

# OS-CON



OS-CON is an aluminum solid capacitor with high conductive polymer or organic semiconductor electrolyte material. OS-CON acquires low Equivalent Series Resistance (ESR), excellent noise reduction capability and frequency characteristics. In addition, OS-CON has a long life span and its ESR has little change even at low temperatures since the electrolyte is solid.

## Features

### Low ESR obtained by using conductive polymer electrolyte

- Suitable as a decoupling capacitor, because its impedance has ideal frequency characteristics.
- Suitable as a smoothing capacitor, enabling miniaturizing switching power supplies, because it allows large ripple current.
- Suitable as a backup capacitor for the circuits that consume large current at a high speed.

### Pb-free Compliant

- All the models are completely Pb-free and RoHS compliant products.

### Long life

- Some special series can be expected 50,000h life at 85°C, suitable for long-operating industrial equipments.

### Superior temperature characteristics

- Its ESR has stable characteristics at a temperature from -55°C to 105°C (partly 125°C), suitable for applications used at low temperatures (under 0°C).

### Wide capacitance range from 1 μF to 2700 μF

- An array of various series covers wide capacitance range.

### High voltage, high reliability

- High reliability products have achieved the highest rated voltage 35V and the guarantee of 85°Cx85%RH (SVPD series), suitable for automotive and industrial equipments.

## Applications

As a smoothing, backup, and bypass capacitor used in various fields such as digital equipments, household appliances, computer-related hardware, and industrial equipments.

## Series integration

① Since the following models of the SC, SA, SL, SH, SVP and SVQP series have been integrated into models with a higher voltage rating, please consider these higher voltage rating models for new adoption or model changes.

Series	Size Code	Applicable model	Alternative model	Series	Size Code	Applicable model	Alternative model	Series	Size Code	Applicable model	Alternative model	
SC	A	16SC1M	25SC1M	SL	C'	6SL33M	10SL33M	SVP	C6	4SVP82M	6SVP82M	
		16SC1R5M	25SC1R5M			6SL47M	10SL47M			E7	10SVP82M	16SVP82M
	B	6SC10M	10SC10M	SH	A	16SH1M	25SH1M				6SVP120M	10SVP120M
		C	16SC10M			25SC10M	16SH1R5M				25SH1R5M	6SVP150M
	6SC22M		10SC22M	C	16SH10M	25SH10M	4SVP150M			10SVP150MX		
D	6SC47M	10SC47M	SVP		A5	6SVP15M	10SVP15M	4SVP220M	6SVP220MX			
SA	C	10SA33M		16SA33M		4SVP22M	6SVP22M	F8	4SVP470M	6SVP470MX		
		E		10SA100M	16SA100M	B6	10SVP22M		16SVP22M	SVQP	E7	6SVQP150M
SL	B'	6SL10M	10SL10M	6SVP33M	10SVP33M	4SVQP220M	6SVQP220M					
		C'	6SL22M	10SL22M	C6	6SVP56M	10SVP56M					

② Production of the SG, SV, SM and SN series has been discontinued. Therefore, customers using these series at present are kindly requested to substitute the SP series for the SG series, and the SVP series for the SV, SM and SN series.

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## Guidelines and Precautions for Use

Please take note of the following points in order to make the best use of SANYO capacitor's performance. Please use the capacitor within the range of specified performance after confirming each capacitor's usage environment and circuit condition.

Please choose the capacitor that matches the lifetime of the intended circuit design.

The performance of the capacitor the temperature or frequency. Therefore, please consider these variations when designing the circuit.

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

### Line-Up

Aluminum Electrolytic Capacitor (E-CAP)

Aluminum Solid Capacitors with Conductive Polymer/Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

Aluminum Electrolytic Capacitors with Hybrid Conductive Polymer

Tantalum Solid Capacitors with Conductive Polymer

OS-CON  
EP-cap  
POSCAP

### Considerations when using in industrial equipment

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

### Polarity

SANYO capacitors have polarity.

Please confirm the polarity prior to use. If it is used with the polarities reverse in leakage current or a short circuit may result.

Bi-polar capacitors should be used in circuit where polarity is occasionally reversed, or where polarity is unknown.

However bi-polar capacitors cannot be used for AC circuit, too.

There is no bi-polar model of OS-CON, EP-cap and POSCAP.

### 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 life span.
- In case the capacitor is used under the condition out of the specified frequency, ripple current shall not exceed the value revised by the frequency coefficient.

**POSCAP** About TQC series please contact us.

### Applied voltage for designing

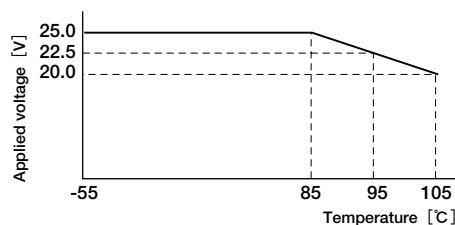
Do not apply voltages exceeding the full rated voltage.

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 POSCAP is recommended. If the rated voltage is 10V or over, 80% and below of the rated voltage or category voltage is recommended.
- Please refer to the following table for rated voltage of OS-CON.
- 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 environmental Temperature	Applied voltage
25V products except for SVPD	85°C below	Less than the rated voltage
	85°C above	Applied the voltage shown right figure
All except for the above	—	Less than the rated voltage



### Parallel connection

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Ripple current may be flowed to the capacitor that has lower impedance when different kind of capacitors are 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.

### Operating environment restrictions

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Do not use the capacitor in the following environments.

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

### Land pattern

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Please design capacitor SMD type and hole space and hole diameter of circuit board for capacitor radial lead type, or land patterns 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 capacitor is mounted to the double sided circuit board, avoid placing through holes under capacitors.

Avoid having the printed wire under the capacitor.

### Capacitor insulation (E-CAP. OS-CON. EP-cap)

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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 in the marking sleeve and the laminate resin is not guaranteed.
- The space between the case and the negative electrode terminal is not insulated and has some resistance.

### Storage conditions

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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.

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

※ Only for capacitors packed by laminate bag.

### Considerations when soldering

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- 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 as size, material and component population of PC board. Please check the heat durability in your actual soldering condition.

### Things to be noted before mounting

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- 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 1kΩ resistor.

### Mounting 1

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- Please mount capacitor after confirming the polarity.
- Please mount capacitor 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 capacitor or use capacitor dropped beforehand.
- Be careful not to deform the capacitor during installation.
- The space specified in the catalog or specification sheet is needed over the pressure relieve vent of E-CAP or EP-cap.
- Avoid having the printed wire over the pressure relieve vent of E-CAP or EP-cap.
- If the space between the top of E-CAP or EP-cap and the circuit board is not enough, the hole where gas can escape is needed when the pressure relieve vent operates.

### Mounting 2

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- When an automatic inserter is used to clinch the capacitor lead terminal, make sure it is not set too strongly.
- Be careful to 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.
- When mounting snap-in type capacitors, please ensure it is snug fit to the circuit board.

### Maintenance / Inspection

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For industrial use, please periodically check the capacitor.  
When checking, inspect the following points.

- Outside appearance.(Opened vent, leakage electrolyte, etc.)
- Electrical performance.(Leakage current, Capacitance, Tangent of loss angle, etc.)

### Disposal of capacitors

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Capacitor comprises solid organic compounds, various metals, resin, rubber, etc. Treat it as industrial waste when disposing of it. In case of disposing a large amount of SANYO capacitor, SANYO can dispose on your behalf.

## About the electronic part capacitor



### Environmental concerns of SANYO capacitors

SANYO Electric Company Co.,Ltd. aims at "Environment · Energy Leading Manufacturer " under the brand vision " Think GAIA " .

Earth-conscious activities are promoted for SANYO capacitors, too.

### RoHS compliance

All SANYO capacitors comply with RoHS directive (2002/95/EC).

Restricted Substance

Restricted substances of RoHS directive
Cadmium(Cd) and it's compounds
Lead(Pb) and it's compounds
Mercury(Hg) and it's compounds
Hexavalent chromium(Cr6+)
Polybrominated biphenyls(PBBs)
Polybrominated diphenyl ethers(PBDEs)

### Lead-Free Stance

All complete parts and homogenous materials of SANYO capacitors are lead-free.(JEITA, PHASE3)

### Halogen-Free Stance

Almost all SANYO capacitors already comply with halogen-free requirements. Please contact us for details.

The definition of halogen-free for SANYO capacitors is about element or compound of chlorine(Cl) and bromine(Br) out of halogen family except fluorine, iodine and astatine, and satisfy the following conditions as homogeneous materials.

The content percentage of chlorine(Cl)	0.09wt% (900ppm) below
The content percentage of bromine(Br)	0.09wt% (900ppm) below
The total content percentage of chlorine(Cl) and bromine(Br)	0.15wt% (1500ppm) below

※It means a homogeneous material or the material that cannot be mechanically decomposed.

- (Example)
- plastic composed of homogeneous material, adhesives, metallic material, ink, glass, paper, alloyed metal, etc.
  - ink layer printed or coated on plastic material, coating layer or film of paint
  - thin metallic film formed on the surface of plastic material or metallic material

**Precautions for circuit designing****Crucial precautions** **Important****1. Prohibited circuits****(a) OS-CON leakage current may become larger as the following conditions.**

- (1) Soldering
- (2) High temperature no-load test, high temperature and high humidity no-load test, rapidly changing temperature test, etc.

**(b) Avoid the use of 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 (with a 60% reliability standard) based on JIS C 5003.

The mainly failure modes are as follows.

**2-1. Contingency failure**

The main causes of failure are thermal stresses cause by the soldering or thermal use environment, along with heat stresses, electrical stresses or mechanical stresses.

The most common failure mode is a short circuit.

**(a) Phenomenon after a short circuit****(1) Organic semiconductive type (resin sealing)**

- In case of a short circuit, if the pass-through current is 3A or less on  $\phi$  10 and 1A or less on  $\phi$  6.3, the OS-CON becomes heated but no effects are visible even when the current is continuously carried.
- If the short circuit currents exceed the mentioned value above.  
The temperature inside will increase and the internal press raise.  
The liquefied organic semiconductor and odorous gas are released from the space of sealant.  
In this case, keep your face and hands away from the area.

**(2) Conductive polymer type (rubber sealing)**

- In case of a short circuit, if the pass-through current is 1A or less on  $\phi$  10, 0.5A or less on  $\phi$  8 and 0.2A or less on  $\phi$  6.3, the OS-CON becomes heated, but no effects are visible even when the current is continuously carried.
- If the short circuit currents exceed the mentioned value above.  
The temperature inside the OS-CON will increase.  
The rubber sealing is turned over and odorous gas is released.  
In this case, keep your face and hands away from the area.

**(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.
- (2) It may take a few seconds to a few minutes before the organic semiconductor liquefies and an odorous gas produces by the situation. Increase safety by using in conjunction with a protective circuit.
- (3) If the gas comes in contact with eyes, rinse immediately. If the gas is inhaled, gargle immediately.
- (4) Do not lick the electrolyte. If the electrolyte comes in contact with skin, wash it off with soap immediately.
- (5) 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 (life-span)**

When life 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.

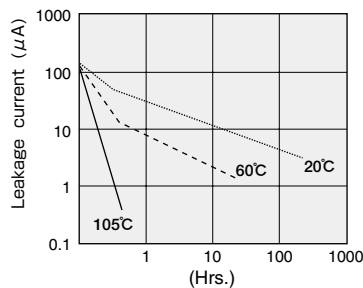
The electric characteristics of capacitance and ESR may possibly change within the specified range in specifications when it is used under the condition of the rated voltage, electric and mechanical performance. Please note it when design.

## Other precautions

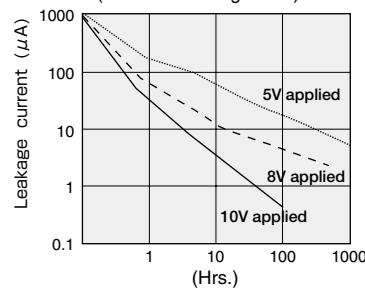
### 1. Leakage current

Mechanical stress may cause OS-CON leakage current increased.  
In such a case, leakage current will gradually decrease by applying voltage within the category voltage and the upper category temperature.  
Then, self-healing speed of leakage current is faster when it is near to the upper category temperature and the category voltage.

OS-CON  
leakage current restoration characteristics  
10 $\mu$ F/16V (16V DC applied)



OS-CON  
leakage current restoration characteristics  
33 $\mu$ F/10V (Ambient temperature: 65°C)  
(Measured voltage: 10V)



※A sample that had stress intentionally applied to make the leakage current larger was used to make leakage current recovery easy to understand.

### 2. Soldering with a soldering iron

(a) Soldering condition should be under the following ranges.

	Soldering iron temperature	time
Soldering condition	400 $\pm$ 10°C	within 5s.

※ Refer to page 5 Considerations when soldering

(b) When the lead terminal for radial lead type must be processed because the lead pitch and the PCB holes in spacing do not match, process it without any stresses to OS-CON before soldering.

(c) Solder without any excessive stresses to OS-CON itself.

(d) When an OS-CON has been soldered once and needs to be removed, remove it after the solder has been completely melted.

(e) Do not let the tip of the soldering iron touch the OS-CON itself.

### 3. Flow soldering

(a) Soldering condition should be under the following ranges.

Recommended flow soldering condition

	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, immersion time should be 10 + 1 sec. or less.

※ Refer to page 5 Considerations when soldering

(b) Do not apply flow soldering to SMD type.

(c) Do not solder OS-CON itself by submerging it in melted solder.  
Solder the opposite side that the OS-CON is mounted on.

(d) Note that flux does not adhere to anywhere except the lead terminal.

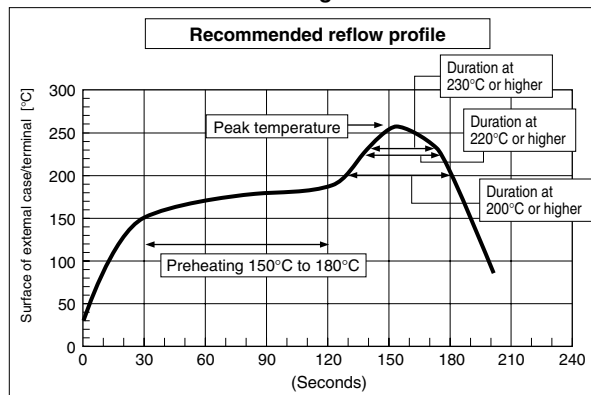
(e) Note that other components do not fall over and touch the OS-CON when soldering.

## Guidelines and Precautions for Use

## 4. Reflow soldering

(a) Soldering condition should be under the following ranges.

Recommended reflow soldering condition



Item	Series	
	SVP,SVQP,SVPA, SVPB,SVPC,SVPD, SVPS,SVPE Series	
Peak temperature (max)	250°C	260°C
Preheat	150°C to 180°C 90 ± 30 sec.	
200°C over time (max)	60 sec.	60 sec.
220°C over time (max)	50 sec.	50 sec.
230°C over time (max)	40 sec.	40 sec.
Reflow number	twice or less	Only 1 time

※ All temperatures are measured on the topside of the Al-can and terminal surface.

(b) Do not apply reflow soldering to Radial Lead type.

(c) Please contact SANYO for setting VPS condition.

## 5. Handling after soldering

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

(a) Do not tilt, bend or twist OS-CON.

(b) Do not move the PCB with catching OS-CON itself.

(c) Do not dump the OS-CON with objects.

(d) When stacking PCBs, make sure that the OS-CON does not touch other PCBs or components.

## 6. 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.

(a) Use immersion or ultrasonic waves to clean within 2 minutes on Polymer conductive type and within 5 minutes on Organic semiconductor type.

