

Conductive Polymer Aluminum Solid Capacitors

OS-CON



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※ Yellow letters : Update
 ※ Red letters : New series

POSCAP

Guidelines and precautions for use

About capacitors

Please take note of the following points in order to make the best use of capacitor's performance.

Please use capacitors within the range of specified performance after confirming each capacitor's usage environment and circuit condition.

Please choose capacitors that match the lifetime of the intended circuit design.

The performance of capacitors is changed by the temperature or frequency. Therefore, please consider these variations when designing the circuit.

Please buy capacitors from our official distributors. Otherwise there is no warranty.

Line-up

Conductive Polymer Aluminum Solid Capacitors **OS-CON**
Conductive Polymer Tantalum Solid Capacitors **POSCAP**

Considerations when using in industrial equipment

To when capacitors are used in industrial equipment, allow wider margin of capacitance, impedance and other characteristics.

Polarity

OS-CON and **POSCAP** have polarity.
Please confirm the polarity prior to use. If it is used with the reverse polarities, leakage current, shorter lifetime or a short circuit may result.
There is no bi-polar model of the **OS-CON** and **POSCAP**.

Rating and category

The definition of rating and category is as follows.

- Rated temperature:
The maximum ambient temperature at which rated voltage may be continuously applied.
- Rated voltage:
The maximum direct voltage or peak value of pulse voltage which may be applied continuously to a capacitor at any temperature between the lower category temperature and the rated temperature.
- Category temperature range:
The range of ambient temperatures for which a capacitor has been designed to operate continuously; this is given by the lower and upper category temperature.
- Category voltage:
The maximum voltage which may be applied continuously to a capacitor at its upper limit of category temperature.

Operating temperature and ripple current

- Set the operating temperature so that it falls within the range stipulated in this delivery specification.
- Do not apply current that exceeds the allowable ripple current. When excessive ripple current is applied, internal heat increases and reduces the lifetime.

In case capacitors are used under the condition out of the specified frequency, ripple current shall not exceed the value revised by the frequency coefficient.

Parallel connection

Ripple current may be flowed to a capacitor that has lower impedance when a different kind of capacitor is used in parallel.

Please be very careful of choosing models.

Please consider the balance of electric current when more than two capacitors are connected in parallel.

Applied voltage for designing

Do not apply voltages exceeding the full rated voltage. If such voltage is applied, it may cause short circuit even though it is just a moment.

- 90% and below of the rated voltage or category voltage of the **POSCAP** is recommended. If the rated voltage is 10V or over except for TQC series, 80% and below of the rated voltage or category voltage is recommended.
- The sum of the DC voltage plus the peak AC voltage shall not exceed the rated voltage or category voltage.
- The sum of the DC voltage plus the negative peak AC voltage shall not allow reverse voltage.
- Do not apply reverse voltage.

Please contact us when there is a concern that circuit operation may cause reverse voltage.

Operating environment restrictions

Do not use the capacitor in the following environments

- Places where water, salt water or oil can directly fall on it and places where dew condensation may form
- Places with noxious gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc)
- Places susceptible to ozone, ultraviolet rays and radiation
- Places where vibration or shock exceeds the allowable value as specified in the catalog or specification sheet
- Places under direct sunlight

Land pattern

Please design hole space and hole diameter of circuit board for capacitor radial lead type, or land patterns for capacitor SMD type with consideration of the product dimension specified in the catalog or specification sheet and the size tolerance. Avoid locating heat-generating components around the capacitor and on the underside of the PC board. When a capacitor is mounted to the double sided circuit board, avoid placing through holes under the capacitor. Avoid having the printed wire under the capacitor.

Soldering

- The soldering conditions as soldering iron, flow soldering, reflow soldering should be under the range prescribed in specifications.
- If the specifications are not followed, there is a possibility of the cosmetic deflection, the intensive increase of leakage current or the capacitance reduction.
- Soldering heat stress to capacitor varies depending on temperature, duration time, mounting condition such as size, material and component quantity of PC board. Please check the heat durability in your actual soldering condition.

Guidelines and precautions for use

About capacitors

Things to be noted before mounting

- Do not reuse capacitors that have been assembled in a set and energized.
- Leakage current may increase when capacitors are stored for long term. In this case, we recommend you to apply the rated voltage for 1 hour at 60°C to 70°C with a resistor load of 1kΩ.
- In case the capacitor has re-striking-voltage, please apply the rated voltage to the capacitor through a resistor load of 1kΩ.

Mounting 1

- Please mount capacitors after confirming the polarity.
- Please mount capacitors after confirming its rated capacitance and rated voltage.
- When mounting capacitors to the circuit board, please use capacitors with the lead space matching the hole space of the circuit board.
- Do not drop capacitors or use capacitors dropped beforehand.
- Be careful not to deform the capacitor during installation.

Mounting 2

- When an automatic inserter is used to clinch the capacitor lead terminal, make sure it is not set too strongly.
- Be careful of the shock force that can be produced by absorbers, product chckers and centers on automatic inserters and installers.
- Do not apply excessive external force to the lead terminal or the capacitor itself.

Storage conditions

It is necessary to maintain a good storage environment in order to prevent the problem when soldering due to the degradation of solderability or moisturization of molding resin.

- When storing the reel in the storage bag, please ensure that the storage bag is fully sealed.※
- Do not store in high temperature and high humidity environment.
- For duration of storage, refer to the respective "Guidelines and precautions for use" of each capacitor.
- Do not store in damp conditions such as with water, salt water, or oil, and dew condensation.
- Do not store in places filled with noxious gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc).
- Do not store in places susceptible to ozone, ultraviolet rays and radiation.
- Please unseal storage bag just before mounting and be conscious that the capacitors are used up. Refer to the respective "Guidelines and precautions for use" of each capacitor when some remain by necessity.

※Only for capacitors packed by laminate bag.

Disposal of capacitors

Capacitors comprise solid organic compounds, various metals, resin, rubber, etc. Treat them as industrial waste when disposing of it.

In case of disposing of a large amount of capacitor, we can dispose on your behalf.

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| SVPF | |
| SVPE | |
| SVPS | |
| SVPD | |
| SVPC | |
| SVPB | |
| SVPA | |
| SVQP | |
| SVP | |

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| SXE | Radial lead type |
| SEPF | |
| SEPC | |
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Catalog Deletion and EOL series

POSCAP

POSCAP Line-up

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Catalog Deletion and EOL models

| Classification | Series | Page | Features | Small size - Low profile | Large capacitance | Low ESR | High voltage | Long life - High reliability | Size code | Category temperature range(°C) | Rated voltage range (V. DC) | Capacitance range(μF) | Marking color | | |
|--------------------|----------|--------------------------------|---|--------------------------|-------------------|---------|--------------|------------------------------|-------------|--------------------------------|-----------------------------|-----------------------|---------------|--------|----------|
| | | | | | | | | | | | | | | | |
| Surface mount type | SXV | 33 | Super high voltage 105°C 5,000h | | | | ● | | E12 | -55 to +105 | 63 to 100 | 15 to 33 | Purple | | |
| | SVPG | 34 | Low ESR High ripple current | | | ● | | ● | B45 | -55 to +105 | 16 to 25 | 15 to 47 | Purple | | |
| | | | | | | | | | C10 | -55 to +105 | 16 | 270 | | | |
| | SVPF | 35 to 36 | High voltage Large capacitance 105°C 5,000h | | ● | | ● | ● | B6 | -55 to +105 | 16 to 25 | 27 to 82 | Purple | | |
| | | | | | | | | | C6 | -55 to +105 | 16 to 50 | 10 to 180 | | | |
| | | | | | | | | | E7 | -55 to +105 | 16 to 50 | 18 to 270 | | | |
| | | | | | | | | | E12 | -55 to +105 | 16 to 50 | 39 to 560 | | | |
| | SVPE | 37 to 38 | Super low ESR Large capacitance | | ● | ● | | | B6 | -55 to +105 | 2.5 to 6.3 | 150 to 390 | Purple | | |
| | | | | | | | | | C6 | -55 to +105 | 2.5 to 10 | 220 to 390 | | | |
| | | | | | | | | | C10 | -55 to +105 | 2.0 to 1.6 | 180 to 1,200 | | | |
| | | | | | | | | | F12 | -55 to +105 | 16 | 470 | | | |
| | SVPS | 39 to 40 | Long life | | | | | ● | A5 | -55 to +105 | 4.0 to 10 | 10 to 33 | Purple | | |
| | | | | | | | | | B6 | -55 to +105 | 4.0 to 16 | 22 to 68 | | | |
| | | | | | | | | | C6 | -55 to +105 | 4.0 to 20 | 22 to 150 | | | |
| | | | | | | | | | E7 | -55 to +105 | 4.0 to 25 | 10 to 270 | | | |
| | SVPD | 41 to 42 | Guaranteed at 125°C Rated 35V max. 85°C85% RH | | | | | ● | ● | F8 | -55 to +125 | 25 to 35 | 18 to 39 | Purple | |
| | | | | | | | | | | E12 | -55 to +125 | 25 to 35 | 22 to 47 | | |
| | | | | | | | | | | | F12 | -55 to +125 | 25 to 35 | | 47 to 82 |
| | | | | | | | | | | | | | | | |
| | SVPC | 43 to 44 | Low ESR Large capacitance | | ● | ● | | | B6 | -55 to +105 | 2.5 to 16 | 39 to 180 | Purple | | |
| | | | | | | | | C6 | -55 to +105 | 2.5 to 16 | 68 to 560 | | | | |
| | | | | | | | | E7 | -55 to +105 | 2.5 to 16 | 120 to 680 | | | | |
| | | | | | | | | E12 | -55 to +105 | 2.5 to 16 | 270 to 1,500 | | | | |
| SVPB | 45 to 46 | Low profile | | ● | | | | C5 | -55 to +105 | 2.5 to 20 | 15 to 120 | Purple | | | |
| | | | | | | | | C55 | -55 to +105 | 20 | 22 | | | | |
| SVPA | 47 to 48 | Low ESR High ripple current | | | | ● | | B6 | -55 to +105 | 2.5 to 20 | 10 to 82 | Purple | | | |
| | | | | | | | | C6 | -55 to +105 | 2.5 to 20 | 22 to 180 | | | | |
| | | | | | | | | E7 | -55 to +105 | 2.5 to 20 | 47 to 330 | | | | |
| | | | | | | | | F8 | -55 to +105 | 2.5 to 16 | 180 to 820 | | | | |
| SVQP | 49 to 50 | Guaranteed at 125°C | | | | | ● | C6 | -55 to +125 | 4.0 to 20 | 22 to 150 | Purple | | | |
| | | | | | | | | E7 | -55 to +125 | 6.3 to 20 | 47 to 220 | | | | |
| SVP | 51 to 52 | Standard | | | | | | A5 | -55 to +105 | 4.0 to 16 | 3.3 to 33 | Purple | | | |
| | | | | | | | | B6 | -55 to +105 | 4.0 to 20 | 10 to 68 | | | | |
| | | | | | | | | C6 | -55 to +105 | 2.5 to 20 | 22 to 220 | | | | |
| | | | | | | | | E7 | -55 to +105 | 4.0 to 20 | 33 to 330 | | | | |
| | | | | | | | | F8 | -55 to +105 | 4.0 to 20 | 56 to 680 | | | | |
| | | | | | | | | E12 | -55 to +105 | 2.5 to 20 | 100 to 680 | | | | |
| | | | | | | | F12 | -55 to +105 | 2.5 to 20 | 150 to 1,500 | | | | | |

| Classification | Series | Page | Features | Small size · Low profile | Large capacitance | Low ESR | High voltage | Long life · High reliability | Size code | Category temperature range(°C) | Rated voltage range (V.DC) | Capacitance range(μF) | Marking color | |
|------------------|--------|-------------|---|--------------------------|-------------------|---------|--------------|------------------------------|-----------|--------------------------------|----------------------------|-----------------------|---------------|--------|
| | | | | | | | | | | | | | | |
| Radial lead type | SXE | 53 | Super high voltage 105°C 5,000h | | | | ● | | E12 | -55 to +105 | 63 to 100 | 15 to 33 | Purple | |
| | SEPF | 54 | Small size · Low profile High voltage Large capacitance 105°C 5,000h | ● | ● | | ● | ● | C55 | -55 to +105 | 16 to 32 | 22 to 150 | Purple | |
| | | | | | | | | | C6 | -55 to +105 | 16 to 35 | 22 to 180 | | |
| | | | | | | | | | E7 | -55 to +105 | 16 to 35 | 39 to 270 | | |
| | | | | | | | | | E12 | -55 to +105 | 16 to 35 | 82 to 560 | | |
| | | | | | | | | | F13 | -55 to +105 | 16 to 35 | 120 to 1,000 | | |
| | SEPC | 55 to 56 | Super low ESR Large capacitance Small size Low profile 105°C 5,000h | ● | ● | ● | ● | ● | B9 | -55 to +105 | 2.5 | 100 to 560 | Purple | |
| | | | | | | | | | C55 | -55 to +105 | 6.3 | 220 | | |
| | | | | | | | | | C6 | -55 to +105 | 2.5 to 16 | 100 to 560 | | |
| | | | | | | | | | C7 | -55 to +105 | 6.3 | 470 | | |
| | | | | | | | | | C9 | -55 to +105 | 2.5 to 16 | 100 to 820 | | |
| | | | | | | | | | E7 | -55 to +105 | 2.5 to 16 | 150 to 1,000 | | |
| | | | | | | | | | E9 | -55 to +105 | 2.5 to 16 | 180 to 1,000 | | |
| | | | | | | | | | E12 | -55 to +105 | 16 | 180 to 270 | | |
| | | | | | | | | | E13 | -55 to +105 | 2.5 to 6.3 | 470 to 820 | | |
| | F13 | -55 to +105 | 2.5 to 16 | 470 to 2,700 | | | | | | | | | | |
| | SEQP | 57 to 58 | 105°C 5,000h Guaranteed at 125°C Rated 32V max. | | | | | ● | ● | C6 | -55 to +125 | 4.0 to 20 | 22 to 150 | Purple |
| | | | | | | | | | | E7 | -55 to +125 | 4.0 to 32 | 6.8 to 330 | |
| | | | | | | | | | | F8 | -55 to +125 | 4.0 to 32 | 15 to 680 | |
| | | | | | | | | | | E12 | -55 to +125 | 4.0 to 32 | 18 to 560 | |
| | | | | | | | | | | F13 | -55 to +125 | 4.0 to 20 | 150 to 1,200 | |
| | SEP | 59 to 60 | Standard | | | | | | | C6 | -55 to +105 | 4.0 to 20 | 22 to 150 | Purple |
| | | | | | | | | | | E7 | -55 to +105 | 4.0 to 20 | 33 to 330 | |
| F8 | | | | | | | | | | -55 to +105 | 4.0 to 20 | 56 to 680 | | |
| E12 | | | | | | | | | | -55 to +105 | 2.5 to 20 | 100 to 680 | | |
| F13 | | | | | | | | | | -55 to +105 | 2.5 to 20 | 150 to 1,500 | | |

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SVPF
SVPE
SVPS
SVPD
SVPC
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SVQP
SVP

Radial lead type
SXE
SEPF
SEPC
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SEP

Catalog Deletion and EOL series

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Precautions for circuit designing

Crucial precautions

Important

1. Prohibited circuits

(a) Leakage current of the **OS-CON** may increase in the following conditions.

- (1) Soldering
- (2) When voltage is not applied: high temperature no-load test, high temperature and high humidity no-load test, rapidly changing temperature test, etc.

(b) Avoid the use of the **OS-CON** in the following type of circuits because leakage current may increase.

- (1) High-impedance circuits
- (2) Coupling circuits
- (3) Time constant circuits
- (4) Other circuits that are significantly affected by leakage current

※ If you plan to use 2 or more **OS-CONs** in a series connection, please contact us before use

2. Failure and life-span

The failure rate is 0.5% /1000h (Confidence level: 60%) based on JIS C 5003.

The prospective failure is not zero. The mainly failure modes are as follows.

2-1. Contingency failure

The most common failure mode is a short circuit. Mainly caused by the soldering or operating temperature environment, along with heat stresses, electrical stresses or mechanical stresses as follows.

- (1) Applying voltage over the rated voltage.
 - (2) Applying reverse voltage
 - (3) Excessive mechanical stress
 - (4) Applying rush current by sudden charge or discharge out of the specification.
- (a) The following phenomenon is seen when short-current is applied to the **OS-CON**.
- (1) When current is relatively low ($\phi 10$: approx 1A or less, $\phi 8$: approx 0.5A or less, $\phi 6.3$: approx 0.2A or less) The **OS-CON** becomes heated, but no effects are visible even when the current is continuously carried.
 - (2) When the short circuit currents exceed the mentioned value above.
After internal temperature increase, sealing rubber may be turned over.
In some cases, odorous gas may be produced.
- (b) In case a short circuit occurs, ensure safety by fully considering the followings.
- (1) If odorous gas is released, turn off the main power of the equipment.
In this case, keep your face and hands away from the area.
 - (2) Though it depends on the conditions, it takes seconds to minutes before odorant gas generates.
Protective circuit should operate in this period.
 - (3) If the gas comes into eyes, rinse immediately. If the gas is inhaled, gargle immediately.
 - (4) Do not lick the electrolyte. If the electrolyte touches skin, wash it off with soap immediately.
 - (5) The **OS-CON** contains combustible substances. In case a large current continues to flow after a short circuit, in the worst case, the shorted-out section may ignite. For safety, install a redundant circuit or a protective circuit, etc.

2-2. Wear-out failure (lifetime)

When lifetime span exceeded the specified guarantee time of endurance and damp heat, electrolyte might insulate and cause electric characteristic changed. This is called an open circuit.

The electric characteristics of capacitance and ESR may possibly change within the specified range in specifications even if it is used under the condition of the rated voltage, electric and mechanical performance. Please note it when designing.

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| Surface mount type | SXV |
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| | SVPF |
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| | SVPC |
| | SVPB |
| | SVPA |
| | SVQP |
| SVP | |

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| Radial lead type | SXE |
| | SEPF |
| | SEPC |
| | SEQP |
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| Surface mount type | |
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| Surface mount type | |
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Other precautions

1. Leakage current

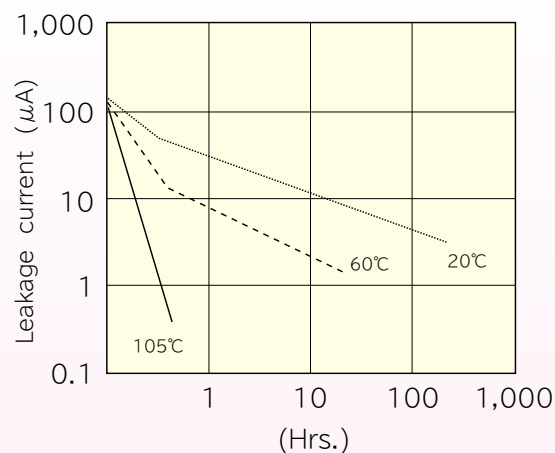
Mechanical stress may cause OS-CON's leakage current increased.

In such a case, leakage current will gradually decrease by applying voltage (within the category voltage and the upper limit of category temperature).

Then, self-healing speed of leakage current is faster when it is near to the upper limit of category temperature and the category voltage.

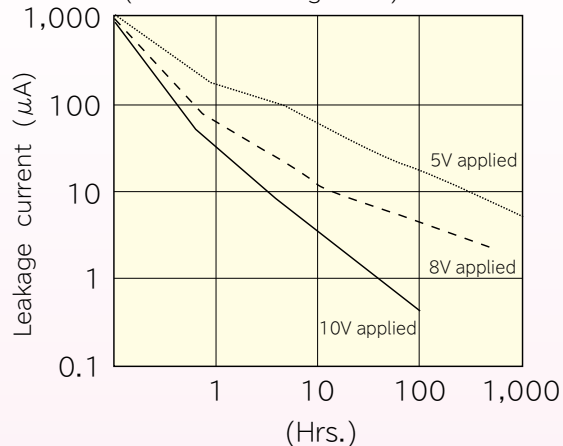
OS-CON

leakage current restoration characteristics
16V/10 μ F (16V DC applied)



OS-CON

leakage current restoration characteristics
10V/33 μ F (Ambient temperature:65°C)
(Measured voltage:10V)



※To make the recovery of LC values easy to show, samples that LC values have been increased on purpose are used in the test.

2. Rapid charge and discharge limitation

Allowance of a large rush current to flow due to rapid charge and discharge may result in short circuit or large leakage current. The protection circuit, to maintain high reliability, is recommended when rush current to flow to the OS-CON is in the following cases.

- Products which 10 times of allowable ripple current is less than 10A: It is when 10A or over of rush current is applied
- Products which 10 times of allowable ripple current is 10A or over: It is when rush current, which the figure is over 10 times of allowable ripple current, is applied.

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SVPF

SVPE

SVPS

SVPD

SVPC

SVPB

SVPA

SVQP

SVP

SXE

SEPF

SEPC

SEQP

SEP

Catalog Deletion and
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3. Soldering with a soldering iron

- When lead terminals for radial lead type must be processed because the lead pitch and the PCB holes do not match, process them without any stresses to the OS-CON before soldering.
- Solder without any excessive stresses to the OS-CON itself.
- When the OS-CON has been soldered once and needs to be removed, remove it after the solder has been completely melted.
- Do not let the tip of the soldering iron touch the OS-CON itself.

4. Flow soldering

- Do not apply flow soldering to OS-CON SMD type.
- Do not solder the OS-CON itself by submerging it in melted solder.
Solder the opposite side that the OS-CON is mounted on.
- Note that flux does not adhere to anywhere except the lead terminal.
- Note that other components do not fall over and touch the OS-CON when soldering.

5. Reflow soldering

- Do not apply reflow soldering to OS-CON Radial Lead type.
- Please contact us for setting VPS conditions.

6. Handling after soldering

Do not subject the OS-CON to excessive stress as follows.

- Do not tilt, bend or twist the OS-CON.
- Do not move the PCB with holding the OS-CON itself.
- Do not hit the OS-CON with objects.
- When stacking PCBs, make sure that the OS-CON does not touch other PCBs or components.

7. Cleaning PCB

Check the following items before washing PC board with these detergents: high quality alcohol-based cleaning fluid such as Pine- α ST-100S, clean thru 750H, 750L, 710M, 750K or Techno Care FRW 14 through 17 or detergents including substitute freon as AK-225AES or IPA.

- Use immersion or ultrasonic waves to clean within 2 minutes.
- The temperature of the cleaning fluid should be less than 60°C.
- Watch the contamination of the detergent such as conductivity, pH, specific gravity, water content, etc.
- Do not store the OS-CON in a location subject to gases from the cleaning fluid or in an airtight container after cleaning.
- Dry the PCB or OS-CON with hot air that should be less than the upper category temperature.
- Please note that indication may disappear when rubbing print side after washing depending on a cleaner.
- Please contact us for details about detergents, cleaning methods and detergents other than those listed above.

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| Radial lead type | SXE |
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| | SEPC |
| | SEQP |
| | SEP |

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| Surface mount type |
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8. Fixatives and coating materials

- Select the appropriate covering and sealant materials for the **OS-CON**. In particular, don't use acetone in the fixative, coating agent and diluent.
- Before applying the fixative or coating, completely remove any flux residue and foreign matter from the area where the board and the **OS-CON** will be jointed together.
- Allow any detergent to dry before applying the fixative or coating.
- Please contact us for the fixative and coating heat curing conditions.

9. Capacitor insulation

Be sure to completely separate the case, negative lead terminal, positive lead terminal and PC board patterns with each other due to the following reasons.

- Insulation is not guaranteed at a part of resin on the surface of a case.
- It offers inconstant resistance between a case and a negative lead terminal and it isn't insulated.

10. Storage conditions

Open the bags just before mounting and use up all products once opened, For keeping a good solderability, store the **OS-CON** as follows.

