NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

CAT. No. E1001G

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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 | | PXF (NEW!) | Vertical type, super low ESR | 105℃ 2,000 hours | | ● | ● | SMD | 2.5 to 6.3 | 220 to 1,000 |
| | | PXE (Upgrade!) | Vertical type, super low ESR | 105℃ 2,000 hours | | ● | ● | SMD | 2.5 to 16 | 33 to 2,700 |
| | | PXA (Upgrade!) | Vertical type, super low ESR | 105℃ 1,000 to 2,000 hours | ● | ● | ● | SMD | 2.5 to 25 | 3.3 to 1,500 |
| | | PXH | 125℃ Vertical type | 125℃ 1,000 hours | | ● | ● | SMD | 2.5 to 20 | 22 to 1,000 |
| | | PSC (Upgrade!) | Radial lead type, super low ESR, high ripple current | 105℃ 2,000 hours | | ● | ● | Radial | 2.5 to 16 | 270 to 2,700 |
| | | PSA | Super low ESR, high ripple current | 105℃ 2,000 hours | | ● | ● | Radial | 2.5 to 16 | 47 to 1,000 |
| | | PS (Upgrade!) | Radial lead type, super low ESR | 105℃ 2,000 hours | ● | ● | ● | Radial | 2.5 to 35 | 18 to 1,500 |
| Surface Mount | 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 | 105℃ 1,000 to 2,000 hours | | | ● | SMD | 6.3 to 50 | 0.1 to 1,000 |
| | | MZA | 6.1 to 10.5mm max. height, very low impedance | 105℃ 2,000 hours | | ● | ● | SMD | 6.3 to 80 | 3.3 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 |
| | | MZD (NEW!) | 105℃5,000 hours, low impedance, long life | 105℃ 5,000 hours | | ● | ● | SMD | 6.3 to 50 | 10 to 470 |
| | | MLA | Low impedance, long life | 105℃ 3,000 hours | | ● | ● | SMD | 6.3 to 50 | 10 to 1,000 |
| | | MVJ | 6.0mm max. height | 105℃ 2,000 hours | | | ● | SMD | 6.3 to 50 | 0.1 to 100 |
| | | MLD (NEW!) | 105℃5,000 hours, long life | 105℃ 5,000 hours | | | ● | SMD | 6.3 to 50 | 0.1 to 1,000 |
| | | 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 |
| | | MHB (NEW!) | 10.5mm max. height (Ask Engineering No767 in detail) | 125℃ 2,000 hours | | | ● | SMD | 10 to 35 | 47 to 470 |
| | | MKB (NEW!) | 10.5mm max. height | 105℃ 3,000 hours | | | ● | SMD | 400 | 2.2 to 4.7 |
| | | 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 No511 in detail) | 85℃ 2,000 hours | | | ▲ | Radial | 6.3 to 450 | 0.1 to 15,000 |
| | | KME | General (Ask Engineering Bulletin No512 in detail) | 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 | KZM | Lowest impedance, long life | 105℃ 6,000 to 10,000 hours +R | | ● | | Radial | 6.3 to 50 | 27 to 10,000 |
| | | KZH | Lowest impedance, long life | 105℃ 5,000 to 6,000 hours +R | | ● | | Radial | 6.3 to 35 | 47 to 8,200 |
| | | KZE | Lowest impedance, long life | 105℃ 1,000 to 5,000 hours +R | | ● | | Radial | 6.3 to 100 | 6.8 to 6,800 |
| | | KY | Low impedance, long life | 105℃ 4,000 to 10,000 hours +R | | ● | | Radial | 6.3 to 100 | 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 |
| | | KMF | Low impedance, high CV, general (Ask Engineering Bulletin No630 in detail) | 105℃ 2,000 hours +R | | ● | | Radial | 160 to 450 | 2.2 to 220 |

: Promotional products

▲ : Some of range are solvent-proof.

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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 | KXJ (Upgrade!) | Downsized, long life, for input filtering | 105℃ 10,000 to 12,000 hours +R | | ● | | Radial | 160 to 450 | 6.8 to 680 |
| | | 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 (Ask Engineering Bulletin No 646 in detail) | 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 | Low profile, for input filtering | 105℃ 2,000 hours +R | | | | Radial | 200 to 450 | 18 to 560 |
| | | KLJ | Downsized, no sparks with DC overvoltage | 105℃ 2,000 hours +R | | | | Radial | 200 & 400 | 4.7 to 330 |
| | | KLG | No sparks with DC overvoltage | 105℃ 2,000 hours +R | | | | Radial | 200 & 400 | 22 to 330 |
| | | FL | Long life | 105℃ 3,000 hours +R | | | ● | Radial | 6.3 to 50 | 0.47 to 270 |
| | | GPA | 125℃, downsized, low impedance | 125℃ 3,000 to 5,000 hours +R | | ● | ● | Radial | 25 to 50 | 470 to 6,800 |
| | | GXE | 125℃, downsize, low impedance | 125℃ 2,000 to 5,000 hours +R | | ● | ▲ | Radial | 10 to 450 | 4.7 to 4,700 |
| | | GXL | 125℃ Long life | 125℃ 5,000/10,000 hours +R | | | ● | Radial | 10 to 50 | 100 to 4,700 |
| | | GHA (NEW!) | 150℃ | 150℃ 1,000 hours | | | ● | Radial | 10 to 35 | 68 to 3,300 |
| | Special Application | LBG | For airbag | 105℃ 5,000 hours +R | | ● | ● | Radial | 25 & 35 | 1,000 to 11,000 |
| | | KZV (NEW!) | For PC motherboard (Ask Engineering Bulletin No756 in detail) | 105℃ 2,000 hours +R | | ● | | Radial | 4 | 820 to 2.700 |
| | | KZJ | For PC motherboard | 105℃ 2,000 hours +R | | ● | | Radial | 6.3 to 16 | 470 to 3,300 |
| | | KZG | For PC motherboard | 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 | – |
| Large Sized | General Purpose | KMR | 105℃, Snap-in terminal, super downsized | 105℃ 2,000 hours +R | ● | | | Pin | 160 to 450 | 100 to 3,900 |
| | | 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 | 35, 50, 160 to 450 | 68 to 33,000 |
| | | SMM | Snap-in terminal, downsized | 85℃ 3,000 hours +R | ● | | | Pin | 160 to 450 | 47 to 3,300 |
| | | KMS (NEW!) | Snap-in terminal, downsized | 105℃ 3,000 hours +R | ● | | | Pin | 160 to 450 | 82 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 (Refer Engineering Bulletin No585 for 160 to 450V) | 85℃ 2,000 hours +R | ● | | | Pin | 6.3 to 100 | 820 to 100,000 |
| | | KMH | Snap-in terminal, general (Refer Engineering Bulletin No584 for 160 to 450V) | 105℃ 2,000 hours +R | ● | | | Pin | 6.3 to 100 | 560 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 |
| | | LXS (NEW!) | Snap-in terminal downsized | 105℃ 5,000 hours +R | ● | | | Pin | 160 to 450 | 82 to 3,300 |
| | | 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 (Upgrade!) | No sparks with DC overvoltage, downsized | 105℃ 2,000 hours +R | | | | Pin | 200 to 450 | 56 to 1,200 |
| | | LXH | No sparks with DC overvoltage | 105℃ 3,000/5,000 hours +R | | | | Pin | 200 & 400 | 68 to 1,500 |
| | | RWE-LR | For air-conditioning (Ask Engineering Bulletin No768 in detail) | 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 | RWG | 85℃, high ripple, downsized, long life | 85℃ 5,000 hours +R | | | | Screw | 350 to 450 | 1,500 to 18,000 |
| | | RWF | High ripple, long life | 85℃ 5,000 hours +R | | | | Screw | 350 to 450 | 820 to 22,000 |
| | | 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 |
| | | RWL | High ripple, long life | 85℃ 20,000 hours +R | | | | Screw | 350 to 450 | 2,200 to 12,000 |
| | | FTP | Ellips can shape, high ripple | 85℃ 5,000 hours +R | | | | Screw | 63 to 450 | 270 to 21,000 |
| | | 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 Engineering Bulletin No714 in detail) | 105℃ 5,000 hours +R | | | | Screw | 350 to 450 | 460 to 13,000 |
| | | KW | Low impedance (Ask Engineering Bulletin in detail) | 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

**Vertical SMD**

Upgrade! PXA → Lower ESR → Upgrade! PXE → Lower ESR → NEW! PXF

**High Temperature**

PXH

Digitalization Super Low ESR

### ◆RADIAL LEAD

**Radial type**

Upgrade! PS → Lower ESR → PSA → Lower ESR → Upgrade! PSC

Digitalization Super Low ESR

## ALUMINUM ELECTROLYTIC CAPACITORS

### ◆SURFACE MOUNT

Digitalization

**Downsized**

MVA 85℃ High CV
MVE 105℃ High CV

**Low Profile**

MVS 4.5mmL

**Low Impedance**

MLA 105℃ 3,000H → NEW! MZD 105℃ 5,000H
Longer life
Longer life
MVY 105℃ → MZA 105℃ 2,000H
Lower Z

**Large size (φ12.5 to φ18)**

MVA 85℃ High CV
MVE 105℃ High CV
MVY 105℃ Low Z
MVH 125℃

**SURFACE MOUNT (Vertical)**

MV 85℃
MKA 105℃
MVK 105℃
Higher Reflow Temp.

**105℃ Long Life**

MVJ 2,000H → MVL 3,000/5,000H → NEW! MLD 5,000H
Longer life
Longer life
NEW! MKB 3,000H

**High Temperature**

NEW! MHB 125℃
MVH 125℃

Automotive Application

### ◆RADIAL LEAD

Low Profile

**5mmL**

SRM 85℃
High CV
SRE 85℃ KRE 105℃

**7mmL & Low Profile**

SRG 85℃ KRG 105℃
High CV
SRA 85℃ KMA 105℃

**105℃ Low Impedance**

Power Supply Output Filter

LXY High Reliability → LXZ High Reliability
LXV Low Z
Lower Z
KY Long Life・Low Z → KZE Lower Z → KZH Lower Z → KZM Long Life・Low Z

**RADIAL TYPE STANDARD**

SMG 85℃ Standard
KMG 105℃ Standard
SMH 160 to 450V
KMH 160 to 450V
SMQ 85℃ Downsize
KMQ 105℃ Downsize

