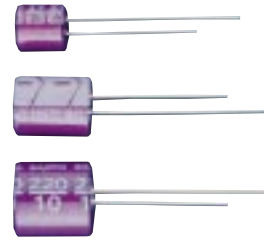


## Large capacitance and miniaturized products

Suitable for high frequency switching power supplies, etc.



# SA

Series

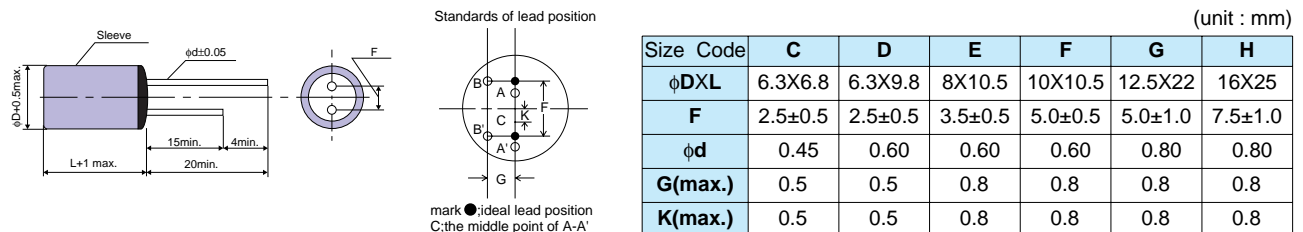
Sleeve color : Purple  
 Marking : Polarity( $\ominus$ ), Rated voltage, Capacitance (White)  
**SANYO, OS-CON**, Lot.No.  
 Max. operating temp.(105°C)

## Specifications

Items	Characteristics		
1. Operating temperature range	-55°C to +105°C		
2. Capacitance tolerance (120Hz)	M : $\pm 20\%$		
3. Tangent of loss angle( $\tan\delta$ ) (120Hz)	Value in Table 2 or less		
4. Leakage current ( $\mu A/2min.$ )(or less) *1	0.02 CV (0.04 CV for G, H size)		
5. ESR (100k to 300kHz)	Value in Table 2 or less		
6. Temperature characteristics Impedance ratio at 100kHz., +20°C	-55°C	Z / Z <sub>20°C</sub>	1.0 to 1.25
	+105°C	Z / Z <sub>20°C</sub>	0.75 to 1.0
7. High-temperature load 105°C, 2,000Hrs. (G, H size ; 1,000Hrs.) Rated voltage applied	$\Delta C/C$		Within $\pm 20\%$
	$\tan\delta$		1.5 times of Item 3 or less
	Leakage current		Item 4 or less
8. Moisture resistance (60°C, 90 to 95%RH, 1,000Hrs. no voltage)	$\Delta C/C$		Within $\pm 10\%$
	$\tan\delta$		1.5 times of Item 3 or less
	Leakage current		Item 4 or less
9. Reverse voltage guarantee	Temporary:less than 20% of the rated voltage, Continuous:less than 10% of the rated voltage		

\*1 If any doubt arises, measure the current after applying voltage (voltage treatment) for 30 minutes at 105°C. The rated voltage should be applied for all vv.

## Dimensions



## Size List

WV : Rated voltage  
 (SV) : Surge voltage(room temperature)

$\mu F$ \ WV (SV)	6.3 (7.2)	10 (11.5)	16 (18.4)	20 (23)
15				C
22				C
33		C	C	D
47	C		D	E
68		D		E
100		E	E	F
150	E		F	
220		F		
330	F			
470			G	
1000			H	
2200	H			

Table 2 SA Series Characteristics List

Size Code	Part Number <sup>*1</sup>	Rated Voltage (V)	Nominal Capacitance (μF)	ESR (100kHz to 300kHz) (mΩ) (max.)	Maximum allowable ripple current (mA <sub>rms</sub> ) <sup>*2</sup>	Tangent of loss angle (max.)	Leakage current (μA) (max.) <sup>*3</sup>
C	20SA15M	20	15	90	1200	0.06	6.00
	20SA22M	20	22	70	1300	0.06	8.80
	16SA33M	16	33	70	1370	0.06	10.56
	10SA33M	10	33	70	1370	0.07	6.60
	6SA47M	6.3	47	60	1430	0.07	5.92
D	20SA33M	20	33	70	1710	0.06	13.20
	16SA47M	16	47	60	1830	0.06	15.04
	10SA68M	10	68	50	2000	0.07	13.60
E	20SA47M	20	47	40	2450	0.06	18.80
	20SA68M	20	68	36	2600	0.06	27.20
	16SA100M	16	100	30	2740	0.06	32.00
	10SA100M	10	100	30	2670	0.07	20.00
	6SA150M	6.3	150	30	2780	0.07	18.90
F	20SA100M	20	100	30	3210	0.06	40.00
	16SA150M	16	150	28	3260	0.06	48.00
	10SA220M	10	220	27	3370	0.07	44.00
	6SA330M	6.3	330	25	3500	0.07	41.58
G	16SA470M	16	470	20	6080	0.08	300.80
H	16SA1000M	16	1000	15	9750	0.09	640.00
	6SA2200M	6.3	2200	15	9750	0.13	554.40

\*1 Capacitance tolerance : M ; ±20%,Product "K" (capacitance tolerance : ±10%) is optionally available.

\*2 100kHz, +45°C

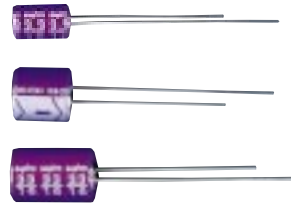
\*3 After 2 minutes

Temperature coefficient for ripple current

Ambient Temp.(°C)	to +45	+65	+85	+95	+105
Coefficient	1.0	0.85	0.7	0.4	0.25

## Standard Products

Designed for general use. Superior high frequency characteristics make capacitors in the SC Series suitable for use in noise limiters and switching power supplies.