(b) The temperature of the cleaning fluid should be less than 60°C.

(c) Watch the contamination of the detergent as conductivity, pH, specific gravity, water content, etc.

(d) Do not store the OS-CON in a location subject to gases from the cleaning fluid or in an airtight container after cleaning.

(e) Dry the PCB or OS-CON with hot air that should be less than the maximum operating temperature.

(f) Please note that Indication may disappear when rubbing print side after washing as a cleaner.

(g) Please contact SANYO for details about detergents, cleaning methods and about detergents other than those listed above.

## 7. Fixatives and coating materials

(a) Select the appropriate covering and sealant materials for OS-CONs. In particular, make sure the fixative, coating and thinner do not contain acetone.

(b) Before applying a fixative or coating, completely remove any flux residue and foreign matter from the area where the board and OS-CON will be jointed together.

(c) Allow any detergent to dry before applying the fixative or coating.

(d) Please contact SANYO for fixative and coating heat curing conditions.

## 8. 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 month after shipment	Within 30 days from opening (packaged with carrier tape)
Radial Lead type	Bag packing product	Within 30 month after shipment	Within 7 days from opening
	Taping product	Within 24 month after shipment	

※1 The JEDEC J-STD-020 Rev.C Standard is not applicable.

※ Please contact SANYO for Organic Semiconductor type.



Product Line-up Table

Classification	Series	Page	Features	Large capacitance	Low ESR	High voltage	Long life	Category Temperature Range (°C)	Rated Voltage Range (V.DC)	Capacitance Range (μF)	External Appearance	Marking Color
Conductive polymer electrolyte	SMD type 	UP GRADE SVPE 96 to 97	Super low ESR, large capacitance	●	●			-55 to +105	2.5 to 6.3	220 to 390	-	Purple
		SVPS 98 to 99	Long life				●	-55 to +105	4.0 to 25	10 to 680	-	Purple
		SVPD 100 to 101	Guaranteed at 125°C, rated 35V max.				●	-55 to +125	10 to 35	8.2 to 82	-	Purple
		SVPC 102 to 103	Large capacitance, super low ESR	●	●			-55 to +105	2.5 to 16	39 to 2700	-	Purple
		SVPB 104 to 105	Low profile					-55 to +105	2.5 to 20	15 to 120	-	Purple
		SVPA 106 to 107	Low ESR, large ripple current			●		-55 to +105	2.5 to 20	10 to 820	-	Purple
		SVQP 108 to 109	Guaranteed at 125°C					-55 to +125	4.0 to 20	22 to 220	-	Purple
		SVP 110 to 111	Standard					-55 to +105	2.5 to 25	3.3 to 1500	-	Purple
	Radial lead type 	UP GRADE SEPC 112 to 113	Super low ESR, large capacitance, miniaturization and low profile	●	●			-55 to +105	2.5 to 16	100 to 2700	-	Purple
		SEQP 114 to 115	Guaranteed at 125°C, high voltage				●	-55 to +125	4.0 to 32	6.8 to 1200	-	Purple
		SEP 116 to 117	Guaranteed for 3,000h				●	-55 to +105	2.5 to 25	6.8 to 1500	-	Purple
	Organic semiconductor electrolyte 	SF 118 to 119	5mm height max.					-55 to +105	4.0 to 6.3	150 to 220	Purple	White
		SP 120 to 121	Large capacitance & low ESR for audio	●	●			-55 to +105	2.0 to 25	6.8 to 2200	Purple	White
		SC 122 to 123	Standard					-55 to +105	6.3 to 30	1.0 to 47	Purple	White
SA 124 to 125		Large capacitance, miniaturization	●				-55 to +105	6.3 to 20	15 to 2200	Purple	White	
SL 126 to 127		Low profile					-55 to +105	4.0 to 25	1.0 to 220	Purple	White	
SH 128 to 129		Long life				●	-55 to +105	6.3 to 25	1.0 to 330	Purple	White	
SS 130 to 131		Miniaturization					-55 to +105	4.0 to 20	2.2 to 470	Purple	White	

Aluminum Solid Capacitors with Conductive Polymer  
Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

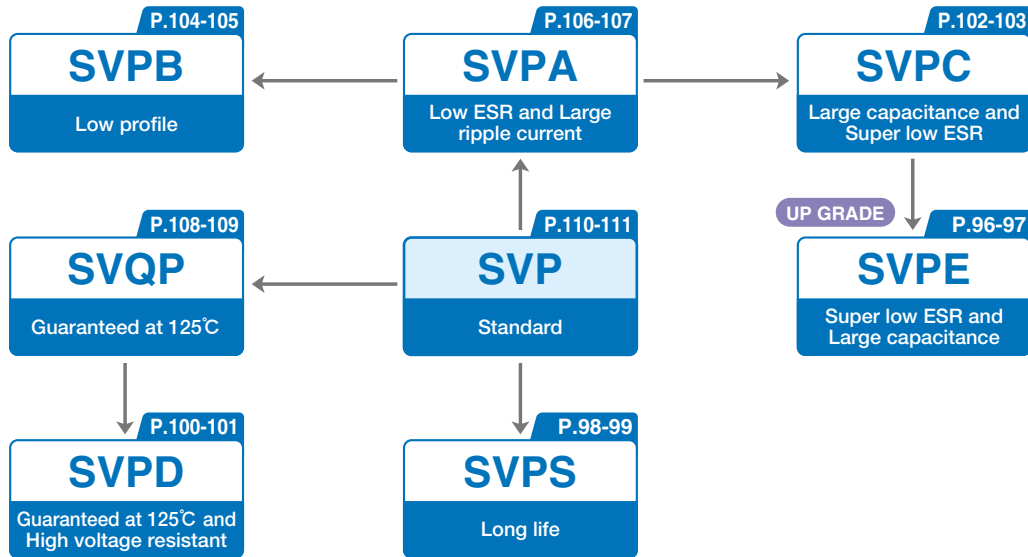
OS-CON

Product Line-up Table

Series System Diagram

1. System Diagram

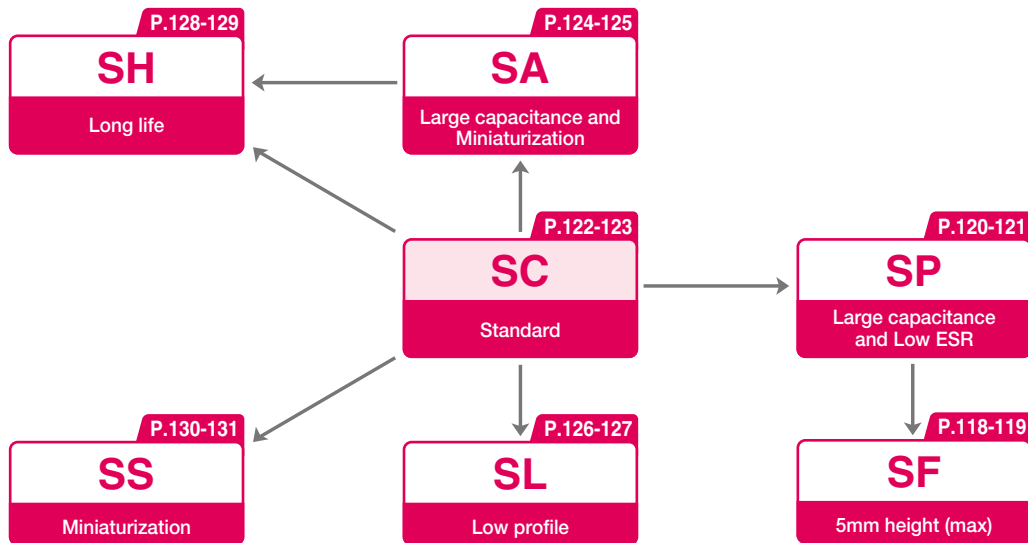
SMD type Aluminum solid capacitors with Conductive polymer



Radial lead type Aluminum solid capacitors with Conductive polymer



Radial lead type Aluminum solid capacitors with Organic semiconductive electrolyte

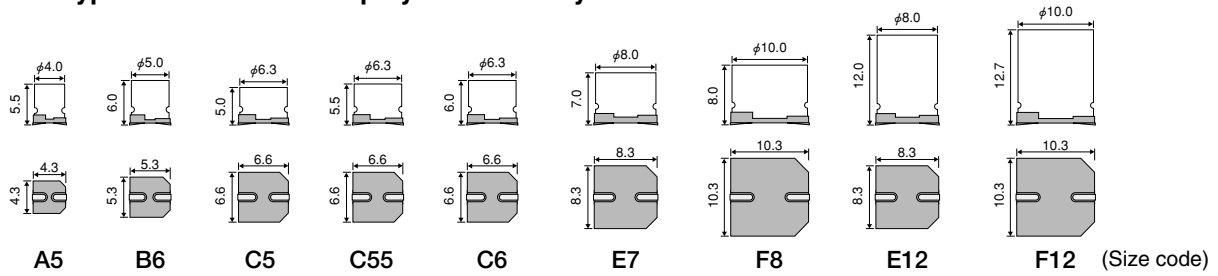


Aluminum Solid Capacitors with Conductive Polymer  
Aluminum Solid Capacitors with Organic Semiconductive Electrolyte  
OS-CON

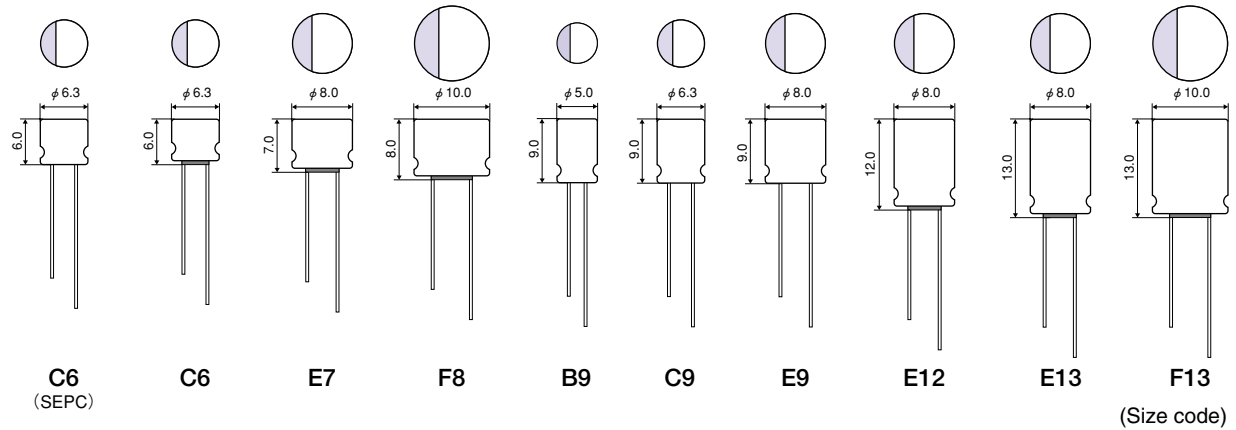
Series System Diagram

Sketch of Case Size (unit:mm)

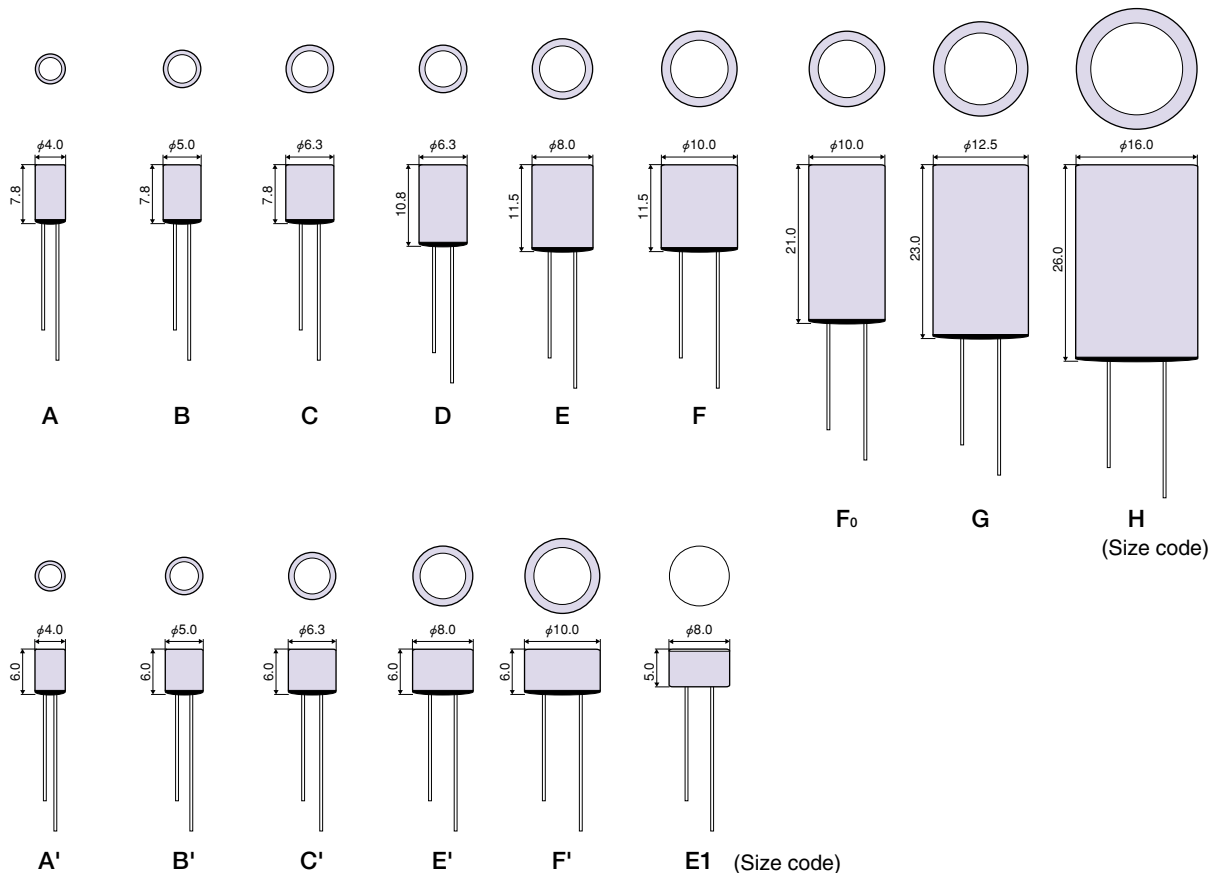
SMD type with conductive polymer electrolyte



Radial lead type with conductive polymer electrolyte



Radial lead type with Organic semiconductive electrolyte



※ Profile of case size are all expressed in maximum values.  
 ※ Unit:mm

Products List

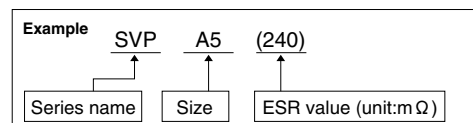
Size·ESR Matrix List SMD Type

V μF	2.5	4.0	6.3	10
3.3				
4.7				SVP A5(240)
6.8				SVP A5(240)
8.2				
10				SVPS A5(220) SVP A5(220)
15				SVPS A5(200) SVP A5(200)
18				
22			SVPS A5(200) SVP A5(200)	
27				
33	SVPS A5(200)	SVP A5(200)		SVPS B6(70) SVP B6(70)
39	SVP B6(70)			
47			SVPS B6(30) SVPA B6(30)	SVP B6(70) SVP C6(50)
56				SVPD C6(45) SVQP C6(45) SVPB C5(40) SVP C6(45)
68	SVPS B6(30) SVPA B6(30)	SVP B6(60)		SVPS C6(30) SVPC B6(23) SVPC B6(30) SVPA C6(30)
82	SVPA B6(30)		SVPB C5(40) SVQP C6(45) SVP C6(45)	
100		SVPB C5(40)	SVPC B6(30) SVPC B6(25)	SVQP C6(40) SVP C6(40)
120	SVPB C5(40)		SVPS C6(22) SVPC B6(21)	SVPA C6(22) SVPC C6(27) SVQP E7(35) SVP C6(17) SVP C6(22) SVP E7(35)
150		SVPS C6(22) SVPC B6(30) SVPC B6(23) SVPC B6(20)	SVPA C6(22) SVQP C6(40) SVP C6(40)	SVPS E7(30) SVP E7(35) SVPS F8(30) SVP F8(30) SVPA E7(30) SVQP E7(35)
180	SVPC B6(30) SVPC B6(24) SVPC B6(19) SVPA C6(20) SVP C6(23)			
220			SVPE C6(10) SVPS E7(22) SVPC C6(27) SVPC C6(15)	SVPA E7(22) SVQP E7(35) SVP E7(35) SVP F8(25)
270		SVPS E7(22) SVPA E7(22)		SVPC E7(22) SVP F8(25)
330	SVPA E7(20)	SVPC C6(27) SVPC C6(21)	SVPC C6(15) SVP E7(35)	SVPC C6(17) SVP F8(25) SVPC E7(22)
390	SVPE C6(10) SVPC C6(25) SVPC C6(15)			
470			SVPS F8(20) SVPA F8(20)	SVP F8(25) SVP E12(15)
560	SVPC C6(16)	SVPC E7(22) SVPC E12(9)	SVP E12(13)	SVP F12(13)
680	SVPC E7(20) SVP E12(13)	SVPS F8(20) SVPA F8(20)	SVP F8(25)	
820	SVPC E12(9) SVPA F8(19)		SVPC E12(12) SVP F12(12)	
1200		SVPC E12(12) SVP F12(12)		
1500	SVPC E12(10) SVP F12(12)	SVPC E12(12)		
2700	SVPC F12(12)			

●...Conductive polymer type

How to read the lists in P88-91

- 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 P96 to P131.
- When you find two or more series names in one section, they have different part numbers. Please confirm the number in the Series Characteristics List of each series.



