11.5 / F11	470	0.72	190	5,000	390	0.72	190	5,000	270	0.72	190	5,000	120	0.72	190	5,000
6.3X15 / F15	560	0.53	245	6,000	470	0.53	245	6,000	390	0.53	245	6,000	180	0.53	245	6,000
8X5 / H05	220	1.5	110	3,000	150	1.5	110	3,000	100	1.5	110	3,000	68	1.5	110	3,000
8X7 / H07	270	0.90	162	3,000	220	0.90	162	3,000	150	0.90	162	3,000	100	0.90	162	3,000
8X12 / H12	1,000	0.41	287	6,000	680	0.41	287	6,000	470	0.41	287	6,000	270	0.41	287	6,000
8X15 / H15	1,200	0.30	365	6,000	1,000	0.30	365	6,000	680	0.30	365	6,000	390	0.30	365	6,000
8X20 / H20	1,500	0.23	417	6,000	1,200	0.23	417	6,000	820	0.23	417	6,000	470	0.23	417	6,000

Vdc / Items / φDXL(mm) / Case code	35				50			
	Capacitance (μF)	Impedance 20℃, 100kHz (Ωmax.)	Rated ripple current (mArms/ 105℃, 100kHz)	Endurance 105℃ (hours)	Capacitance (μF)	Impedance 20℃, 100kHz (Ωmax.)	Rated ripple current (mArms/ 105℃, 100kHz)	Endurance 105℃ (hours)
4X5 / D05	4.7	5.4	37	3,000	3.3	11	26	3,000
4X7 / D07	6.8	4.5	44	3,000	4.7	9.0	30	3,000
4X11.5 / D11	22	2.2	83	5,000	12	3.7	67	5,000
5X5 / E05	10	3.1	57	3,000	4.7	6.0	40	3,000
5X7 / E07	10	2.5	70	3,000	6.8	4.8	50	3,000
5X11.5 / E11	47	1.5	115	5,000	27	2.6	87	5,000
5X15 / E15	56	1.2	149	6,000	33	2.0	115	6,000
6.3X5 / F05	22	1.7	82	3,000	10	2.9	63	3,000
6.3X7 / F07	22	1.3	116	3,000	15	2.2	90	3,000
6.3X11.5 / F11	100	0.72	190	5,000	47	1.2	147	5,000
6.3X15 / F15	120	0.53	245	6,000	68	0.89	189	6,000
8X5 / H05	33	1.5	110	3,000	22	2.6	84	3,000
8X7 / H07	47	0.90	162	3,000	22	1.6	120	3,000
8X12 / H12	180	0.41	287	6,000	100	0.68	223	6,000
8X15 / H15	220	0.30	365	6,000	120	0.51	280	6,000
8X20 / H20	330	0.23	417	6,000	180	0.38	371	6,000

Vdc / Items / φDXL(mm) / Case code	50 (Small capacitance)			
	Capacitance (μF)	Impedance 20℃, 100kHz (Ωmax.)	Rated ripple current (mArms/ 105℃, 100kHz)	Endurance 105℃ (hours)
4X5 / D05	0.47	34	14	3,000
	1.0	19	18	3,000
	2.2	14	22	3,000
5X11.5 / E11	0.47	14	36	5,000
	1.0	8.0	48	5,000
	2.2	6.0	56	5,000
	3.3	5.0	62	5,000
	4.7	4.0	68	5,000
	10	2.5	90	5,000

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Capacitance(μF) \ Frequency(Hz)	120	1k	10k	100k
to 3.3 (and 50WV (Small capacitance) items)	0.20	0.66	0.90	1.00
4.7 to 6.8	0.35	0.70	0.90	1.00
10 to 180	0.40	0.75	0.90	1.00
220 to 560	0.50	0.85	0.94	1.00
680 to 1500	0.60	0.87	0.95	1.00

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Long Life, Downsized, 125℃

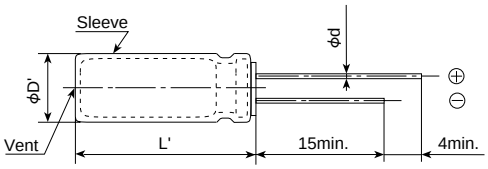
GXE Series

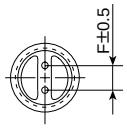
- For automobile modules and other high temperature applications
- Downsize, long life, low impedance and better low temperature characteristics
- Endurance with ripple current : 125℃ 2000 to 5000 hours
- Solvent-proof type except 63 to 450V (see PRECAUTIONS AND GUIDELINES)

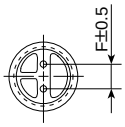
◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +125℃ (10 to 250Vdc) −25 to +125℃ (350 to 450Vdc)
Rated Voltage Range	10 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	10 to 100Vdc: I=0.03CV or 4μA, whichever is greater. 160 to 450Vdc: CV≦1000 I=0.1CV+40; CV>1000 I=0.04CV+100 Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, 1 minute)
Dissipation Factor (tanδ)	Rated voltage (Vdc): 10V 16V 25V 35V 50V 63V 80V 100V 160 to 250V 350 to 450V tanδ (Max.): 0.20 0.16 0.14 0.12 0.10 0.10 0.08 0.08 0.20 0.24 When nominal capacitance exceeds 1000μF, add 0.02 to the above value for each 1000μF increase. (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc): 10V 16V 25V 35V 50V 63V 80V 100V 160 to 250V 350 to 450V Z(−25℃)/Z(+20℃): 3 2 2 2 2 2 2 2 3 6 Z(−40℃)/Z(+20℃): 6 4 4 4 4 4 4 4 6 — (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for the specified time at 125℃. Time: φ8 : 2000hours φ10 : 3000hours φ12.5 & φ16 : 5000hours / 2000hours 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℃ after exposing them for 1000 hours (500 hours for 350 to 450WV) at 125℃ without voltage applied. 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 / ≦500% of the initial specified value

◆DIMENSIONS (Radial Lead Type=VB) [mm]







Gas escape end seal

φD	8	10	12.5	16
φd	0.6	0.6	0.6	0.8
F	3.5	5.0	5.0	7.5
φD'	φD+0.5max.			
L'	L+2.0max.			

◆PART NUMBERING SYSTEM

GXE 16 VB 470 M

- M : Cap tolerance (±20%)
- 470 : Nominal cap code
- VB : Radial lead type
- 16 : Rated voltage in volts
- GXE : Series name

Capacitance	Code
4.7μF	4R7
10μF	10
100μF	100
1000μF	1000

◆RATED RIPPLE CURRENT MULTIPLIERS

●(10 to 100Vdc) Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
4.7 to 100	0.40	0.75	0.90	1.00
220 to 470	0.50	0.85	0.94	1.00
1000	0.60	0.87	0.95	1.00
2200 to 3300	0.75	0.90	0.95	1.00
4700	0.85	0.95	0.98	1.00

●(160 to 450Vdc) Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	50	120	300	1k	10k	100k
4.7 to 33	0.75	1.00	1.25	1.50	1.75	1.80
47 to 150	0.80	1.00	1.15	1.30	1.40	1.50

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Long Life, Downsized, 125℃

GXE Series

◆STANDARD RATINGS

Vdc / Items / Capacitance (μF)	10			16			25			35		
	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple (mArms/ 125℃, 100kHz)	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple (mArms/ 125℃, 100kHz)	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple (mArms/ 125℃, 100kHz)	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple (mArms/ 125℃, 100kHz)
100				8×12	0.32	340	8×12	0.32	340	8×12	0.32	340
										10×12.5	0.15	620
220	8×12	0.32	340	10×12.5	0.15	620	10×12.5	0.15	620	10×16	0.094	790
330	10×12.5	0.15	620	10×12.5	0.15	620	10×16	0.094	790	10×20	0.075	950
470	10×12.5	0.15	620	10×16	0.094	790	10×20	0.075	950	12.5×20	0.058	1,080
1,000	10×20	0.075	950	12.5×20	0.058	1,080	12.5×25	0.040	1,350	16×25	0.031	1,620
2,200	12.5×25	0.040	1,350	16×25	0.031	1,620	16×31.5	0.025	1,860			
3,300	16×25	0.031	1,620	16×31.5	0.025	1,860						
4,700	16×31.5	0.025	1,860									

Non solvent-proof

Vdc / Items / Capacitance (μF)	50			63			80			100		
	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple (mArms/ 125℃, 100kHz)	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple (mArms/ 125℃, 100kHz)	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple (mArms/ 125℃, 100kHz)	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple (mArms/ 125℃, 100kHz)
4.7										8×12	2.0	130
10	8×12	0.75	180							8×12	1.5	150
22	8×12	0.50	250				8×12	1.50	150	10×12.5	0.80	480
33	8×12	0.50	280	8×12	1.5	150	10×12.5	0.80	480	10×12.5	0.80	480
47	8×12	0.50	280	10×12.5	0.59	530	10×12.5	0.80	480	10×16	0.55	630
100	10×12.5	0.20	520	10×16	0.41	690	10×20	0.39	790	12.5×20	0.25	990
220	10×20	0.098	880	12.5×20	0.16	1,050	12.5×25	0.18	1,240	16×25	0.11	1,500
330	12.5×20	0.081	990	12.5×25	0.12	1,290	12.5×30	0.16	1,390	16×31.5	0.079	1,790
470	12.5×25	0.059	1,150	12.5×30	0.097	1,460	16×25	0.11	1,500			
1,000	16×31.5	0.032	1,590	16×31.5	0.059	1,850						

Non solvent-proof

Vdc / Items / Capacitance (μF)	160		200		250		350		400		450	
	Case size φD×L (mm)	Rated ripple (mArms/ 125℃, 120Hz)	Case size φD×L (mm)	Rated ripple (mArms/ 125℃, 120Hz)	Case size φD×L (mm)	Rated ripple (mArms/ 125℃, 120Hz)	Case size φD×L (mm)	Rated ripple (mArms/ 125℃, 120Hz)	Case size φD×L (mm)	Rated ripple (mArms/ 125℃, 120Hz)	Case size φD×L (mm)	Rated ripple (mArms/ 125℃, 120Hz)
4.7							10×20	53	10×20	53	10×25	58
10			10×20	78	10×20	78	10×25	85	10×25	86	12.5×20	86
22	10×20	115	10×25	126	12.5×20	128	12.5×25	139	12.5×30	142	16×25	154
33	10×25	154	12.5×20	157	12.5×25	171	16×25	189	16×25	189	16×31.5	203
47	12.5×20	187	12.5×25	204	16×25	225	16×31.5	243	16×31.5	243		
68	12.5×25	245	16×20	250	16×31.5	292						
100	16×25	329	16×25	329								
150	16×31.5	434										

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Longer life, 125℃

New!

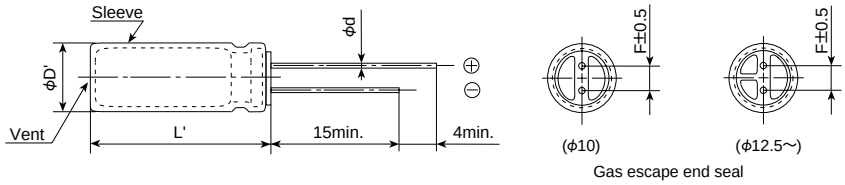
GXL Series

- Long-Life version of GXE series
- For automobile modules and other high temperature applications
- Endurance with ripple current : 125℃ 5000 to 10000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

◆SPECIFICATIONS

Items	Characteristics						
Category Temperature Range	−40 to +125℃						
Rated Voltage Range	10 to 50Vdc						
Capacitance Tolerance	±20% (M)						(at 20℃, 120Hz)
Leakage Current	I=0.03CV or 4μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)						(at 20℃, 1 minute)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	10V	16V	25V	35V	50V	
	tanδ (Max.)	0.20	0.16	0.14	0.12	0.10	
	When nominal capacitance exceeds 1000μF, add 0.02 to the above value for each 1000μF increase.						(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	10V	16V	25V	35V	50V	
	Z(−25℃)/Z(+20℃)	3	2	2	2	2	
	Z(−40℃)/Z(+20℃)	6	4	4	4	4	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 10000 hours (5000 hours for φ10) at 125℃.						
	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℃ after exposing them for 1000 hours at 125℃ without voltage applied.						
	Capacitance change	≦±30% of the initial value					
	D.F. (tanδ)	≦±300% of the initial specified value					
	Leakage current	≦The initial specified value					

◆DIMENSIONS (Radial Lead Type=VB) [mm]



φD	10	12.5	16
φd	0.6	0.6	0.8
F	5.0	5.0	7.5
φD'	φD+0.5max.		
L'	L+1.5max.		

◆PART NUMBERING SYSTEM

GXL 10 VB 3300 M

- M : Cap tolerance (±20%)
- 3300 : Nominal cap code
- VB : Radial lead type
- 10 : Rated voltage in volts
- GXL : Series name

Capacitance	Code
100μF	100
470μF	470
1000μF	1000

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Capacitance(μF) \ Frequency(Hz)	120	1k	10k	100k
100	0.40	0.75	0.90	1.00
220～470	0.50	0.85	0.94	1.00
1000	0.60	0.87	0.95	1.00
2200～3300	0.75	0.90	0.95	1.00
4700	0.85	0.95	0.98	1.00

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Longer life, 125℃

New!

GXL Series

◆STANDARD RATINGS

Vdc / Items / Capacitance (μF)	10			16		
	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current (mArms/ 125℃, 100kHz)	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current (mArms/ 125℃, 100kHz)
220	—	—	—	10×12.5	0.17	800
330	10×12.5	0.17	800	10×12.5	0.17	800
470	10×12.5	0.17	800	10×16	0.12	1,050
1,000	10×20	0.094	1,300	12.5×20	0.067	1,650
2,200	12.5×25	0.055	2,050	16×25	0.035	2,500
3,300	16×25	0.035	2,500	16×31.5	0.027	3,000
4,700	16×31.5	0.027	3,000	—	—	—

Vdc / Items / Capacitance (μF)	25			35		
	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current (mArms/ 125℃, 100kHz)	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current (mArms/ 125℃, 100kHz)
100	—	—	—	10×12.5	0.17	800
220	10×12.5	0.17	800	10×16	0.12	1,050
330	10×16	0.12	1,050	10×20	0.094	1,300
470	10×20	0.094	1,300	12.5×20	0.067	1,650
1,000	12.5×25	0.055	2,050	16×25	0.035	2,500
2,200	16×31.5	0.027	3,000	—	—	—

Vdc / Items / Capacitance (μF)	50		
	Case size φD×L (mm)	Impedance (Ωmax./ 20℃, 100kHz)	Rated ripple current (mArms/ 125℃, 100kHz)
100	10×12.5	0.30	590
220	10×20	0.19	970
330	12.5×20	0.11	1,380
470	12.5×25	0.085	1,700
1,000	16×31.5	0.043	2,490

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

For airbag module, 105℃

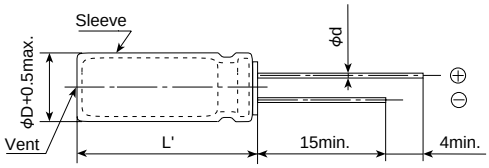
LBG Series

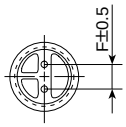
- For airbag application
- High capacitance, low impedance, and good low temperature behavior
- Endurance with ripple current : 105℃ 5000 hours
- Solvent-proof type (see PRECAUTIONS AND GUIDELINES)

◆SPECIFICATIONS

Items	Characteristics				
Category Temperature Range	−55 to +105℃				
Rated Voltage Range	16 to 35Vdc				
Capacitance Range	820 to 6800μF				(at 20℃, 120Hz)
Capacitance Tolerance	0 to +30% (S)				(at 20℃, 120Hz)
Leakage Current	I=0.01CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)				(at 20℃ after 2 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	16V	25V	35V	
	tanδ (Max.)	0.16	0.14	0.12	
	When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase.				(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	16V	25V	35V	
	Z(−55℃)/Z(+20℃)	3	3	3	
	Impedance at -10℃ and 20℃ 100kHz in the STANDARD RATINGS				(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 5000 hours at 105℃.				
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.				
	Capacitance change	≦±20% of the initial value			
	D.F. (tanδ)	≦200% of the initial specified value			
	Leakage current	≦The initial specified value			

◆DIMENSIONS (Radial Lead Type=VB) [mm]





Gas escape end seal

φD	12.5	16	18
φd	0.6	0.8	0.8
F	5.0	7.5	7.5
L'	L+1.5max.		

◆PART NUMBERING SYSTEM

LBG 25 VB 2200 S L20

- LBG : Series name
- 25 : Rated voltage in volts
- VB : Radial lead type
- 2200 : Nominal cap code
- S : Cap tolerance (S=0/+30%)
- L20 : Case Code

Capacitance	Code
100μF	100
2200μF	2200

◆STANDARD RATINGS

φDXL	Case Code	Vdc	16				25				35			
			Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃,100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃,100kHz)	Capacitance (μF)	Impedance (Ωmax/100kHz)		Rated ripple current (mArms/105℃,100kHz)
				20℃	−10℃			20℃	−10℃			20℃	−10℃	
12.5X20	K20		2,200	0.038	0.076	1,660	1,200	0.038	0.076	1,660	820	0.038	0.076	1,660
12.5X25	K25		2,700	0.030	0.060	1,950	1,800	0.030	0.060	1,950	1,200	0.030	0.060	1,950
16X20	L20		3,300	0.029	0.058	2,210	2,200	0.029	0.058	2,210	1,500	0.029	0.058	2,210
16X25	L25		4,700	0.022	0.044	2,560	3,300	0.022	0.044	2,560	1,800	0.022	0.044	2,560
18X20	M20		4,700	0.028	0.056	2,490	2,700	0.028	0.056	2,490	1,800	0.028	0.056	2,490
18X25	M25		6,800	0.020	0.040	2,740	3,900	0.020	0.040	2,740	2,700	0.020	0.040	2,740

◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

Capacitance (μF) \ Frequency (Hz)	120	1k	10k	100k
820 to 1800	0.60	0.87	0.95	1.00
2200 to 3900	0.75	0.90	0.95	1.00
4700 to 6800	0.85	0.95	0.98	1.00

CAT. No. E1001D

NIPPON CHEMI-CON

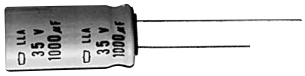
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Low leakage current, 85℃

LLA Series

- Endurance : 85℃ 1000 hours
- Solvent-proof (see PRECAUTIONS AND GUIDELINES)

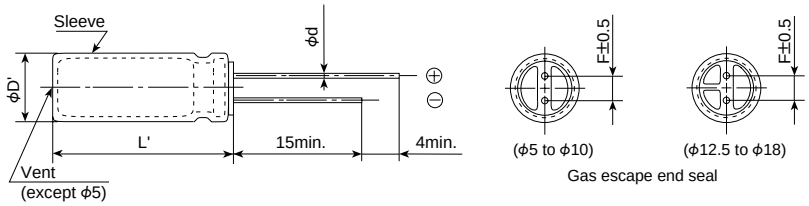
LLA
↑ low LC
SME



◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +85℃
Rated Voltage Range	6.3 to 50Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.002CV or 0.2μA, whichever is greater. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 1 minute)
Dissipation Factor (tanδ)	Rated voltage (Vdc) 6.3V 10V 16V 25V 35V 50V tanδ (Max.) 0.24 0.20 0.16 0.14 0.12 0.10 When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase. (at 20℃, 120Hz)
Low Temperature Characteristics	○Leakage current Leakage current at 85℃ : ≦10 times of the 20℃ specified value ○Max. Impedance Ratio (at 120Hz) Z(−25℃)/Z(+20℃)≦4, Z(−40℃)/Z(+20℃)≦8
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1000 hours at 85℃. 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 same specifications as "Endurance" shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 85℃ without voltage applied.
Shelf Test	The following specifications shall be satisfied when the capacitors are restored to 20℃ after leaving them for 6 months at a nominal temperature (-10 to +40℃) 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 (Radial Lead Type=VB) [mm]



φD	5	6.3	8	10	12.5	16	18
φd	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
φD'	φD+0.5max.						
L'	L+1.5max.						

◆PART NUMBERING SYSTEM

LLA 10 VB 100 M

- M : Cap tolerance (±20%)
- 100 : Nominal cap code
- VB : Radial lead type
- 10 : Rated voltage in volts
- LLA : Series name

Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100

◆STANDARD RATINGS

Vdc / Items / μF	6.3 Case size φDXL (mm)	6.3 Rated ripple (mArms/ 85℃ 120Hz)	10 Case size	10 Rated ripple	16 Case size	16 Rated ripple	25 Case size	25 Rated ripple	35 Case size	35 Rated ripple	50 Case size	50 Rated ripple
1.0											5×11	17
2.2											5×11	25
3.3											5×11	35
4.7							5×11	31	5×11	40	5×11	42
10					5×11	44	5×11	54	5×11	58	5×11	65
22			5×11	59	5×11	75	5×11	80	5×11	87	5×11	95
33	5×11	55	5×11	84	5×11	90	5×11	97	5×11	105	6.3×11	125
47	5×11	79	5×11	100	5×11	110	5×11	115	6.3×11	145	6.3×11	150
100	5×11	130	5×11	145	6.3×11	180	6.3×11	190	8×11.5	240	8×11.5	255
220	6.3×11	230	6.3×11	250	8×11.5	300	8×11.5	320	10×12.5	420	10×16	490
330	6.3×11	280	8×11.5	350	8×11.5	370	10×12.5	470	10×16	570	10×20	650
470	8×11.5	380	8×11.5	415	10×12.5	520	10×16	620	10×20	740	12.5×20	860
1,000	10×12.5	650	10×16	790	10×20	910	12.5×20	1,090	12.5×25	1,300	16×25	1,530
2,200	12.5×20	1,150	12.5×20	1,240	12.5×25	1,420	16×25	1,660	16×31.5	1,890	18×35.5	2,160
3,300	12.5×20	1,380	12.5×25	1,590	16×25	1,840	16×31.5	2,070	18×35.5	2,340		
4,700	16×25	1,880	16×25	1,980	16×31.5	2,260	18×35.5	2,520	18×40	2,690		
6,800	16×25	2,120	16×31.5	2,390	18×35.5	2,690	18×40	2,830				
10,000	16×31.5	2,500	18×35.5	2,840	18×40	2,920						
15,000	18×35.5	2,990										

Vdc / Items / μF	50 Case size φDXL (mm)	50 Rated ripple (mArms/ 85℃ 120Hz)
0.1	5×11	1.3
0.22	5×11	2.9
0.33	5×11	4.4
0.47	5×11	11

CAT. No. E1001D

NIPPON CHEMI-CON

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

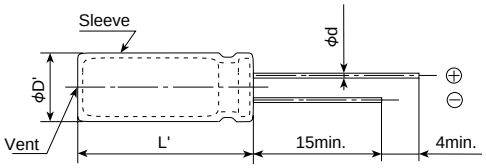
For strobe flash

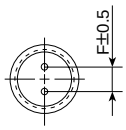
PH Series

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−20 to +55℃
Rated Voltage Range	300 & 330Vdc
Capacitance Tolerance	−10 to +20% (V) (at 20℃, 120Hz)
Leakage Current	I=1×C Where, I : Max. leakage current (μA), C : Nominal capacitance (μF) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.06max. (at 20℃, 120Hz)
Charge and Discharge Characteristics	The following specifications shall be satisfied when the capacitors are restored to 20℃ after charge and discharge are repeated 5000 times at room temperature (5 to 35℃). Discharge resistance or 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℃ after exposing them for 1000 hours at 55℃ 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 (Radial Lead Type=VB) [mm]





φD	10	12.5	14.5	16	18
φd	0.6	0.6	0.8	0.8	0.8
F	5.0	5.0	7.5	7.5	7.5
φD'	φD+0.5max.				
L'	L+1.0max.				

◆PART NUMBERING SYSTEM

PH 330 VB 140 V 14.5X30

- 14.5X30 : Case size
- V : Cap tolerance (−10/+20%)
- 140 : Nominal cap in μF
- VB : Radial lead type
- 330 : Rated voltage in volts
- PH : Series name

◆STANDARD RATINGS

Case size φDXL (mm)

μF \ Vdc	300V					330V				
50	10X26					10X27				
70	10X33	12.5X23				10X35	12.5X24			
100	10X43	12.5X28	14.5X23				12.5X30	14.5X24		
120		12.5X32	14.5X26	16X24			12.5X34	14.5X27	16X26	
140		12.5X36	14.5X28	16X27			12.5X39	14.5X30	16X28	18X24
160		12.5X40	14.5X31	16X28	18X24		12.5X43	14.5X33	16X30	18X26
180		12.5X44	14.5X34	16X30	18X26			14.5X36	16X33	18X28
200			14.5X37	16X33	18X28			14.5X39	16X35	18X29
220			14.5X39	16X35	18X29			14.5X43	16X38	18X31
240			14.5X42	16X37	18X31				16X40	18X33

Custom-made products are available upon requests, please consult us.

CAT. No. E1001D

Snap-in/Screw Terminal Aluminum Electrolytic Capacitors (Large Capacitor)

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 85℃

SMQ Series

- Downsized from current downsized snap-ins SMM series
- Endurance with ripple current : 85℃ 2000 hours
- Non solvent-proof type

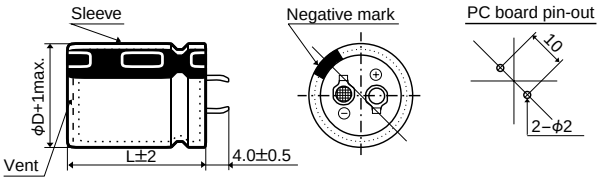
SMQ
↑ downsized
SMH

◆SPECIFICATIONS

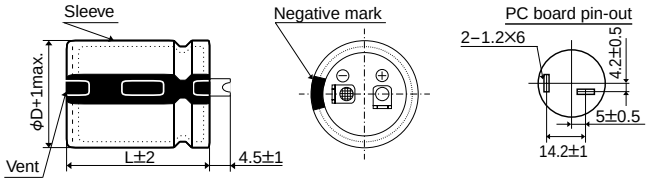
Items	Characteristics				
Category Temperature Range	−25 to +85℃				
Rated Voltage Range	160 to 450Vdc				
Capacitance Tolerance	±20% (M)				(at 20℃, 120Hz)
Leakage Current	I≦3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)				(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	160 to 250V	315 to 400V	420 & 450V	
	tanδ (Max.)	0.15	0.15	0.20	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 250V	315 to 400V	420 & 450V	
	Z(−25℃)/Z(+20℃)	4	8	8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 85℃.				
	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℃ after exposing them for 1000 hours at 85℃ 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]

●Standard Terminal Type : VSSN (ϕ22 to ϕ35)



●Terminal Type : LISN (ϕ35)



* No plastic disk is the standard design.

◆PART NUMBERING SYSTEM

SMQ 400 VSSN 330 M 25D

- 25D : Case code
- M : Cap tolerance (±20%)
- 330 : Nominal cap in μF
- VSSN : Terminal type
- 400 : Rated voltage in volts
- SMQ : Series name

◆CASE CODE [mm]

Case code	Case size ϕDXL	Case code	Case size ϕDXL	Case code	Case size ϕDXL	Case code	Case size ϕDXL
22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
22E	22×45	25E	25.4×45	30E	30×45	35E	35×45
22F	22×50	25F	25.4×50	30F	30×50	35F	35×50

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 85℃

SMQ Series

◆STANDARD RATINGS

Vdc / μF \ φD	160				180				200			
	22	25	30	35	22	25	30	35	22	25	30	35
390									22×25 1.68			
470					22×25 2.08				22×30 1.85			
560	22×25 2.25				22×30 2.25				22×30 2.43	25.4×25 2.43		
680	22×30 2.50				22×30 2.50	25.4×25 2.50			22×35 2.68	25.4×30 2.68		
820	22×35 2.75				22×35 2.75	25.4×30 2.75			22×40 2.93	25.4×30 2.93	30×25 2.93	
1,000	22×40 3.00	25.4×30 3.00			22×45 3.00	25.4×35 3.00	30×25 3.00		22×45 3.25	25.4×35 3.25	30×30 3.25	35×25 3.25
1,200	22×45 3.25	25.4×35 3.25	30×25 3.25		22×50 3.31	25.4×40 3.31	30×30 3.31	35×25 3.31		25.4×40 3.50	30×30 3.50	35×30 3.50
1,500	22×50 3.73	25.4×40 3.73	30×30 3.73	35×25 3.73		25.4×45 3.83	30×35 3.83	35×30 3.83		25.4×50 3.87	30×35 3.87	35×30 3.87
1,800		25.4×45 4.20	30×35 4.20	35×30 4.20		25.4×50 4.32	30×40 4.32	35×30 4.32			30×45 4.32	35×35 4.32
2,200			30×40 4.78	35×35 4.78			30×45 4.92	35×40 4.92			30×50 4.92	35×40 4.92
2,700				35×40 5.45				35×45 5.52				35×50 5.45
3,300				35×45 5.75				35×50 5.75				
3,900				35×50 6.00	← Upper : Case size φDXL (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz							

Vdc / μF \ φD	250				315				350			
	22	25	30	35	22	25	30	35	22	25	30	35
150									22×25 1.12			
180					22×25 1.21				22×30 1.22			
220					22×30 1.41				22×35 1.44			
270	22×25 1.31				22×30 1.60				22×40 1.66	25.4×30 1.66		
330	22×30 1.75				22×40 1.82	25.4×30 1.82	30×25 1.82		22×45 1.88	25.4×35 1.88		
390	22×30 1.91	25.4×25 1.91			22×45 2.01	25.4×35 2.01	30×30 2.01		22×50 2.06	25.4×40 2.06	30×30 2.06	35×25 2.06
470	22×35 2.11	25.4×30 2.11			22×50 2.27	25.4×40 2.27	30×30 2.27	35×25 2.27		25.4×45 2.40	30×35 2.40	35×30 2.40
560	22×40 2.25	25.4×30 2.25	30×25 2.25			25.4×45 2.56	30×35 2.56	35×30 2.56		25.4×50 2.60	30×40 2.60	35×30 2.60
680	22×45 2.50	25.4×35 2.50	30×30 2.50				30×40 2.87	35×35 2.87			30×45 2.96	35×35 2.96
820	22×50 2.77	25.4×40 2.77	30×30 2.77	35×25 2.77			30×45 3.25	35×40 3.25			30×50 3.25	35×45 3.25
1,000		25.4×45 3.32	30×35 3.32	35×30 3.32			30×50 3.63	35×45 3.63				35×50 3.54
1,200			30×40 3.53	35×35 3.53								
1,500			30×50 4.04	35×40 4.04								
1,800				35×45 4.55	← Upper : Case size φDXL (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz							

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 85℃

SMQ Series

◆STANDARD RATINGS

Vdc / μF \ φD	400				420				450			
	22	25	30	35	22	25	30	35	22	25	30	35
82									22×25 0.83			
100					22×25 0.97				22×25 0.93			
120	22×25 1.02				22×25 1.08				22×30 1.04			
150	22×30 1.16				22×30 1.30	25.4×25 1.30			22×35 1.19	25.4×25 1.19		
180	22×35 1.44				22×35 1.48	25.4×30 1.48			22×40 1.35	25.4×30 1.35		
220	22×40 1.49	25.4×30 1.49			22×40 1.65	25.4×35 1.65	30×25 1.65		22×45 1.55	25.4×40 1.55	30×30 1.55	35×25 1.55
270	22×45 1.67	25.4×35 1.67	30×25 1.67		22×50 1.94	25.4×35 1.94	30×30 1.94		22×50 1.78	25.4×40 1.78	30×30 1.78	
330	22×50 1.90	25.4×40 1.90	30×30 1.90	35×25 1.90		25.4×45 2.17	30×35 2.17	35×30 2.17		25.4×50 2.01	30×40 2.01	35×30 2.01
390		25.4×45 2.13	30×35 2.13	35×30 2.13		25.4×50 2.27	30×35 2.27	35×30 2.27			30×40 2.24	35×35 2.24
470		25.4×50 2.39	30×40 2.39	35×30 2.39			30×40 2.61	35×35 2.61			30×45 2.53	35×40 2.53
560			30×45 2.69	35×35 2.69			30×50 2.82	35×40 2.82			30×50 2.82	35×45 2.82
680			30×50 2.96	35×40 2.96				35×45 3.11				
820				35×45 3.25	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz							

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency(Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 105℃

KMQ Series

- Downsized from current downsized snap-ins KMM series
- Endurance with ripple current : 105℃ 2000 hours
- Non solvent-proof type

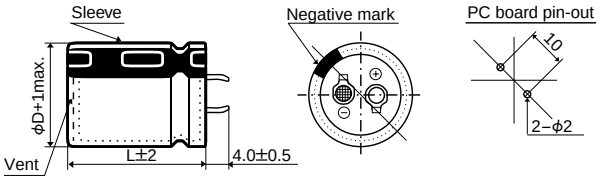
KMQ
↑ downsized
KMH

◆SPECIFICATIONS

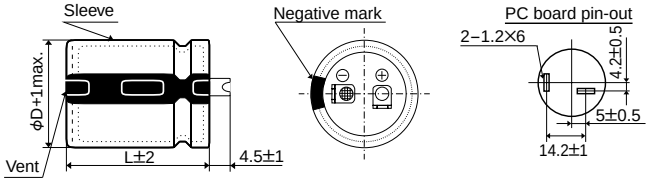
Items	Characteristics				
Category Temperature Range	−25 to +105℃				
Rated Voltage Range	160 to 450Vdc				
Capacitance Tolerance	±20% (M)				(at 20℃, 120Hz)
Leakage Current	I≦3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)				(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	160 to 250V	315 to 400V	420 & 450V	
	tanδ (Max.)	0.15	0.15	0.20	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 250V	315 to 400V	420 & 450V	
	Z(−25℃)/Z(+20℃)	4	8	8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 105℃.				
	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℃ after exposing them for 1000 hours at 105℃ 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]

●Standard Terminal Type : VSSN (φ22 to φ35)



●Terminal Type : LISN (φ35)



* No plastic disk is the standard design.