# SC Series

Sleeve color : Purple  
 Marking : Polarity( $\ominus$ ), Rated voltage, Capacitance (White)  
**SANYO, OS-CON**, Lot.No.  
 Max. operating temp.(105°C)

## Specifications

Items	Characteristics		
1. Operating temperature range	-55°C to +105°C		
2. Capacitance tolerance (120Hz)	M : $\pm 20\%$		
3. Tangent of loss angle( $\tan\delta$ ) (120Hz)	Value in Table 1 or less		
4. Leakage current ( $\mu\text{A}/2\text{min.}$ )(or less) *2	6.3 to 25WV : 0.01CV or 0.5 30WV : 0.02CV or 1.0 (whichever is the greater)		
5. ESR (100k to 300kHz)	Value in Table 1 or less		
6. Temperature characteristics Impedance ratio at 100kHz., +20°C	-55°C	Z / Z <sub>20°C</sub>	1.0 to 1.25
	+105°C	Z / Z <sub>20°C</sub>	0.75 to 1.0
7. High-temperature load 105°C, 2,000Hrs. Rated voltage applied (25WV→20V applied) *1	$\Delta\text{C}/\text{C}$	Within $\pm 20\%$	
	$\tan\delta$	1.5 times of Item 3 or less	
	Leakage current	Item 4 or less	
8. Moisture resistance (60°C, 90 to 95%RH, 1,000Hrs. no voltage)	$\Delta\text{C}/\text{C}$	Within $\pm 10\%$	
	$\tan\delta$	1.5 times of Item 3 or less	
	Leakage current	Item 4 or less	
9. Reverse voltage guarantee	Temporary:less than 20% of the rated voltage, Continuous:less than 10% of the rated voltage		

\*1 To use an OS-CON when the operating temperature exceeds 85°C on a component with a rated voltage of 25V, reduce the voltage by 0.25V for every degree(1°C) relative to the value at 85°C(25V).

\*2 If any doubt arises, measure the current after applying voltage(voltage treatment) for 30 minutes at 105°C. The rated voltage should be applied for 6.3 to 16 and 30WV, while a temperature reduction voltage should be applied for 25WV.

## Dimensions

Standards of lead position

mark ●:ideal lead position  
 C:the middle point of A-A'

(unit : mm)

Size Code	A	B	C	D	E	F
$\phi\text{DXL}$	4.0X6.8	5.0X6.8	6.3X6.8	6.3X9.8	8X10.5	10X10.5
F	2.0 $\pm$ 0.5	2.0 $\pm$ 0.5	2.5 $\pm$ 0.5	2.5 $\pm$ 0.5	3.5 $\pm$ 0.5	5.0 $\pm$ 0.5
$\phi\text{d}$	0.45	0.45	0.45	0.60	0.60	0.60
G(max.)	0.5	0.5	0.5	0.5	0.8	0.8
K(max.)	0.5	0.5	0.5	0.5	0.8	0.8

## Size List

WV : Rated voltage  
 (SV) : Surge voltage(room temperature)

$\mu\text{F}$	WV (SV)	6.3 (7.3)	10 (11.5)	16 (18.4)	25 (25)	30 (34.5)
1.0				A	A	A
1.5				A	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	B	C	C	C	E
15	B		C	C	D	
22	C	C	D	D	E	F
33	C		D	D	F	
47	D	D			F	

Table 1 SC Series Characteristics List

Size Code	Part Number <sup>*1 *2</sup>	Rated Voltage (V)	Nominal Capacitance (μF)	ESR <sup>*3</sup> (100kHz to 300kHz) (mΩ) (max.)	Maximum allowable ripple current (mA rms) <sup>*3</sup>	Tangent of loss angle (max.)	Leakage current (μA) (max.) <sup>*4</sup>
A	30SC1M	30	1.0	350	430	0.03	1.00
	25(16)SC1M	25(16)	1.0	350	430	0.03	0.50
	25(16)SC1R5M	25(16)	1.5	300	435	0.03	0.50
	16SC2R2M	16	2.2	280	450	0.04	0.50
	16SC3R3M	16	3.3	280	500	0.04	0.53
	10SC4R7M	10	4.7	280	540	0.05	0.50
	6SC6R8M	6.3	6.8	250	560	0.05	0.50
B	30SC1R5M	30	1.5	300	435	0.03	1.00
	30SC2R2M	30	2.2	250	695	0.03	1.32
	25SC2R2M	25	2.2	200	695	0.03	0.55
	25SC3R3M	25	3.3	200	700	0.03	0.83
	16SC4R7M	16	4.7	180	720	0.04	0.75
	16SC6R8M	16	6.8	150	745	0.04	1.09
	10SC10M	10	10	150	780	0.05	1.00
	6SC10M	6.3	10	150	780	0.05	0.63
	6SC15M	6.3	15	120	815	0.05	0.95
C	30SC3R3M	30	3.3	200	820	0.03	1.98
	25SC4R7M	25	4.7	100	1130	0.03	1.18
	25SC6R8M	25	6.8	100	1140	0.03	1.70
	25SC10M	25	10	90	1150	0.03	2.50
	16SC10M	16	10	90	1150	0.04	1.60
	16SC15M	16	15	90	1230	0.04	2.40
	10SC22M	10	22	70	1270	0.05	2.20
	6SC22M	6.3	22	70	1270	0.05	1.39
	6SC33M	6.3	33	70	1320	0.05	2.08
D	30SC4R7M	30	4.7	120	1300	0.04	2.82
	30SC6R8M	30	6.8	120	1340	0.04	4.08
	25SC15M	25	15	70	1650	0.04	3.75
	16SC22M	16	22	70	1800	0.05	3.52
	16SC33M	16	33	70	1900	0.06	5.28
	10SC47M	10	47	60	2020	0.06	4.70
	6SC47M	6.3	47	60	2020	0.06	2.96
E	30SC10M	30	10	110	1380	0.06	6.00
	25SC22M	25	22	40	2330	0.06	5.50
F	25SC33M	25	33	35	2900	0.06	8.25
	25SC47M	25	47	35	2980	0.06	11.75
	30SC22M	30	22	80	1830	0.06	13.20