**No Sparks against Over-voltage**

KLG 2,000H → KLJ 2,000H
Downsized

**High Ripple Current / Longlife**

PAG 2,000H → KXG 8,000/10,000H → Upgrade! KXJ 10,000/12,000H
Downsized

Adapter/ Ballast

**For Strobe**

PH

**For Motherboard**

KZG → KZJ
Lower Z
Lower Z
NEW! KZV

**Low LC**

LLA 85℃

**Long Life**

FL 3,000H

**High Temperature (125℃)**

GXE 2,000 to 5,000H
GXL 5,000/10,000H
GPA 3,000/5,000H

Automotive Application

**High Temperature (150℃)**

NEW! GHA

**For Airbag**

LBG



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# GROUP CHART

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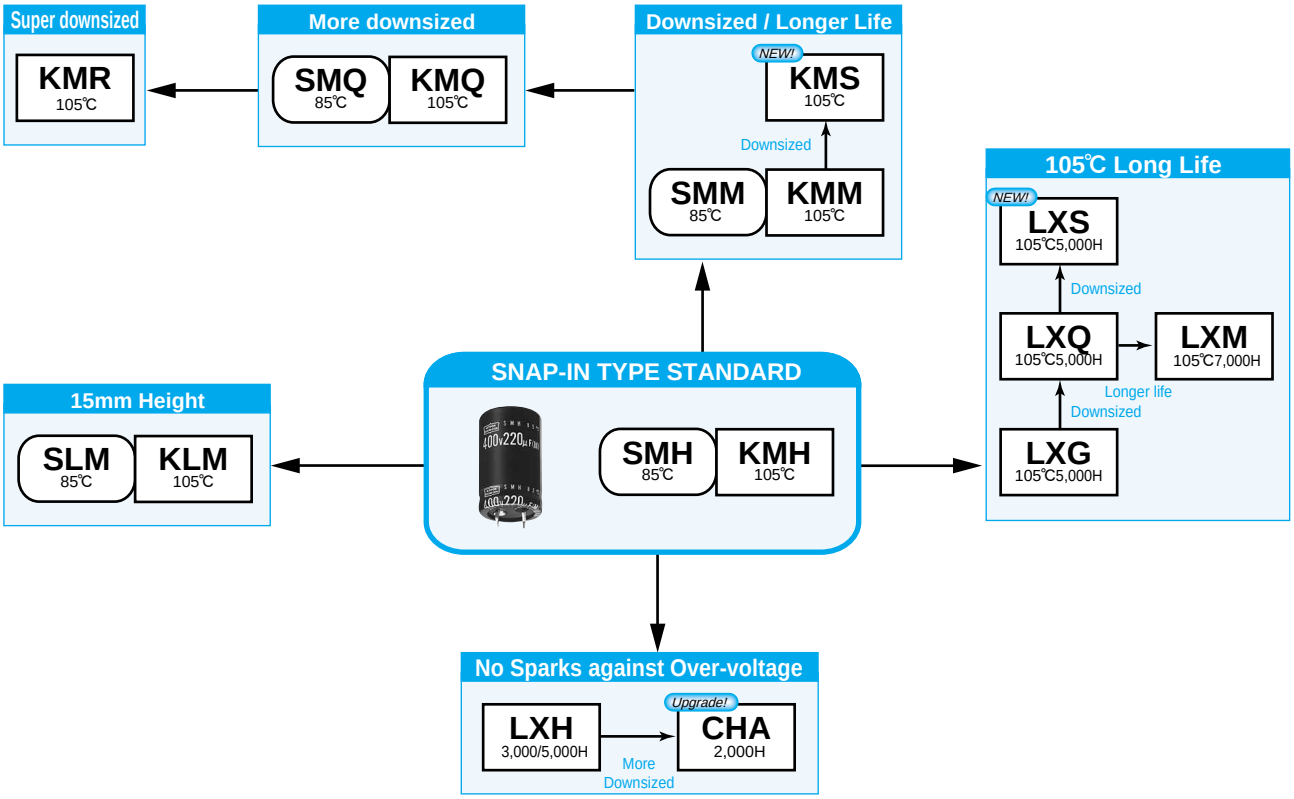
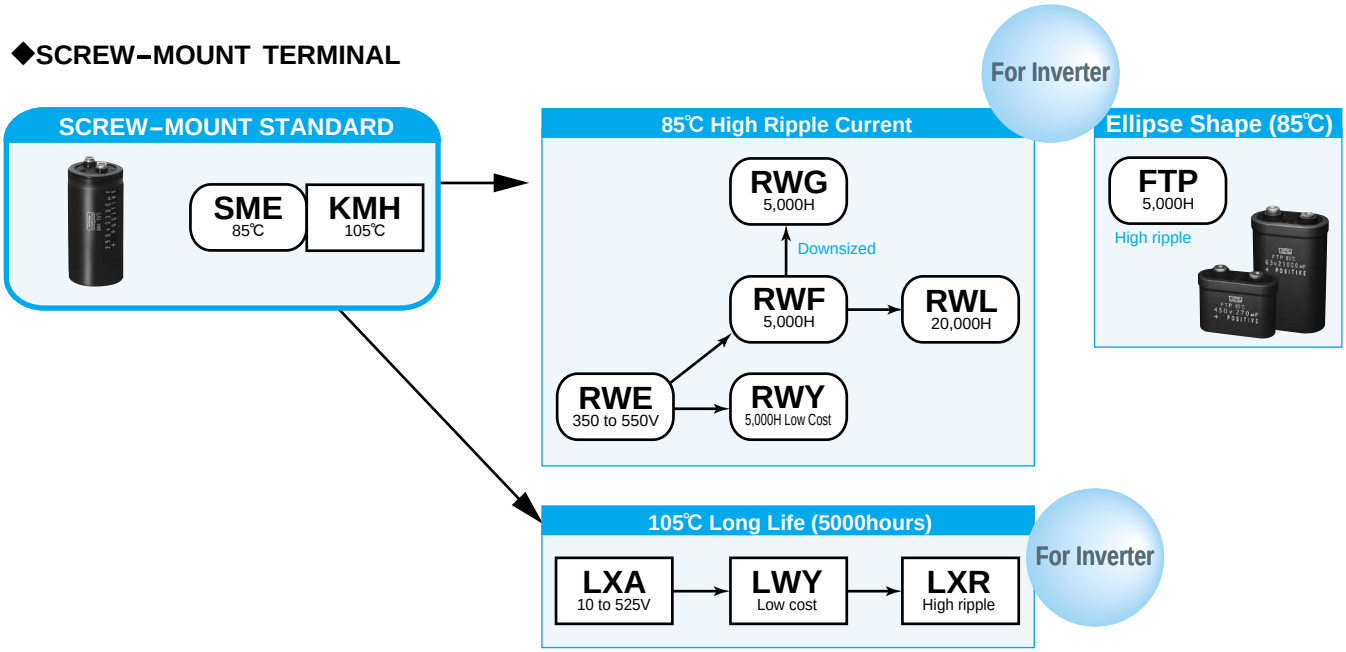
## ALUMINUM ELECTROLYTIC CAPACITORS

### ◆SNAP-IN




### ◆SCREW–MOUNT TERMINAL



# PRECAUTIONS AND GUIDELINES (Conductive Polymer)

The NPCAP™ is a Conductive Polymer Solid Aluminum Capacitor that uses highly conductive polymer electrolytic material.
Please read the following in order to get the most out of your NPCAP™ capacitor.
For aluminum electrolytic capacitors, please refer to PRECAUTIONS AND GUIDELINES.

## Designing Device Circuits

### 1 Types of Circuits Where NPCAP™ Capacitors are Not to be Used

The leakage current in conductive polymer solid aluminum capacitors (hereafter called capacitors) may vary depending on thermal stresses during soldering. Avoid the use of capacitors in the following types of circuits:

a) High-impedance circuits that are to sustain voltages.
b) Coupling circuits
c) Time constant circuits
Because the capacitance varies depending on the environment the capacitors are used in, there is a possibility that the capacitor affects the time constant circuit where sensitivity to variation in capacitance is required.
d) Other circuits that are significantly affected by leakage current

### 2 Circuit Design

Verify the following before designing the circuit:

a) The electrical characteristics of the capacitor will vary depending on differences in temperature and frequency. Perform circuit design after verifying the scope of these factors.
b) When connecting two or more capacitors in parallel, ensure that the design takes current balancing into account.
c) When two or more capacitors are connected in series, variability in applied voltage may cause over-voltage conditions. Contact Nippon Chemi-Con before using capacitors connected in series.

### 3 Use in High Reliable and Critical Applications

Consult with Nippon Chemi-Con before using these capacitors in applications involving human life: Aviation/space equipment, Nuclear power equipment, Medical equipment and Automotive equipment, or in applications where capacitor failure could have a major impact on society.

### 4 Polarity

The NPCAP™ is a polarized solid aluminum electrolytic capacitor. Do not apply either reverse voltages or AC voltages to the polarized capacitors, using reversed polarity may cause a short circuit. Refer to the catalog, product specifications or capacitor body to confirm the polarity prior to use.

### 5 Operating Voltage

Do not apply DC voltages exceeding the full rated voltage. The peak voltage of superimposed AC voltages (ripple voltages) on DC voltages must not exceed the full rated voltage. While there are specifications for surge voltages exceeding the rated voltage, usage conditions apply, and continued operation for extended periods of time under such conditions cannot be guaranteed.

### 6 Ripple Current

Do not apply currents in excess of the rated ripple current. The superimposition of a large ripple current increases the rate of heating within the capacitor. This may reduce the service life of the capacitor or damage the capacitor.

### 7 Operating Temperature

Do not use the capacitor at high temperatures (temperatures exceeding the maximum temperature for the capacitor category). Use of the capacitor outside of the maximum temperature for the capacitor category may decrease the service life of the capacitor.

### 8 Charging and Discharging the Capacitor

Do not use the NPCAP™ capacitor in circuits where the capacitor is repetitively charged and discharged rapidly. Repetitively charging and discharging the capacitor rapidly may reduce the capacitance or may cause damage due to internal heating. Use of a protective circuit to ensure reliability is recommended when rush currents exceed 20A.

### 9 Failures and Service Life

Based on the JIS C 5003 Standard, the failure rate for NPCAP™ capacitors (with a 60% reliability standard) is as follows:

* in case of the endurance of 2,000 hours at 105℃:
0.5%/1,000 hours (at an ambient temperature of 105℃ at rated voltage)
* in case of the endurance of 1,000 hours at 105℃ or 1,000 hours at 125℃:
1.0%/1,000 hours (at an ambient temperature of 105℃ at rated voltage)

a) Failure Modes
The main causes of failure are thermal stresses caused by the solder reflow process or thermal use environment, along with electrical stresses and mechanical stresses. The most common capacitor failure mode is the short circuit mode, where the following phenomenon may occur after shorting:
(1) If the pass-through current when the product is shorted is 1A or less, then the product becomes heated, but no effects are visible, even when the current is continuously carried. However, larger currents may cause substantial internal heating that causes the rubber seal to separate from the case, causing the release of an odorous gas.
(2) Some flammable materials are used in the capacitor. If an extremely large electric current flows through the capacitor after shorting, the shorted part may spark, and in a worst-case scenario, may ignite. Consequently, ensure safety by fully considering the design issues described below when using this capacitor in equipment where safety is a priority.
• Increase safety by using in conjunction with a protective circuit or protective equipment.
• Install measures such as redundant circuits so that the failure of a part of equipment will not cause unstable operation.

b) Service Life
NPCAP™ uses rubber as the sealing material, so the service life depends on the thermal deterioration of this rubber. Consequently, it is recommended to use the capacitor at a lower temperature than the maximum temperature for the capacitor category as much as possible.

### 10 Capacitor Insulation

Ensure electrical insulation between the capacitor case, negative electrode, positive electrode and circuit pattern.

### 11 Capacitor Usage Environment

Do not use/expose capacitors to the following conditions.

a) Oil, water, salty water, take care to avoid storage in damp locations.
b) Direct sunlight
c) Toxic gases such as hydrogen, sulfide, sulfurous acids, nitrous acids, chlorine and chlorine compounds, bromine and bromine compounds, ammonia, etc.
d) Ozone, ultraviolet rays and radiation.
e) Severe vibration or mechanical shock conditions beyond the

# PRECAUTIONS AND GUIDELINES (Conductive Polymer)

limits advised in the product specification section of the catalog.

### 12 Capacitor mounting

a) For the surface mount capacitor, design the copper pads on the PC board in accordance with the catalog or the product specification
b) For radial capacitors, design the terminal holes on the PC board to fit the terminal pitch of the capacitor.

## Installing Capacitors

### 1 Installing

a) Do not reuse capacitors already assembled in equipment that have been exposed to power.
b) The capacitor may have self charge. If this happens, discharge the capacitor 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. This may also occur if the capacitors are stored for a longer period than the period which is specified in the catalog or the product specification. In this case, they can be reformed by the voltage treatment through a resistor of approximately 1kΩ.
d) Verify the rated capacitance and voltage of the capacitors when installing.
e) Verify the polarity of the capacitors.
f) Do not use the capacitors if they have been dropped on the floor.
g) Do not deform the case of the capacitors.
h) Verify that the lead spacing of the capacitor fits the hole spacing in the PC board before installing the capacitors.
i) Do not apply any mechanical force in excess of the limits prescribed in the catalog or the product specification of the capacitors. Avoid subjecting the capacitor to strong forces, as this may break the electrode terminals, bend or deform the capacitor, or damage the packaging, and may also cause short/open circuits, increased leakage current, or damage the appearance. 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 Heat Resistance during Soldering

Ensure that the soldering conditions meet the specifications recommended by Nippon Chemi-Con. Note that the leakage current may increase due to thermal stresses that occur during soldering, etc. Note that increased leakage currents gradually decrease when voltage is applied.
a) Verify the following before using a soldering iron:
- That the soldering conditions (temperature and time) are within the ranges specified in the catalog or product specifications.
- That the tip of the soldering iron does not come into contact with the capacitor itself.

b) Verify the following when 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 catalog 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) Verify the following when reflow soldering:
- Soldering conditions (preheat, solder temperature and soldering time) should be within the limits prescribed in the catalogs or the product specification.
- The heat level should be appropriate. (Note that the thermal stress on the capacitor varies depending on the type and position of the heater in the reflow oven, and the color and material of the capacitor.)
- Vapor phase soldering (VPS) is not used.
- Except for the surface mount type, reflow soldering must not be used for the capacitors.

d) Do not reuse a capacitor that has already been soldered to PC board and then removed. When using a new capacitor in the same location, remove the flux, etc. first, and then use a soldering iron to solder on the new capacitor in accordance with the specifications.
e) Confirm before running into soldering that the capacitors are for reflow soldering.

### 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 assembled board.

### 4 Cleaning PC boards

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 catalog or the product specification. In particular, ultrasonic cleaning will accelerate damage to 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 markings.

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) for 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 a voltage is applied. This corrosion causes an extremely high leakage current which results venting and an open circuit.

If the new types of cleaning agents mentioned below are used, the following are recommended as cleaning conditions for some of new cleaning agents.

**-Higher alcohol cleaning agents**
Pine Alpha ST-100S (Arakawa Chemical)

# PRECAUTIONS AND GUIDELINES (Conductive Polymer)

Clean Through 750 H, 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 which can be caused by contact with other components or the PC board. Note that shower cleaning adversely affects the markings on the sleeve.

**-Non-Halogenated Solvent Cleaning**
AK225AES (Asahi Glass)
Cleaning Conditions:
Ultrasonic or vapor cleaning for 5 minutes. However, from an environmental point of view, these types of solvent will be banned in near future. We would recommend not using them if at all possible.