◆PART NUMBERING SYSTEM

KMQ 400 VSSN 330 M 25E

- 25E : Case code
- M : Cap tolerance (±20%)
- 330 : Nominal cap in μF
- VSSN : Terminal type
- 400 : Rated voltage in volts
- KMQ : Series name

◆CASE CODE [mm]

Case code	Case size φD×L	Case code	Case size φD×L	Case code	Case size φD×L	Case code	Case size φD×L
22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
22E	22×45	25E	25.4×45	30E	30×45	35E	35×45
22F	22×50	25F	25.4×50	30F	30×50	35F	35×50

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 105℃

KMQ Series

◆STANDARD RATINGS

Vdc / μF \ φD	160				180				200			
	22	25	30	35	22	25	30	35	22	25	30	35
390					22×25 1.30				22×25 1.31			
470	22×25 1.40				22×30 1.40				22×30 1.45			
560	22×30 1.50				22×30 1.50	25.4×25 1.50			22×30 1.67	25.4×25 1.67		
680	22×30 1.70	25.4×25 1.70			22×35 1.70	25.4×30 1.70			22×40 1.75	25.4×30 1.75		
820	22×35 2.00	25.4×30 2.00	30×25 2.00		22×40 2.00	25.4×30 2.00	30×25 2.00		22×45 2.04	25.4×35 2.04	30×25 2.04	
1,000	22×40 2.20	25.4×35 2.20	30×25 2.20		22×45 2.20	25.4×40 2.20	30×30 2.20	35×25 2.20	22×50 2.30	25.4×45 2.30	30×30 2.30	35×25 2.30
1,200		25.4×40 2.30	30×30 2.30	35×25 2.30		25.4×45 2.30	30×35 2.30	35×30 2.30		25.4×50 2.65	30×35 2.65	35×30 2.65
1,500		25.4×45 2.50	30×35 2.50	35×30 2.50		25.4×50 2.50	30×40 2.50	35×30 2.50			30×40 2.80	35×30 2.80
1,800		25.4×50 2.70	30×40 2.70	35×30 2.70			30×45 2.70	35×35 2.70			30×45 3.08	35×40 3.08
2,200			30×45 2.90	35×35 2.90			30×50 2.90	35×40 2.90				35×45 3.48
2,700			30×50 3.10	35×40 3.10				35×50 3.10				
3,300				35×50 3.30	← Upper : Case size φDXL (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							

Vdc / μF \ φD	250				315				350			
	22	25	30	35	22	25	30	35	22	25	30	35
120									22×25 0.75			
150					22×25 0.82				22×30 0.82			
180					22×30 0.90				22×30 0.90	25.4×25 0.90		
220	22×25 1.00				22×30 1.00	25.4×25 1.00			22×35 1.00	25.4×30 1.00		
270	22×25 1.10				22×35 1.10	25.4×30 1.10			22×40 1.10	25.4×30 1.10	30×25 1.10	
330	22×30 1.20	25.4×25 1.20			22×45 1.20	25.4×35 1.20	30×25 1.20		22×45 1.20	25.4×40 1.20	30×30 1.20	
390	22×35 1.30	25.4×25 1.30			22×45 1.30	25.4×40 1.30	30×30 1.30	35×25 1.30		25.4×45 1.30	30×35 1.30	
470	22×40 1.40	25.4×30 1.40	30×25 1.40			25.4×45 1.40	30×35 1.40	35×25 1.40		25.4×50 1.40	30×35 1.40	35×30 1.40
560	22×45 1.50	25.4×35 1.50	30×25 1.50			25.4×50 1.50	30×40 1.50	35×30 1.50			30×45 1.50	35×35 1.50
680	22×50 1.70	25.4×40 1.70	30×30 1.70	35×25 1.70			30×45 1.70	35×35 1.70			30×50 1.70	35×40 1.70
820		25.4×45 2.00	30×35 2.00	35×30 2.00			30×50 2.00	35×40 2.00				35×45 1.90
1,000			30×40 2.20	35×30 2.20				35×45 2.30				
1,200			30×45 2.30	35×35 2.30								
1,500				35×45 2.50								
1,800				35×50 2.70	← Upper : Case size φDXL (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 105℃

KMQ Series

◆STANDARD RATINGS

Vdc / μF \ φD	400				420				450			
	22	25	30	35	22	25	30	35	22	25	30	35
68									22×25 0.50			
82					22×25 0.64				22×30 0.56			
100	22×25 0.70				22×25 0.66	25.4×25 0.66			22×30 0.64	25.4×25 0.64		
120	22×30 0.75				22×30 0.81	25.4×25 0.81			22×35 0.72	25.4×30 0.72		
150	22×30 0.88	25.4×25 0.88			22×35 0.84	25.4×30 0.84	30×25 0.84		22×40 0.79	25.4×30 0.79	30×25 0.79	
180	22×35 0.95	25.4×30 0.95			22×40 0.91	25.4×30 0.91	30×25 0.91		22×45 0.87	25.4×40 0.87	30×30 0.87	
220	22×45 1.10	25.4×35 1.10	30×25 1.10		22×45 1.05	25.4×35 1.05	30×30 1.05	35×25 1.05		25.4×45 1.00	30×30 1.00	35×25 1.00
270	22×50 1.22	25.4×40 1.22	30×30 1.22	35×25 1.22		25.4×40 1.25	30×30 1.25	35×25 1.25		25.4×50 1.19	30×40 1.19	35×30 1.19
330		25.4×45 1.44	30×35 1.44	35×30 1.44		25.4×50 1.42	30×35 1.42	35×30 1.42			30×45 1.38	35×35 1.38
390		25.4×50 1.55	30×40 1.55	35×30 1.55			30×40 1.61	35×35 1.61			30×50 1.55	35×40 1.55
470			30×45 1.68	35×35 1.68			30×45 1.86	35×40 1.86				35×45 1.74
560			30×50 1.90	35×40 1.90				35×45 2.10				35×50 1.90
680				35×45 2.12				35×50 2.20	← Upper : Case size φDXL (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency(Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 85℃

SMM Series

- Downsize, longer life, and high ripple version of SMH series
- Endurance with ripple current : 85℃ 3000 hours
- Non solvent-proof type

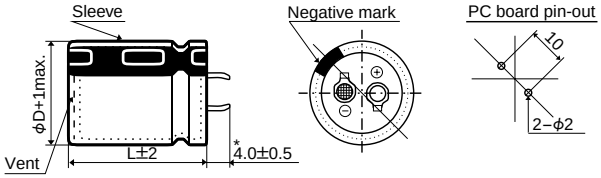
SMM
↑ downsized, longer life, higher ripple
SMH

◆SPECIFICATIONS

Items	Characteristics			
Category Temperature Range	−25 to +85℃			
Rated Voltage Range	160 to 450Vdc			
Capacitance Tolerance	±20% (M)			(at 20℃, 120Hz)
Leakage Current	I≦3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)			(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	160 to 400V	420 & 450V	
	tanδ (Max.)	0.15	0.20	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 400V	420 & 450V	
	Z(−25℃)/Z(+20℃)	4	8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 3000 hours at 85℃.			
	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℃ after exposing them for 1000 hours at 85℃ 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		

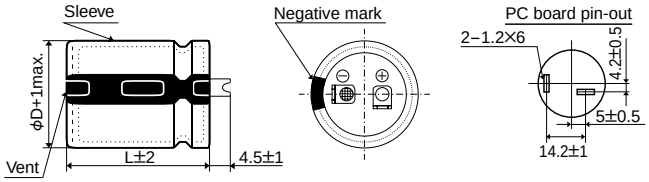
◆DIMENSIONS [mm]

●Standard Terminal Type : VSSN (φ20 to φ35)

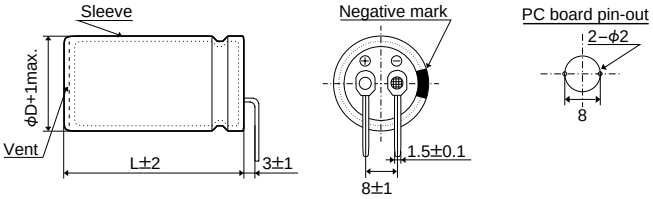


*φD=35mm : 3.5±0.5mm

●Terminal Type : LISN (φ35)



●Terminal type : LCSN (φ20×30 to 50L & φ22×30 to 50L)



◆PART NUMBERING SYSTEM

SMM 400 VSSN 120 M 22B

- 22B : Case code
- M : Cap tolerance (±20%)
- 120 : Nominal cap in μF
- VSSN : Terminal type
- 400 : Rated voltage in volts
- SMM : Series name

◆CASE CODE [mm]

Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL
—	—	22S	22×20	25S	25.4×20	30S	30×20	35S	35×20
20A	20×25	22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
20B	20×30	22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
20C	20×35	22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
20D	20×40	22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
20E	20×45	22E	22×45	25E	25.4×45	30E	30×45	35E	35×45
20F	20×50	22F	22×50	25F	25.4×50	30F	30×50	35F	35×50

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 85℃

SMM Series

◆STANDARD RATINGS

Vdc / μF \ φD	160					180				
	20	22	25.4	30	35	20	22	25.4	30	35
220							22×20 1.18			
270	20×25 1.28	22×20 1.30				20×25 1.29				
330	20×25 1.55					20×30 1.77	22×25 1.77	25.4×20 1.49		
390	20×30 1.63	22×25 1.63	25.4×20 1.62			20×30 1.84	22×25 1.84			
470	20×30 1.90	22×30 1.86	25.4×25 1.86			20×35 1.91	22×30 1.91	25.4×25 2.08	30×20 1.88	
560	20×35 2.14	22×30 2.15	25.4×25 2.15	30×20 2.05		20×40 2.15	22×35 2.25	25.4×25 2.25		
680	20×40 2.35	22×35 2.35	25.4×30 2.33	30×25 2.33	35×20 2.26	20×45 2.41	22×35 2.48	25.4×30 2.50	30×25 2.46	35×20 2.26
820	20×45 2.64	22×40 2.68	25.4×30 2.65	30×25 2.64	35×20 2.49	20×50 2.72	22×40 2.86	25.4×35 2.75	30×25 2.69	
1,000		22×45 3.02	25.4×35 3.00	30×30 2.96	35×25 3.13		22×50 3.10	25.4×40 3.06	30×30 3.10	35×25 2.98
1,200		22×50 3.47	25.4×40 3.43	30×30 3.41	35×25 3.40			25.4×45 3.63	30×35 3.55	35×30 3.49
1,500			25.4×50 3.96	30×35 3.96	35×30 3.94				30×40 4.10	35×35 4.02
1,800				30×40 4.31	35×35 4.28				30×45 4.55	35×35 4.54
2,200				30×50 4.96	35×40 4.96					35×40 4.83
2,700					35×45 5.57	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz				35×50 5.30
3,300					35×50 6.21					

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency(Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 85℃

SMM Series

◆STANDARD RATINGS

Vdc / μF \ φD	200					220				
	20	22	25.4	30	35	20	22	25.4	30	35
180							22×20 1.06			
220	20×25 1.19	22×20 1.18				20×25 1.25				
270	20×25 1.39	22×25 1.37	25.4×20 1.35			20×30 1.46	22×25 1.47	25.4×20 1.35		
330	20×30 1.56	22×25 1.51	25.4×20 1.49			20×35 1.64	22×30 1.70	25.4×25 1.69	30×20 1.58	
390	20×35 1.74	22×30 1.73	25.4×25 1.71	30×20 1.71		20×35 1.84	22×30 1.89	25.4×25 1.84	30×20 1.71	
470	20×35 2.03	22×30 1.97	25.4×25 1.95	30×20 1.88		20×40 2.12	22×35 2.08	25.4×30 2.08	30×25 2.12	35×20 1.88
560	20×40 2.18	22×35 2.18	25.4×30 2.15	30×25 2.15	35×20 2.05	20×50 2.33	22×40 2.33	25.4×35 2.38	30×25 2.31	35×20 2.14
680	20×50 2.48	22×40 2.48	25.4×30 2.48	30×25 2.48	35×20 2.36		22×45 2.63	25.4×35 2.68	30×30 2.62	35×25 2.58
820		22×45 2.81	25.4×35 2.79	30×30 2.80	35×25 2.83			25.4×45 3.01	30×35 2.99	35×30 2.79
1,000		22×50 3.28	25.4×40 3.28	30×35 3.15	35×30 3.26			25.4×50 3.40	30×35 3.42	35×30 3.29
1,200			25.4×45 3.61	30×35 3.61	35×30 3.57				30×40 3.88	35×35 3.68
1,500				30×45 4.13	35×35 4.06				30×50 4.44	35×40 4.10
1,800				30×50 4.60	35×40 4.59	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz				35×45 4.52
2,200					35×45 5.25					

Vdc / μF \ φD	250					315				
	20	22	25.4	30	35	20	22	25.4	30	35
100							22×20 0.79			
120						20×25 0.89		25.4×20 0.90		
150		22×20 0.97				20×30 1.05	22×25 1.06	25.4×20 1.00		
180	20×25 1.20	22×20 1.06				20×35 1.18	22×30 1.29	25.4×25 1.38	30×20 1.16	
220	20×25 1.26	22×25 1.24	25.4×20 1.22			20×35 1.30	22×30 1.41	25.4×25 1.47	30×20 1.28	
270	20×30 1.42	22×25 1.50				20×45 1.52	22×35 1.68	25.4×30 1.70	30×25 1.55	35×20 1.43
330	20×35 1.68	22×30 1.66	25.4×25 1.61	30×20 1.58		20×50 1.73	22×40 1.91	25.4×35 1.94	30×25 1.98	
390	20×40 1.92	22×35 1.88	25.4×30 1.88	30×25 1.86	35×20 1.71		22×45 2.07	25.4×40 2.11	30×30 2.15	35×25 1.95
470	20×50 2.06	22×35 2.15	25.4×35 2.15	30×25 2.05	35×20 1.88			25.4×45 2.31	30×35 2.38	35×30 2.46
560		22×40 2.48	25.4×35 2.35	30×25 2.35				25.4×50 2.46	30×35 2.63	35×30 2.69
680		22×50 2.61	25.4×40 2.67	30×30 2.71	35×25 2.58				30×45 2.82	35×35 3.05
820			25.4×45 3.01	30×35 2.98	35×30 2.96				30×50 3.28	35×40 3.45
1,000				30×40 3.56	35×35 3.48					35×45 3.59
1,200				30×45 3.99	35×35 3.84					
1,500					35×40 4.33	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz				
1,800					35×50 4.54					

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 85℃

SMM Series

◆STANDARD RATINGS

μF \ Vdc / φD	350					400				
	20	22	25.4	30	35	20	22	25.4	30	35
68						20×25 0.75	22×20 0.65			
82		22×20 0.72				20×25 0.82	22×25 0.84	25.4×20 0.74		
100	20×25 0.81					20×30 0.95	22×25 0.99	25.4×20 0.82		
120	20×30 0.96	22×25 1.04	25.4×20 0.90			20×35 1.07	22×30 1.09	25.4×25 1.13	30×20 0.95	
150	20×30 1.10	22×30 1.20	25.4×25 1.22	30×20 1.06		20×40 1.22	22×35 1.24	25.4×30 1.27	30×25 1.20	
180	20×35 1.24	22×30 1.34	25.4×25 1.37	30×20 1.16		20×45 1.28	22×40 1.41	25.4×30 1.44	30×25 1.52	35×20 1.16
220	20×45 1.37	22×35 1.47	25.4×30 1.53	30×25 1.54	35×20 1.29	20×50 1.41	22×45 1.58	25.4×35 1.64	30×30 1.66	35×25 1.47
270	20×50 1.56	22×40 1.70	25.4×35 1.73	30×25 1.80	35×20 1.49		22×50 1.65	25.4×40 1.79	30×30 1.82	35×25 1.63
330		22×45 1.87	25.4×35 1.97	30×30 2.03	35×25 1.80			25.4×45 2.00	30×35 2.05	35×30 2.05
390			25.4×40 2.14	30×35 2.23	35×30 2.30			25.4×50 2.12	30×40 2.26	35×35 2.28
470			25.4×50 2.55	30×35 2.53	35×30 2.55				30×45 2.51	35×35 2.54
560				30×40 2.73	35×35 2.75				30×50 2.85	35×40 2.85
680				30×50 3.15	35×40 3.15					35×50 3.10
820					35×45 3.47	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz				
1,000					35×50 3.60					

μF \ Vdc / φD	420					450				
	20	22	25.4	30	35	20	22	25.4	30	35
47		22×20 0.54					22×20 0.54			
56	20×25 0.58	22×20 0.59				20×25 0.61	22×20 0.59			
68	20×25 0.70		25.4×20 0.68			20×30 0.71	22×25 0.71	25.4×20 0.68		
82	20×30 0.80	22×25 0.85	25.4×20 0.74			20×35 0.80	22×25 0.86	25.4×20 0.74	30×20 0.79	
100	20×35 0.90	22×30 0.97	25.4×25 0.98	30×20 0.87		20×35 0.88	22×30 0.95	25.4×25 0.97	30×20 0.87	
120	20×35 1.04	22×30 1.07	25.4×25 1.08	30×20 0.95		20×40 0.99	22×35 1.07	25.4×30 1.09	30×25 1.12	35×20 0.99
150	20×40 1.17	22×35 1.21	25.4×30 1.26	30×25 1.30	35×20 1.11	20×45 1.13	22×40 1.18	25.4×30 1.25	30×25 1.29	35×20 1.06
180	20×50 1.27	22×40 1.33	25.4×35 1.42	30×25 1.48	35×20 1.16		22×45 1.32	25.4×35 1.40	30×30 1.45	35×25 1.33
220		22×45 1.55	25.4×35 1.58	30×30 1.65	35×25 1.47		22×50 1.48	25.4×40 1.59	30×30 1.64	35×25 1.66
270			25.4×40 1.74	30×35 1.90	35×30 1.94			25.4×45 1.73	30×35 1.89	35×30 1.90
330			25.4×50 2.20	30×35 1.98	35×35 2.17			25.4×50 2.12	30×40 2.12	35×35 2.15
390				30×40 2.22	35×35 2.27				30×45 2.35	35×40 2.38
470				30×45 2.50	35×40 2.61				30×50 2.65	35×45 2.68
560					35×45 2.95	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz				35×50 2.88
680					35×50 3.15					

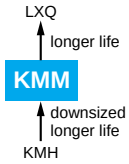
NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 105℃

KMM Series

- Downsize, longer life, and high ripple version of KMH series
- Endurance with ripple current : 105℃ 2000 to 3000 hours
- Non solvent-proof type

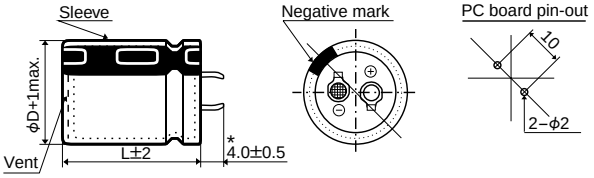


◆SPECIFICATIONS

Items	Characteristics			
Category Temperature Range	−25 to +105℃			
Rated Voltage Range	160 to 450Vdc			
Capacitance Tolerance	±20% (M)			(at 20℃, 120Hz)
Leakage Current	I≦3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)			(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	160 to 400V	420 & 450V	
	tanδ (Max.)	0.15	0.20	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 400V	420 & 450V	
	Z(−25℃)/Z(+20℃)	4	8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 3000 hours (2000 hours for φ20×20L products) at 105℃.			
	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℃ after exposing them for 1000 hours at 105℃ 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		

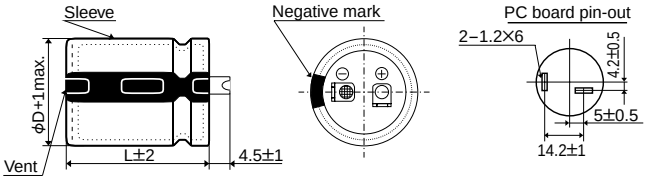
◆DIMENSIONS [mm]

●Standard Terminal Type : VSSN (φ20 to φ35)

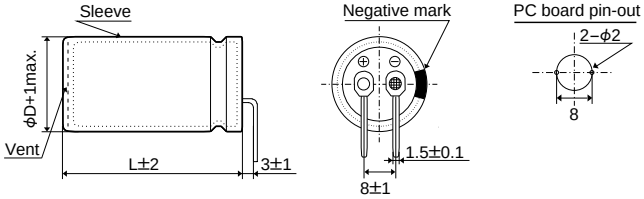


*φD=35mm : 3.5±0.5mm

●Terminal Type : LISN(φ35)



●Terminal Type : LCSN(φ20×30 to 50L, φ22×30 to 50L)



◆PART NUMBERING SYSTEM

KMM 160 VSSN 1000 M 22F

- 22F : Case code
- M : Cap tolerance (±20%)
- 1000 : Nominal cap in μF
- VSSN : Terminal type
- 160 : Rated voltage in volts
- KMM : Series name

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 105℃

KMM Series

◆STANDARD RATINGS

μF \ Vdc / φD	160					180				
	20	22	25.4	30	35	20	22	25.4	30	35
150						20×20 0.62				
180	20×20 0.68					20×25 0.77	22×20 0.80			
220	20×25 0.85	22×20 0.81				20×25 1.00		25.4×20 0.90		
270	20×25 1.10		25.4×20 0.98			20×30 1.10	22×25 1.00	25.4×20 0.95		
330	20×30 1.20	22×25 1.20	25.4×20 1.02			20×30 1.20	22×25 1.20	25.4×25 1.16	30×20 1.15	
390	20×30 1.30	22×25 1.30	25.4×25 1.26	30×20 1.25		20×35 1.30	22×30 1.35	25.4×25 1.35	30×20 1.20	
470	20×35 1.34	22×30 1.55	25.4×25 1.55	30×20 1.30		20×40 1.40	22×35 1.50	25.4×30 1.50	30×25 1.50	35×20 1.36
560	20×40 1.50	22×35 1.67	25.4×30 1.67	30×25 1.67	35×20 1.46	20×45 1.55	22×40 1.67	25.4×30 1.67	30×25 1.67	35×20 1.43
680	20×45 1.70	22×40 1.82	25.4×30 1.82	30×25 1.82	35×20 1.51	20×50 1.75	22×45 1.78	25.4×35 1.78	30×30 1.78	35×25 1.83
820		22×45 2.04	25.4×35 2.04	30×30 2.04	35×25 2.04		22×50 2.04	25.4×40 2.04	30×30 2.04	35×25 2.04
1,000		22×50 2.25	25.4×40 2.25	30×30 2.25	35×25 2.25			25.4×45 2.30	30×35 2.30	35×30 2.30
1,200			25.4×45 2.49	30×35 2.49	35×30 2.49			25.4×50 2.55	30×40 2.55	35×30 2.55
1,500			25.4×60 2.97	30×40 2.84	35×30 2.84				30×45 2.90	35×35 2.90
1,800				30×45 3.32	35×35 3.00				30×60 3.49	35×40 3.30
2,200				30×60 3.86	35×45 3.50					35×50 3.65
2,700					35×50 4.00	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz				35×60 4.19
3,300					35×60 4.63					

◆CASE CODE

Case code	Case size φD×L	Case code	Case size φD×L	Case code	Case size φD×L	Case code	Case size φD×L	Case code	Case size φD×L
20S	20×20	22S	22×20	25S	25.4×20	30S	30×20	35S	35×20
20A	20×25	22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
20B	20×30	22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
20C	20×35	22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
20D	20×40	22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
20E	20×45	22E	22×45	25E	25.4×45	30E	30×45	35E	35×45
20F	20×50	22F	22×50	25F	25.4×50	30F	30×50	35F	35×50
–	–	–	–	25H	25.4×60	30H	30×60	35H	35×60

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 105℃

KMM Series

◆STANDARD RATINGS

Vdc / μF \ φD	200					220				
	20	22	25.4	30	35	20	22	25.4	30	35
120	20×20 0.56					20×20 0.56				
150	20×25 0.71	22×20 0.73				20×25 0.73	22×20 0.67			
180	20×25 0.77	22×20 0.80				20×25 0.90		25.4×20 0.76		
220	20×25 1.00		25.4×20 0.85			20×30 1.00	22×25 1.00	25.4×20 0.84		
270	20×30 1.10	22×25 1.10		30×20 1.05		20×35 1.15	22×30 1.15	25.4×25 1.08	30×20 0.98	
330	20×35 1.20	22×30 1.25	25.4×25 1.25	30×20 1.10		20×40 1.25	22×35 1.25	25.4×25 1.25		35×20 1.13
390	20×40 1.31	22×30 1.35	25.4×25 1.35		35×20 1.30	20×45 1.40	22×35 1.40	25.4×30 1.40	30×25 1.36	35×20 1.23
470	20×45 1.45	22×35 1.50	25.4×30 1.50	30×25 1.50	35×20 1.41	20×50 1.51	22×40 1.51	25.4×35 1.54	30×25 1.50	
560	20×50 1.58	22×40 1.67	25.4×30 1.67	30×25 1.67			22×45 1.70	25.4×40 1.72	30×30 1.70	35×25 1.71
680		22×45 1.78	25.4×35 1.78	30×30 1.78	35×25 1.78			25.4×45 1.94	30×35 1.93	35×25 1.89
820			25.4×45 2.04	30×30 2.04	35×25 2.04			25.4×50 2.18	30×40 2.19	35×30 2.16
1,000			25.4×50 2.30	30×35 2.30	35×30 2.30			25.4×60 2.54	30×45 2.50	35×35 2.44
1,200			25.4×60 2.66	30×40 2.65	35×35 2.65				30×50 2.81	35×40 2.79
1,500				30×50 3.08	35×40 3.08				30×60 3.30	35×45 3.22
1,800				30×60 3.49	35×45 3.48	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz				35×50 3.63
2,200					35×50 3.78					35×60 4.23

Vdc / μF \ φD	250					315				
	20	22	25.4	30	35	20	22	25.4	30	35
56						20×20 0.38				
68						20×25 0.47	22×20 0.45			
82						20×25 0.64	22×20 0.47			
100	20×20 0.51					20×30 0.69	22×25 0.61	25.4×20 0.56		
120	20×25 0.58	22×20 0.60				20×30 0.75	22×25 0.75	25.4×20 0.62	30×20 0.65	
150	20×25 0.79		25.4×20 0.74			20×35 0.82	22×30 0.82	25.4×25 0.82	30×20 0.70	35×20 0.76
180	20×30 0.90	22×25 0.78	25.4×20 0.75			20×40 0.90	22×35 0.92	25.4×25 0.92	30×25 0.90	35×20 0.85
220	20×30 1.00	22×25 1.00	25.4×25 0.95	30×20 0.95		20×50 1.00	22×40 1.04	25.4×30 1.04	30×25 1.04	35×20 0.90
270	20×35 1.10	22×30 1.18	25.4×25 1.18	30×20 1.00			22×45 1.16	25.4×35 1.16	30×25 1.16	35×25 1.15
330	20×40 1.20	22×35 1.30	25.4×30 1.30	30×25 1.30	35×20 1.16		22×50 1.33	25.4×40 1.33	30×30 1.33	35×25 1.33
390	20×50 1.45	22×40 1.49	25.4×35 1.49	30×25 1.49				25.4×45 1.47	30×35 1.47	35×30 1.47
470		22×45 1.65	25.4×35 1.65	30×30 1.65	35×25 1.65			25.4×50 1.70	30×40 1.70	35×30 1.70
560		22×50 1.67	25.4×40 1.80	30×30 1.80	35×25 1.80				30×45 2.05	35×35 2.05
680			25.4×50 2.00	30×35 2.00	35×30 2.00				30×50 2.17	35×40 2.17
820			25.4×60 2.20	30×40 2.30	35×35 2.30					35×45 2.20
1,000				30×50 2.47	35×40 2.47					35×60 2.55
1,200				30×60 2.85	35×45 2.60					
1,500					35×50 3.00	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz				
1,800					35×60 3.42					

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Downsized snap-ins, 105℃

KMM Series

◆STANDARD RATINGS

Vdc / μF \ φD	350					400				
	20	22	25.4	30	35	20	22	25.4	30	35
39						20×20 0.32				
47	20×20 0.35					20×25 0.39	22×20 0.37			
56	20×25 0.43	22×20 0.41				20×25 0.51		25.4×20 0.42		
68	20×25 0.47		25.4×20 0.46			20×30 0.56	22×25 0.50	25.4×20 0.46		
82	20×30 0.54	22×25 0.55	25.4×20 0.51			20×30 0.64	22×25 0.64		30×20 0.55	
100	20×30 0.60	22×25 0.69		30×20 0.60		20×35 0.70	22×30 0.70	25.4×25 0.70	30×20 0.60	
120	20×35 0.68	22×30 0.75	25.4×25 0.75	30×20 0.65		20×40 0.75	22×35 0.75	25.4×25 0.75	30×25 0.73	35×20 0.75
150	20×40 0.78	22×35 0.82	25.4×30 0.83	30×25 0.82	35×20 0.76	20×45 0.83	22×40 0.88	25.4×30 0.88	30×25 0.88	35×20 0.80
180	20×45 0.87	22×40 0.92	25.4×30 0.92	30×25 0.90			22×45 0.98	25.4×35 0.98	30×30 0.98	35×25 0.98
220	20×50 1.00	22×45 1.05	25.4×35 1.04	30×30 1.02	35×25 1.04		22×50 1.10	25.4×40 1.10	30×30 1.10	35×25 1.10
270		22×50 1.16	25.4×40 1.18	30×30 1.17	35×25 1.20			25.4×45 1.22	30×35 1.22	35×30 1.22
330			25.4×45 1.29	30×35 1.34	35×30 1.22			25.4×50 1.44	30×40 1.44	35×30 1.44
390			25.4×50 1.51	30×40 1.51	35×35 1.47			25.4×60 1.51	30×45 1.60	35×35 1.60
470			25.4×60 1.66	30×45 1.65	35×35 1.69				30×50 1.90	35×40 1.90
560				30×50 1.85	35×40 1.90				30×60 2.10	35×45 2.12
680				30×60 2.15	35×50 1.99	← Upper : Case size φD×L (mm)				35×60 2.27
820					35×60 2.31	← Lower : Rated ripple current (Arms) at 105℃, 120Hz				