Aluminum Solid Capacitors with Conductive Polymer  
Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

OS-CON

Products List

Products List

Size-ESR Matrix List SMD Type

16		20		25	35	V μF
SVP A5(260)						3.3
						4.7
				SVP C6(80)		6.8
					SVPD E7(70)	8.2
		SVPA B6(40) SVP B6(120)		SVPS E7(60) SVPD C6(65) SVP E7(60)		10
SVP B6(120)		SVPB C5(45)				15
					SVPD F8(60)	18
SVPS B6(90) SVP B6(90)		SVPS C6(60) SVPB C55(35) SVPA C6(35) SVP C6(60)	SVQP C6(60) SVP C6(60)	SVPD E7(48) SVP F8(50)	SVPD E12(50)	22
						27
SVPB C5(40)		SVP E7(45)		SVP E12(30)		33
SVPS C6(24) SVPC B6(35) SVPC B6(27) SVPA C6(35)	SVPA C6(24) SVQP C6(50) SVP C6(50)			SVPD F8(45)		39
		SVPS E7(45) SVPA E7(33)	SVQP E7(45) SVP E7(45)	SVPD E12(30)	SVPD F12(30)	47
SVP E7(45)		SVP F8(40)		SVP F12(28)		56
						68
SVPC C6(30) SVPC C6(25)		SVP F8(40)				82
SVPS E7(30) SVPD E7(40) SVPA E7(30)	SVQP E7(40) SVP E7(40)			SVPD F12(28)		100
SVPS F8(35) SVPC C6(24) SVPC E7(27)	SVP F8(35)	SVP E12(24)				120
						150
SVPC E7(22) SVP F8(30)		SVP F12(20)				180
SVPS F8(29) SVPA F8(29) SVP F8(30)	SVP E12(20)					220
						270
SVPC E12(16) SVP F12(16)						330
						390
						470
						560
						680
						820
						1200
						1500
						2700

●...Conductive polymer type

Standard sizes (Conductive polymer type) (unit : mm)

A5	φ 4.0×L5.5	E7	φ 8.0×L7.0
B6	φ 5.0×L6.0	F8	φ 10.0×L8.0
C5	φ 6.3×L5.0	E12	φ 8.0×L12.0
C55	φ 6.3×L5.5	F12	φ 10.0×L12.7
C6	φ 6.3×L6.0		

Aluminum Solid Capacitors with  
Conductive Polymer  
Aluminum Solid Capacitors with  
Organic Semiconductive Electrolyte

OS-CON

Products List

Products List

Size-ESR Matrix List Radial Lead Type

V μF	2.0	2.5	4.0	6.3		10	
1							
1.5							
2.2							
3.3							
4.7						SC A(280) SL A'(400)	SH A(280)
6.8				SC A(250) SL A'(350) SH A(250)			
10						SC B(150) SL B'(150) SH B(150)	SS A'(350)
15				SC B(120) SL B'(120)	SH B(120) SS A'(350)		
18							
22						SC C(70) SL C'(80) SS B'(150)	
33				SC C(70) SS B'(150)		SL C'(80)	
39							
47				SA C(60) SH C(60)		SC D(60) SL C'(70)	
56						SEQP C6(45) SEP C6(45)	SP C'(45)
68			SS C'(70)	SP C'(40)		SA D(50) SL E'(65) SH D(50)	
82				SEQP C6(45)	SEP C6(45)	SP C(40)	
100		SEPC B9(7)	SEP C6(40) SP C'(40)	SL E'(65)		SP E'(32) SL F(60) SS D(40)	
120				SP C(35)		SEQP E7(35)	SEP E7(35)
150			SS D(40)	SEQP E7(35) SEP E7(35) SF E1(32) SP E'(30)	SA E(30) SL F'(60) SH E(30)	SP D(25) SS E(30)	
180						SP F'(29)	
220			SEP E7(35) SF E1(30)	SP E'(28) SL F(55)	SP F'(28) SP D(20)	SS E(30) SA F(27) SH F(27)	
270			SP D(20)			SEQP F8(25) SEP F8(25)	SP E(18)
330		SEPC B9(7) SEPC C9(7)	SEQP E7(35) SEP E7(35)	SP F'(24)	SEQP F8(25) SEP F8(25)	SA F(25) SH F(25)	SS F(25)
390		SEPC C6(10)		SP E(16)		SEQP E12(15) SEP E12(15)	
470		SEPC B9(7)	SEP F8(25) SS F(25)	SEPC C9(7) SEPC E9(8) SEPC E13(8)		SP F(15)	
560		SEPC B9(7) SEPC C9(7) SEPC E9(8)	SEPC C9(7) SEPC E9(7) SEPC E13(7)	SEPC E12(13) SEP E12(13) SP E(14)	SEPC C9(8) SEPC E9(7)	SEQP F13(13) SEP F13(13)	
680		SEP E12(13)	SEPC E13(7) SEQP F8(25)	SEP F8(25)	SEPC F13(7) SP F(13)		
820		SEPC C9(7) SEPC E9(5) SEPC E9(7) SEPC E13(7)	SEPC F13(7) SP F(12)		SEQP F13(12) SEP F13(12)		
1000	SP F(11)	SEPC E9(7)	SP F(12)				
1200		SP F(12)	SEQP F13(12) SEP F13(12)				
1500		SEP F13(12)	SP Fo(8)		SEPC F13(10)		
1800	SP Fo(8)						
2200			SP G(9)		SA H(15)		
2700		SEPC F13(10)					

●...Conductive polymer type ●...Organic semiconductive Electrolyte type

Standard sizes (Conductive polymer type)

(unit : mm)

C6	φ6.3×L6.0	E7	φ8.0×L7.0	E12	φ8.0×L12.0
B9	φ5.0×L9.0	F8	φ10.0×L8.0	E13	φ8.0×L13.0
C9	φ6.3×L9.0	E9	φ8.0×L9.0	F13	φ10.0×L13.0

Aluminum Solid Capacitors with Conductive Polymer  
Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

OS-CON

Products List

Products List

Size-ESR Matrix List Radial Lead Type

16		20		25		30	32	V μF
				SC A(350) SL A'(450)	SH A(350)	SC A(350)		1
				SC A(300) SL A'(400)	SH A(300)	SC B(300)		1.5
SC A(280) SL A'(400)	SH A(280)	SS A'(400)		SC B(200) SL B'(250)	SH B(200)	SC B(250)		2.2
SC A(280) SL A'(400)	SH A(280)	SS A'(400)		SC B(200) SL B'(250)	SH B(200)	SC C(200)		3.3
SC B(180) SL B'(250)	SH B(180) SS A'(400)	SS B'(250)		SC C(100) SL C'(100)	SH C(100)	SC D(120)		4.7
SL B'(180) SH B(150) SS A'(400)		SS B'(180)		SEP C6(80) SP C'(60) SC C(100)	SL C'(100) SH C(100)	SC D(120)	SEQP E7(100)	6.8
SL C'(100) SS B'(150)		SS C'(100)		SEP E7(60) SP C(55) SC C(90)	SH C(90)	SC E(110)		10
SC C(90) SL C'(100)	SS B'(150)	SA C(90) SH C(90)	SS C'(100)	SC D(70) SL E'(75) SP D(40)	SH D(70)		SEQP F8(80)	15
				SEP F8(50) SC E(40) SL F'(70)		SC F(80)	SEQP E12(50)	18
SC D(70)		SEQP C6(60) SEP C6(60) SP C'(50)	SA C(70) SH C(70) SS C'(100)					22
SC D(70) SP C'(50) SA C(70)	SH C(70) SS C'(100)	SEP E7(45) SP C(45) SA D(70)	SH D(70)	SEP E12(30) SP E(30) SC F(35)				33
SEQP C6(50)	SEP C6(50)							39
SP C(45) SA D(60) SL E'(70)	SH D(60)	SEQP E7(45) SEP E7(45) SP E'(36)	SA E(40) SH E(40) SS D(60)					47
		SEP F8(40)		SEP F13(28) SP F(25)				56
SP E'(34) SL F'(65) SS D(50)		SEQP F8(40) SEP F8(40) SP F'(34)	SP D(30) SA E(36) SH E(36)					68
SEQP E7(40)	SEP E7(40)							82
SEPC C6(24) SEPC C9(10) SP F'(32)	SP D(25) SA E(30) SH E(30)	SEQP E12(24) SEP F8(35) SEP E12(24)	SA F(30) SH F(30) SS E(30)					100
		SP E(24)						120
SEQP F8(30) SEP F8(30) SA F(28) SH F(28)		SEQP F13(20) SEP F13(20) SS F(30)						150
SEQP E12(20) SEPC E9(10)	SEPC E12(16) SEP E12(20) SP E(20)	SP F(20)						180
								220
SEPC E12(11) SP F(18)								270
SEQP F13(16) SEP F13(16)								330
								390
SEPC F13(10) SA G(20)								470
								560
								680
								820
SA H(15)								1000
								1200
								1500
								1800
								2200
								2700

●...Conductive polymer type ●...Organic semiconductive Electrolyte type

Standard sizes (Organic semiconductive Electrolyte type)

(unit : mm)

A	φ4.0XL7.8	D	φ6.3XL10.8	F0	φ10.0XL21.0	A'	φ4.0XL6.0	E'	φ8.0XL6.0
B	φ5.0XL7.8	E	φ8.0XL11.5	G	φ12.5XL23.0	B'	φ5.0XL6.0	F'	φ10.0XL6.0
C	φ6.3XL7.8	F	φ10.0XL11.5	H	φ16.0XL26.0	C'	φ6.3XL6.0	E1	φ8.0XL10.0

Aluminum Solid Capacitors with  
Conductive Polymer  
Aluminum Solid Capacitors with  
Organic Semiconductive Electrolyte

OS-CON

Products List

# Specifications for SMD type

## 1. Part number system

**1 6**

Rated voltage

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

**S V P**

Series name

<b>SVP Series</b>
<b>SVQP Series</b>
<b>SVPA Series</b>
<b>SVPB Series</b>
<b>SVPC Series</b>
<b>SVPD Series</b>
<b>SVPS Series</b>
<b>SVPE Series</b>

**3 R 3**

Rated capacitance

Example

Rated Cap.( $\mu$ F)	Code
3.3	3R3
4.7	4R7
10	10
22	22
100	100
220	220
470	470
1500	1500

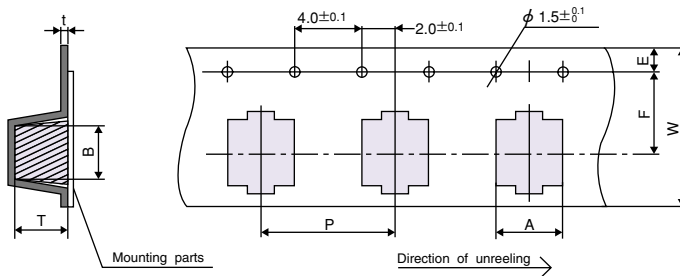
**M**

Capacitance tolerance

Cap. tolerance	Code
$\pm 20\%$	M

## 2. Taping

### 2-1. Carrier tape



(unit : mm)

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

Aluminum Solid Capacitors with Conductive Polymer  
Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

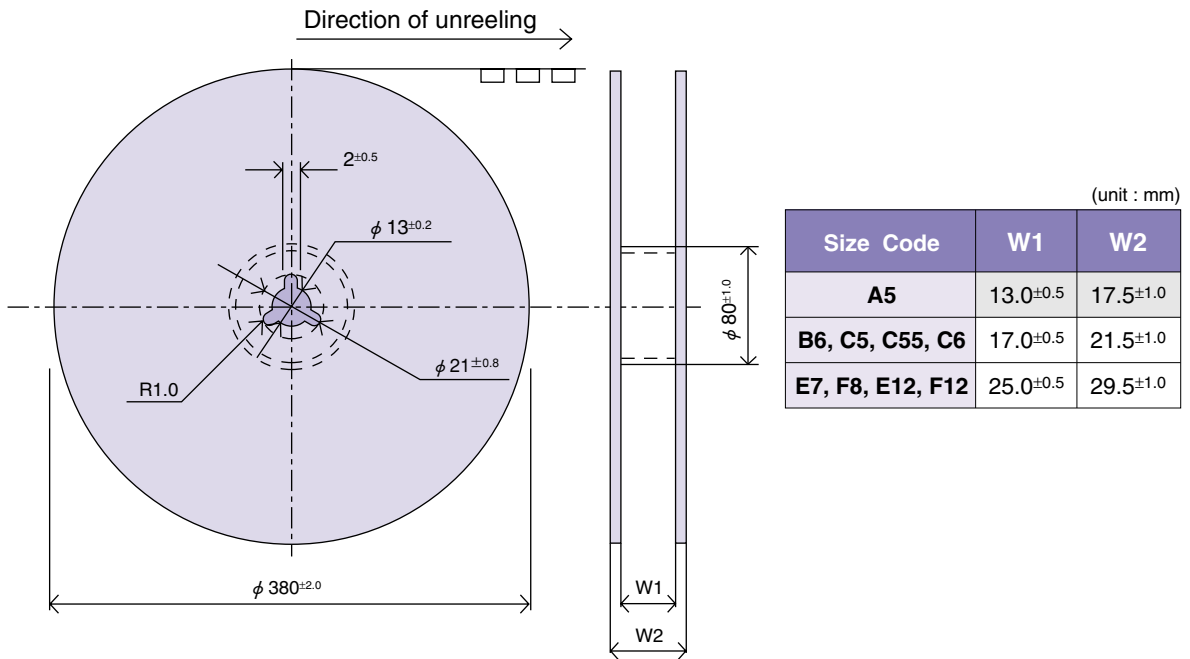
OS-CON

Packing Specifications

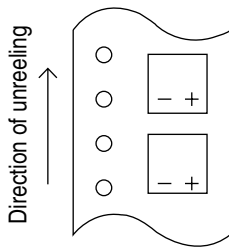


Packing Specifications

2-2. Reel



2-3. Polarity



3. Minimum Packing Quantity

Taping type

Size Code	pcs./Reel ( $\phi 380$ )
A5	2000
B6	1500
C5	1300
C55	1000
C6	1000
E7	1000
F8	500
E12	400
F12	400

# Specifications for radial lead type

## 1. Part number system

**1 6**

Rated voltage

Rated volt.	Code
2.0	2
2.5	2R5 <sup>※1</sup>
4.0	4
6.3	6
10	10
16	16
20	20
25	25
30	30
32	32

**S L**

Series name

SC Series
SA Series
SL Series
SH Series
SP Series
SS Series
SEP Series
SEQP Series
SEPC Series
SF Series

**4 R 7**

Rated capacitance

Example

Rated Cap.(μF)	Code
1	1
2.2	2R2
4.7	4R7
10	10
22	22
100	100
220	220
1000	1000
2700	2700

**M**

Capacitance tolerance

Cap. tolerance	Code
±20%	M

**+ T S**

Taping or forming of terminal code

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,E9 and F13 size in SEPC series.