**-Isopropyl Alcohol (IPA)**
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 left over 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 catalog or the product specification for the capacitors.
- Covering over the whole surface of the capacitor rubber seal with resin may result in a hazardous condition because the inside pressure cannot be completely released. 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.
- Consider that some solvents in the adhesives and coating materials may make the capacitor surface matt or result in whitening.

### 6 Fumigation

In many cases when exporting or importing electronic devices, such as capacitors, wooden packaging is used. In order to control insects it may become necessary to fumigate the shipment. Precautions during “Fumigation” using halogenated chemical such as Methyl Bromide must be taken. Halogen gas can penetrate packaging materials such as cardboard boxes and vinyl bags. Penetration of the halogenated gas can cause corrosion of Electrolytic capacitors. Nippon Chemi-Con gives consideration to the packaging materials not to require the Fumigation. Verify whether the assembled PC board, products and capacitors themselves are subjected to Fumigation during their transportation or not.

## The Operation of Devices

a) Do not touch the capacitor terminals directly.
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 circumstances where they would be subject to exposure to the following materials
- Oil, water, salty water or damp location.
- Direct sunlight.
- Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or its compounds, and ammonium.
- Ozone, ultraviolet rays or radiation.
- Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalog 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. 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
- Electrical characteristics: leakage current, capacitance, tan$\delta$ and other characteristics prescribed in the catalog or product specification.
- We recommend replacing the capacitors if the parts are out of specification.

## Contingencies

a) If gas has vented from the capacitor during use, there is a short circuit and burning, or the capacitor discharges an odor or smoke, turn off the main power supply to the equipment or unplug the power cord.
b) If there is a problem with the capacitor or a fire breaks out, the capacitor may produce a burning gas or reactive gas from the outer resin, etc. If this happens, keep your hands and face away from the gas. If vented gas is inhaled or comes into contact with your eyes, flush your eyes immediately with water and/or gargle. If vented gas comes into contact with the skin, wash the affected area thoroughly with soap and water.

## Storage

We recommend the following conditions for storage.
a) Store capacitors in a cool, dry place. Store at a temperature between 5 and 35℃, with a humidity of 75% or less.
(table-1)

| | Befor the bag is opened | After the bag is opened |
|---|---|---|
| SMD | Within 3 years after manufacturing | Within 6 months after the bag is opend |
| Radial | Within 3 years after manufacturing | – |

SMD products are sealed in a special laminated aluminum bag. Use all capacitors once the bag is opened. Return unused capacitors to the bag, and seal it with a zipper. Please refer to (Table -1) for storage conditions. Be sure to follow our recommendations for reflow soldering.
b) Store the capacitors in a location free from direct contact with water, salt water, and oil.
c) Store in a location where the capacitor is not exposed to toxic gas, such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or chlorine compounds, bromine or other halogen gases, methyl bromide or other halogen compounds, ammonia, or similar.
d) Store in a location where the capacitor is not exposed to ozone, ultraviolet radiation, or other radiation.
e) It is recommended to store capacitors in their original packaging wherever possible.
f) The JEDEC J-STD-020 (Rev. C) standard does not apply.

# PRECAUTIONS AND GUIDELINES (Conductive Polymer)

## Disposal

Please consult a local specialist regarding the disposal of industrial waste when disposing of aluminum electrolytic capacitors.

## Catalogs

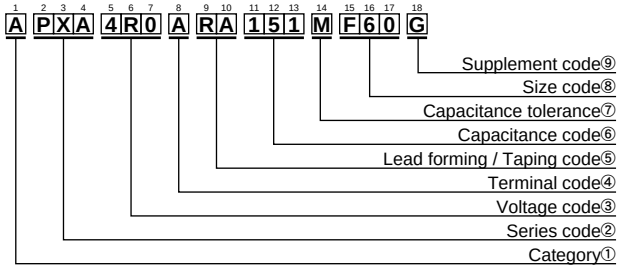
Specifications in the catalogs may be subject to change without notice. For more details of precautions and guidelines for aluminum electrolytic capacitors, please refer to Engineering Bulletin No. 634A.

# PART NUMBERING SYSTEM

## A guide to global code (Conductive polymer)

### (Example : PXA series, 4V-150μF, φ6.3×5.7L)

Refer to the following table about global code for conductive polymer type




①Category

| Contents | Code |
|---|---|
| | 1st |
| Polar | A |

②Series code

| Series name | Code | | |
|---|---|---|---|
| | 2nd | 3rd | 4th |
| PXA | P | X | A |
| PSA | P | S | A |
| PS | P | S | — |

③Voltage code

| Voltage (V) | Code | | |
|---|---|---|---|
| | 5th | 6th | 7th |
| 2.5 | 2 | R | 5 |
| 4 | 4 | R | 0 |
| 6.3 | 6 | R | 3 |
| 10 | 1 | 0 | 0 |
| 16 | 1 | 6 | 0 |
| 20 | 2 | 0 | 0 |
| 25 | 2 | 5 | 0 |
| 35 | 3 | 5 | 0 |

④Terminal code

| Type | Code |
|---|---|
| | 8th |
| SMD | A |
| Radial lead | E |

⑤Lead forming code (Radial lead type)

| Type | Contents | Code | |
|---|---|---|---|
| | | 9th | 10th |
| Lead forming (Radial lead /Bulk) | Straight | L | L |
| | CC(3.5mm) | C | 3 |
| | CC(5.0mm) | C | 5 |
| Taping (Radial lead) | Straight | T | D |

⑤Taping code (SMD)

| Type | Taping contents | Reel dia. (mm) | Code | | Application size φD (mm) |
|---|---|---|---|---|---|
| | | | 9th | 10th | |
| Taping (SMD) | Reel for resuse | 380 | R | A | φD=4 to 10 |
| | Reel for resuse | 330 | R | B | φD=8 to 10 |

Refer product guide for taping specifications.

⑥Capacitance code

| Cap. (μF) | Code | | |
|---|---|---|---|
| | 11th | 12th | 13th |
| 10 | 1 | 0 | 0 |
| 22 | 2 | 2 | 0 |
| 27 | 2 | 7 | 0 |
| 33 | 3 | 3 | 0 |
| 39 | 3 | 9 | 0 |
| 47 | 4 | 7 | 0 |
| 56 | 5 | 6 | 0 |
| 68 | 6 | 8 | 0 |
| 82 | 8 | 2 | 0 |
| 100 | 1 | 0 | 1 |
| 120 | 1 | 2 | 1 |
| 150 | 1 | 5 | 1 |
| 180 | 1 | 8 | 1 |
| 220 | 2 | 2 | 1 |
| 270 | 2 | 7 | 1 |
| 330 | 3 | 3 | 1 |
| 390 | 3 | 9 | 1 |
| 470 | 4 | 7 | 1 |
| 560 | 5 | 6 | 1 |
| 680 | 6 | 8 | 1 |
| 820 | 8 | 2 | 1 |
| 1,000 | 1 | 0 | 2 |
| 1,200 | 1 | 2 | 2 |
| 1,500 | 1 | 5 | 2 |

⑦Capacitance tolerance

| Tol. (%) | Code |
|---|---|
| | 14th |
| ±20 | M |

⑧Size code (Radial lead type)

| φD | Code |
|---|---|
| | 15th |
| 6.3 | F |
| 8 | H |
| 10 | J |

| L | Code | |
|---|---|---|
| | 16th | 17th |
| 8 | 0 | 8 |
| 10.5 | A | 5 |
| 11.5 | B | 5 |
| 12.5 | C | 5 |

⑧Size code (SMD)

| φD | Code |
|---|---|
| | 15th |
| 5 | E |
| 6.3 | F |
| 8 | H |
| 10 | J |

| L | Code | |
|---|---|---|
| | 16th | 17th |
| 5.2 | 5 | 5 |
| 5.7 | 6 | 0 |
| 6.7 | 7 | 0 |
| 7.7 | 8 | 0 |
| 10 | A | 0 |
| 12 | C | 0 |
| 12.2 | C | 0 |

⑨Supplement code

| Classification | Code |
|---|---|
| Type | 18th |
| SMD | G |
| Radial lead | S |

* Refer to the appendix (Global code) for codes does not listed.

NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

New!

## NPCAP™-PXF Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
- Rated voltage range : 2.5 to 6.3Vdc, Capacitance range : 220 to 1,000µF
- Case size range : φ6.3×5.8L to φ8×7.7L
- Suitable for DC-DC converters, voltage regulators and decoupling applications used to computer motherboards etc.
- **RoHS Compliant**

PXF
↑ Lower ESR
PXE

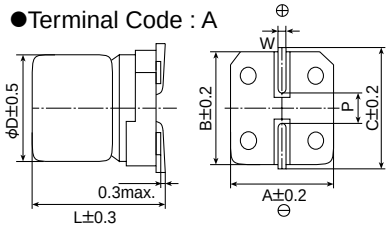
## ◆SPECIFICATIONS

| Items | Characteristics |
|---|---|
| **Category Temperature Range** | −55 to +105℃ |
| **Rated Voltage Range** | 2.5 to 6.3Vdc |
| **Capacitance Tolerance** | ±20% (M) (at 20℃, 120Hz) |
| **Surge Voltage** | Rated voltage×1.15V (at 105℃) |
| **Leakage Current** | I=0.3CV<br>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<br>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 2,000 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 1,000 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 1,000 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 1,000 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]

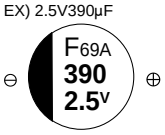
●Terminal Code : A




| Size Code | φD | L | A | B | C | W | P |
|---|---|---|---|---|---|---|---|
| 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 |
| H70 | 8 | 6.7 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |
| H80 | 8 | 7.7 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |

## ◆MARKING

EX) 2.5V390µF




## ◆PART NUMBERING SYSTEM

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | P | X | F | | | | A | R | A | | | | M | | | | G |

- Supplement code
- Size code
- Capacitance tolerance code
- Capacitance code (ex. 330µF:331, 1,000µF:102)
- Taping code
- Terminal code
- Voltage code (ex. 2.5V:2R5, 6.3V:6R3)
- Series code
- Category

Please refer to "A guide to global code (conductive polymer type)"



CAT. No. E1001G

NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

New!
NPCAP™-PXF Series

## ◆STANDARD RATINGS

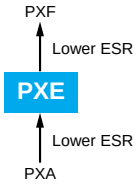
| WV (Vdc) | Cap (μF) | Size code | ESR (mΩmax/20℃, 100kHz) | Rated ripple current (mArms/100k to 300kHz) -55 to +105℃ | Part No. |
|---|---|---|---|---|---|
| 2.5 | 390 | F61 | 10 | 3,900 | APXF2R5ARA391MF61G |
| | 470 | F80 | 9 | 4,200 | APXF2R5ARA471MF80G |
| | 560 | F80 | 9 | 4,200 | APXF2R5ARA561MF80G |
| | 560 | H70 | 9 | 4,500 | APXF2R5ARA561MH70G |
| | 680 | H70 | 9 | 4,500 | APXF2R5ARA681MH70G |
| | 1,000 | H80 | 9 | 4,500 | APXF2R5ARA102MH80G |
| 4 | 330 | F61 | 10 | 3,900 | APXF4R0ARA331MF61G |
| | 390 | F80 | 9 | 4,200 | APXF4R0ARA391MF80G |
| | 470 | H70 | 9 | 4,500 | APXF4R0ARA471MH70G |
| | 560 | H70 | 9 | 4,500 | APXF4R0ARA561MH70G |
| | 680 | H80 | 9 | 4,500 | APXF4R0ARA681MH80G |
| 6.3 | 220 | F61 | 10 | 3,900 | APXF6R3ARA221MF61G |
| | 270 | F80 | 9 | 4,200 | APXF6R3ARA271MF80G |
| | 330 | F80 | 9 | 4,200 | APXF6R3ARA331MF80G |
| | 330 | H70 | 9 | 4,500 | APXF6R3ARA331MH70G |
| | 390 | H70 | 9 | 4,500 | APXF6R3ARA391MH70G |
| | 470 | H80 | 9 | 4,500 | APXF6R3ARA471MH80G |
| | 560 | H80 | 9 | 4,500 | APXF6R3ARA561MH80G |

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

Upgrade!