Vdc / μF \ φD	420					450				
	20	22	25.4	30	35	20	22	25.4	30	35
39	20×20 0.32					20×25 0.34				
47	20×25 0.39	22×20 0.37				20×25 0.39				
56	20×25 0.51		25.4×20 0.42			20×30 0.51	22×25 0.40			
68	20×30 0.56	22×25 0.50	25.4×20 0.46			20×35 0.56	22×30 0.53	25.4×25 0.50		
82	20×35 0.64	22×25 0.64	25.4×25 0.58	30×20 0.53		20×35 0.64	22×30 0.64	25.4×25 0.64		
100	20×35 0.70	22×30 0.70	25.4×25 0.70	30×20 0.59		20×45 0.69	22×35 0.69	25.4×30 0.69	30×25 0.64	
120	20×40 0.75	22×35 0.75	25.4×30 0.75	30×25 0.73	35×20 0.67	20×50 0.75	22×40 0.80	25.4×30 0.80	30×25 0.80	35×25 0.73
150	20×50 0.88	22×40 0.88	25.4×35 0.88	30×25 0.88			22×45 0.88	25.4×35 0.88	30×30 0.88	35×25 0.75
180		22×45 0.95	25.4×35 0.95	30×30 0.95	35×25 0.94		22×50 1.00	25.4×40 1.00	30×30 1.00	
220		22×50 1.10	25.4×45 1.10	30×35 1.10	35×25 1.10			25.4×45 1.12	30×35 1.12	35×30 1.12
270			25.4×50 1.22	30×40 1.22	35×30 1.22			25.4×60 1.18	30×40 1.28	35×35 1.28
330			25.4×60 1.41	30×45 1.45	35×35 1.45				30×50 1.45	35×40 1.45
390				30×50 1.55	35×40 1.55				30×60 1.51	35×40 1.55
470				30×60 1.79	35×45 1.90					35×50 1.85
560					35×50 2.15	← Upper : Case size φD×L (mm)				35×60 1.91
680					35×60 2.27	← Lower : Rated ripple current (Arms) at 105℃, 120Hz				

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Standard snap-ins, 85℃

SMH Series

- Endurance with ripple current : 85℃ 2000 hours
- Non solvent-proof type

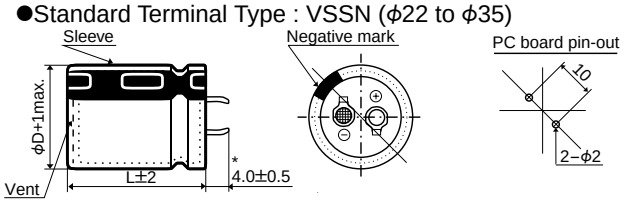
SMM
↑ downsized longer life
SMH

◆SPACIFICATIONS

Items	Characteristics											
Category Temperature Range	−40 to +85℃ (6.3 to 100Vdc) −25 to +85℃ (160 to 450Vdc)											
Rated Voltage Range	6.3 to 450Vdc											
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)											
Leakage Current	I=0.02CV or 3mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)											
Dissipation Factor (tanδ)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	80V	100V	160 to 250V	315 to 400V	450V
	tanδ (Max.)	0.60	0.50	0.40	0.30	0.25	0.20	0.15	0.15	0.15	0.10*	0.15	0.15
	* : 0.15 for φD=35mm (at 20℃, 120Hz)												
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	80V	100V	160 to 250V	315 to 400V	450V
	Z(−25℃)/Z(+20℃)	4	4	4	3	3	2	2	2	2	4	4	8
	Z(−40℃)/Z(+20℃)	15	15	15	10	8	6	6	5	5	—	—	— (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 85℃.												
	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℃ after exposing them for 1000 hours at 85℃ 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											

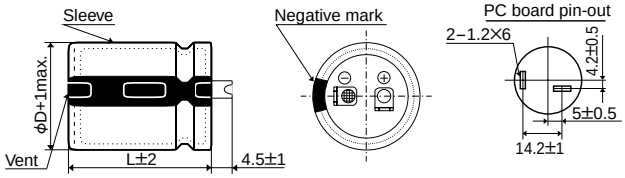
◆DIMENSIONS [mm]

●Standard Terminal Type : VSSN (φ22 to φ35)

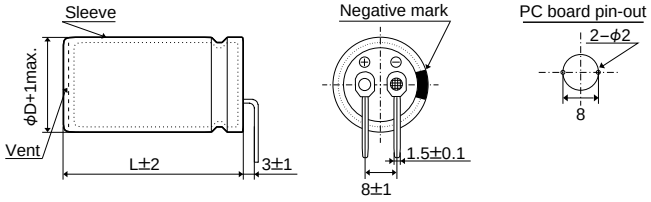


*φD=35mm : 3.5±0.5mm

●Terminal Type : LISN (φ35)



●Terminal Type : LCSN (φ22×30 to 50L)



◆PART NUMBERING SYSTEM

SMH 100 VSSN 1200 M 22B

- 22B : Case code
- M : Cap tolerance (±20%)
- 1200 : Nominal cap in μF
- VSSN : Terminal type
- 100 : Rated voltage in volts
- SMH : Series name

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Standard snap-ins, 85℃

SMH Series

◆STANDARD RATINGS

Vdc / μF \ φD	6.3				10				16			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
8,200									22×25 2.51			
10,000									22×25 2.77			
12,000					22×25 2.39				22×30 2.86	25.4×25 2.95		
15,000	22×25 2.44				22×30 2.76	25.4×25 2.77			22×35 3.29	25.4×30 3.46	30×25 3.66	
18,000	22×30 2.67	25.4×25 2.70			22×35 3.12	25.4×25 3.04			22×40 3.72	25.4×35 3.98	30×25 4.00	
22,000	22×30 3.06	25.4×25 3.07			22×40 3.55	25.4×30 3.48	30×25 3.53		22×50 4.37	25.4×40 4.26	30×30 4.21	35×25 4.15
27,000	22×35 3.49	25.4×30 3.52	30×25 3.57		22×45 4.04	25.4×35 3.98	30×30 3.73	35×25 3.73		25.4×45 4.72	30×35 4.82	35×30 4.65
33,000	22×40 3.97	25.4×35 4.02	30×25 3.95		22×50 4.58	25.4×40 4.54	30×30 4.13	35×25 4.13		25.4×50 5.33	30×40 5.36	35×30 5.15
39,000	22×50 4.55	25.4×40 4.50	30×30 4.45	35×25 4.51		25.4×45 5.08	30×35 5.05	35×30 4.80			30×45 6.01	35×35 5.95
47,000		25.4×45 5.09	30×35 5.06	35×30 5.01		25.4×50 5.73	30×40 5.72	35×30 5.27			30×50 6.79	35×40 6.76
56,000		25.4×50 5.71	30×40 5.70	35×30 5.77			30×45 6.44	35×35 6.38				35×45 7.62
68,000			30×45 6.48	35×35 6.42			30×50 7.27	35×40 7.27				35×50 8.63
82,000			30×50 7.32	35×40 7.29				35×50 8.49				
100,000				35×45 8.31	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz							

Vdc / μF \ φD	25				35				50			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
2,200									22×25 1.91			
3,300									22×30 2.37	25.4×25 2.38		
3,900					22×25 2.22				22×35 2.65	25.4×30 2.68	30×25 2.55	
4,700					22×30 2.41	25.4×25 2.42			22×40 2.99	25.4×35 3.03	30×25 2.81	
5,600	22×25 2.21				22×35 2.75	25.4×25 2.64			22×45 3.36	25.4×35 3.31	30×30 3.37	35×25 3.42
6,800	22×30 2.40	25.4×25 2.56			22×40 2.80	25.4×30 2.74	30×25 2.97		22×50 3.81	25.4×40 3.81	30×35 3.85	35×30 3.85
8,200	22×35 2.72	25.4×25 2.80			22×45 3.47	25.4×35 3.10	30×30 3.13	35×25 2.73		25.4×50 4.37	30×40 4.36	35×30 4.41
10,000	22×40 3.09	25.4×30 3.12	30×25 3.21		22×50 3.57	25.4×40 3.53	30×30 3.46	35×25 3.02			30×45 4.97	35×35 4.92
12,000	22×45 3.48	25.4×35 3.43	30×30 3.86	35×25 3.54		25.4×45 3.98	30×35 4.01	35×30 4.42			30×50 5.60	35×40 5.58
15,000	22×50 4.00	25.4×40 3.95	30×30 4.00	35×25 3.95		25.4×50 4.54	30×40 4.52	35×35 5.01				35×45 6.44
18,000		25.4×45 4.45	30×35 4.46	35×30 4.63			30×45 4.71	35×40 5.54				35×50 6.71
22,000		25.4×50 5.02	30×45 5.21	35×35 5.16			30×50 5.33	35×45 6.04				
27,000			30×50 5.94	35×40 5.92				35×50 6.89				
33,000				35×45 6.75	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz							
39,000				35×50 7.56								

◆CASE CODE [mm]

Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL
22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
22E	22×45	25E	25.4×45	30E	30×45	35E	35×45
22F	22×50	25F	25.4×50	30F	30×50	35F	35×50

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
6.3 to 50Vdc	0.95	1.00	1.03	1.05	1.08	1.08
63 to 100Vdc	0.92	1.00	1.07	1.13	1.19	1.20
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Standard snap-ins, 85℃

SMH Series

◆STANDARD RATINGS

Vdc / μF \ φD	63				80				100			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
820									22×25 1.86			
1,200					22×25 1.69				22×30 2.09	25.4×25 2.10		
1,500					22×25 1.88				22×35 2.41	25.4×30 2.43	30×25 2.46	
1,800	22×25 1.82				22×30 2.14	25.4×25 2.26			22×40 2.71	25.4×35 2.75	30×25 2.72	
2,200	22×30 2.31	25.4×25 2.30			22×35 2.44	25.4×30 2.46	30×25 2.49		22×45 3.08	25.4×40 3.13	30×30 3.09	35×25 3.14
2,700	22×35 2.40	25.4×25 2.40			22×40 2.78	25.4×35 2.81	30×25 2.75		22×50 3.53	25.4×45 3.57	30×35 3.55	35×30 3.71
3,300	22×35 2.62	25.4×30 2.64	30×25 2.78		22×45 3.16	25.4×40 3.21	30×30 3.17	35×25 3.21		25.4×50 4.06	30×40 4.05	35×30 4.05
3,900	22×40 2.93	25.4×35 2.97	30×30 3.00	35×25 3.00	22×50 3.52	25.4×45 3.59	30×35 3.57	35×25 3.50			30×45 4.54	35×35 4.49
4,700	22×50 3.39	25.4×40 3.36	30×30 3.32	35×25 3.36		25.4×50 4.05	30×40 4.05	35×30 4.09			30×50 5.13	35×40 5.11
5,600		25.4×45 3.77	30×35 3.75	35×30 3.76			30×45 4.55	35×35 4.51				35×45 5.75
6,800		25.4×50 4.27	30×40 4.27	35×30 4.15			30×50 5.16	35×40 5.14				35×50 6.50
8,200			30×45 4.83	35×35 4.79				35×45 5.83				
10,000			30×50 5.49	35×40 5.47				35×50 6.63				
12,000				35×45 6.19	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz							

Vdc / μF \ φD	160				180				200			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
270					22×25 1.27				22×25 1.27			
330	22×25 1.40				22×25 1.40				22×30 1.45	25.4×25 1.45		
390	22×25 1.52				22×30 1.58	25.4×25 1.58			22×30 1.58	25.4×25 1.58		
470	22×30 1.73	25.4×25 1.74			22×35 1.79	25.4×25 1.79			22×35 1.78	25.4×30 1.80	30×25 1.80	
560	22×35 1.95	25.4×25 1.95			22×40 2.00	25.4×30 1.96	30×25 1.99		22×40 2.00	25.4×35 2.03	30×25 2.00	
680	22×40 2.21	25.4×30 2.16	30×25 2.19		22×45 2.27	25.4×35 2.23	30×25 2.25		22×50 2.33	25.4×40 2.30	30×30 2.28	35×25 2.31
820	22×45 2.49	25.4×35 2.45	30×30 2.50	35×25 2.50	22×50 2.55	25.4×40 2.53	30×30 2.70	35×25 2.53		25.4×45 2.60	30×35 2.59	35×25 2.60
1,000	22×50 2.82	25.4×40 2.79	30×30 2.80	35×25 2.80		25.4×45 2.87	30×35 2.86	35×30 2.99		25.4×50 2.95	30×40 2.95	35×30 2.95
1,200		25.4×45 3.15	30×35 3.13	35×30 3.27		25.4×50 3.30	30×40 3.23	35×35 3.31			30×45 3.31	35×35 3.31
1,500		25.4×50 3.72	30×45 3.73	35×35 3.69			30×50 3.83	35×40 3.82			30×50 3.82	35×40 3.82
1,800			30×50 4.20	35×40 4.18				35×45 4.32				35×45 4.32
2,200				35×45 4.78				35×50 4.92				35×50 4.92
2,700				35×50 5.45	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz							

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Standard snap-ins, 85℃

SMH Series

◆STANDARD RATINGS

Vdc / μF \ φD	250				315				350			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
82												
100									22×25 0.86			
120					22×25 0.94				22×30 0.99	25.4×25 0.99		
150					22×30 1.11	25.4×25 1.10			22×35 1.14	25.4×25 1.10		
180	22×25 1.04				22×35 1.20	25.4×25 1.20			22×40 1.28	25.4×30 1.24	30×25 1.27	
220	22×25 1.15				22×40 1.41	25.4×30 1.38	30×25 1.40		22×45 1.44	25.4×35 1.44	30×30 1.44	35×25 1.44
270	22×30 1.31	25.4×25 1.32			22×45 1.60	25.4×35 1.59	30×30 1.59	35×25 1.59	22×50 1.64	25.4×40 1.63	30×35 1.66	35×25 1.63
330	22×35 1.49	25.4×30 1.51	30×25 1.52		22×50 1.82	25.4×40 1.80	30×30 1.80	35×25 1.80		25.4×50 1.88	30×35 1.83	35×30 1.87
390	22×40 1.67	25.4×30 1.66	30×25 1.66			25.4×45 2.01	30×35 1.99	35×30 2.00			30×40 2.06	35×30 2.03
470	22×45 1.88	25.4×35 1.86	30×30 1.89	35×25 1.88		25.4×45 2.20	30×40 2.27	35×30 2.23			30×50 2.40	35×35 2.33
560	22×50 2.10	25.4×40 2.09	30×35 2.14	35×25 2.06			30×45 2.56	35×35 2.49				35×40 2.60
680		25.4×50 2.44	30×40 2.43	35×30 2.46			30×50 2.88	35×40 2.87				35×45 2.96
820			30×45 2.75	35×35 2.77				35×45 3.25				35×50 3.04
1,000			30×50 3.31	35×40 3.32				35×50 3.69				
1,200				35×45 3.53	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz							
1,500				35×50 4.04								

Vdc / μF \ φD	400				450			
	22	25.4	30	35	22	25.4	30	35
56					22×25 0.65			
68					22×25 0.71			
82	22×25 0.78				22×30 0.82	25.4×25 0.82		
100	22×30 0.90	25.4×25 0.90			22×35 0.93	25.4×25 0.90		
120	22×35 1.02	25.4×25 0.98			22×40 1.04	25.4×30 1.02	30×25 1.03	
150	22×40 1.16	25.4×30 1.14	30×25 1.16		22×45 1.19	25.4×35 1.19	30×30 1.19	35×25 1.19
180	22×45 1.31	25.4×35 1.30	30×30 1.44	35×25 1.32	22×50 1.34	25.4×40 1.33	30×35 1.35	35×25 1.33
220	22×45 1.49	25.4×40 1.47	30×30 1.47	35×25 1.47		25.4×50 1.54	30×40 1.55	35×30 1.53
270	22×50 1.64	25.4×45 1.67	30×35 1.66	35×30 1.69			30×45 1.78	35×35 1.73
330		25.4×50 1.88	30×40 1.90	35×30 1.87			30×50 2.01	35×40 2.00
390			30×45 2.13	35×35 2.08				35×45 2.24
470			30×50 2.40	35×40 2.39				35×50 2.53
560				35×45 2.69	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz			
680				35×50 3.04				

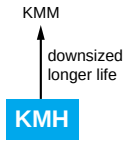
NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Standard snap-ins, 105℃

KMH Series

●Endurance with ripple current : 105℃ 2000 hours
●Non solvent-proof type

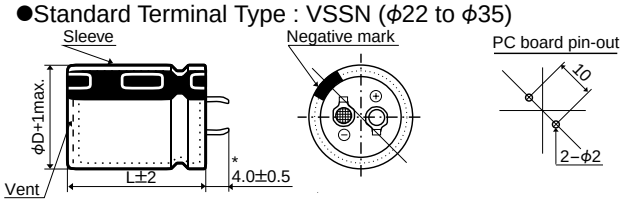


◆SPECIFICATIONS

Items	Characteristics											
Category Temperature Range	−40 to +105℃ (6.3 to 100Vdc) −25 to +105℃ (160 to 450Vdc)											
Rated Voltage Range	6.3 to 450Vdc											
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)											
Leakage Current	I=0.02CV (0.03CV for L=20mm) or 3mA, whichever is smaller Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)											
Dissipation Factor (tanδ)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	80V	100V	160 to 250V	315 to 400V	450V
	tanδ (Max.)	0.60	0.50	0.40	0.30	0.25	0.20	0.15	0.15	0.15	0.10*	0.15	0.15
	* : 0.15 for D=35mm or L=20mm (at 20℃, 120Hz)												
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	6.3V	10V	16V	25V	35V	50V	63V	80V	100V	160 to 250V	315 to 400V	450V
	Z(−25℃)/Z(+20℃)	4	4	4	3	3	2	2	2	2	4	4	8
	Z(−40℃)/Z(+20℃)	15	15	15	10	8	6	6	5	5	—	—	— (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 105℃.												
	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℃ after exposing them for 1000 hours at 105℃ 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											

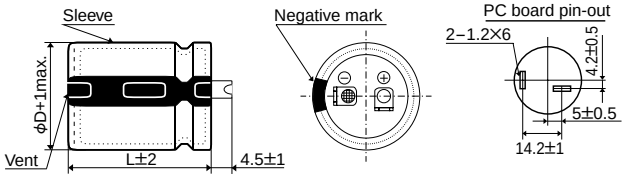
◆DIMENSIONS [mm]

●Standard Terminal Type : VSSN (ϕ22 to ϕ35)

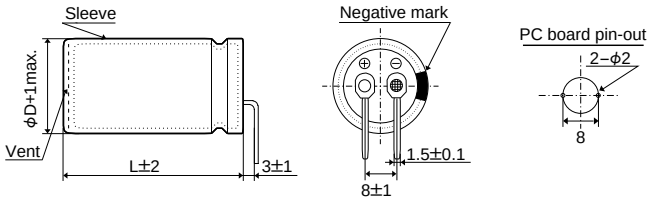


*ϕD=35mm : 3.5±0.5mm

●Terminal Type : LISN(ϕ35)



●Terminal Type : LCSN (ϕ22×30 to 50ℓ)



◆PART NUMBERING SYSTEM

KMH 100 VSSN 1000 M 25B

- 25B : Case code
- M : Cap tolerance (±20%)
- 1000 : Nominal cap in μF
- VSSN : Terminal type
- 100 : Rated voltage in volts
- KMH : Series name

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Standard snap-ins, 105℃

KMH Series

◆STANDARD RATINGS

μF \ Vdc / φD	6.3				10				16			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
6,800									22×25 1.57			
10,000					22×25 1.55				22×30 1.97	25.4×25 1.97		
12,000	22×25 1.54				22×30 1.77				22×35 2.22	25.4×30 2.24	30×25 2.45	
15,000	22×25 1.72				22×30 1.97	25.4×25 1.96			22×40 2.55	25.4×35 2.58	30×25 2.52	
18,000	22×30 1.95	25.4×25 1.96			22×35 2.21	25.4×30 2.23			22×45 2.87	25.4×40 2.92	30×30 2.88	35×25 2.92
22,000	22×35 2.23	25.4×30 2.25	30×25 2.28		22×40 2.51	25.4×35 2.54	30×25 2.40			25.4×45 3.32	30×35 3.29	35×25 3.23
27,000	22×40 2.54	25.4×35 2.57	30×25 2.52		22×50 2.93	25.4×40 2.90	30×30 2.87	35×25 2.73		25.4×50 3.78	30×40 3.77	35×30 3.45
33,000	22×45 2.88	25.4×40 2.93	30×30 2.89	35×25 2.93		25.4×45 3.30	30×35 3.28	35×30 3.16			30×45 4.30	35×35 4.26
39,000		25.4×40 3.18	30×35 3.26	35×30 3.40		25.4×50 3.68	30×40 3.69	35×30 3.43			30×50 4.81	35×40 4.79
47,000		25.4×50 3.69	30×40 3.69	35×30 3.73			30×45 4.17	35×35 3.76				35×45 5.43
56,000			30×45 4.16	35×35 4.12			30×50 4.68	35×40 4.67				
68,000			30×50 4.71	35×40 4.69				35×50 5.46				
82,000				35×45 5.32	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							

μF \ Vdc / φD	25				35				50			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
1,800									22×25 1.33			
2,700									22×30 1.69	25.4×25 1.70		
3,300					22×25 1.40				22×35 1.93	25.4×30 1.85		
3,900					22×30 1.57				22×40 2.16	25.4×35 2.18	30×25 1.95	
4,700	22×25 1.50				22×30 1.72	25.4×25 1.80			22×45 2.43	25.4×35 2.39	30×30 2.25	35×25 2.48
5,600	22×25 1.63				22×35 1.95	25.4×30 1.96	30×25 1.99		22×50 2.75	25.4×40 2.70	30×35 2.76	35×25 2.70
6,800	22×30 1.86	25.4×25 1.87			22×40 2.20	25.4×35 2.23	30×25 2.19			25.4×50 3.30	30×40 3.30	35×30 3.25
8,200	22×35 2.11	25.4×30 2.12	30×25 2.15		22×50 2.55	25.4×40 2.53	30×30 2.75	35×25 2.75			30×45 3.60	35×35 3.55
10,000	22×40 2.39	25.4×35 2.42	30×25 2.37			25.4×45 2.87	30×35 2.90	35×30 2.91			30×50 4.04	35×40 4.03
12,000	22×45 2.69	25.4×40 2.74	30×30 2.70	35×25 2.74		25.4×50 3.24	30×40 3.23	35×30 2.99				35×45 4.55
15,000		25.4×45 3.15	30×35 3.13	35×30 3.27			30×45 3.72	35×35 3.67				
18,000		25.4×50 3.54	30×40 3.54	35×30 3.58				35×40 4.37				
22,000			30×45 4.04	35×35 3.64				35×50 4.92				
27,000				35×45 4.73	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							
33,000				35×50 5.39								

◆CASE CODE [mm]

Case code	Case size φD×L	Case code	Case size φD×L	Case code	Case size φD×L	Case code	Case size φD×L
22S	22×20	25S	25.4×20	30S	30×20	35S	35×20
22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
22E	22×45	25E	25.4×45	30E	30×45	35E	35×45
22F	22×50	25F	25.4×50	30F	30×50	35F	35×50

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
6.3 to 50Vdc	0.95	1.00	1.03	1.05	1.08	1.08
63 to 100Vdc	0.92	1.00	1.07	1.13	1.19	1.20
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Standard snap-ins, 105℃

KMH Series

◆STANDARD RATINGS

Vdc / μF \ φD	63				80				100			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
560									22×25 1.05			
820					22×25 1.11				22×30 1.32	25.4×25 1.33		
1,000					22×25 1.22				22×35 1.50	25.4×30 1.51		
1,200	22×25 1.19				22×30 1.38	25.4×25 1.39			22×40 1.69	25.4×35 1.71	30×25 1.68	
1,500	22×25 1.33				22×35 1.59	25.4×30 1.61			22×45 1.94	25.4×40 1.98	30×30 1.95	35×25 1.98
1,800	22×30 1.51	25.4×25 1.52			22×40 1.80	25.4×30 1.76	30×25 1.65			25.4×45 2.23	30×35 2.50	35×25 2.17
2,200	22×35 1.73	25.4×30 1.74			22×45 2.04	25.4×35 2.01	30×30 2.05	35×25 2.07		25.4×50 2.53	30×40 2.70	35×30 2.50
2,700	22×40 1.97	25.4×35 1.99	30×25 1.76			25.4×45 2.36	30×35 2.35	35×25 2.29			30×45 2.88	35×35 2.86
3,300	22×50 2.29	25.4×40 2.27	30×30 2.24	35×25 2.06		25.4×50 2.68	30×40 2.68	35×30 2.45			30×50 3.28	35×40 3.27
3,900		25.4×45 2.54	30×35 2.55	35×25 2.24			30×45 3.00	35×35 2.98				35×45 3.67
4,700		25.4×50 2.86	30×40 2.86	35×30 2.79			30×50 3.39	35×40 3.38				35×50 3.80
5,600			30×45 3.22	35×35 3.19				35×45 3.80				
6,800			30×50 3.65	35×40 3.64				35×50 3.90				
8,200				35×45 3.90	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							
10,000				35×50 4.40								

Vdc / μF \ φD	160				180				200			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
150									22×20 0.66			
180					22×20 0.73				22×20 0.72			
220	22×20 0.80				22×20 0.80				22×25 0.79	25.4×20 0.83		
270	22×25 1.09				22×25 0.96	25.4×20 0.92			22×25 0.87	25.4×25 1.09		
330	22×25 1.20	25.4×20 1.02			22×25 1.06	25.4×25 1.20			22×30 1.20	25.4×25 1.21	30×20 1.08	
390	22×30 1.30	25.4×25 1.28	30×20 1.17		22×30 1.30	25.4×25 1.30	30×20 1.17		22×35 1.31	25.4×25 1.31	30×25 1.37	
470	22×35 1.40	25.4×25 1.41	30×20 1.28		22×35 1.35	25.4×30 1.40	30×25 1.38	35×20 1.41	22×40 1.40	25.4×30 1.41	30×25 1.50	35×20 1.41
560	22×40 1.50	25.4×30 1.51	30×25 1.56	35×20 1.54	22×40 1.51	25.4×35 1.53	30×25 1.51	35×20 1.53	22×45 1.56	25.4×35 1.53	30×25 1.63	35×25 1.56
680	22×45 1.71	25.4×35 1.70	30×25 1.72	35×20 1.70	22×45 1.71	25.4×40 1.74	30×30 1.72	35×25 1.74	22×50 1.74	25.4×40 1.74	30×30 1.74	35×25 1.72
820	22×50 1.93	25.4×40 2.01	30×30 2.00	35×25 1.91	22×50 1.97	25.4×45 1.97	30×35 2.00	35×25 1.91		25.4×50 2.04	30×35 2.00	35×30 2.04
1,000		25.4×45 2.20	30×35 2.22	35×25 2.11		25.4×50 2.23	30×40 2.24	35×30 2.26			30×45 2.30	35×35 2.30
1,200		25.4×50 2.45	30×40 2.44	35×30 2.44			30×45 2.52	35×35 2.50			30×50 2.60	35×40 2.65
1,500			30×45 2.82	35×35 2.50			30×50 2.89	35×40 2.89				35×45 3.08
1,800			30×50 3.31	35×45 3.31				35×40 3.17				35×50 3.47
2,200				35×50 3.77				35×50 3.60	← Upper : Case size φDXL (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Standard snap-ins, 105℃

KMH Series

◆STANDARD RATINGS

Vdc / μF \ φD	250				315				350			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
56									22×20 0.40			
68					22×20 0.44				22×25 0.51			
82					22×25 0.64				22×25 0.56	25.4×20 0.51		
100					22×30 0.68	25.4×20 0.56			22×30 0.69	25.4×25 0.69	30×20 0.59	
120	22×20 0.59				22×30 0.75	25.4×25 0.76	30×20 0.65		22×35 0.75	25.4×25 0.75	30×20 0.64	
150	22×25 0.71				22×35 0.82	25.4×30 0.80	30×25 0.82		22×40 0.82	25.4×30 0.83	30×25 0.83	35×20 0.76
180	22×25 0.78	25.4×20 0.75			22×40 0.91	25.4×30 0.88	30×25 0.90	35×20 0.83	22×45 0.92	25.4×35 0.92	30×25 0.91	35×25 0.94
220	22×30 0.95	25.4×25 0.95	30×20 0.88		22×45 1.02	25.4×35 1.02	30×30 1.02	35×25 1.03	22×50 1.05	25.4×40 1.04	30×30 1.02	35×25 1.04
270	22×35 1.14	25.4×25 1.05	30×20 0.97		22×50 1.16	25.4×40 1.15	30×35 1.17	35×25 1.15		25.4×45 1.18	30×35 1.17	35×30 1.20
330	22×40 1.26	25.4×30 1.20	30×25 1.26	35×20 1.18		25.4×50 1.33	30×35 1.30	35×30 1.32			30×40 1.34	35×30 1.33
390	22×45 1.49	25.4×35 1.49	30×25 1.37	35×25 1.43			30×40 1.46	35×35 1.47			30×45 1.51	35×35 1.47
470	22×50 1.57	25.4×40 1.57	30×30 1.57	35×25 1.57			30×50 1.70	35×40 1.69				35×40 1.69
560		25.4×45 1.79	30×35 1.79	35×30 1.79				35×45 1.90				35×45 1.90
680		25.4×50 1.84	30×40 2.00	35×30 1.97				35×50 2.15				
820			30×45 2.16	35×35 1.98								
1,000				35×40 2.30	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							
1,200				35×45 2.43								

Vdc / μF \ φD	400				450			
	22	25.4	30	35	22	25.4	30	35
47	22×20 0.37							
56	22×20 0.40				22×25 0.40			
68	22×25 0.51	25.4×20 0.46			22×30 0.50	25.4×25 0.50		
82	22×30 0.58	25.4×25 0.64			22×35 0.56	25.4×25 0.55		
100	22×30 0.64	25.4×25 0.67	30×20 0.59		22×40 0.64	25.4×30 0.57	30×25 0.64	
120	22×35 0.72	25.4×30 0.72	30×25 0.76		22×45 0.72	25.4×35 0.71	30×25 0.70	
150	22×40 0.82	25.4×35 0.84	30×25 0.84	35×20 0.76	22×50 0.79	25.4×40 0.75	30×30 0.74	35×25 0.75
180	22×50 0.95	25.4×40 0.94	30×30 0.92	35×25 0.94		25.4×45 0.84	30×35 0.87	35×30 0.90
220		25.4×45 1.07	30×35 1.06	35×30 1.08		25.4×50 0.98	30×40 0.98	35×30 1.00
270		25.4×50 1.21	30×40 1.21	35×30 1.20			30×45 1.15	35×35 1.17
330			30×45 1.39	35×35 1.35			30×50 1.38	35×40 1.38
390			30×50 1.55	35×40 1.54				35×45 1.55
470				35×45 1.74				35×50 1.72

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

15mm height snap-ins, 85℃

SLM Series

- 15mm height snap-ins
- Endurance with ripple current : 85℃ 2000 hours
- Non solvent-proof type

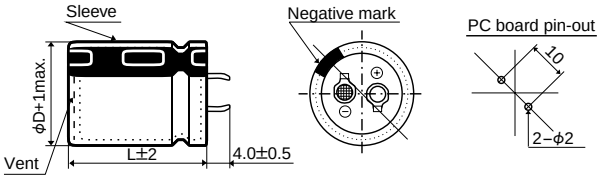
SLM
low profile
SMH

◆SPECIFICATIONS

Items	Characteristics		
Category Temperature Range	−25 to +85℃		
Rated Voltage Range	160 to 400Vdc		
Capacitance Tolerance	±20% (M)		(at 20℃, 120Hz)
Leakage Current	I≦3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)		(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	160 to 400V	
	tanδ (Max.)	0.20	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 400V	
	Z (−25℃) /Z (+20℃)	4	(at 120Hz)
Endurace	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 85℃.		
	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℃ after exposing them for 1000 hours at 85℃ 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 Type : VSSN



*No plastic disk is the standard design.