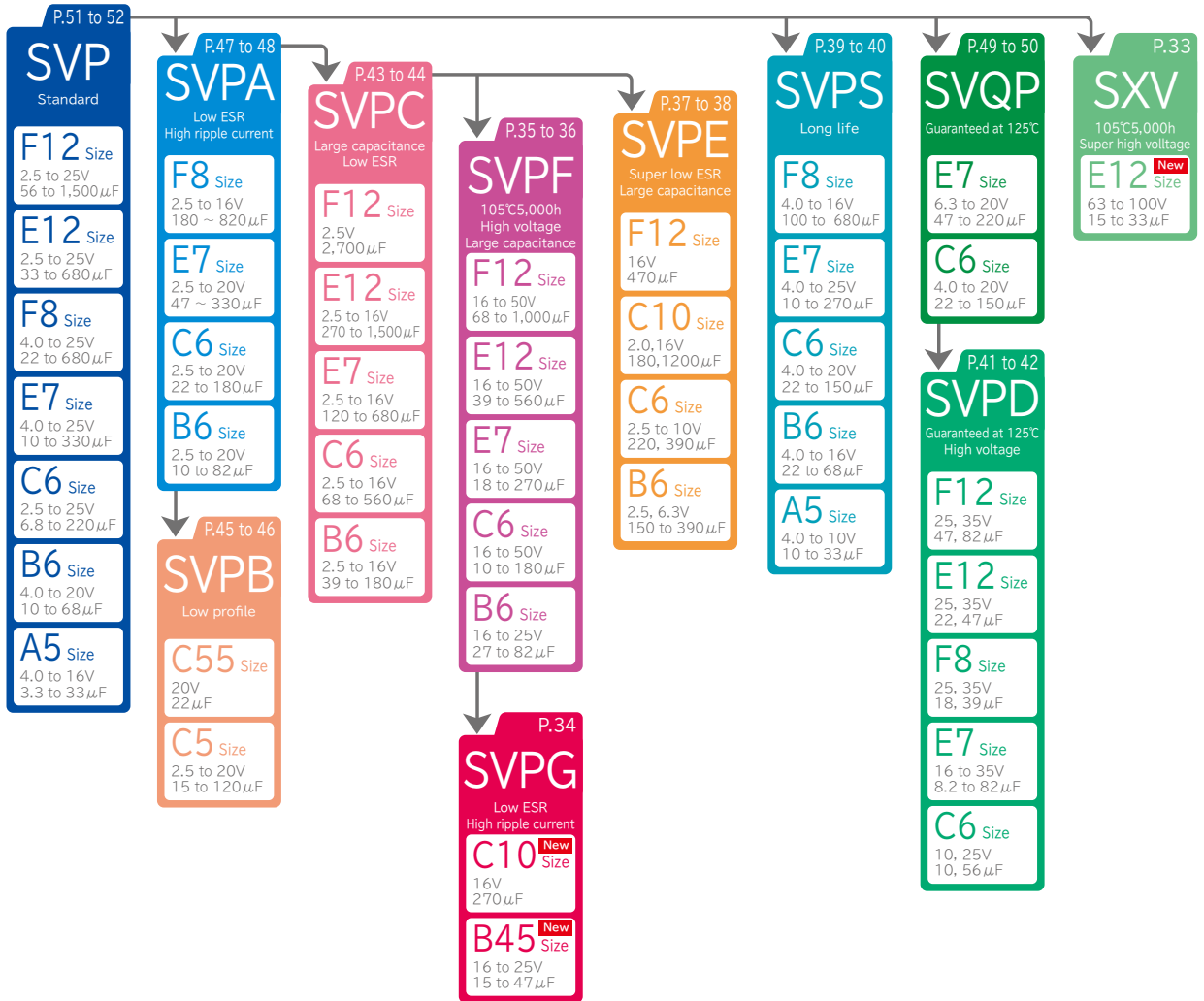
| | | Before unsealing | After unsealing |
|------------------|---------------------|---------------------------------|--|
| SMD type※1 | | Within 24 months after shipment | Within 30 days from opening (packaged with carrier tape) |
| Radial lead type | Bag packing product | Within 30 months after shipment | Within 7 days from opening |
| | Taping product | Within 24 months after shipment | |

※1 The JEDEC J-STD-020 standard is not applicable

| | |
|---|--------------------|
| OS-CON Line-up | Selection guide |
| Guidelines and precautions | |
| Series system diagram | |
| Image of case size | |
| Products list | |
| Packing specifications (SMD type) | Technical data |
| Packing specifications (Radial lead type) | |
| Recommended soldering condition | |
| Fundamental structure | |
| Characteristics | |
| Reliability | Surface mount type |
| SVX | |
| SVPG | |
| SVPF | |
| SVPE | |
| SVPS | |
| SVPD | |
| SVPC | |
| SVPB | |
| SVPA | |
| SVQP | |
| SVP | |
| SXE | Radial lead type |
| SEPF | |
| SEPC | |
| SEQP | |
| SEP | |
| Catalog Deletion and EOL series | |

| |
|---------------------------------|
| POSCAP Line-up |
| Guidelines and precautions |
| Selection guide |
| Technical data |
| Surface mount type |
| Catalog Deletion and EOL models |

SMD type



Radial lead type

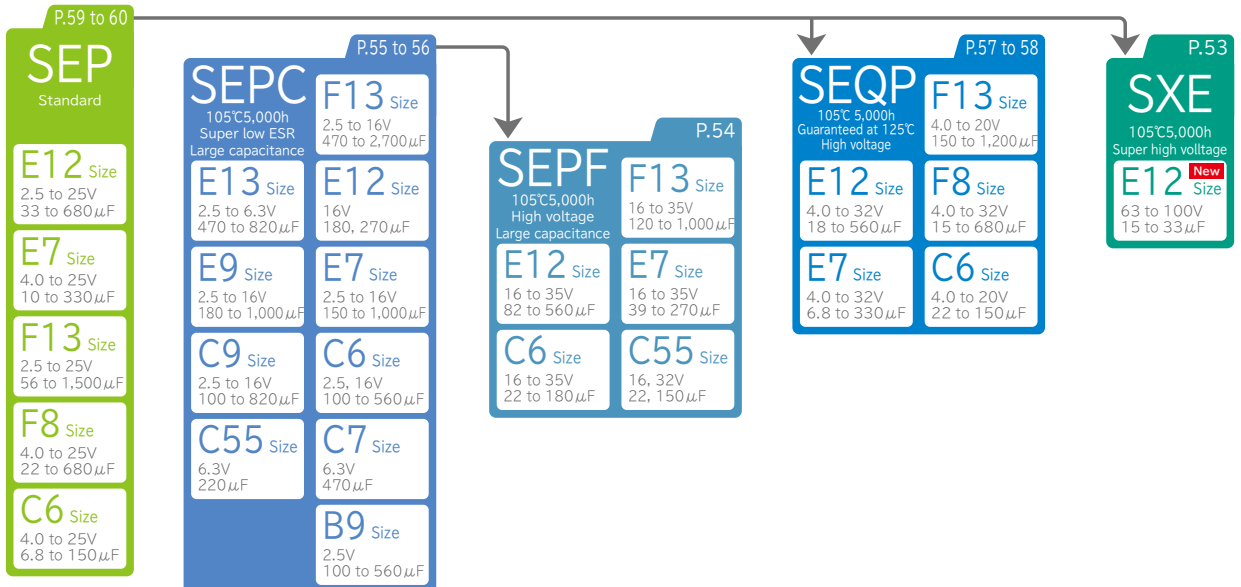


Image of case size

SMD type

(Unit:mm)

| A5 size | B45 size | B6 size | C5 size | C55 size | C6 size | C10 size | E7 size | E12 size | F8 size | F12 size |
|---|----------------------------|---|--------------------|--------------------|---|--|---|--|---|---|
| | | | | | | | | | | |
| P.39 to 40 SVPS P.51 to 52 SVP | New P.34 SVPG | P.35 to 36 SVPF P.37 to 38 SVPE P.39 to 40 SVPS P.43 to 44 SVPC P.47 to 48 SVPA P.51 to 52 SVP | P.45 to 46 SVPB | P.45 to 46 SVPB | P.35 to 36 SVPF P.37 to 38 SVPE P.39 to 40 SVPS P.41 to 42 SVPD P.43 to 44 SVPC P.47 to 48 SVPA P.49 to 50 SVQP P.51 to 52 SVP | New P.34 SVPG P.37 to 38 SVPE | P.35 to 36 SVPF P.39 to 40 SVPS P.41 to 42 SVPD P.43 to 44 SVPC P.47 to 48 SVPA P.49 to 50 SVQP P.51 to 52 SVP | New P.33 SXV P.35 to 36 SVPF P.39 to 40 SVPS P.41 to 42 SVPD P.43 to 44 SVPC P.47 to 48 SVPA P.51 to 52 SVP | P.39 to 40 SVPS P.41 to 42 SVPD P.47 to 48 SVPA P.51 to 52 SVP | P.35 to 36 SVPF P.37 to 38 SVPE P.41 to 42 SVPD P.43 to 44 SVPC P.51 to 52 SVP |

※ Profile of case size are all indicated in maximum values.

Radial lead type

| B9 size | C55 size | C6 size | C6 size | C7 size | C9 size | E7 size | E7 size | E9 size | E12 size | E12 size | E13 size | F8 size | F13 size | F13 size |
|--------------------|------------------------------------|------------------------------------|---|--------------------|--------------------|------------------------------------|---|--------------------|---|--|--------------------|---|--------------|---|
| | | | | | | | | | | | | | | |
| P.55 to 56 SEPC | P.54 SEPF P.55 to 56 SEPC | P.54 SEPF P.55 to 56 SEPC | P.57 to 58 SEQP P.59 to 60 SEP | P.55 to 56 SEPC | P.55 to 56 SEPC | P.54 SEPF P.55 to 56 SEPC | P.57 to 58 SEQP P.59 to 60 SEP | P.55 to 56 SEPC | P.54 SEPF P.55 to 56 SEPC P.57 to 58 SEQP P.59 to 60 SEP | New P.53 SXE P.55 to 56 SEPC P.57 to 58 SEQP P.59 to 60 SEP | P.55 to 56 SEPC | P.57 to 58 SEQP P.59 to 60 SEP | P.54 SEPF | P.55 to 56 SEPC P.57 to 58 SEQP P.59 to 60 SEP |

※ Profile of case size are all indicated in maximum values.

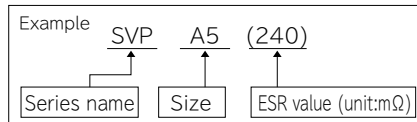
Products list

Size · ESR Matrix list / SMD type

| V | Series | μF | | | | | | | | | | | | | | | |
|-----|--------|---------------|-----|-----|-----|----|----------|----------|----|----|----------|----------|---------|----|---------|----|-----------------|
| | | 3.3 | 4.7 | 6.8 | 8.2 | 10 | 15 | 18 | 22 | 27 | 33 | 39 | 47 | 56 | 68 | 82 | 100 |
| 2.0 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPC | | | | | | | | | | | | | | | | |
| | SVPB | | | | | | | | | | | | | | | | |
| | SVPA | | | | | | | | | | | | | | | | B6 (30) |
| | SVP | | | | | | | | | | | | | | | | |
| 2.5 | SVPS | | | | | | | | | | A5 (200) | | | | B6 (30) | | |
| | SVPC | | | | | | | | | | | | | | | | |
| | SVPB | | | | | | | | | | | | | | | | C5 (40) |
| | SVPA | | | | | | | | | | | | | | B6 (30) | | |
| | SVQP | | | | | | | | | | | | | | | | |
| | SVP | | | | | | | | | | | A5 (200) | B6 (70) | | B6 (60) | | |
| | SVPE | | | | | | | | | | | | | | | | |
| 4.0 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | | | | | A5 (200) | | | | B6 (30) | | |
| | SVPC | | | | | | | | | | | | | | | | B6 (30,25) |
| | SVPB | | | | | | | | | | | | | | | | C5 (40) |
| | SVPA | | | | | | | | | | | | | | B6 (30) | | |
| | SVQP | | | | | | | | | | | | | | | | C6 (45) C6 (40) |
| 6.3 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | | | | | A5 (200) | | | | B6 (70) | | |
| | SVPC | | | | | | | | | | | | | | | | |
| | SVPB | | | | | | | | | | | | | | | | C6 (45) C6 (40) |
| | SVPA | | | | | | | | | | | | | | B6 (70) | | |
| | SVQP | | | | | | | | | | | | | | | | C6 (45) C6 (40) |
| 10 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | A5 (220) | A5 (200) | | | | | | | B6 (70) | | C6 (30) |
| | SVPD | | | | | | | | | | | | | | | | C6 (45) |
| | SVPC | | | | | | | | | | | | | | | | B6 (30,23) |
| | SVPB | | | | | | | | | | | | | | | | C5 (40) |
| | SVPA | | | | | | | | | | | | | | | | C6 (30) |
| 16 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | | | | | | | | | | | C6 (45) |
| | SVPD | | | | | | | | | | | | | | | | |
| | SVPC | | | | | | | | | | | | | | | | B6 (30,23) |
| | SVPB | | | | | | | | | | | | | | | | C6 (45) |
| | SVPA | | | | | | | | | | | | | | | | C6 (30) |
| 20 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | | | | | | | | | | | C6 (45) |
| | SVPD | | | | | | | | | | | | | | | | |
| | SVPC | | | | | | | | | | | | | | | | B6 (30,23) |
| | SVPB | | | | | | | | | | | | | | | | C6 (45) |
| | SVPA | | | | | | | | | | | | | | | | C6 (30) |
| 25 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | | | | | | | | | | | C6 (45) |
| | SVPD | | | | | | | | | | | | | | | | |
| | SVPC | | | | | | | | | | | | | | | | B6 (30,23) |
| | SVPB | | | | | | | | | | | | | | | | C6 (45) |
| | SVPA | | | | | | | | | | | | | | | | C6 (30) |
| 35 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | | | | | | | | | | | C6 (45) |
| | SVPD | | | | | | | | | | | | | | | | |
| | SVPC | | | | | | | | | | | | | | | | B6 (30,23) |
| | SVPB | | | | | | | | | | | | | | | | C6 (45) |
| | SVPA | | | | | | | | | | | | | | | | C6 (30) |
| 50 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | | | | | | | | | | | C6 (45) |
| | SVPD | | | | | | | | | | | | | | | | |
| | SVPC | | | | | | | | | | | | | | | | B6 (30,23) |
| | SVPB | | | | | | | | | | | | | | | | C6 (45) |
| | SVPA | | | | | | | | | | | | | | | | C6 (30) |
| 63 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | | | | | | | | | | | C6 (45) |
| | SVPD | | | | | | | | | | | | | | | | |
| | SVPC | | | | | | | | | | | | | | | | B6 (30,23) |
| | SVPB | | | | | | | | | | | | | | | | C6 (45) |
| | SVPA | | | | | | | | | | | | | | | | C6 (30) |
| 100 | SVPE | | | | | | | | | | | | | | | | |
| | SVPE | | | | | | | | | | | | | | | | |
| | SVPS | | | | | | | | | | | | | | | | C6 (45) |
| | SVPD | | | | | | | | | | | | | | | | |
| | SVPC | | | | | | | | | | | | | | | | B6 (30,23) |
| | SVPB | | | | | | | | | | | | | | | | C6 (45) |
| | SVPA | | | | | | | | | | | | | | | | C6 (30) |

How to read the lists in P17 to 20

- The name, sizes and ESR values of each series are found where the voltage (V) and capacitance (μF) intersect each other. (Refer to the example.)
- Please confirm the details in the list of each series from P33 to P60.
- There are two or more same series names in a cell, which part number is different each, so please check the characteristics list of the series.



Size · ESR Matrix list / SMD type

| V | Series | 120 | 150 | 180 | 220 | 270 | 330 | 390 | 470 | 560 | 680 | 820 | 1000 | 1200 | 1500 | 2700 |
|-----|--------|------------|---------------|---------------|------------|----------|---------------|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| 2.0 | SVPE | | | | | | | | | | | | | C10 (8) | | |
| 2.5 | SVPE | | | | | B6 (10) | B6 (15,10) | C6 (10) | | | | | | | | |
| | SVPE | | | | | | | B6 (10) | | | | | | | | |
| | SVPC | | | B6 (30,24,19) | | | | C6 (25,15) | | C6 (16) | E7 (20) | E12 (9) | | | E12 (10) | F12 (12) |
| | SVPB | C5 (40) | | | | | | | | | | | | | | |
| | SVPA | | | C6 (20) | | | | E7 (20) | | | | | F8 (19) | | | |
| | SVP | | | | C6 (23) | | | | | | | E12 (13) | | | | F12 (12) |
| 4.0 | SVPS | | C6 (22) | | | E7 (22) | | | | | | F8 (20) | | | | |
| | SVPC | | B6 (30,23,20) | | | | C6 (27,21,15) | | | E7 (22) | | | | E12 (12) | E12 (12) | |
| | SVPB | | | | | | | | | | | | | | | |
| | SVPA | | C6 (22) | | | E7 (22) | | | | | | F8 (20) | | | | |
| | SVQP | | C6 (40) | | | | | | | | | | | | | |
| | SVP | | C6 (40) | | | | | E7 (35) | | | E12 (13) | F8 (25) | | | F12 (12) | |
| 6.3 | SVPE | | B6 (12) | B6 (15) | C6 (10) | | | | | | | | | | | |
| | SVPE | | | | B6 (15) | | | | | | | | | | | |
| | SVPS | C6 (22) | | | E7 (22) | | | | F8 (20) | | | | | | | |
| | SVPC | B6 (21) | | | C6 (27,15) | | C6 (17) | E7 (22) | | | | E12 (12) | | | | |
| | SVPB | | | | | | | | | | | | | | | |
| | SVPA | C6 (22) | | | E7 (22) | | | | F8 (20) | | | | | | | |
| | SVQP | | | | E7 (35) | | | | | | | | | | | |
| | SVP | C6 (17) | | | E7 (35) | | F8 (25) | | F8 (25) | | | F12 (12) | | | | |
| 10 | SVPE | | | | C6 (20) | | | | | | | | | | | |
| | SVPS | | E7 (30) | | | | | F8 (24) | | | | | | | | |
| | SVPC | | F8 (30) | | | | | | | | | | | | | |
| | SVPC | C6 (27,22) | | | | E7 (22) | E7 (19) | | | | | | | | | |
| | SVPB | | | | | | | | | | | | | | | |
| | SVPA | | E7 (30) | | | | | F8 (24) | | | | | | | | |
| | SVQP | E7 (35) | E7 (35) | | | | | | | | | | | | | |
| | SVP | E7 (35) | F8 (30) | | | F8 (25) | E12 (17) | | | F12 (13) | | | | | | |
| 16 | SVPG | | | | | | C10 (8) | | | | | | | | | |
| | SVPF | | | | | | E7 (22) | | | E12 (14) | | | F12 (12) | | | |
| | SVPE | | | C6 (22) | | | | | | | | | | | | |
| | SVPS | | | C10 (11) | | | | | F12 (10) | | | | | | | |
| | SVPD | | | F8 (29) | | | | | | | | | | | | |
| | SVPC | E7 (27) | E7 (22) | | | E12 (16) | | | | | | | | | | |
| | SVPB | | | | | | | | | | | | | | | |
| | SVPA | | | F8 (29) | | | | | | | | | | | | |
| | SVP | | F8 (30) | E12 (20) | | | F12 (16) | | | | | | | | | |
| 20 | SVPG | | | | | | | | | | | | | | | |
| | SVPF | C6 (25) | | E7 (25) | | | | E12 (14) | | F12 (12) | | | | | | |
| | SVPS | | | | | | | | | | | | | | | |
| | SVPB | | | | | | | | | | | | | | | |
| | SVPA | | | | | | | | | | | | | | | |
| | SVP | | F12 (20) | | | | | | | | | | | | | |
| 25 | SVPG | | | | | | | | | | | | | | | |
| | SVPF | | | E12 (16) | | | F12 (14) | | | | | | | | | |
| | SVPD | | | | | | | | | | | | | | | |
| 35 | SVPF | F12 (18) | | | | | | | | | | | | | | |
| | SVPD | | | | | | | | | | | | | | | |
| 50 | SVPF | | | | | | | | | | | | | | | |
| 63 | SXV | | | | | | | | | | | | | | | |
| 100 | SXV | | | | | | | | | | | | | | | |

Standard sizes

(unit : mm)

| | | | | | | | | | |
|----|-----------|-----|-----------|-----|------------|-----|------------|-----|-------------|
| A5 | φ4.0×L5.5 | B45 | φ5.0×L4.5 | C5 | φ6.3×L5.0 | E7 | φ8.0×L7.0 | F8 | φ10.0×L8.0 |
| | | B6 | φ5.0×L6.0 | C55 | φ6.3×L5.5 | E12 | φ8.0×L12.0 | F12 | φ10.0×L12.7 |
| | | | | C6 | φ6.3×L6.0 | | | | |
| | | | | C10 | φ6.3×L10.0 | | | | |

※ Red letters : New models

Products list

Size · ESR Matrix list / Radial lead type

| V | Series | μF | | | | | | | | | | | | | |
|-----|--------|----------|----|----------|----------|----|----------|----------|---------|---------|---------|----------|----------|----------|----------|
| | | 6.8 | 10 | 15 | 18 | 22 | 33 | 39 | 47 | 56 | 68 | 82 | 100 | 120 | 150 |
| 2.5 | SEPC | | | | | | | | | | | | B9 (7) | | |
| | SEP | | | | | | | | | | | | | | |
| 4.0 | SEPC | | | | | | | | | | | | | | |
| | SEQP | | | | | | | | | | | | | | C6 (40) |
| | SEP | | | | | | | | | | | | C6 (40) | | C6 (40) |
| 6.3 | SEPC | | | | | | | | | | | | | | |
| | SEQP | | | | | | | | | | | C6 (45) | | | E7 (35) |
| | SEP | | | | | | | | | | | C6 (45) | | | E7 (35) |
| 10 | SEPC | | | | | | | | | | | | | | |
| | SEQP | | | | | | | | | C6 (45) | | | | E7 (35) | |
| 16 | SEP | | | | | | | | | C6 (45) | | | | E7 (35) | |
| | SEPF | | | | | | | | | | | | | | C55 (30) |
| 16 | SEPC | | | | | | | | | | | | C6 (24) | | E7 (22) |
| | SEQP | | | | | | | | | | | C9 (10) | | | |
| | SEQP | | | | | | | C6 (50) | | | | E7 (40) | | | F8 (30) |
| | SEP | | | | | | | C6 (50) | | | | E7 (40) | | | F8 (30) |
| 20 | SEPF | | | | | | | | | | | | | C6 (25) | |
| | SEQP | | | | | | C6 (60) | | | E7 (45) | F8 (40) | | E12 (24) | | F13 (20) |
| | SEP | | | | | | C6 (60) | E7 (45) | | E7 (45) | F8 (40) | F8 (40) | E12 (24) | | F13 (20) |
| 25 | SEPF | | | | | | | | | C6 (30) | | E7 (28) | | | |
| 32 | SEPF | | | | | | C55 (35) | | | | | E7 (25) | | | |
| | SEQP | E7 (100) | | F8 (80) | E12 (50) | | | | | | | | | | |
| 35 | SEPF | | | | | | C6 (35) | | E7 (30) | | | E12 (20) | | F13 (18) | |
| 63 | SXE | | | | | | | E12 (25) | | | | | | | |
| 100 | SXE | | | E12 (40) | | | | | | | | | | | |

Standard sizes

(unit : mm)

| | | | | | | | |
|----|-----------|-----|-----------|-----|------------|-----|------------|
| B9 | φ5.0×L9.0 | C55 | φ6.3×L5.5 | E7 | φ8.0×L7.0 | F8 | φ10.0×L8.0 |
| | | C6 | φ6.3×L6.0 | E9 | φ8.0×L9.0 | F13 | φ8.0×L12.0 |
| | | C7 | φ6.3×L7.0 | E12 | φ8.0×L12.0 | | |
| | | C9 | φ6.3×L9.0 | E13 | φ8.0×L13.0 | | |