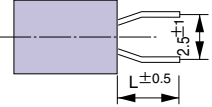
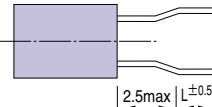
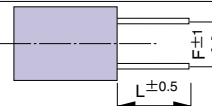
## 2. Lead terminal process

### 2-1. Applications

※ The following table is a standard specification. Please contact us concerning other specifications and +S taping.

Series	Size code	Bag-packed products (lead terminal cutting)			Taping	
		Not processed	Forming cut	Straight cut		
Conductive polymer	SEP,SEQP	C6,E7,E12	○	×	+C3	+TSS
		F8,F13	○	×	+C3	+T
	SEPC	C6,C9,E9,E12	○	×	+C3	+TSS(+S)
		E13	○	×	+C3	+TS
Organic semiconductor	SF	F13	○	×	+C3	+T
		E1	○	×	×	+T,+TS
	SP	C',E',C,D,E	○	×	×	+T,+TS
		F',F	○	×	×	+T
	SC,SH	F0,G	○	×	×	×
		A,B	○	+CA,+CC,+CD,+F,+F1,+F2	+C3	+T,+TS
		C,D,E	○	+F,+F1,+F2	+C3	+T,+TS
	SA	F	○	×	+C3	+T
		C,D,E	○	+F,+F1,+F2	+C3	+T,+TS
		G,H	○	×	×	×
	SL	A'	○	+CA,+CC,+CD,+F,+F1,+F2	×	+T,+TS
		B'	○	+CA,+CC,+CD,+F,+F1,+F2	+C3	+T,+TS
C',E'		○	+F,+F1,+F2	+C3	+T,+TS	
F		○	×	+C3	+T	
SS	A'	○	+CA,+CC,+CD,+F,+F1,+F2	×	+T,+TS	
	B'	○	+CA,+CC,+CD,+F,+F1,+F2	+C3	+T,+TS	
	C,D,E	○	+F,+F1,+F2	+C3	+T,+TS	
		F	○	×	+C3	+T

### 2-2. Lead terminal cutting

Lead terminal cutting code	Process names	Size code (φD)	Dimensions (unit : mm)												
+CA +CC +CD	Lead space : 2.5mm forming cut	A, A' (φ4) B, B' (φ5)	 <table border="1" style="float: right;"> <thead> <tr><th>CA</th><th>CC</th><th>CD</th></tr> </thead> <tbody> <tr><td>L</td><td>5.5</td><td>4.0</td></tr> <tr><td></td><td></td><td>2.5</td></tr> </tbody> </table>	CA	CC	CD	L	5.5	4.0			2.5			
CA	CC	CD													
L	5.5	4.0													
		2.5													
+F +F1 +F2	Lead space : 5mm forming cut	A, A' (φ4) B, B' (φ5) C, C', D (φ6.3) E, E' (φ8)	 <table border="1" style="float: right;"> <thead> <tr><th>F</th><th>F1</th><th>F2</th></tr> </thead> <tbody> <tr><td>L</td><td>5.5</td><td>4.5</td></tr> <tr><td></td><td></td><td>3.0</td></tr> </tbody> </table>	F	F1	F2	L	5.5	4.5			3.0			
F	F1	F2													
L	5.5	4.5													
		3.0													
+C3	Straight cut	A (φ4) B, B' (φ5) C, C', C6, C9, D (φ6.3) E, E', E7, E9, E12, E13 (φ8) F, F', F8, F13 (φ10)	 <table border="1" style="float: right;"> <thead> <tr><th>C3</th></tr> </thead> <tbody> <tr><td>L</td><td>3.5</td></tr> </tbody> </table>	C3	L	3.5									
C3															
L	3.5														
			<table border="1"> <thead> <tr> <th>Size Code</th> <th>A</th> <th>B, B'</th> <th>C, C', C6, C9, D</th> <th>E, E', E7, E9, E12, E13</th> <th>F, F', F8, F13</th> </tr> </thead> <tbody> <tr> <td>F</td> <td>2.0</td> <td>2.0</td> <td>2.5</td> <td>3.5</td> <td>5.0</td> </tr> </tbody> </table>	Size Code	A	B, B'	C, C', C6, C9, D	E, E', E7, E9, E12, E13	F, F', F8, F13	F	2.0	2.0	2.5	3.5	5.0
Size Code	A	B, B'	C, C', C6, C9, D	E, E', E7, E9, E12, E13	F, F', F8, F13										
F	2.0	2.0	2.5	3.5	5.0										

Aluminum Solid Capacitors with Conductive Polymer  
Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

OS-CON

Packing Specifications

Packing Specifications

2-3. Lead terminal Taping

Taping code	F	Size code ( $\phi$ D)	Taping
+T	F=5.0mm	A,A' ( $\phi$ 4) B,B' ( $\phi$ 5) C,C',D ( $\phi$ 6.3) E,E' ( $\phi$ 8)	
		F,F',F8,F13 ( $\phi$ 10)	
+TS	F=2.5mm F=3.5mm	A,A' ( $\phi$ 4) B,B' ( $\phi$ 5)	
		C,C',D ( $\phi$ 6.3) E,E',E1,E13 ( $\phi$ 8)	
+TSS (+S)	F=2.5mm F=3.5mm	C6,C9 ( $\phi$ 6.3) E7,E9,E12 ( $\phi$ 8)	

(unit : mm)

Code	F	P	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	$\Delta$ h	W	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	H	H <sub>0</sub>	$\phi$ D <sub>0</sub>	t	$\ell$	L	a	
Tolerance	$\pm 0.8$ $-0.2$	$\pm 1.0$	$\pm 0.2$	$\pm 0.5$	$\pm 1.0$	$\pm 1.0$	$\pm 0.5$	min.	$\pm 0.5$	max	$\pm 0.75$	$\pm 0.5$	$\pm 0.2$	$\pm 0.3$	max	max	max	
+T	$\phi$ 4	5.0	12.7	12.7	3.85	6.35	0	18.0	9.5	9.0	2.5	18.5	16.0	4.0	0.6	0	11.0	-
	$\phi$ 5	5.0	12.7	12.7	3.85	6.35	0	18.0	9.5	9.0	2.5	18.5	16.0	4.0	0.6	0	11.0	-
	$\phi$ 6.3	5.0	12.7	12.7	3.85	6.35	0	18.0	9.5	9.0	2.5	18.5	16.0	4.0	0.6	0	11.0	-
	$\phi$ 8	5.0	12.7	12.7	3.85	6.35	0	18.0	9.5	9.0	2.5	20.0	16.0	4.0	0.6	0	11.0	-
	$\phi$ 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	$\phi$ 4	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	1.5
	$\phi$ 5	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	1.5
	$\phi$ 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	-
+TSS (+S)	$\phi$ 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

Packing quantities standard • Processed type discrete lead terminals

Size Code	Case Size	pcs./Bag
A,A'	$\phi$ 4	500
B,B',B9	$\phi$ 5	500
C,C',C6,C9,D	$\phi$ 6.3	500
E,E',E7,E9,E12,E13,E1	$\phi$ 8	200
F,F',F8,F13	$\phi$ 10	200
F <sub>0</sub>	$\phi$ 10	100
G	$\phi$ 12.5	50
H	$\phi$ 16	25

Zig-zag pack taping type

Size Code	Case Size	pcs./Box
A,A'	$\phi$ 4	2000
B,B',B9	$\phi$ 5	2000
C,C',C6,C9,D	$\phi$ 6.3	1500
E,E',E7,E9,E12,E13,E1	$\phi$ 8	1000
F,F',F8,F13	$\phi$ 10	500

※ Ordering information  
 $\phi$  10(F<sub>0</sub>),  $\phi$  12.5 and  $\phi$  16 are packing type only.

# SVPE Series

Super low ESR

Large capacitance



The SVPE series capacitor has lower ESR than SVPC series.

Adopt this series to reduce the size of equipment and circuits. This product can support lead free-reflow.※2

## Specifications

Items	Condition		Specifications	
Rated voltage (V)	—		2.5	6.3
Surge voltage (V)	Room temperature		3.3	8.2
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 <sub>20°C</sub>	0.75 to 1.25
		+105°C	Z/Z <sub>20°C</sub>	0.75 to 1.25
Endurance	105°C, 2,000h, Rated voltage applied	△C/C		Within ±20%
		tan δ		1.5 times or less than an initial standard
		ESR		1.5 times or less than an initial standard
		LC		Below an initial standard
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	△C/C		Within ±20%
		tan δ		1.5 times or less than an initial standard
		ESR		1.5 times or less than an initial standard
		LC		Below an initial standard (after voltage processing)
Resistance to soldering heat※2	VPS (230°C X 75s)	△C/C		Within ±10%(±15% for 2.5V)
		tan δ		1.3 times or less than an initial standard
		ESR		1.3 times or less than an initial standard
		LC		Below an initial standard (after voltage processing)

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

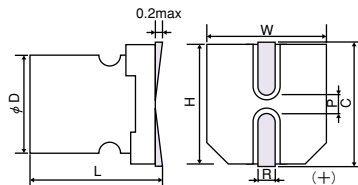
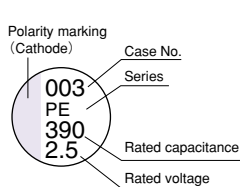
Voltage processing: Apply voltage for 120 minutes at 105°C.

※2 Please refer to page 84 for reflow soldering conditions.

SMD Type

SVPE Series

## 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
C6	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1

## Size List

RV : Rated voltage

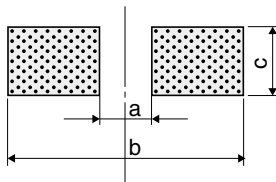
μF \ RV	2.5	6.3
220		C6
390	C6	

## ■ SVPE Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR ( $m\Omega$ ) (max)		Rated ripple current 100kHz (mA <sub>rms</sub> ) at 105°C	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
				100kHz/20°C	300kHz/20°C※1			
C6	2R5SVPE390M	2.5	390	10	9	3900	12	500
	6SVPE220M	6.3	220	10	9	3900	12	500

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

## ■ Recommended land pattern dimension of PWB



(unit : mm)

Size Code	a	b	c
C6	2.1	9.1	1.6

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

# SVPS Series

Long Life



The SVPS series has longer lifespan than the SVP series. They are a good choice to extend the life of flat panel television sets and others. Lead free-reflow is supported.※2

## Specifications

Items	Condition	Specifications					
		4.0	6.3	10	16	20	25
Rated voltage (V)	—	4.0	6.3	10	16	20	25
Surge voltage (V)	Room temperature	5.2	8.2	12	18.4	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/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 (25V → 20V applied)	△C/C		Within ±20%			
		tan δ		1.5 times or less than an initial standard			
		ESR		1.5 times or less than an initial standard			
		LC		Below an initial standard			
Damp heat(Steady state)	60°C, 90 to 95% RH, 1,000h, No-applied voltage	△C/C		Within ±20%			
		tan δ		1.5 times or less than an initial standard			
		ESR		1.5 times or less than an initial standard			
		LC		Below an initial standard (after voltage processing)			
Resistance to soldering heat※2	VPS (230°C X 75s)	△C/C		Within ±10%			
		tan δ		1.3 times or less than an initial standard			
		ESR		1.3 times or less than an initial standard			
		LC		Below an initial standard (after voltage processing)			

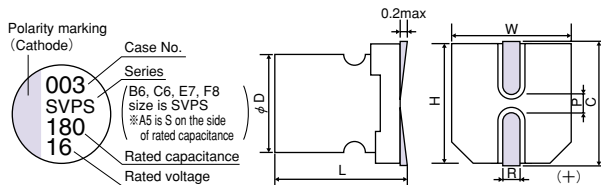
※1 When measured values are questionable, measure after voltage processing mentioned below.

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 84 for reflow soldering conditions.

## Marking and dimensions

(unit : mm)



Size Code	φ D ±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 to 0.8	1.0
B6	5.0	5.9	5.3	5.3	6.0	0.6 to 0.8	1.4
C6	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1
E7	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
F8	10.0	7.9	10.3	10.3	11.0	0.6 to 0.8	4.6

## Size List

RV : Rated voltage

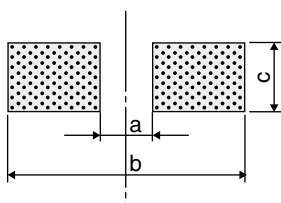
μF	RV	4.0	6.3	10	16	20	25
10				A5			E7
15				A5			
22			A5		B6	C6	
33		A5		B6			
39					C6		
47			B6			E7	
68		B6		C6			
82					E7		
100					F8		
120			C6				
150		C6		E7, F8			
180					F8		
220			E7				
270		E7					
330				F8			
470			F8				
680		F8					

## ■ SVPS Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz / 20°C	Allowable ripple current 100kHz(mArms) <sup>※1</sup>	Tangent of loss angle (% max)	Leakage current ( $\mu$ 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



(unit : mm)

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

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

# SVPD Series

Guaranteed at 125°C

Rated 35V max.

85°C X 85% guaranteed, Rated 35V



The SVQP series guaranteed 125°C high voltage resistance was improved to a rated maximum of 35V. This product is very reliable, guaranteeing 85°C X 85% performance. Suitable for use in smoothing circuits of vehicle-mounted equipment, industrial equipment, etc. This product can support lead free-reflow. ※2

## Specifications

Items		Condition		Specifications			
Rated voltage (V)	(V)	—		10	16	25	35
Surge voltage (V)	(V)	125°C		12	18.4	29	40
Category temperature range (°C)	(°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/Z20°C	0.75 to 1.25			
		+125°C	Z/Z20°C	0.75 to 1.25			
Endurance	125°C, 2,000h, Rated voltage applied	△C/C		Within ±20%			
		tan δ		2 times or less than an initial standard			
		ESR		2 times or less than an initial standard			
		LC		Below an initial standard			
Damp heat(Steady state)	85°C, 85 to 95%RH, 1,000h, Rated voltage applied	△C/C		Within ±20%			
		tan δ		2 times or less than an initial standard			
		ESR		2 times or less than an initial standard			
		LC		Below an initial standard			
Resistance to soldering heat※2	VPS (230°C X 75s)	△C/C		Within ±10%			
		tan δ		1.3 times or less than an initial standard			
		ESR		1.3 times or less than an initial standard			
		LC		Below an initial standard (after voltage processing)			

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

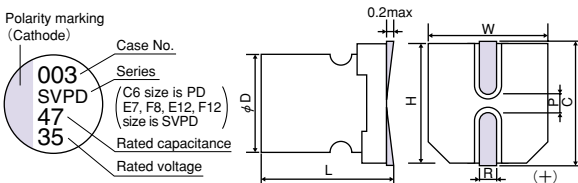
※2 Please refer to page 84 for reflow soldering conditions.