◆PART NUMBERING SYSTEM

SLM 400 VSSN 68 M

- M : Cap tolerance (±20%)
- 68 : Nominal cap in μF
- VSSN : Terminal type
- 400 : Rated voltage in volts
- SLM : Series name

◆STANDARD RATINGS

Vdc / Items / ϕD×L (mm)	160		180		200		250		400	
	Capacitance (μF)	Rated ripple (Arms/85℃ 120Hz)	Capacitance (μF)	Rated ripple (Arms/85℃ 120Hz)	Capacitance (μF)	Rated ripple (Arms/85℃ 120Hz)	Capacitance (μF)	Rated ripple (Arms/85℃ 120Hz)	Capacitance (μF)	Rated ripple (Arms/85℃ 120Hz)
22×15	180	0.99	150	0.90	150	0.90	100	0.73	47	0.50
25.4×15	270	1.29	220	1.16	220	1.16	150	0.96	68	0.65
30×15	390	1.47	330	1.35	270	1.22	220	1.10	100	0.74
35×15	560	1.74	470	1.60	390	1.46	330	1.34	120	0.81

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
400Vdc	0.77	1.00	1.16	1.30	1.41	1.43

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

15mm height snap-ins, 105℃

KLM Series

- 15mm height snap-ins
- Endurance with ripple current : 105℃ 2000 hours
- Non solvent-proof type

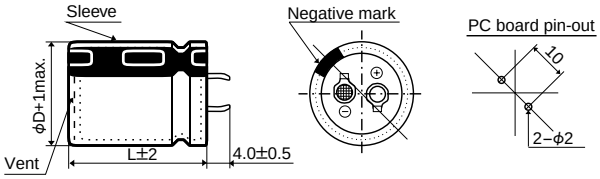
KLM
low profile
KMH

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−25 to +105℃
Rated Voltage Range	160 to 400Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I≦3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc) 160 to 400V tanδ (Max.) 0.20 (at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc) 160 to 400V Z (−25℃) /Z (+20℃) 4 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 105℃. 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℃ after exposing them for 1000 hours at 105℃ 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 Type : VSSN



*No plastic disk is the standard design.

◆PART NUMBERING SYSTEM

KLM 200 VSSN 150 M

- M : Cap tolerance (±20%)
- 150 : Nominal cap in μF
- VSSN : Terminal type
- 200 : Rated voltage in volts
- KLM : Series name

◆STANDARD RATINGS

Vdc / Items / φDXL (mm)	160 Capacitance (μF)	160 Rated ripple (Arms/105℃ 120Hz)	180 Capacitance (μF)	180 Rated ripple (Arms/105℃ 120Hz)	200 Capacitance (μF)	200 Rated ripple (Arms/105℃ 120Hz)	250 Capacitance (μF)	250 Rated ripple (Arms/105℃ 120Hz)	400 Capacitance (μF)	400 Rated ripple (Arms/105℃ 120Hz)
22X15	150	0.68	120	0.61	120	0.61	82	0.50	39	0.35
25.4X15	180	0.79	150	0.73	150	0.73	100	0.59	47	0.40
	220	0.88	180	0.79			120	0.65	56	0.44
30X15	270	0.96	220	0.86	180	0.79	150	0.71	68	0.46
	330	1.06	270	0.96	220	0.90	180	0.79	82	0.51
35X15	390	1.20	330	1.10	270	1.00	220	0.90	100	0.56
			390	1.17	330	1.07			120	0.62

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
400Vdc	0.77	1.00	1.16	1.30	1.41	1.43

CAT. No. E1001D

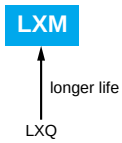
NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXM Series

- Endurance with ripple current : 105℃ 7000 hours
- Non solvent-proof type

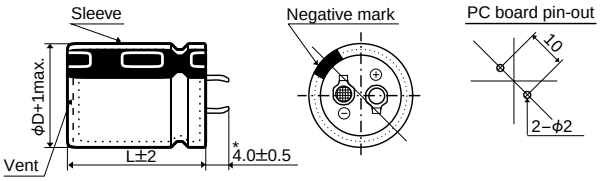


◆SPECIFICATIONS

Items	Characteristics			
Category Temperature Range	−25 to +105℃			
Rated Voltage Range	160 to 450Vdc			
Capacitance Tolerance	±20% (M)			(at 20℃, 120Hz)
Leakage Current	I≦3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)			(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	160 to 400V	420 & 450V	
	tanδ (Max.)	0.15	0.20	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 400V	420 & 450V	
	Z(−25℃)/Z(+20℃)	4	8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 7000 hours at 105℃.			
	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℃ after exposing them for 1000 hours at 105℃ 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		

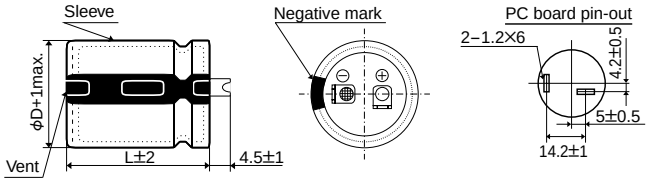
◆DIMENSIONS [mm]

●Standard Terminal Type : VSSN (ϕ22 to ϕ35)



*ϕD=35mm : 3.5±0.5mm

●Terminal Type : LISN (ϕ35)



◆PART NUMBERING SYSTEM

LXM 400 VSSN 120 M 22C

- 22C : Case code
- M : Cap tolerance (±20%)
- 120 : Nominal cap in μF
- VSSN : Terminal type
- 400 : Rated voltage in volts
- LXM : Series name

◆CASE CODE [mm]

Case code	Case size ϕDXL	Case code	Case size ϕDXL	Case code	Case size ϕDXL	Case code	Case size ϕDXL
22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
22E	22×45	25E	25.4×45	30E	30×45	35E	35×45
22F	22×50	25F	25.4×50	30F	30×50	35F	35×50

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXM Series

◆STANDARD RATINGS

μF \ Vdc / φD	160				180			
	22	25	30	35	22	25	30	35
270					22×25 1.00			
330	22×25 1.11				22×30 1.16			
390	22×30 1.26				22×30 1.26	25.4×25 1.26		
470	22×30 1.39	25.4×25 1.38			22×35 1.42	25.4×30 1.42		
560	22×35 1.55	25.4×30 1.55			22×40 1.59	25.4×30 1.55	30×25 1.58	
680	22×40 1.75	25.4×35 1.78	30×25 1.74		22×45 1.79	25.4×35 1.78	30×30 1.79	
820	22×50 1.97	25.4×40 2.01	30×30 1.96			25.4×40 2.01	30×35 2.04	
1,000		25.4×45 2.27	30×35 2.26			25.4×50 2.32	30×35 2.26	35×30 2.30
1,200		25.4×50 2.54	30×40 2.56	35×30 2.52			30×45 2.65	35×35 2.58
1,500			30×45 2.96	35×35 2.89			30×50 3.03	35×40 3.01
1,800			30×50 3.32	35×40 3.30				35×45 3.41
2,200				35×50 3.87	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			35×50 3.87

μF \ Vdc / φD	200				220			
	22	25	30	35	22	25	30	35
220	22×25 0.90				22×25 0.90			
270	22×30 1.05				22×30 1.05			
330	22×30 1.16	25.4×25 1.16			22×35 1.19	25.4×25 1.16		
390	22×35 1.29	25.4×30 1.29			22×40 1.33	25.4×30 1.29		
470	22×40 1.46	25.4×30 1.42	30×25 1.45		22×45 1.49	25.4×35 1.48	30×25 1.45	
560	22×45 1.63	25.4×35 1.62	30×30 1.62		22×50 1.63	25.4×40 1.71	30×30 1.62	
680		25.4×40 1.83	30×30 1.79			25.4×45 1.87	30×35 1.86	
820		25.4×45 2.06	30×35 2.04			25.4×50 2.10	30×40 2.12	35×30 2.08
1,000			30×45 2.42	35×30 2.30			30×50 2.48	35×40 2.46
1,200			30×50 2.71	35×40 2.70				35×45 2.78
1,500				35×45 3.11				35×50 3.20
1,800				35×50 3.50	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXM Series

◆STANDARD RATINGS

Vdc / μF \ φD	250				315			
	22	25	30	35	22	25	30	35
100					22×25 0.67			
120					22×30 0.77			
150					22×30 0.86	25.4×25 0.85		
180	22×25 0.82				22×35 0.96	25.4×30 0.96		
220	22×30 0.95				22×40 1.09	25.4×30 1.06	30×25 1.08	
270	22×35 1.08	25.4×25 1.05			22×45 1.24	25.4×35 1.23	30×30 1.23	
330	22×40 1.22	25.4×30 1.19				25.4×40 1.40	30×35 1.42	35×30 1.45
390	22×45 1.36	25.4×35 1.35	30×25 1.32			25.4×50 1.59	30×35 1.54	35×30 1.57
470	22×50 1.49	25.4×40 1.52	30×30 1.49				30×45 1.81	35×35 1.77
560		25.4×45 1.70	30×35 1.69				30×50 2.03	35×40 2.02
680		25.4×50 1.91	30×40 1.93	35×30 1.90				35×45 2.29
820			30×45 2.19	35×35 2.13				35×50 2.59
1,000				35×40 2.46				
1,200				35×50 2.86	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			

Vdc / μF \ φD	350				400			
	22	25	30	35	22	25	30	35
68					22×25 0.55			
82					22×30 0.63			
100	22×25 0.67				22×30 0.70	25.4×25 0.70		
120	22×30 0.77	25.4×25 0.76			22×35 0.79	25.4×30 0.79		
150	22×35 0.88	25.4×30 0.88			22×40 0.90	25.4×30 0.88	30×25 0.90	
180	22×40 0.99	25.4×30 0.96	30×25 0.98		22×45 0.99	25.4×35 1.01	30×30 1.01	
220	22×45 1.12	25.4×35 1.11	30×30 1.11			25.4×40 1.14	30×35 1.16	
270		25.4×40 1.26	30×35 1.28			25.4×50 1.32	30×40 1.33	35×30 1.31
330		25.4×45 1.40	30×35 1.42	35×30 1.45			30×45 1.52	35×35 1.48
390			30×40 1.60	35×35 1.61			30×50 1.69	35×40 1.68
470			30×50 1.86	35×40 1.85				35×45 1.91
560				35×40 2.02				35×50 2.14
680				35×50 2.36	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXM Series

◆STANDARD RATINGS

μF \ Vdc / φD	420				450			
	22	25	30	35	22	25	30	35
47					22×25 0.46			
56	22×25 0.50				22×30 0.52			
68	22×30 0.58				22×30 0.58	25.4×25 0.58		
82	22×30 0.63	25.4×25 0.63			22×35 0.65	25.4×30 0.65		
100	22×35 0.72	25.4×30 0.72			22×40 0.74	25.4×30 0.72	30×25 0.73	
120	22×40 0.81	25.4×30 0.79	30×25 0.80		22×45 0.83	25.4×35 0.82	30×30 0.82	
150	22×45 0.92	25.4×35 0.92	30×30 0.92			25.4×40 0.94	30×35 0.96	
180		25.4×40 1.03	30×35 1.05			25.4×45 1.06	30×35 1.05	35×30 1.07
220		25.4×50 1.19	30×35 1.16	35×30 1.18			30×40 1.20	35×35 1.21
270			30×45 1.38	35×35 1.34			30×50 1.41	35×40 1.40
330			30×50 1.56	35×40 1.55				35×45 1.60
390				35×45 1.74				35×50 1.79
470				35×50 1.96	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency(Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

CAT. No. E1001D

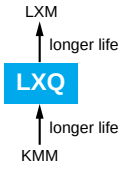
NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXQ Series

- Endurance with ripple current : 105℃ 5000 hours
- Downsized and higher ripple version of LXG series
- Non solvent-proof type

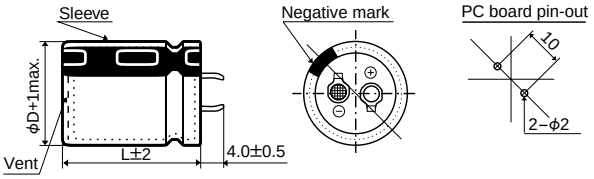


◆SPECIFICATIONS

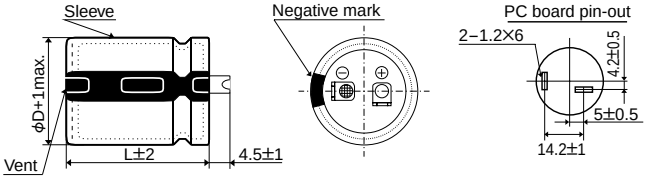
Items	Characteristics			
Category Temperature Range	−25 to +105℃			
Rated Voltage Range	160 to 450Vdc			
Capacitance Tolerance	±20% (M)			(at 20℃, 120Hz)
Leakage Current	I≦3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)			(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	160 to 400V	420 & 450V	
	tanδ (Max.)	0.15	0.20	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (Vdc)	160 to 400V	420 & 450V	
	Z(−25℃)/Z(+20℃)	4	8	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 5000 hours at 105℃.			
	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℃ after exposing them for 1000 hours at 105℃ 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]

●Standard Terminal Type : VSSN (φ22 to φ35)

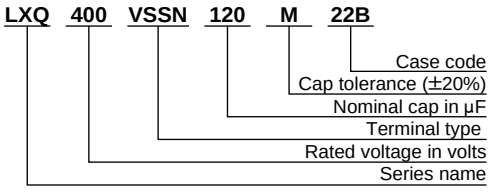


●Terminal Type : LISN(φ30, φ35)



*No plastic disk is the standard design.

◆PART NUMBERING SYSTEM



◆CASE CODE [mm]

Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL
22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
22E	22×45	25E	25.4×45	30E	30×45	35E	35×45
22F	22×50	25F	25.4×50	30F	30×50	35F	35×50

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXQ Series

◆STANDARD RATINGS

Vdc / μF \ φD	160				180				200			
	22	25	30	35	22	25	30	35	22	25	30	35
270									22×25 1.10			
330					22×25 1.21							
390	22×25 1.32								22×30 1.38	25.4×25 1.39		
470					22×30 1.52	25.4×25 1.52			22×35 1.55			
560	22×30 1.66	25.4×25 1.68			22×35 1.70		30×25 1.78		22×40 1.73	25.4×30 1.71	30×25 1.78	
680	22×35 1.87	25.4×30 1.88	30×25 1.96		22×40 1.91	25.4×30 1.88			22×45 1.81	25.4×35 1.87	30×30 1.98	35×25 2.10
820	22×40 2.09				22×45 1.99	25.4×35 2.16	30×30 2.17	35×25 2.31	22×50 2.18	25.4×40 2.09	30×35 2.22	
1,000	22×45(50) 2.36(2.41)	25.4×35 2.38	30×30 2.40	35×25 2.55	22×50 2.25	25.4×40(45) 2.43(2.47)	30×35 2.46			25.4×45(50) 2.35(2.39)	30×40 2.53	35×30 2.61
1,200		25.4×40(45) 2.66(2.71)	30×35(40) 2.69(2.77)	35×30 2.86		25.4×50 2.75	30×40 2.77	35×30 2.86			30×45(50) 2.84(2.88)	35×35 2.88
1,500		25.4×50 3.08	30×45 3.17	35×35 3.22			30×45(50) 3.17(3.22)	35×35 3.22				35×40 3.34
1,800			30×50 3.53	35×40 3.66				35×40(45) 3.66(3.74)				35×45(50) 3.74(3.82)
2,200				35×45 4.14				35×50 4.22				
2,700				35×50 4.68	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							

Vdc / μF \ φD	220				250				315			
	22	25	30	35	22	25	30	35	22	25	30	35
150									22×25 0.80			
180									22×30 0.92	25.4×25 0.94		
220					22×25 1.01				22×35 1.04		30×25 1.17	
270	22×25 1.10				22×30 1.20				22×40 1.18	25.4×30 1.19		
330	22×30 1.19					25.4×25 1.32			22×45 1.33	25.4×35 1.37	30×30 1.40	35×25 1.49
390		25.4×25 1.39			22×35 1.44	25.4×30 1.43	30×25 1.51		22×50 1.48	25.4×40 1.52		
470	22×35 1.55	25.4×30 1.56	30×25 1.63		22×40 1.62					25.4×45 1.70	30×35 1.71	35×30 1.82
560	22×40 1.73		30×30 1.79		22×45(50) 1.80(1.84)	25.4×35 1.78	30×30 1.83	35×25 1.91		25.4×50 1.88	30×40(45) 1.92(1.97)	35×35 2.00
680	22×45(50) 1.94(1.99)	25.4×35 1.96	30×35 2.02	35×25 2.10		25.4×40(45) 2.00(2.04)	30×35 2.06	35×30 2.15			30×50 2.21	35×40 2.29
820		25.4×40(45) 2.20(2.24)	30×40 2.29	35×30 2.36		25.4×50 2.28	30×40(45) 2.33(2.39)	35×35 2.38				35×45 2.57
1,000		25.4×50 2.51	30×45 2.59	35×35 2.63			30×50 2.68	35×40 2.72				35×50 2.89
1,200			30×50 2.88	35×40 2.98				35×45 3.05				
1,500				35×45 3.41				35×50 3.49				
1,800				35×50 3.82	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXQ Series

◆STANDARD RATINGS

Vdc / μF \ φD	350				400				420			
	22	25	30	35	22	25	30	35	22	25	30	35
100					22×25 0.66				22×25 0.66			
120	22×25 0.72				22×30 0.75				22×30 0.75	25.4×25 0.77		
150	22×30 0.84				22×35 0.86	25.4×25 0.86			22×35 0.86			
180		25.4×25 0.94			22×40 0.96	25.4×30 0.97	30×25 1.02		22×40(45) 0.96(0.98)	25.4×30(35) 0.97(1.01)	30×25 1.02	
220	22×35(40) 1.04(1.06)	25.4×30 1.07	30×25 1.13		22×45 1.09	25.4×35 1.12		35×25 1.22	22×50 1.11	25.4×40 1.14	30×30 1.14	35×25 1.22
270	22×45 1.20	25.4×35 1.24	30×30 1.27	35×25 1.35	22×50 1.23	25.4×40(45) 1.26(1.29)	30×30 1.27			25.4×45 1.29	30×35 1.30	35×30 1.38
330	22×50 1.36	25.4×40 1.39	30×35 1.43			25.4×50 1.44	30×35 1.43	35×30 1.52		25.4×50 1.44	30×40 1.48	35×35 1.54
390		25.4×45 1.55	30×40 1.60	35×30 1.66			30×40 1.60	35×35 1.67			30×45 1.64	35×40 1.73
470		25.4×50 1.72	30×45 1.81	35×35 1.83			30×45(50) 1.81(1.84)	35×40 1.90			30×50 1.84	35×45 1.94
560			30×50 2.00	35×40 2.07				35×45 2.12				35×50 2.17
680				35×45 2.34				35×50 2.39				
820				35×50 2.62	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							

Vdc / μF \ φD	450			
	22	25	30	35
82	22×25 0.59			
100	22×30 0.69	25.4×25 0.70		
120	22×35 0.77			
150	22×40(45) 0.88(0.90)	25.4×30(35) 0.88(0.92)	30×25 0.93	
180	22×50 1.01	25.4×40 1.03	30×30 1.03	35×25 1.10
220		25.4×45 1.16	30×35 1.17	35×30 1.24
270		25.4×50 1.31	30×40 1.33	35×35 1.39
330			30×45 1.51	
390			30×50 1.67	35×40(45) 1.73(1.77)
470				35×50 1.98

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
160 to 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450Vdc	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXG Series

●Endurance with ripple current : 105℃ 5000 hours
●Non solvent-proof type

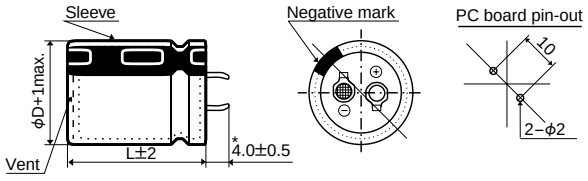
LXG
↑ longer life
KMH

◆SPECIFICATIONS

Items	Characteristics								
Category Temperature Range	−40 to +105℃								
Rated Voltage Range	10 to 100Vdc								(at 20℃, 120Hz)
Capacitance Tolerance	±20% (M)								
Leakage Current	I=0.02CV or 3mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)								(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Rated voltage (Vdc)	10V	16V	25V	35V	50V	63V	80 & 100V	
	tanδ (Max.)	0.60	0.45	0.30	0.25	0.20	0.15	0.15	(at 20℃, 120Hz)
Low Temperature Characteristics (Max. Impedance Ratio)	Capacitance change : Capacitance at the lowest operating temperature shall not be less than 70% of the 20℃ value.								
	Rated voltage (Vdc)	10V	16V	25V	35V	50V	63V	80 & 100V	
	Z(−25℃)/Z(+20℃)	4	4	3	3	2	2	2	
	Z(−40℃)/Z(+20℃)	15	15	10	8	6	6	5	(at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with rated ripple current is applied for 5000 hours at 105℃.								
	Capacitance change	≦±25% 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℃ after exposing them for 500 hours at 105℃ 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							

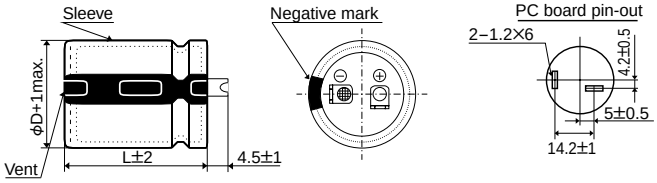
◆DIMENSIONS [mm]

●Standard Terminal Type : VSSN (ϕ22 to ϕ35)



*ϕD=35mm : 3.5±0.5mm

●Terminal Type : LISN (ϕ35)



◆PART NUMBERING SYSTEM

LXG 100 VSSN 1200 M 22F

- 22F : Case code
- M : Cap tolerance (±20%)
- 1200 : Nominal cap in μF
- VSSN : Terminal type
- 100 : Rated voltage in volts
- LXG : Series name

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
10 to 50Vdc	0.95	1.00	1.03	1.05	1.08	1.08
63 to 100Vdc	0.92	1.00	1.07	1.13	1.19	1.20

◆CASE CODE [mm]

Case code	Case size ϕDXL	Case code	Case size ϕDXL	Case code	Case size ϕDXL	Case code	Case size ϕDXL
22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
22F	22×50	25F	25.4×50	30F	30×50	35F	35×50

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXG Series

◆STANDARD RATINGS

Vdc / μF \ φD	10				16				25			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
3,900									22×25 1.31			
4,700									22×30 1.51	25.4×25 1.51		
5,600					22×25 1.44				22×35 1.70			
6,800	22×25 1.30				22×30 1.66	25.4×25 1.66			22×40 1.92	25.4×30 1.87	30×25 1.90	
8,200					22×35 1.87					25.4×35 2.14	30×30 2.15	35×25 2.19
10,000	22×30 1.65	25.4×25 1.64			22×40 2.12	25.4×30 2.07	30×25 2.11		22×50 2.45	25.4×40 2.43		
12,000	22×35 1.85	25.4×30 1.85	30×25 1.89			25.4×35 2.37	30×30 2.37	35×25 2.42		25.4×50 2.78	30×35 2.70	35×30 2.76
15,000	22×40 2.12	25.4×35 2.16			22×50 2.74	25.4×40 2.71					30×40 3.13	35×35 3.16
18,000	22×50 2.45	25.4×40 2.43	30×30 2.37	35×25 2.42		25.4×50 3.11	30×35 3.02	35×30 3.09			30×50 3.64	35×40 3.61
22,000			30×35 2.73	35×30 2.79			30×40 3.46	35×35 3.49				
27,000		25.4×50 3.11	30×40 3.13				30×50 4.07	35×40 4.04				35×50 4.70
33,000				35×35 3.49								
39,000			30×50 3.99	35×40 3.96				35×50 5.16				
47,000				35×50 4.62	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							

Vdc / μF \ φD	35				50				63			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
1,000									22×25 1.00			
1,200									22×30 1.15	25.4×25 1.15		
1,500					22×25 1.02				22×35 1.32			
1,800					22×30 1.17	25.4×25 1.17			22×40 1.49	25.4×30 1.45	30×25 1.48	
2,200	22×25 1.10				22×35 1.33					25.4×35 1.67	30×30 1.68	35×25 1.71
2,700					22×40 1.51	25.4×30 1.47	30×25 1.50		22×50 1.92	25.4×40 1.90	30×35 1.93	
3,300	22×30 1.42	25.4×25 1.41				25.4×35 1.70	30×30 1.70	35×25 1.74		25.4×50 2.20		35×30 2.18
3,900	22×35 1.58	25.4×30 1.58			22×50 1.91	25.4×40 1.89					30×40 2.41	35×35 2.43
4,700	22×40 1.78		30×25 1.77				30×35 2.11	35×30 2.16			30×50 2.80	35×40 2.78
5,600		25.4×35 1.98	30×30 1.98	35×25 2.03		25.4×50 2.38	30×40 2.39	35×35 2.41				
6,800	22×50 2.26	25.4×40 2.24					30×50 2.79	35×40 2.78				35×50 3.55
8,200		25.4×50 2.57	30×35 2.50	35×30 2.55								
10,000			30×40 2.86	35×35 2.88				35×50 3.57				
12,000			30×50 3.32	35×40 3.30	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							
18,000				35×50 4.29								

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Long life snap-ins, 105℃

LXG Series

◆STANDARD RATINGS

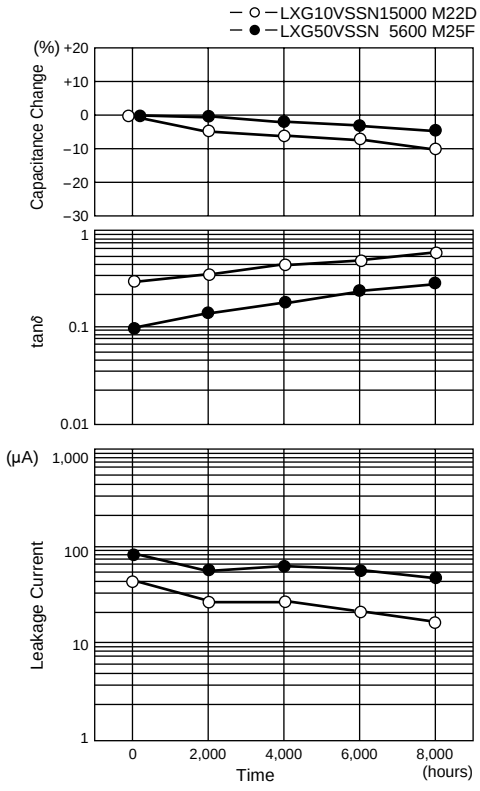
μF \ Vdc / φD	80				100			
	22	25.4	30	35	22	25.4	30	35
390					22×25 0.78			
470								
560					22×30 0.99	25.4×25 0.98		
680	22×25 0.97				22×35 1.12			
820	22×30 1.12				22×40 1.26	25.4×30 1.23	30×25 1.25	
1,000	22×35 1.27	25.4×25 1.23				25.4×35 1.41	30×30 1.42	35×25 1.45
1,200	22×40 1.42	25.4×30 1.39	30×25 1.41		22×50 1.60	25.4×40 1.59	30×35 1.61	
1,500		25.4×35 1.62				25.4×50 1.86	30×40 1.87	35×30 1.85
1,800	22×50 1.84	25.4×40 1.82	30×30 1.78	35×25 1.82				35×35 2.07
2,200		25.4×50 2.11	30×35 2.05	35×30 2.09			30×50 2.40	35×40 2.39
2,700			30×40 2.35	35×35 2.37				35×50 2.81
3,300			30×50 2.75	35×40 2.73				
4,700				35×50 3.46				

Upper : Case size φD×L (mm)
Lower : Rated ripple current (Arms) at 105℃, 120Hz

◆MAXIMUM IMPEDANCE [mΩ/20℃, 30kHz]

Case size φDXL (mm) \ Case code / Vdc		10 to 63	80	100
22×25	22A	120	150	
22×30	22B	100	120	
22×35	22C	80	95	
22×40	22D	70	80	
22×50	22F	50	60	
25.4×25	25A	90	110	
25.4×30	25B	70	85	
25.4×35	25C	60	70	
25.4×40	25D	50	60	
25.4×50	25F	40	45	
30×25	30A	70	80	
30×30	30B	50	60	
30×35	30C	40	50	
30×40	30D	35	40	
30×50	30F	25	30	
35×25	35A	65	70	
35×30	35B	45	50	
35×35	35C	38	40	
35×40	35D	30	30	
35×50	35F	23	25	

●105℃ Endurance with Rated Ripple Current

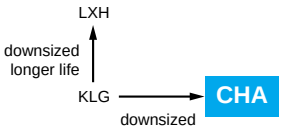


NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Overvoltage-proof design, 105℃

CHA Series

- No sparks against DC over-voltage
- Downsized from current KLG series
- Endurance with ripple current : 105℃, 2000hours
- Non solvent-proof type

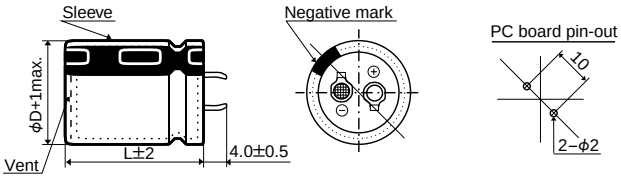


◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−25 to +105℃
Rated Voltage Range	200 & 400Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (Vdc) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	200Vdc : 0.15 max. (0.20 max. for φD=35mm) 400Vdc : 0.15 max. (at 20℃, 120Hz)
Low Temperature Characteristics (Max.Impedance Ratio)	Rated Voltage (Vdc) 200V 400V Z(-25℃) / Z(+20℃) 4 4 (at 120Hz)
ESL	50nH max. (at 20℃, 1MHz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 105℃. 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℃ after exposing them for 1000 hours at 105℃ 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]

- Standard Terminal Type : VSSN (φ22 to φ35)



*No plastic disk is the standard design.