Size · ESR Matrix list / Radial lead type

| V | Series | μF | | | | | | | | | | | | |
|-----|--------|-----|-----|-----|--------|---------|--------|--------|---------|----------|---------|------|----------|----------|
| | | 180 | 220 | 270 | 330 | 390 | 470 | 560 | 680 | 820 | 1000 | 1200 | 1500 | 2700 |
| 2.5 | SEPC | | | | B9 (7) | C6 (10) | B9 (7) | B9 (7) | | C9 (7) | E9 (7) | | | F13 (10) |
| | SEP | | | | C9 (7) | | | | C9 (7) | E7 (8) | | | | |
| 4.0 | SEPC | | | | | | | | C9 (7) | E13 (7) | F13 (7) | | | |
| | SEPC | | | | | | | | E9 (7) | | | | | |
| | SEPC | | | | | | | | E13 (7) | | | | | |
| 6.3 | SEPC | | | | | | | | C9 (7) | E9 (7) | F13 (7) | | E7 (18) | F13 (10) |
| | SEPC | | | | | | | | E9 (8) | C9 (7) | F13 (7) | | | |
| | SEPC | | | | | | | | E13 (8) | E9 (7) | | | | |
| 10 | SEPC | | | | | | | | C7 (20) | | | | | |
| | SEPC | | | | | | | | E13 (8) | | | | | |
| | SEPC | | | | | | | | C7 (20) | | | | | |
| 16 | SEPC | | | | | | | | F8 (25) | E12 (15) | | | F13 (12) | |
| | SEPC | | | | | | | | F8 (25) | E12 (15) | | | F13 (12) | |
| | SEPC | | | | | | | | F8 (25) | E12 (15) | | | F13 (12) | |
| 20 | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| 25 | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| 32 | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| 35 | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| 63 | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| 100 | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |
| | SEPC | | | | | | | | | | | | | |

※ Red letters : New models

- OS-CON Line-up
- Guidelines and precautions
- Series system diagram
- Image of case size
- Products list
- Packing specifications (SMD type)**
- Packing specifications (Radial lead type)
- Recommended soldering condition
- Fundamental structure
- Characteristics
- Reliability

Specifications for SMD type

1. Part number system

1 6

Rated voltage

Example

| Rated volt. | Code |
|-------------|------|
| 2.0 | 2 |
| 2.5 | 2R5 |
| 4.0 | 4 |
| 6.3 | 6 |
| 10 | 10 |
| 16 | 16 |
| 20 | 20 |
| 25 | 25 |
| 35 | 35 |
| 100 | 100 |

S V P

Series name

SVP

SVQP

SVPA

SVPB

SVPC

SVPD

SVPS

SVPE

SVPF

SVPG

SXV

3 R 3

Rated capacitance

Example

| Rated cap. (μF) | Code |
|-----------------|------|
| 3.3 | 3R3 |
| 4.7 | 4R7 |
| 10 | 10 |
| 22 | 22 |
| 100 | 100 |
| 220 | 220 |
| 470 | 470 |
| 1,500 | 1500 |

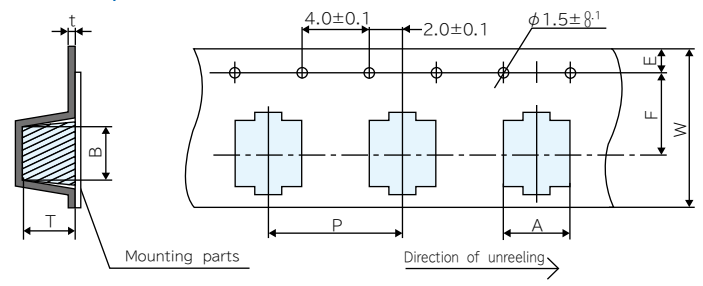
M

Capacitance tolerance

| Cap. tolerance | Code |
|----------------|------|
| ±20% | M |

2. Taping

2-1. Carrier tape



(unit : mm)

| Dimension / Size code | A | B | W | F | E | P | t | T |
|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|
| A5 | 4.7 ±0.2 | 4.7 ±0.2 | 12.0 ±0.3 | 5.5 ±0.1 | 1.75 ±0.1 | 8.0 ±0.1 | 0.4 ±0.1 | 5.8 ±0.2 |
| B6 | 5.6 ±0.2 | 5.6 ±0.2 | 16.0 ±0.3 | 7.5 ±0.1 | 1.75 ±0.1 | 8.0 ±0.1 | 0.4 ±0.1 | 6.2 ±0.2 |
| C5 | 6.9 ±0.2 | 6.9 ±0.2 | 16.0 ±0.3 | 7.5 ±0.1 | 1.75 ±0.1 | 12.0 ±0.1 | 0.4 ±0.1 | 5.3 ±0.2 |
| C55 | 6.9 ±0.2 | 6.9 ±0.2 | 16.0 ±0.3 | 7.5 ±0.1 | 1.75 ±0.1 | 12.0 ±0.1 | 0.4 ±0.1 | 6.2 ±0.2 |
| C6 | 6.9 ±0.2 | 6.9 ±0.2 | 16.0 ±0.3 | 7.5 ±0.1 | 1.75 ±0.1 | 12.0 ±0.1 | 0.4 ±0.1 | 6.2 ±0.2 |
| C10 | 7.0 ±0.2 | 7.0 ±0.2 | 24.0 ±0.3 | 11.5 ±0.1 | 1.75 ±0.1 | 16.0 ±0.1 | 0.5 ±0.1 | 10.5 ±0.2 |
| E7 | 8.6 ±0.2 | 8.6 ±0.2 | 24.0 ±0.3 | 11.5 ±0.1 | 1.75 ±0.1 | 12.0 ±0.1 | 0.4 ±0.1 | 7.2 ±0.2 |
| E12 | 8.6 ±0.2 | 8.6 ±0.2 | 24.0 ±0.3 | 11.5 ±0.1 | 1.75 ±0.1 | 16.0 ±0.1 | 0.5 ±0.1 | 12.3 ±0.2 |
| F8 | 10.7 ±0.2 | 10.7 ±0.2 | 24.0 ±0.3 | 11.5 ±0.1 | 1.75 ±0.1 | 16.0 ±0.1 | 0.4 ±0.1 | 8.2 ±0.2 |
| F12 | 10.7 ±0.2 | 10.7 ±0.2 | 24.0 ±0.3 | 11.5 ±0.1 | 1.75 ±0.1 | 16.0 ±0.1 | 0.4 ±0.1 | 13.0 ±0.2 |

※Please contact us separately concerning about B45 size of SVPG series.

- Surface mount type
- Radial lead type

- SXE
- SEPF
- SEPC
- SEQP
- SEP

Catalog Deletion and EOL series

- POSCAP Line-up
- Guidelines and precautions

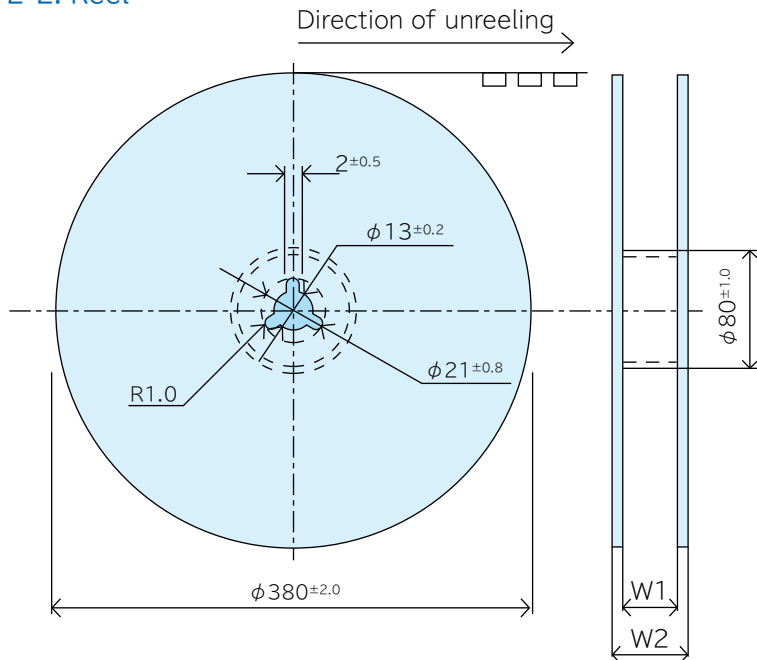
Selection guide

Technical data

Surface mount type

Catalog Deletion and EOL models

2-2. Reel

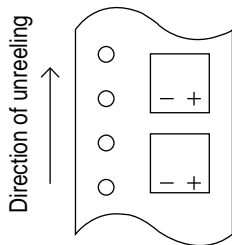


(unit : mm)

| Size code | W1 | W2 |
|-----------------------|----------------|----------------|
| A5 | 13.0 \pm 0.5 | 17.5 \pm 1.0 |
| B6, C5, C55, C6 | 17.0 \pm 0.5 | 21.5 \pm 1.0 |
| C10, E7, F8, E12, F12 | 25.0 \pm 0.5 | 29.5 \pm 1.0 |

※Please contact us separately concerning about B45 size of SVPG series.

2-3. Polarity



3. Minimum packing quantity and weight

Taping type

| Size code | Quantity(pcs./Reel, ϕ 380) | Typical weight(g) |
|-----------|---------------------------------|-------------------|
| A5 | 2,000 | 700 |
| B6 | 1,500 | 800 |
| C5 | 1,300 | 800 |
| C55 | 1,000 | 800 |
| C6 | 1,000 | 800 |
| C10 | 500 | 700 |
| E7 | 1,000 | 1,100 |
| E12 | 400 | 800 |
| F8 | 500 | 1,000 |
| F12 | 400 | 1,000 |

※Please contact us separately concerning about B45 size of SVPG series.

Packing specifications (Radial lead type)

Specifications for radial lead type

1. Part number system

1 6 S E P C 4 7 0 M + T

Rated voltage Series name Rated capacitance Capacitance tolerance Taping or forming of terminal code

Example

| Rated volt. | Code |
|-------------|-------------------|
| 2.5 | 2R5 ^{※1} |
| 4.0 | 4 |
| 6.3 | 6 |
| 10 | 10 |
| 16 | 16 |
| 20 | 20 |
| 25 | 25 |
| 32 | 32 |
| 100 | 100 |

| |
|------|
| SEP |
| SEQP |
| SEPC |
| SEPF |
| SXE |

| Rated cap. (μF) | Code |
|-----------------|------|
| 6.8 | 6R8 |
| 10 | 10 |
| 22 | 22 |
| 100 | 100 |
| 220 | 220 |
| 470 | 470 |
| 1,000 | 1000 |
| 2,700 | 2700 |

| Cap. tolerance | Code |
|----------------|------|
| ±20% | M |

Taping or lead terminal wire process code
None suffix for regular length lead type products

※1 Code 2 is used for 2.5V products of B9,C6,C9,E7,E9 and F13 size in SEPC series.

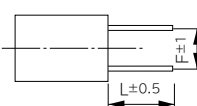
2. Lead terminal process

2-1. Applications

※ The following table is a standard specification. Please contact us separately concerning specifications except for that mentioned below. Because of a limit on the length of a model name, the part of process name changes to +S from +TSS, +D from +TS, +3 from +C3. Please contact us for details.

| Series | Size code | Bag-packed products (lead terminal cutting) | | Taping |
|------------------------------------|---------------------------|---|--------------|-----------|
| | | Not processed | Straight cut | |
| SEP SEQP SEPC SEPF SXE | B9,C55,C6,C7,C9,E7,E9,E12 | ○ | +C3 | +TSS (+S) |
| | E13 | ○ | +C3 | +TS (+D) |
| | F8,F13 | ○ | +C3 | +T |

2-2. Lead terminal cutting

| Lead terminal cutting code | Process names | Size code (φD) | Dimensions (unit : mm) | | | | | | | |
|----------------------------|---------------|---|--|-----------|----|--------------|------------------|---------|---|-----|
| +C3 (+3) | Straight cut | B9 (φ5) C55,C6, C7,C9 (φ6.3) E7, E9, E12, E13 (φ8) F8, F13 (φ10) |  | | | | | | | |
| | | | <table border="1"> <thead> <tr> <th>Size code</th> <th>B9</th> <th>C55,C6,C7,C9</th> <th>E7, E9, E12, E13</th> <th>F8, F13</th> </tr> </thead> <tbody> <tr> <td>F</td> <td>2.0</td> <td>2.5</td> <td>3.5</td> <td>5.0</td> </tr> </tbody> </table> | Size code | B9 | C55,C6,C7,C9 | E7, E9, E12, E13 | F8, F13 | F | 2.0 |
| Size code | B9 | C55,C6,C7,C9 | E7, E9, E12, E13 | F8, F13 | | | | | | |
| F | 2.0 | 2.5 | 3.5 | 5.0 | | | | | | |

2-3. Lead terminal taping

| Taping code | F | Size code (ϕD) | Taping |
|-------------|-------------------------------|--|--------|
| +T | F=5.0mm | F8,F13 ($\phi 10$) | |
| +TS (+D) | F=3.5mm | E13 ($\phi 8$) | |
| +TSS (+S) | F=2.0mm F=2.5mm F=3.5mm | B9 ($\phi 5$) C55,C6,C7,C9 ($\phi 6.3$) E7,E9,E12 ($\phi 8$) | |

(unit : mm)

| Code | F | P | P ₀ | P ₁ | P ₂ | Δh | W | W ₀ | W ₁ | W ₂ | H | ϕD_0 | t | l | L | |
|-----------|--|-----------|----------------|----------------|----------------|------------|-----------|----------------|----------------|----------------|------------|------------|-----------|-----|-----|------|
| Tolerance | $\begin{smallmatrix} +0.8 \\ -0.2 \end{smallmatrix}$ | ± 1.0 | ± 0.2 | ± 0.5 | ± 1.0 | ± 1.0 | ± 0.5 | min. | ± 0.5 | max | ± 0.75 | ± 0.2 | ± 0.3 | max | max | |
| +T | $\phi 10$ | 5.0 | 12.7 | 12.7 | 3.85 | 6.35 | 0 | 18.0 | 9.5 | 9.0 | 2.5 | 18.5 | 4.0 | 0.6 | 0 | 11.0 |
| +TS (+D) | $\phi 8$ | 3.5 | 12.7 | 12.7 | 4.60 | 6.35 | 0 | 18.0 | 9.5 | 9.0 | 2.5 | 17.5 | 4.0 | 0.6 | 0 | 11.0 |
| +TSS (+S) | $\phi 5$ | 2.0 | 12.7 | 12.7 | 5.35 | 6.35 | 0 | 18.0 | 9.5 | 9.0 | 2.5 | 17.5 | 4.0 | 0.6 | 0 | 11.0 |
| | $\phi 6.3$ | 2.5 | 12.7 | 12.7 | 5.10 | 6.35 | 0 | 18.0 | 9.5 | 9.0 | 2.5 | 17.5 | 4.0 | 0.6 | 0 | 11.0 |
| | $\phi 8$ | 3.5 | 12.7 | 12.7 | 4.60 | 6.35 | 0 | 18.0 | 9.5 | 9.0 | 2.5 | 17.5 | 4.0 | 0.6 | 0 | 11.0 |

3. Minimum packing quantity and weight

| Size code | Case size | Processed type discrete lead terminals | | Zig-zag pack taping type | |
|-----------|------------|--|-------------------|--------------------------|-------------------|
| | | Quantity(pcs./Bag) | Typical weight(g) | Quantity(pcs./Bag) | Typical weight(g) |
| B9 | $\phi 5$ | 500 | 180 | 2,000 | 1,000 |
| C55 | $\phi 6.3$ | 500 | 150 | 1,500 | 650 |
| C6 | $\phi 6.3$ | 500 | 160 | 1,500 | 700 |
| C7 | $\phi 6.3$ | 500 | 210 | 1,500 | 920 |
| C9 | $\phi 6.3$ | 500 | 240 | 1,500 | 1,000 |
| E7 | $\phi 8$ | 200 | 110 | 1,000 | 820 |
| E9 | $\phi 8$ | 200 | 130 | 1,000 | 900 |
| E12 | $\phi 8$ | 200 | 200 | 1,000 | 980 |
| E13 | $\phi 8$ | 200 | 160 | 1,000 | 1,060 |
| F8 | $\phi 10$ | 200 | 180 | 500 | 890 |
| F13 | $\phi 10$ | 200 | 280 | 500 | 940 |

OS-CON Line-up

Guidelines and precautions

Series system diagram

Image of case size

Products list

Packing specifications (SMD type)

Packing specifications (Radial lead type)

Recommended soldering condition

Fundamental structure

Characteristics

Reliability

SXV

SVPG

SVPF

SVPE

SVPS

SVPD

SVPC

SVPB

SVPA

SVQP

SVP

SXE

SEPF

SEPC

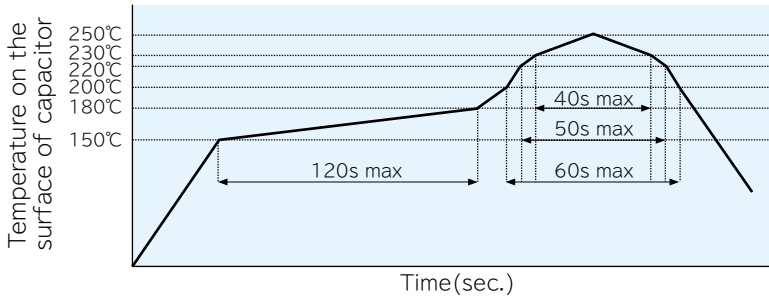
SEQP

SEP

Catalog Deletion and EOL series

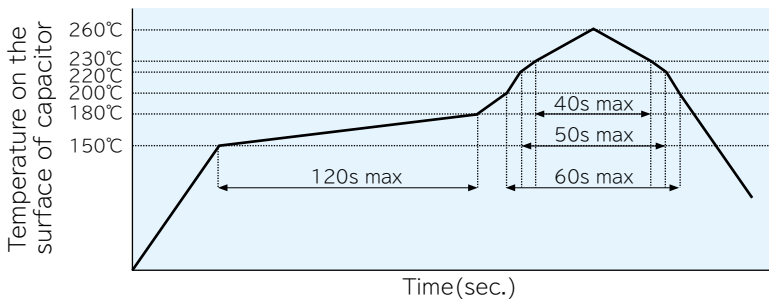
Peak temperature 250°C lead free reflow soldering profile

The cycles of reflow soldering: Twice (max)



Peak temperature 260°C lead free reflow soldering profile

The cycles of reflow soldering: Once (max)



Soldering with a soldering iron

Tip of a soldering iron: 400±10°C
Working time: 5sec. max

Flow soldering

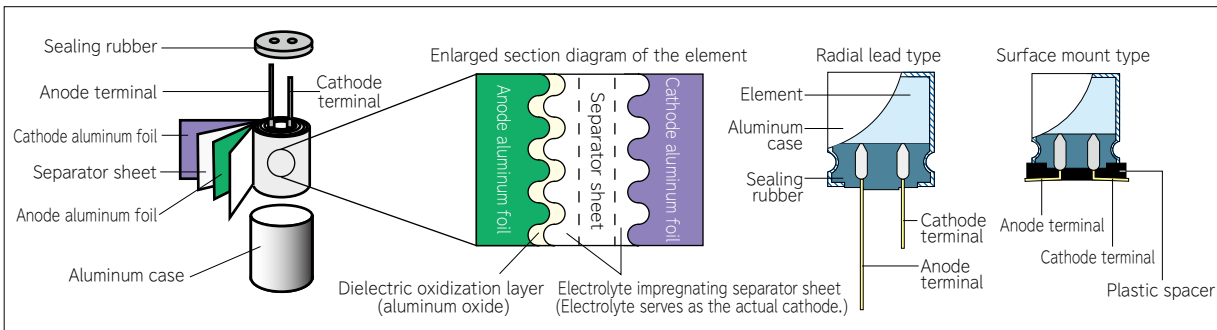
| | Temperature | Time | Flow number |
|---------------------|-------------------------------------|---------------------|--------------------|
| Preheating | 120°C or less (ambient temperature) | 120 sec. or less | 1 time |
| Soldering condition | 260 + 5°C or less | 10 + 1 sec. or less | 2 times or less ※1 |

※1. When soldering 2 times, total immersion time should be 10 + 1 sec. or less.

1. Basic structure of OS-CON

OS-CON has a basic construction similar to an aluminum electrolytic capacitor. A distinctive difference lies in **electrolyte**.

| | | |
|---------------------------------|---|---------------------------|
| Aluminum electrolytic capacitor | Separator sheet impregnated with electrolytic solution . | Liquid electrolyte |
| OS-CON | Separator sheet impregnated with conductive polymer . | Solid electrolyte |



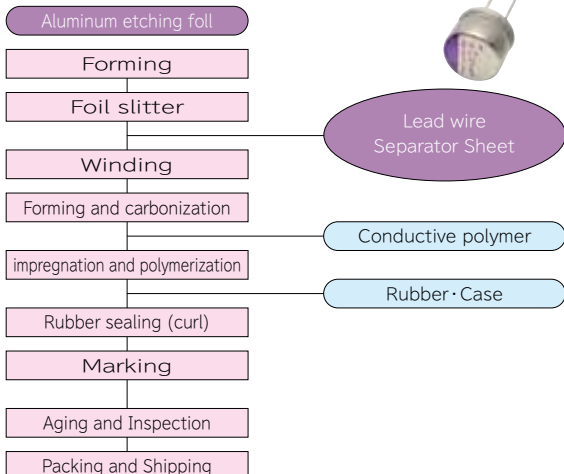
Characteristics between OS-CON and aluminum electrolytic capacitor due to a difference in electrolyte

| | Aluminum electrolytic capacitor | OS-CON |
|--|---|--|
| Conductivity | 0.01S/cm • Difficult to lower ESR due to low conductivity • ESR augments, in particular, in low temperature conditions | 100S/cm • The highest electronic conductivity, realizing super low ESR. • ESR is stable in low temperature conditions |
| Reliability, lifespan | • Liquid electrolyte is evaporable at high temperature • Static capacitance is on the decline at high temperature • Limited lifespan resulting from dry-up • Major fluctuations in temperature characteristics | • Little evaporation due to solid electrolyte • Little decrease in static capacitance • Long lifespan even at high temperature • Very minor fluctuations in temperature characteristics |
| Temperature coefficient (for lifespan) | 2 times by 10°C reduction 105°C/2,000h → 85°C/8,000h | 10 times by 20°C reduction 105°C/2,000h → 85°C/20,000h |

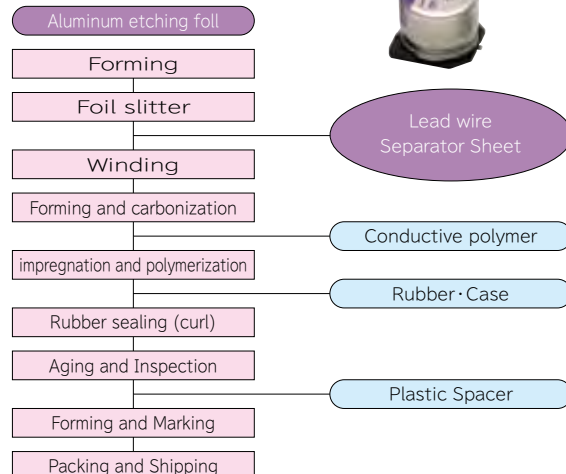
※Please contact us separately if you require life factor of SXV, SXE series.