SMD Type

SVPD Series

## Marking and dimensions

(unit : mm)



Size Code	φ D ±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 to 0.8	2.1
E7	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
F8	10.0	7.9	10.3	10.3	11.0	0.6 to 0.8	4.6
E12	8.0	11.9	8.3	8.3	9.0	0.8 to 1.1	3.2
F12	10.0	12.6	10.3	10.3	11.0	0.8 to 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	

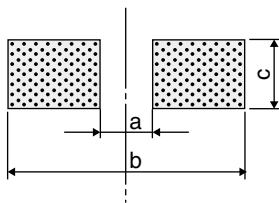


### SVPD Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR ( $m\Omega$ ) (max) 100kHz to 300kHz/20°C	Rated ripple current		Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
					100kHz (mArms) <sup>※1</sup>			
					105°C < Tx ≤ 125°C	Tx ≤ 105°C		
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 Tx: 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 ≤ f < 1kHz	1kHz ≤ f < 10kHz	10kHz ≤ f < 100kHz	100kHz ≤ f ≤ 500kHz
Coefficient	0.05	0.3	0.7	1

# SVPC Series

Large capacitance

Super low ESR



The SVPC series capacitor has larger capacitance than SVPA series. Adopt this series to reduce the size of equipment and circuits. This product can support lead free-reflow. ※2

## 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	18.4
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/Z20°C	0.75 to 1.25		
		+105°C	Z/Z20°C	0.75 to 1.25		
Endurance	105°C, 2,000h, Rated voltage applied	△C/C	Within ±20%			
		tan δ	1.5 times or less than an initial standard			
		ESR	1.5 times or less than an initial standard			
		LC	Below an initial standard			
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	△C/C	Within ±20%			
		tan δ	1.5 times or less than an initial standard			
		ESR	1.5 times or less than an initial standard			
		LC	Below an initial standard (after voltage processing)			
Resistance to soldering heat※2	VPS (230°C X 75s)	△C/C	Within ±10% (±15% for 2.5V 4.0V)			
		tan δ	1.3 times or less than an initial standard			
		ESR	1.3 times or less than an initial standard			
		LC	Below an initial standard (after voltage processing)			

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

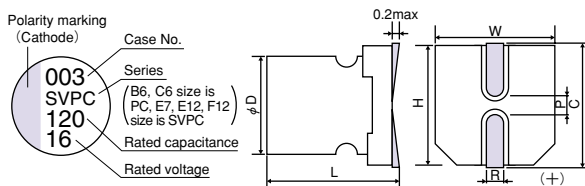
※2 Please refer to page 84 for reflow soldering conditions.

## SMD Type

### SVPC Series

## Marking and dimensions

(unit : mm)



Size Code	φ D±0.5	L <sup>+0.1</sup> <sub>-0.4</sub>	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 to 0.8	1.4
C6	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1
E7	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
E12	8.0	11.9	8.3	8.3	9.0	0.8 to 1.1	3.2
F12	10.0	12.6	10.3	10.3	11.0	0.8 to 1.1	4.6

## Size List

RV : Rated voltage

μF	RV	2.5	4.0	6.3	10	16
39						B6
68					B6	C6
100				B6		C6
120				B6	C6	E7
150			B6			E7
180	B6					
220				C6		
270					E7	E12
330			C6	C6		
390	C6			E7		
560	C6		E7, E12			
680	E7					
820	E12			E12		
1200			E12			
1500	E12		E12			
2700	F12					

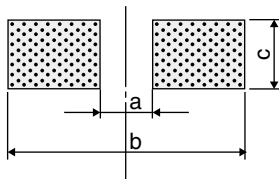
## ■ SVPC Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR (m $\Omega$ ) (max)		Rated ripple current 100kHz (mA <sub>rms</sub> ) at 105°C	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(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
16SVPC150M		16	150	22	21	3220	12	500
10SVPC270M		10	270	22	19	3220	12	500
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

# SVPB Series

Low profile



This is a low profile series based on the SVPA series. Suitable for miniaturizing devices and circuits. This product can support lead free-reflow.※2

## 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	18.4	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	△C/C	Within ±20%(±30% for C5 size)				
		tan δ	1.5 times or less than an initial standard				
		ESR	1.5 times or less than an initial standard				
		LC	Below an initial standard				
Damp heat(Steady state)	60°C,90 to 95%RH, 1,000h, No-applied voltage	△C/C	Within ±20%				
		tan δ	1.5 times or less than an initial standard				
		ESR	1.5 times or less than an initial standard				
		LC	Below an initial standard (after voltage processing)				
Resistance to soldering heat※2	VPS (230°C X 75s)	△C/C	Within ±10% (±20% for C5 size)				
		tan δ	1.3 times or less than an initial standard				
		ESR	1.3 times or less than an initial standard				
		LC	Below an initial standard (after voltage processing)				

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

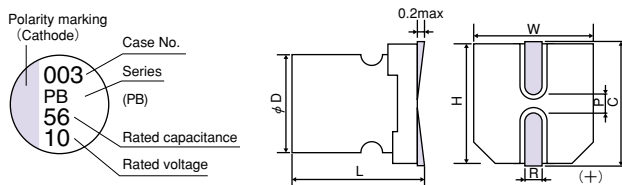
※2 Please refer to page 84 for reflow soldering conditions.

SMD Type

SVPB Series

## Marking and dimensions

(unit : mm)



Size Code	φ D ±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 to 0.8	2.1
C55	6.3	5.4	6.6	6.6	7.3	0.6 to 0.8	2.1

## Size List

RV : Rated voltage

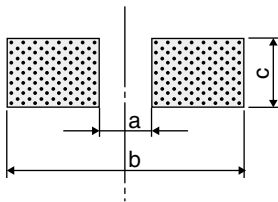
μF	RV	2.5	4.0	6.3	10	16	20
15							C5
22							C55
33						C5	
56					C5		
82				C5			
100			C5				
120		C5					

### ■ SVPB Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR ( $m\Omega$ ) (max) 100kHz to 300kHz/20°C	Rated ripple current 100kHz (mA <sub>rms</sub> ) at 105°C	Tangent of loss angle (% max)	Leakage current ( $\mu$ 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

- The C5 size is also available upon request as a radial lead type. Please contact us if this type is required. Maximum height for radial lead types is 4.5 mm.
- The C55 size is also available upon request as 4.0V and 6.3V products.

### ■ Recommended land pattern dimension of PWB



(unit : mm)

Size Code	a	b	c
C5	2.1	9.1	1.6
C55	2.1	9.1	1.6

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

# SVPA Series

Low ESR

Large ripple current



This is a low ESR series based on the SVP series. Suitable for miniaturizing devices and circuits. This product can support lead free-reflow.※2

## Specifications

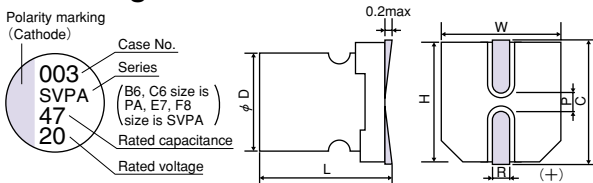
Items	Condition	Specifications					
Rated voltage (V)	—	2.5	4.0	6.3	10	16	20
Surge voltage (V)	Room temperature	3.3	5.2	8.2	12	18.4	23
Category temperature range (°C)	—	-55 to +105					
Capacitance tolerance (%)	120Hz/20°C	M : ±20					
Dissipation Factor (DF)	120Hz/20°C	Please see the attached characteristics 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/Z20°C	0.75 to 1.25			
		+105°C	Z/Z20°C	0.75 to 1.25			
Endurance	105°C, 2,000h, Rated voltage applied	△C/C	Within ±20%				
		tan δ	1.5 times or less than an initial standard				
		ESR	1.5 times or less than an initial standard				
		LC	Below an initial standard				
Damp heat(Steady state)	60°C,90 to 95%RH, 1,000h, No-applied voltage	△C/C	Within ±20%				
		tan δ	1.5 times or less than an initial standard				
		ESR	1.5 times or less than an initial standard				
		LC	Below an initial standard (after voltage processing)				
Resistance to soldering heat※2	VPS (230°C X 75s)	△C/C	Within ±10%				
		tan δ	1.3 times or less than an initial standard				
		ESR	1.3 times or less than an initial standard				
		LC	Below an initial standard (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 84 for reflow soldering conditions.

## Marking and dimensions

(unit : mm)



Size Code	φ D±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 to 0.8	1.4
C6	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1
E7	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
F8	10.0	7.9	10.3	10.3	11.0	0.6 to 0.8	4.6

## Size List

RV : Rated voltage

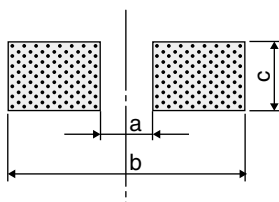
μF	RV	2.5	4.0	6.3	10	16	20
10							B6
22							C6
39						C6	
47				B6			E7
68			B6		C6		
82	B6					E7	
120			C6				
150			C6		E7		
180	C6					F8	
220				E7			
270			E7				
330	E7				F8		
470				F8			
680			F8				
820	F8						

## ■ SVPA Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR ( $m\Omega$ ) (max)		Rated ripple current 100kHz (mA <sub>rms</sub> ) at 105°C	Tangent of loss angle (% max)	Leakage current ( $\mu$ 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



(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
F8	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

# SVQP Series

Guaranteed at 125°C



This series has advanced characteristics in resistance to heat compared with the SVP series. The SVQP series is best suited for devices that require enhanced reliability. This product can support lead free-reflow.※2

## Specifications

Items	Condition	Specifications				
Rated voltage (V)	—	4.0	6.3	10	16	20
Surge voltage (V)	Room temperature	5.2	8.2	12	18.4	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/Z20°C	0.75 to 1.25		
		+125°C	Z/Z20°C	0.75 to 1.25		
Endurance	125°C, 1,000h, Rated voltage applied	ΔC/C		Within ±20%		
		tan δ		2 times or less than an initial standard		
		ESR		2 times or less than an initial standard		
		LC		Below an initial standard		
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	ΔC/C		Within ±20%		
		tan δ		1.5 times or less than an initial standard		
		ESR		1.5 times or less than an initial standard		
		LC		Below an initial standard (after voltage processing)		
Resistance to soldering heat※1	VPS (230°C X 75s)	ΔC/C		Within ±10%		
		tan δ		1.3 times or less than an initial standard		
		ESR		1.3 times or less than an initial standard		
		LC		Below an initial standard (after voltage processing)		

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

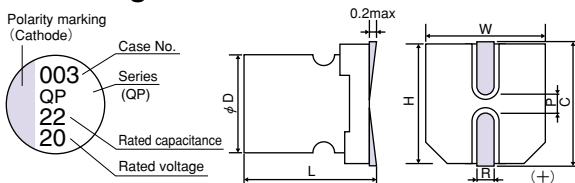
※2 Please refer to page 84 for reflow soldering conditions.

SMD Type

SVQP Series

## Marking and dimensions

(unit : mm)



Size Code	φ D ±0.5	L <sup>+0.1</sup> / <sub>-0.4</sub>	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 to 0.8	2.1
E7	8.0	6.9	8.3	8.3	9.0	0.6 to 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			

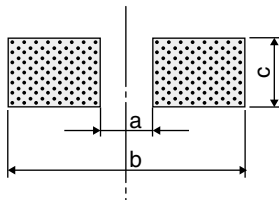


### SVQP Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Rated ripple current	Allowable ripple current	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
					100kHz (mA) ※1			
					105°C<Tx≤125°C	Tx≤105°C		
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



(unit : mm)

Size Code	a	b	c
C6	2.1	9.1	1.6
E7	2.8	11.1	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

# SVP Series

Standard SMD type



Standard SMD type product.

Use for surface mounted type switching power supplies. This product can support lead free-reflow.※2

## Specifications

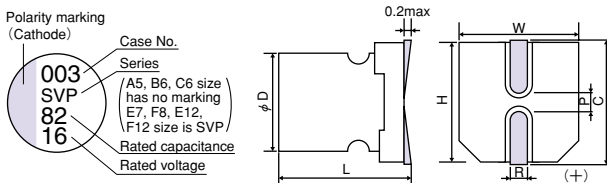
Items	Condition	Specifications						
Rated voltage (V)	—	2.5	4.0	6.3	10	16	20	25
Surge voltage (V)	Room temperature	3.3	5.2	8.2	12	18.4	23	25
Category temperature range (°C)	—	-55 to +105						
Capacitance tolerance (%)	120Hz/20°C	M : ±20						
Dissipation Factor (DF)	120Hz/20°C	Please see the attached 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/Z20°C	0.75 to 1.25				
		+105°C	Z/Z20°C	0.75 to 1.25				
Endurance	105°C, 2,000h, Rated voltage applied (25V → 20V applied)	ΔC/C	Within ±20%					
		tan δ	1.5 times or less than an initial standard					
		ESR	1.5 times or less than an initial standard					
		LC	Below an initial standard					
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No applied voltage	ΔC/C	Within ±20%					
		tan δ	1.5 times or less than an initial standard					
		ESR	1.5 times or less than an initial standard					
		LC	Below an initial standard (after voltage processing)					
Resistance to soldering heat※2	VPS (230°C X 75s)	ΔC/C	Within ±10%					
		tan δ	1.3 times or less than an initial standard					
		ESR	1.3 times or less than an initial standard					
		LC	Below an initial standard (after voltage processing)					

※1 In case of some problems for measured values, measure after applying rated voltage for 2.5 to 20V products or 20V for 25V products for 120 minutes at 105°C.

※2 Please refer to page 84 for reflow soldering conditions.

## Marking and dimensions

(unit : mm)



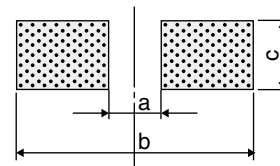
Size Code	φ D ±0.5	L +0.1 -0.4	W ±0.2	H ±0.2	C ±0.2	R	P ±0.2
A5	4.0	5.4	4.3	4.3	5.0	0.6 to 0.8	1.0
B6	5.0	5.9	5.3	5.3	6.0	0.6 to 0.8	1.4
C6	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1
E7	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
F8	10.0	7.9	10.3	10.3	11.0	0.6 to 0.8	4.6
E12	8.0	11.9	8.3	8.3	9.0	0.8 to 1.1	3.2
F12	10.0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

## Size List

RV : Rated voltage

μF	RV	2.5	4.0	6.3	10	16	20	25
3.3						A5		
4.7					A5			
6.8					A5			C6
10					A5		B6	E7
15					A5		B6	
22				A5		B6	C6	F8
27						B6	C6	
33			A5		B6		E7	E12
39			B6			C6		
47				B6	C6		E7	
56					C6		E7	F8
68			B6				F8	F12
82					C6		E7	
100					C6		F8	E12
120					C6			
150			C6			E7	F8	F12
180						E7, F8	F8, E12	
220				E7, F8				
270						F8		
330			E7		F8	F8, E12	F12	
470					F8, E12			
560						F12		
680		E12						
820			F8					
1200				F12				
1500		F12						

## Recommended land pattern dimension of PWB



(unit : mm)

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

## ■ SVP Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated Capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Rated ripple current 100kHz (mA <sub>rms</sub> ) at 105°C	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
A5	16SVP3R3M	16	3.3	260	660	7	26.4
	10SVP4R7M	10	4.7	240	670	8	23.5
	10SVP6R8M	10	6.8	240	670	9	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	25SVP6R8M ※1	25	6.8	80	1200	10	85
	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	25SVP10M ※1	25	10	60	1500	10	125
	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
	25SVP22M ※1	25	22	50	2000	10	275
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
	25SVP33M ※1	25	33	30	2980	12	413
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
	25SVP56M ※1	25	56	28	3800	12	700
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

※1 The surge voltage of 25V products is 25V. Please consider SVPD series 25V products (whose surge voltage is 29V) in placing a new order.