◆PART NUMBERING SYSTEM

CHA 400 VSSN 100 M 25A

- 25A : Case code
- M : Cap tolerance (±20%)
- 100 : Nominal cap in μF
- VSSN : Terminal type
- 400 : Rated voltage in volts
- CHA : Series name

◆CASE CODE [mm]

Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL
22S	22×20						
22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
22D	22×40	25D	25.4×40	30D	30×40		
		25E	25.4×45	30E	30×45		

◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
200 & 400Vdc	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Overvoltage-proof design, 105℃

CHA Series

◆STANDARD RATINGS

μF \ Vdc / φD	200			
	22	25.4	30	35
180	22×20 ← Upper : Case size φDXL (mm) 0.82 ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			
220	22×20 0.90			
270	22×25 1.02			
330	22×30 1.20	25.4×25 1.20		
390	22×30 1.35	25.4×25 1.35		
470	22×35 1.45	25.4×30 1.45	30×25 1.47	
560	22×40 1.62	25.4×30 1.60	30×25 1.60	
680		25.4×35 1.82	30×30 1.81	35×25 1.86
820		25.4×45 2.11	30×35 2.11	35×25 2.11
1,000			30×35 2.40	35×30 2.40
1,200			30×45 2.69	35×35 2.65

μF \ Vdc / φD	400			
	22	25.4	30	35
56	22×20 ← Upper : Case size φDXL (mm) 0.45 ← Lower : Rated ripple current (Arms) at 105℃, 120Hz			
68	22×20 0.51			
82	22×25 0.58			
100	22×25 0.66	25.4×25 0.66		
120	22×30 0.76	25.4×25 0.76		
150	22×35 0.85	25.4×30 0.85	30×25 0.85	
180	22×40 0.94	25.4×35 0.95	30×25 0.95	
220		25.4×35 1.24	30×30 1.24	
270		25.4×45 1.30	30×35 1.30	35×25 1.30
330			30×40 1.47	35×30 1.47

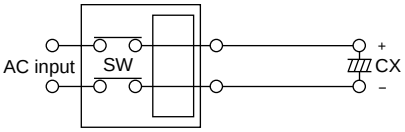
◆DC OVERVOLTAGE TEST CONDITIONS

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

●Test DC voltage

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

●Test Circuit



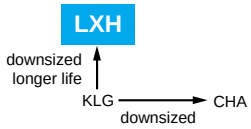
Constant DC voltage/current power supply

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Long life, Overvoltage-proof design, 105℃

LXH Series

- No sparks against DC over-voltage
- Same case sizes of KMH
- Endurance with ripple current : 105℃ 5000 hours
- Non solvent-proof type

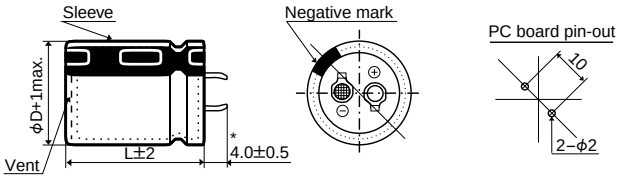


◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−25 to +105℃
Rated Voltage	200 & 400Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 3mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.15 max. (at 20℃, 120Hz)
Low Temperature Characteristics	Z(−25℃) /Z(+20℃)≦4 (at 120Hz)
ESL	50nH max. (at 20℃, 1MHz)
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.
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 3000 or 5000 hours at 105℃.
	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℃ after exposing them for 1000 hours at 105℃ 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]

- Standard Terminal Type : VSSN (ϕ22 to ϕ35)



* : ϕD=35mm : 3.5±0.5mm

◆PART NUMBERING SYSTEM

LXH 200 VSSN 470 M 25B

- 25B : Case code
- M : Cap tolerance (±20%)
- 470 : Nominal cap in μF
- VSSN : Terminal type
- 200 : Rated voltage in volts
- LXH : Series name

◆CASE CODE [mm]

Case code	Case size ϕDXL	Case code	Case size ϕDXL	Case code	Case size ϕDXL	Case code	Case size ϕDXL
22A	22×25	25A	25.4×25	30A	30×25	35A	35×25
22B	22×30	25B	25.4×30	30B	30×30	35B	35×30
22C	22×35	25C	25.4×35	30C	30×35	35C	35×35
22D	22×40	25D	25.4×40	30D	30×40	35D	35×40
22E	22×45	25E	25.4×45	30E	30×45	35E	35×45
22F	22×50	25F	25.4×50	30F	30×50	—	—

◆RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
200Vdc	0.81	1.00	1.17	1.32	1.45	1.50
400Vdc	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Long life, Overvoltage-proof design, 105℃

LXH Series

◆STANDARD RATINGS

μF \ Vdc, ϕ	200							
	22		25.4		30		35	
270	22×25 ← Upper : Case size ϕD×L (mm)							
	0.45	0.87						
330	22×30		25.4×25					
	0.62	1.20	0.62	1.21				
390	22×35		25.4×30					
	0.67	1.31	0.66	1.28				
470	22×40		25.4×30		30×25			
	0.72	1.40	0.72	1.41	0.77	1.50		
560	22×45		25.4×35		30×30			
	0.80	1.56	0.78	1.53	0.81	1.57		
680	22×50		25.4×40		30×30		35×25	
	0.89	1.74	0.89	1.74	0.89	1.74	0.88	1.72
820			25.4×50		30×35		35×30	
			1.05	2.04	1.03	2.00	1.05	2.04
1,000					30×45		35×35	
					1.18	2.30	1.18	2.30
1,200					30×50		35×40	
					1.33	2.60	1.36	2.65
1,500							35×45	
							1.57	3.08

Rated ripple current for 3000 hours at 105℃ (Arms, 120Hz)
Rated ripple current for 5000 hours at 105℃ (Arms, 120Hz)

μF \ Vdc, ϕ	400							
	22		25.4		30		35	
68	22×25		25.4×20 ← Upper : Case size ϕD×L (mm)					
	0.26	0.51	0.24	0.46				
82	22×30		25.4×25					
	0.30	0.58	0.30	0.58				
100	22×35		25.4×30					
	0.34	0.66	0.34	0.66				
120	22×40		25.4×30		30×25			
	0.37	0.72	0.37	0.72	0.39	0.76		
150	22×45		25.4×35		30×30			
	0.42	0.82	0.43	0.84	0.43	0.84		
180	22×50		25.4×40		30×30		35×25	
	0.49	0.95	0.48	0.94	0.47	0.92	0.48	0.94
220			25.4×45		30×35		35×30	
			0.55	1.07	0.54	1.06	0.55	1.08
270			25.4×50		30×40		35×30	
			0.62	1.21	0.62	1.21	0.59	1.15
330					30×45		35×35	
					0.71	1.39	0.69	1.35
390					30×50		35×40	
					0.80	1.55	0.79	1.54
470							35×45	
							0.89	1.74

Rated ripple current for 3000 hours at 105℃ (Arms, 120Hz)
Rated ripple current for 5000 hours at 105℃ (Arms, 120Hz)

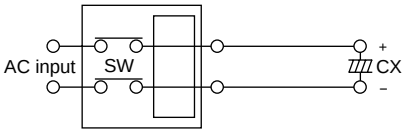
◆DC OVERVOLTAGE TEST CONDITIONS

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

●Test DC voltage

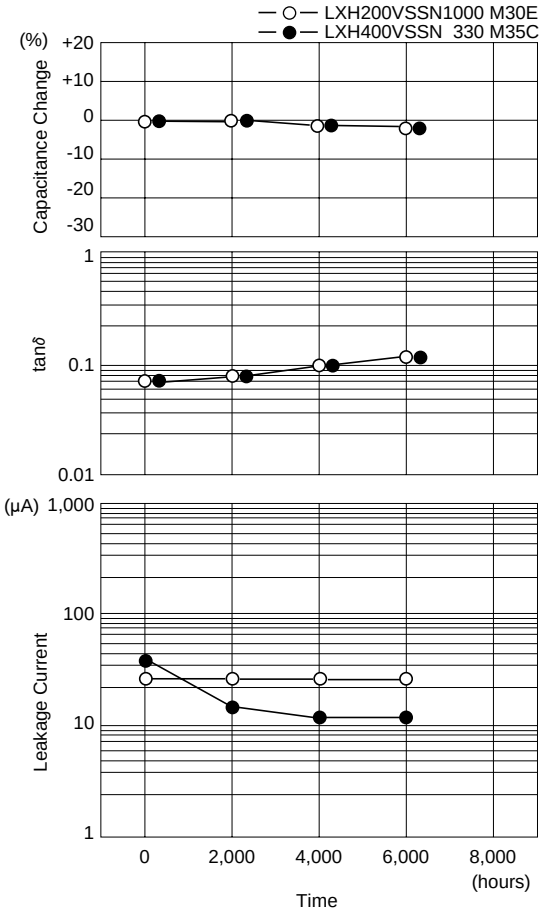
Rated Voltage	Capacitance	Current limit	Test DC voltage
200Vdc	<330μF	4A	300/375Vdc
	330≦C<470μF	5A	
	≧470μF	7A	
400Vdc	<100μF	2A	500/600Vdc
	100≦C<220μF	4A	
	≧220μF	7A	

●Test Circuit



Constant DC voltage/current power supply

●105℃ Endurance with Rated Ripple Current

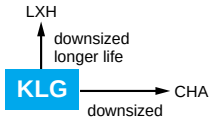


NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Overvoltage-proof design, 105℃

KLG Series

- No sparks against DC over-voltage
- Same case sizes of KMG
- Endurance with ripple current : 105℃ 2000 hours
- Non solvent-proof type

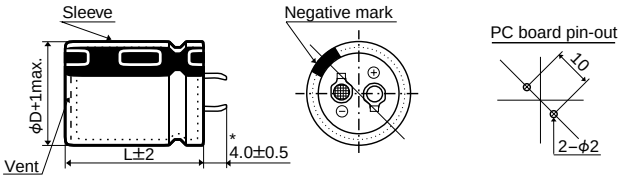


◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−25 to +105℃
Rated Voltage Range	200 & 400Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 3mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	200Vdc : 0.10 max. (0.15 max. for φD=35mm) 400Vdc : 0.15 max. (at 20℃, 120Hz)
Low Temperature Characteristics	Max. Impedance Ratio : Z(−25℃)/Z(+20℃)≦4 (at 120Hz)
ESL	50nH max. (at 20℃, 1MHz)
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.
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 105℃. 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℃ after exposing them for 1000 hours at 105℃ 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 [mm]

●Standard Terminal Type : VSSN (φ22 to φ35)



* : φD=35mm : 3.5±0.5mm

◆PART NUMBERING SYSTEM

KLG 400 VSSN 330 M 35D

- 35D : Case code
- M : Cap tolerance (±20%)
- 330 : Nominal cap in μF
- VSSN : Terminal type
- 400 : Rated voltage in volts
- KLG : Series name

◆CASE CODE [mm]

Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL	Case code	Case size φDXL
22S	22X20	25S	25.4X20	—	—	—	—
22A	22X25	25A	25.4X25	30A	30X25	35A	35X25
22B	22X30	25B	25.4X30	30B	30X30	35B	35X30
22C	22X35	25C	25.4X35	30C	30X35	35C	35X35
22D	22X40	25D	25.4X40	30D	30X40	35D	35X40
22E	22X45	25E	25.4X45	30E	30X45	35E	35X45
22F	22X50	25F	25.4X50	30F	30X50	35F	35X50

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
200Vdc	0.81	1.00	1.17	1.32	1.45	1.50
400Vdc	0.77	1.00	1.16	1.30	1.41	1.43

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Overvoltage-proof design, 105℃

KLG Series

◆STANDARD RATINGS

μF \ Vdc / φD	200			
	22	25.4	30	35
100	22×20 0.50	← Upper : Case size φDXL (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz		
120	22×20 0.56			
150	22×20 0.66	25.4×20 0.65		
180	22×25 0.80	25.4×20 0.70		
220	22×25 0.92	25.4×20 0.77		
270	22×30 1.00	25.4×25 1.00	30×20 1.00	
330	22×35 1.13	25.4×30 1.13		
390	22×40 1.25	25.4×30 1.18	30×25 1.20	
470	22×45 1.32	25.4×35 1.32	30×30 1.32	
560	22×50 1.52	25.4×40 1.50	30×30 1.52	35×25 1.43
680		25.4×50 1.70	30×35 1.73	35×30 1.73
820			30×40 1.93	35×35 1.93
1,000			30×50 2.20	35×40 2.20
1,200				35×45 2.41
1,500				35×50 2.82

μF \ Vdc / φD	400			
	22	25.4	30	35
33	22×20 0.29	← Upper : Case size φDXL (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz		
39	22×20 0.30			
47	22×25 0.36	25.4×20 0.35		
56	22×25 0.39	25.4×20 0.44		
68	22×30 0.51	25.4×25 0.49		
82	22×35 0.56	25.4×30 0.53		
100	22×40 0.61	25.4×30 0.64	30×25 0.62	
120	22×45 0.67	25.4×35 0.69	30×30 0.68	
150	22×50 0.77	25.4×40 0.78	30×30 0.76	35×25 0.74
180		25.4×45 0.83	30×35 0.82	35×30 0.90
220		25.4×50 0.93	30×40 0.91	35×35 0.99
270			30×45 1.10	35×35 1.12
330			30×50 1.24	35×40 1.25
390				35×45 1.37
470				35×50 1.50

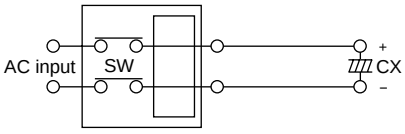
◆DC OVERVOLTAGE TEST CONDITIONS

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

●Test DC voltage

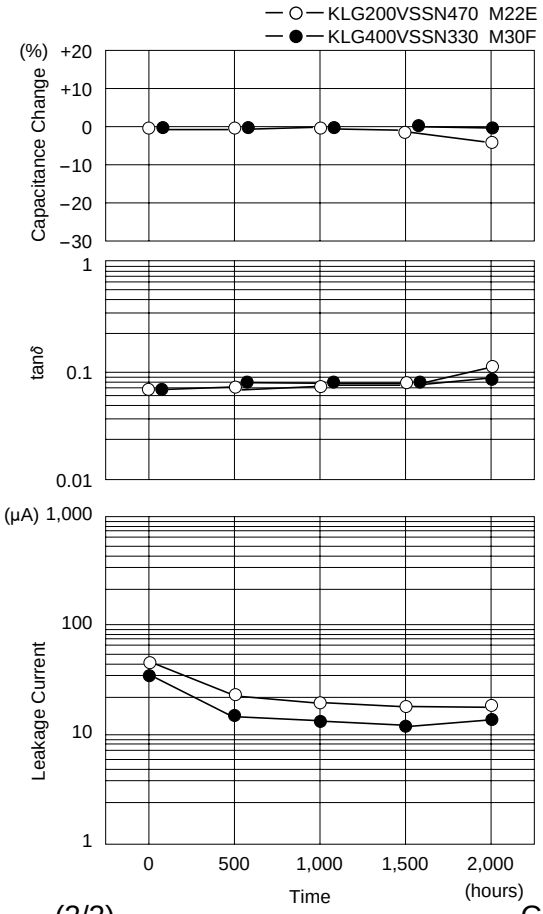
Rated Voltage	Capacitance	Current limit	Test DC voltage
200Vdc	<330μF	4A	300/375Vdc
	330≦C<470μF	5A	
	≧470μF	7A	
400Vdc	<100μF	2A	500/600Vdc
	100≦C<220μF	4A	
	≧220μF	7A	

●Test Circuit



Constant DC voltage/current power supply

●105℃ Endurance with Rated Ripple Current



CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

No-smoke snap-ins, 105℃

KSL Series

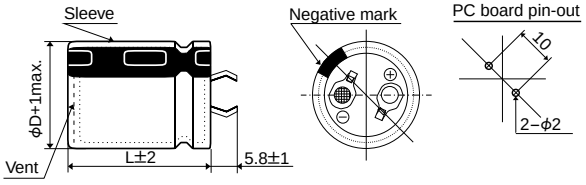
- Mechanically open-mode capacitor (no fire, smoke and electrolyte outside)
- Endurance with ripple current : 105℃ 2000 hours
- Non Solvent-proof

◆SPECIFICATIONS

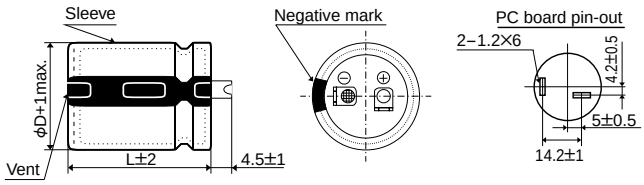
Items	Characteristics	
Category Temperature Range	−25 to +105℃	
Rated Voltage	200 & 400Vdc	
Capacitance Tolerance	±20% (M)	(at 20℃, 120Hz)
Leakage Current	I≦3√CV Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)	(at 20℃ after 5 minute)
Dissipation Factor (tanδ)	0.15max. (200Vdc), 0.10max. (400Vdc)	(at 20℃, 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after DC voltage with rated ripple current is applied for 2000 hours at 105℃.	
	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℃ after exposing them for 1000 hours at 105℃ 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 Type : VKSN (φ30 & φ35)



●Terminal Type : LTSN (φ30 & φ35)



◆PART NUMBERING SYSTEM

KSL 400 VKSN 470 M 35

- 35 : Diameter
- M : Cap tolerance (±20%)
- 470 : Nominal cap in μF
- VKSN : Terminal type
- 400 : Rated voltage in volts
- KSL : Series name

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	50	120	300	1k	10k	50k
200Vdc	0.81	1.00	1.17	1.32	1.45	1.50
400Vdc	0.77	1.00	1.16	1.30	1.41	1.43

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

No-smoke snap-ins, 105℃

KSL Series

◆STANDARD RATINGS

μF \ Vdc / φD	200				400			
	30		35		30		35	
180					30×34	0.92		
220					30×39	1.06		
270					30×44	1.21	35×34	1.18
330					30×49	1.39	35×39	1.30
390					30×54	1.55	35×44	1.54
470							35×49	1.74
560	30×34	1.57					35×54	1.95
680	30×39	1.80						
820	30×44	2.00	35×34	2.04				
1,000	30×49	2.30	35×39	2.30				
1,200	30×54	2.60	35×44	2.65				
1,500			35×49	3.08				

Rated ripple current (Arms) at 105℃, 120Hz
case size φD×L (mm)

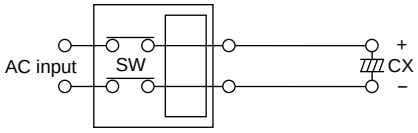
◆DC OVERVOLTAGE TEST CONDITIONS

The safety function will be operated and the capacitor shall become an open circuit without fire, smoke and electrolyte outside when the following excess DC voltage is applied.

●DC voltage test

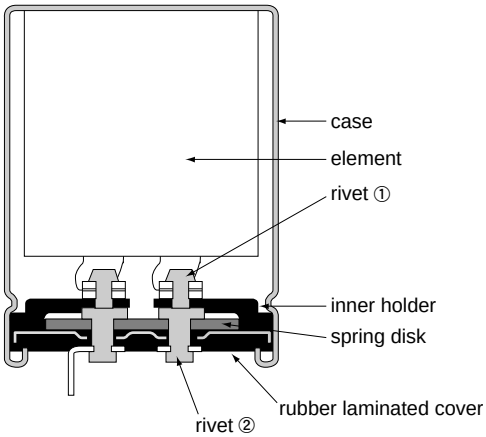
Rated Voltage	Capacitance	Current limit	Test DC voltage
200Vdc	＜330μF	4A	300/375Vdc
	330≦C＜470μF	5A	
	≧470μF	7A	
400Vdc	＜100μF	2A	500/600Vdc
	100≦C＜220μF	4A	
	≧220μF	7A	

●Test circuit

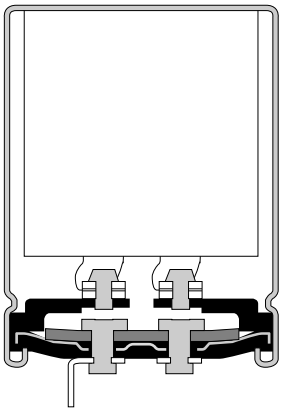


Constant DC voltage/current power supply

◆INSIDE STRUCTURE



Before function



After function

Note : Conformal coating between the cover of the capacitors and the PC board should be avoided.

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS For inverter air-conditionings, 85℃

RWE-LR Series

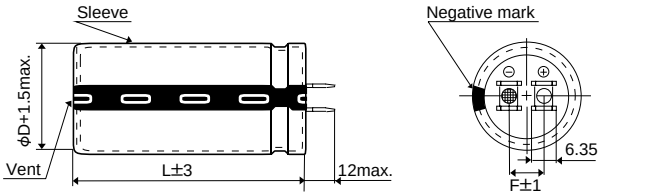
- For high ripple current application such as air conditioning system
- Endurance with ripple current : 85℃ 3000 hours
- Custom-made parts are also available upon requests

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−25 to +85℃
Rated Voltage Range	250Vdc 330 to 450Vdc
Capacitance Tolerance	±10%, (K) (250Vdc) ±20% (M) (330 to 450Vdc) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 3mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.02 max. (250Vdc) 0.25 max. (330 to 450Vdc) (at 20℃, 120Hz)
Low Temperature Characteristics	Z(−25℃)/Z(+20℃)≦4 (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 shall not be less than 100MΩ.
Insulation Withstanding Voltage	When a voltage of 1500Vac 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℃ after subjected to DC voltage with the rated ripple current is applied for 3000 hours at 85℃.
	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℃ after exposing them for 1000 hours at 85℃ 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 Type : LRSN (ϕ35 to ϕ63.5)



ϕD	35 to 50	63.5
F	14	28

◆PART NUMBERING SYSTEM

RWE 250 LRSN 440 K A8

- A8 : Case code
- K : Cap tolerance (K=±10%, M=±20%)
- 440 : Nominal cap in μF
- LRSN : Terminal type
- 250 : Rated voltage in volts
- RWE : Series name

◆STANDARD RATINGS

Vdc / Items / μF	250		
	Case size	Case code	Rated ripple (Arms/85℃, 60Hz)
330	35×70	A7	4.5
360	35×70	A7	4.7
390	35×70	A7	4.9
440	35×80	A8	5.4
470	35×80	A8	5.6
500	35×90	A9	6.0

Vdc / Items / μF	330			350			400		
	Case size	Case code	Rated ripple (Arms/85℃, 120Hz)	Case size	Case code	Rated ripple (Arms/85℃, 120Hz)	Case size	Case code	Rated ripple (Arms/85℃, 120Hz)
1,000	35×80	A8	3.9	35×80	A8	3.9	35×100	A10	4.2
1,300	35×100	A10	4.8	35×100	A10	4.8	40×100	B10	5.2
1,500	35×100	A10	5.2	35×110	A11	5.4	40×110	B11	5.8
	40×90	B9	5.3	40×100	B10	5.5	50×90	C9	6.0
1,800	40×100	B10	6.1	40×110	B11	6.3	50×100	C10	6.9
				50×80	C8	6.2			
2,200	40×110	B11	7.0	50×90	C9	7.3	50×110	C11	7.9

Vdc / Items / μF	420			450		
	Case size	Case code	Rated ripple (Arms/85℃, 120Hz)	Case size	Case code	Rated ripple (Arms/85℃, 120Hz)
1,000	35×110	A11	4.4	40×100	B10	4.5
1,300	40×110	B11	5.4	50×90	C9	5.6
1,500	50×90	C9	6.0	50×100	C10	6.3
1,800	50×100	C10	6.9	50×120	C12	7.5
2,200	50×120	C12	8.3	63.5×100	D10	8.7

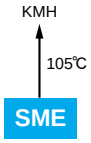
CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Standard screw terminals, 85℃

SME Series

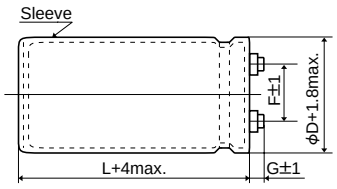
●Endurance with ripple current : 85℃ 2000 hours



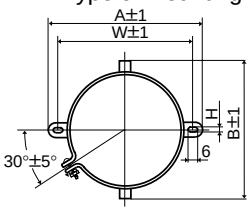
◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +85℃ (10 to 100Vdc)　−25 to +85℃ (160 to 250Vdc)
Rated Voltage Range	10 to 250Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Shall not exceed the values shown in the STANDARD RATINGS (at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change　C(−25℃)/C(+20℃)≧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 2000Vac 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℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 85℃.
	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℃ after exposing them for 500 hours at 85℃ 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 (Terminal Type=LGSN) [mm]

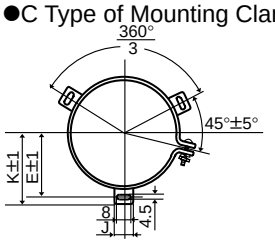


●B Type of Mounting Clamp



ϕD	A	B	W	H	F
35	58	44	48	3.5	12.7
50	78	64	68	4.5	22.4
63.5	90	76	80	4.5	28.0
76	104.5	90	93.5	4.5	31.5

●C Type of Mounting Clamp



ϕD	E	K	J	F
50	32.5	37.0	14.0	22.4
63.5	38.1	43.5	14.0	28.0
76	44.5	50.0	14.0	31.5
89	50.8	56.5	16.0	31.5

ϕ35 to ϕ63.5 : G=6
ϕ76 & ϕ89 : G=5

<Screw specifications>
Plus hexagon-headed screw:
M5×0.8×10
Maximum screw tightening torque:
3.23Nm

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

◆PART NUMBERING SYSTEM

SME 50 LGSN 10000 M B

- B : Type of mounting clamp, if required
- M : Capacitance tolerance (±20%)
- 10000 : Nominal capacitance in μF
- LGSN : Screw terminal type
- 50 : Rated voltage in volts
- SME : Series name

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Rated voltage (Vdc)	Case diameter (mm)	Frequency (Hz)					
		50	120	300	1k	10k	50k
10 to 50	ϕ35 to ϕ89	0.95	1.00	1.03	1.05	1.09	1.12
63 & 80	ϕ35	0.90	1.00	1.06	1.10	1.18	1.22
	ϕ50 to ϕ89	0.95	1.00	1.03	1.05	1.09	1.12
100	ϕ35	0.82	1.00	1.12	1.22	1.30	1.33
	ϕ50	0.90	1.00	1.06	1.10	1.18	1.22
	ϕ63.5 to ϕ89	0.95	1.00	1.03	1.05	1.09	1.12
160 to 250	ϕ35	0.80	1.00	1.19	1.34	1.46	1.52
	ϕ50 & ϕ63.5	0.81	1.00	1.14	1.26	1.36	1.41
	ϕ76 & ϕ89	0.82	1.00	1.12	1.22	1.30	1.33

◆CASE CODE

ϕD (mm) \ L (mm)	50	80	100	120	140
35	A5	A8	A10	A12	—
50	—	C8	C10	C12	—
63.5	—	—	D10	D12	—
76	—	—	E10	E12	E14
89	—	—	—	—	F14

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Standard screw terminals, 85℃

SME Series

◆STANDARD RATINGS

Vdc / μF \ SV	10			16			25			35			50			63			80		
	13			20			32			44			63			79			100		
3,300																			A 5	2.5	0.15
3,900																					
4,700																					
5,600																A 5	3.0	0.20			
6,800																			A 8	3.7	0.20
8,200																					
10,000													A 5	4.1	0.25	A 8	4.0	0.25	A10	4.9	0.20
12,000																			A12	5.4	0.20
15,000										A 5	3.9	0.30				A10	5.3	0.25	C 8	6.0	0.25
18,000							A 5	4.0	0.35				A 8	5.2	0.25	A12	6.2	0.25			
22,000													A10	5.9	0.30	C 8	6.5	0.30	C10	7.1	0.30
27,000				A 5	4.2	0.45							A12	6.6	0.35				C12	8.6	0.30
33,000										A 8	6.0	0.40				C10	8.1	0.35	D10	9.3	0.35
39,000	A 5	4.7	0.60				A 8	6.2	0.40	A10	7.0	0.40	C 8	7.4	0.40	C12	9.6	0.35			
47,000							A10	7.4	0.40	A12	8.0	0.45				D10	10.2	0.40	D12	12.0	0.35
56,000				A 8	6.5	0.60	A12	8.3	0.45				C10	9.8	0.40						
68,000										C 8	9.0	0.50	C12	11.1	0.45	D12	13.3	0.40	E12	15.4	0.35
82,000	A 8	7.4	0.60	A10	8.0	0.70	C 8	9.7	0.50	C10	10.3	0.55	D10	12.2	0.50				E14	18.1	0.35
100,000	A10	8.0	0.70	A12	9.6	0.70	C10	10.8	0.60							E12	17.1	0.45	F14	21.0	0.40
120,000	A12	9.4	0.70	C 8	9.6	0.80	C12	12.8	0.60	C12	12.8	0.60	D12	16.0	0.50	E14	19.0	0.50			
150,000	C 8	9.8	0.90	C10	11.2	0.90				D10	14.0	0.70	E12	18.1	0.60	F14	22.0	0.55			
180,000							D10	14.7	0.75	D12	16.6	0.70	E14	19.5	0.70						
220,000	C10	12.1	1.00	C12	14.2	1.00	D12	16.8	0.80	E10	17.3	0.75									
270,000	C12	13.6	1.20	D10	15.3	1.20	E10	18.3	0.90	E12	19.8	0.80	F14	24.6	0.80						
330,000				D12	17.1	1.30	E12	20.7	1.00	E14	22.5	0.90									
390,000	D10	15.3	1.50	E10	18.0	1.60	E14	22.1	1.20												
470,000	D12	16.0	2.00	E12	19.3	1.80				F14	28.3	1.00									
560,000	E10	17.3	2.50	E14	20.7	2.00	F14	25.8	1.50												
680,000	E12	18.7	3.00																		

Case code
Rated ripple current (Arms) at 85℃, 120Hz
Max. tanδ at 20℃, 120Hz

Vdc / μF \ SV	100			160			200			250		
	125			200			250			300		
560										A 5	1.3	0.15
680												
820							A 5	1.6	0.15			
1,000												
1,200				A 5	2.0	0.15				A 8	2.3	0.15
1,500										A10	3.0	0.15
1,800							A 8	2.8	0.15	A12	3.3	0.15
2,200	A 5	2.5	0.10	A 8	3.4	0.15	A10	3.6	0.15	C 8	3.7	0.15
2,700				A10	3.7	0.15	A12	4.0	0.15			
3,300				A12	4.5	0.15	C 8	4.5	0.15	C10	5.1	0.15
3,900										C12	5.9	0.15
4,700	A 8	3.4	0.15	C 8	5.6	0.20	C10	7.1	0.15	D10	6.9	0.20
5,600							C12	8.2	0.15			
6,800	A10	4.2	0.15	C10	7.5	0.20				D12	8.7	0.20
8,200	A12	5.0	0.15	C12	8.1	0.20	D10	10.0	0.20			
10,000	C 8	5.2	0.20	D10	9.8	0.20	D12	11.0	0.20	E12	11.1	0.20
12,000				D12	10.8	0.20	E10	11.5	0.20	E14	13.0	0.20
15,000				E10	12.7	0.20	E12	12.8	0.20	F14	14.9	0.20
18,000	C12	8.1	0.20	E12	14.0	0.20	E14	15.0	0.20			
22,000	D10	8.6	0.25	E14	16.6	0.20	F14	15.6	0.25			
27,000	D12	10.3	0.25									
33,000	E10	11.1	0.25	F14	18.9	0.25						
39,000	E12	12.4	0.25									
47,000	E14	14.3	0.25									
68,000	F14	18.0	0.30									

Max. tanδ at 20℃, 120Hz
Rated ripple current (Arms) at 85℃, 120Hz
Case code

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Standard screw terminals, 105℃

KMH Series

- Downsized from KME series
- Endurance with ripple current : 105℃ 2000 hours

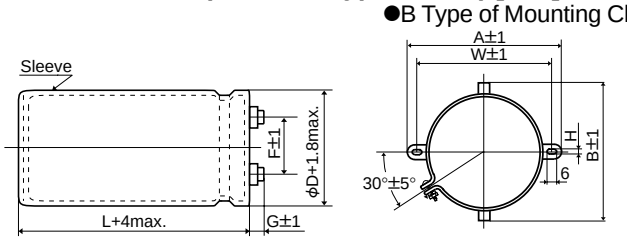
KMH
105℃
SME

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +105℃ (10 to 100Vdc) −25 to +105℃ (160 to 400Vdc)
Rated Voltage Range	10 to 400Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Shall not exceed the values shown in the STANDARD RATINGS (at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change 10 to 100Vdc : C(−40℃)/C(+20℃)≧0.6 160 to 400Vdc : C(−25℃)/C(+20℃)≧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 2000Vac 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℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 105℃. 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℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change ≦±20% of the initial value D.F. (tanδ) ≦200% of the initial specified value Leakage current ≦The initial specified value

◆DIMENSIONS (Terminal Type=LGSN) [mm]

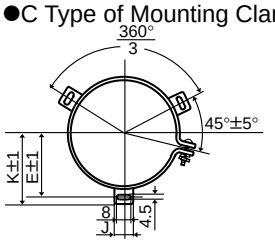
●B Type of Mounting Clamp



ϕD	A	B	W	H	F
35	58	44	48	3.5	12.7
50	78	64	68	4.5	22.4
63.5	90	76	80	4.5	28.0
76	104.5	90	93.5	4.5	31.5

ϕ35 to ϕ63.5 : G=6
ϕ76 & ϕ89 : G=5

●C Type of Mounting Clamp



ϕD	E	K	J	F
50	32.5	37.0	14.0	22.4
63.5	38.1	43.5	14.0	28.0
76	44.5	50.0	14.0	31.5
89	50.8	56.5	16.0	31.5

<Screw specifications>
Plus hexagon-headed screw:
M5×0.8×10
Maximum screw tightening torque:
3.23Nm

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

◆PART NUMBERING SYSTEM

KMH 400 LGSN 1000 M C

- C : Type of mounting clamp, if required
- M : Capacitance tolerance (±20%)
- 1000 : Nominal capacitance in μF
- LGSN : Screw terminal type
- 400 : Rated voltage in volts
- KMH : Series name

◆CASE CODE

ϕD (mm) \ L (mm)	50	60	80	100	120	130	140
35	A5	A6	A8	A10	A12	—	—
50	—	—	C8	C10	C12	—	—
63.5	—	—	—	D10	D12	—	—
76	—	—	—	E10	E12	E13	E14
89	—	—	—	—	—	—	F14

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Rated voltage (Vdc)	Case diameter (mm)	Frequency (Hz)					
		50	120	300	1k	10k	50k
10 to 50	ϕ35 to ϕ89	0.95	1.00	1.03	1.05	1.09	1.12
63 & 80	ϕ35	0.90	1.00	1.06	1.10	1.18	1.22
	ϕ50 to ϕ89	0.95	1.00	1.03	1.05	1.09	1.12
100	ϕ35	0.82	1.00	1.12	1.22	1.30	1.33
	ϕ50	0.90	1.00	1.06	1.10	1.18	1.22
	ϕ63.5 to ϕ89	0.95	1.00	1.03	1.05	1.09	1.12
160 to 250	ϕ35	0.80	1.00	1.19	1.34	1.46	1.52
	ϕ50 & ϕ63.5	0.81	1.00	1.14	1.26	1.36	1.41
	ϕ76 & ϕ89	0.82	1.00	1.12	1.22	1.30	1.33
315 to 400	ϕ35 to ϕ89	0.80	1.00	1.19	1.34	1.46	1.52