2. OS-CON Manufacturing Method

[Radial lead type]



[Surface mount type]



| | |
|---|--------------------|
| OS-CON Line-up | |
| Guidelines and precautions | |
| Series system diagram | Selection guide |
| Image of case size | |
| Products list | |
| Packing specifications (SMD type) | |
| Packing specifications (Radial lead type) | Technical data |
| Recommended soldering condition | |
| Fundamental structure | |
| Characteristics | |
| Reliability | Surface mount type |
| SXV | |
| SVPG | |
| SVPF | |
| SVPE | |
| SVPS | |
| SVPD | |
| SVPC | |
| SVPB | |
| SVPA | |
| SVQP | |
| SVP | |
| SXE | Radial lead type |
| SEPF | |
| SEPC | |
| SEQP | |
| SEP | |
| Catalog Deletion and EOL series | |

Characteristics

1. OS-CON Electrical characteristics

1-1. Frequency characteristics

Fig.A Impedance frequency characteristics (OS-CON vs other types)

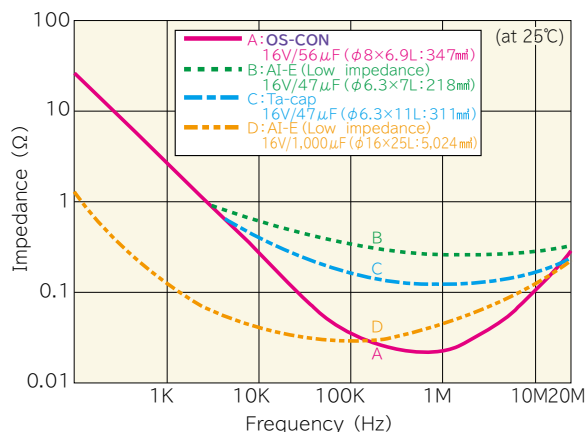
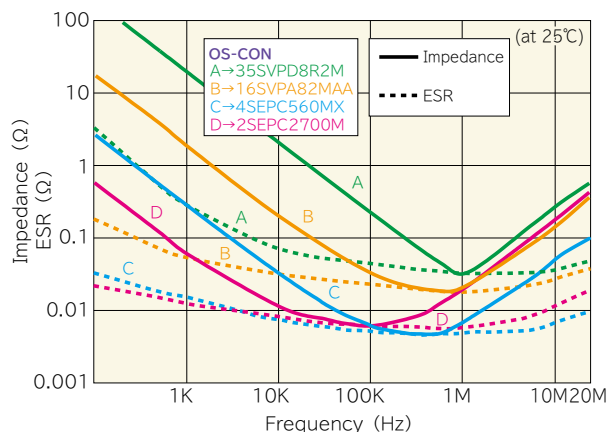


Fig.B Impedance & ESR frequency characteristics (several OS-CON models)



The OS-CON is an electrolytic capacitor that has excellent frequency characteristics. It improves ESR greatly, and provides the excellent frequency characteristics because the OS-CON uses a high conductive polymer as electrolyte. Fig.A: The OS-CON's frequency characteristic shows a nearly ideal curve. When compared at 100kHz, The OS-CON 56μF, and low impedance aluminum electrolytic capacitor 1,000μF nearly have the same feature. Fig.B: The resonance point of the OS-CON is at 100kHz to 10MHz. The ESR is an extremely small value approximately 5mΩ at 100kHz of 560μF.

1-2. Characteristics at high temperature and low temperature

Fig.A ESR temperature characteristics (OS-CON vs other types)

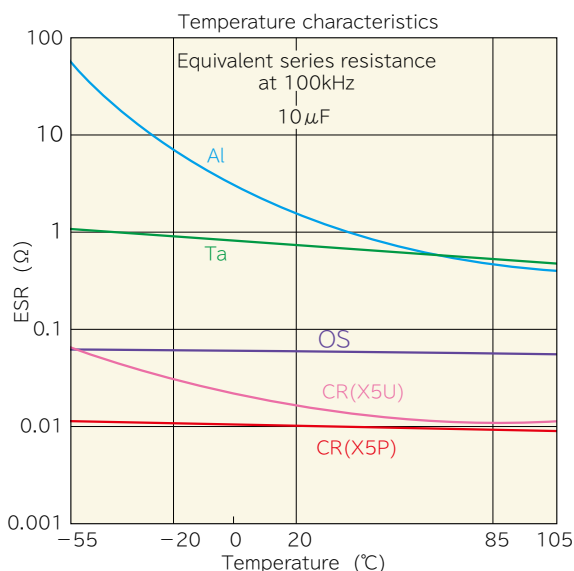
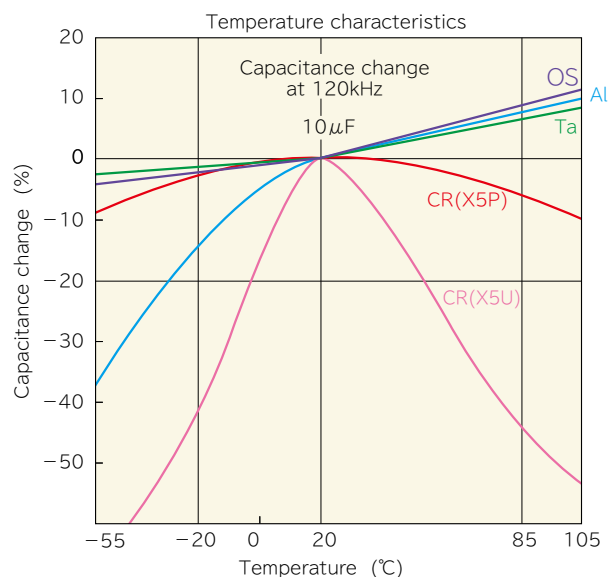


Fig.B Capacitance temperature characteristics (OS-CON vs other types)



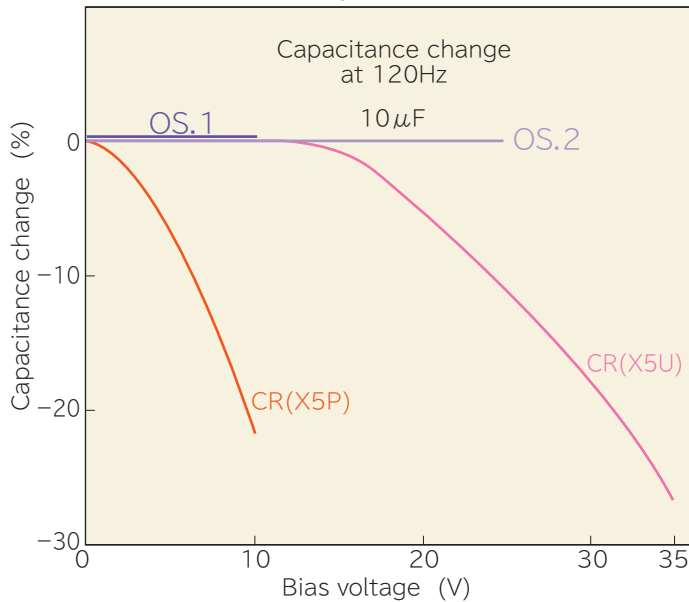
OS-CON's Characteristics at high temperature and low temperature is that it features little change in temperature for the ESR. What ESR changes a little against temperature means that noise clearing ability changes a little against temperature as well. The OS-CON is suitable for outdoor apparatus.

- OS = OS-CON ————— Purple
- Al = AL-E. Cap ————— Blue
- Ta = Tantalum Cap. ————— Green
- CR(X5P) = Cera Cap. (X5P Type) — Red
- CR(X5U) = Cera Cap. (X5U Type) — Pink

1-3. Bias characteristics

(a) Capacitance

Bias voltage characteristics



OS.1 = OS-CON(10SVP10M) — Purple

OS.2 = OS-CON(25SVDP10M) — Light Purple

CR(X5P) = Cera Cap. — Red
(X5P Type ; 10V/10μF)

CR(X5U) = Cera Cap. — Pink
(X5U Type ; 50V/10μF)

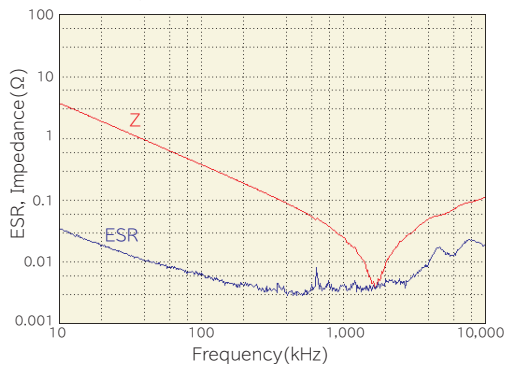
When voltage is applied to ceramic capacitors, they show a bias characteristics where static capacitance is reduced. Our OS-CON product, however, will show no reduction in capacitance for applied voltage within its rating.

(b) Impedance, ESR

Bias characteristics of OS-CON & ceramic capacitors

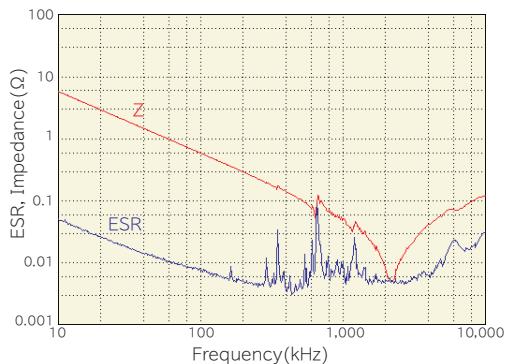
Multi-layer ceramic capacitor (25V/4.7μF)

0V bias



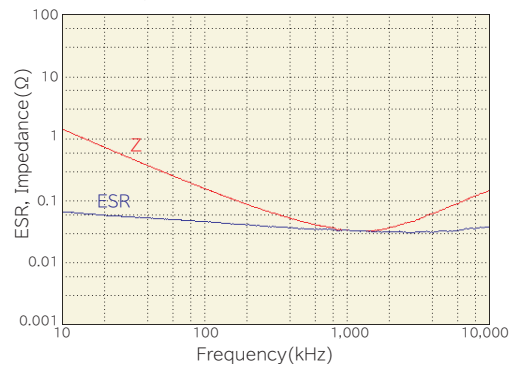
Multi-layer ceramic capacitor (25V/4.7μF)

20V bias



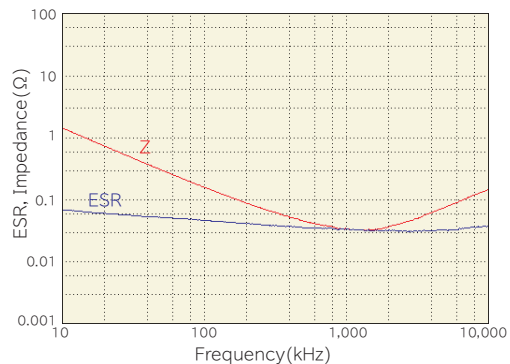
OS-CON (25SVDP10M)

0V bias



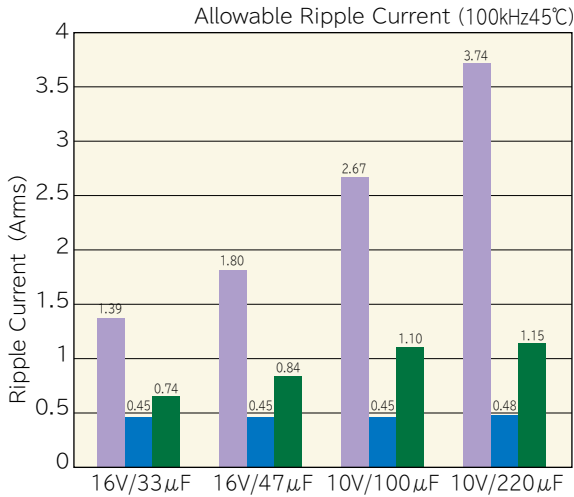
OS-CON (25SVDP10M)

20V bias



ESR & impedance of ceramic capacitors change largely between 300kHz to 1MHz. As for OS-CON, neither ESR nor impedance changes.

1-4. Allowable Ripple Current



OS-CON (SVP series) — Light Purple
 AI-E. Cap. (Low Impedance) — Blue
 Ta.Cap. (Low ESR) — Green
 ※Samples of SVP series are approximate models.

When selecting smoothing capacitors for power supply, the allowable ripple current of a capacitor is one of criterion.

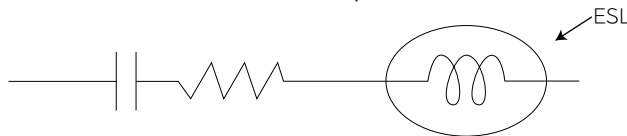
The allowable value of ripple current is decided by the generated heat of a capacitor, this heating is due to the ESR. Since a large ESR capacitor generates larger heat value, it can not make the flow of ripple current greater.

Compared to other electrolytic capacitors, ESR of the OS-CON is so small that it can allow much ripple currents.

1-5. ESL Characteristics

The OS-CON is a capacitor of high performance with low ESR and large capacitance. Recently in circuit technologies, the constituent of ESL is important in the domain of the high frequency with that of electronic equipment.

(a) Equivalent series circuit of capacitor



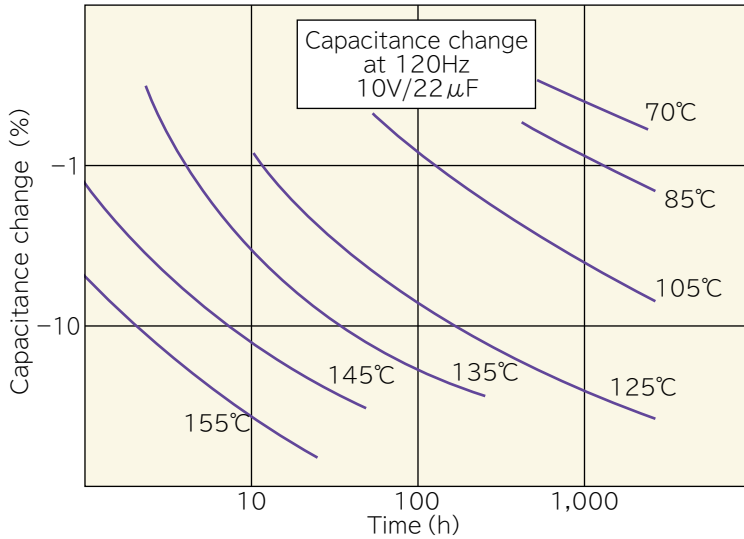
(b) Approximate ESL values of SEPC series

(unit:nH)

| Size Code | at 10 MHz | at 40 MHz |
|-----------|-----------|-----------|
| B9 | 1.6 | 1.5 |
| C55 | 2.4 | 2.3 |
| C6 | 2.6 | 2.5 |
| C7 | 2.3 | 2.3 |
| C9 | 2.2 | 2.1 |
| E7 | 2.9 | 2.8 |
| E9 | 2.7 | 2.6 |
| E12 | 4.3 | 4.1 |
| E13 | 4.3 | 4.1 |
| F13 | 6.0 | 5.8 |

※Measuring position: root of lead terminal
 ※Measuring method: Based on JEITA RC-2003
 ※All values on left figure are not guaranteed but reference.
 Please contact SANYO for details of measurement.

1. Temperature acceleration test (Endurance)



The decrease in capacitance of the OS-CON depends on temperature. The left figure shows the speed of capacitance decrease at each temperature. This graph indicates that temperature coefficient of the OS-CON lifetime is 10 times by 20°C reduction. Compared with this, aluminum capacitor lifetime is 2 times by 10°C reduction.

Estimation of life time

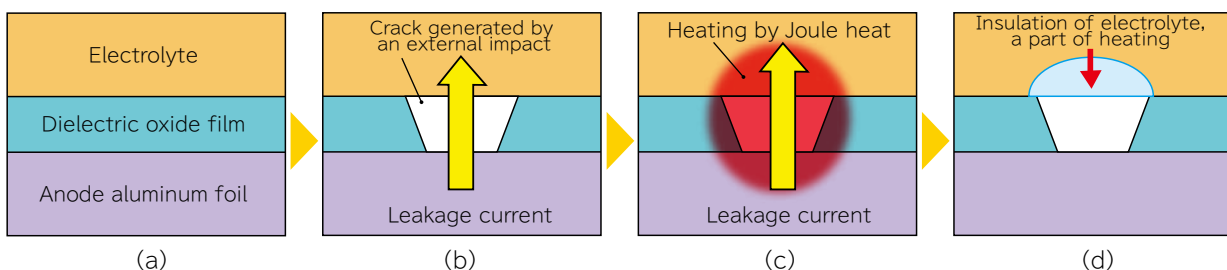
| OS-CON | Aluminum electrolytic capacitor |
|----------------|---------------------------------|
| 105°C ⇒ 2,000h | 105°C ⇒ 2,000h |
| 95°C ⇒ 6,324h | 95°C ⇒ 4,000h |
| 85°C ⇒ 20,000h | 85°C ⇒ 8,000h |
| 75°C ⇒ 63,245h | 75°C ⇒ 16,000h |

※Guaranteed temperature of the OS-CON is 105°C, except for SEQP, SVQP and SVPD series.
 ※Time is an estimate, not guaranteed.

Though the OS-CON and an aluminum electrolytic capacitors are guaranteed on 2,000 hours at 105°C, the life span results in differences as temperature drops. The OS-CON has a longer life span compared with an aluminum electrolytic capacitor.

2. Self-Healing Mechanism

The dielectric substance of the OS-CON is a non-conductive oxide film that has formed on the surface of an anode aluminum foil. Since the oxide film is solid and thin, leakage current may temporarily increase if micro cracks are generated by external stress (i.e. mechanical, thermal, electrical) [see figure (b)]. When this happens, the leakage current generates Joule heat [see figure (c)] and with this heat the electrolyte turns non-conductive and insulates the outlet of the leakage path [see figure (d)]. The leakage current from the micro cracks is thus suppressed through this function. This is known as "self-healing mechanism."



3. Reliability presumption of life for the OS-CON

The capacitance of the OS-CON is getting smaller as time goes with endurance test. This means wear-failure of the OS-CON is open mode, which is a main failure factor. The life time is different by each operating temperature and self-heating by ripple current. The following formula is used to estimate the presumptive lifetime of the OS-CON at ambient temperature

Tx (°C).

The result of the following estimation is not guaranteed but presumptive values based on actual measurement. The estimated life-span is limited up to 15 years.

3-1. Calculation formula of estimated life expectancy

$$Lx = Lo \times 10^{\frac{To - Tx}{20}}$$

Lx: Life expectancy (h) in actual use (temperature Tx)

Lo: Guaranteed (h) at maximum temperature in use

To: Maximum operating temperature (°C)

Tx: Temperature in actual use (ambient temperature of the OS-CON) (°C)

Please contact us separately about estimated life expectancy of new series (SXV, SXE series) and products (SVQP, SVPD, SEQP series) guaranteed at 125°C.

- ※The estimated life expectancy of conductive polymer electrolyte type can be calculated without consideration of self-heating under application of the ripple current
- ※SVPS series: Self-heating temperature when applied the allowable ripple current.

Self-heating temperature when applied the rated ripple current

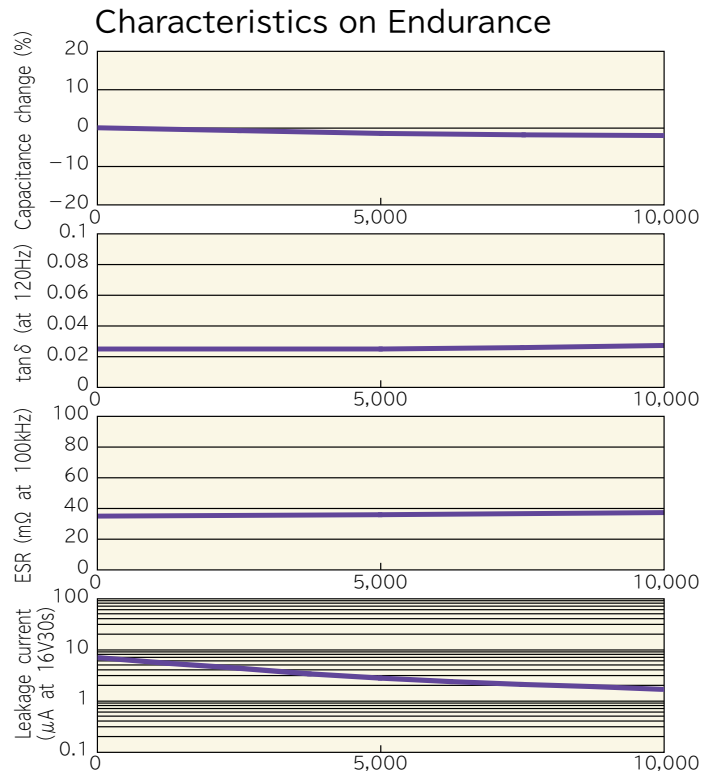
| series | size | Self-heating |
|---|-------------------|--------------|
| SVP, SVPA, SVPC, SVPS* | Except for A5, B6 | approx. 20°C |
| SVP, SVPA, SVPC, SVPS* | A5, B6 | approx. 10°C |
| SVPB, SVPE, SVPF, SVPG, SXV, SEP, SEPC, SEPF, SXE | All | approx. 20°C |
| SVQP, SEQP, SVPD | All | approx. 2°C |

| | |
|---|--------------------|
| OS-CON Line-up | |
| Guidelines and precautions | |
| Series system diagram | Selection guide |
| Image of case size | |
| Products list | |
| Packing specifications (SMD type) | |
| Packing specifications (Radial lead type) | |
| Recommended soldering condition | Technical data |
| Fundamental structure | |
| Characteristics | |
| Reliability | |
| SXV | Surface mount type |
| SVPG | |
| SVPF | |
| SVPE | |
| SVPS | |
| SVPD | |
| SVPC | |
| SVPB | |
| SVPA | |
| SVQP | |
| SVP | |
| SXE | Radial lead type |
| SEPF | |
| SEPC | |
| SEQP | |
| SEP | |
| Catalog Deletion and EOL series | |

| | |
|---------------------------------|--|
| POSCAP Line-up | |
| Guidelines and precautions | |
| Selection guide | |
| Technical data | |
| Surface mount type | |
| Catalog Deletion and EOL models | |

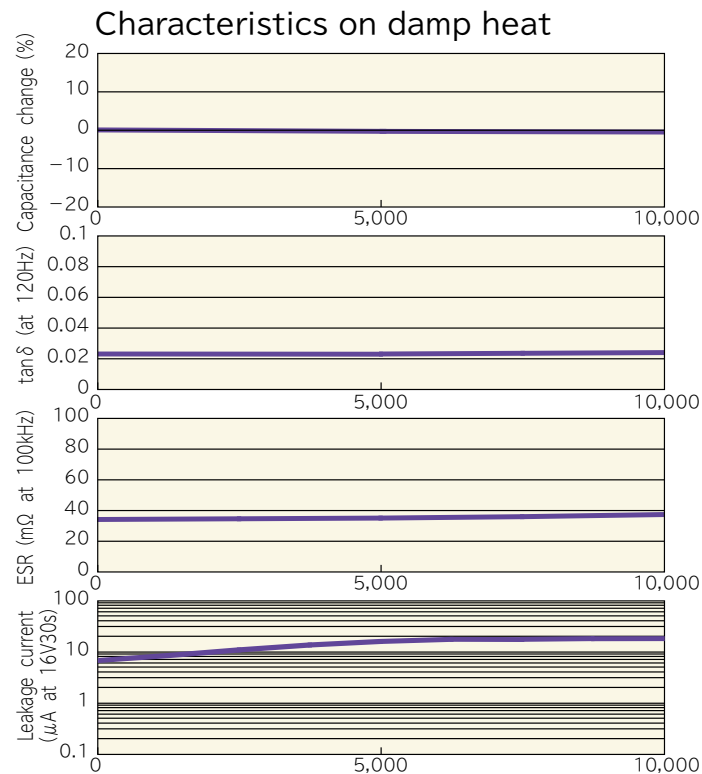
4. Conductive polymer type (16SVP39M)

4-1. Endurance (105°C, 16V applied)



Little change in characteristics can be seen after 10,000 hours because of adoption of conductive polymer that excels in thermal stability.