## NPCAP™-PXE 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 : 33 to 2,700μF
- Case size range : φ5×5.8L to φ10×12.2L
- Suitable for DC-DC converters, voltage regulators and decoupling applications used to computer motherboards etc.
- **RoHS Compliant**

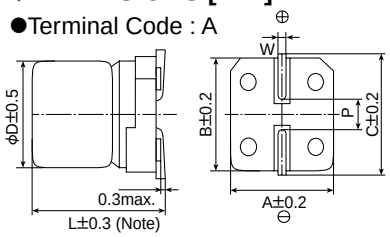
## ◆SPECIFICATIONS

| 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.)<br>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<br>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 2,000 hours at 105℃.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial value<br>DF (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>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 1,000 hours.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial value<br>DF (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>Leakage current: ≦The initial specified value |
| **Surge Voltage** | The capacitors shall be subjected to 1,000 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.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial value<br>DF (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>Leakage current: ≦The initial specified value |
| **Failure Rate** | 1% per 1,000 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]

●Terminal Code : A




(Note) L±0.5 for HA0, HC0, JA0, JC0

| Size Code | φD | L | A | B | C | W | P |
|---|---|---|---|---|---|---|---|
| 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 |
| H70 | 8 | 6.7 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |
| H80 | 8 | 7.7 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |
| HA0 | 8 | 10.0 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |
| HC0 | 8 | 12.0 | 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 |
| JA0 | 10 | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC0 | 10 | 12.2 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆MARKING

EX) 2.5V390μF


## ◆PART NUMBERING SYSTEM

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | P | X | E | | | | A | R | A | | | | M | | | | G |

- 18 Supplement code
- 15–17 Size code
- 14 Capacitance tolerance code
- 11–13 Capacitance code (ex. 47μF:470,100μF:101)
- 8–10 Taping code
- 5–7 Terminal code
- 4 Voltage code (ex. 6.3V:6R3,10V:100)
- 2–3 Series code
- 1 Category

Please refer to "A guide to global code (conductive polymer type)"



CAT. No. E1001G

NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

Upgrade!

NPCAP™-PXE Series

## ◆STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size code | ESR (mΩmax/20℃, 100kHz) | Rated ripple current (mArms/105℃, 100k to 300kHz) | Part No. |
|---|---|---|---|---|---|
| 2.5 | 180 | E61 | 21 | 2,670 | APXE2R5ARA181ME61G |
| | 390 | F61 | 15 | 3,160 | APXE2R5ARA391MF61G |
| | 470 | F80 | 13 | 3,600 | APXE2R5ARA471MF80G |
| | 560 | F80 | 13 | 3,600 | APXE2R5ARA561MF80G |
| | 560 | H70 | 13 | 4,100 | APXE2R5ARA561MH70G |
| | 680 | H70 | 13 | 4,100 | APXE2RA5RA681MH70G |
| | 820 | H80 | 12 | 4,260 | APXE2R5ARA821MH80G |
| | 820 | HC0 | 9 | 5,400 | APXE2R5ARA821MHC0G |
| | 1,000 | H80 | 12 | 4,260 | APXE2R5ARA102MH80G |
| | 1,500 | HA0 | 10 | 5,220 | APXE2R5ARA152MHA0G |
| | 1,500 | HC0 | 9 | 5,400 | APXE2R5ARA152MHC0G |
| | 1,200 | J80 | 13 | 4,450 | APXE2R5ARA122MJ80G |
| | 2,200 | JA0 | 10 | 5,500 | APXE2R5ARA222MJA0G |
| | 2,700 | JC0 | 9 | 5,600 | APXE2R5ARA272MJC0G |
| 4 | 100 | E61 | 22 | 2,610 | APXE4R0ARA101ME61G |
| | 150 | E61 | 22 | 2,610 | APXE4R0ARA151ME61G |
| | 270 | F61 | 15 | 3,160 | APXE4R0ARA271MF61G |
| | 330 | F61 | 15 | 3,160 | APXE4R0ARA331MF61G |
| | 390 | F80 | 14 | 3,470 | APXE4R0ARA391MF80G |
| | 470 | H70 | 14 | 3,950 | APXE4R0ARA471MH70G |
| | 560 | H70 | 14 | 3,950 | APXE4R0ARA561MH70G |
| | 680 | H80 | 13 | 3,950 | APXE4R0ARA681MH80G |
| | 1,000 | HA0 | 10 | 5,220 | APXE4R0ARA102MHA0G |
| | 1,000 | J80 | 14 | 4,300 | APXE4R0ARA102MJ80G |
| | 1,200 | HC0 | 9 | 5,400 | APXE4R0ARA122MHC0G |
| | 1,200 | JA0 | 10 | 5,500 | APXE4R0ARA122MJA0G |
| | 1,500 | JA0 | 10 | 5,500 | APXE4R0ARA152MJA0G |
| | 1,800 | JA0 | 10 | 5,500 | APXE4R0ARA182MJA0G |
| | 1,800 | JC0 | 9 | 5,600 | APXE4R0ARA182MJC0G |
| 6.3 | 100 | E61 | 24 | 2,500 | APXE6R3ARA101ME61G |
| | 120 | E61 | 24 | 2,500 | APXE6R3ARA121ME61G |
| | 220 | F61 | 15 | 3,160 | APXE6R3ARA221MF61G |
| | 270 | F80 | 14 | 3,470 | APXE6R3ARA271MF80G |
| | 330 | F80 | 14 | 3,470 | APXE6R3ARA331MF80G |
| | 330 | H70 | 14 | 3,950 | APXE6R3ARA331MH70G |
| | 390 | H70 | 14 | 3,950 | APXE6R3ARA391MH70G |
| | 470 | H80 | 13 | 3,950 | APXE6R3ARA471MH80G |
| | 820 | HA0 | 12 | 4,770 | APXE6R3ARA821MHA0G |
| | 820 | HC0 | 10 | 5,150 | APXE6R3ARA821MHC0G |
| | 820 | J80 | 14 | 4,300 | APXE6R3ARA821MJ80G |
| | 1,200 | JA0 | 12 | 5,025 | APXE6R3ARA122MJA0G |
| | 1,500 | JA0 | 12 | 5,025 | APXE6R3ARA152MJA0G |
| | 1,500 | JC0 | 10 | 5,500 | APXE6R3ARA152MJC0G |
| 10 | 47 | E61 | 28 | 2,310 | APXE100ARA470ME61G |
| | 56 | E61 | 28 | 2,310 | APXE100ARA560ME61G |
| | 68 | E61 | 28 | 2,310 | APXE100ARA680ME61G |
| | 120 | F61 | 25 | 2,530 | APXE100ARA121MF61G |
| | 150 | F80 | 21 | 2,880 | APXE100ARA151MF80G |
| | 220 | H70 | 21 | 3,220 | APXE100ARA221MH70G |
| | 270 | H70 | 21 | 3,220 | APXE100ARA271MH70G |
| | 330 | H80 | 19 | 3,390 | APXE100ARA331MH80G |
| | 390 | HA0 | 17 | 4,000 | APXE100ARA391MHA0G |
| | 470 | J80 | 19 | 3,800 | APXE100ARA471MJ80G |
| | 680 | JA0 | 13 | 4,820 | APXE100ARA681MJA0G |
| 16 | 33 | E61 | 35 | 2,070 | APXE160ARA330ME61G |
| | 39 | E61 | 35 | 2,070 | APXE160ARA390ME61G |
| | 68 | F61 | 28 | 2,390 | APXE160ARA680MF61G |
| | 82 | F80 | 24 | 2,700 | APXE160ARA820MF80G |
| | 100 | F80 | 24 | 2,700 | APXE160ARA101MF80G |
| | 100 | H70 | 24 | 3,010 | APXE160ARA101MH70G |
| | 120 | H70 | 24 | 3,010 | APXE160ARA121MH70G |
| | 150 | H80 | 22 | 3,150 | APXE160ARA151MH80G |
| | 180 | HA0 | 18 | 3,890 | APXE160ARA181MHA0G |
| | 220 | HA0 | 18 | 3,890 | APXE160ARA221MHA0G |
| | 220 | J80 | 22 | 3,450 | APXE160ARA221MJ80G |
| | 330 | JA0 | 16 | 4,350 | APXE160ARA331MJA0G |

NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

## Upgrade! NPCAP™-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 : φ4×5.2L to φ10×12.2L (Case code F45 was newly added)
- Suitable for DC-DC converters, voltage regulators and decoupling applications used to computer motherboards etc.
- **RoHS Compliant**

PXE
↑ Lower ESR
PXA

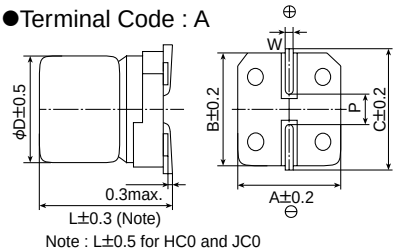
## ◆SPECIFICATIONS

| 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(V)×1.15 (Rated voltage 2.5 to 20Vdc, 25Vdc) / Rated voltage(V)×1.00 (Rated voltage 23Vdc) (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<br>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 2,000 hours (F45 : 1,000 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 1,000 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 1,000 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 1,000 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]

●Terminal Code : A




Note : L±0.5 for HC0 and JC0

| Size 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 |
| E60 | 5 | 5.2 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.4 |
| F45 | 6.3 | 4.4 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| 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 |
| HC0 | 8 | 12.0 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |
| JC0 | 10 | 12.2 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆MARKING

EX) 16V39μF


## ◆PART NUMBERING SYSTEM

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | P | X | A | | | | A | R | A | | | | M | | | | G |

- 18 Supplement code
- 15-17 Size code
- 14 Capacitance tolerance code
- 11-13 Capacitance code (ex. 10μF:100,100μF:101)
- 9-10 Taping code
- 8 Terminal code
- 5-7 Voltage code (ex. 6.3V:6R3,10V:100)
- 4 Series code
- 1 Category

Please refer to "A guide to global code (conductive polymer type)"



CAT. No. E1001G

NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

Upgrade!
NPCAP™-PXA Series

## ◆STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size code | Leakage current (μAmax/ after 2 min.) | ESR (mΩmax/ 20℃, 100kHz) | Rated ripple current (mArms/100k to 300kHz) -55 to +105℃ | Part No. |
|---|---|---|---|---|---|---|
| 2.5 | 220 | F55 | 110 | 25 | 2,500 | APXA2R5ARA221MF55G |
| | 220 | F60 | 110 | 25 | 2,500 | APXA2R5ARA221MF60G |
| | 560 | H70 | 280 | 23 | 3,100 | APXA2R5ARA561MH70G |
| | 680 | HC0 | 340 | 12 | 4,770 | APXA2R5ARA681MHC0G |
| | 1,000 | J80 | 500 | 19 | 4,240 | APXA2R5ARA102MJ80G |
| | 1,500 | JC0 | 750 | 10 | 5,500 | APXA2R5ARA152MJC0G |
| 4 | 33 | D55 | 66 | 200 | 740 | APXA4R0ARA330MD55G |
| | 100 | F55 | 80 | 26 | 2,450 | APXA4R0ARA101MF55G |
| | 100 | F60 | 80 | 26 | 2,450 | APXA4R0ARA101MF60G |
| | 120 | F45 | 240 | 38 | 1,710 | APXA4R0ARA121MF45G |
| | 150 | E60 | 120 | 30 | 1,490 | APXA4R0ARA151ME60G |
| | 150 | F55 | 120 | 26 | 2,450 | APXA4R0ARA151MF55G |
| | 150 | F60 | 120 | 26 | 2,450 | APXA4R0ARA151MF60G |
| | 220 | H70 | 176 | 25 | 3,020 | APXA4R0ARA221MH70G |
| | 330 | H70 | 264 | 25 | 3,020 | APXA4R0ARA331MH70G |
| | 470 | J80 | 376 | 20 | 4,130 | APXA4R0ARA471MJ80G |
| | 560 | HC0 | 448 | 12 | 4,770 | APXA4R0ARA561MHC0G |
| | 680 | J80 | 544 | 20 | 4,130 | APXA4R0ARA681MJ80G |
| | 820 | JC0 | 656 | 10 | 5,500 | APXA4R0ARA821MJC0G |
| | 1,200 | JC0 | 960 | 10 | 5,500 | APXA4R0ARA122MJC0G |
| 6.3 | 22 | D55 | 69 | 200 | 740 | APXA6R3ARA220MD55G |
| | 47 | E60 | 59 | 35 | 1,380 | APXA6R3ARA470ME60G |
| | 68 | F60 | 86 | 27 | 2,400 | APXA6R3ARA680MF60G |
| | 82 | F45 | 267 | 40 | 1,670 | APXA6R3ARA820MF45G |
| | 82 | F55 | 103 | 27 | 2,400 | APXA6R3ARA820MF55G |
| | 82 | F60 | 103 | 27 | 2,400 | APXA6R3ARA820MF60G |
| | 100 | F45 | 315 | 40 | 1,670 | APXA6R3ARA101MF45G |
| | 100 | E60 | 126 | 35 | 1,380 | APXA6R3ARA101ME60G |
| | 100 | F55 | 126 | 27 | 2,400 | APXA6R3ARA101MF55G |
| | 100 | F60 | 126 | 27 | 2,400 | APXA6R3ARA101MF60G |
| | 120 | F60 | 151 | 27 | 2,400 | APXA6R3ARA121MF60G |
| | 150 | H70 | 189 | 25 | 3,020 | APXA6R3ARA151MH70G |
| | 220 | H70 | 277 | 25 | 3,020 | APXA6R3ARA221MH70G |
| | 330 | J80 | 416 | 20 | 4,130 | APXA6R3ARA331MJ80G |
| | 390 | HC0 | 491 | 12 | 4,770 | APXA6R3ARA391MHC0G |
| | 470 | J80 | 592 | 20 | 4,130 | APXA6R3ARA471MJ80G |
| | 470 | HC0 | 592 | 12 | 4,770 | APXA6R3ARA471MHC0G |
| | 680 | JC0 | 857 | 10 | 5,500 | APXA6R3ARA681MJC0G |
| | 820 | JC0 | 1,033 | 10 | 5,500 | APXA6R3ARA821MJC0G |