\*1 Capacitance tolerance : M ; ±20%, Product "K" (capacitance tolerance : ±10%) is optionally available.

\*2 ( ) : 16SC1M etc.

\*3 100kHz, +45°C

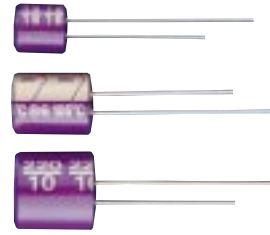
\*4 After 2 minutes

Temperature coefficient for ripple current

Ambient Temp.(°C)	to +45	+65	+85	+95	+105
Coefficient	1.0	0.85	0.7	0.4	0.25

## Specially designed for audio

- This is optimum for digital audio and Hi-Fi VCR.
- Since OS-CON has solid electrolyte and resin-sealed structure, it doesn't expose the phenomenon of element vibration.
- Adopted OFC (Oxygen Free Copper) into the lead terminals for improvement of tone quality.



# SG

Series

Sleeve color : Purple  
 Marking : Polarity(⊖), Rated voltage, Capacitance (Gold)  
 : SANYO, OS-CON, Lot.No.  
 Max. operating temp.(105°C)

## Specifications

Items	Characteristics		
1. Operating temperature range	-55°C to +105°C		
2. Capacitance tolerance (120Hz)	M : ±20%		
3. Tangent of loss angle(tanδ) (120Hz)	Value in Table 5 or less		
4. Leakage current (μA/2min.)(or less) *2	0.02CV (0.04CV for G.H size)		
5. ESR (100k to 300kHz)	Value in Table 5 or less		
6. Temperature characteristics Impedance ratio at 100kHz., +20°C	-55°C	Z / Z <sub>20°C</sub>	1.0 to 1.25
	+105°C	Z / Z <sub>20°C</sub>	0.75 to 1.0
7. High-temperature load 105°C, 2,000Hrs. (G, H size ; 1,000Hrs.) Rated voltage applied (25WV→20V applied) *1	ΔC/C		Within ±20%
	tanδ		1.5 times of Item 3 or less
	Leakage current		Item 4 or less
8. Moisture resistance (60°C, 90 to 95%RH, 1,000Hrs. no voltage)	ΔC/C		Within ±10%
	tanδ		1.5 times of Item 3 or less
	Leakage current		Item 4 or less
9. Reverse voltage guarantee	Temporary:less than 20% of the rated voltage, Continuous:less than 10% of the rated voltage		

\*1 To use an OS-CON when the operating temperature exceeds 85°C on a component with a rated voltage of 25V, reduce the voltage by 0.25V for every degree(1°C) relative to the value at 85°C(25V).

\*2 If any doubt arises, measure the current after applying voltage(voltage treatment) for 30 minutes at 105°C. The rated voltage should be applied for 6.3 to 20WV, while a temperature reduction voltage should be applied for 25WV.

## Dimensions

Standards of lead position

mark ● ideal lead position  
 C: the middle point of A-A'

(unit : mm)

Size Code	C	D	E	F	G	H
φDXL	6.3X6.8	6.3X9.8	8.0X10.5	10X10.5	12.5X22	16X25
F	2.5±0.5	2.5±0.5	3.5±0.5	5.0±0.5	5.0±1.0	7.5±1.0
φd	0.45	0.60	0.60	0.60	0.80	0.80
G(max.)	0.5	0.5	0.8	0.8	0.8	0.8
K(max.)	0.5	0.5	0.8	0.8	0.8	0.8

## Size List

WV : Rated voltage  
 (SV) : Surge voltage(room temperature)

μF	WV (SV)	6.3 (7.2)	10 (11.5)	16 (18.4)	20 (23)	25 (25)
4.7						C
6.8						C
10				C		C
15					C	D
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				

Table 5 SG Series Characteristics List

Size Code	Part Number <sup>*1</sup>	Rated Voltage (V)	Nominal Capacitance (μF)	ESR (100kHz to 300kHz) (mΩ) (max.)	Maximum allowable ripple current (mA <sub>rms</sub> ) <sup>*2</sup>	Tangent of loss angle (max.)	Leakage current (μA) (max.) <sup>*3</sup>
C	25SG4R7M	25	4.7	100	1130	0.05	2.35
	25SG6R8M	25	6.8	100	1140	0.05	3.40
	25SG10M	25	10	90	1150	0.05	5.00
	20SG15M	20	15	90	1200	0.06	6.00
	20SG22M	20	22	70	1300	0.06	8.80
	16SG10M	16	10	90	1150	0.06	3.20
	16SG33M	16	33	70	1370	0.06	10.56
	6SG47M	6.3	47	60	1430	0.07	5.92
D	25SG15M	25	15	70	1650	0.05	7.50
	20SG33M	20	33	70	1710	0.06	13.20
	16SG47M	16	47	60	1830	0.06	15.04
	10SG68M	10	68	50	2000	0.07	13.60
E	20SG47M	20	47	40	2450	0.06	18.80
	20SG68M	20	68	36	2600	0.06	27.20
	16SG100M	16	100	30	2740	0.06	32.00
	6SG150M	6.3	150	30	2780	0.07	18.90
F	20SG100M	20	100	30	3210	0.06	40.00
	16SG150M	16	150	28	3260	0.06	48.00
	10SG220M	10	220	27	3370	0.07	44.00
	6SG330M	6.3	330	25	3500	0.07	41.58
G	16SG470M	16	470	20	6080	0.08	300.80
H	16SG1000M	16	1000	15	9750	0.09	640.00
	6SG2200M	6.3	2200	15	9750	0.13	554.40