4-2. Damp heat (60°C/90% RH, without load)



Little change in characteristics can be seen after 10,000h hours in a high temperature and damp heat environment because of the excellent thermal stability of conductive polymer.

OS-CON Line-up

Guidelines and precautions

Series system diagram

Image of case size

Products list

Packing specifications (SMD type)

Packing specifications (Radial lead type)

Recommended soldering condition

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Reliability

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Surface mount type

Radial lead type

Catalog Deletion and EOL series

Surface mount type

SXV Series NEW



RoHS directive/Halogen-free compliant
 Super high voltage(100V)
 Endurance: 105°C 5,000h

Specifications

| Items | Condition | Specifications | |
|--|---|--|---|
| Rated voltage (V) | — | 63 | 100 |
| Surge voltage (V) | Room temperature | 72.5 | 115.0 |
| Category temperature range (°C) | — | -55 to +105 | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C Z/Z _{20°C} | 0.75 to 1.25 |
| | | +105°C Z/Z _{20°C} | 0.75 to 1.25 |
| Endurance | 105°C, 5,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value |
| | | DF | Within 1.5 times of the initial limit |
| | | ESR | Within 1.5 times of the initial limit |
| | | LC | Within the initial limit |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No applied voltage | ΔC/C | Within ±20% of the initial value |
| | | DF | Within 1.5 times of the initial limit |
| | | ESR | Within 1.5 times of the initial limit |
| | | LC | Within the initial limit (after voltage processing) |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | ΔC/C | Within ±10% of the initial value |
| | | DF | Within 1.3 times of the initial limit |
| | | ESR | Within 1.3 times of the initial limit |
| | | LC | Within the initial limit (after voltage processing) |

*1 In case of some problems for measured values, measure after applying rated voltage.
 *2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

Case No. Series (SXV)

Rated capacitance

Rated voltage

(unit : mm)

| Size code | φD ±0.5 | L ^{+0.1} _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | P ±0.2 |
|-----------|---------|-----------------------------------|--------|--------|--------|---------|--------|
| E12 | 8.0 | 11.9 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |

Size list RV : Rated voltage

| RV | 63 | 100 |
|----|-----|-----|
| 15 | | E12 |
| 33 | E12 | |

Recommended land pattern dimension of PWB

(unit : mm)

| Size code | a | b | c |
|-----------|-----|------|-----|
| E12 | 2.8 | 11.1 | 1.9 |

SXV series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μF) | ESR(mΩ) (max) 100kHz to 300kHz/20°C | Rated ripple current 100kHz (mA Arms) at 105°C | DF (% max) | Leakage current (μA) (max) After 2 minutes |
|-----------|-------------|-------------------|------------------------|-------------------------------------|--|------------|--|
| E12 | 63SXV33M | 63 | 33 | 25 | 2950 | 12 | 104 |
| | 100SXV15M | 100 | 15 | 40 | 2350 | 12 | 75 |

Frequency coefficient for ripple current

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f ≤ 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

Surface mount type

SVPG Series NEW



HS directive/Halogen-free compliant
Low ESR(8mΩ)
High rated ripple current(5,800mArms)

OS-CON

OS-CON Line-up

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Packing specifications (SMD type)
Packing specifications (Radial lead type)

Technical data

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Surface mount type

SVX
SVPG
SVPF
SVPE
SVPS
SVPD
SVPC
SVPB
SVPA
SVQP
SVP

Radial lead type

SXE
SEPF
SEPC
SEQP
SEP

Catalog Deletion and EOL series

POSCAP

POSCAP Line-up

Guidelines and precautions

Selection guide

Technical data

Surface mount type

Catalog Deletion and EOL models

Specifications

| Items | Condition | | Specifications | | |
|--|---|----------------------------|---|----|----|
| Rated voltage (V) | - | | 16 | 20 | 25 |
| Surge voltage (V) | Room temperature | | 18 | 23 | 29 |
| Category temperature range(°C) | - | | -55 to +105 | | |
| Capacitance tolerance (%) | 120Hz/20°C | | M : ±20 | | |
| Dissipation Factor (DF) | 120Hz/20°C | | Please see the attached characteristics list | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | | Please see the attached characteristics list | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | | Please see the attached characteristics list | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C Z/Z _{20°C} | 0.75 to 1.25 | | |
| | | +105°C Z/Z _{20°C} | 0.75 to 1.25 | | |
| Endurance | 105°C, 5,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | |
| | | DF | Within 1.5 times of the initial limit | | |
| | | ESR | Within 1.5 times of the initial limit | | |
| | | LC | Within the initial limit | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No applied voltage | ΔC/C | Within ±20% of the initial value | | |
| | | DF | Within 1.5 times of the initial limit | | |
| | | ESR | Within 1.5 times of the initial limit | | |
| | | LC | Within the initial limit (after voltage processing) | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | ΔC/C | Within ±10% of the initial value | | |
| | | DF | Within 1.3 times of the initial limit | | |
| | | ESR | Within 1.3 times of the initial limit | | |
| | | LC | Within the initial limit (after voltage processing) | | |

*1 In case of some problems for measured values, measure after applying rated voltage.

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

Case No. Series (PG)
Rated capacitance
Rated voltage

0.2max
φD
L
W
H
C
R
P
IRL (+)

(unit : mm)

| Size code | φD ±0.5 | L ^{+0.1} _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | P ±0.2 |
|-----------|---------|-----------------------------------|--------|--------|--------|---------|--------|
| B45 | 5.0 | 4.4 | 5.3 | 5.3 | 6.0 | 0.6~0.8 | 1.4 |
| C10 | 6.3 | 9.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |

Size list RV : Rated voltage

| RV | 16 | 20 | 25 |
|-----|-----|-----|-----|
| 15 | | | B45 |
| 33 | | B45 | |
| 47 | B45 | | |
| 270 | C10 | | |

Recommended land pattern dimension of PWB

(unit : mm)

| Size code | a | b | c |
|-----------|-----|-----|-----|
| B45 | 1.4 | 7.4 | 1.6 |
| C10 | 2.1 | 9.1 | 1.6 |

SVPG series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μF) | ESR(mΩ) (max) 100kHz to 300kHz/20°C | Rated ripple current 100kHz (mArms) at 105°C | DF (% max) | Leakage current (μA)(max) After 2 minutes |
|-----------|-------------|-------------------|------------------------|-------------------------------------|--|------------|---|
| B45 | 25SVPG15M | 25 | 15 | 30 | 2800 | 12 | 75 |
| | 20SVPG33M | 20 | 33 | 27 | 3000 | 12 | 132 |
| | 16SVPG47M | 16 | 47 | 25 | 3200 | 12 | 150 |
| C10 | 16SVPG270M | 16 | 270 | 8 | 5800 | 12 | 864 |

Frequency coefficient for ripple current

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f ≤ 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

Surface mount type

SVPF Series



RoHS directive/Halogen-free compliant
High voltage (50V)
Large capacitance (1,000 μF)
Endurance: 105°C 5,000h

Specifications

| Items | Condition | Specifications | | | | |
|--|---|--|---|--------------|----|----|
| Rated voltage (V) | — | 16 | 20 | 25 | 35 | 50 |
| Surge voltage (V) | Room temperature | 18 | 23 | 29 | 40 | 57 |
| Category temperature range (°C) | — | -55 to +105 | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| | | +105°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| | | ΔC/C | Within ±20% of the initial value | | | |
| Endurance | 105°C, 5,000h, Rated voltage applied | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit | | | |
| | | ΔC/C | Within ±20% of the initial value | | | |
| Damp heat (Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |
| | | ΔC/C | Within ±10% of the initial value | | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | DF | Within 1.3 times of the initial limit | | | |
| | | ESR | Within 1.3 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |
| | | ΔC/C | Within ±10% of the initial value | | | |

*1 When measured values are questionable, measure after voltage processing mentioned below.

Voltage processing: Apply voltage for 120 minutes at 105°C.

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

(unit : mm)

| Size code | φD ±0.5 | L ^{+0.1} _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | P ±0.2 |
|-----------|---------|-----------------------------------|--------|--------|--------|---------|--------|
| B6 | 5.0 | 5.9 | 5.3 | 5.3 | 6.0 | 0.6~0.8 | 1.4 |
| C6 | 6.3 | 5.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| E7 | 8.0 | 6.9 | 8.3 | 8.3 | 9.0 | 0.6~0.8 | 3.2 |
| E12 | 8.0 | 11.9 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| F12 | 10.0 | 12.6 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

Size list

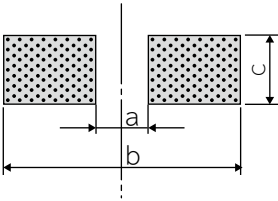
RV : Rated voltage

| μF | RV | 16 | 20 | 25 | 35 | 50 |
|------|-----|-----|----|-----|-----|-----|
| 10 | | | | | | C6 |
| 18 | | | | | | E7 |
| 22 | | | | | C6 | |
| 27 | | | | B6 | | |
| 39 | | | | | E7 | E12 |
| 47 | | | | C6 | | |
| 56 | | B6 | | C6 | | |
| 68 | | | | | | F12 |
| 82 | B6 | | | E7 | E12 | |
| 100 | | | | E7 | | |
| 120 | | C6 | | | F12 | |
| 180 | C6 | E7 | | E12 | | |
| 270 | E7 | | | | | |
| 330 | | | | F12 | | |
| 390 | | E12 | | | | |
| 560 | E12 | F12 | | | | |
| 1000 | F12 | | | | | |

SVPF series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR($m\Omega$) (max) 100kHz to 300kHz/20°C | Rated ripple current 100kHz (mA _{rms}) at 105°C | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-----------|-------------|-------------------|------------------------------|--|---|------------|--|
| B6 | 25SVPF27MX | 25 | 27 | 40 | 2450 | 12 | 135 |
| | 20SVPF56MX | 20 | 56 | 30 | 2800 | 12 | 224 |
| | 16SVPF82M | 16 | 82 | 27 | 3000 | 12 | 262 |
| C6 | 50SVPF10M | 50 | 10 | 40 | 2500 | 12 | 100 |
| | 35SVPF22M | 35 | 22 | 35 | 2600 | 12 | 154 |
| | 25SVPF47M | 25 | 47 | 30 | 2800 | 12 | 235 |
| | 25SVPF56M | 25 | 56 | 30 | 2800 | 12 | 280 |
| | 20SVPF120M | 20 | 120 | 25 | 3200 | 12 | 480 |
| | 16SVPF180M | 16 | 180 | 22 | 3300 | 12 | 576 |
| E7 | 50SVPF18M | 50 | 18 | 35 | 2700 | 12 | 180 |
| | 35SVPF39M | 35 | 39 | 30 | 2800 | 12 | 273 |
| | 25SVPF82M | 25 | 82 | 28 | 3000 | 12 | 410 |
| | 25SVPF100M | 25 | 100 | 24 | 3200 | 12 | 500 |
| | 20SVPF180M | 20 | 180 | 25 | 3200 | 12 | 720 |
| | 16SVPF270M | 16 | 270 | 22 | 3300 | 12 | 864 |
| E12 | 50SVPF39M | 50 | 39 | 25 | 3800 | 12 | 390 |
| | 35SVPF82M | 35 | 82 | 20 | 4000 | 12 | 574 |
| | 25SVPF180M | 25 | 180 | 16 | 4650 | 12 | 900 |
| | 20SVPF390M | 20 | 390 | 14 | 4950 | 12 | 1560 |
| | 16SVPF560M | 16 | 560 | 14 | 4950 | 12 | 1792 |
| F12 | 50SVPF68M | 50 | 68 | 20 | 4300 | 12 | 680 |
| | 35SVPF120M | 35 | 120 | 18 | 4400 | 12 | 840 |
| | 25SVPF330M | 25 | 330 | 14 | 5000 | 12 | 1650 |
| | 20SVPF560M | 20 | 560 | 12 | 5400 | 12 | 2240 |
| | 16SVPF1000M | 16 | 1000 | 12 | 5400 | 12 | 3200 |

Recommended land pattern dimension of PWB



| (unit : mm) | | | |
|-------------|-----|------|-----|
| Size code | a | b | c |
| B6 | 1.4 | 7.4 | 1.6 |
| C6 | 2.1 | 9.1 | 1.6 |
| E7 | 2.8 | 11.1 | 1.9 |
| E12 | 2.8 | 11.1 | 1.9 |
| F12 | 4.3 | 13.1 | 1.9 |

Frequency coefficient for ripple current

| Frequency | $120\text{Hz} \leq f < 1\text{kHz}$ | $1\text{kHz} \leq f < 10\text{kHz}$ | $10\text{kHz} \leq f < 100\text{kHz}$ | $100\text{kHz} \leq f \leq 500\text{kHz}$ |
|-------------|-------------------------------------|-------------------------------------|---------------------------------------|---|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

Surface mount type

SVPE Series

RoHS directive/Halogen-free compliant
 Super Low ESR (8mΩ~18mΩ)
 Large capacitance(1,200μF)



Specifications

| Items | Condition | Specifications | | | | |
|--|---|--|---|--------------|----|----|
| | | 2.0 | 2.5 | 6.3 | 10 | 16 |
| Rated voltage (V) | — | 2.0 | 2.5 | 6.3 | 10 | 16 |
| Surge voltage (V) | Room temperature | 2.6 | 3.3 | 8.2 | 12 | 18 |
| Category temperature range(°C) | — | -55 to +105 | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | |
| Equivalent series resistance (ESR) | 100kHz/20°C | Please see the attached characteristics list | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| | | +105°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| Endurance | 105°C, 2,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | | |
| | | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit | | | |
| | | ΔC/C | Within ±20% of the initial value | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |
| | | ΔC/C | Within ±10% of the initial value (±15% for 2.5V) | | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | DF | Within 1.3 times of the initial limit | | | |
| | | ESR | Within 1.3 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |
| | | ΔC/C | Within ±10% of the initial value (±15% for 2.5V) | | | |

*1 When measured values are questionable, measure after voltage processing mentioned below.

Voltage processing: Apply voltage for 120 minutes at 105°C.

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

Case No.

Series (B6, C6, C10 size is PE, F12 size is SVPE)

Rated capacitance

Rated voltage

(unit : mm)

| Size code | φD ±0.5 | L ^{+0.1} _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | P ±0.2 |
|-----------|---------|-----------------------------------|--------|--------|--------|---------|--------|
| B6 | 5.0 | 5.9 | 5.3 | 5.3 | 6.0 | 0.6~0.8 | 1.4 |
| C6 | 6.3 | 5.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| C10 | 6.3 | 9.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| F12 | 10.0 | 12.6 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

Size list

RV : Rated voltage

| μF | RV | 2.0 | 2.5 | 6.3 | 10 | 16 |
|------|-----|-----|-------|-------|----|-----|
| 150 | | | | B6 | | |
| 180 | | | | B6 | | C10 |
| 220 | | | | B6,C6 | C6 | |
| 270 | | | B6 | | | |
| 330 | | | B6 | | | |
| 390 | | | B6,C6 | | | |
| 470 | | | | | | F12 |
| 1200 | C10 | | | | | |

OS-CON Line-up

Guidelines and precautions

Series system diagram

Image of case size

Products list

Packing specifications (SMD type)

Packing specifications (Radial lead type)

Recommended soldering condition

Fundamental structure

Characteristics

Reliability

SVX

SVPG

SVPF

SVPE

SVPS

SVPD

SVPC

SVPB

SVPA

SVQP

SVP

SXE

SEPF

SEPC

SEQP

SEP

Catalog Deletion and EOL series

POSCAP Line-up

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Technical data

Surface mount type

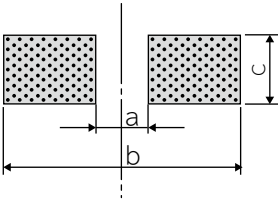
Catalog Deletion and EOL models

SVPE series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR($m\Omega$) (max) | | Rated ripple current 100kHz (mA _{rms}) at 105°C | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-----------|--------------|-------------------|------------------------------|------------------------|---------------|---|------------|--|
| | | | | 100kHz/20°C | 300kHz/20°C※1 | | | |
| B6 | 6SVPE150M | 6.3 | 150 | 12 | 10 | 3520 | 12 | 500 |
| | 6SVPE180M | 6.3 | 180 | 15 | 13 | 3150 | 12 | 500 |
| | 6SVPE220MW | 6.3 | 220 | 15 | 13 | 3150 | 12 | 500 |
| | 2R5SVPE270M | 2.5 | 270 | 10 | 9 | 3860 | 12 | 500 |
| | 2R5SVPE330M | 2.5 | 330 | 15 | 13 | 3150 | 12 | 500 |
| | 2R5SVPE330MY | 2.5 | 330 | 10 | 9 | 3860 | 12 | 500 |
| | 2R5SVPE390MX | 2.5 | 390 | 10 | 9 | 3860 | 12 | 700 |
| C6 | 10SVPE220M | 10 | 220 | 20 | 18 | 2700 | 12 | 500 |
| | 6SVPE220M | 6.3 | 220 | 10 | 9 | 3900 | 12 | 500 |
| | 2R5SVPE390M | 2.5 | 390 | 10 | 9 | 3900 | 12 | 500 |
| C10 | 16SVPE180M | 16 | 180 | 11 | 10 | 4460 | 12 | 576 |
| | 2SVPE1200M | 2.0 | 1200 | 8 | 8 | 5230 | 12 | 500 |
| F12 | 16SVPE470M | 16 | 470 | 10 | 9 | 6100 | 12 | 1504 |

※1 The ESR value in 300kHz is a reference one.

Recommended land pattern dimension of PWB



| Size code | a | b | c |
|-----------|-----|------|-----|
| B6 | 1.4 | 7.4 | 1.6 |
| C6 | 2.1 | 9.1 | 1.6 |
| C10 | 2.1 | 9.1 | 1.6 |
| F12 | 4.3 | 13.1 | 1.9 |

(unit : mm)

Frequency coefficient for ripple current

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f ≤ 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |



Specifications

| Items | Condition | Specifications | | | | | |
|--|--|--|---|--------------|----|----|----|
| Rated voltage (V) | — | 4.0 | 6.3 | 10 | 16 | 20 | 25 |
| Surge voltage (V) | Room temperature | 5.2 | 8.2 | 12 | 18 | 23 | 25 |
| Category temperature range (°C) | — | -55 to +105 | | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | | |
| | | +105°C | Z/Z _{20°C} | 0.75 to 1.25 | | | |
| Endurance | 105°C, 5,000h, Rated voltage applied (25V → 20V applied) | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit | | | | |
| Damp heat(Steady state) | 60°C, 90 to 95% RH, 1,000h, No-applied voltage | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | ΔC/C | Within ±10% of the initial value | | | | |
| | | DF | Within 1.3 times of the initial limit | | | | |
| | | ESR | Within 1.3 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |

*1 When measured values are questionable, measure after voltage processing mentioned below.

Voltage processing: Apply voltage for 120 minutes at 105°C. The voltage to be applied is the rated voltage for 4.0-20V products, and 20V for 25V products.

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

Case No.

Series

Size is SVPS

※A5 is 5 on the side of rated capacitance

Rated capacitance

Rated voltage

(unit : mm)

| Size code | φD ±0.5 | L ^{+0.1} _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | P ±0.2 |
|-----------|---------|-----------------------------------|--------|--------|--------|---------|--------|
| A5 | 4.0 | 5.4 | 4.3 | 4.3 | 5.0 | 0.6~0.8 | 1.0 |
| B6 | 5.0 | 5.9 | 5.3 | 5.3 | 6.0 | 0.6~0.8 | 1.4 |
| C6 | 6.3 | 5.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| E7 | 8.0 | 6.9 | 8.3 | 8.3 | 9.0 | 0.6~0.8 | 3.2 |
| F8 | 10.0 | 7.9 | 10.3 | 10.3 | 11.0 | 0.6~0.8 | 4.6 |

Size list

RV : Rated voltage

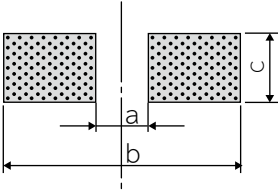
| μF \ RV | 4.0 | 6.3 | 10 | 16 | 20 | 25 |
|---------|-----|-----|--------|----|----|----|
| 10 | | | A5 | | | E7 |
| 15 | | | A5 | | | |
| 22 | | A5 | | B6 | C6 | |
| 33 | A5 | | B6 | | | |
| 39 | | | | C6 | | |
| 47 | | B6 | | | E7 | |
| 68 | B6 | | C6 | | | |
| 82 | | | | E7 | | |
| 100 | | | | F8 | | |
| 120 | | C6 | | | | |
| 150 | C6 | | E7, F8 | | | |
| 180 | | | | F8 | | |
| 220 | | E7 | | | | |
| 270 | E7 | | | | | |
| 330 | | | F8 | | | |
| 470 | | F8 | | | | |
| 680 | F8 | | | | | |

SVPS series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR($m\Omega$) (max) 100kHz to 300kHz/20°C | Allowable ripple current 100kHz (mA _{rms}) ^{※1} | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-----------|-------------|-------------------|------------------------------|---|---|------------|---|
| A5 | 10SVPS10M | 10 | 10 | 220 | 700 | 10 | 50 |
| | 10SVPS15M | 10 | 15 | 200 | 740 | 10 | 75 |
| | 6SVPS22M | 6.3 | 22 | 200 | 740 | 12 | 69.3 |
| | 4SVPS33M | 4.0 | 33 | 200 | 740 | 15 | 66 |
| B6 | 16SVPS22M | 16 | 22 | 90 | 1060 | 10 | 176 |
| | 10SVPS33M | 10 | 33 | 70 | 1100 | 12 | 165 |
| | 6SVPS47M | 6.3 | 47 | 30 | 1970 | 12 | 300 |
| | 4SVPS68M | 4.0 | 68 | 30 | 1970 | 12 | 300 |
| C6 | 20SVPS22M | 20 | 22 | 60 | 1450 | 10 | 88 |
| | 16SVPS39M | 16 | 39 | 24 | 2460 | 12 | 300 |
| | 10SVPS68M | 10 | 68 | 30 | 2200 | 12 | 300 |
| | 6SVPS120M | 6.3 | 120 | 22 | 2570 | 12 | 300 |
| | 4SVPS150M | 4.0 | 150 | 22 | 2570 | 12 | 300 |
| E7 | 25SVPS10M | 25 | 10 | 60 | 1500 | 10 | 125 |
| | 20SVPS47M | 20 | 47 | 45 | 1890 | 12 | 188 |
| | 16SVPS82M | 16 | 82 | 30 | 2760 | 12 | 262 |
| | 10SVPS150MX | 10 | 150 | 30 | 2760 | 12 | 500 |
| | 6SVPS220M | 6.3 | 220 | 22 | 3220 | 12 | 500 |
| | 4SVPS270M | 4.0 | 270 | 22 | 3220 | 12 | 500 |
| F8 | 16SVPS100M | 16 | 100 | 35 | 2670 | 12 | 320 |
| | 16SVPS180M | 16 | 180 | 29 | 3430 | 12 | 576 |
| | 10SVPS150M | 10 | 150 | 30 | 3020 | 12 | 300 |
| | 10SVPS330M | 10 | 330 | 24 | 3770 | 12 | 660 |
| | 6SVPS470M | 6.3 | 470 | 20 | 4130 | 12 | 592 |
| | 4SVPS680M | 4.0 | 680 | 20 | 4130 | 12 | 544 |

※1 The surface temperature of aluminum case top must not exceed 105°C. A rise in temperature due to self-heating by ripple current should be factored in.