| WV (Vdc) | Cap (μF) | Size code | Leakage current (μAmax/ after 2 min.) | ESR (mΩmax/ 20℃, 100kHz) | Rated ripple current (mArms/100k to 300kHz) -55 to +105℃ | Part No. |
|---|---|---|---|---|---|---|
| 10 | 4.7 | D55 | 24 | 240 | 670 | APXA100ARA4R7MD55G |
| | 6.8 | D55 | 34 | 240 | 670 | APXA100ARA6R8MD55G |
| | 10 | D55 | 50 | 220 | 700 | APXA100ARA100MD55G |
| | 15 | D55 | 75 | 200 | 740 | APXA100ARA150MD55G |
| | 33 | E60 | 66 | 40 | 1,270 | APXA100ARA330ME60G |
| | 47 | E60 | 94 | 40 | 1,270 | APXA100ARA470ME60G |
| | 47 | F45 | 235 | 41 | 1,560 | APXA100ARA470MF45G |
| | 47 | F60 | 94 | 31 | 2,250 | APXA100ARA470MF60G |
| | 56 | F55 | 112 | 31 | 2,250 | APXA100ARA560MF55G |
| | 56 | F60 | 112 | 31 | 2,250 | APXA100ARA560MF60G |
| | 120 | H70 | 240 | 27 | 2,800 | APXA100ARA121MH70G |
| | 150 | H70 | 300 | 27 | 2,800 | APXA100ARA151MH70G |
| | 270 | J80 | 540 | 24 | 3,770 | APXA100ARA271MJ80G |
| | 270 | HC0 | 540 | 14 | 4,420 | APXA100ARA271MHC0G |
| | 330 | J80 | 660 | 24 | 3,770 | APXA100ARA331MJ80G |
| | 330 | HC0 | 660 | 14 | 4,420 | APXA100ARA331MHC0G |
| | 470 | JC0 | 940 | 12 | 5,300 | APXA100ARA471MJC0G |
| | 560 | JC0 | 1,120 | 12 | 5,300 | APXA100ARA561MJC0G |
| 16 | 3.3 | D55 | 26 | 260 | 660 | APXA160ARA3R3MD55G |
| | 22 | E60 | 70 | 45 | 1,210 | APXA160ARA220ME60G |
| | 22 | F45 | 176 | 45 | 1,490 | APXA160ARA220MF45G |
| | 33 | F60 | 106 | 37 | 2,050 | APXA160ARA330MF60G |
| | 39 | F55 | 125 | 37 | 2,050 | APXA160ARA390MF55G |
| | 39 | F60 | 125 | 37 | 2,050 | APXA160ARA390MF60G |
| | 82 | H70 | 262 | 30 | 2,700 | APXA160ARA820MH70G |
| | 150 | J80 | 480 | 26 | 3,430 | APXA160ARA151MJ80G |
| | 180 | J80 | 576 | 26 | 3,430 | APXA160ARA181MJ80G |
| | 180 | HC0 | 576 | 16 | 4,360 | APXA160ARA181MHC0G |
| | 220 | JC0 | 704 | 14 | 5,050 | APXA160ARA221MJC0G |
| | 330 | JC0 | 1,056 | 14 | 5,050 | APXA160ARA331MJC0G |
| 20 | 15 | F45 | 150 | 57 | 1,300 | APXA200ARA150MF45G |
| | 22 | F55 | 88 | 50 | 1,650 | APXA200ARA220MF55G |
| | 22 | F60 | 88 | 50 | 1,650 | APXA200ARA220MF60G |
| | 39 | H70 | 156 | 45 | 2,000 | APXA200ARA390MH70G |
| | 47 | H70 | 188 | 45 | 2,000 | APXA200ARA470MH70G |
| | 82 | J80 | 328 | 40 | 2,500 | APXA200ARA820MJ80G |
| 23 | 15 | F45 | 172 | 57 | 1,300 | APXA230ARA150MF45G |
| 25 | 10 | F60 | 125 | 65 | 1,500 | APXA250ARA100MF60G |
| | 22 | H70 | 275 | 50 | 1,800 | APXA250ARA220MH70G |
| | 39 | J80 | 488 | 45 | 2,100 | APXA250ARA390MJ80G |

NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

## NPCAP™-PXH Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
- Suitable for DC-DC converters, voltage regulators and decoupling applications.
- Endurance : 125℃ 1,000 hours
- Rated voltage range : 2.5 to 20Vdc, Capacitance range : 22 to 1,000μF
- Case size range : φ6.3×5.7L to φ10×7.7L
- **RoHS Compliant**





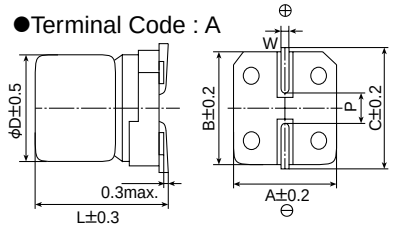
## ◆SPECIFICATIONS

| Items | Characteristics |
|---|---|
| **Category Temperature Range** | −55 to +125℃ |
| **Rated Voltage Range** | 2.5 to 20Vdc |
| **Capacitance Tolerance** | ±20% (M) (at 20℃, 120Hz) |
| **Surge Voltage** | Rated voltage(V)×1.15 (at 105℃) |
| **Leakage Current** | Shall not exceed value 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<br>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 1,000 hours at 125℃.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial value<br>DF (tanδ): ≦200% of the initial specified value<br>ESR: ≦200% of the initial specified value<br>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 1,000 hours.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial value<br>DF (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>Leakage current: ≦The initial specified value |
| **Surge Voltage** | The capacitors shall be subjected to 1,000 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.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial value<br>DF (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>Leakage current: ≦The initial specified value |
| **Failure Rate** | 1% per 1,000 hours maximum (Confidence level 60%) |

*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 125℃.

## ◆DIMENSIONS [mm]

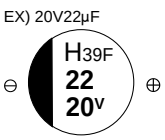
●Terminal Code : A



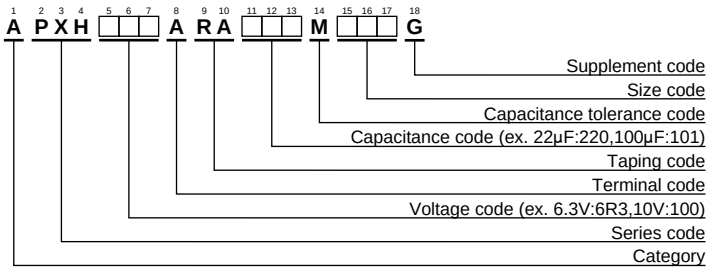

| Size code | φD | L | A | B | C | W | P |
|---|---|---|---|---|---|---|---|
| F60 | 6.3 | 5.7 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| H70 | 8 | 6.7 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |
| J80 | 10 | 7.7 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆MARKING

EX) 20V22μF




## ◆PART NUMBERING SYSTEM




Please refer to "A guide to global code (conductive polymer type)"

NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Surface Mount

## NPCAP™-PXH Series

### ◆STANDARD RATINGS

| WV(Vdc) | Cap(μF) | Size code | Leakage current (μAmax/after 2min.) | ESR (mΩmax/20℃, 100kHz) | Rated ripple current (mArms/100k to 300kHz) | | Part No. |
|---|---|---|---|---|---|---|---|
| | | | | | -55℃ to +105℃ | +105℃ to +125℃ | |
| 2.5 | 220 | F60 | 110 | 35 | 2,500 | 770 | APXH2R5ARA221MF60G |
| | 560 | H70 | 280 | 30 | 3,100 | 960 | APXH2R5ARA561MH70G |
| | 1,000 | J80 | 500 | 25 | 3,700 | 1,100 | APXH2R5ARA102MJ80G |
| 4 | 150 | F60 | 120 | 35 | 2,450 | 770 | APXH4R0ARA151MF60G |
| | 220 | H70 | 176 | 30 | 3,020 | 960 | APXH4R0ARA221MH70G |
| | 680 | J80 | 544 | 25 | 3,700 | 1,100 | APXH4R0ARA681MJ80G |
| 6.3 | 82 | F60 | 103 | 40 | 2,400 | 720 | APXH6R3ARA820MF60G |
| | 100 | F60 | 126 | 40 | 2,400 | 720 | APXH6R3ARA101MF60G |
| | 150 | H70 | 189 | 30 | 3,020 | 960 | APXH6R3ARA151MH70G |
| | 220 | H70 | 277 | 30 | 3,020 | 960 | APXH6R3ARA221MH70G |
| | 470 | J80 | 592 | 25 | 3,700 | 1,100 | APXH6R3ARA471MJ80G |
| 10 | 56 | F60 | 112 | 45 | 2,250 | 680 | APXH100ARA560MF60G |
| | 120 | H70 | 240 | 35 | 2,800 | 880 | APXH100ARA121MH70G |
| | 150 | H70 | 300 | 35 | 2,800 | 880 | APXH100ARA151MH70G |
| | 330 | J80 | 660 | 30 | 3,700 | 1,010 | APXH100ARA331MJ80G |
| 16 | 39 | F60 | 125 | 50 | 2,050 | 650 | APXH160ARA390MF60G |
| | 82 | H70 | 262 | 40 | 2,700 | 830 | APXH160ARA820MH70G |
| | 150 | J80 | 480 | 35 | 3,020 | 930 | APXH160ARA151MJ80G |
| | 180 | J80 | 576 | 35 | 3,020 | 930 | APXH160ARA181MJ80G |
| 20 | 22 | F60 | 88 | 60 | 1,650 | 590 | APXH200ARA220MF60G |
| | 47 | H70 | 188 | 45 | 2,000 | 780 | APXH200ARA470MH70G |
| | 82 | J80 | 328 | 45 | 2,400 | 820 | APXH200ARA820MJ80G |

NIPPON CHEMI-CON

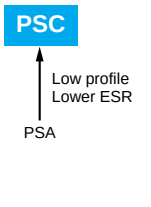
# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

Upgrade!

## NPCAP™-PSC Series

- Super low ESR, high ripple current capability
- Lower profile than PSA (φ8×8L to φ10×12.5L)
- Rated voltage range : 2.5 to 16Vdc
- Nominal capacitance range : 270 to 2,700μF
- Endurance : 2,000 hours at 105℃
- Suitable for DC-DC converters, voltage regulators and decoupling applications for computer motherboards
- **RoHS Compliant**



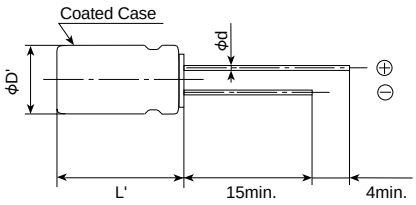

## ◆SPECIFICATIONS

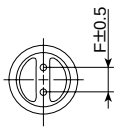
| Items | Characteristics |
|---|---|
| **Category Temperature Range** | −55 to +105℃ |
| **Rated Voltage Range** | 2.5 to 16Vdc |
| **Capacitance Tolerance** | ±20% (M) (at 20℃, 120Hz) |
| **Surge Voltage** | Rated voltage(V)×1.15 (at 105℃) |
| **Leakage Current** *Note | I=0.2CV or 500μA, whichever is greater.<br>Where, I : Leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (Vdc) (at 20℃ after 2 minutes) |
| **Dissipation Factor (tanδ)** | 0.10 max. (at 20℃, 120Hz) |
| **Low Temperature Characteristics (Max.Impedance Ratio)** | Z(−25℃)/Z(+20℃)≦1.15<br>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 2,000 hours at 105℃. |
| | Appearance : No significant damage |
| | Capacitance change : ≦±20% of the initial value |
| | D.F. (tanδ) : ≦150% of the initial specified value |
| | ESR : ≦150% of the initial specified value |
| | Leakage current : ≦The initial specified value |
| **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 1,000 hours. |
| | Appearance : No significant damage |
| | Capacitance change : ≦±20% of the initial value |
| | D.F. (tanδ) : ≦150% of the initial specified value |
| | ESR : ≦150% of the initial specified value |
| | Leakage current : ≦The initial specified value |
| **Surge Voltage Test** | The capacitors shall be subjected to 1,000 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 |
| | 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 1,000 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 60 minutes at 105℃.

## ◆DIMENSIONS [mm]

●Terminal Code : E

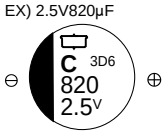



| Size code | H08 | HB5 | JB5 | JC5 |
|---|---|---|---|---|
| φD | 8.0 | 8.0 | 10.0 | 10.0 |
| φd | 0.6 | 0.8 | 0.8 | 0.6 |
| F | 3.5 | 3.5 | 5.0 | 5.0 |
| φD' | φD+0.5max. | | | |
| L' | L+1.0max. | L+1.5max. | | |

## ◆MARKING

EX) 2.5V820μF



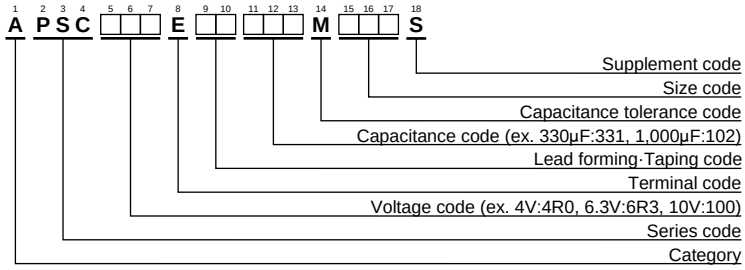
# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

Upgrade!