\*1 Capacitance tolerance : M ; ±20%

\*2 100kHz, +45°C

\*3 After 2 minutes

Temperature coefficient for ripple current

Ambient Temp.(°C)	to +45	+65	+85	+95	+105
Coefficient	1.0	0.85	0.7	0.4	0.25

**Vertical Surface Mounting Devices  
New Products**

**New SV  
Series**

New SV Series is designed for use in high frequency noise limiters and switching power supplies for miniaturization ; compatible with Aluminum electrolytic capacitors of Vertical chip.



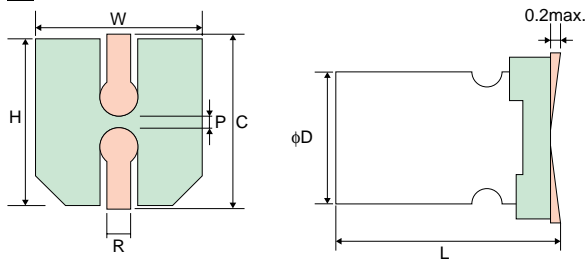
Marking (Purple) : Polarity(⊖), Rated voltage, Capacitance, Lot.No.

**Specifications**

Items	Characteristics		
1. Operating temperature range	-55°C to +105°C		
2. Capacitance tolerance (120Hz)	M : ±20%		
3. Tangent of loss angle(tanδ) (120Hz)	Value in Table 8 or less		
4. Leakage current (μA/2min.)(or less) *1	0.2CV		
5. ESR (100k to 300kHz)	Value in Table 8 or less		
6. Temperature characteristics Impedance ratio at 100kHz., +20°C	-55°C	Z / Z20°C	1.0 to 1.25
	+105°C	Z / Z20°C	0.75 to 1.0
7. High-temperature load 105°C, 1,000Hrs. Rated voltage applied *2 (25WV→20V applied)	ΔC/C	A5, B5, C6 size	Within ±30%
		E7, F8, F12 size	Within ±20%
	tanδ	1.5 times of Item 3 or less	
8. Moisture resistance (60°C, 90 to 95%RH, 500Hrs. no voltage)	ΔC/C	Within ±20%	
	tanδ	1.5 times of Item 3 or less	
	Leakage current	Item 4 or less	
9. Reverse voltage guarantee	Temporary:less than 20% of the rated voltage, Continuous:less than 10% of the rated voltage		
10.Solder heat resistance (Hot plate soldering method) (240°C X 30sec.) *3	ΔC/C	Within ±10%	
	tanδ	1.5 times of Item 3 or less	
	Leakage current	Item 4 or less	

- \*1 If any doubt arises, measure the current after applying voltage (voltage treatment) for 120 minutes at 105°C. The rated voltage should be applied for 2.0 to 20WV, while a temperature reduction voltage should be applied for 25WV.
- \*2 To use an OS-CON when the operating temperature exceeds 85°C on a component with a rated voltage of 25V, reduce the voltage by 0.25V for every degree (1°C) relative to the value at 85°C (25V).
- \*3 Reflow soldering may bring about change of nominal capacitance. Refer to SANYO about soldering spec.

**Dimensions**



(unit : mm)

Size Code	φD+ 0.5max.	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	0.5 to 0.8	1.0
B6	5.0	5.9	5.3	5.3	6.0	0.5 to 0.8	1.4
C6	6.3	5.9	6.6	6.6	7.3	0.5 to 0.8	2.1
E7	8.0	6.9	8.3	8.3	9.0	0.5 to 0.8	3.2
F8	10.0	7.9	10.3	10.3	11.0	0.5 to 0.8	4.6
F12	10.0	12.6	10.3	10.3	11.0	0.8 to 1.1	4.6

**Size List**

WV : Rated voltage  
(SV) : Surge voltage(room temperature)

μF \ WV (SV)	2.0 (2.6)	4.0 (5.2)	6.3 (8.2)	10 (11.5)	16 (18.4)	20 (23)	25 (25)
3.3					A5		
4.7				A5			
6.8				A5			
10				A5		B6	E7
15			A5		B6		
22		A5		B6		C6	F8
27					C6		
33			B6				
39		B6					
47				C6		E7	F12
56			C6		E7		
68						F8	
82		C6		E7			
100					F8		
120			E7				
150		E7		F8		F12	
220			F8		F12		
270		F8					
330				F12			
470			F12				
680		F12					
820	F12						