Frequency coefficient for ripple current

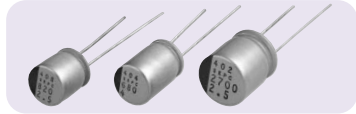
Frequency	120Hz $\leq$ f < 1kHz	1kHz $\leq$ f < 10kHz	10kHz $\leq$ f < 100kHz	100kHz $\leq$ f $\leq$ 500kHz
Coefficient	0.05	0.3	0.7	1

# SEPC Series

Miniaturization and Low profile

Super low ESR

Large capacitance



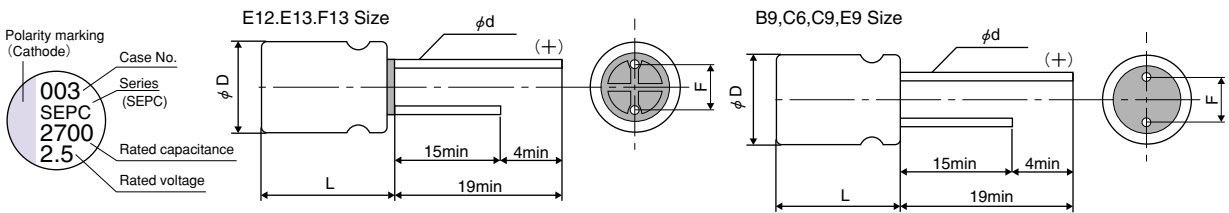
This is an even lower ESR series based on our SEP series. Suitable for use with motherboards, servers, VGA, etc. Lead free-flow is supported.

## Specifications

Items	Condition	Specifications			
		2.5	4.0	6.3	16
Rated voltage (V)	—	2.5	4.0	6.3	16
Surge voltage (V)	Room temperature	3.3	5.2	8.2	18.4
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 <sup>※1</sup>	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 <sub>20°C</sub>	0.75 to 1.25	
		+105°C	Z/Z <sub>20°C</sub>	0.75 to 1.25	
Endurance	105°C, 2,000h, Rated voltage applied	ΔC/C		Within ±20%	
		tan δ		1.5 times or less than an initial standard	
		ESR		1.5 times or less than an initial standard	
		LC		Below an initial standard	
Damp heat(Steady state)	60°C, 90%RH, 1,000h, No-applied voltage	ΔC/C		Within ±20%	
		tan δ		1.5 times or less than an initial standard	
		ESR		1.5 times or less than an initial standard	
		LC		Below an initial standard (after voltage processing)	
Resistance to soldering heat	Flow method (260±5°C X 10s)	ΔC/C		Within ±5%	
		tan δ		Below an initial standard	
		ESR		Below an initial standard	
		LC		Below an initial standard (after voltage processing)	

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

## Marking and dimensions



B9,C6,C9,E9 size flat rubber is used.

## Size List

RV : Rated voltage

(unit : mm)

μF	RV	2.5	4.0	6.3	16
100		B9			C6, C9
180					E9, E12
270					E12
330		B9, C9			
390		C6			
470		B9		C9, E9, E13	F13
560		B9, C9, E9	C9, E9, E13	C9, E9	
680			E13	F13	
820		C9, E9, E13	F13		
1000		E9			
1500				F13	
2700		F13			

Size Code	φ D <sup>±0.5</sup>	Lmax	F	φ d <sup>±0.05</sup>
<b>B9</b>	5.0	9.0	2.0±0.5	0.6
<b>C6</b>	6.3	6.0	2.5±0.5	0.45 <sup>※</sup>
<b>C9</b>	6.3	9.0	2.5±0.5	0.6
<b>E9</b>	8.0	9.0	3.5±0.5	0.6
<b>E12</b>	8.0	12.0	3.5±0.5	0.6
<b>E13</b>	8.0	13.0	3.5±0.5	0.6
<b>F13</b>	10.0	13.0	5.0±0.5	0.6

※ 2SEPC390M : 0.5±0.05

Aluminum Solid Capacitors with Conductive Polymer Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

OS-CON

Radial Lead Type SEPC Series

## ■ SEPC Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR ( $m\Omega$ ) (max) 100kHz to 300kHz/20°C	Rated ripple current 100kHz (mA <sub>rms</sub> ) at 105°C	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(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
C6	16SEPC100M	16	100	24	2490	10	320
	2SEPC390M	2.5	390	10	3900	12	500
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
E9	16SEPC180MX	16	180	10	5000	10	576
	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

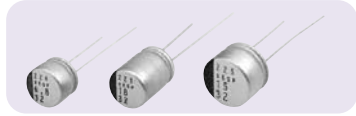
Frequency coefficient for ripple current

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

# SEQP Series

125°C guaranteed

32V product



This series has advanced characteristics in resistance to heat compared with the SEP series, and adds a rated voltage of 32V. Suitable for use in increasing device reliability, 32V products may be used on 16 to 24V line industrial devices. Lead free-flow is supported.

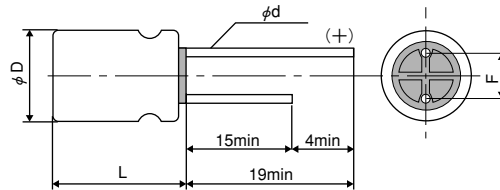
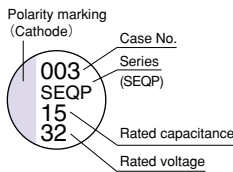
## Specifications

Items		Condition		Specifications					
Rated voltage (V)		—		4.0	6.3	10	16	20	32
Surge voltage (V)		Room temperature		5.2	8.4	12	18.4	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/Z20°C	0.75 to 1.25					
		+125°C	Z/Z20°C	0.75 to 1.25					
Endurance	125°C, 1,000h, Rated voltage applied	ΔC/C		Within ±20%					
		tan δ		2 times or less than an initial standard					
		ESR		2 times or less than an initial standard					
		LC		Below an initial standard					
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	ΔC/C		Within ±20%					
		tan δ		1.5 times or less than an initial standard					
		ESR		1.5 times or less than an initial standard					
		LC		Below an initial standard (after voltage processing)					
Resistance to soldering heat※2	Flow method (260±5°C X 10s)	ΔC/C		Within ±5%					
		tan δ		Below an initial standard					
		ESR		Below an initial standard					
		LC		Below an initial standard (after voltage processing)					

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

## Marking and dimensions

(unit : mm)



Size Code	ϕ D ±0.5	Lmax	F	ϕ d ±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				
1200	F13						

Aluminum Solid Capacitors with Conductive Polymer Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

OS-CON

Radial Lead Type

SEQP Series

## ■ SEQP Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Rated ripple current	Allowable ripple current	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
					100kHz (mArms)※1			
					105°C<Tx≤125°C	Tx≤105°C		
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 Tx : Ambient temperature

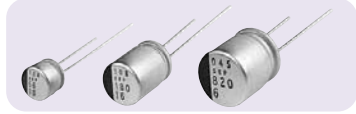
Frequency coefficient for ripple current

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

# SEP Series

Standard radial lead type

Guaranteed at 105°C for 3,000h



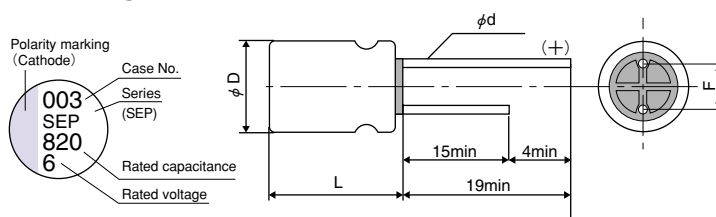
This is a radial lead type using conductive polymer based on the SVP series.  
Lead free-flow is supported.

## Specifications

Items	Condition	Specifications							
		2.5	4.0	6.3	10	16	20	25	
Rated voltage (V)	—	2.5	4.0	6.3	10	16	20	25	
Surge voltage (V)	Room temperature	3.3	5.2	8.2	12	18.4	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/Z20°C	0.75 to 1.25					
		+105°C	Z/Z20°C	0.75 to 1.25					
Endurance	105°C, 3,000h, Rated voltage applied (2.5V → 2,000h) (25V → 20V applied)	ΔC/C		Within ±20%					
		tan δ		1.5 times or less than an initial standard					
		ESR		1.5 times or less than an initial standard					
		LC		Below an initial standard					
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	ΔC/C		Within ±20%					
		tan δ		1.5 times or less than an initial standard					
		ESR		1.5 times or less than an initial standard					
		LC		Below an initial standard (after voltage processing)					
Resistance to soldering heat	Flow method (260±5°C X 10s)	ΔC/C		Within ±5%					
		tan δ		Below an initial standard					
		ESR		Below an initial standard					
		LC		Below an initial standard (after voltage processing)					

\*\*1 In case of some problems for measured values, measure after applying rated voltage for 2.5 to 20V products or temperature derating voltage for 25V products for 120 minutes at 105°C.

## Marking and dimensions



(unit : mm)

Size Code	φD ±0.5	Lmax	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	2.5	4.0	6.3	10	16	20	25
6.8							C6
10							E7
22						C6	F8
33						E7	E12
39					C6		
47						E7	
56				C6		F8	F13
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				
1200		F13					
1500	F13						



## ■ SEP Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Rated ripple current 100kHz (mA <sub>rms</sub> ) at 105°C	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
C6	25SEP6R8M ※1	25	6.8	80	1200	10	170
	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	25SEP10M ※1	25	10	60	1500	10	250
	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	25SEP22M ※1	25	22	50	2000	10	275
	20SEP56M	20	56	40	2400	12	224
	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	25SEP33M ※1	25	33	30	2980	12	413
	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	25SEP56M ※1	25	56	28	3800	12	700
	20SEP150M	20	150	20	4320	15	600
	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

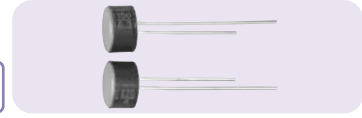
※1 The surge voltage of 25V products is 25V. Please consider SVPD series 25V products (whose surge voltage is 29V) in placing a new order.

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

SF Series

Radial lead type.5mm height (max.)



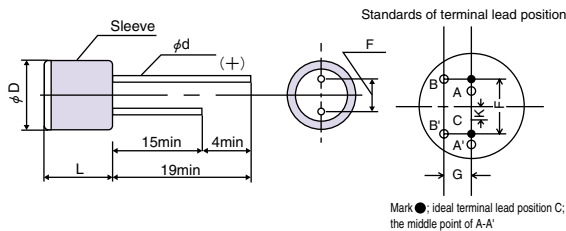
The SF series is low-profile, having a maximum height of 5mm.  
Use this series for smooth power supply of notebook PCs. Lead free-flow is supported.

### Specifications

Items	Condition	Specifications	
Rated voltage (V)	—	4.0	6.3
Surge voltage (V)	Room temperature	5.2	8.2
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 <sup>※1</sup>	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 <sub>20°C</sub>	0.75 to 1.25
		+105°C Z/Z <sub>20°C</sub>	0.75 to 1.25
Endurance	105°C, 2,000h, Rated voltage applied	△C/C	Within ±20%
		tan δ	1.5 times or less than an initial standard
		LC	Below an initial standard
Damp heat(Steady state)	60°C, 90 to 95%RH, No-applied voltage 500h,	△C/C	Within ±20%
		tan δ	2 times or less than an initial standard
		LC	Below an initial standard
Resistance to soldering heat	Flow method (260±5°C X 10s)	△C/C	Within ±5%
		tan δ	1.5 times or less than an initial standard
		LC	Below an initial standard (after voltage processing)

※1 In case of some problems for measured values, measure after applying rated voltage for 30 minutes at 105°C .

### Dimensions



(unit : mm)

Size Code	φ D +0.5max	Lmax	F	φ d ±0.05
E1	8.0	5.0	3.5±0.5	0.6

### Size List

RV : Rated voltage

μF \ RV	4.0	6.3
150		E1
220	E1	

### ■ SF Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Allowable ripple current (mA rms) <sup>※1</sup>	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
E1	6SF150M	6.3	150	32	2420	7	189
	4SF220M	4.0	220	30	2510	7	176

※1 100kHz, +45°C

Temperature coefficient for allowable ripple current

Ambient Temp.	$T_x \leq 45^\circ\text{C}$	$45^\circ\text{C} < T_x \leq 65^\circ\text{C}$	$65^\circ\text{C} < T_x \leq 85^\circ\text{C}$	$85^\circ\text{C} < T_x \leq 95^\circ\text{C}$	$95^\circ\text{C} < T_x \leq 105^\circ\text{C}$
<b>Coefficient</b>	1	0.85	0.7	0.4	0.25

Frequency coefficient for allowable ripple current

Frequency	$120\text{Hz} \leq f < 1\text{kHz}$	$1\text{kHz} \leq f < 10\text{kHz}$	$10\text{kHz} \leq f < 100\text{kHz}$	$100\text{kHz} \leq f \leq 500\text{kHz}$
<b>Coefficient</b>	0.05	0.2	0.5	1

# SP Series

Large Capacitance

Low ESR

Optimum for Audio etc



The characteristics of SP series are large capacitance (about 2 times of previous value) and low ESR (about half of previous value). It is optimum to use around MPU of computer equipment. Also, suitable for audio because OFC is used as the lead wires. Lead free-flow is supported.

## Specifications

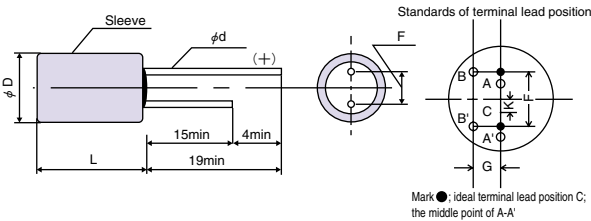
Items	Condition	Specifications							
		2.0	2.5	4.0	6.3	10	16	20	25
Rated voltage (V)	—	2.0	2.5	4.0	6.3	10	16	20	25
Surge voltage (V)	Room temperature	2.6	3.3	5.2	8.2	12	18.4	23	25
Category temperature range (°C)	—	-55 to +105							
Capacitance tolerance (%)	120Hz/20°C	M : ±20							
Dissipation Factor (DF)	120Hz/20°C	Please see the attached characteristics list							
Leakage current**2	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**3	105°C, 1,000 to 2,000h, Rated voltage applied (25V → 20V applied) **1	ΔC/C		Within ±20%					
		tan δ		1.5 times or less than an initial standard					
		LC		Below an initial standard					
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	ΔC/C		Within ±20%					
		tan δ		2 times or less than an initial standard					
		LC		Below an initial standard					
Resistance to soldering heat	Flow method (260±5°C X 10s)	ΔC/C		Within ±5%					
		tan δ		1.5 times or less than an initial standard					
		LC		Below an initial standard (after voltage processing)					

\*1 Please reduce 0.25V per 1°C from over 85°C for 25V products.

\*2 In case of some problems for measured values, measure after applying rated voltage for 2.0 to 20V products or temperature derating voltage for 25V products for 30 minutes at 105°C.