NPCAP™-PSC Series

## ◆PART NUMBERING SYSTEM




Please refer to "A guide to global code (conductive polymer type)"

## ◆STANDARD RATINGS

| WV(Vdc) | Cap(μF) | Case size φD×L(mm) | Leakage Current (μA) | ESR (mΩ max/20℃, 100k to 300kHz) | Rated ripple current (mArms/105℃, 100kHz) | Part No. |
|---|---|---|---|---|---|---|
| 2.5 | 560 | 8×8 | 500 | 7 | 6,100 | APSC2R5E□□561MH08S |
| | 820 | 8×8 | 500 | 7 | 6,100 | APSC2R5E□□821MH08S |
| | 1,000 | 8×11.5 | 500 | 7 | 6,100 | APSC2R5E□□102MHB5S |
| | 2,700 | 10×11.5 | 1,350 | 8 | 5,560 | APSC2R5E□□272MJB5S |
| 4 | 560 | 8×8 | 500 | 7 | 6,100 | APSC4R0E□□561MH08S |
| | 680 | 8×11.5 | 544 | 7 | 6,100 | APSC4R0E□□681MHB5S |
| | 1,000 | 10×11.5 | 800 | 6 | 6,640 | APSC4R0E□□102MJB5S |
| 6.3 | 470 | 8×8 | 592 | 8 | 5,700 | APSC6R3E□□471MH08S |
| | 820 | 10×11.5 | 1,033 | 7 | 6,640 | APSC6R3E□□821MJB5S |
| | 1,500 | 10×11.5 | 1,890 | 10 | 5,560 | APSC6R3E□□152MJB5S |
| 10 | 390 | 8×11.5 | 780 | 9 | 5,650 | APSC100E□□391MHB5S |
| | 680 | 10×11.5 | 1,360 | 7 | 6,100 | APSC100E□□681MJB5S |
| 16 | 270 | 8×11.5 | 864 | 11 | 5,080 | APSC160E□□271MHB5S |
| | 330 | 10×12.5 | 1,056 | 10 | 6,100 | APSC160E□□331MJC5S |
| | 470 | 10×11.5 | 1,504 | 10 | 6,100 | APSC160E□□471MJB5S |

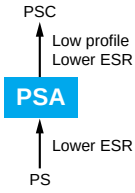
□□ : Fill with appropriate lead forming or taping code.

NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

## NPCAP™-PSA Series




- ●Super low ESR, high temperature resistance and high ripple current capability
- ●Rated voltage range : 2.5 to 16$V_{dc}$
- ●Endurance : 2,000 hours at 105℃
- ●Suitable for DC-DC converters, voltage regulators and decoupling applications for computer motherboards
- ●**RoHS Compliant**

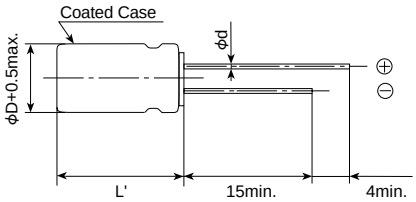
## ◆SPECIFICATIONS

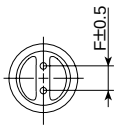
| Items | Characteristics |
|---|---|
| **Category Temperature Range** | −55 to +105℃ |
| **Rated Voltage Range** | 2.5 to 16$V_{dc}$ |
| **Capacitance Tolerance** | ±20% (M) (at 20℃, 120Hz) |
| **Surge Voltage** | Rated voltage(V)×1.15 (at 105℃) |
| **Leakage Current** *Note | I=0.2CV (max.)<br>Where, I : Leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage ($V_{dc}$) (at 20℃ after 2 minutes) |
| **Dissipation Factor (tanδ)** | 0.08 max. (FA5 size : 0.12max.) (at 20℃, 120Hz) |
| **Low Temperature Characteristics (Max. Impedance Ratio)** | Z(−25℃)/Z(+20℃)≦1.15<br>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 2,000 hours at 105℃.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial measured value<br>D.F. (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>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 1,000 hours.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial measured value<br>D.F. (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>Leakage current: ≦The initial specified value |
| **Surge Voltage Test** | The capacitors shall be subjected to 1,000 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.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial measured value<br>D.F. (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>Leakage current: ≦The initial specified value |
| **Failure Rate** | 1% per 1,000 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]

●Terminal Code : E

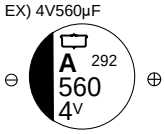



| ϕD | 6.3 | 8 | 10 |
|---|---|---|---|
| ϕd | 0.5 | 0.8 | |
| F | 2.5 | 3.5 | 5.0 |
| ϕD' | ϕD+5max | | |
| L' | L+0.3max | L+1.5max | |

## ◆MARKING

EX) 4V560μF



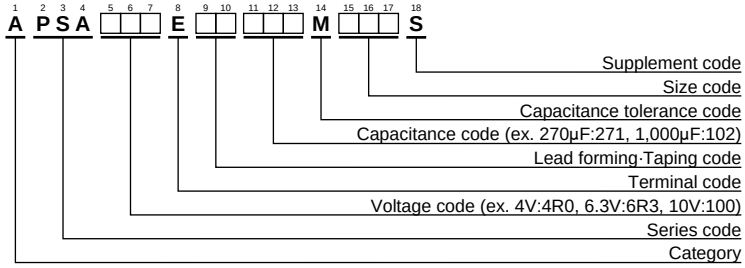
NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

## NPCAP™-PSA Series

### ◆PART NUMBERING SYSTEM




Please refer to "A guide to global code (conductive polymer type)"

### ◆STANDARD RATINGS

| WV(Vdc) | Cap(μF) | Case size φD×L(mm) | ESR (mΩmax/20℃, 100k to 300kHz) | Rated ripple current (mArms/105℃, 100kHz) | Part No. |
|---|---|---|---|---|---|
| 2.5 | 390 | 6.3×10.5 | 20 | 3,160 | APSA2R5E□□391MFA5S |
| | 680 | 8×11.5 | 7 | 5,580 | APSA2R5E□□681MHB5S |
| | 820 | 8×11.5 | 7 | 5,580 | APSA2R5E□□821MHB5S |
| | 1,000 | 10×11.5 | 6 | 5,860 | APSA2R5E□□102MJB5S |
| 4 | 270 | 6.3×10.5 | 20 | 3,160 | APSA4R0E□□271MFA5S |
| | 390 | 6.3×10.5 | 24 | 3,300 | APSA4R0E□□391MFA5S |
| | 560 | 8×11.5 | 7 | 5,580 | APSA4R0E□□561MHB5S |
| | 820 | 10×11.5 | 6 | 5,860 | APSA4R0E□□821MJB5S |
| 6.3 | 220 | 6.3×10.5 | 20 | 3,160 | APSA6R3E□□221MFA5S |
| | 330 | 6.3×10.5 | 28 | 3,190 | APSA6R3E□□331MFA5S |
| | 390 | 8×11.5 | 8 | 5,080 | APSA6R3E□□391MHB5S |
| | 680 | 10×11.5 | 7 | 5,860 | APSA6R3E□□681MJB5S |
| 10 | 47 | 6.3×10.5 | 25 | 2,820 | APSA100E□□470MFA5S |
| | 68 | 6.3×10.5 | 25 | 2,820 | APSA100E□□680MFA5S |
| | 100 | 6.3×10.5 | 25 | 2,820 | APSA100E□□101MFA5S |
| | 150 | 6.3×10.5 | 25 | 2,820 | APSA100E□□151MFA5S |
| | 270 | 8×11.5 | 9 | 4,710 | APSA100E□□271MHB5S |
| | 470 | 10×11.5 | 8 | 5,650 | APSA100E□□471MJB5S |
| 16 | 100 | 6.3×10.5 | 25 | 2,820 | APSA160E□□101MFA5S |

□□ : Fill with appropriate lead forming or taping code.

NIPPON CHEMI-CON

# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

Upgrade!

## NPCAP™-PS Series

- Super low ESR, high temperature resistance
- Large capacitance & Improved high ripple current capability
- Rated voltage range : 2.5 to 35Vdc
- Endurance : 2,000 hours at 105℃
- Suitable for DC-DC converters, voltage regulators and decoupling applications
  For computer motherboards
- **RoHS Compliant**



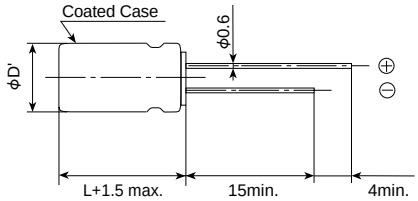

## ◆SPECIFICATIONS

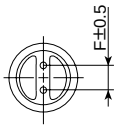
| Items | Characteristics |
|---|---|
| **Category Temperature Range** | −55 to +105℃ |
| **Rated Voltage Range** | 2.5 to 35Vdc |
| **Capacitance Tolerance** | ±20% (M) (at 20℃, 120Hz) |
| **Surge Voltage** | Rated voltage(V)×1.15 (at 105℃) |
| **Leakage Current** *Note | I=0.2CV (max.) (Rated voltage 2.5 to 25Vdc) / I=0.5CV (max.) (Rated voltage 35Vdc)<br>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)** | Z(−25℃)/Z(+20℃)≦1.15<br>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 2,000 hours at 105℃.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial measured value<br>D.F. (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>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.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial measured value<br>D.F. (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>Leakage current: ≦The initial specified value |
| **Surge Voltage Test** | The capacitors shall be subjected to 1,000 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.<br>Appearance: No significant damage<br>Capacitance change: ≦±20% of the initial measured value<br>D.F. (tanδ): ≦150% of the initial specified value<br>ESR: ≦150% of the initial specified value<br>Leakage current: ≦The initial specified value |
| **Failure Rate** | 1% per 1,000 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]

- Terminal Code : E

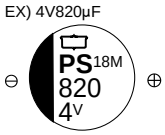



| ϕD | 8 | 10 |
|---|---|---|
| ϕd | 0.6 | |
| F | 3.5 | 5.0 |
| ϕD' | ϕD+0.5max. | |
| L | L+1.5max. | |

## ◆MARKING

EX) 4V820μF



NIPPON CHEMI-CON

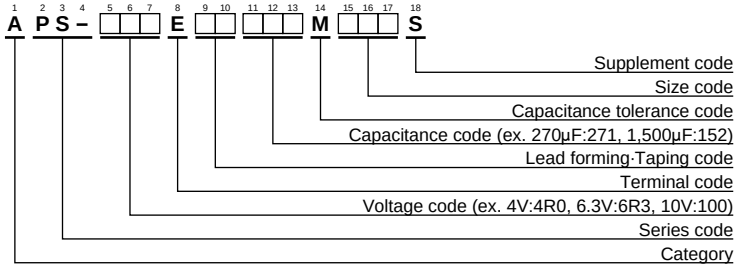
# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Radial Lead

Upgrade!

NPCAP™-PS Series

## ◆PART NUMBERING SYSTEM




Please refer to "A guide to global code (conductive polymer type)"

## ◆STANDARD RATINGS

| WV(Vdc) | Cap(μF) | Case size φD×L(mm) | ESR (mΩmax/20℃, 100k to 300kHz) | Rated ripple current (mArms/105℃, 100kHz) | Part No. |
|---|---|---|---|---|---|
| 2.5 | 680 | 8×11.5 | 10 | 5,230 | APS-2R5E□□681MHB5S |
| | 1,500 | 10×12.5 | 8 | 5,500 | APS-2R5E□□152MJC5S |
| 4 | 560 | 8×11.5 | 10 | 5,230 | APS-4R0E□□561MHB5S |
| | 820 | 10×12.5 | 8 | 5,500 | APS-4R0E□□821MJC5S |
| 6.3 | 390 | 8×11.5 | 12 | 4,770 | APS-6R3E□□391MHB5S |
| | 680 | 10×12.5 | 10 | 5,500 | APS-6R3E□□681MJC5S |
| 10 | 270 | 8×11.5 | 14 | 4,420 | APS-100E□□271MHB5S |
| | 470 | 10×12.5 | 12 | 5,300 | APS-100E□□471MJC5S |
| 16 | 180 | 8×11.5 | 16 | 4,360 | APS-160E□□181MHB5S |
| | 330 | 10×12.5 | 14 | 5,050 | APS-160E□□331MJC5S |
| 20 | 100 | 8×11.5 | 24 | 3,320 | APS-200E□□101MHB5S |
| | 150 | 10×12.5 | 20 | 4,320 | APS-200E□□151MJC5S |
| 25 | 68 | 8×11.5 | 24 | 3,320 | APS-250E□□680MHB5S |
| | 100 | 10×12.5 | 20 | 4,320 | APS-250E□□101MJC5S |
| 35 | 18 | 8 ×11.5 | 34 | 2,830 | APS-350E□□180MHB5S |
| | 33 | 10 ×12.5 | 30 | 3,270 | APS-350E□□330MJC5S |

□□ : Fill with appropriate lead forming or taping code.