Recommended land pattern dimension of PWB



| Size code | (unit : mm) | | |
|-----------|-------------|------|-----|
| | a | b | c |
| A5 | 1.0 | 6.2 | 1.6 |
| B6 | 1.4 | 7.4 | 1.6 |
| C6 | 2.1 | 9.1 | 1.6 |
| E7 | 2.8 | 11.1 | 1.9 |
| F8 | 4.3 | 13.1 | 1.9 |

Frequency coefficient for ripple current

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f ≤ 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

Surface mount type

SVPD Series

RoHS directive/Halogen-free compliant
 Endurance: 125°C 2,000h 35V max./Rated voltage
 85°C 85% guaranteed
 Available for high reliability applications such as automotive, industrial equipments, etc.



Specifications

| Items | Condition | Specifications | | | |
|--|--|--|---|--------------|----|
| | | 10 | 16 | 25 | 35 |
| Rated voltage (V) | — | 10 | 16 | 25 | 35 |
| Surge voltage (V) | 125°C | 12 | 18 | 29 | 40 |
| Category temperature range (°C) | — | -55 to +125 | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | |
| | | +125°C | Z/Z _{20°C} | 0.75 to 1.25 | |
| Endurance | 125°C, 2,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | |
| | | DF | Within 2 times of the initial limit | | |
| | | ESR | Within 2 times of the initial limit | | |
| | | LC | Within the initial limit | | |
| Damp heat(Steady state) | 85°C, 85 to 90%RH, 1,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | |
| | | DF | Within 2 times of the initial limit | | |
| | | ESR | Within 2 times of the initial limit | | |
| | | LC | Within the initial limit | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | ΔC/C | Within ±10% of the initial value | | |
| | | DF | Within 1.3 times of the initial limit | | |
| | | ESR | Within 1.3 times of the initial limit | | |
| | | LC | Within the initial limit (after voltage processing) | | |

*1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C.
 *2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

Case No.
Series
Rated capacitance
Rated voltage

(C6 size is PD, E7, F8, E12, F12 size is SVPD)

(unit : mm)

| Size code | φD ±0.5 | L ^{+0.1} _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | p ±0.2 |
|-----------|---------|-----------------------------------|--------|--------|--------|---------|--------|
| C6 | 6.3 | 5.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| E7 | 8.0 | 6.9 | 8.3 | 8.3 | 9.0 | 0.6~0.8 | 3.2 |
| F8 | 10.0 | 7.9 | 10.3 | 10.3 | 11.0 | 0.6~0.8 | 4.6 |
| E12 | 8.0 | 11.9 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| F12 | 10.0 | 12.6 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

Size list

RV : Rated voltage

| μF \ RV | 10 | 16 | 25 | 35 |
|---------|----|----|-----|-----|
| 8.2 | | | | E7 |
| 10 | | | C6 | |
| 18 | | | | F8 |
| 22 | | | E7 | E12 |
| 39 | | | F8 | |
| 47 | | | E12 | F12 |
| 56 | C6 | | | |
| 82 | | E7 | F12 | |

OS-CON Line-up

Guidelines and precautions

Series system diagram

Image of case size

Products list

Packing specifications (SMD type)

Packing specifications (Radial lead type)

Recommended soldering condition

Fundamental structure

Characteristics

Reliability

Selection guide

Technical data

Surface mount type

Radial lead type

Catalog Deletion and EOL series

POSCAP Line-up

Guidelines and precautions

Selection guide

Technical data

Surface mount type

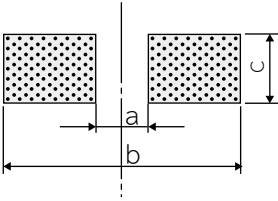
Catalog Deletion and EOL models

SVPD series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR(m Ω) (max) 100kHz to 300kHz/20 $^{\circ}$ C | Rated ripple current | | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-----------|-------------|-------------------|------------------------------|--|---|--|------------|---|
| | | | | | 100kHz (mA _{rms}) | | | |
| | | | | | 105 $^{\circ}$ C < T _x \leq 125 $^{\circ}$ C*1 | T _x \leq 105 $^{\circ}$ C*1 | | |
| C6 | 25SVPD10M | 25 | 10 | 65 | 474 | 1500 | 10 | 50 |
| | 10SVPD56M | 10 | 56 | 45 | 538 | 1700 | 12 | 112 |
| E7 | 35SVPD8R2M | 35 | 8.2 | 70 | 400 | 1300 | 10 | 57 |
| | 25SVPD22M | 25 | 22 | 48 | 580 | 1835 | 10 | 110 |
| | 16SVPD82M | 16 | 82 | 40 | 670 | 2120 | 12 | 262 |
| F8 | 35SVPD18M | 35 | 18 | 60 | 550 | 1800 | 10 | 126 |
| | 25SVPD39M | 25 | 39 | 45 | 664 | 2100 | 10 | 195 |
| E12 | 35SVPD22M | 35 | 22 | 50 | 700 | 2300 | 12 | 154 |
| | 25SVPD47M | 25 | 47 | 30 | 943 | 2980 | 12 | 235 |
| F12 | 35SVPD47M | 35 | 47 | 30 | 1150 | 3650 | 12 | 329 |
| | 25SVPD82M | 25 | 82 | 28 | 1202 | 3800 | 12 | 410 |

※1 T_x : Ambient temperature

Recommended land pattern dimension of PWB



| (unit : mm) | | | |
|-------------|-----|------|-----|
| Size code | a | b | c |
| C6 | 2.1 | 9.1 | 1.6 |
| E7 | 2.8 | 11.1 | 1.9 |
| F8 | 4.3 | 13.1 | 1.9 |
| E12 | 2.8 | 11.1 | 1.9 |
| F12 | 4.3 | 13.1 | 1.9 |

Frequency coefficient for ripple current

| Frequency | 120Hz \leq f < 1kHz | 1kHz \leq f < 10kHz | 10kHz \leq f < 100kHz | 100kHz \leq f \leq 500kHz |
|-------------|-----------------------|-----------------------|-------------------------|-------------------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

| |
|---|
| OS-CON Line-up |
| Guidelines and precautions |
| Series system diagram |
| Image of case size |
| Products list |
| Packing specifications (SMD type) |
| Packing specifications (Radial lead type) |
| Recommended soldering condition |
| Fundamental structure |
| Characteristics |
| Reliability |
| SXV |
| SVPG |
| SVPF |
| SVPE |
| SVPS |
| SVPD |
| SVPC |
| SVPB |
| SVPA |
| SVQP |
| SVP |
| SXE |
| SEPF |
| SEPC |
| SEQP |
| SEP |
| Catalog Deletion and EOL series |

Surface mount type

SVPC Series

Update



RoHS directive/Halogen-free compliant
 Low ESR(9mΩ~30mΩ)
 Large capacitance (2,700μF)

Specifications

| Items | Condition | Specifications | | | | |
|--|---|--|---|--------------|----|----|
| | | 2.5 | 4.0 | 6.3 | 10 | 16 |
| Rated voltage (V) | — | 2.5 | 4.0 | 6.3 | 10 | 16 |
| Surge voltage (V) | Room temperature | 3.3 | 5.2 | 8.2 | 12 | 18 |
| Category temperature range (°C) | — | -55 to +105 | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | |
| Equivalent series resistance (ESR) | 100kHz/20°C | Please see the attached characteristics list | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| | | +105°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| Endurance | 105°C, 2,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | | |
| | | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | ΔC/C | Within ±20% of the initial value | | | |
| | | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | ΔC/C | Within ±10% of the initial value (±15% for 2.5V 4.0V) | | | |
| | | DF | Within 1.3 times of the initial limit | | | |
| | | ESR | Within 1.3 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |

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

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

| Size code | φD ±0.5 | L ^{+0.1} / _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | P ±0.2 |
|-----------|---------|-------------------------------------|--------|--------|--------|---------|--------|
| B6 | 5.0 | 5.9 | 5.3 | 5.3 | 6.0 | 0.6~0.8 | 1.4 |
| C6 | 6.3 | 5.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| E7 | 8.0 | 6.9 | 8.3 | 8.3 | 9.0 | 0.6~0.8 | 3.2 |
| E12 | 8.0 | 11.9 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| F12 | 10.0 | 12.6 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

(unit : mm)

Size list

RV : Rated voltage

| μF \ RV | 2.5 | 4.0 | 6.3 | 10 | 16 |
|---------|-----|---------|-----|----|-----|
| 39 | | | | | B6 |
| 68 | | | | B6 | C6 |
| 100 | | | B6 | C6 | C6 |
| 120 | | | B6 | C6 | E7 |
| 150 | | B6 | | | E7 |
| 180 | B6 | | | | |
| 220 | | | C6 | | |
| 270 | | | | E7 | E12 |
| 330 | | C6 | C6 | E7 | |
| 390 | C6 | | E7 | | |
| 560 | C6 | E7, E12 | | | |
| 680 | E7 | | | | |
| 820 | E12 | | E12 | | |
| 1,200 | | E12 | | | |
| 1,500 | E12 | E12 | | | |
| 2,700 | F12 | | | | |

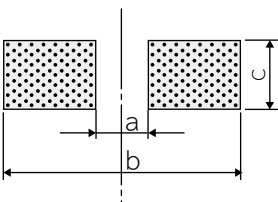
SXV
SVPG
SVPF
SVPE
SVPS
SVPD
SVPC
SVPB
SVPA
SVQP
SVPSXE
SEPF
SEPC
SEQP
SEP

SVPC series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μF) | ESR (mΩ) (max) | | Rated ripple current 100kHz (mA rms) at 105°C | DF (% max) | Leakage current (μA) (max) After 2 minutes |
|--------------|-------------------|-------------------|------------------------|----------------|---------------|---|------------|--|
| | | | | 100kHz/20°C | 300kHz/20°C※1 | | | |
| B6 | 16SVPC39M | 16 | 39 | 35 | 30 | 1820 | 12 | 300 |
| | 16SVPC39MV | 16 | 39 | 27 | 23 | 2350 | 12 | 300 |
| | 10SVPC68M | 10 | 68 | 30 | 26 | 1970 | 12 | 300 |
| | 10SVPC68MV | 10 | 68 | 23 | 20 | 2540 | 12 | 300 |
| | 6SVPC100M | 6.3 | 100 | 30 | 26 | 1970 | 12 | 300 |
| | 6SVPC100MY | 6.3 | 100 | 25 | 21 | 2150 | 12 | 300 |
| | 6SVPC120MV | 6.3 | 120 | 21 | 18 | 2660 | 12 | 300 |
| | 4SVPC150M | 4.0 | 150 | 30 | 26 | 1970 | 12 | 300 |
| | 4SVPC150MY | 4.0 | 150 | 23 | 20 | 2240 | 12 | 300 |
| | 4SVPC150MV | 4.0 | 150 | 20 | 17 | 2730 | 12 | 300 |
| | 2R5SVPC180M | 2.5 | 180 | 30 | 26 | 1970 | 12 | 300 |
| | 2R5SVPC180MY | 2.5 | 180 | 24 | 20 | 2200 | 12 | 300 |
| 2R5SVPC180MV | 2.5 | 180 | 19 | 16 | 2800 | 12 | 300 | |
| C6 | 16SVPC68M | 16 | 68 | 30 | 26 | 2200 | 12 | 300 |
| | 16SVPC68MV | 16 | 68 | 25 | 22 | 2440 | 12 | 300 |
| | 16SVPC100M | 16 | 100 | 24 | 23 | 2490 | 12 | 300 |
| | 10SVPC120M | 10 | 120 | 27 | 23 | 2320 | 12 | 300 |
| | 10SVPC120MV | 10 | 120 | 22 | 19 | 2600 | 12 | 300 |
| | 6SVPC220M | 6.3 | 220 | 27 | 23 | 2320 | 12 | 300 |
| | 6SVPC220MV | 6.3 | 220 | 15 | 13 | 3160 | 12 | 300 |
| | 6SVPC330M | 6.3 | 330 | 17 | 15 | 3390 | 12 | 415 |
| | 4SVPC330M | 4.0 | 330 | 27 | 23 | 2320 | 12 | 300 |
| | 4SVPC330MY | 4.0 | 330 | 21 | 18 | 2630 | 12 | 300 |
| | 4SVPC330MV | 4.0 | 330 | 15 | 13 | 3160 | 12 | 300 |
| | 2R5SVPC390M | 2.5 | 390 | 25 | 22 | 2410 | 12 | 300 |
| | 2R5SVPC390MV | 2.5 | 390 | 15 | 13 | 3160 | 12 | 300 |
| | 2R5SVPC560M | 2.5 | 560 | 16 | 14 | 3500 | 12 | 300 |
| E7 | 16SVPC120M | 16 | 120 | 27 | 23 | 2900 | 12 | 500 |
| | 16SVPC150M | 16 | 150 | 22 | 21 | 3220 | 12 | 500 |
| | 10SVPC270M | 10 | 270 | 22 | 19 | 3220 | 12 | 500 |
| | 10SVPC330M | 10 | 330 | 19 | 17 | 3460 | 12 | 660 |
| | 6SVPC390M | 6.3 | 390 | 22 | 19 | 3220 | 12 | 491 |
| | 4SVPC560M | 4.0 | 560 | 22 | 19 | 3220 | 12 | 500 |
| | 2R5SVPC680M | 2.5 | 680 | 20 | 17 | 3370 | 12 | 500 |
| E12 | 16SVPC270M | 16 | 270 | 16 | 14 | 4070 | 15 | 864 |
| | 6SVPC820M | 6.3 | 820 | 12 | 10 | 4700 | 15 | 1033 |
| | 4SVPC560MX | 4.0 | 560 | 9 | 8 | 5380 | 15 | 500 |
| | 4SVPC1200M | 4.0 | 1200 | 12 | 10 | 4700 | 15 | 960 |
| | 4SVPC1500M | 4.0 | 1500 | 12 | 10 | 4700 | 15 | 1200 |
| | 2R5SVPC820M | 2.5 | 820 | 9 | 8 | 5380 | 15 | 500 |
| | 2R5SVPC1500M | 2.5 | 1500 | 10 | 9 | 5150 | 15 | 750 |
| F12 | 2R5SVPC2700M | 2.5 | 2700 | 12 | 10 | 5070 | 15 | 1350 |

※1 The ESR value in 300kHz is a reference one.

Recommended land pattern dimension of PWB



(unit : mm)

| Size code | a | b | c |
|-----------|-----|------|-----|
| B6 | 1.4 | 7.4 | 1.6 |
| C6 | 2.1 | 9.1 | 1.6 |
| E7 | 2.8 | 11.1 | 1.9 |
| E12 | 2.8 | 11.1 | 1.9 |
| F12 | 4.3 | 13.1 | 1.9 |

Frequency coefficient for ripple current

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f ≤ 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

※ Red letters : New models



Specifications

| Items | Condition | Specifications | | | | | |
|--|---|--|---|--------------|----|----|----|
| | | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
| Rated voltage (V) | — | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
| Surge voltage (V) | Room temperature | 3.3 | 5.2 | 8.2 | 12 | 18 | 23 |
| Category temperature range (°C) | — | -55 to +105 | | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z20°C | 0.75 to 1.25 | | | |
| | | +105°C | Z/Z20°C | 0.75 to 1.25 | | | |
| Endurance | 105°C, 1,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value(±30% for C5 size) | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit | | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | ΔC/C | Within ±10% of the initial value (±20% for C5 size) | | | | |
| | | DF | Within 1.3 times of the initial limit | | | | |
| | | ESR | Within 1.3 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |

*1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C.

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

(unit : mm)

| Size code | φD ±0.5 | L ^{+0.1} / _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | P ±0.2 |
|-----------|---------|-------------------------------------|--------|--------|--------|---------|--------|
| C5 | 6.3 | 4.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| C55 | 6.3 | 5.4 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |

Size list

RV : Rated voltage

| μF \ RV | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
|---------|-----|-----|-----|----|----|-----|
| 15 | | | | | | C5 |
| 22 | | | | | | C55 |
| 33 | | | | | C5 | |
| 56 | | | | C5 | | |
| 82 | | | C5 | | | |
| 100 | | C5 | | | | |
| 120 | C5 | | | | | |

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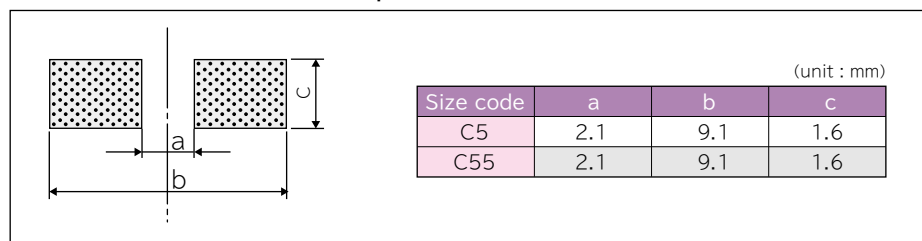
Surface mount type

Catalog Deletion and EOL models

SVPB series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR ($m\Omega$) (max) 100kHz to 300kHz/20°C | Rated ripple current 100kHz (mA _{rms}) at 105°C | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-----------|-------------|-------------------|------------------------------|---|---|------------|--|
| C5 | 20SVPB15M | 20 | 15 | 45 | 2000 | 12 | 120 |
| | 16SVPB33M | 16 | 33 | 40 | 1670 | 12 | 211 |
| | 10SVPB56M | 10 | 56 | 40 | 1670 | 12 | 224 |
| | 6SVPB82M | 6.3 | 82 | 40 | 1670 | 12 | 207 |
| | 4SVPB100M | 4.0 | 100 | 40 | 1670 | 12 | 160 |
| | 2R5SVPB120M | 2.5 | 120 | 40 | 1670 | 12 | 120 |
| C55 | 20SVPB22M | 20 | 22 | 35 | 2000 | 12 | 88 |

Recommended land pattern dimension of PWB



Frequency coefficient for ripple current

| Frequency | $120\text{Hz} \leq f < 1\text{kHz}$ | $1\text{kHz} \leq f < 10\text{kHz}$ | $10\text{kHz} \leq f < 100\text{kHz}$ | $100\text{kHz} \leq f \leq 500\text{kHz}$ |
|-------------|-------------------------------------|-------------------------------------|---------------------------------------|---|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |



Specifications

| Items | Condition | Specifications | | | | | |
|--|---|--|---|--------------|----|----|----|
| | | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
| Rated voltage (V) | — | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
| Surge voltage (V) | Room temperature | 3.3 | 5.2 | 8.2 | 12 | 18 | 23 |
| Category temperature range (°C) | — | -55 to +105 | | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | | |
| Equivalent series resistance (ESR) | 100kHz/20°C | Please see the attached characteristics list | | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | | |
| | | +105°C | Z/Z _{20°C} | 0.75 to 1.25 | | | |
| Endurance | 105°C, 2,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit | | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | ΔC/C | Within ±10% of the initial value | | | | |
| | | DF | Within 1.3 times of the initial limit | | | | |
| | | ESR | Within 1.3 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |

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

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

(unit : mm)

| Size code | φD ±0.5 | L ^{+0.1} _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | p ±0.2 |
|-----------|---------|-----------------------------------|--------|--------|--------|---------|--------|
| B6 | 5.0 | 5.9 | 5.3 | 5.3 | 6.0 | 0.6~0.8 | 1.4 |
| C6 | 6.3 | 5.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| E7 | 8.0 | 6.9 | 8.3 | 8.3 | 9.0 | 0.6~0.8 | 3.2 |
| F8 | 10.0 | 7.9 | 10.3 | 10.3 | 11.0 | 0.6~0.8 | 4.6 |

Size list

RV : Rated voltage

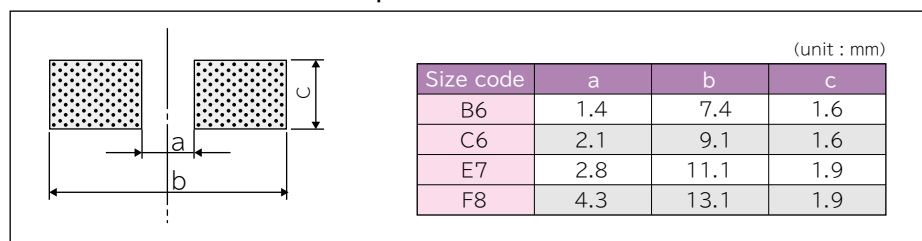
| μF \ RV | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
|---------|-----|-----|-----|----|----|----|
| 10 | | | | | | B6 |
| 22 | | | | | | C6 |
| 39 | | | | | C6 | |
| 47 | | | B6 | | | E7 |
| 68 | | B6 | | C6 | | |
| 82 | B6 | | | | E7 | |
| 120 | | | C6 | | | |
| 150 | | C6 | | E7 | | |
| 180 | C6 | | | | F8 | |
| 220 | | | E7 | | | |
| 270 | | E7 | | | | |
| 330 | E7 | | | F8 | | |
| 470 | | | F8 | | | |
| 680 | | F8 | | | | |
| 820 | F8 | | | | | |

SVPA series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR (m Ω) (max) | | Rated ripple current 100kHz (mA _{rms}) at 105°C | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-----------|---------------|-------------------|------------------------------|-------------------------|---------------|---|------------|--|
| | | | | 100kHz/20°C | 300kHz/20°C*1 | | | |
| B6 | 20SVPA10M | 20 | 10 | 40 | 35 | 1700 | 12 | 80 |
| | 6SVPA47MAA | 6.3 | 47 | 30 | 26 | 1970 | 12 | 300 |
| | 4SVPA68MAA | 4.0 | 68 | 30 | 26 | 1970 | 12 | 300 |
| | 2R5SVPA82MAA | 2.5 | 82 | 30 | 26 | 1970 | 12 | 300 |
| C6 | 20SVPA22M | 20 | 22 | 35 | 31 | 2040 | 12 | 88 |
| | 16SVPA39MAA | 16 | 39 | 35 | 31 | 2040 | 12 | 300 |
| | 16SVPA39MAAY | 16 | 39 | 24 | 20 | 2460 | 12 | 300 |
| | 10SVPA68MAA | 10 | 68 | 30 | 26 | 2200 | 12 | 300 |
| | 6SVPA120MAA | 6.3 | 120 | 22 | 19 | 2570 | 12 | 300 |
| | 4SVPA150MAA | 4.0 | 150 | 22 | 19 | 2570 | 12 | 300 |
| | 2R5SVPA180MAA | 2.5 | 180 | 20 | 18 | 2690 | 12 | 300 |
| E7 | 20SVPA47M | 20 | 47 | 33 | 29 | 2630 | 12 | 188 |
| | 16SVPA82MAA | 16 | 82 | 30 | 25 | 2760 | 12 | 262 |
| | 10SVPA150MAA | 10 | 150 | 30 | 25 | 2760 | 12 | 500 |
| | 6SVPA220MAA | 6.3 | 220 | 22 | 19 | 3220 | 12 | 500 |
| | 4SVPA270MAA | 4.0 | 270 | 22 | 19 | 3220 | 12 | 500 |
| | 2R5SVPA330MAA | 2.5 | 330 | 20 | 18 | 3370 | 12 | 500 |
| F8 | 16SVPA180M | 16 | 180 | 29 | 28 | 3430 | 12 | 576 |
| | 10SVPA330M | 10 | 330 | 24 | 23 | 3770 | 12 | 660 |
| | 6SVPA470M | 6.3 | 470 | 20 | 19 | 4130 | 12 | 592 |
| | 4SVPA680M | 4.0 | 680 | 20 | 19 | 4130 | 12 | 544 |
| | 2R5SVPA820M | 2.5 | 820 | 19 | 18 | 4240 | 12 | 500 |

*1 The ESR value at 300kHz is a reference one.