\*3 C', E', F', C, D size : 1,000h. E, F, Fo, G size : 2,000h. (2.0V, 25V, 4SP1000M, 2R5SP1200M : 1,000h)

## Dimensions



(unit : mm)

Size Code	φ D +0.5max	Lmax	F	φ d ±0.05	Gmax	Kmax
C'	6.3	6.0	2.5±0.5	0.60	0.5	0.5
E'	8.0	6.0	3.5±0.5	0.60	0.8	0.8
F'	10.0	6.0	5.0±0.5	0.60	0.8	0.8
C	6.3	7.8	2.5±0.5	0.60	0.5	0.5
D	6.3	10.8	2.5±0.5	0.60	0.5	0.5
E	8.0	11.5	3.5±0.5	0.60	0.8	0.8
F	10.0	11.5	5.0±0.5	0.60	0.8	0.8
F <sub>0</sub>	10.0	21.0	5.0±0.5	0.80	0.8	0.8
G	12.5	23.0	5.0±1.0	0.80	0.8	0.8

## Size List

RV : Rated voltage

μF \ RV	2.0	2.5	4.0	6.3	10	16	20	25
6.8								C'
10								C
18								D
22								
33						C'	C'	E
47						C	E'	
56								F
68				C'	C'	E'	F',D	
82					C			
100			C'		E'	F',D		
120				C			E	
150			C	E'	D		F	
180					F'	E		
220			E'	F',D				
270			D		E	F		
330			F'					
390				E				
470					F			
560			E					
680				F				
820			F					
1000	F		F					
1200		F						
1500			F <sub>0</sub>					
1800	F <sub>0</sub>							
2200			G					

Aluminum Solid Capacitors with Conductive Polymer Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

OS-CON

Radial Lead Type SP Series

## ■ SP Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Allowable ripple current (mA <sub>rms</sub> )※1	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
C'	25SP6R8M	25	6.8	60	1510	6	17
	20SP22M	20	22	50	1580	6	44
	16SP33M	16	33	50	1580	6	52.8
	10SP56M	10	56	45	1710	6	56
	6SP68M	6.3	68	40	1850	6	42.84
	4SP100M	4.0	100	40	1850	6	40
E'	20SP47M	20	47	36	2210	7	94
	16SP68M	16	68	34	2280	7	108.8
	10SP100M	10	100	32	2350	7	100
	6SP150M	6.3	150	30	2420	7	94.5
	4SP220M	4.0	220	28	2510	7	88
F'	20SP68M	20	68	34	2800	7	136
	16SP100M	16	100	32	2890	7	160
	10SP180M	10	180	29	2990	7	180
	6SP220M	6.3	220	28	3100	7	138.6
	4SP330M	4.0	330	24	3230	7	132
C	25SP10M	25	10	55	1560	7	25
	20SP33M	20	33	45	1710	7	66
	16SP47M	16	47	45	1710	7	75.2
	10SP82M	10	82	40	1850	7	82
	6SP120M	6.3	120	35	1930	7	75.6
	4SP150M	4.0	150	35	1930	7	60
D ※2	25SPS18M	25	18	40	2230	8	45
	20SPS68M	20	68	30	2580	8	136
	16SPS100M	16	100	25	2820	8	160
	10SPS150M	10	150	25	2820	8	150
	6SPS220M	6.3	220	20	3160	8	138.6
	4SPS270M	4.0	270	20	3160	8	108
E	25SP33M	25	33	30	2780	8	82.5
	20SP120M	20	120	24	3110	8	240
	16SP180M	16	180	20	3410	8	288
	10SP270M	10	270	18	3600	8	270
	6SP390M	6.3	390	16	3810	8	245.7
	4SP560M	4.0	560	14	4080	8	224
F	25SP56M	25	56	25	3260	8	140
	20SP180M	20	180	20	4280	8	360
	16SP270M	16	270	18	4400	8	432
	10SP470M	10	470	15	4510	8	470
	6SP680M	6.3	680	13	4840	8	428.4
	4SP820M	4.0	820	12	5040	8	328
	4SP1000M	4.0	1000	12	5040	8	400
	2R5SP1200M	2.5	1200	12	5040	8	450
	2SP1000M	2.0	1000	11	5260	8	400
F <sub>0</sub>	4SP1500M	4.0	1500	8	6500	10	600
	2SP1800M	2.0	1800	8	6500	10	720
G	4SP2200M	4.0	2200	9	7100	12	880

※1 100kHz, +45°C ※2 D size is indicated to SPS series.

Temperature coefficient for allowable ripple current

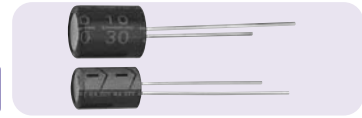
Ambient Temp.	T <sub>x</sub> ≤ 45°C	45°C < T <sub>x</sub> ≤ 65°C	65°C < T <sub>x</sub> ≤ 85°C	85°C < T <sub>x</sub> ≤ 95°C	95°C < T <sub>x</sub> ≤ 105°C
Coefficient	1	0.85	0.7	0.4	0.25

Frequency coefficient for allowable ripple current

Frequency	120Hz ≤ f < 1kHz	1kHz ≤ f < 10kHz	10kHz ≤ f < 100kHz	100kHz ≤ f ≤ 500kHz
Coefficient	0.05	0.2	0.5	1

# SC Series

Standard radial lead type



Suitable for noise limiters and switching power supplies that make a point of high frequency characteristics. Also, make use of it when needed long life span and high reliability. Lead free-flow is supported.

## Specifications

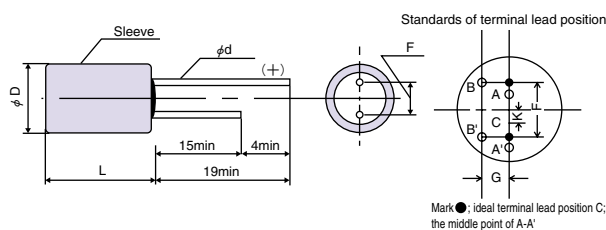
Items	Condition	Specifications				
Rated voltage (V)	—	6.3	10	16	25	30
Surge voltage (V)	Room temperature	7.2	12	18.4	25	34.5
Category temperature range (°C)	—	-55 to +105				
Capacitance tolerance (%)	120Hz/20°C	M : ±20				
Dissipation Factor (DF)	120Hz/20°C	Please see the attached characteristics list				
Leakage current <sup>※2</sup>	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 <sub>20°C</sub>	0.75 to 1.25		
		+105°C	Z/Z <sub>20°C</sub>	0.75 to 1.25		
Endurance	105°C, 2,000h, Rated voltage applied (25V → 20V applied) <sup>※1</sup>	ΔC/C		Within ±20%		
		tan δ		1.5 times or less than an initial standard		
		LC		Below an initial standard		
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No applied voltage	ΔC/C		Within ±10%		
		tan δ		1.5 times or less than an initial standard		
		LC		Below an initial standard		
Resistance to soldering heat	Flow method (260±5°C X 10s)	ΔC/C		Within ±5%		
		tan δ		Below an initial standard		
		LC		Below an initial standard (after voltage processing)		

※1 Please reduce 0.25V per 1°C from over 85°C for 25V products.

※2 In case of some problems for measured values, measure after applying rated voltage for 6.3 to 16 and 30V products or temperature derating voltage for 25V products for 30 minutes at 105°C.

## Dimensions

(unit : mm)



Size Code	φ D +0.5max	Lmax	F	φ d ±0.05	Gmax	Kmax
A	4.0	7.8	2.0±0.5	0.45	0.5	0.5
B	5.0	7.8	2.0±0.5	0.45	0.5	0.5
C	6.3	7.8	2.5±0.5	0.45	0.5	0.5
D	6.3	10.8	2.5±0.5	0.60	0.5	0.5
E	8.0	11.5	3.5±0.5	0.60	0.8	0.8
F	10.0	11.5	5.0±0.5	0.60	0.8	0.8

## Size List

RV : Rated voltage

μF	RV	6.3	10	16	25	30
1.0					A	A
1.5					A	B
2.2				A	B	B
3.3				A	B	C
4.7			A	B	C	D
6.8	A		B	B	C	D
10			B		C	E
15	B			C	D	
22			C	D	E	F
33	C			D	F	
47			D		F	

## ■ SC Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu F$ )	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Allowable ripple current (mA $r_{ms}$ ) ※1	Tangent of loss angle (% max)	Leakage current ( $\mu A$ )(max) After 2 minutes
A	30SC1M	30	1.0	350	430	3	1
	25SC1M	25	1.0	350	430	3	0.5
	25SC1R5M	25	1.5	300	435	3	0.5
	16SC2R2M	16	2.2	280	450	4	0.5
	16SC3R3M	16	3.3	280	500	4	0.53
	10SC4R7M	10	4.7	280	540	5	0.5
	6SC6R8M	6.3	6.8	250	560	5	0.5
B	30SC1R5M	30	1.5	300	435	3	1
	30SC2R2M	30	2.2	250	695	3	1.32
	25SC2R2M	25	2.2	200	695	3	0.55
	25SC3R3M	25	3.3	200	700	3	0.83
	16SC4R7M	16	4.7	180	720	4	0.75
	16SC6R8M	16	6.8	150	745	4	1.09
	10SC10M	10	10	150	780	5	1
	6SC15M	6.3	15	120	815	5	0.95
C	30SC3R3M	30	3.3	200	820	3	1.98
	25SC4R7M	25	4.7	100	1130	3	1.18
	25SC6R8M	25	6.8	100	1140	3	1.7
	25SC10M	25	10	90	1150	3	2.5
	16SC15M	16	15	90	1230	4	2.4
	10SC22M	10	22	70	1270	5	2.2
	6SC33M	6.3	33	70	1320	5	2.08
D	30SC4R7M	30	4.7	120	1300	4	2.82
	30SC6R8M	30	6.8	120	1340	4	4.08
	25SC15M	25	15	70	1650	4	3.75
	16SC22M	16	22	70	1800	5	3.52
	16SC33M	16	33	70	1900	6	5.28
	10SC47M	10	47	60	2020	6	4.7
E	30SC10M	30	10	110	1380	6	6
	25SC22M	25	22	40	2330	6	5.5
F	30SC22M	30	22	80	1830	6	13.2
	25SC33M	25	33	35	2900	6	8.25
	25SC47M	25	47	35	2980	6	11.75

※1 100kHz, +45°C

Temperature coefficient for allowable ripple current

Ambient Temp.	$T_x \leq 45^\circ C$	$45^\circ C < T_x \leq 65^\circ C$	$65^\circ C < T_x \leq 85^\circ C$	$85^\circ C < T_x \leq 95^\circ C$	$95^\circ C < T_x \leq 105^\circ C$
Coefficient	1	0.85	0.7	0.4	0.25

Frequency coefficient for allowable ripple current

Frequency	$120Hz \leq f < 1kHz$	$1kHz \leq f < 10kHz$	$10kHz \leq f < 100kHz$	$100kHz \leq f \leq 500kHz$
Coefficient	0.05	0.2	0.5	1

## SA Series

Large capacitance

Miniaturization



SA series is miniaturized SC series with large capacitance. Suitable for high frequency switching power supplies, etc. Lead free-flow is supported.

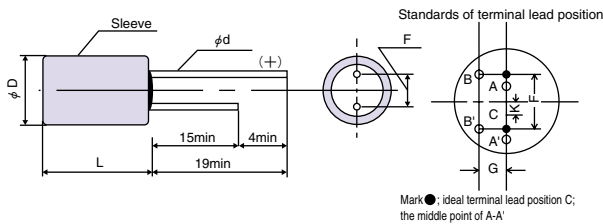
## Specifications

Items	Condition	Specifications			
		6.3	10	16	20
Rated voltage (V)	—	6.3	10	16	20
Surge voltage (V)	Room temperature	7.2	12	18.4	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 <sup>※1</sup>	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 <sub>20°C</sub>	0.75 to 1.25	
		+105°C	Z/Z <sub>20°C</sub>	0.75 to 1.25	
Endurance	105°C, 2,000h, Rated voltage applied	ΔC/C	Within ±20%		
		tan δ	1.5 times or less than an initial standard		
		LC	Below an initial standard		
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No applied voltage	ΔC/C	Within ±10%		
		tan δ	1.5 times or less than an initial standard		
		LC	Below an initial standard		
Resistance to soldering heat	Flow method (260±5°C X 10s)	ΔC/C	Within ±5%		
		tan δ	Below an initial standard		
		LC	Below an initial standard (after voltage processing)		

※1 In case of some problems for measured values, measure after applying rated voltage for 30 minutes at 105°C.

## Dimensions

(unit : mm)



Size Code	$\phi D^{+0.5max}$	Lmax	F	$\phi d^{\pm 0.05}$	Gmax	Kmax
C	6.3	7.8	2.5±0.5	0.45	0.5	0.5
D	6.3	10.8	2.5±0.5	0.60	0.5	0.5
E	8.0	11.5	3.5±0.5	0.60	0.8	0.8
F	10.0	11.5	5.0±0.5	0.60	0.8	0.8
G	12.5	23.0	5.0±1.0	0.80	0.8	0.8
H	16.0	26.0	7.5±1.0	0.80	0.8	0.8

## Size List

RV : Rated voltage

$\mu F$	RV	6.3	10	16	20
15					C
22					C
33				C	D
47	C			D	E
68			D		E
100				E	F
150	E			F	
220			F		
330	F				
470				G	
1000				H	
2200	H				



## ■ SA Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR( $m\Omega$ ) (max) 100kHz to 300kHz/20°C	Allowable ripple current (mA <sub>rms</sub> ) ※1	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
C	20SA15M	20	15	90	1200	6	6
	20SA22M	20	22	70	1300	6	8.8
	16SA33M	16	33	70	1370	6	10.56
	6SA47M	6.3	47	60	1430	7	5.92
D	20SA33M	20	33	70	1710	6	13.2
	16SA47M	16	47	60	1830	6	15.04
	10SA68M	10	68	50	2000	7	13.6
E	20SA47M	20	47	40	2450	6	18.8
	20SA68M	20	68	36	2600	6	27.2
	16SA100M	16	100	30	2740	6	32
	6SA150M	6.3	150	30	2780	7	18.9
F	20SA100M	20	100	30	3210	6	40
	16SA150M	16	150	28	3260	6	48
	10SA220M	10	220	27	3370	7	44
	6SA330M	6.3	330	25	3500	7	41.58
G	16SA470M	16	470	20	6080	8	300.8
H	16SA1000M	16	1000	15	9750	9	640
	6SA2200M	6.3	2200	15	9750	13	554.4

※1 100kHz, +45°C

Temperature coefficient for allowable ripple current

Ambient Temp.	$T_x \leq 45^\circ\text{C}$	$45^\circ\text{C} < T_x \leq 65^\circ\text{C}$	$65^\circ\text{C} < T_x \leq 85^\circ\text{C}$	$85^\circ\text{C} < T_x \leq 95^\circ\text{C}$	$95^\circ\text{C} < T_x \leq 105^\circ\text{C}$
<b>Coefficient</b>	1	0.85	0.7	0.4	0.25

Frequency coefficient for allowable ripple current

Frequency	$120\text{Hz} \leq f < 1\text{kHz}$	$1\text{kHz} \leq f < 10\text{kHz}$	$10\text{kHz} \leq f < 100\text{kHz}$	$100\text{kHz} \leq f \leq 500\text{kHz}$
<b>Coefficient</b>	0.05	0.2	0.5	1

SL Series

Low-profile products



The SL series is low profile with a category upper limit temperature of 105°C.  
Use the SL series for compact and slim designs, such as VTRs, video cameras, etc.  
Lead free-flow is supported.