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Standard screw terminals, 105℃

KMH Series

◆STANDARD RATINGS

μF \ Vdc / SV	10			16			25			35			50			63			80		
	13			20			32			44			63			79			100		
2,200																			A 5	2.4	0.15
2,700																A 5	2.3	0.20	A 5	2.7	0.15
3,300																A 5	2.5	0.20	A 5	3.0	0.15
3,900													A 5	2.8	0.20	A 5	2.8	0.20	A 6	3.4	0.15
4,700													A 5	3.1	0.20	A 5	3.1	0.20	A 6	3.7	0.15
5,600													A 5	3.3	0.20	A 6	3.5	0.20	A 8	4.5	0.15
6,800													A 5	3.3	0.25	A 6	3.9	0.20	A 8	4.9	0.15
8,200										A 5	3.3	0.30	A 6	3.8	0.25	A 8	4.7	0.20	A10	5.1	0.20
10,000										A 5	3.6	0.30	A 8	4.6	0.25	A 8	4.7	0.25	A12	6.1	0.20
12,000							A 5	3.7	0.35	A 6	4.2	0.30	A 8	5.1	0.25	A10	5.5	0.25	C 8	6.7	0.20
15,000							A 5	4.1	0.35	A 6	4.7	0.30	A 8	5.7	0.25	A12	6.6	0.25	C10	8.3	0.20
18,000				A 5	4.2	0.40	A 6	4.8	0.35	A 8	5.7	0.30	A10	6.7	0.25	C 8	7.4	0.25	C12	9.9	0.20
22,000				A 5	4.7	0.40	A 6	5.3	0.35	A 8	6.3	0.30	A12	8.1	0.25	C10	9.0	0.25	C12	11.0	0.20
27,000	A 5	4.9	0.45	A 6	5.5	0.40	A 8	6.4	0.35	A10	7.5	0.30	C 8	9.1	0.25	C12	10.9	0.25	D10	11.4	0.25
33,000	A 5	5.1	0.50	A 6	5.7	0.45	A 8	6.7	0.40	A12	9.0	0.30	C10	11.1	0.25	C12	12.0	0.25	E10	13.9	0.25
39,000	A 6	5.9	0.50	A 8	6.8	0.45	A10	7.8	0.40	C 8	9.2	0.35	C12	13.1	0.25	D10	12.5	0.30	E10	13.9	0.30
47,000	A 8	7.1	0.50	A 8	7.1	0.50	A12	9.3	0.40	C10	11.2	0.35	C12	13.9	0.30	D12	14.9	0.30	E12	16.5	0.30
56,000	A 8	7.1	0.60	A10	8.4	0.50	C 8	9.7	0.45	C10	11.4	0.40	D10	13.9	0.35	D12	16.3	0.30	E12	18.1	0.30
68,000	A10	8.5	0.60	A10	8.8	0.55	C10	11.2	0.45	C12	13.6	0.40	D12	16.6	0.35	E12	18.4	0.35	E14	19.7	0.35
82,000	A10	8.9	0.65	C 8	10.7	0.55	C10	11.2	0.50	D10	14.8	0.45	E12	18.9	0.40	E14	20.0	0.40	F14	22.1	0.40
100,000	A12	10.7	0.65	C 8	10.8	0.65	C12	14.8	0.50	D12	17.6	0.45	E12	19.5	0.45	E14	20.0	0.50			
120,000	C 8	11.0	0.75	C10	13.1	0.65	D10	14.9	0.65	D12	17.6	0.55	E12	19.5	0.55	F14	21.8	0.60			
150,000	C10	13.2	0.80	C12	15.3	0.70	D12	17.9	0.65	E12	19.8	0.65	F14	23.9	0.60						
180,000	C12	15.7	0.80	C12	15.7	0.80	D12	17.9	0.80	E12	19.8	0.80	F14	23.9	0.75						
220,000	C12	16.8	0.85	D12	19.2	0.85	E12	21.3	0.85	E14	23.4	0.80									
270,000	D12	19.6	1.00	D12	19.6	1.00	E12	21.7	1.00	F14	25.5	1.00									
330,000	D12	19.7	1.20	E12	21.1	1.30	E14	23.4	1.20												
390,000	E12	21.3	1.50	E12	21.3	1.50	F14	24.9	1.50												
470,000	E12	21.4	1.80	E14	24.2	1.60															
560,000	E14	23.6	2.00	F14	28.1	2.00															
680,000	F14	26.0	2.40	F14	28.5	2.40															

Case code
Rated ripple current (Arms) at 105℃, 120Hz
Max. tanδ at 20℃, 120Hz

μF \ Vdc / SV	100			160			200			250			315			350			400		
	125			200			250			300			365			400			450		
180													A 5	0.8	0.10	A 5	0.8	0.10	A 5	0.8	0.10
220													A 5	0.9	0.10	A 5	0.9	0.10	A 5	0.9	0.10
270										A 5	0.8	0.15	A 5	1.0	0.10	A 5	1.0	0.10	A 5	1.0	0.10
330							A 5	0.9	0.15	A 5	0.9	0.15	A 5	1.1	0.10	A 5	1.1	0.10	A 6	1.2	0.10
390							A 5	1.0	0.15	A 5	1.0	0.15	A 5	1.2	0.10	A 6	1.3	0.10	A 6	1.3	0.10
470							A 5	1.1	0.15	A 5	1.1	0.15	A 6	1.4	0.10	A 6	1.4	0.10	A 8	1.4	0.10
560				A 5	1.2	0.15	A 5	1.2	0.15	A 5	1.2	0.15	A 6	1.5	0.10	A 8	1.6	0.10	A 8	1.4	0.15
680				A 5	1.3	0.15	A 5	1.3	0.15	A 6	1.4	0.15	A 8	1.7	0.10	A 8	1.6	0.15	A10	1.7	0.15
820				A 5	1.4	0.15	A 5	1.4	0.15	A 8	1.6	0.15	A 8	1.7	0.15	A10	1.8	0.15	A12	2.0	0.15
1,000				A 5	1.6	0.15	A 6	1.7	0.15	A 8	1.6	0.20	A10	2.0	0.15	A12	2.2	0.15	C 8	2.2	0.15
1,200				A 6	1.9	0.15	A 6	1.9	0.15	A 8	1.8	0.20	A12	2.4	0.15	C 8	2.4	0.15	C10	2.7	0.15
1,500				A 6	2.1	0.15	A 8	2.3	0.15	A10	2.1	0.20	C 8	2.7	0.15	C10	3.0	0.15	C12	3.3	0.15
1,800	A 5	2.7	0.10	A 8	2.5	0.15	A 8	2.5	0.15	A12	2.5	0.20	C10	3.3	0.15	C12	3.6	0.15			
2,200	A 5	3.0	0.10	A 8	2.8	0.15	A10	3.0	0.15	C 8	2.9	0.20	C12	4.0	0.15	C12	4.0	0.15	D10	4.2	0.15
2,700	A 6	3.5	0.10	A10	3.3	0.15	A12	3.6	0.15	C10	3.5	0.20	C12	4.4	0.15	D10	4.6	0.15			
3,300	A 8	4.2	0.10	A12	3.8	0.15	C 8	4.1	0.15	C12	4.2	0.20	D10	5.1	0.15				D12	5.5	0.15
3,900	A 8	4.2	0.12	C 8	3.8	0.20	C10	4.9	0.15	C12	4.6	0.20	D12	6.0	0.15	E12	6.7	0.15			
4,700	A10	5.0	0.12	C10	4.6	0.20	D10	5.3	0.20	D12	5.7	0.20	E10	6.8	0.15				E13	7.6	0.15
5,600	A10	5.4	0.12	C10	5.1	0.20	D10	5.8	0.20	D12	6.3	0.20	E12	8.0	0.15	E13	8.3	0.15	F14	9.4	0.15
6,800	A12	5.8	0.15	C12	6.1	0.20	D12	6.9	0.20	E12	7.7	0.20	E13	9.2	0.15	E14	9.5	0.15	F14	10.4	0.15
8,200	C 8	6.4	0.15	D10	7.0	0.20	D12	7.6	0.20	E12	8.4	0.20	F14	11.4	0.15	F14	11.4	0.15			
10,000	C10	7.8	0.15	D12	8.4	0.20	E12	9.3	0.20	E14	10.0	0.20	F14	12.6	0.15						
12,000	C12	9.3	0.15	E10	9.4	0.20	E12	10.2	0.20	F14	11.9	0.20									
15,000	C12	10.4	0.15	E12	11.4	0.20	E14	12.2	0.20												
18,000	D10	10.4	0.20	E14	13.4	0.20	F14	13.1	0.25												
22,000	D12	12.5	0.20	F14	14.5	0.25															
27,000	E12	13.7	0.25	F14	16.0	0.25															
33,000	E12	15.2	0.25																		
39,000	E14	16.1	0.30																		
47,000	F14	19.3	0.30																		
56,000	F14	21.1	0.30																		

Max. tanδ at 20℃, 120Hz
Rated ripple current (Arms) at 105℃, 120Hz
Case code

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

FTP Series

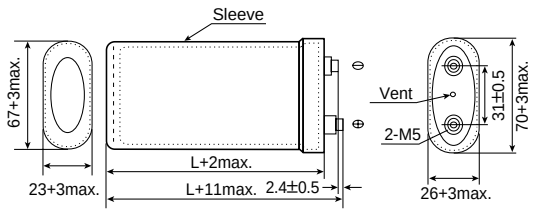
- Ideal for inverter smoothing capacitors such as Electric Vehicle, Hybrid Car, etc.
- Endurance with ripple current : 85℃ 5000 hours
- Rated voltage range : 63 to 450Vdc
- Lower profile offers drastic space saving comparing to conventional cylindrical type
- Superior heat radiation realizes higher ripple current

◆SPECIFICATIONS

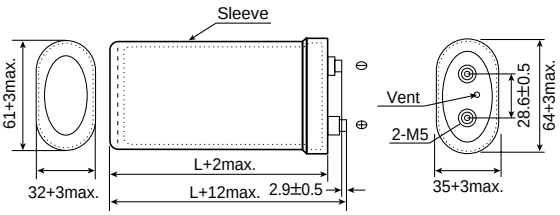
Items	Characteristics
Category Temperature Range	−40 to +85℃ (63～100Vdc), −25 to +85℃ (350～450Vdc)
Rated Voltage Range	63 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.25 max. (at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change 63 to 100Vdc : C(-40℃)/C(+20℃)≧0.6 350 to 450Vdc : C(-25℃)/C(+20℃)≧0.7 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 5000 hours at 85℃. 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℃ after exposing them for 1000 hours at 85℃ without voltage applied. Capacitance change: ≦±20% of the initial value D.F. (tanδ): ≦200% of the initial specified value Leakage current: ≦The initial specified value

◆DIMENSIONS (Terminal Type=LGSN) [mm]

●26×70 size



●35×64 size



<Screw specifications>
Plus hexagon-headed screw: M5×0.8
Maximum screw tightening torque: 3.23Nm

◆PART NUMBERING SYSTEM

FTP 80 LGSN 12000 M

- M : Capacitance tolerance (±20%)
- 12000 : Nominal capacitance in μF
- LGSN : Screw terminal type
- 80 : Rated voltage in volts
- FTP : Series name

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

FTP Series

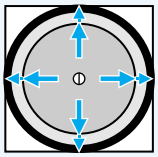
◆STANDARD RATINGS

Vdc / SV / Items / Case size S.Dia×L.Dia.×L(mm)	63		80		100	
	79		100		125	
	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 10kHz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 10kHz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 10kHz
26×70×50	6,000	14.0	4,300	14.0	2,900	14.0
26×70×75	12,000	19.0	8,600	19.0	5,700	19.0
26×70×95	17,000	22.0	12,000	22.0	8,100	22.0
35×64×50	7,400	16.1	5,300	16.1	3,600	16.1
35×64×75	15,000	21.7	10,000	21.7	7,100	21.7
35×64×95	21,000	25.3	15,000	25.3	10,000	25.3

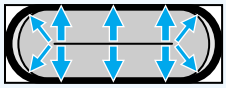
Vdc / SV / Items / Case size S.Dia×L.Dia.×L(mm)	350		400		450	
	400		450		500	
	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 10kHz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 10kHz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 10kHz
26×70×50	400	10.6	330	10.6	270	10.1
26×70×75	800	15.7	660	15.7	540	15.0
26×70×95	1,100	18.7	930	18.7	760	18.0
35×64×50	490	11.9	400	11.9	330	11.4
35×64×75	970	17.6	800	17.6	660	16.7
35×64×95	1,400	21.0	1,100	21.0	930	20.1

◆Improvement of space factor and heat radiation

Dead spaces are found for the conventional cylindrial shape. But lower profile offers small dead spaces, and makes the equipments smaller in size. Moreover, the internal element of the lower profile capacitor is widely touched to the can. This largely improves the heat radiation compared to the cylindrical shape.



Cylindrical shape



FTP series

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

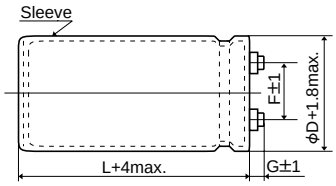
RWE Series

●Rated voltage range : 350 to 550Vdc
●Endurance with ripple current : 85℃ 2000 hours

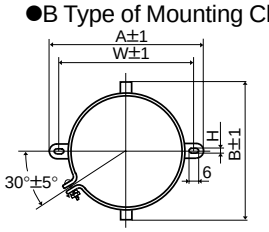
◆SPECIFICATIONS

Items	Characteristics				
Category Temperature Range	−25 to +85℃				
Rated Voltage Range	350 to 550Vdc				
Capacitance Tolerance	±20% (M)				(at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)				(at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.25 max.				(at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change	Rated Voltage (Vdc)	350 to 450V	500 & 550V	(at 120Hz)
		C(−25℃)/C(+20℃)	≧0.7	≧0.6	
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 2000Vac 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℃ after subjected to DC voltage with the rated ripple current is applied for 2000 hours at 85℃.				
	Capacitance change	≦±20% 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℃ after exposing them for 500 hours at 85℃ without voltage applied.				
	Capacitance change	≦±20% of the initial value			
	D.F. (tanδ)	≦300% of the initial specified value			
	Leakage current	≦The initial specified value			

◆DIMENSIONS (Terminal Type=LGSN) [mm]

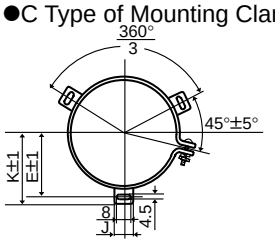


●B Type of Mounting Clamp



φD	A	B	W	H	F
35	58	44	48	3.5	12.7
50	78	64	68	4.5	22.4
63.5	90	76	80	4.5	28.0
76	104.5	90	93.5	4.5	31.5

●C Type of Mounting Clamp



φD	E	K	F	J
50	32.5	37.0	22.4	14.0
63.5	38.1	43.5	28.0	14.0
76	44.5	50.0	31.5	14.0
89	50.8	56.5	31.5	16.0

φ35 to φ63.5 : G=6
φ76 & φ89 : G=5

<Screw specifications>
Plus hexagon-headed screw:
M5X0.8X10
Maximum screw tightening torque:
3.23Nm

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

◆PART NUMBERING SYSTEM

RWE 550 LGSN 820 M C C13

- C13 : Case code
- C : Type of mounting clamp, if required
- M : Capacitance tolerance (±20%)
- 820 : Nominal capacitance in μF
- LGSN : Screw terminal type
- 550 : Rated voltage in volts
- RWE : Series name

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

RWE Series

◆STANDARD RATINGS

μF \ Vdc	350		400		450		500		550	
100									A5	0.6
120							A5	0.7		
180									A8	1.0
270					A5	1.6	A8	1.2	A10	1.3
330			A5	1.7			A10	1.4	A12	1.6
390	A5	1.9					A12	1.7	C7	1.7
470					A8	2.4	C7	1.8		
560			A8	2.7					C9 D9	2.1 2.5
680	A8	2.9			A10	3.1	C9	2.5	C11 D11	2.7 3.0
820			A10	3.4	A12	3.5	C11	2.9	C13 D13	3.1 3.5
1,000	A10	3.8	A12	3.9	C7	3.9	C13 D9	3.4 3.4		
1,200	A12	4.2	C7	4.2	C9	4.7			E9	4.2
1,500	C7	4.7			C11	5.6	D11 E9	4.5 4.6	E11	5.0
1,800			C9	5.7	C13	6.5	D13	5.2	E13	5.8
2,200	C9	6.3	C13	7.2	D9	7.2	E11	6.1	E15	7.0
2,700			D9	7.9	D11	8.6	E15	7.7		
3,300	C13 D9	8.8 8.8	D11	9.5	D13 E9	10.0 9.8			F15	9.3
3,900	D11	10.3	D13 E9	10.9 10.6	E11	11.5	F15	10.1		
4,700	D13 E9	12.0 11.7	E11	12.6	E13	13.3				
5,600	E11	12.6	E13	14.5	E15	15.7				
6,800	E13	15.9	E15	17.3						
8,200	E15	19.0			F15	18.6				
10,000			F15	20.5						
12,000	F15	22.5								

Case code

Rated ripple current (Arms) at 85℃, 120Hz

◆CASE CODE

φD (mm) \ L (mm)	50	75	80	96	100	115	120	130	155
35	A5	—	A8	—	A10	—	A12	—	—
50	—	C7	—	C9	—	C11	—	C13	—
63.5	—	—	—	D9	—	D11	—	D13	—
76	—	—	—	E9	—	E11	—	E13	E15
89	—	—	—	—	—	—	—	—	F15

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

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

Note : The endurance of capacitors is shorted with internal heating produced by ripple current at the rate of halving the lifetime with every 5 to 10℃ rise. When long life performance is required in actual use, the rms ripple current has to be reduced. Also, for the RWE series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For the details, please contact a representative of Nippon Chemi-Con.

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

RWY Series

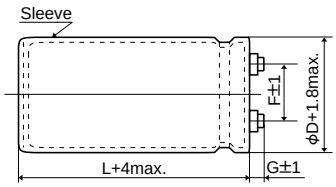
- ●High ripple capability
- ●Endurance with ripple current : 85℃ 5000 hours
- ●Cost-down design for three-phase input inverters

RWY
↑ low price version
RWF

◆SPECIFICATIONS

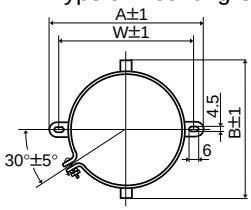
Items	Characteristics
Category Temperature Range	−25 to +85℃
Rated Voltage Range	350 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.12 max. (at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change C(−25℃)/C(+20℃)≧0.7 (at 120Hz)
Insulation Resistance	When it is 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 2000Vac 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℃ after subjected to DC voltage with the rated ripple current is applied for 5000 hours at 85℃.
	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℃ after exposing them for 1000 hours at 85℃ without voltage applied.
	Capacitance change: ≦±20% of the initial value
	D.F. (tanδ): ≦200% of the initial specified value
	Leakage current: ≦The initial specified value

◆DIMENSIONS (Terminal Type=LGSN) [mm]



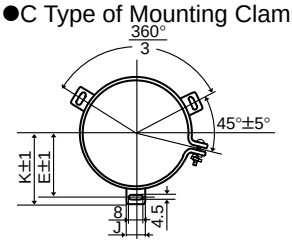
ϕ50 to ϕ76 : G=6
ϕ89 : G=4
ϕ100 : G=10

●B Type of Mounting Clamp



ϕD	A	B	W	F
50	78	64	68	22.4
63.5	90	76	80	28.0
76	104.5	90	93.5	31.5

●C Type of Mounting Clamp



ϕD	E	K	F	J
63.5	38.1	43.5	28.0	14.0
76	44.5	50.0	31.5	14.0
89	50.8	56.5	31.5	16.0
100	56.5	63.4	41.5	18.0

<Screw specifications>
ϕ50 to ϕ89
Plus hexagon-headed screw :
M5×0.8×10
Maximum screw tightening torque :
3.23Nm
ϕ100
Cross-recessed head (Phillips) screw : M8×1.25×16
Spring washer
Washer
Maximum screw tightening torque :
6.31Nm

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

◆PART NUMBERING SYSTEM

RWY 400 LGSN 5700 M C

- C : Type of mounting clamp, if required
- M : Capacitance tolerance (±20%)
- 5700 : Nominal capacitance in μF
- LGSN : Screw terminal type
- 400 : Rated voltage in volts
- RWY : Series name

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

RWY Series

◆STANDARD RATINGS

Vdc	350		400		450	
SV	400		450		500	
Items / Case size φDXL (mm)	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 300Hz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 300Hz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 300Hz
50×75	750	5.1	620	4.6	500	4.0
50×96	1,100	6.9	880	6.1	710	5.2
50×105	1,300	7.8	1,000	6.8	840	5.9
50×130	1,600	9.5	1,400	8.9	1,100	7.5
50×145	1,900	10.7	1,600	9.9	1,300	8.4
63.5×96	1,800	10.0	1,500	9.1	1,200	7.8
63.5×115	2,400	12.6	2,000	11.5	1,600	9.8
63.5×130	2,800	14.3	2,300	13.0	1,800	10.9
63.5×155	3,400	17.1	2,800	15.5	2,300	13.3
63.5×170	3,800	18.8	3,200	17.3	2,500	14.5
76×115	3,500	16.9	2,900	15.4	2,300	13.0
76×130	4,000	19.0	3,400	17.5	2,700	14.8
76×155	5,000	23.0	4,200	21.1	3,300	17.7
76×170	5,600	25.3	4,600	23.0	3,700	19.5
89×155	6,900	27.2	5,700	24.7	4,600	22.2
89×170	7,700	29.6	6,400	27.0	5,100	24.1
89×190	8,400	32.9	7,000	30.0	5,700	27.1
100×190	9,500	37.3	7,900	34.0	6,400	30.6
100×220	11,000	42.9	9,400	39.6	7,600	35.6
100×270	14,000	53.1	12,000	49.2	9,500	43.7

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Frequency (Hz)	120	300	1k	3k
Coefficient	0.83	1.0	1.25	1.33

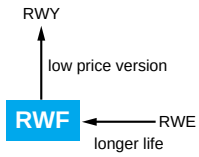
Note : The endurance of capacitors is shorted with internal heating produced by ripple currents at the rate of halving the lifetime with every 5 to 10℃ rise. When long life performance is required in actual use, the rms ripple current has to be reduced. Also, for RWY series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For the details, please contact a representative of Nippon Chemi-Con.

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

RWF Series

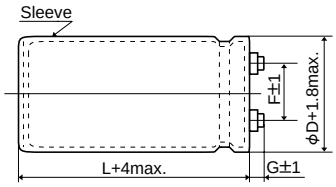
- High ripple capability
- Endurance with ripple current : 85℃ 5000 hours
- Wide variety case sizes from φ50 to φ100



◆SPECIFICATIONS

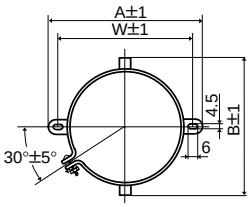
Items	Characteristics
Category Temperature Range	−25 to +85℃
Rated Voltage Range	350 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.25 max. (at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change C(−25℃)/C(+20℃)≧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 2000Vac 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℃ after subjected to DC voltage with the rated ripple current is applied for 5000 hours at 85℃.
	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℃ after exposing them for 500 hours at 85℃ without voltage applied.
	Capacitance change: ≦±20% of the initial value
	D.F. (tanδ): ≦200% of the initial specified value
	Leakage current: ≦The initial specified value

◆DIMENSIONS (Terminal Type=LGSN) [mm]



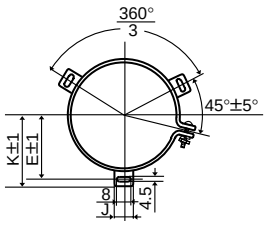
φ50 & φ63.5 : G=6
φ76 & φ89 : G=5
φ100 : G=10

●B Type of Mounting Clamp



φD	A	B	W	F
50	78	64	68	22.4
63.5	90	76	80	28.0
76	104.5	90	93.5	31.5

●C Type of Mounting Clamp



φD	E	K	F	J
50	32.5	37.0	22.4	14.0
63.5	38.1	43.5	28.0	14.0
76	44.5	50.0	31.5	14.0
89	50.8	56.5	31.5	16.0
100	56.5	63.4	41.5	18.0

<Screw specifications>
φ50 to φ89
Plus hexagon-headed screw : M5×0.8×10
Maximum screw tightening torque : 3.23Nm
φ100
Cross-recessed head (Phillips) screw : M8×1.25×16
Spring washer
Washer
Maximum screw tightening torque : 6.31Nm

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

◆PART NUMBERING SYSTEM

RWF 350 LGSN 10000 M C E17

- E17 : Case code
- C : Type of mounting clamp, if required
- M : Capacitance tolerance (±20%)
- 10000 : Nominal capacitance in μF
- LGSN : Screw terminal type
- 350 : Rated voltage in volts
- RWF : Series name

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

RWF Series

◆STANDARD RATINGS

Vdc	350		400		450	
SV	400		450		500	
Items / Case size φD×L (mm)	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 120Hz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 120Hz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 85℃, 120Hz
50×96	2,200	7.7	1,800	7.0	1,200	5.7
					1,500	6.3
50×105			2,200	8.0		
50×115	2,700	9.3			1,800	7.6
50×130	3,300	10.8	2,700	9.8	2,200	8.8
63.5×115	3,900	12.1	3,300	11.1	2,700	10.1
63.5×130	4,700	14.0	3,900	12.7	3,300	11.7
63.5×155	5,600	16.6	4,700	15.2	3,900	13.8
63.5×190	6,800	20.0	5,600	18.2	4,700	16.7
76×115	5,600	16.1	4,700	14.7	3,900	13.4
76×130	6,800	18.6	5,600	16.9	4,700	15.5
76×155	8,200	22.2	6,800	20.2	5,600	18.3
76×170	10,000	25.2	8,200	22.8	6,800	20.7
89×155	12,000	29.1	10,000	26.6	8,200	24.1
89×170			12,000	30.0	10,000	27.8
89×190	15,000	35.7				
100×190	18,000	36.9	15,000	33.7	12,000	29.3
100×220			18,000	37.4		
100×250	22,000	46.1			15,000	37.0

◆CASE CODE

φD (mm) \ L (mm)	96	105	115	130	155	170	190	220	250
50	C9	C10R	C11	C13	—	—	—	—	—
63.5	—	—	D11	D13	D15	—	D19	—	—
76	—	—	E11	E13	E15	E17	—	—	—
89	—	—	—	—	F15	F17	F19	—	—
100	—	—	—	—	—	—	G19	G22	G25

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

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

Note : The endurancce of capacitors is shorted with internal heating produced by ripple currents at the rate of halving the lifetime with every 5 to 10℃ rise. When long life performance is required in actual use, the rms ripple current has to be reduced. Also, for the RWF series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For the details, please contact a representative of Nippon Chemi-Con.

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

RWL Series

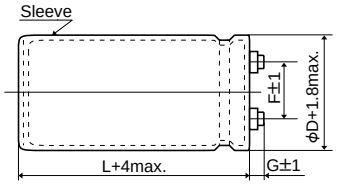
- High ripple capability
- For train systems and high power consumed inverter circuits
- Endurance with ripple current : 85℃ 20000 hours

RWL
↑ longer life
RWF

◆SPECIFICATIONS

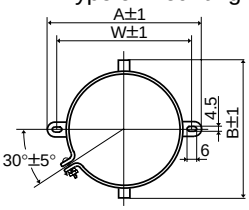
Items	Characteristics
Category Temperature Range	−25 to +85℃
Rated Voltage Range	350 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.25 max. (at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change C(−25℃)/C(+20℃)≧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 2000Vac 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℃ after subjected to DC voltage with the rated ripple current is applied 20000 hours at 85℃.
	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℃ after exposing them for 500 hours at 85℃ without voltage applied.
	Capacitance change: ≦±20% of the initial value
	D.F. (tanδ): ≦300% of the initial specified value
	Leakage current: ≦The initial specified value

◆DIMENSIONS (Terminal Type=LGSN) [mm]



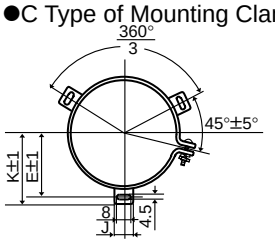
ϕ63.5 : G=6
ϕ76 & ϕ89 : G=5

●B Type of Mounting Clamp



ϕD	A	B	W	F
63.5	90	76	80	28.0
76	104.5	90	93.5	31.5

●C Type of Mounting Clamp



ϕD	E	K	F	J
63.5	38.1	43.5	28.0	14.0
76	44.5	50.0	31.5	14.0
89	50.8	56.5	31.5	16.0

<Screw specifications>
Plus hexagon-headed screw:
M5×0.8×10
Maximum screw tightening torque:
3.23Nm

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

◆PART NUMBERING SYSTEM

RWL 400 LGSN 10000 M C F19

- F19 : Case code
- C : Type of mounting clamp, if required
- M : Capacitance tolerance (±20%)
- 10000 : Nominal capacitance in μF
- LGSN : Screw terminal type
- 400 : Rated voltage in volts
- RWL : Series name

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85℃

RWL Series

◆STANDARD RATINGS

Vdc / SV / φD / μF	350			400			450		
	400			450			500		
	63.5	76	89	63.5	76	89	63.5	76	89
2,200							63.5×115 9.1		
2,700				63.5×115 10.1			63.5×130 10.6	76×115 11.2	
3,300	63.5×115 11.1			63.5×130 11.7			63.5×155 12.7	76×130 13.0	
3,900	63.5×130 12.8			63.5×155 13.8	76×115 14.7		63.5×170 14.4		
4,700	63.5×155 15.2	76×115 14.7		63.5×170 15.8	76×130 15.5			76×155 16.7	
5,600	63.5×170 17.3	76×130 16.9		63.5×190 18.2	76×155 18.3			76×190 20.1	89×155 19.9
6,800	63.5×190 20.0	76×155 20.2			76×170 21.0				89×170 23.0
8,200		76×170 23.1				89×155 24.1			89×190 26.4
10,000			89×155 26.6			89×190 29.1	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 85℃, 120Hz		
12,000			89×190 32.0						

◆CASE CODE

φD (mm) \ L (mm)	115	130	155	170	190
63.5	D11	D13	D15	D17	D19
76	E11	E13	E15	E17	E19
89	—	—	F15	F17	F19

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

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

Note : The endurance of capacitors is shorted with internal heating produced by ripple currents at the rate of halving the lifetime with every 5 to 10℃ rise. When long life performance is required in actual use, the rms ripple current has to be reduced. Also, for RWL series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For the details, please contact a representative of Nippon Chemi-Con.

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS long life screw terminals ,105℃

LXA Series

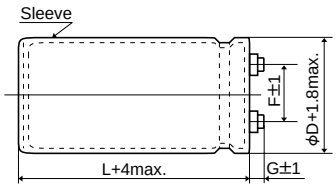
- Rated voltage range up to 525Vdc
- Endurance with ripple current : 105℃ 5000 hours (2000 hours for 500Vdc & 525Vdc)
- High reliability products

◆SPECIFICATIONS

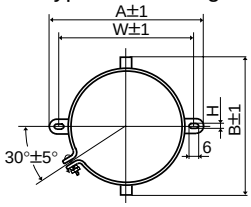
Items	Characteristics
Category Temperature Range	−40 to +105℃ (10 to 100Vdc) −25 to +105℃ (160 to 525Vdc)
Rated Voltage Range	10 to 525Vdc
Capacitance Tolerance	−10 to +50% (T) (10 to 250Vdc) ±20% (M) (350 to 525Vdc) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	See STANDARD RATINGS (10 to 250Vdc) 0.20max (350 to 525Vdc) (at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change C(-40℃)/C(+20℃)≧0.6(10 to 100Vdc) C(-25℃)/C(+20℃)≧0.7(160 to 250Vdc) C(-25℃)/C(+20℃)≧0.65(350 to 525Vdc) (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 2000Vac 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℃ after DC voltage with the rated ripple current is applied for 5000 hours (2000 hours for 500 & 525Vdc products) at 105℃.
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.