# PART NUMBERING SYSTEM

## Appendix (Global code)

### ◆Capacitance code

* How to use the table

| | 1st |
|---|---|
| 2nd | Cap. Value |

For less than 10μF, a decimal point position is displayed with R.
For 10μF or more, capacitance code is set to the first 2 digits and index (1digit).
Treatment of fraction (Refer to the table)

Capacitance value part

| 2nd | 1st | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 10.0 | 20.0 | 30.0 | 40.0 | 50.0 | 60.0 | 70.0 | 80.0 | 90.0 |
| A | 10.5 | 20.5 | 30.5 | 40.5 | 50.5 | 60.5 | 70.5 | 80.5 | 90.5 |
| 1 | 11.0 | 21.0 | 31.0 | 41.0 | 51.0 | 61.0 | 71.0 | 81.0 | 91.0 |
| B | 11.5 | 21.5 | 31.5 | 41.5 | 51.5 | 61.5 | 71.5 | 81.5 | 91.5 |
| 2 | 12.0 | 22.0 | 32.0 | 42.0 | 52.0 | 62.0 | 72.0 | 82.0 | 92.0 |
| C | 12.5 | 22.5 | 32.5 | 42.5 | 52.5 | 62.5 | 72.5 | 82.5 | 92.5 |
| 3 | 13.0 | 23.0 | 33.0 | 43.0 | 53.0 | 63.0 | 73.0 | 83.0 | 93.0 |
| D | 13.5 | 23.5 | 33.5 | 43.5 | 53.5 | 63.5 | 73.5 | 83.5 | 93.5 |
| 4 | 14.0 | 24.0 | 34.0 | 44.0 | 54.0 | 64.0 | 74.0 | 84.0 | 94.0 |
| E | 14.5 | 24.5 | 34.5 | 44.5 | 54.5 | 64.5 | 74.5 | 84.5 | 94.5 |
| 5 | 15.0 | 25.0 | 35.0 | 45.0 | 55.0 | 65.0 | 75.0 | 85.0 | 95.0 |
| F | 15.5 | 25.5 | 35.5 | 45.5 | 55.5 | 65.5 | 75.5 | 85.5 | 95.5 |
| 6 | 16.0 | 26.0 | 36.0 | 46.0 | 56.0 | 66.0 | 76.0 | 86.0 | 96.0 |
| G | 16.5 | 26.5 | 36.5 | 46.5 | 56.5 | 66.5 | 76.5 | 86.5 | 96.5 |
| 7 | 17.0 | 27.0 | 37.0 | 47.0 | 57.0 | 67.0 | 77.0 | 87.0 | 97.0 |
| H | 17.5 | 27.5 | 37.5 | 47.5 | 57.5 | 67.5 | 77.5 | 87.5 | 97.5 |
| 8 | 18.0 | 28.0 | 38.0 | 48.0 | 58.0 | 68.0 | 78.0 | 88.0 | 98.0 |
| J | 18.5 | 28.5 | 38.5 | 48.5 | 58.5 | 68.5 | 78.5 | 88.5 | 98.5 |
| 9 | 19.0 | 29.0 | 39.0 | 49.0 | 59.0 | 69.0 | 79.0 | 89.0 | 99.0 |
| K | 19.5 | 29.5 | 39.5 | 49.5 | 59.5 | 69.5 | 79.5 | 89.5 | 99.5 |

Example of conversion

| Real cap. | The first 2 digits | Treatment of fraction | Code 11th | Code 12th | Code 13th |
|---|---|---|---|---|---|
| 10.0μF → | 10.0 → | 10.0 → | 1 | 0 | 0 |
| 10.1μF → | 10.1 → | 10.0 → | 1 | 0 | 0 |
| 10.2μF → | 10.2 → | 10.0 → | 1 | 0 | 0 |
| 10.3μF → | 10.3 → | 10.5 → | 1 | A | 0 |
| 10.4μF → | 10.4 → | 10.5 → | 1 | A | 0 |
| 10.5μF → | 10.5 → | 10.5 → | 1 | A | 0 |
| 10.6μF → | 10.6 → | 10.5 → | 1 | A | 0 |
| 10.7μF → | 10.7 → | 10.5 → | 1 | A | 0 |
| 10.8μF → | 10.8 → | 11.0 → | 1 | 1 | 0 |
| 10.9μF → | 10.9 → | 11.0 → | 1 | 1 | 0 |
| 11.0μF → | 11.0 → | 11.0 → | 1 | 1 | 0 |
| 132μF → | 13.2 → | 13.0 → | 1 | 3 | 1 |
| 133μF → | 13.3 → | 13.5 → | 1 | D | 1 |
| 167μF → | 16.7 → | 16.5 → | 1 | G | 1 |
| 168μF → | 16.8 → | 17.0 → | 1 | 7 | 1 |
| 1110μF → | 11.1 → | 11.0 → | 1 | 1 | 2 |
| 1340μF → | 13.4 → | 13.5 → | 1 | D | 2 |
| 13200μF → | 13.2 → | 13.0 → | 1 | 3 | 3 |
| 13600μF → | 13.6 → | 13.5 → | 1 | D | 3 |
| 270000μF → | 27.0 → | 27.0 → | 2 | 7 | 4 |

### ◆Case length (Radial lead type)

| Case length [mm] | 16th | 17th |
|---|---|---|
| 0.0 | — | — |
| 0.1 | 0 | B |
| 0.2 | 0 | C |
| 0.3 | 0 | D |
| 0.4 | 0 | E |
| 0.5 | 0 | F |
| 0.6 | 0 | G |
| 0.7 | 0 | H |
| 0.8 | 0 | J |
| 0.9 | 0 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 1.0 | 0 | 1 |
| 1.1 | 1 | B |
| 1.2 | 1 | C |
| 1.3 | 1 | D |
| 1.4 | 1 | E |
| 1.5 | 1 | F |
| 1.6 | 1 | G |
| 1.7 | 1 | H |
| 1.8 | 1 | J |
| 1.9 | 1 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 2.0 | 0 | 2 |
| 2.1 | 2 | B |
| 2.2 | 2 | C |
| 2.3 | 2 | D |
| 2.4 | 2 | E |
| 2.5 | 2 | F |
| 2.6 | 2 | G |
| 2.7 | 2 | H |
| 2.8 | 2 | J |
| 2.9 | 2 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 3.0 | 0 | 3 |
| 3.1 | 3 | B |
| 3.2 | 3 | C |
| 3.3 | 3 | D |
| 3.4 | 3 | E |
| 3.5 | 3 | F |
| 3.6 | 3 | G |
| 3.7 | 3 | H |
| 3.8 | 3 | J |
| 3.9 | 3 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 4.0 | 0 | 4 |
| 4.1 | 4 | B |
| 4.2 | 4 | C |
| 4.3 | 4 | D |
| 4.4 | 4 | E |
| 4.5 | 4 | F |
| 4.6 | 4 | G |
| 4.7 | 4 | H |
| 4.8 | 4 | J |
| 4.9 | 4 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 5.0 | 0 | 5 |
| 5.1 | 5 | B |
| 5.2 | 5 | C |
| 5.3 | 5 | D |
| 5.4 | 5 | E |
| 5.5 | 5 | F |
| 5.6 | 5 | G |
| 5.7 | 5 | H |
| 5.8 | 5 | J |
| 5.9 | 5 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 6.0 | 0 | 6 |
| 6.1 | 6 | B |
| 6.2 | 6 | C |
| 6.3 | 6 | D |
| 6.4 | 6 | E |
| 6.5 | 6 | F |
| 6.6 | 6 | G |
| 6.7 | 6 | H |
| 6.8 | 6 | J |
| 6.9 | 6 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 7.0 | 0 | 7 |
| 7.1 | 7 | B |
| 7.2 | 7 | C |
| 7.3 | 7 | D |
| 7.4 | 7 | E |
| 7.5 | 7 | F |
| 7.6 | 7 | G |
| 7.7 | 7 | H |
| 7.8 | 7 | J |
| 7.9 | 7 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 8.0 | 0 | 8 |
| 8.1 | 8 | B |
| 8.2 | 8 | C |
| 8.3 | 8 | D |
| 8.4 | 8 | E |
| 8.5 | 8 | F |
| 8.6 | 8 | G |
| 8.7 | 8 | H |
| 8.8 | 8 | J |
| 8.9 | 8 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 9.0 | 0 | 9 |
| 9.1 | 9 | B |
| 9.2 | 9 | C |
| 9.3 | 9 | D |
| 9.4 | 9 | E |
| 9.5 | 9 | F |
| 9.6 | 9 | G |
| 9.7 | 9 | H |
| 9.8 | 9 | J |
| 9.9 | 9 | K |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 10.0 | 1 | 0 |
| 10.1 | A | 1 |
| 10.2 | A | 2 |
| 10.3 | A | 3 |
| 10.4 | A | 4 |
| 10.5 | A | 5 |
| 10.6 | A | 6 |
| 10.7 | A | 7 |
| 10.8 | A | 8 |
| 10.9 | A | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 11.0 | 1 | 1 |
| 11.1 | B | 1 |
| 11.2 | B | 2 |
| 11.3 | B | 3 |
| 11.4 | B | 4 |
| 11.5 | B | 5 |
| 11.6 | B | 6 |
| 11.7 | B | 7 |
| 11.8 | B | 8 |
| 11.9 | B | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 12.0 | 1 | 2 |
| 12.1 | C | 1 |
| 12.2 | C | 2 |
| 12.3 | C | 3 |
| 12.4 | C | 4 |
| 12.5 | C | 5 |
| 12.6 | C | 6 |
| 12.7 | C | 7 |
| 12.8 | C | 8 |
| 12.9 | C | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 13.0 | 1 | 3 |
| 13.1 | D | 1 |
| 13.2 | D | 2 |
| 13.3 | D | 3 |
| 13.4 | D | 4 |
| 13.5 | D | 5 |
| 13.6 | D | 6 |
| 13.7 | D | 7 |
| 13.8 | D | 8 |
| 13.9 | D | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 14.0 | 1 | 4 |
| 14.1 | E | 1 |
| 14.2 | E | 2 |
| 14.3 | E | 3 |
| 14.4 | E | 4 |
| 14.5 | E | 5 |
| 14.6 | E | 6 |
| 14.7 | E | 7 |
| 14.8 | E | 8 |
| 14.9 | E | 9 |