## Specifications

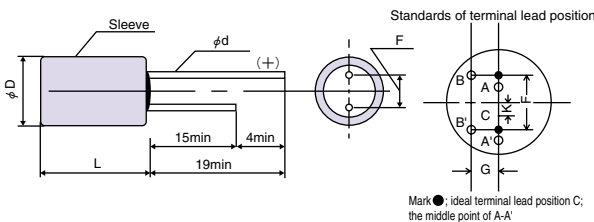
Items	Condition	Specifications				
Rated voltage (V)	—	4.0	6.3	10	16	25
Surge voltage (V)	Room temperature	4.6	7.2	12	18.4	25
Category temperature range (°C)	—	-55 to +105				
Capacitance tolerance (%)	120Hz/20°C	M : ±20				
Dissipation Factor (DF)	120Hz/20°C	Please see the attached characteristics list				
Leakage current**2	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, 2,000h, Rated voltage applied (E', F' size : 1,000h) (25V → 20V applied)**1	ΔC/C		Within ±20%		
		tan δ		1.5 times or less than an initial standard		
		LC		Below an initial standard		
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	ΔC/C		Within ±20%		
		tan δ		2 times or less than an initial standard		
		LC		Below an initial standard		
Resistance to soldering heat	Flow method (260±5°C X 10s)	ΔC/C		Within ±5%		
		tan δ		1.5 times or less than an initial standard		
		LC		Below an initial standard (after voltage processing)		

※1 Please reduce 0.25V per 1°C from over 85°C for 25V products.

※2 In case of some problems for measured values, measure after applying rated voltage for 4.0 to 16V products or temperature derating voltage for 25V products for 30 minutes at 105°C.

## Dimensions

(unit : mm)



Size Code	$\phi D^{+0.5max}$	Lmax	F	$\phi d \pm 0.05$	Gmax	Kmax
A'	4.0	6.0	1.5±0.5	0.45	0.5	0.5
B'	5.0	6.0	2.0±0.5	0.45	0.5	0.5
C'	6.3	6.0	2.5±0.5	0.45	0.5	0.5
E'	8.0	6.0	3.5±0.5	0.50	0.8	0.8
F'	10.0	6.0	5.0±0.5	0.50	0.8	0.8

## Size List

RV : Rated voltage

$\mu F$	RV	4.0	6.3	10	16	25
1.0						A'
1.5						A'
2.2					A'	B'
3.3					A'	B'
4.7				A'	B'	C'
6.8			A'	B'	B'	C'
10				B'	C'	
15			B'		C'	E'
22				C'		F'
33				C'		
47				C'	E'	
68				E'	F'	
100			E'	F'		
150	E'		F'			
220	F'					

## ■ SL Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Allowable ripple current (mA <sub>rms</sub> ) ※1	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
A'	25SL1M	25	1	450	430	5	0.5
	25SL1R5M	25	1.5	400	435	5	0.75
	16SL2R2M	16	2.2	400	450	5	0.7
	16SL3R3M	16	3.3	400	500	6	1.06
	10SL4R7M	10	4.7	400	540	6	0.94
	6SL6R8M	6.3	6.8	350	560	6	0.86
B'	25SL2R2M	25	2.2	250	695	5	1.1
	25SL3R3M	25	3.3	250	700	5	1.65
	16SL4R7M	16	4.7	250	720	5	1.5
	16SL6R8M	16	6.8	180	745	5	2.18
	10SL10M	10	10	150	780	5	2
	6SL15M	6.3	15	120	815	6	1.89
C'	25SL4R7M	25	4.7	100	1130	6	2.35
	25SL6R8M	25	6.8	100	1140	6	3.4
	16SL10M	16	10	100	1150	6	3.2
	16SL15M	16	15	100	1230	6	4.8
	10SL22M	10	22	80	1270	6	4.4
	10SL33M	10	33	80	1350	6	6.6
	10SL47M	10	47	70	1430	6	9.4
E'	25SL15M	25	15	75	1400	7	7.5
	16SL47M	16	47	70	1550	7	15.04
	10SL68M	10	68	65	1600	7	13.6
	6SL100M	6.3	100	65	1600	7	12.6
	4SL150M	4.0	150	60	2000	7	12
F'	25SL22M	25	22	70	1600	7	11
	16SL68M	16	68	65	1850	7	21.76
	10SL100M	10	100	60	2100	7	20
	6SL150M	6.3	150	60	2100	7	18.9
	4SL220M	4.0	220	55	2400	7	17.6

※1 100kHz, +45°C

Temperature coefficient for allowable ripple current

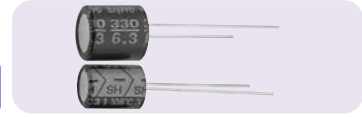
Ambient Temp.	$T_x \leq 45^\circ\text{C}$	$45^\circ\text{C} < T_x \leq 65^\circ\text{C}$	$65^\circ\text{C} < T_x \leq 85^\circ\text{C}$	$85^\circ\text{C} < T_x \leq 95^\circ\text{C}$	$95^\circ\text{C} < T_x \leq 105^\circ\text{C}$
Coefficient	1	0.85	0.7	0.4	0.25

Frequency coefficient for allowable 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	0.2	0.5	1

## SH Series

Long Life (105°C X 5,000h)



SH series has a long life (guaranteed at 105°C for 5,000h) with keeping high frequency characteristics. Please use the SH series for industrial equipment that requires high reliability. Lead free-flow is supported.

## Specifications

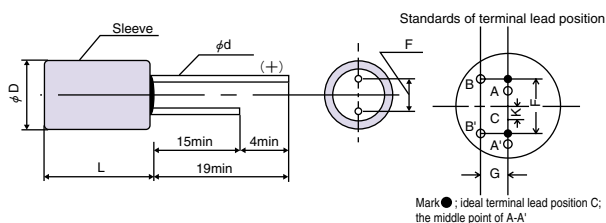
Items	Condition	Specifications				
Rated voltage (V)	—	6.3	10	16	20	25
Surge voltage (V)	Room temperature	7.2	12	18.4	23	25
Category temperature range (°C)	—	-55 to +105				
Capacitance tolerance (%)	120Hz/20°C	M : ±20				
Dissipation Factor (DF)	120Hz/20°C	Please see the attached characteristics list				
Leakage current <sup>※2</sup>	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 <sub>20°C</sub>	0.75 to 1.25		
		+105°C	Z/Z <sub>20°C</sub>	0.75 to 1.25		
Endurance	105°C, 5,000h, Rated voltage applied (25V → 20V applied) <sup>※1</sup>	ΔC/C		Within ±30%		
		tan δ		1.5 times or less than an initial standard		
		LC		5 times or less than an initial standard		
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	ΔC/C		Within ±10%		
		tan δ		1.5 times or less than an initial standard		
		LC		Below an initial standard		
Resistance to soldering heat	Flow method (260±5°C X 10s)	ΔC/C		Within ±5%		
		tan δ		Below an initial standard		
		LC		Below an initial standard (after voltage processing)		

※1 Please reduce 0.25V per 1°C from over 85°C for 25V products.

※2 In case of some problems for measured values, measure after applying rated voltage for 6.3 to 20V products or temperature derating voltage for 25V products for 30 minutes at 105°C.

## Dimensions

(unit : mm)



Size Code	φ D <sup>+0.5max</sup>	Lmax	F	φ d <sup>±0.05</sup>	Gmax	Kmax
A	4.0	7.8	2.0±0.5	0.45	0.5	0.5
B	5.0	7.8	2.0±0.5	0.45	0.5	0.5
C	6.3	7.8	2.5±0.5	0.45	0.5	0.5
D	6.3	10.8	2.5±0.5	0.60	0.5	0.5
E	8.0	11.5	3.5±0.5	0.60	0.8	0.8
F	10.0	11.5	5.0±0.5	0.60	0.8	0.8

## Size List

RV : Rated voltage

μ F	RV	6.3	10	16	20	25
1.0						A
1.5						A
2.2				A		B
3.3				A		B
4.7			A	B		C
6.8	A		B			C
10			B			C
15	B				C	D
22					C	
33				C	D	
47	C			D	E	
68			D		E	
100				E	F	
150	E			F		
220			F			
330	F					

 Aluminum Solid Capacitors with Conductive Polymer  
 Aluminum Solid Capacitors with Organic Semiconductive Electrolyte

OS-CON

 Radial Lead Type  
 SH Series

## ■ SH Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Allowable ripple current (mA rms)※1	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
A	25SH1M	25	1.0	350	430	3	0.5
	25SH1R5M	25	1.5	300	435	3	0.75
	16SH2R2M	16	2.2	280	450	4	0.7
	16SH3R3M	16	3.3	280	500	4	1.06
	10SH4R7M	10	4.7	280	540	5	0.94
	6SH6R8M	6.3	6.8	250	560	5	0.86
B	25SH2R2M	25	2.2	200	695	3	1.1
	25SH3R3M	25	3.3	200	700	3	1.65
	16SH4R7M	16	4.7	180	720	4	1.5
	16SH6R8M	16	6.8	150	745	4	2.18
	10SH10M	10	10	150	780	5	2
	6SH15M	6.3	15	120	815	5	1.89
C	25SH4R7M	25	4.7	100	1130	3	2.35
	25SH6R8M	25	6.8	100	1140	3	3.4
	25SH10M	25	10	90	1150	3	5
	20SH15M	20	15	90	1200	5	6
	20SH22M	20	22	70	1300	5	8.8
	16SH33M	16	33	70	1370	6	10.56
	6SH47M	6.3	47	60	1430	7	5.92
D	25SH15M	25	15	70	1650	4	7.5
	20SH33M	20	33	70	1710	6	13.2
	16SH47M	16	47	60	1830	6	15.04
	10SH68M	10	68	50	2000	7	13.6
E	20SH47M	20	47	40	2450	6	18.8
	20SH68M	20	68	36	2600	6	27.2
	16SH100M	16	100	30	2740	6	32
	6SH150M	6.3	150	30	2780	7	18.9
F	20SH100M	20	100	30	3210	6	40
	16SH150M	16	150	28	3260	6	48
	10SH220M	10	220	27	3370	7	44
	6SH330M	6.3	330	25	3500	7	41.58

※1 100kHz, +45°C

Temperature coefficient for allowable ripple current

Ambient Temp.	$T_x \leq 45^\circ\text{C}$	$45^\circ\text{C} < T_x \leq 65^\circ\text{C}$	$65^\circ\text{C} < T_x \leq 85^\circ\text{C}$	$85^\circ\text{C} < T_x \leq 95^\circ\text{C}$	$95^\circ\text{C} < T_x \leq 105^\circ\text{C}$
Coefficient	1	0.85	0.7	0.4	0.25

Frequency coefficient for allowable 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	0.2	0.5	1

SS Series

Miniaturization of SC, SA and SL series



SS series is a miniaturized version of SC, SA and SL series. Suitable for switching power supplies, etc. to make more compact. Lead free-flow is supported.

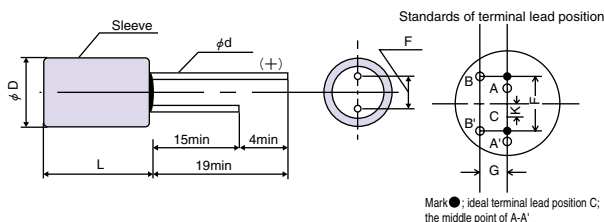
## Specifications

Items	Condition	Specifications				
Rated voltage (V)	—	4.0	6.3	10	16	20
Surge voltage (V)	Room temperature	4.6	7.2	12	18.4	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 <sup>※1</sup>	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 <sub>20°C</sub>	0.75 to 1.25		
		+105°C	Z/Z <sub>20°C</sub>	0.75 to 1.25		
Endurance	105°C, 1,000h, Rated voltage applied (E, F size : 2,000h)	ΔC/C		Within ±20%		
		tan δ		1.5 times or less than an initial standard		
		LC		Below an initial standard		
Damp heat(Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	ΔC/C		Within ±20%		
		tan δ		2 times or less than an initial standard		
		LC		Below an initial standard		
Resistance to soldering heat	Flow method (260±5°C X 10s)	ΔC/C		Within ±5%		
		tan δ		1.5 times or less than an initial standard		
		LC		Below an initial standard (after voltage processing)		

※1 In case of some problems for measured values, measure after applying rated voltage for 30 minutes at 105°C.

## Dimensions

(unit : mm)



Size Code	$\phi D^{+0.5\max}$	Lmax	F	$\phi d^{\pm 0.05}$	Gmax	Kmax
A'	4.0	6.0	1.5±0.5	0.45	0.5	0.5
B'	5.0	6.0	2.0±0.5	0.45	0.5	0.5
C'	6.3	6.0	2.5±0.5	0.45	0.5	0.5
D	6.3	10.8	2.5±0.5	0.60	0.5	0.5
E	8.0	11.5	3.5±0.5	0.60	0.8	0.8
F	10.0	11.5	5.0±0.5	0.60	0.8	0.8

## Size List

RV : Rated voltage

$\mu F$	RV	4.0	6.3	10	16	20
2.2						A'
3.3						A'
4.7					A'	B'
6.8					A'	B'
10				A'	B'	C'
15			A'		B'	C'
22				B'		C'
33			B'		C'	
47						D
68	C'				D	
100				D		E
150	D			E		F
220			E			
330				F		
470	F					

## ■ SS Series Characteristics List

Size Code	Part Number	Rated voltage (V)	Rated capacitance ( $\mu$ F)	ESR(m $\Omega$ ) (max) 100kHz to 300kHz/20°C	Allowable ripple current (mA <sub>rms</sub> ) ※1	Tangent of loss angle (% max)	Leakage current ( $\mu$ A)(max) After 2 minutes
A'	20SS2R2M	20	2.2	400	450	5	2.2
	20SS3R3M	20	3.3	400	500	6	3.3
	16SS4R7M	16	4.7	400	540	6	3.76
	16SS6R8M	16	6.8	400	540	6	5.44
	10SS10M	10	10	350	560	6	5
	6SS15M	6.3	15	350	560	6	4.73
B'	20SS4R7M	20	4.7	250	720	5	4.7
	20SS6R8M	20	6.8	180	745	5	6.8
	16SS10M	16	10	150	780	5	8
	16SS15M	16	15	150	780	5	12
	10SS22M	10	22	150	780	5	11
	6SS33M	6.3	33	150	780	5	10.4
C'	20SS10M	20	10	100	1150	6	10
	20SS15M	20	15	100	1230	6	15
	20SS22M	20	22	100	1230	6	22
	16SS33M	16	33	100	1230	6	26.4
	4SS68M	4.0	68	70	1430	6	13.6
D	20SS47M	20	47	60	1830	6	47
	16SS68M	16	68	50	2000	7	54.4
	10SS100M	10	100	40	2100	7	50
	4SS150M	4.0	150	40	2100	8	30
E	20SS100M	20	100	30	2740	7	100
	10SS150M	10	150	30	2780	7	75
	6SS220M	6.3	220	30	3000	7	69.3
F	20SS150M	20	150	30	3200	7	150
	10SS330M	10	330	25	3500	7	165
	4SS470M	4.0	470	25	3500	7	94

※1 100kHz, +45°C

Temperature coefficient for allowable ripple current

Ambient Temp.	$T_x \leq 45^\circ\text{C}$	$45^\circ\text{C} < T_x \leq 65^\circ\text{C}$	$65^\circ\text{C} < T_x \leq 85^\circ\text{C}$	$85^\circ\text{C} < T_x \leq 95^\circ\text{C}$	$95^\circ\text{C} < T_x \leq 105^\circ\text{C}$
Coefficient	1	0.85	0.7	0.4	0.25

Frequency coefficient for allowable 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	0.2	0.5	1