Rated voltage	10 to 250Vdc	350 to 525Vdc
Capacitance change	≦±15% of the initial value	≦±20% of the initial value
D.F. (tanδ)	≦150% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦The initial specified value

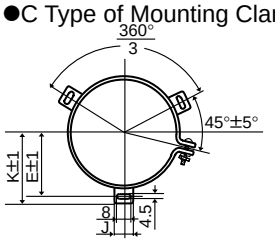
◆DIMENSIONS (Terminal Type=LGSN) [mm]



●B Type of Mounting Clamp



●C Type of Mounting Clamp



φD	G	
	10 to 250Vdc	350 to 525Vdc
~φ63.5	6	6
φ76	5	6
φ89	5	4

φD	A	B	W	H	F
35	58	44	48	3.5	12.7
50	78	64	68	4.5	22.4
63.5	90	76	80	4.5	28.0
76	104.5	90	93.5	4.5	31.5

φD	E	K	J	F
50	32.5	37.0	14.0	22.4
63.5	38.1	43.5	14.0	28.0
76	44.5	50.0	14.0	31.5
89	50.8	56.5	16.0	31.5

<Screw specifications>
Plus hexagon-headed screw:
M5×0.8×10
Maximum screw tightening torque:
3.23Nm

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

◆PART NUMBERING SYSTEM

LXA 450 LGSN 3300 M C E10R

- E10R: Case code
- C: Type of mounting clamp, if required
- M: Capacitance tolerance
- 3300: Nominal capacitance in μF
- LGSN: Screw terminal type
- 450: Rated voltage in volts
- LXA: Series name

*Capacitance tolerance
T : 10 to 250Vdc
M : 350 to 525Vdc

◆CASE CODE

φD (mm) \ L (mm)	50	60	80	85	100	105	120	125	140	145	190	270
35	A5	—	A8	—	A10	—	A12	—	—	—	—	—
50	—	C6	C8	C8R	C10	C10R	C12	C12R	—	C14R	—	—
63.5	—	—	—	D8R	D10	D10R	D12	D12R	—	D14R	—	—
76	—	—	—	E8R	E10	E10R	E12	E12R	E14	E14R	E19	—
89	—	—	—	—	—	—	—	F12R	F14	F14R	F19	F27

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS long life screw terminals ,105℃

LXA Series

◆STANDARD RATINGS

μF \ Vdc / SV	10			16			25			35			50			63			80		
	13			20			32			44			63			79			100		
2,200																			A 5	1.9	0.15
2,700																A 5	1.9	0.15	A 8	2.2	0.15
3,300																A 5	2.1	0.15	A 8	2.5	0.15
3,900													A 5	2.0	0.20	A 8	2.7	0.20	A 8	2.9	0.15
4,700													A 5	2.2	0.25	A 8	2.9	0.20	A10	3.1	0.15
5,600													A 8	2.8	0.25	A 8	3.2	0.20	A10	3.5	0.15
6,800													A 8	3.0	0.25	A 8	3.5	0.20	A12	4.1	0.20
8,200										A 8	3.0	0.30	A 8	3.3	0.25	A10	4.2	0.20	C 8	4.8	0.20
10,000										A 8	3.3	0.30	A 8	3.7	0.25	A12	4.3	0.25	C10	5.6	0.20
12,000							A 8	3.3	0.35	A 8	3.6	0.30	A10	4.4	0.25	C 8	4.8	0.25	C10	6.1	0.20
15,000				A 5	2.9	0.45	A 8	3.7	0.35	A 8	4.1	0.30	A12	4.7	0.30	C10	5.9	0.25	C12	7.4	0.20
18,000				A 8	3.5	0.45	A 8	4.0	0.35	A10	4.8	0.30	C 8	4.8	0.35	C12	6.3	0.25	D12	8.0	0.25
22,000				A 8	3.9	0.45	A 8	4.5	0.35	A12	5.2	0.35	C10	5.9	0.35	C12	6.7	0.30	E10	9.1	0.25
27,000	A 8	4.3	0.45	A 8	4.3	0.45	A10	5.0	0.40	C 8	5.9	0.40	C12	7.0	0.35	D12	8.8	0.30	E12	9.7	0.30
33,000	A 8	4.7	0.45	A10	4.8	0.50	A12	5.9	0.40	C10	6.6	0.40	D10	7.6	0.40	E10	10.0	0.30	E14	11.5	0.30
39,000	A 8	5.3	0.45	A10	5.3	0.50	C 8	6.5	0.40	C12	7.8	0.40	D12	8.9	0.40	E12	10.7	0.35	F14	12.5	0.35
47,000	A10	6.1	0.45	A12	6.2	0.50	C10	7.9	0.40	C12	8.0	0.45	D12	9.8	0.40	E14	12.5	0.35			
56,000	A10	6.2	0.50	C 8	6.3	0.60	C12	8.8	0.40	D10	9.2	0.45	E12	11.9	0.40	F14	13.8	0.40			
68,000	A12	6.8	0.60	C10	7.6	0.60	C12	9.1	0.50	D12	11.0	0.45	E14	13.1	0.45						
82,000	C 8	7.8	0.60	C12	8.3	0.70	D10	10.6	0.50	E12	12.7	0.50	F14	14.8	0.50						
100,000	C10	8.5	0.70	C12	9.2	0.70	D12	11.4	0.60	E14	13.5	0.60									
120,000	C10	9.5	0.70	D10	9.9	0.80	E10	12.8	0.60	F14	16.1	0.60									
150,000	D10	11.0	0.80	E10	12.3	0.80	E12	13.7	0.75												
180,000	D10	12.1	0.80	E12	14.5	0.80	E14	16.1	0.75												
220,000	E10	13.2	1.00	E14	15.2	1.00	F14	16.6	1.00												
270,000	E12	14.4	1.20	F14	16.8	1.20															
330,000	E14	17.0	1.20																		
390,000	F14	18.6	1.40																		

Case code
Rated ripple current (Arms) at 105℃, 120Hz
Max. tanδ at 20℃, 120Hz

μF \ Vdc / SV	100			160			200			250		
	125			200			250			300		
330										A 5	0.7	0.15
390										A 8	0.8	0.15
470							A 5	0.9	0.15	A 8	0.9	0.15
560							A 8	1.0	0.15	A 8	1.0	0.15
680				A 5	1.1	0.15	A 8	1.1	0.15	A10	1.2	0.15
820				A 8	1.2	0.15	A 8	1.3	0.15	A10	1.4	0.15
1,000				A 8	1.3	0.15	A10	1.5	0.15	A12	1.6	0.15
1,200	A 5	1.4	0.15	A 8	1.5	0.15	A12	1.7	0.15	C 8	1.8	0.15
1,500	A 8	1.6	0.15	A 8	1.7	0.15	A12	1.9	0.15	C10	2.2	0.15
1,800	A 8	1.8	0.15	A10	2.0	0.15	C 8	2.2	0.15	C12	2.6	0.15
2,200	A 8	2.0	0.15	A12	2.3	0.15	C10	2.7	0.15	C12	2.8	0.15
2,700	A 8	2.4	0.15	A12	2.7	0.15	C12	3.2	0.15	D10	3.3	0.15
3,300	A10	2.8	0.15	C10	3.3	0.15	C12	3.5	0.15	D12	4.0	0.15
3,900	A12	3.1	0.15	C12	3.8	0.15	D10	4.0	0.15	E10	4.4	0.15
4,700	C 8	3.6	0.15	C12	4.2	0.15	D12	4.7	0.15	E12	5.2	0.15
5,600	C10	4.3	0.15	C12	4.7	0.15	E10	5.3	0.15	E14	6.1	0.15
6,800	C12	5.0	0.15	D12	5.7	0.15	E12	6.3	0.15	F14	7.4	0.15
8,200	C12	5.5	0.15	E10	6.4	0.20	E14	6.4	0.20			
10,000	D10	6.4	0.15	E12	6.6	0.20	F14	7.7	0.20			
12,000	D12	6.6	0.20	E14	7.8	0.20						
15,000	E10	7.5	0.20	F14	9.5	0.20						
18,000	E12	8.0	0.25									
22,000	E14	9.4	0.25									
27,000	F14	10.4	0.30									

Max. tanδ at 20℃, 120Hz
Rated ripple current (Arms) at 105℃, 120Hz
Case code

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS long life screw terminals ,105℃

LXA Series

◆STANDARD RATINGS

Vdc / SV / Items / Case size φD×L (mm)	350		400		450	
	400		450		500	
	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 105℃, 120Hz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 105℃, 120Hz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 105℃, 120Hz
50×60	820	3.3	680	3.0	560	2.6
50×85	1,500	5.2	1,200	4.7	1,000	4.0
50×105	2,200	7.0	1,800	6.3	1,200	4.8
50×125	2,700	8.4	2,200	7.5	1,800	6.4
50×145	3,300	9.9	2,700	8.9	2,200	7.6
63.5×85	2,700	8.1	2,200	7.3	1,800	6.2
63.5×105	3,300	9.8	2,700	8.8	2,200	7.5
63.5×125	3,900	11.5	3,300	10.5	2,700	8.9
63.5×145	5,600	14.7	4,700	13.4	3,300	10.6
76×85	3,900	10.8	3,300	9.9	2,700	8.4
76×105					3,300	10.2
76×125	6,800	16.8	4,700	13.9	3,900	11.9
76×145	8,200	19.6	6,800	17.9	4,700	14.0
76×190	10,000	23.0	8,200	20.8	6,800	17.3
89×125	8,200	18.9	6,800	17.2	5,600	14.2
89×145	10,000	22.2	8,200	20.1	6,800	16.7
89×190	15,000	30.6	12,000	27.4	10,000	22.8
89×270	22,000	43.5	18,000	39.4	15,000	32.8

Vdc / SV / Items / Case size φD×L (mm)	500		525	
	550		575	
	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 105℃, 120Hz	Capacitance (μF) 20℃, 120Hz	Rated ripple current (Arms) 105℃, 120Hz
50×60	470	2.4	390	2.2
50×85	820	3.6	680	3.3
50×105	1,000	4.4		
50×125	1,200	5.2	1,000	4.8
50×145	1,500	6.3		
63.5×85	1,200	5.0		
63.5×105	1,800	6.8	1,500	6.2
63.5×125			1,800	7.3
63.5×145	2,700	9.6	2,200	8.6
76×85				
76×105	2,700	9.2	2,200	8.3
76×125			2,700	9.9
76×145	3,900	12.7	3,300	11.7
76×190			4,700	14.4
89×125	3,900	11.9		
89×145			4,700	13.9
89×190	6,800	18.8	5,600	17.1
89×270	10,000	26.8		

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS long life screw terminals ,105℃

LXA Series

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multiplirs

(10 to 250Vdc)

Frequency (Hz)	50	120	300	1k	10k	50k
10 to 50Vdc	0.95	1.00	1.03	1.05	1.09	1.12
63 to 80Vdc	0.90	1.00	1.06	1.10	1.18	1.22
100 to 250Vdc	0.80	1.00	1.12	1.22	1.30	1.33

(350 to 525Vdc)

Frequency (Hz)	50	120	300	1k	3k
Coefficient	0.8	1.0	1.2	1.5	1.6

Note : The endurance of capacitors is shorted with internal heating produced by ripple currents at the rate of halving the lifetime with every 5 to 10℃ rise. When long life performance is requested in actual use, the rms ripple current has to be reduced. Also, for the LXA series capacitors (350 to 525Vdc products), using them at operating voltage can extend their lifetime. For the detail, please contact a representative of Nippon Chemi-con.

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 105℃

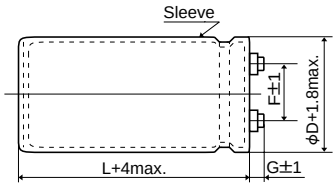
LXR Series

●Higher ripple capability than LX series
●Endurance with ripple current : 105℃ 5000 hours

◆SPECIFICATIONS

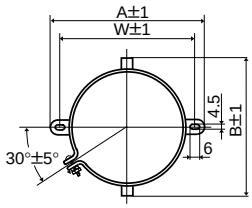
Items	Characteristics
Category Temperature Range	−25 to +105℃
Rated Voltage Range	350 to 450Vdc
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	0.15max. (at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change C (−25℃)/C(+20℃)≧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 shall not be less than than 100MΩ.
Insulation Withstanding Voltage	When a voltage of 2000Vac 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℃ after subjected to DC voltage with the rated ripple current is applied for 5000 hours at 105℃.
	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℃ after exposing them for 1000 hours at 105℃ without voltage applied.
	Capacitance change: ≦±20% of the initial value
	D.F. (tanδ): ≦200% of the initial specified value
	Leakage current: ≦The initial specified value

◆DIMENSIONS (Terminal Type=LGSN) [mm]



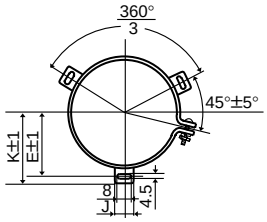
ϕ63.5 & ϕ76 : G=6
ϕ89 : G=4
ϕ100 : G=10

●B Type of Mounting Clamp



ϕD	A	B	W	F
63.5	90	76	80	28.0
76	104.5	90	93.5	31.5

●C Type of Mounting Clamp



ϕD	E	K	F	J
63.5	38.1	43.5	28.0	14.0
76	44.5	50.0	31.5	14.0
89	50.8	56.5	31.5	16.0
100	56.5	63.4	41.5	18.0

<Screw specifications>
ϕ63.5 to ϕ89
Plus hexagon-headed screw :
M5×0.8×10
Maximum screw tightening torque :
3.23Nm
ϕ100
Cross-recessed head (Phillips) screw :
M8×1.25×16
Spring washer
Washer
Maximum screw tightening torque :
6.31Nm

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

◆PART NUMBERING SYSTEM

LXR 400 LGSN 10000 M C G19

- G19 : Case code
- C : Type of mounting clamp, if required
- M : Capacitance tolerance (±20%)
- 10000 : Nominal capacitance in μF
- LGSN : Screw terminal type
- 400 : Rated voltage in volts
- LXR : Series name

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 105℃

LXR Series

◆STANDARD RATINGS

Vdc / SV / φD / μF	350				400				450			
	400				450				500			
	63.5	76	89	100	63.5	76	89	100	63.5	76	89	100
2,200									63.5×115 11.8			
2,700					63.5×115 13.1				63.5×130 13.7	76×115 14.5		
3,300	63.5×115 14.4				63.5×130 15.2				63.5×155 16.5	76×130 16.9		
3,900	63.5×130 16.6				63.5×155 17.9	76×115 18.2			63.5×170 18.7			
4,700	63.5×155 19.8	76×115 19.1			63.5×170 20.5	76×130 20.1				76×155 21.7		
5,600	63.5×170 22.5	76×130 21.9				76×155 23.8				76×190 26.1	89×155 24.1	
6,800		76×155 26.2				76×170 27.3	89×155 26.6				89×170 27.8	
8,200		76×170 30.0	89×155 29.2				89×170 30.5				89×190 32.0	
10,000			89×170 33.7					100×190 34.5				100×220 36.8
12,000				100×190 37.8				100×220 40.2				100×250 42.7
15,000				100×250 47.7	← Upper : Case size φD×L (mm) ← Lower : Rated ripple current (Arms) at 105℃, 120Hz							

◆CASE CODE

φD (mm) \ L (mm)	115	130	155	170	190	220	250
63.5	D11	D13	D15	D17	—	—	—
76	E11	E13	E15	E17	E19	—	—
89	—	—	F15	F17	F19	—	—
100	—	—	—	—	G19	G22	G25

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

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

The endurance of capacitors is shorted with internal heating produced by ripple current at the rate of halving the lifetime with every 5 to 10℃ rise. When long life performance is required in actual use, the rms ripple current has to be reduced. Also, for the LXR series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For the details, please contact a representative of Nippon Chemi-Con.

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

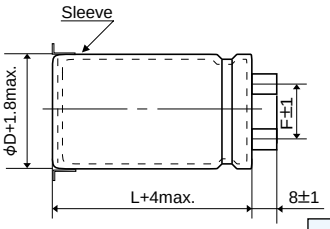
KW Series

- Low ESR and impedance at high frequency (10k to 50kHz)
- Endurance : 105℃ 2000 hours

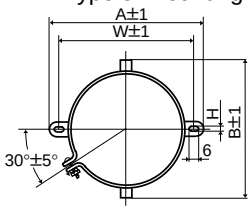
◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	−40 to +105℃
Rated Voltage Range	10 to 100Vdc
Capacitance Tolerance	−10 to +50% (T) (at 20℃, 120Hz)
Leakage Current	I=0.02CV or 5mA, whichever is smaller. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)
Dissipation Factor (tanδ)	Shall not exceed the values shown in the STANDARD RATINGS (at 20℃, 120Hz)
Low Temperature Characteristics	Capacitance change : C(−40℃)/C(+20℃)≧0.6 (at 120Hz) Z(−10℃)/Z(+20℃): 10 & 16Vdc ≦8; 25 to 100Vdc ≦6 (at 20kHz)
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 2000Vac 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℃ after the rated voltage is applied for 2000 hours at 105℃. 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℃ after exposing them for 500 hours at 105℃ without voltage applied. Capacitance change: ≦±15% of the initial value D.F. (tanδ): ≦175% of the initial specified value Leakage current: ≦The initial specified value

◆DIMENSIONS (Terminal Type=LGSN) [mm]

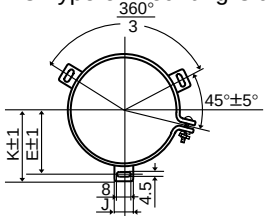


●B Type of Mounting Clamp



φD	A	B	W	H	F
35	58	44	48	3.5	14.0
50	78	64	68	4.5	22.4

●C Type of Mounting Clamp



φD	E	K	J	F
50	32.5	37.0	14.0	22.4

<Screw specifications>
Plus hexagon-headed screw:
M5×0.8×10
Maximum screw tightening torque:
3.23Nm

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

◆PART NUMBERING SYSTEM

KW 100 LGSN 1000 T B

- B : Type of mounting clamp, if required
- T : Capacitance tolerance (−10%/+50%)
- 1000 : Nominal capacitance in μF
- LGSN : Screw terminal type
- 100 : Rated voltage in volts
- KW : Series name

CAT. No. E1001D

NIPPON CHEMI-CON

LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 105℃

KW Series

◆STANDARD RATINGS

Rated voltage (Vdc)	Surge voltage (Vdc)	Capacitance (μF)	Part number	Case size φD×L (mm)	Rated ripple (Arms/85℃, 20kHz)	Impedance (mΩ/20℃, 20kHz)	Dissipation factor
10	13	10,000	KW10LGSN10000T	35×50	10.2	12	0.20
		22,000	KW10LGSN22000T	35×80	14.0	8	0.20
		33,000	KW10LGSN33000T	35×80	17.1	7	0.25
		47,000	KW10LGSN47000T	35×100	19.9	6	0.25
		100,000	KW10LGSN100000T	50×120	28.9	5	0.30
16	20	10,000	KW16LGSN10000T	35×50	10.2	12	0.20
		22,000	KW16LGSN22000T	35×80	14.0	8	0.20
		33,000	KW16LGSN33000T	35×100	18.6	8	0.20
		47,000	KW16LGSN47000T	50×80	23.2	6	0.25
25	32	10,000	KW25LGSN10000T	35×80	12.9	10	0.17
		22,000	KW25LGSN22000T	35×100	15.2	8	0.17
		33,000	KW25LGSN33000T	50×80	21.7	6	0.20
35	44	4,700	KW35LGSN4700T	35×50	8.4	16	0.15
		10,000	KW35LGSN10000T	35×80	12.9	10	0.15
		22,000	KW35LGSN22000T	50×80	19.4	7	0.15
50	63	3,300	KW50LGSN3300T	35×50	8.4	15	0.13
		4,700	KW50LGSN4700T	35×80	12.1	10	0.13
		10,000	KW50LGSN10000T	35×100	15.2	8	0.13
63	79	2,200	KW63LGSN2200T	35×50	7.7	18	0.12
		3,300	KW63LGSN3300T	35×80	10.8	12	0.12
		4,700	KW63LGSN4700T	35×80	12.1	10	0.12
		10,000	KW63LGSN10000T	50×80	17.7	7	0.12
80	100	2,200	KW80LGSN2200T	35×80	9.9	14	0.10
		3,300	KW80LGSN3300T	35×80	11.4	12	0.10
		4,700	KW80LGSN4700T	35×100	14.0	8	0.10
100	125	1,000	KW100LGSN1000T	35×50	7.2	22	0.10
		2,200	KW100LGSN2200T	35×80	9.9	14	0.10
		3,300	KW100LGSN3300T	35×100	12.4	11	0.10

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

Rated Voltage (Vdc)	Case size	Frequency (Hz)				
		50	120	1k	20k	50k
10 & 16	φ35 & φ50	0.75	0.84	0.96	1.00	1.01
25 to 50	φ35	0.68	0.81	0.95	1.00	1.01
25 to 63	φ50					
63 to 100	φ35	0.56	0.75	0.94	1.00	1.01

●Temperature Multipliers

Temperature (℃)	85	105
Coefficient	1.00	0.57

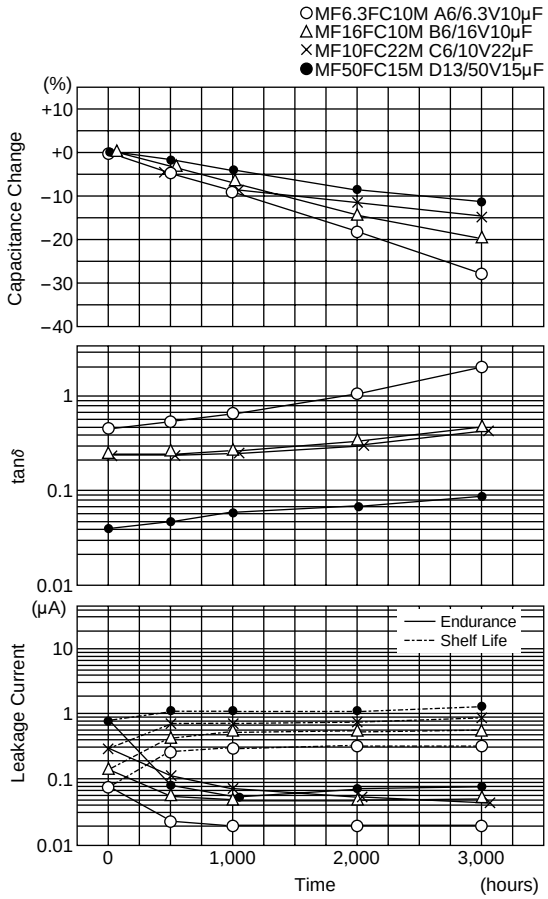
NIPPON CHEMI-CON

RELIABILITY DATA

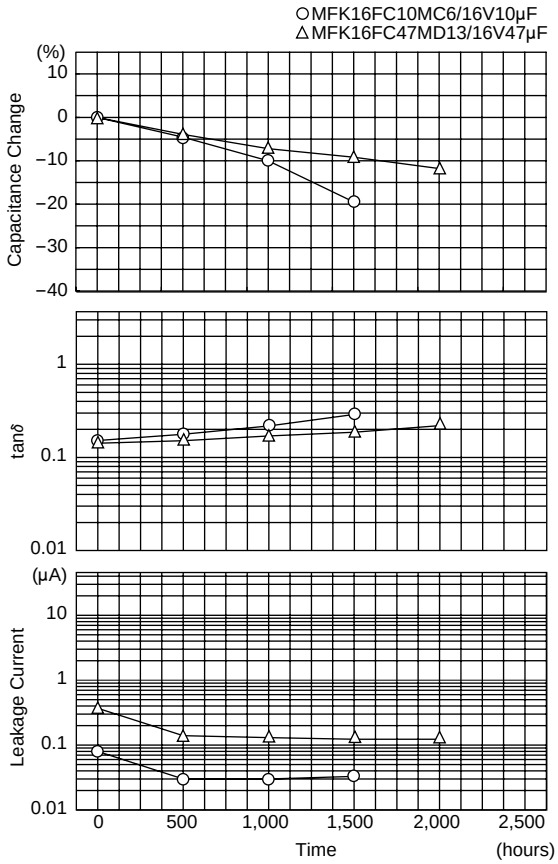
Surface Mount

Alchip® MF/MFK Series

●MF series 85℃ Endurance/Shelf Life



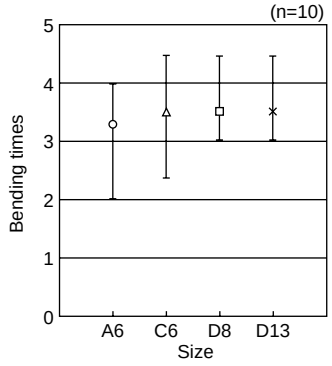
●MFK series 105℃ Endurance



◆MF Series Terminal Strength Test

●Without Dummy Terminal : Type FC

①Bent Test <Fig-1>



②Mechanical Force to Lead Facing Side <Fig-2>

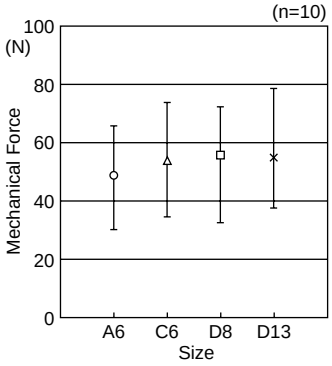
(n=10)

Size	Mechanical Force
A6	≧5N
C6	≧5N
D8	≧5N
D13	≧5N

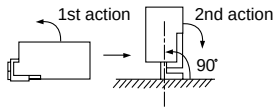
*No peeling off terminal.