# PART NUMBERING SYSTEM

| Case length [mm] | 16th | 17th |
|---|---|---|
| 15.0 | 1 | 5 |
| 15.1 | F | 1 |
| 15.2 | F | 2 |
| 15.3 | F | 3 |
| 15.4 | F | 4 |
| 15.5 | F | 5 |
| 15.6 | F | 6 |
| 15.7 | F | 7 |
| 15.8 | F | 8 |
| 15.9 | F | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 16.0 | 1 | 6 |
| 16.1 | G | 1 |
| 16.2 | G | 2 |
| 16.3 | G | 3 |
| 16.4 | G | 4 |
| 16.5 | G | 5 |
| 16.6 | G | 6 |
| 16.7 | G | 7 |
| 16.8 | G | 8 |
| 16.9 | G | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 17.0 | 1 | 7 |
| 17.1 | H | 1 |
| 17.2 | H | 2 |
| 17.3 | H | 3 |
| 17.4 | H | 4 |
| 17.5 | H | 5 |
| 17.6 | H | 6 |
| 17.7 | H | 7 |
| 17.8 | H | 8 |
| 17.9 | H | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 18.0 | 1 | 8 |
| 18.1 | J | 1 |
| 18.2 | J | 2 |
| 18.3 | J | 3 |
| 18.4 | J | 4 |
| 18.5 | J | 5 |
| 18.6 | J | 6 |
| 18.7 | J | 7 |
| 18.8 | J | 8 |
| 18.9 | J | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 19.0 | 1 | 9 |
| 19.1 | K | 1 |
| 19.2 | K | 2 |
| 19.3 | K | 3 |
| 19.4 | K | 4 |
| 19.5 | K | 5 |
| 19.6 | K | 6 |
| 19.7 | K | 7 |
| 19.8 | K | 8 |
| 19.9 | K | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 20.0 | 2 | 0 |
| 20.5 | L | 1 |
| 21.0 | 2 | 1 |
| 21.5 | L | 3 |
| 22.0 | 2 | 2 |
| 22.5 | L | 5 |
| 23.0 | 2 | 3 |
| 23.5 | L | 7 |
| 24.0 | 2 | 4 |
| 24.5 | L | 9 |
| 25.0 | 2 | 5 |
| 25.5 | M | 1 |
| 26.0 | 2 | 6 |
| 26.5 | M | 3 |
| 27.0 | 2 | 7 |
| 27.5 | M | 5 |
| 28.0 | 2 | 8 |
| 28.5 | M | 7 |
| 29.0 | 2 | 9 |
| 29.5 | M | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 30.0 | 3 | 0 |
| 30.5 | N | 1 |
| 31.0 | 3 | 1 |
| 31.5 | N | 3 |
| 32.0 | 3 | 2 |
| 32.5 | N | 5 |
| 33.0 | 3 | 3 |
| 33.5 | N | 7 |
| 34.0 | 3 | 4 |
| 34.5 | N | 9 |
| 35.0 | 3 | 5 |
| 35.5 | P | 1 |
| 36.0 | 3 | 6 |
| 36.5 | P | 3 |
| 37.0 | 3 | 7 |
| 37.5 | P | 5 |
| 38.0 | 3 | 8 |
| 38.5 | P | 7 |
| 39.0 | 3 | 9 |
| 39.5 | P | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 40.0 | 4 | 0 |
| 40.5 | Q | 1 |
| 41.0 | 4 | 1 |
| 41.5 | Q | 3 |
| 42.0 | 4 | 2 |
| 42.5 | Q | 5 |
| 43.0 | 4 | 3 |
| 43.5 | Q | 7 |
| 44.0 | 4 | 4 |
| 44.5 | Q | 9 |
| 45.0 | 4 | 5 |
| 45.5 | R | 1 |
| 46.0 | 4 | 6 |
| 46.5 | R | 3 |
| 47.0 | 4 | 7 |
| 47.5 | R | 5 |
| 48.0 | 4 | 8 |
| 48.5 | R | 7 |
| 49.0 | 4 | 9 |
| 49.5 | R | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 50.0 | 5 | 0 |
| 50.5 | S | 1 |
| 51.0 | 5 | 1 |
| 51.5 | S | 3 |
| 52.0 | 5 | 2 |
| 52.5 | S | 5 |
| 53.0 | 5 | 3 |
| 53.5 | S | 7 |
| 54.0 | 5 | 4 |
| 54.5 | S | 9 |
| 55.0 | 5 | 5 |
| 55.5 | T | 1 |
| 56.0 | 5 | 6 |
| 56.5 | T | 3 |
| 57.0 | 5 | 7 |
| 57.5 | T | 5 |
| 58.0 | 5 | 8 |
| 58.5 | T | 7 |
| 59.0 | 5 | 9 |
| 59.5 | T | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 60.0 | 6 | 0 |
| 60.5 | U | 1 |
| 61.0 | 6 | 1 |
| 61.5 | U | 3 |
| 62.0 | 6 | 2 |
| 62.5 | U | 5 |
| 63.0 | 6 | 3 |
| 63.5 | U | 7 |
| 64.0 | 6 | 4 |
| 64.5 | U | 9 |
| 65.0 | 6 | 5 |
| 65.5 | V | 1 |
| 66.0 | 6 | 6 |
| 66.5 | V | 3 |
| 67.0 | 6 | 7 |
| 67.5 | V | 5 |
| 68.0 | 6 | 8 |
| 68.5 | V | 7 |
| 69.0 | 6 | 9 |
| 69.5 | V | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 70.0 | 7 | 0 |
| 70.5 | W | 1 |
| 71.0 | 7 | 1 |
| 71.5 | W | 3 |
| 72.0 | 7 | 2 |
| 72.5 | W | 5 |
| 73.0 | 7 | 3 |
| 73.5 | W | 7 |
| 74.0 | 7 | 4 |
| 74.5 | W | 9 |
| 75.0 | 7 | 5 |
| 75.5 | X | 1 |
| 76.0 | 7 | 6 |
| 76.5 | X | 3 |
| 77.0 | 7 | 7 |
| 77.5 | X | 5 |
| 78.0 | 7 | 8 |
| 78.5 | X | 7 |
| 79.0 | 7 | 9 |
| 79.5 | X | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 80.0 | 8 | 0 |
| 80.5 | Y | 1 |
| 81.0 | 8 | 1 |
| 81.5 | Y | 3 |
| 82.0 | 8 | 2 |
| 82.5 | Y | 5 |
| 83.0 | 8 | 3 |
| 83.5 | Y | 7 |
| 84.0 | 8 | 4 |
| 84.5 | Y | 9 |
| 85.0 | 8 | 5 |
| 85.5 | Z | 1 |
| 86.0 | 8 | 6 |
| 86.5 | Z | 3 |
| 87.0 | 8 | 7 |
| 87.5 | Z | 5 |
| 88.0 | 8 | 8 |
| 88.5 | Z | 7 |
| 89.0 | 8 | 9 |
| 89.5 | Z | 9 |

# PART NUMBERING SYSTEM

## ◆Case length (Snap-in type / Screw mount terminal type)

| Case length [mm] | 16th | 17th |
|---|---|---|
| 20 | 2 | 0 |
| 21 | 2 | 1 |
| 22 | 2 | 2 |
| 23 | 2 | 3 |
| 24 | 2 | 4 |
| 25 | 2 | 5 |
| 26 | 2 | 6 |
| 27 | 2 | 7 |
| 28 | 2 | 8 |
| 29 | 2 | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 30 | 3 | 0 |
| 31 | 3 | 1 |
| 32 | 3 | 2 |
| 33 | 3 | 3 |
| 34 | 3 | 4 |
| 35 | 3 | 5 |
| 36 | 3 | 6 |
| 37 | 3 | 7 |
| 38 | 3 | 8 |
| 39 | 3 | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 40 | 4 | 0 |
| 41 | 4 | 1 |
| 42 | 4 | 2 |
| 43 | 4 | 3 |
| 44 | 4 | 4 |
| 45 | 4 | 5 |
| 46 | 4 | 6 |
| 47 | 4 | 7 |
| 48 | 4 | 8 |
| 49 | 4 | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 50 | 5 | 0 |
| 51 | 5 | 1 |
| 52 | 5 | 2 |
| 53 | 5 | 3 |
| 54 | 5 | 4 |
| 55 | 5 | 5 |
| 56 | 5 | 6 |
| 57 | 5 | 7 |
| 58 | 5 | 8 |
| 59 | 5 | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 60 | 6 | 0 |
| 61 | 6 | 1 |
| 62 | 6 | 2 |
| 63 | 6 | 3 |
| 64 | 6 | 4 |
| 65 | 6 | 5 |
| 66 | 6 | 6 |
| 67 | 6 | 7 |
| 68 | 6 | 8 |
| 69 | 6 | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 70 | 7 | 0 |
| 71 | 7 | 1 |
| 72 | 7 | 2 |
| 73 | 7 | 3 |
| 74 | 7 | 4 |
| 75 | 7 | 5 |
| 76 | 7 | 6 |
| 77 | 7 | 7 |
| 78 | 7 | 8 |
| 79 | 7 | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 80 | 8 | 0 |
| 81 | 8 | 1 |
| 82 | 8 | 2 |
| 83 | 8 | 3 |
| 84 | 8 | 4 |
| 85 | 8 | 5 |
| 86 | 8 | 6 |
| 87 | 8 | 7 |
| 88 | 8 | 8 |
| 89 | 8 | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 90 | 9 | 0 |
| 91 | 9 | 1 |
| 92 | 9 | 2 |
| 93 | 9 | 3 |
| 94 | 9 | 4 |
| 95 | 9 | 5 |
| 96 | 9 | 6 |
| 97 | 9 | 7 |
| 98 | 9 | 8 |
| 99 | 9 | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 100 | A | 0 |
| 101 | A | 1 |
| 102 | A | 2 |
| 103 | A | 3 |
| 104 | A | 4 |
| 105 | A | 5 |
| 106 | A | 6 |
| 107 | A | 7 |
| 108 | A | 8 |
| 109 | A | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 110 | B | 0 |
| 111 | B | 1 |
| 112 | B | 2 |
| 113 | B | 3 |
| 114 | B | 4 |
| 115 | B | 5 |
| 116 | B | 6 |
| 117 | B | 7 |
| 118 | B | 8 |
| 119 | B | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 120 | C | 0 |
| 121 | C | 1 |
| 122 | C | 2 |
| 123 | C | 3 |
| 124 | C | 4 |
| 125 | C | 5 |
| 126 | C | 6 |
| 127 | C | 7 |
| 128 | C | 8 |
| 129 | C | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 130 | D | 0 |
| 131 | D | 1 |
| 132 | D | 2 |
| 133 | D | 3 |
| 134 | D | 4 |
| 135 | D | 5 |
| 136 | D | 6 |
| 137 | D | 7 |
| 138 | D | 8 |
| 139 | D | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 140 | E | 0 |
| 141 | E | 1 |
| 142 | E | 2 |
| 143 | E | 3 |
| 144 | E | 4 |
| 145 | E | 5 |
| 146 | E | 6 |
| 147 | E | 7 |
| 148 | E | 8 |
| 149 | E | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 150 | F | 0 |
| 151 | F | 1 |
| 152 | F | 2 |
| 153 | F | 3 |
| 154 | F | 4 |
| 155 | F | 5 |
| 156 | F | 6 |
| 157 | F | 7 |
| 158 | F | 8 |
| 159 | F | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 160 | G | 0 |
| 161 | G | 1 |
| 162 | G | 2 |
| 163 | G | 3 |
| 164 | G | 4 |
| 165 | G | 5 |
| 166 | G | 6 |
| 167 | G | 7 |
| 168 | G | 8 |
| 169 | G | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 170 | H | 0 |
| 171 | H | 1 |
| 172 | H | 2 |
| 173 | H | 3 |
| 174 | H | 4 |
| 175 | H | 5 |
| 176 | H | 6 |
| 177 | H | 7 |
| 178 | H | 8 |
| 179 | H | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 180 | J | 0 |
| 181 | J | 1 |
| 182 | J | 2 |
| 183 | J | 3 |
| 184 | J | 4 |
| 185 | J | 5 |
| 186 | J | 6 |
| 187 | J | 7 |
| 188 | J | 8 |
| 189 | J | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 190 | K | 0 |
| 191 | K | 1 |
| 192 | K | 2 |
| 193 | K | 3 |
| 194 | K | 4 |
| 195 | K | 5 |
| 196 | K | 6 |
| 197 | K | 7 |
| 198 | K | 8 |
| 199 | K | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 200 | L | 0 |
| 201 | L | 1 |
| 202 | L | 2 |
| 203 | L | 3 |
| 204 | L | 4 |
| 205 | L | 5 |
| 206 | L | 6 |
| 207 | L | 7 |
| 208 | L | 8 |
| 209 | L | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 210 | M | 0 |
| 211 | M | 1 |
| 212 | M | 2 |
| 213 | M | 3 |
| 214 | M | 4 |
| 215 | M | 5 |
| 216 | M | 6 |
| 217 | M | 7 |
| 218 | M | 8 |
| 219 | M | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 220 | N | 0 |
| 221 | N | 1 |
| 222 | N | 2 |
| 223 | N | 3 |
| 224 | N | 4 |
| 225 | N | 5 |
| 226 | N | 6 |
| 227 | N | 7 |
| 228 | N | 8 |
| 229 | N | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 230 | P | 0 |
| 231 | P | 1 |
| 232 | P | 2 |
| 233 | P | 3 |
| 234 | P | 4 |
| 235 | P | 5 |
| 236 | P | 6 |
| 237 | P | 7 |
| 238 | P | 8 |
| 239 | P | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 240 | Q | 0 |
| 241 | Q | 1 |
| 242 | Q | 2 |
| 243 | Q | 3 |
| 244 | Q | 4 |
| 245 | Q | 5 |
| 246 | Q | 6 |
| 247 | Q | 7 |
| 248 | Q | 8 |
| 249 | Q | 9 |

| Case length [mm] | 16th | 17th |
|---|---|---|
| 250 | R | 0 |
| 251 | R | 1 |
| 252 | R | 2 |
| 253 | R | 3 |
| 254 | R | 4 |
| 255 | R | 5 |
| 256 | R | 6 |
| 257 | R | 7 |
| 258 | R | 8 |
| 259 | R | 9 |

# PART NUMBERING SYSTEM

## ◆Supplement code

### Surface mount type / Conductive polymer (Include Radial lead type)

| | Terminal plating material (Radial lead type) | | |
|---|---|---|---|
| | Sn100% | Sn-Bi | Sn-Pb |
| Coating case | S | G | N |

### Radial lead type / Snap-in type

| | | Terminal plating material (Radial lead type) | | |
|---|---|---|---|---|
| | | Sn100% | Sn-Bi | Sn-Pb |
| Outer sleeve | PET | S | D | C |
| | Coating case | H | G | F |
| | Polyolefin | L | — | — |
| | Pb-free PVC | M | — | N |
| | PVC | B | A | N |

* Pb-free snap-in type does not have top disk.
We also produce Pb-free snap-in type with "Top disk, Pb-free PVC sleeve and Sn100% terminal plating".
In this case, supplement code (the 18th digit) becomes "T".

### Screw mount terminal type

| | Screw terminal |
|---|---|
| Pb-free PVC | M |
| Polyolefin | S |
| PET | C |
| PVC | N |