Recommended land pattern dimension of PWB



Frequency coefficient for ripple current

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f ≤ 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |



Specifications

| Items | Condition | Specifications | | | | |
|--|---|--|---|--------------|----|----|
| | | 4.0 | 6.3 | 10 | 16 | 20 |
| Rated voltage (V) | — | 4.0 | 6.3 | 10 | 16 | 20 |
| Surge voltage (V) | Room temperature | 5.2 | 8.2 | 12 | 18 | 23 |
| Category temperature range (°C) | — | -55 to +125 | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| | | +125°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| Endurance | 125°C, 1,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | | |
| | | DF | Within 2 times of the initial limit | | | |
| | | ESR | Within 2 times of the initial limit | | | |
| | | LC | Within the initial limit | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | ΔC/C | Within ±20% of the initial value | | | |
| | | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | ΔC/C | Within ±10% of the initial value | | | |
| | | DF | Within 1.3 times of the initial limit | | | |
| | | ESR | Within 1.3 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |

*1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C.

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

(unit : mm)

| Size code | φD ±0.5 | L ^{+0.1} / _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | P ±0.2 |
|-----------|---------|-------------------------------------|--------|--------|--------|---------|--------|
| C6 | 6.3 | 5.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| E7 | 8.0 | 6.9 | 8.3 | 8.3 | 9.0 | 0.6~0.8 | 3.2 |

Size list

RV : Rated voltage

| μF \ RV | 4.0 | 6.3 | 10 | 16 | 20 |
|---------|-----|-----|----|----|----|
| 22 | | | | | C6 |
| 39 | | | | C6 | |
| 47 | | | | | E7 |
| 56 | | | C6 | | |
| 82 | | C6 | | E7 | |
| 100 | | C6 | | | |
| 120 | | | E7 | | |
| 150 | C6 | | E7 | | |
| 220 | | E7 | | | |

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Packing specifications (Radial lead type)

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Radial lead type

Catalog Deletion and EOL series

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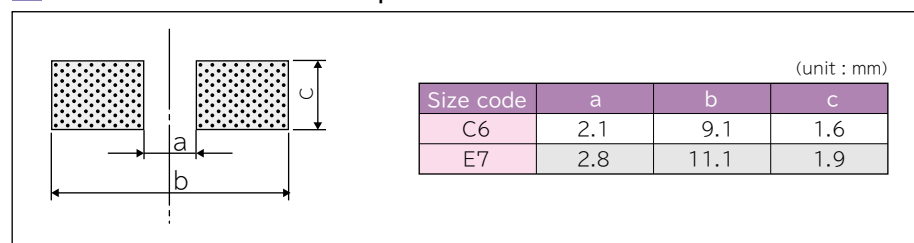
Catalog Deletion and EOL models

SVQP series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR(m Ω) (max) 100kHz to 300kHz/20°C | Rated ripple current | Allowable ripple current | DF (% max) | Leakage current (μ A)(max) After 2 minutes |
|-----------|-------------|-------------------|------------------------------|---|-------------------------|--------------------------|------------|--|
| | | | | | 100kHz (mArms) | | | |
| | | | | | 105°C<Tx \leq 125°C※1 | Tx \leq 105°C※1 | | |
| C6 | 20SVQP22M | 20 | 22 | 60 | 459 | 1450 | 10 | 220 |
| | 16SVQP39M | 16 | 39 | 50 | 512 | 1620 | 10 | 312 |
| | 10SVQP56M | 10 | 56 | 45 | 538 | 1700 | 12 | 280 |
| | 6SVQP82M | 6.3 | 82 | 45 | 538 | 1700 | 12 | 258 |
| | 6SVQP100M | 6.3 | 100 | 40 | 572 | 1810 | 12 | 315 |
| | 4SVQP150M | 4.0 | 150 | 40 | 572 | 1810 | 12 | 300 |
| E7 | 20SVQP47M | 20 | 47 | 45 | 598 | 1890 | 12 | 470 |
| | 16SVQP82M | 16 | 82 | 40 | 670 | 2120 | 12 | 656 |
| | 10SVQP120M | 10 | 120 | 35 | 810 | 2560 | 12 | 600 |
| | 10SVQP150M | 10 | 150 | 35 | 810 | 2560 | 12 | 750 |
| | 6SVQP220M | 6.3 | 220 | 35 | 810 | 2560 | 12 | 693 |

※1 Tx : Ambient temperature

Recommended land pattern dimension of PWB



Frequency coefficient for ripple current

| Frequency | 120Hz \leq f <1kHz | 1kHz \leq f <10kHz | 10kHz \leq f <100kHz | 100kHz \leq f \leq 500kHz |
|-------------|----------------------|----------------------|------------------------|-------------------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |



Specifications

| Items | Condition | Specifications | | | | | |
|--|---|--|---|-----|----|----|----|
| | | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
| Rated voltage (V) | — | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
| Surge voltage (V) | Room temperature | 3.3 | 5.2 | 8.2 | 12 | 18 | 23 |
| Category temperature range (°C) | — | -55 to +105 | | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | | | | |
| | | +105°C | Z/Z _{20°C} | | | | |
| Endurance | 105°C, 2,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit | | | | |
| | | ΔC/C | Within ±20% of the initial value | | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No applied voltage | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |
| | | ΔC/C | Within ±10% of the initial value | | | | |
| | | DF | Within 1.3 times of the initial limit | | | | |
| Resistance to soldering heat*2 | VPS (230°C X 75s) | ESR | Within 1.3 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |
| | | ΔC/C | Within ±10% of the initial value | | | | |
| | | DF | Within 1.3 times of the initial limit | | | | |

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

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

| Size code | φD ±0.5 | L ^{+0.1} _{-0.4} | W ±0.2 | H ±0.2 | C ±0.2 | R | P ±0.2 |
|-----------|---------|-----------------------------------|--------|--------|--------|---------|--------|
| A5 | 4.0 | 5.4 | 4.3 | 4.3 | 5.0 | 0.6~0.8 | 1.0 |
| B6 | 5.0 | 5.9 | 5.3 | 5.3 | 6.0 | 0.6~0.8 | 1.4 |
| C6 | 6.3 | 5.9 | 6.6 | 6.6 | 7.3 | 0.6~0.8 | 2.1 |
| E7 | 8.0 | 6.9 | 8.3 | 8.3 | 9.0 | 0.6~0.8 | 3.2 |
| F8 | 10.0 | 7.9 | 10.3 | 10.3 | 11.0 | 0.6~0.8 | 4.6 |
| E12 | 8.0 | 11.9 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| F12 | 10.0 | 12.6 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

Size list

RV : Rated voltage

| RV | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
|-------|-----|-----|---------|---------|---------|-----|
| 3.3 | | | | A5 | A5 | |
| 4.7 | | | | A5 | | |
| 6.8 | | | | A5 | | B6 |
| 10 | | | | A5 | B6 | |
| 15 | | | | A5 | B6 | C6 |
| 22 | | | A5 | | B6 | C6 |
| 27 | | | | | B6 | C6 |
| 33 | | A5 | | B6 | C6 | E7 |
| 39 | | B6 | | | C6 | |
| 47 | | | B6 | C6 | C6 | E7 |
| 56 | | | | C6 | E7 | F8 |
| 68 | | B6 | | | E7 | F8 |
| 82 | | | C6 | | E7 | F8 |
| 100 | | | C6 | | F8 | E12 |
| 120 | | | C6 | E7 | | |
| 150 | | C6 | | E7, F8 | F8 | F12 |
| 180 | | | | | F8, E12 | |
| 220 | C6 | | E7, F8 | | | |
| 270 | | | | F8 | | |
| 330 | | E7 | F8 | F8, E12 | F12 | |
| 470 | | | F8, E12 | | | |
| 560 | | E12 | | F12 | | |
| 680 | E12 | F8 | | | | |
| 820 | | | F12 | | | |
| 1,200 | | F12 | | | | |
| 1,500 | F12 | | | | | |

Recommended land pattern dimension of PWB

| Size code | a | b | c |
|-----------|-----|------|-----|
| A5 | 1.0 | 6.2 | 1.6 |
| B6 | 1.4 | 7.4 | 1.6 |
| C6 | 2.1 | 9.1 | 1.6 |
| E7 | 2.8 | 11.1 | 1.9 |
| F8 | 4.3 | 13.1 | 1.9 |
| E12 | 2.8 | 11.1 | 1.9 |
| F12 | 4.3 | 13.1 | 1.9 |

(unit : mm)

SVP series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR(m Ω) (max) 100kHz to 300kHz/20 $^{\circ}$ C | Rated ripple current 100kHz (mA _{rms}) at 105 $^{\circ}$ C | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-------------|-------------|-------------------|------------------------------|--|---|------------|---|
| A5 | 16SVP3R3M | 16 | 3.3 | 260 | 660 | 7.0 | 26.4 |
| | 10SVP4R7M | 10 | 4.7 | 240 | 670 | 8.0 | 23.5 |
| | 10SVP6R8M | 10 | 6.8 | 240 | 670 | 9.0 | 34 |
| | 10SVP10M | 10 | 10 | 220 | 700 | 10 | 50 |
| | 10SVP15M | 10 | 15 | 200 | 740 | 10 | 75 |
| | 6SVP22M | 6.3 | 22 | 200 | 740 | 12 | 69.3 |
| | 4SVP33M | 4.0 | 33 | 200 | 740 | 15 | 66 |
| B6 | 20SVP10M | 20 | 10 | 120 | 1020 | 10 | 100 |
| | 16SVP15M | 16 | 15 | 120 | 1020 | 10 | 120 |
| | 16SVP22M | 16 | 22 | 90 | 1060 | 10 | 176 |
| | 10SVP33M | 10 | 33 | 70 | 1100 | 12 | 165 |
| | 6SVP47M | 6.3 | 47 | 70 | 1100 | 12 | 148 |
| | 4SVP39M | 4.0 | 39 | 70 | 1100 | 12 | 78 |
| | 4SVP68M | 4.0 | 68 | 60 | 1400 | 12 | 136 |
| C6 | 20SVP22M | 20 | 22 | 60 | 1450 | 10 | 88 |
| | 20SVP27M | 20 | 27 | 60 | 1450 | 10 | 108 |
| | 16SVP39M | 16 | 39 | 50 | 1620 | 10 | 125 |
| | 10SVP47M | 10 | 47 | 50 | 1620 | 12 | 94 |
| | 10SVP56M | 10 | 56 | 45 | 1700 | 12 | 112 |
| | 6SVP82M | 6.3 | 82 | 45 | 1700 | 12 | 103 |
| | 6SVP100M | 6.3 | 100 | 40 | 1810 | 12 | 126 |
| | 6SVP120MV | 6.3 | 120 | 17 | 2780 | 12 | 151 |
| | 4SVP150MX | 4.0 | 150 | 40 | 1810 | 12 | 120 |
| | 2R5SVP220M | 2.5 | 220 | 23 | 2390 | 12 | 110 |
| E7 | 20SVP33M | 20 | 33 | 45 | 1890 | 12 | 132 |
| | 20SVP47M | 20 | 47 | 45 | 1890 | 12 | 188 |
| | 16SVP56M | 16 | 56 | 45 | 1890 | 12 | 179 |
| | 16SVP82M | 16 | 82 | 40 | 2120 | 12 | 262 |
| | 10SVP120M | 10 | 120 | 35 | 2560 | 12 | 240 |
| | 10SVP150MX | 10 | 150 | 35 | 2560 | 12 | 300 |
| | 6SVP220MX | 6.3 | 220 | 35 | 2560 | 12 | 277 |
| | 4SVP330M | 4.0 | 330 | 35 | 2560 | 12 | 264 |
| F8 | 20SVP56M | 20 | 56 | 40 | 2400 | 12 | 224 |
| | 20SVP68M | 20 | 68 | 40 | 2400 | 12 | 272 |
| | 16SVP100M | 16 | 100 | 35 | 2670 | 12 | 320 |
| | 16SVP150M | 16 | 150 | 30 | 3020 | 12 | 480 |
| | 16SVP180MX | 16 | 180 | 30 | 3020 | 12 | 576 |
| | 10SVP150M | 10 | 150 | 30 | 3020 | 12 | 300 |
| | 10SVP270M | 10 | 270 | 25 | 3700 | 12 | 540 |
| | 10SVP330MX | 10 | 330 | 25 | 3700 | 12 | 660 |
| | 6SVP220M | 6.3 | 220 | 25 | 3700 | 12 | 277 |
| | 6SVP330M | 6.3 | 330 | 25 | 3700 | 12 | 416 |
| 6SVP470MX | 6.3 | 470 | 25 | 3700 | 12 | 592 | |
| 4SVP680M | 4.0 | 680 | 25 | 3700 | 12 | 544 | |
| E12 | 20SVP100M | 20 | 100 | 24 | 3320 | 15 | 400 |
| | 16SVP180M | 16 | 180 | 20 | 3640 | 15 | 576 |
| | 10SVP330M | 10 | 330 | 17 | 3950 | 15 | 660 |
| | 6SVP470M | 6.3 | 470 | 15 | 4210 | 15 | 592 |
| | 4SVP560M | 4.0 | 560 | 13 | 4520 | 15 | 448 |
| 2R5SVP680M | 2.5 | 680 | 13 | 4520 | 15 | 340 | |
| F12 | 20SVP150M | 20 | 150 | 20 | 4320 | 15 | 600 |
| | 16SVP330M | 16 | 330 | 16 | 4720 | 15 | 792 |
| | 10SVP560M | 10 | 560 | 13 | 5230 | 15 | 840 |
| | 6SVP820M | 6.3 | 820 | 12 | 5440 | 15 | 775 |
| | 4SVP1200M | 4.0 | 1200 | 12 | 5440 | 18 | 960 |
| 2R5SVP1500M | 2.5 | 1500 | 12 | 5440 | 18 | 750 | |

Frequency coefficient for ripple current

| Frequency | 120Hz \leq f <1kHz | 1kHz \leq f <10kHz | 10kHz \leq f <100kHz | 100kHz \leq f \leq 500kHz |
|-------------|----------------------|----------------------|------------------------|-------------------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

Radial lead type

SXE Series

NEW



RoHS directive/Halogen-free compliant
Super high voltage(100V)
Endurance: 105°C 5,000h

Specifications

| Items | Condition | Specifications | |
|--|---|--|---|
| Rated voltage (V) | - | 63 | 100 |
| Surge voltage (V) | - | 72.5 | 115.0 |
| Category temperature range (°C) | - | -55 to +105 | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C Z/Z20°C | 0.75 to 1.25 |
| | | +105°C Z/Z20°C | 0.75 to 1.25 |
| Endurance | 105°C, 5,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value |
| | | tan δ | Within 1.5 times of the initial limit |
| | | ESR | Within 1.5 times of the initial limit |
| | | LC | Within the initial limit |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No applied voltage | ΔC/C | Within ±20% of the initial value |
| | | tan δ | Within 1.5 times of the initial limit |
| | | ESR | Within 1.5 times of the initial limit |
| | | LC | Within the initial limit (after voltage processing) |
| Resistance to soldering heat*2 | Flow method (260±5°C X 10s) | ΔC/C | Within ±5% of the initial value |
| | | tan δ | Within 1.3 times of the initial limit |
| | | ESR | Within 1.3 times of the initial limit |
| | | LC | Within the initial limit (after voltage processing) |

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

*2 Please refer to page 25 for reflow soldering conditions.

Marking and dimensions

| Size code | φD ±0.5 | L max | F | φd ±0.05 |
|-----------|---------|-------|---------|----------|
| E12 | 8.0 | 12.0 | 3.5±0.3 | 0.6 |

Size list

RV : Rated voltage

| μF | RV | 63 | 100 |
|----|-----|----|-----|
| 15 | | | E12 |
| 33 | E12 | | |

SXE series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μF) | ESR(mΩ) (max) 100kHz to 300kHz/20°C | Rated ripple current 100kHz (mA rms) at 105°C | DF (% max) | Leakage current (μA) (max) After 2 minutes |
|-----------|-------------|-------------------|------------------------|-------------------------------------|---|------------|--|
| E12 | 63SXE33M | 63 | 33 | 25 | 2950 | 12 | 104 |
| | 100SXE15M | 100 | 15 | 40 | 2350 | 12 | 75 |

Frequency coefficient for ripple current

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f ≤ 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |



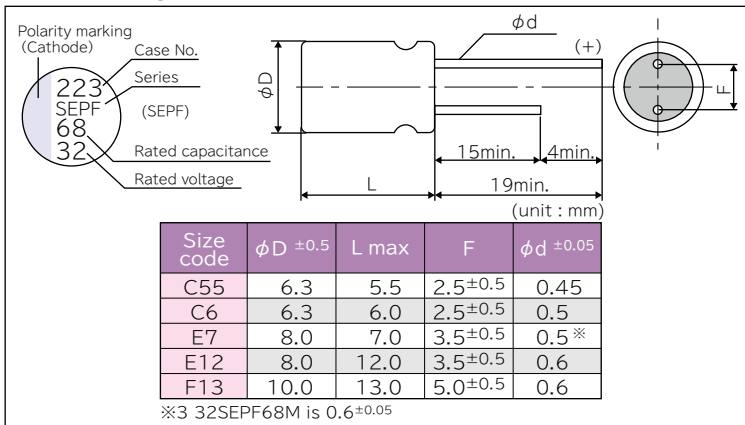
Specifications

| Items | Condition | Specifications | | | | |
|--|--|--|---|----|----|----|
| Rated voltage (V) | — | 16 | 20 | 25 | 32 | 35 |
| Surge voltage (V) | Room temperature | 18 | 23 | 29 | 37 | 40 |
| Category temperature range ($^{\circ}$ C) | — | -55 to +105 | | | | |
| Capacitance tolerance (%) | 120Hz/20 $^{\circ}$ C | M: \pm 20 | | | | |
| Dissipation Factor (DF) | 120Hz/20 $^{\circ}$ C | Please see the attached characteristics list | | | | |
| Leakage current \ast 1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20 $^{\circ}$ C | Please see the attached characteristics list | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20 $^{\circ}$ C | -55 $^{\circ}$ C | Z/Z _{20$^{\circ}$C} | | | |
| | | +105 $^{\circ}$ C | Z/Z _{20$^{\circ}$C} | | | |
| Endurance | 105 $^{\circ}$ C, 5,000h, Rated voltage applied | Δ C/C | Within \pm 20% of the initial value | | | |
| | | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit | | | |
| Damp heat(Steady state) | 60 $^{\circ}$ C, 90 to 95%RH, 1,000h, No-applied voltage | Δ C/C | Within \pm 20% of the initial value | | | |
| | | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |
| Resistance to soldering heat \ast 2 | Flow method (260 \pm 5 $^{\circ}$ C X 10s) | Δ C/C | Within \pm 5% of the initial value | | | |
| | | DF | Within the initial limit | | | |
| | | ESR | Within the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |

\ast 1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105 $^{\circ}$ C.

\ast 2 Please refer to page 25 for flow soldering conditions.

Marking and dimensions



Size list

RV : Rated voltage

| μ F | RV | 16 | 20 | 25 | 32 | 35 |
|---------|-----|-----|-----|----|-----|-----|
| 22 | | | | | C55 | C6 |
| 39 | | | | | | E7 |
| 56 | | | | C6 | | |
| 68 | | | | | E7 | |
| 82 | | | | E7 | | E12 |
| 120 | | C6 | | | | F13 |
| 150 | C55 | | | | | |
| 180 | C6 | E7 | E12 | | | |
| 270 | E7 | | | | | |
| 330 | | | F13 | | | |
| 390 | | | E12 | | | |
| 560 | E12 | F13 | | | | |
| 1,000 | F13 | | | | | |

SEPF series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR(m Ω) (max) 100kHz to 300kHz/20 $^{\circ}$ C | Rated ripple current 100kHz (mA)rms at 105 $^{\circ}$ C | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-----------|-------------|-------------------|------------------------------|---|---|------------|--|
| C55 | 32SEPF22M | 32 | 22 | 35 | 2400 | 12 | 140 |
| | 16SEPF150M | 16 | 150 | 30 | 2590 | 12 | 480 |
| C6 | 35SEPF22M | 35 | 22 | 35 | 2600 | 12 | 154 |
| | 25SEPF56M | 25 | 56 | 30 | 2800 | 12 | 280 |
| | 20SEPF120M | 20 | 120 | 25 | 3200 | 12 | 480 |
| | 16SEPF180M | 16 | 180 | 22 | 3300 | 12 | 576 |
| E7 | 35SEPF39M | 35 | 39 | 30 | 2800 | 12 | 273 |
| | 32SEPF68M | 32 | 68 | 25 | 3200 | 10 | 435 |
| | 25SEPF82M | 25 | 82 | 28 | 3000 | 12 | 410 |
| | 20SEPF180M | 20 | 180 | 25 | 3200 | 12 | 720 |
| | 16SEPF270M | 16 | 270 | 22 | 3300 | 12 | 864 |
| E12 | 35SEPF82M | 35 | 82 | 20 | 4000 | 12 | 574 |
| | 25SEPF180M | 25 | 180 | 16 | 4650 | 12 | 900 |
| | 20SEPF390M | 20 | 390 | 14 | 4950 | 12 | 1560 |
| | 16SEPF560M | 16 | 560 | 14 | 4950 | 12 | 1792 |
| F13 | 35SEPF120M | 35 | 120 | 18 | 4400 | 12 | 840 |
| | 25SEPF330M | 25 | 330 | 14 | 5000 | 12 | 1650 |
| | 20SEPF560M | 20 | 560 | 12 | 5400 | 12 | 2240 |
| | 16SEPF1000M | 16 | 1000 | 12 | 5400 | 12 | 3200 |

Frequency coefficient for ripple current

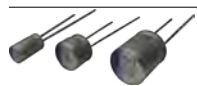
| Frequency | 120Hz \leq f <1kHz | 1kHz \leq f <10kHz | 10kHz \leq f <100kHz | 100kHz \leq f \leq 500kHz |
|-------------|----------------------|----------------------|------------------------|-------------------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

| |
|---|
| OS-CON Line-up |
| Guidelines and precautions |
| Series system diagram |
| Image of case size |
| Products list |
| Packing specifications (SMD type) |
| Packing specifications (Radial lead type) |
| Recommended soldering condition |
| Fundamental structure |
| Characteristics |
| Reliability |
| SXV |
| SVPG |
| SVPF |
| SVPE |
| SVPS |
| SVPD |
| SVPC |
| SVPB |
| SVPA |
| SVQP |
| SVP |
| SXE |
| SEPF |
| SEPC |
| SEQP |
| SEP |
| Catalog Deletion and EOL series |

Radial lead type

SEPC Series

Update



RoHS directive/Halogen-free compliant
 Super Low ESR(5mΩ~ 24mΩ)
 Large capacitance(2,700μF)
 Endurance: 105°C 5,000h

Specifications

| Items | Condition | Specifications | | | | |
|--|---|--|---|--------------|----|----|
| Rated voltage (V) | — | 2.5 | 4.0 | 6.3 | 10 | 16 |
| Surge voltage (V) | Room temperature | 3.3 | 5.2 | 8.2 | 12 | 18 |
| Category temperature range (°C) | — | -55 to +105 | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| | | +105°C | Z/Z _{20°C} | 0.75 to 1.25 | | |
| Endurance | 105°C, 5,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | | |
| | | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | ΔC/C | Within ±20% of the initial value | | | |
| | | DF | Within 1.5 times of the initial limit | | | |
| | | ESR | Within 1.5 times of the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |
| Resistance to soldering heat*2 | Flow method (260±5°C X 10s) | ΔC/C | Within ±5% of the initial value | | | |
| | | DF | Within the initial limit | | | |
| | | ESR | Within the initial limit | | | |
| | | LC | Within the initial limit (after voltage processing) | | | |

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

*2 Please refer to page 25 for flow soldering conditions.

Marking and dimensions

POSCAP
Line-up

Guidelines and precautions

Selection guide

Technical data

E12, E13, F13 Size

B9, C55, C6, C7, C9, E7, E9 Size

B9, C55, C6, C7, C9, E7, E9 size flat rubber is used.