●With Dummy Terminal : Type FD

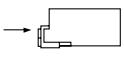
①Mechanical Force to Side <Fig-3>



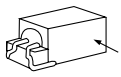
<Fig-1>



<Fig-2>



<Fig-3>



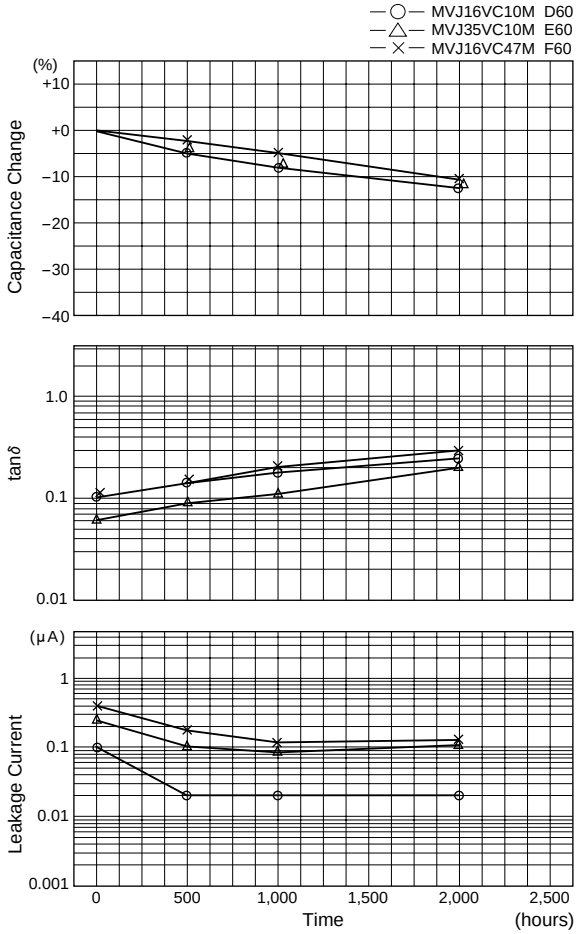
NIPPON CHEMI-CON

RELIABILITY DATA

Surface Mount

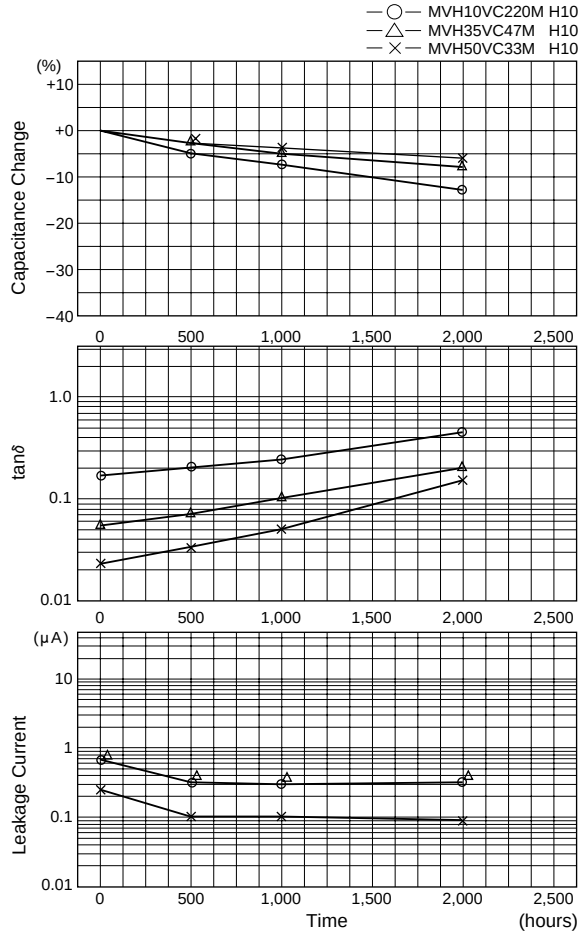
MVJ Series

●105℃ Endurance



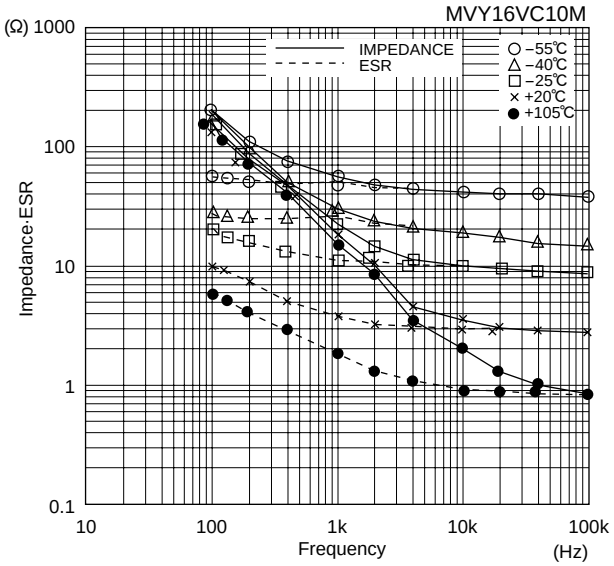
MVH Series

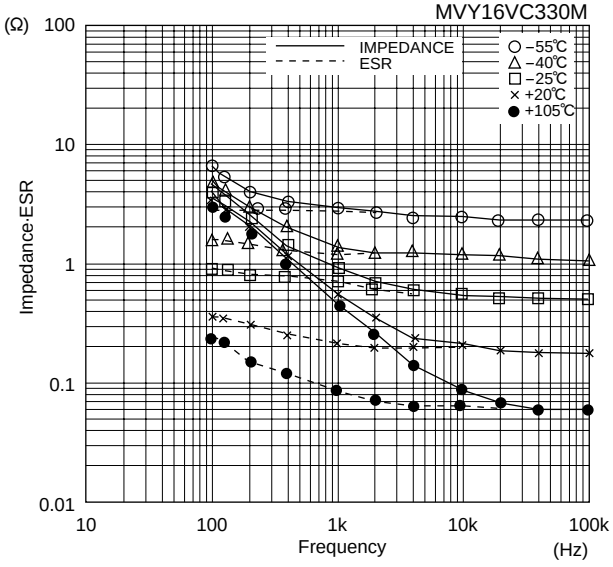
●125℃ Endurance



MVY Series

●Impedance/ESR vs Frequency





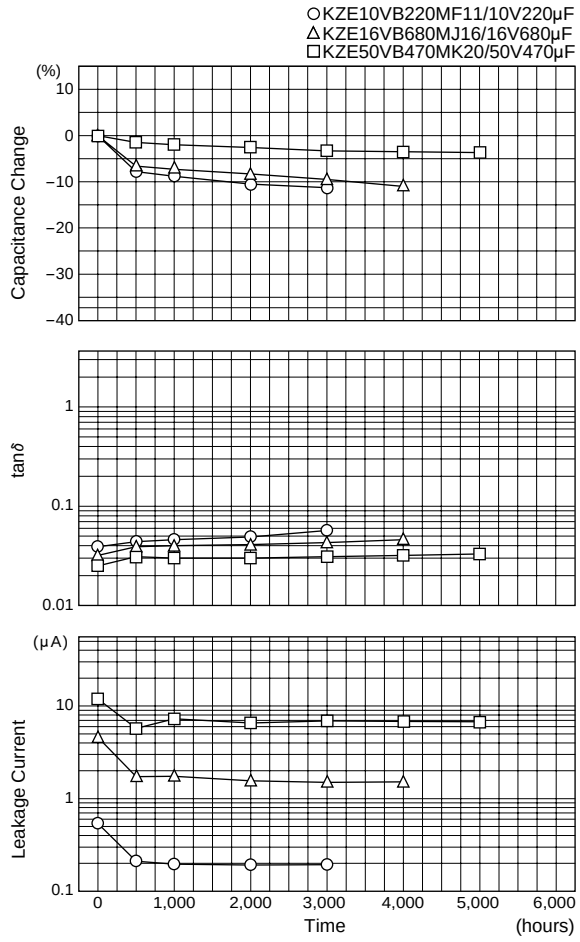
NIPPON CHEMI-CON

RELIABILITY DATA

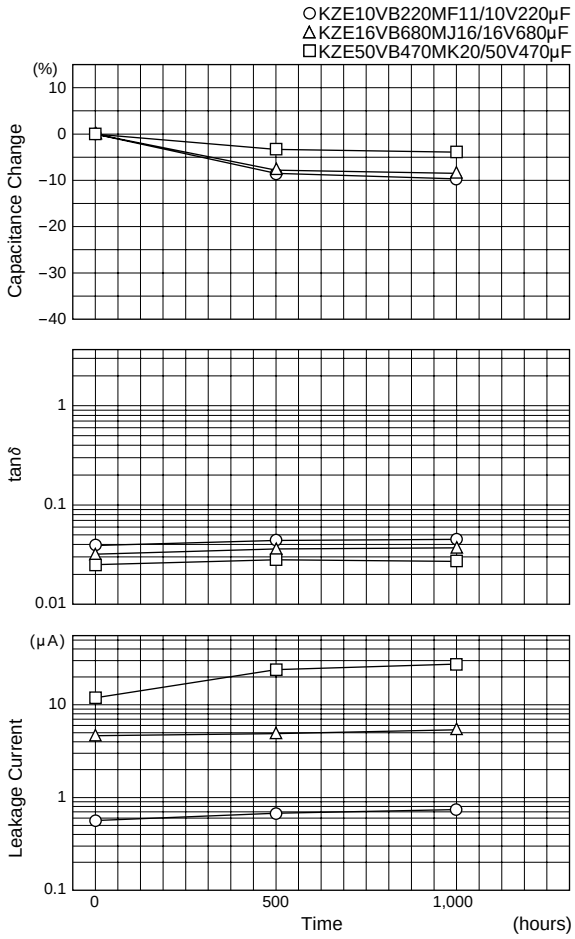
Radial

KZE Series

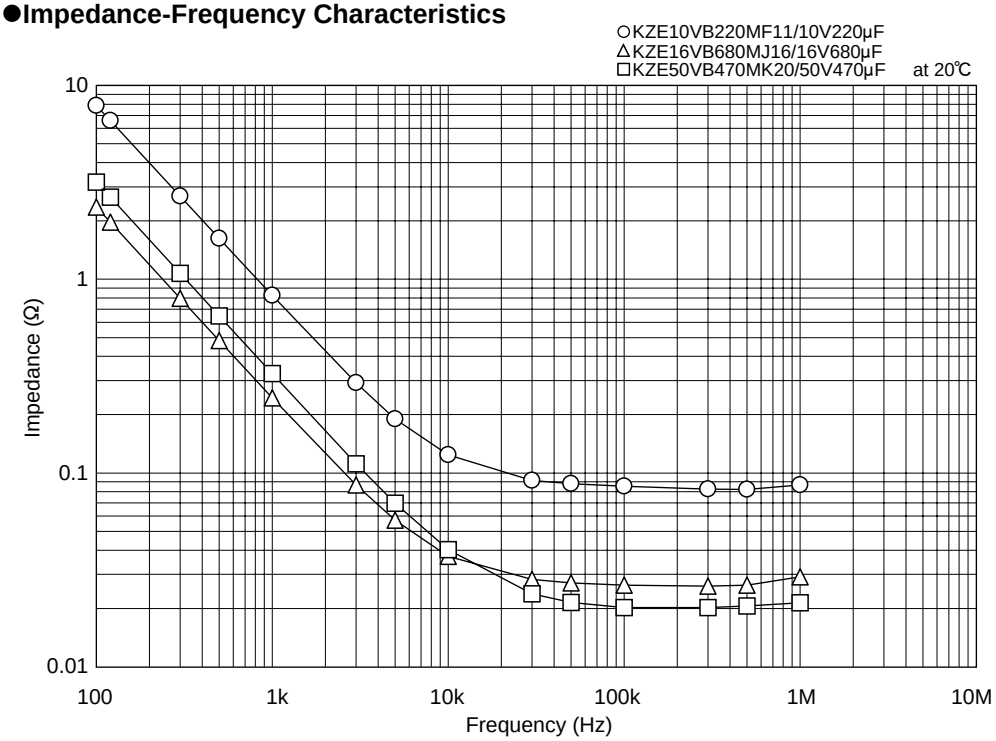
●105℃ Endurance with Rated Ripple Current



●105℃ Shelf Life



●Impedance-Frequency Characteristics



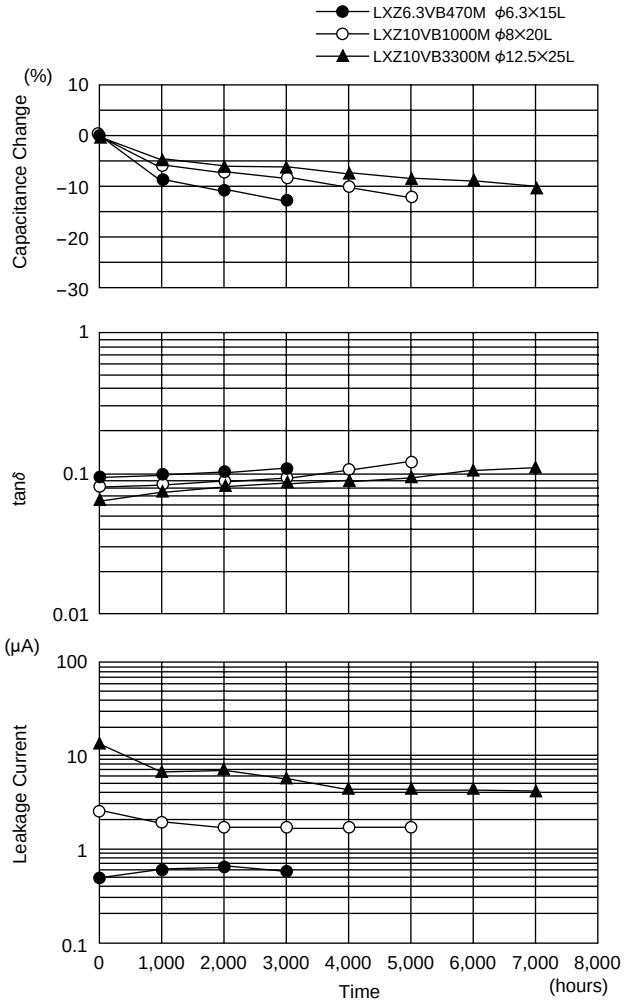
NIPPON CHEMI-CON

RELIABILITY DATA

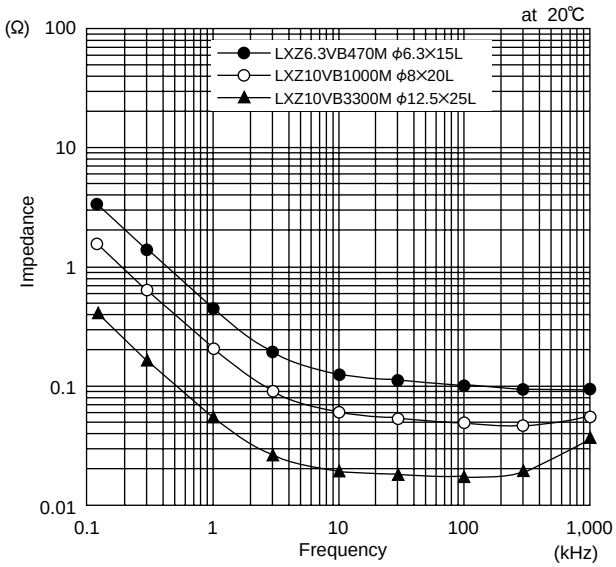
Low Impedance Radial

LXZ Series

●105℃ Endurance with Rated Ripple Current

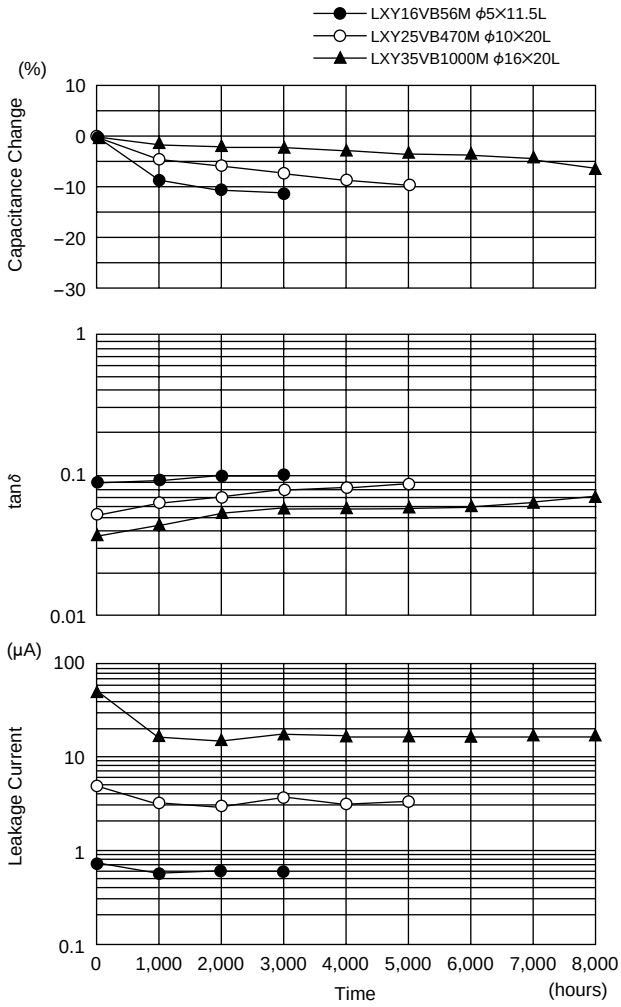


●Impedance-Frequency Characteristics

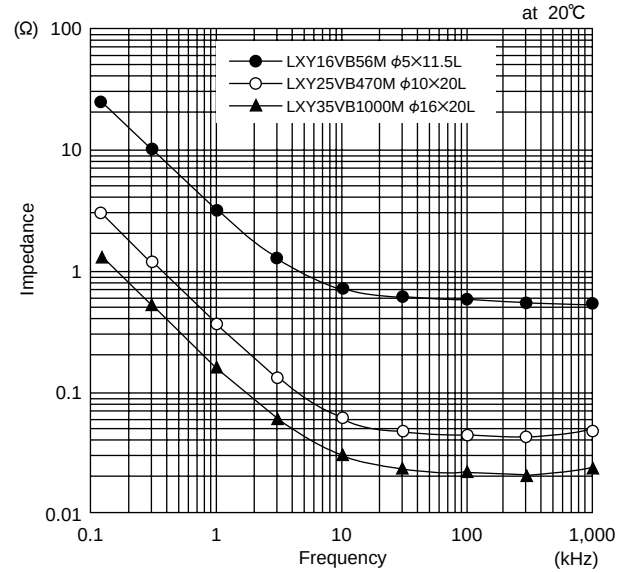


LXY Series

●105℃ Endurance with Rated Ripple Current



●Impedance-Frequency Characteristics



NIPPON CHEMI-CON

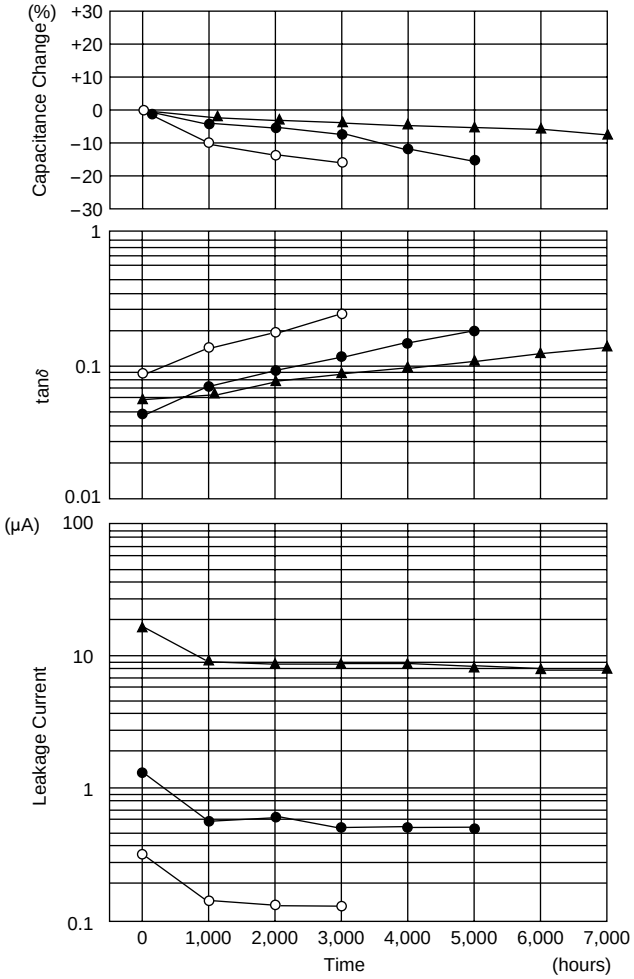
RELIABILITY DATA

Low Impedance Radial

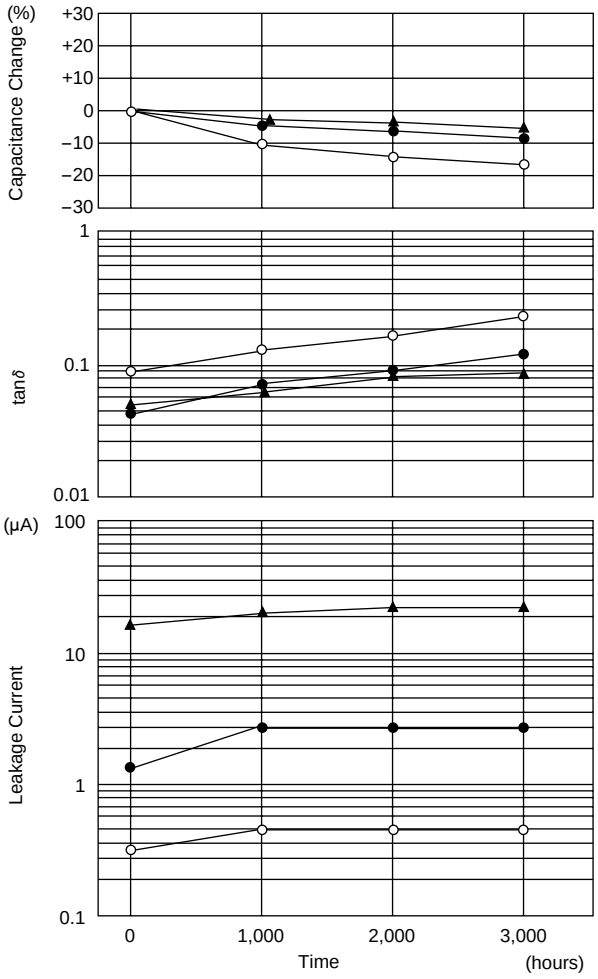
LXV Series

— ● — LXV10VB82M φ5×11.5L
— ○ — LXV25VB220M φ8×15L
— ▲ — LXV35VB560M φ12.5×20L

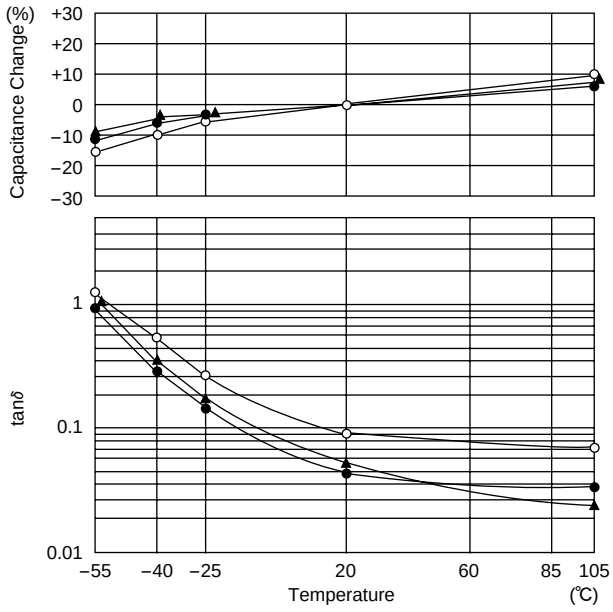
●105℃ Endurance with Rated Ripple Current



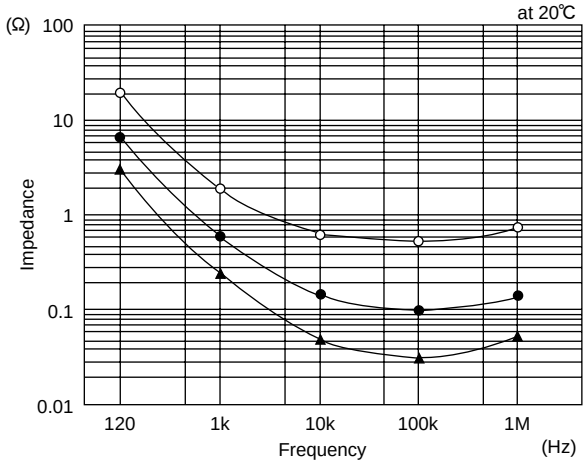
●105℃ Shelf Life test



●Temperature Characteristics



●Impedance-Frequency Characteristics



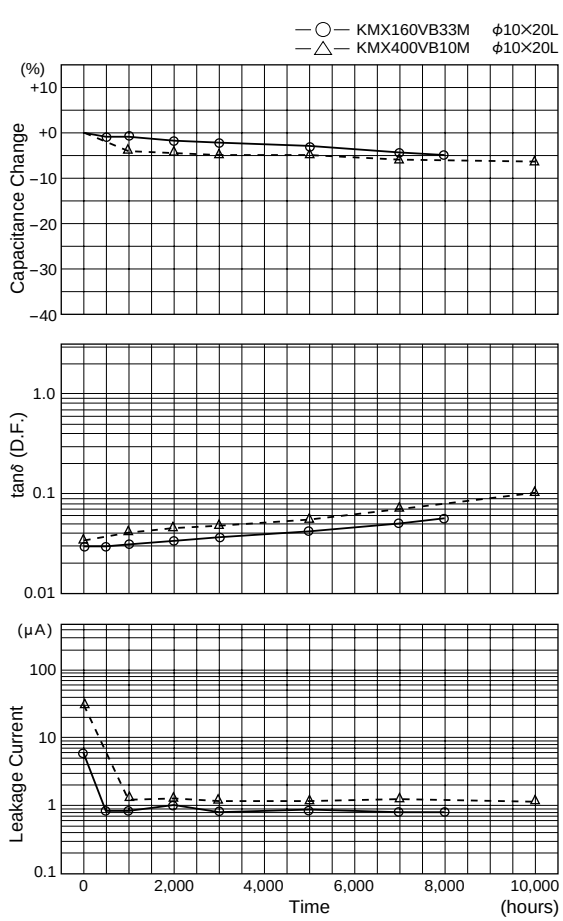
NIPPON CHEMI-CON

RELIABILITY DATA

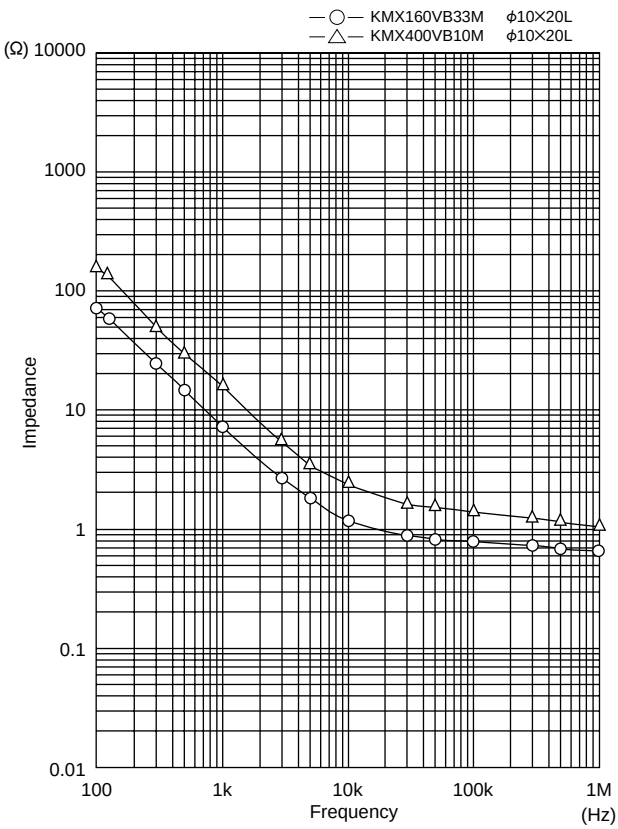
Radial

KMX Series

●105℃ Endurance with Rated Ripple Current

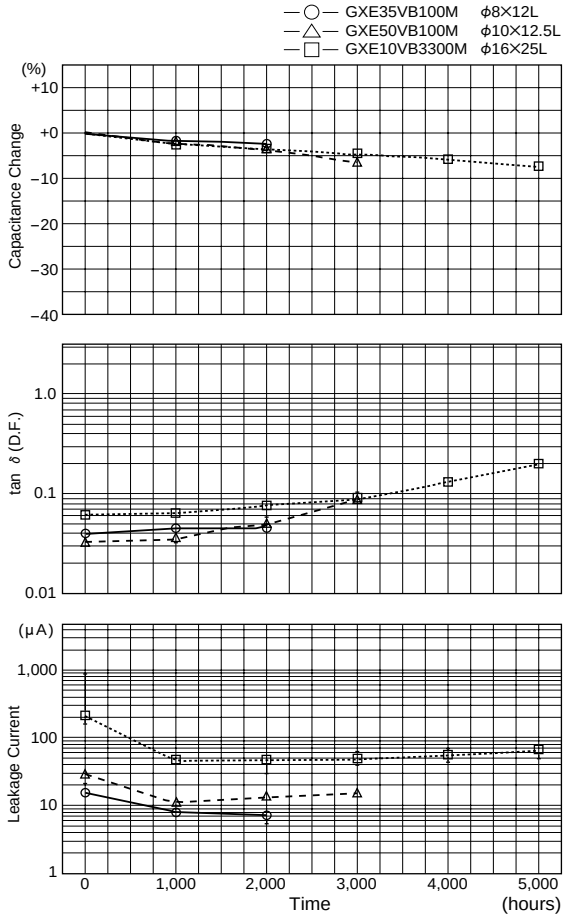


●Impedance-Frequency Characteristics at 20℃

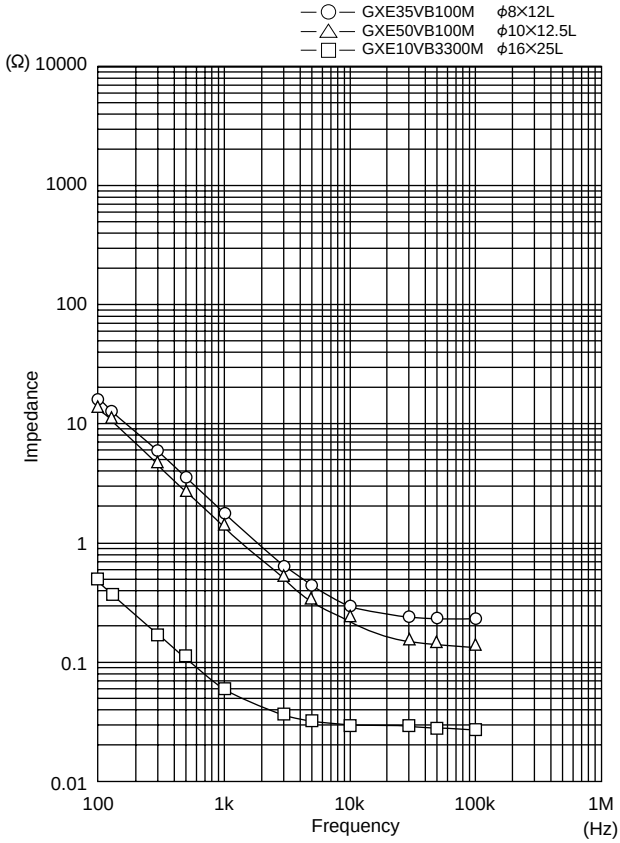


GXE Series

●125℃ Endurance with Rated Ripple Current



●Impedance-Frequency Characteristics at 20℃

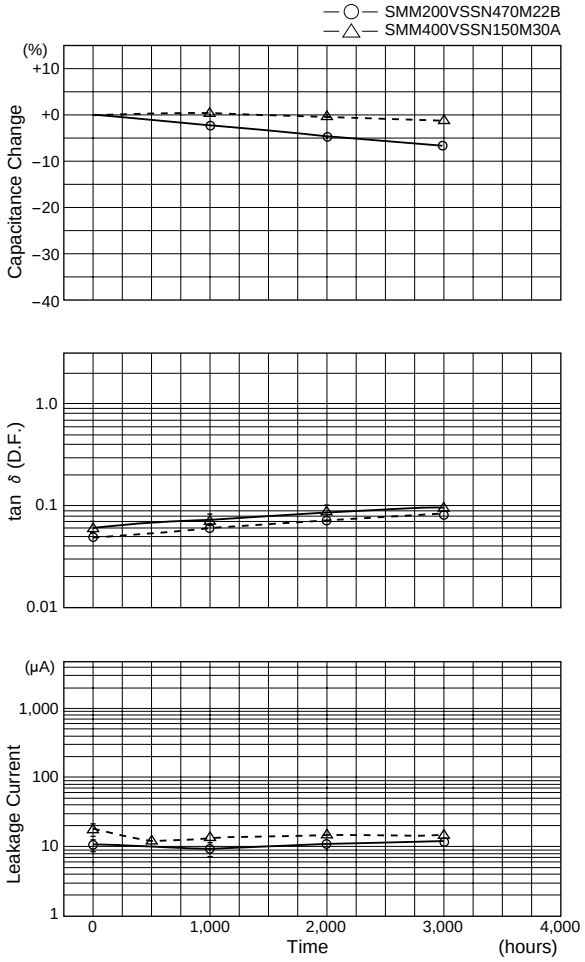


NIPPON CHEMI-CON

RELIABILITY DATA

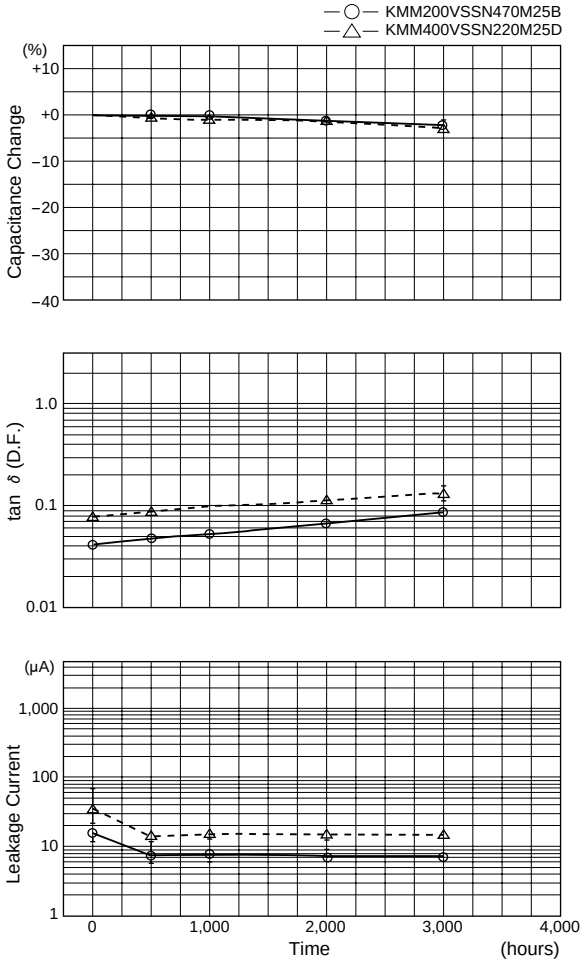
SMM Series

●85℃ Endurance with Rated Ripple Current



KMM Series

●105℃ Endurance with Rated Ripple Current



NIPPON CHEMI-CON

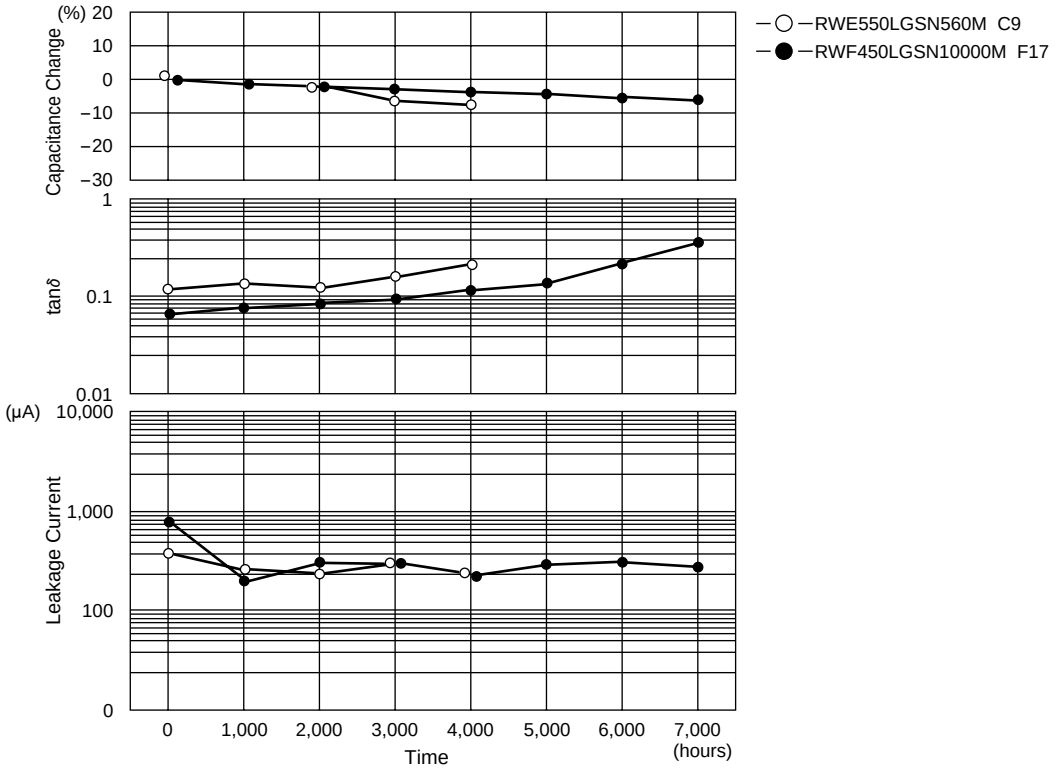
RELIABILITY DATA

Screw-Mount

RWE/RWF/RWL Series

RWE/RWF series

●85℃ Endurance with Rated Ripple Current



RWL series

●85℃ Endurance with Rated Ripple Current