Table 8 New SV Series Characteristics List

Size Code	Part Number *1	Rated Voltage (V)	Nominal Capacitance (μF)	ESR (100kHz to 300kHz) (mΩ) (max.)	Maximum allowable ripple current (mA <sub>rms</sub> )*2	Tangent of loss angle (max.)	Leakage current (μA) (max.)*3
A5	16SV3R3MN	16	3.3	400	500	0.07	10.6
	10SV4R7MN	10	4.7	400	540	0.08	9.4
	10SV6R8MN	10	6.8	400	540	0.09	13.6
	10SV10MN	10	10	350	560	0.10	20.0
	6SV15MN	6.3	15	350	560	0.12	18.9
	4SV22MN	4	22	350	560	0.15	17.6
B6	20SV10M	20	10	220	600	0.10	40.0
	16SV15M	16	15	200	650	0.10	48.0
	10SV22M	10	22	180	700	0.15	44.0
	6SV33M	6.3	33	140	750	0.15	42.0
	4SV39M	4	39	120	780	0.15	31.0
C6	20SV22M	20	22	80	1050	0.10	88.0
	16SV27M	16	27	80	1100	0.10	86.0
	10SV47M	10	47	70	1150	0.15	94.0
	6SV56M	6.3	56	70	1200	0.15	71.0
	4SV82M	4	82	65	1250	0.15	66.0
E7	25SV10M	25	10	60	1400	0.12	50.0
	20SV47M	20	47	60	1450	0.12	188.0
	16SV56M	16	56	60	1500	0.12	179.0
	10SV82M	10	82	55	1550	0.15	164.0
	6SV120M	6.3	120	50	1600	0.15	151.0
	4SV150M	4	150	50	1700	0.15	120.0
F8	25SV22M	25	22	50	1800	0.12	110.0
	20SV68M	20	68	45	2000	0.12	272.0
	16SV100M	16	100	45	2200	0.12	320.0
	10SV150M	10	150	40	2400	0.15	300.0
	6SV220M	6.3	220	40	2700	0.15	277.0
	4SV270M	4	270	40	2800	0.15	216.0
F12	25SV47M	25	47	25	3500	0.10	235.0
	20SV150M	20	150	20	3600	0.10	600.0
	16SV220M	16	220	18	3700	0.12	704.0
	10SV330M	10	330	16	3800	0.15	660.0
	6SV470M	6.3	470	15	4000	0.15	592.0
	4SV680M	4	680	13	4200	0.15	544.0
	2SV820M	2	820	12	4400	0.15	328.0

\*1 Capacitance tolerance : M ; ±20%

\*2 100kHz, +45°C

\*3 After 2 minutes

Temperature coefficient for ripple current

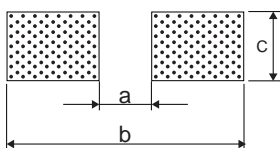
Ambient Temp.(°C)	to +45	+65	+85	+95	+105
Coefficient	1.0	0.85	0.7	0.4	0.25

Note:

Former SV series appeared in the OS-CON technical book version 5.2 has been integrated into New SV series, size A5. Please order it as New SV series. Additionally, part numbers of New SV series, size A5 have "N" in the end to distinguish themselves from former SV series.

Recommended land pattern dimension of PWB

(unit : mm)



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

\*New SV series is a new product. Therefore, the specification, dimension may be changed.

## Horizontal Surface Mounting Devices

SANYO has succeeded in developing the chip-type OS-CON. Ideal for use in products such as switching power supplies, VCRs, etc. where a surface mounting design is necessary.



Case color : Purple  
 Marking : Polarity(⊕), Rated voltage, Capacitance, Lot.No.

### Specifications

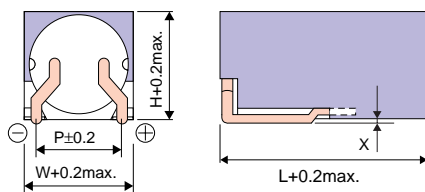
Items	Characteristics		
1. Operating temperature range	-55°C to +105°C		
2. Capacitance tolerance (120Hz)	M : ±20%		
3. Tangent of loss angle(tanδ) (120Hz)	Value in Table 9 or less		
4. Leakage current (μA/2min.)(or less) *1	A, B size 0.03CV or 1 (whichever is the greater) C, D, E size 0.05CV		
5. ESR (100k to 300kHz)	Value in Table 9 or less		
6. Temperature characteristics Impedance ratio at 100kHz., +20°C	-55°C	Z / Z <sub>20°C</sub>	1.0 to 2.0
	+105°C	Z / Z <sub>20°C</sub>	0.6 to 1.0
7. High-temperature load 105°C, 2,000Hrs. Rated voltage applied	ΔC/C		Within ±20%
	tanδ		1.5 times of Item 3 or less
	Leakage current		Item 4 or less
8. Moisture resistance (60°C, 90 to 95%RH, 500Hrs. no voltage)	ΔC/C		Within ±20%
	tanδ		1.5 times of Item 3 or less
	Leakage current		Item 4 or less
9. Reverse voltage guarantee	Temporary:less than 20% of the rated voltage, Continuous:less than 10% of the rated voltage		
10.Solder heat resistance (VPS) *2 (230°C X 10sec.)	ΔC/C		Within ±10%
	tanδ		2 times of Item 3 or less
	Leakage current		Item 4 or less

\*1 If any doubt arises, measure the current after applying voltage (voltage treatment) for 120 minutes at 105°C. The rated voltage should be applied for all wv.

\*2 The electrostatic capacity of SM series products may be changed by soldering such as reflow. Refer to page 40 for soldering specifications.