(unit : mm)

| Size code | φD ±0.5 | L max | F | φd ±0.05 |
|-----------|---------|-------|---------|----------|
| B9 | 5.0 | 9.0 | 2.0±0.5 | 0.6 |
| C55 | 6.3 | 5.5 | 2.5±0.5 | 0.45 |
| C6 | 6.3 | 6.0 | 2.5±0.5 | 0.45*3 |
| C7 | 6.3 | 7.0 | 2.5±0.5 | 0.6 |
| C9 | 6.3 | 9.0 | 2.5±0.5 | 0.6 |
| E7 | 8.0 | 7.0 | 3.5±0.5 | 0.6*4 |
| E9 | 8.0 | 9.0 | 3.5±0.5 | 0.6 |
| E12 | 8.0 | 12.0 | 3.5±0.5 | 0.6 |
| E13 | 8.0 | 13.0 | 3.5±0.5 | 0.6 |
| F13 | 10.0 | 13.0 | 5.0±0.5 | 0.6 |

*3 2SEPC390M, 2SEPC560M : 0.5±0.05
 *4 16SEPC150MD, 10SEPC270MD : 0.45±0.05

Size list

RV : Rated voltage

| RV \ μF | 2.5 | 4.0 | 6.3 | 10 | 16 |
|---------|-----------------|-------------|-----------------|----|---------|
| 100 | B9 | | | | C6, C9 |
| 150 | | | | | E7 |
| 180 | | | | | E9, E12 |
| 220 | | | C55 | | E7 |
| 270 | | | | E7 | E9, E12 |
| 330 | B9, C9 | | | | |
| 390 | C6 | | | | |
| 470 | B9 | | C7, C9, E9, E13 | | F13 |
| 560 | B9, C6, C9, E9 | C9, E9, E13 | C9, E9 | | |
| 680 | | E13 | F13 | | |
| 820 | C9, E7, E9, E13 | F13 | | | |
| 1,000 | E9 | | E7 | | |
| 1,500 | | | F13 | | |
| 2,700 | F13 | | | | |

SEPC series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μF) | ESR(mΩ) (max) 100kHz to 300kHz/20°C | Rated ripple current 100kHz (mA _{rms}) at 105°C | DF (% max) | Leakage current (μA)(max) After 2 minutes |
|-----------|--------------------|-------------------|------------------------|--|--|------------|--|
| B9 | 2SEPC100MZ | 2.5 | 100 | 7 | 4180 | 10 | 500 |
| | 2SEPC330MZ | 2.5 | 330 | 7 | 4180 | 10 | 500 |
| | 2SEPC470MZ | 2.5 | 470 | 7 | 4180 | 10 | 500 |
| | 2SEPC560MZ | 2.5 | 560 | 7 | 4180 | 10 | 500 |
| C55 | 6SEPC220M | 6.3 | 220 | 18 | 2980 | 12 | 280 |
| C6 | 16SEPC100M | 16 | 100 | 24 | 2490 | 10 | 320 |
| | 2SEPC390M | 2.5 | 390 | 10 | 3900 | 12 | 500 |
| | 2SEPC560M | 2.5 | 560 | 10 | 3900 | 12 | 500 |
| C7 | 6SEPC470ME | 6.3 | 470 | 20 | 2970 | 10 | 592 |
| C9 | 16SEPC100MW | 16 | 100 | 10 | 4680 | 10 | 500 |
| | 6SEPC470MW | 6.3 | 470 | 7 | 5600 | 10 | 592 |
| | 6SEPC560MW | 6.3 | 560 | 7 | 5600 | 10 | 705 |
| | 4SEPC560MW | 4.0 | 560 | 7 | 5600 | 10 | 500 |
| | 2SEPC330MW | 2.5 | 330 | 7 | 5600 | 10 | 500 |
| | 2SEPC560MW | 2.5 | 560 | 7 | 5600 | 10 | 500 |
| | 2SEPC820MW | 2.5 | 820 | 7 | 5600 | 10 | 500 |
| E7 | 16SEPC150MD | 16 | 150 | 22 | 3220 | 12 | 500 |
| | 16SEPC220MD | 16 | 220 | 13 | 4150 | 10 | 500 |
| | 10SEPC270MD | 10 | 270 | 22 | 3220 | 12 | 500 |
| | 2SEPC820MD | 2.5 | 820 | 8 | 5300 | 10 | 500 |
| | 6SEPC1000MD | 6.3 | 1000 | 18 | 3530 | 10 | 1260 |
| E9 | 16SEPC180MX | 16 | 180 | 10 | 5000 | 10 | 576 |
| | 16SEPC270MX | 16 | 270 | 10 | 5000 | 10 | 864 |
| | 6SEPC470MX | 6.3 | 470 | 8 | 5700 | 10 | 592 |
| | 6SEPC560MX | 6.3 | 560 | 7 | 6100 | 10 | 705 |
| | 4SEPC560MX | 4.0 | 560 | 7 | 6100 | 10 | 500 |
| | 2SEPC560MX | 2.5 | 560 | 8 | 4700 | 10 | 280 |
| | 2SEPC820MX | 2.5 | 820 | 7 | 6100 | 10 | 500 |
| | 2SEPC820MY | 2.5 | 820 | 5 | 7200 | 10 | 500 |
| | 2SEPC1000MX | 2.5 | 1000 | 7 | 6100 | 10 | 500 |
| E12 | 16SEPC180M | 16 | 180 | 16 | 4360 | 10 | 576 |
| | 16SEPC270M | 16 | 270 | 11 | 5000 | 10 | 864 |
| E13 | 6SEPC470M | 6.3 | 470 | 8 | 5700 | 10 | 592 |
| | 4SEPC560M | 4.0 | 560 | 7 | 6100 | 10 | 500 |
| | 4SEPC680M | 4.0 | 680 | 7 | 6100 | 10 | 544 |
| | 2R5SEPC820M | 2.5 | 820 | 7 | 6100 | 10 | 500 |
| F13 | 16SEPC470M | 16 | 470 | 10 | 6100 | 10 | 1504 |
| | 6SEPC680M | 6.3 | 680 | 7 | 6640 | 10 | 857 |
| | 6SEPC1500M | 6.3 | 1500 | 10 | 5560 | 10 | 1890 |
| | 4SEPC820M | 4.0 | 820 | 7 | 6640 | 10 | 656 |
| | 2SEPC2700M | 2.5 | 2700 | 10 | 5560 | 10 | 1350 |

Frequency coefficient for ripple current

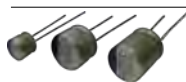
| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f ≤ 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

※ Red letters : New models

| |
|---|
| OS-CON Line-up |
| Guidelines and precautions |
| Series system diagram |
| Image of case size |
| Products list |
| Packing specifications (SMD type) |
| Packing specifications (Radial lead type) |
| Recommended soldering condition |
| Fundamental structure |
| Characteristics |
| Reliability |
| SXV |
| SVPG |
| SVPF |
| SVPE |
| SVPS |
| SVPD |
| SVPC |
| SVPB |
| SVPA |
| SVQP |
| SVP |
| SXE |
| SEPF |
| SEPC |
| SEQP |
| SEP |
| Catalog Deletion and EOL series |

Radial lead type

SEQP Series



RoHS directive/Halogen-free compliant
High voltage(32V)
Endurance: 125°C 1,000h, 105°C 5,000h

Specifications

| Items | Condition | Specifications | | | | | |
|--|---|--|---|--------------|----|----|----|
| | | 4.0 | 6.3 | 10 | 16 | 20 | 32 |
| Rated voltage (V) | — | 4.0 | 6.3 | 10 | 16 | 20 | 32 |
| Surge voltage (V) | Room temperature | 5.2 | 8.4 | 12 | 18 | 23 | 37 |
| Category temperature range(°C) | — | -55 to +125 | | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | | |
| | | +125°C | Z/Z _{20°C} | 0.75 to 1.25 | | | |
| Endurance | 125°C, 1,000h, 105°C, 5,000h, Rated voltage applied | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 2 times of the initial limit | | | | |
| | | ESR | Within 2 times of the initial limit | | | | |
| | | LC | Within the initial limit | | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |
| Resistance to soldering heat*2 | Flow method (260±5°C X 10s) | ΔC/C | Within ±5% of the initial value | | | | |
| | | DF | Within the initial limit | | | | |
| | | ESR | Within the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |

*1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 125°C.

*2 Please refer to page 25 for flow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

(unit : mm)

| Size code | φD ±0.5 | L max | F | φd ±0.05 |
|-----------|---------|-------|---------|----------|
| C6 | 6.3 | 6.0 | 2.5±0.5 | 0.45 |
| E7 | 8.0 | 7.0 | 3.5±0.5 | 0.45 |
| F8 | 10.0 | 8.0 | 5.0±0.5 | 0.50 |
| E12 | 8.0 | 12.0 | 3.5±0.5 | 0.60 |
| F13 | 10.0 | 13.0 | 5.0±0.5 | 0.60 |

Size list

RV : Rated voltage

| μF \ RV | 4.0 | 6.3 | 10 | 16 | 20 | 32 |
|---------|-----|-----|-----|-----|-----|-----|
| 6.8 | | | | | | E7 |
| 15 | | | | | | F8 |
| 18 | | | | | | E12 |
| 22 | | | | | C6 | |
| 39 | | | | C6 | | |
| 47 | | | | | E7 | |
| 56 | | | C6 | | | |
| 68 | | | | | F8 | |
| 82 | | C6 | | E7 | | |
| 100 | | | | | E12 | |
| 120 | | | E7 | | | |
| 150 | C6 | E7 | | F8 | F13 | |
| 180 | | | | E12 | | |
| 270 | | | F8 | | | |
| 330 | E7 | F8 | E12 | F13 | | |
| 470 | | E12 | | | | |
| 560 | E12 | | F13 | | | |
| 680 | F8 | | | | | |
| 820 | | F13 | | | | |
| 1,200 | F13 | | | | | |

SEQP series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR($m\Omega$) (max) 100kHz to 300kHz/20°C | Rated ripple current | Allowable ripple current | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-----------|-------------|-------------------|------------------------------|---|---|-------------------------------------|------------|---|
| | | | | | 100kHz (mA rms) | | | |
| | | | | | $105^{\circ}\text{C} < T_x \leq 125^{\circ}\text{C}^{*1}$ | $T_x \leq 105^{\circ}\text{C}^{*1}$ | | |
| C6 | 20SEQP22M | 20 | 22 | 60 | 458 | 1450 | 10 | 220 |
| | 16SEQP39M | 16 | 39 | 50 | 512 | 1620 | 10 | 312 |
| | 10SEQP56M | 10 | 56 | 45 | 537 | 1700 | 12 | 280 |
| | 6SEQP82M | 6.3 | 82 | 45 | 537 | 1700 | 12 | 258 |
| | 4SEQP150M | 4.0 | 150 | 40 | 572 | 1810 | 12 | 300 |
| E7 | 32SEQP6R8M | 32 | 6.8 | 100 | 440 | 1400 | 10 | 44 |
| | 20SEQP47M | 20 | 47 | 45 | 598 | 1890 | 12 | 470 |
| | 16SEQP82M | 16 | 82 | 40 | 670 | 2120 | 12 | 656 |
| | 10SEQP120M | 10 | 120 | 35 | 810 | 2560 | 12 | 600 |
| | 6SEQP150M | 6.3 | 150 | 35 | 810 | 2560 | 12 | 472 |
| | 4SEQP330M | 4.0 | 330 | 35 | 810 | 2560 | 12 | 660 |
| F8 | 32SEQP15M | 32 | 15 | 80 | 560 | 1800 | 10 | 96 |
| | 20SEQP68M | 20 | 68 | 40 | 759 | 2400 | 12 | 272 |
| | 16SEQP150M | 16 | 150 | 30 | 955 | 3020 | 12 | 480 |
| | 10SEQP270M | 10 | 270 | 25 | 1170 | 3700 | 12 | 540 |
| | 6SEQP330M | 6.3 | 330 | 25 | 1170 | 3700 | 12 | 416 |
| | 4SEQP680M | 4.0 | 680 | 25 | 1170 | 3700 | 12 | 544 |
| E12 | 32SEQP18M | 32 | 18 | 50 | 790 | 2500 | 12 | 115 |
| | 20SEQP100M | 20 | 100 | 24 | 1050 | 3320 | 15 | 400 |
| | 16SEQP180M | 16 | 180 | 20 | 1151 | 3640 | 15 | 576 |
| | 10SEQP330M | 10 | 330 | 17 | 1250 | 3950 | 15 | 660 |
| | 6SEQP470M | 6.3 | 470 | 15 | 1332 | 4210 | 15 | 592 |
| | 4SEQP560M | 4.0 | 560 | 13 | 1430 | 4520 | 15 | 448 |
| F13 | 20SEQP150M | 20 | 150 | 20 | 1367 | 4320 | 15 | 600 |
| | 16SEQP330M | 16 | 330 | 16 | 1493 | 4720 | 15 | 792 |
| | 10SEQP560M | 10 | 560 | 13 | 1655 | 5230 | 15 | 840 |
| | 6SEQP820M | 6.3 | 820 | 12 | 1721 | 5440 | 15 | 775 |
| | 4SEQP1200M | 4.0 | 1200 | 12 | 1721 | 5440 | 18 | 960 |

*1 T_x : Ambient temperature

Frequency coefficient for ripple current

| Frequency | $120\text{Hz} \leq f < 1\text{kHz}$ | $1\text{kHz} \leq f < 10\text{kHz}$ | $10\text{kHz} \leq f < 100\text{kHz}$ | $100\text{kHz} \leq f \leq 500\text{kHz}$ |
|-------------|-------------------------------------|-------------------------------------|---------------------------------------|---|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |



Specifications

| Items | Condition | Specifications | | | | | |
|--|--|--|---|--------------|----|----|----|
| Rated voltage (V) | — | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
| Surge voltage (V) | Room temperature | 3.3 | 5.2 | 8.2 | 12 | 18 | 23 |
| Category temperature range (°C) | — | -55 to +105 | | | | | |
| Capacitance tolerance (%) | 120Hz/20°C | M : ±20 | | | | | |
| Dissipation Factor (DF) | 120Hz/20°C | Please see the attached characteristics list | | | | | |
| Leakage current*1 | Rated voltage applied, after 2 minutes | Please see the attached characteristics list | | | | | |
| Equivalent series resistance (ESR) | 100kHz to 300kHz/20°C | Please see the attached characteristics list | | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | | |
| | | +105°C | Z/Z _{20°C} | 0.75 to 1.25 | | | |
| Endurance | 105°C, 3,000h, Rated voltage applied (2.5V → 2,000h) | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit | | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | ΔC/C | Within ±20% of the initial value | | | | |
| | | DF | Within 1.5 times of the initial limit | | | | |
| | | ESR | Within 1.5 times of the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |
| Resistance to soldering heat*2 | Flow method (260±5°C X 10s) | ΔC/C | Within ±5% of the initial value | | | | |
| | | DF | Within the initial limit | | | | |
| | | ESR | Within the initial limit | | | | |
| | | LC | Within the initial limit (after voltage processing) | | | | |

*1 In case of some problems for measured values, measure after applying rated voltage.

*2 Please refer to page 25 for flow soldering conditions.

Marking and dimensions

Polarity marking (Cathode)

| Size code | φD ±0.5 | L max | F | φd ±0.05 |
|-----------|---------|-------|---------|----------|
| C6 | 6.3 | 6.0 | 2.5±0.5 | 0.45 |
| E7 | 8.0 | 7.0 | 3.5±0.5 | 0.45 |
| F8 | 10.0 | 8.0 | 5.0±0.5 | 0.50 |
| E12 | 8.0 | 12.0 | 3.5±0.5 | 0.60 |
| F13 | 10.0 | 13.0 | 5.0±0.5 | 0.60 |

(unit : mm)

Size list

RV : Rated voltage

| μF \ RV | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 |
|---------|-----|-----|-----|-----|-----|---------|
| 22 | | | | | | C6 |
| 33 | | | | | | E7 |
| 39 | | | | | C6 | |
| 47 | | | | | | E7 |
| 56 | | | | C6 | | F8 |
| 68 | | | | | | F8 |
| 82 | | | C6 | | E7 | |
| 100 | | C6 | | | | F8, E12 |
| 120 | | | | E7 | | |
| 150 | | C6 | | E7 | F8 | F13 |
| 180 | | | | | E12 | |
| 220 | | E7 | | | | |
| 270 | | | | F8 | | |
| 330 | | E7 | F8 | E12 | F13 | |
| 470 | | F8 | E12 | | | |
| 560 | | E12 | | F13 | | |
| 680 | E12 | F8 | | | | |
| 820 | | | F13 | | | |
| 1,200 | | F13 | | | | |
| 1,500 | F13 | | | | | |

SEP series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μ F) | ESR(m Ω) (max) 100kHz to 300kHz/20 $^{\circ}$ C | Rated ripple current 100kHz (mA _{rms}) at 105 $^{\circ}$ C | DF (% max) | Leakage current (μ A) (max) After 2 minutes |
|-------------|-------------|-------------------|------------------------------|--|---|------------|---|
| C6 | 20SEP22M | 20 | 22 | 60 | 1450 | 10 | 220 |
| | 16SEP39M | 16 | 39 | 50 | 1620 | 10 | 312 |
| | 10SEP56M | 10 | 56 | 45 | 1700 | 12 | 280 |
| | 6SEP82M | 6.3 | 82 | 45 | 1700 | 12 | 258 |
| | 4SEP100M | 4.0 | 100 | 40 | 1810 | 12 | 200 |
| | 4SEP150M | 4.0 | 150 | 40 | 1810 | 12 | 300 |
| E7 | 20SEP33M | 20 | 33 | 45 | 1890 | 12 | 330 |
| | 20SEP47M | 20 | 47 | 45 | 1890 | 12 | 470 |
| | 16SEP82M | 16 | 82 | 40 | 2120 | 12 | 656 |
| | 10SEP120M | 10 | 120 | 35 | 2560 | 12 | 600 |
| | 6SEP150M | 6.3 | 150 | 35 | 2560 | 12 | 472 |
| | 4SEP220M | 4.0 | 220 | 35 | 2560 | 12 | 440 |
| | 4SEP330M | 4.0 | 330 | 35 | 2560 | 12 | 660 |
| | F8 | 20SEP56M | 20 | 56 | 40 | 2400 | 12 |
| 20SEP68M | | 20 | 68 | 40 | 2400 | 12 | 272 |
| 20SEP100MX | | 20 | 100 | 35 | 2570 | 12 | 400 |
| 16SEP150M | | 16 | 150 | 30 | 3020 | 12 | 480 |
| 10SEP270M | | 10 | 270 | 25 | 3700 | 12 | 540 |
| 6SEP330M | | 6.3 | 330 | 25 | 3700 | 12 | 416 |
| 4SEP470M | | 4.0 | 470 | 25 | 3700 | 12 | 376 |
| 4SEP680M | | 4.0 | 680 | 25 | 3700 | 12 | 544 |
| E12 | 20SEP100M | 20 | 100 | 24 | 3320 | 15 | 400 |
| | 16SEP180M | 16 | 180 | 20 | 3640 | 15 | 576 |
| | 10SEP330M | 10 | 330 | 17 | 3950 | 15 | 660 |
| | 6SEP470M | 6.3 | 470 | 15 | 4210 | 15 | 592 |
| | 4SEP560M | 4.0 | 560 | 13 | 4520 | 15 | 448 |
| | 2R5SEP680M | 2.5 | 680 | 13 | 4520 | 15 | 340 |
| | F13 | 20SEP150M | 20 | 150 | 20 | 4320 | 15 |
| 16SEP330M | | 16 | 330 | 16 | 4720 | 15 | 792 |
| 10SEP560M | | 10 | 560 | 13 | 5230 | 15 | 840 |
| 6SEP820M | | 6.3 | 820 | 12 | 5440 | 15 | 775 |
| 4SEP1200M | | 4.0 | 1200 | 12 | 5440 | 18 | 960 |
| 2R5SEP1500M | | 2.5 | 1500 | 12 | 5440 | 18 | 750 |

※1 Tx : Ambient temperature

Frequency coefficient for ripple current

| Frequency | 120Hz \leq f <1kHz | 1kHz \leq f <10kHz | 10kHz \leq f <100kHz | 100kHz \leq f \leq 500kHz |
|-------------|----------------------|----------------------|------------------------|-------------------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

| | |
|---|-----------------|
| OS-CON Line-up | |
| Guidelines and precautions | |
| Series system diagram | Selection guide |
| Image of case size | |
| Products list | |
| Packing specifications (SMD type) | |
| Packing specifications (Radial lead type) | |
| Recommended soldering condition | Technical data |
| Fundamental structure | |
| Characteristics | |
| Reliability | |

The following table is a list of our parts which have been deleted from our catalogs. If you are using any of the following models, please substitute with the suggested alternative model/series. Also, we have announced the end of life of aluminum solid capacitors with organic semiconductive electrolyte. We hope alternative parts (Aluminum Solid Capacitors with Organic Semiconductive Electrolyte) will continue to serve your needs. Thank you very much.

■ The list of alternatives for higher voltage

| Series | Size Code | Models for Deletion | Year of Deletion | Alternative model |
|-----------|-----------|---------------------|------------------|-------------------|
| SVP | A5 | 6SVP15M | 2002 | 10SVP15M |
| | | 4SVP22M | 2002 | 6SVP22M |
| | B6 | 10SVP22M | 2002 | 16SVP22M |
| | | 6SVP33M | 2002 | 10SVP33M |
| | C6 | 6SVP56M | 2002 | 10SVP56M |
| | | 4SVP82M | 2002 | 6SVP82M |
| | | 4SVP100M | 2002 | 4SVP150MX |
| | E7 | 10SVP82M | 2002 | 16SVP82M |
| | | 6SVP120M | 2002 | 10SVP120M |
| | | 6SVP150M | 2002 | 10SVP150MX |
| | | 4SVP150M | 2002 | 10SVP150MX |
| | | 4SVP220M | 2002 | 6SVP220MX |
| | F8 | 4SVP470M | 2002 | 6SVP470MX |
| | SVQP | E7 | 6SVQP150M | 2007 |
| 4SVQP220M | | | 2007 | 6SVQP220M |

■ The list of alternatives to 25V products

| Series | Size Code | Models for Deletion | Year of Deletion | Alternative series |
|--------|-----------|---------------------|------------------|----------------------------|
| SVP | C6 | 25SVP6R8M | 2013 | SVPD series SVPF series |
| | E7 | 25SVP10M | 2013 | |
| | F8 | 25SVP22M | 2013 | |
| | E12 | 25SVP33M | 2013 | |
| | F12 | 25SVP56M | 2013 | |
| SEP | C6 | 25SEP6R8M | 2013 | SEPF series |
| | E7 | 25SEP10M | 2013 | |
| | F8 | 25SEP22M | 2013 | |
| | E12 | 25SEP33M | 2013 | |
| | F13 | 25SEP56M | 2013 | |

※Surge voltage of above models is 25V and they need to apply the temperature derating voltage, so customers are encouraged to migrate to models in alternative series which is superior in operating voltage.

■ End of life/ Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

| Series | Size Code | Status |
|--------|-----------|--------|
| SZP | All size | EOL |
| SF | | |
| SP | | |
| SC | | |
| SA | | |
| SL | | |
| SH | | |
| SS | | |
| SG | | |
| SPA | | |
| SM | | |
| SN | | |
| SV | | |

| | |
|------|--------------------|
| SXV | Surface mount type |
| SVPG | |
| SVPF | |
| SVPE | |
| SVPS | |
| SVPD | |
| SVPC | |
| SVPB | |
| SVPA | |
| SVQP | |
| SVP | |
| SXE | Radial lead type |
| SEPF | |
| SEPC | |
| SEQP | |
| SEP | |

Catalog Deletion and EOL series

| |
|---------------------------------|
| POSCAP |
| POSCAP Line-up |
| Guidelines and precautions |
| Selection guide |
| Technical data |
| Surface mount type |
| Catalog Deletion and EOL models |