### Dimensions

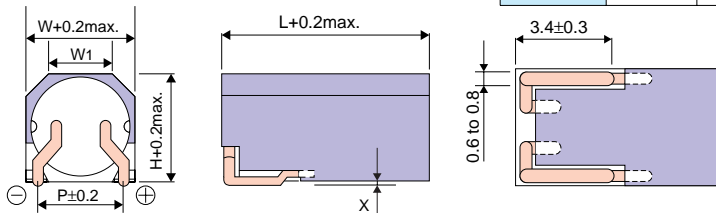
A, B, E  
Size



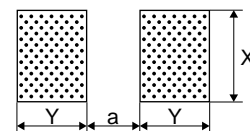
(unit : mm)

Size Code	L	W	H	P	X	W <sub>1</sub>
A	7.3	4.6	4.6	3.6	0.2max.	-
B	7.3	5.6	5.6	4.4	0.2max.	-
C	9.0	7.0	7.0	5.5	0.3max.	5.6
D	12.0	7.0	7.0	5.5	0.3max.	5.6
E	13.0	8.8	8.8	7.0	0.3max.	-

C, D  
Size



Recommended land pattern  
dimension of PWB.



### Size List

WV : Rated voltage  
(SV) : Surge voltage(room temperature)

μF	WV (SV)	6.3 (7.2)	10 (11.5)	16 (18.4)	20 (23)
1.0				A	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	D
22			C		D
33	C				D
47	C		D		E
68			D		E
100			E		
150	E				

(unit : mm)

Size	X	Y	a
A	4.7±0.1	2.0±0.1	1.6±0.1
B	4.7±0.1	2.2±0.1	2.2±0.1
C	4.7±0.1	2.5±0.1	3.0±0.1
D	4.7±0.1	2.5±0.1	3.0±0.1
E	4.7±0.1	2.8±0.1	4.2±0.1

Table 9 SM Series Characteristics List

Size Code	Part Number <sup>*1</sup>	Rated Voltage (V)	Nominal Capacitance (μF)	ESR (100kHz to 300kHz) (mΩ) (max.)	Maximum allowable ripple current (mA <sub>rms</sub> ) <sup>*2</sup>	Tangent of loss angle (max.)	Leakage current (μA) (max.) <sup>*3</sup>
A	20SM1M	20	1	600	430	0.06	1.00
	16SM2R2M	16	2.2	500	450	0.07	1.06
	16SM3R3M	16	3.3	450	500	0.08	1.58
	10SM4R7M	10	4.7	400	540	0.09	1.41
	6SM6R8M	6.3	6.8	400	560	0.09	1.29
B	20SM2R2M	20	2.2	300	695	0.06	1.32
	20SM3R3M	20	3.3	300	700	0.06	1.98
	16SM4R7M	16	4.7	300	720	0.07	2.26
	16SM6R8M	16	6.8	250	745	0.07	3.26
	10SM10M	10	10	250	780	0.09	3.00
	6SM15M	6.3	15	250	815	0.09	2.84
C	20SM4R7M	20	4.7	150	790	0.07	4.70
	20SM6R8M	20	6.8	150	800	0.07	6.80
	20SM10M	20	10	150	890	0.07	10.0
	16SM15M	16	15	150	900	0.07	12.0
	10SM22M	10	22	150	1000	0.07	11.0
	6SM33M	6.3	33	150	1240	0.07	10.3
	6SM47M	6.3	47	150	1320	0.08	14.8
D	20SM15M	20	15	125	1140	0.07	15.0
	20SM22M	20	22	125	1450	0.07	22.0
	20SM33M	20	33	125	1580	0.07	33.0
	10SM47M	10	47	100	1630	0.08	23.5
	10SM68M	10	68	100	1650	0.08	34.0
E	20SM47M	20	47	80	1710	0.07	47.0
	20SM68M	20	68	80	2020	0.07	68.0
	10SM100M	10	100	80	2110	0.08	50.0
	6SM150M	6.3	150	80	2150	0.09	47.2

\*1 Capacitance tolerance : M ; ±20%

\*2 100kHz, +45°C

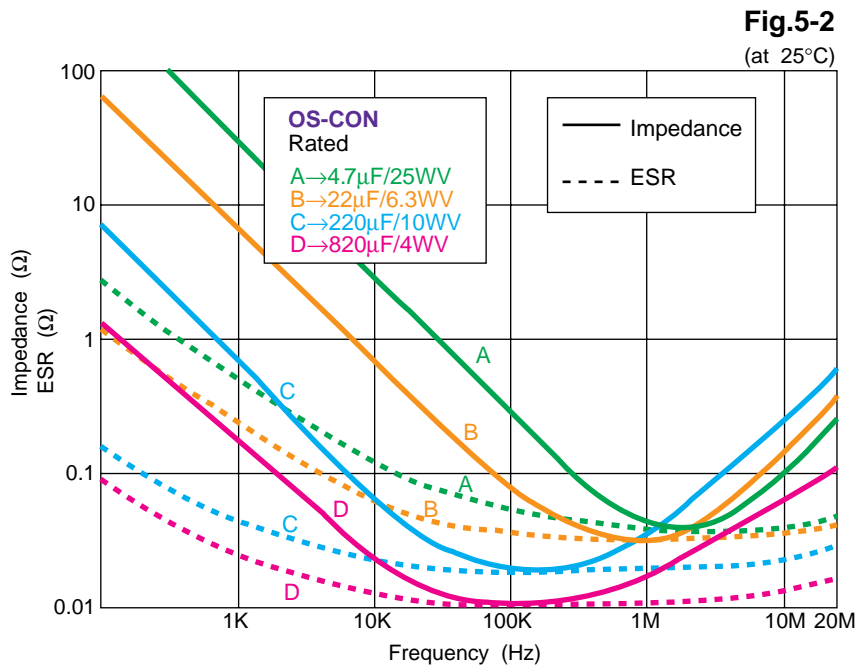
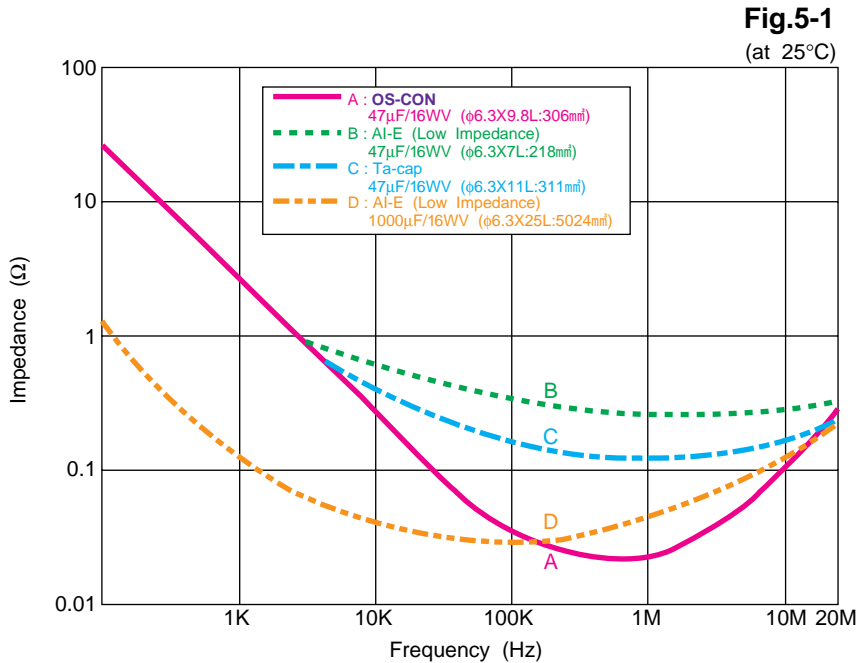
\*3 After 2 minutes

Temperature coefficient for ripple current

Ambient Temp.(°C)	to +45	+65	+85	+95	+105
Coefficient	1.0	0.85	0.7	0.4	0.25

### 3. OS-CON Electrical Characteristics

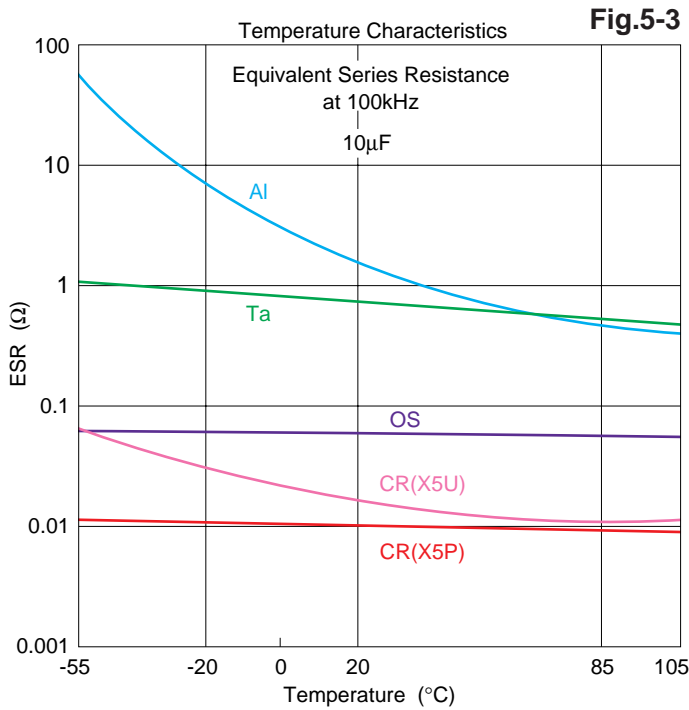
#### 3-1. Frequency Characteristic



The greatest feature of the **OS-CON** is its excellent frequency characteristic nearly equal to that of film capacitor. Using the high conductivity of an organic semiconductor with an electrolyte, and adopting the winding element for layer thinness of electrolyte, the ESR (Equivalent Series Resistance) is greatly improved, obtaining the frequency characteristic nearly equal to the film capacitor.

Fig.5-1 shows the impedance frequency characteristic of **OS-CON**, compared to that of other types of capacitors. The **OS-CON** shows a nearly ideal curve. When compared at 100kHz of frequency, **OS-CON** 47μF and low impedance aluminum electrolytic capacitor 1000μF nearly have the same feature. If the frequency gets higher, the capacitance ratio between **OS-CON** and aluminum electrolytic capacitor becomes bigger. Fig.5-2 shows the impedance and ESR frequency characteristics for each size of **OS-CON**. The resonance point of the **OS-CON** is at 100kHz to 10MHz. The ESR becomes about 10mΩ or less at 100kHz (820μF products), and extremely small value.

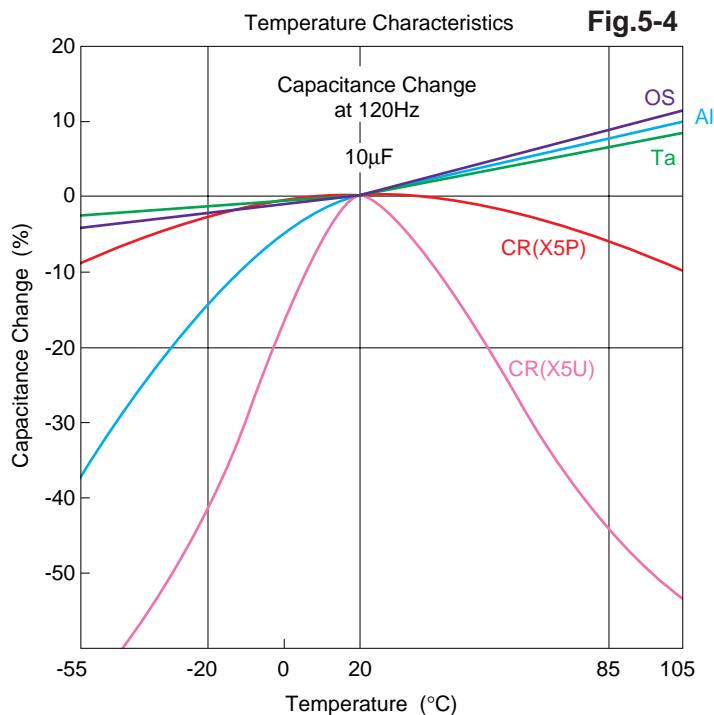
### 3-2 Temperature Characteristic



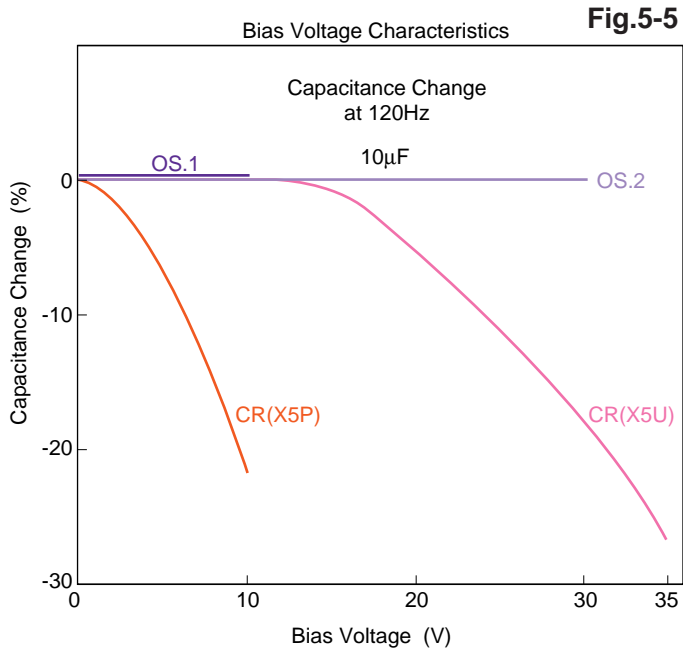
- OS = OS-CON ————— Purple
- Al = AL-E. Cap ————— Blue
- Ta = Tantalum Cap. ————— Green
- CR(X5P) = Cera Cap. (X5P Type) ————— Red
- CR(X5U) = Cera Cap. (X5U Type) ————— Pink

The temperature characteristic of the **OS-CON** is that it features little change in temperature for the ESR. Since ESR is dominant at high range of impedance (near resonance point), the ESR value greatly affects noise clearing capacity. What ESR changes little against temperature means that noise clearing ability changes little against temperature as well.

The **OS-CON** is best suited for outdoor apparatus and vehicles machineries.



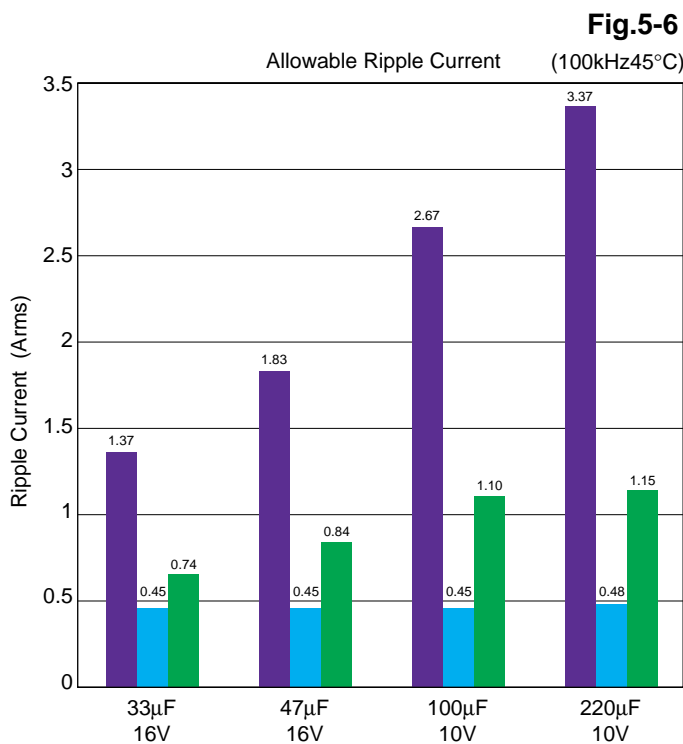
3-3 Bias Characteristic



OS.1 = OS-CON(10SL10M) — Purple  
 OS.2 = OS-CON(30SC10M) — Light Purple  
 CR(X5P) = Cera Cap. — Red  
 (X5P Type ; 10V-10μF)  
 CR(X5U) = Cera Cap. — Pink  
 (X5U Type ; 50V-10μF)

As far as the voltage within rated is applied for OS-CON (less than 80% of the rated voltage is recommended), it shows the stable characteristic that the capacitance changes little.

Also as regards bias characteristic, which must be considered in using ceramic capacitors, OS-CON can be used safely.



OS-CON (SA series) — Purple  
 Al-E. Cap. (Low Impedance) — Blue  
 Ta.Cap. (Low Impedance) — Green

When selecting smoothing capacitors for power supply, the allowable ripple current of the capacitor becomes one of the standard selections.

The allowable value of Ripple current is decided by generated heat of capacitor, but its heating come out of ESR. Since a large ESR capacitor generates larger heat value, it can not make the flow of Ripple current greater.

The OS-CON has a small ESR, and compared to other electorolytic capacitors, can allow far more ripple currents.

3-5. Many property

