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■ ■ Devices thru Material Innovation
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NEC/TOKIN

Chip Capacitors

Product Information



Lead-free
tantalum
chip capacitors

Conductive polymer
tantalum
chip capacitors
NeoCapacitor

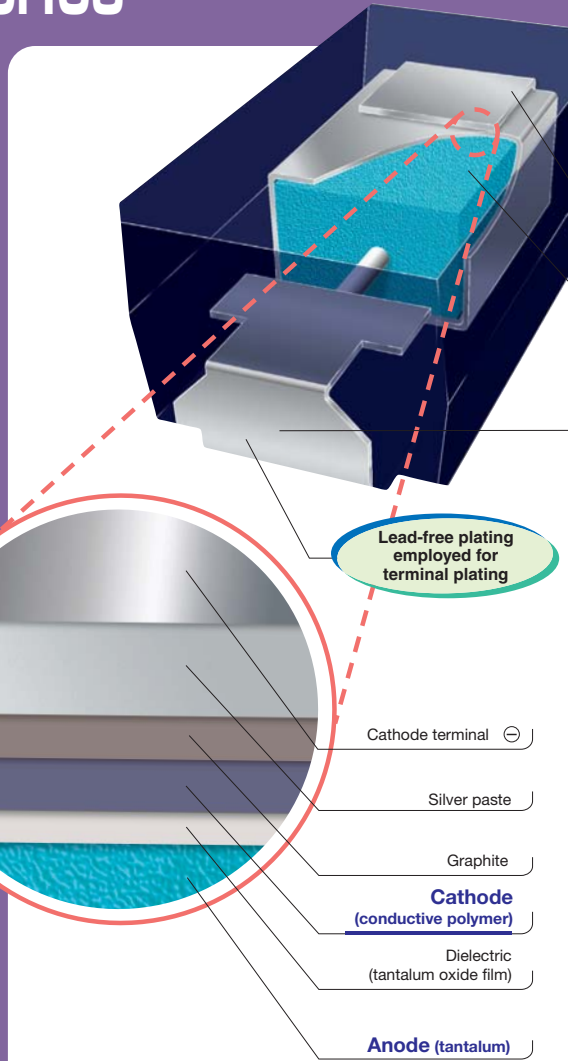


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Ultra-low ESR/RoHS compliant conductive polymer tantalum chip capacitors *NeoCapacitor*™ PS/L series

Featuring new 12 mΩ ultra-low ESR model highly effective for decoupling and noise reduction. Now available with RoHS compliant lead free plating.

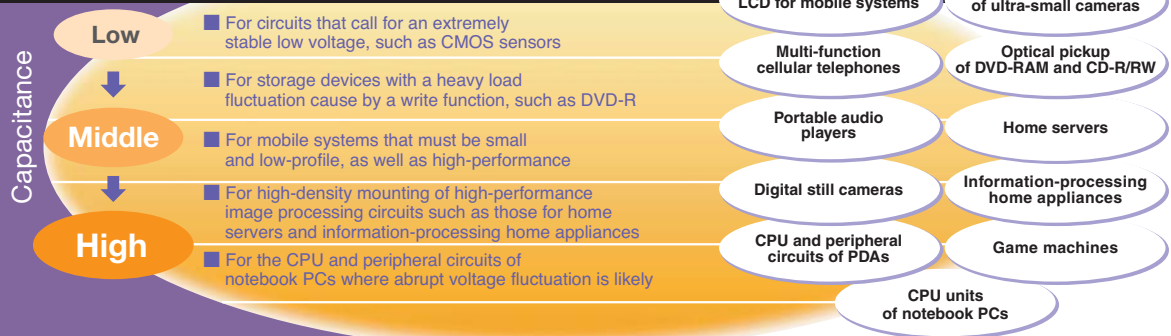
The conductive polymer tantalum chip capacitors, NeoCapacitor, is small but has a high capacitance and an ultra-low ESR (Equivalent series resistance). Compared with other capacitors, the NeoCapacitor absorbs a large amount of noise with less capacitance. By using the NeoCapacitor, therefore, the number of capacitors and mounting space can be reduced. This capacitor is thus ideal for electronic systems that are required to provide not only a high performance and sophisticated functions, but also a small size. In addition, the high permissible ripple current of the NeoCapacitor makes it ideal for smoothing switching power supplies.



Features

- New, ultra-small case (1608 size) available
- Low-profile series 1.1 mm or less in height (J, P, A2, B3 case) offering a wide variation of capacitance, from 2.2 μF to 47 μF
- 1000 μF large capacitance model available for D case (7343 size)
- New, Low-profile 1.5mm or less height with large capacitance series (C2 case) available

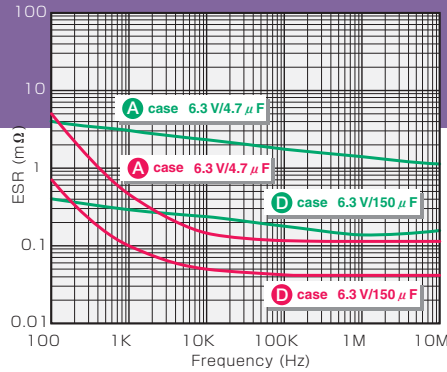
Application fields of NeoCapacitor



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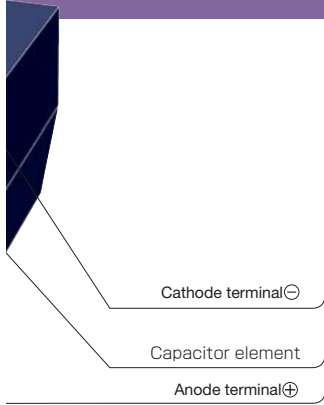
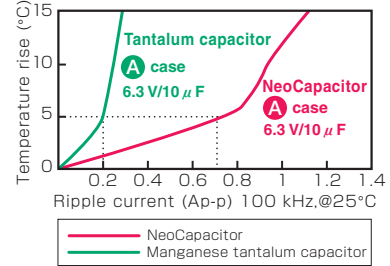
Comparison with standard product (manganese dioxide type)

Comparison of ESR



Comparison of ripple current

Because the ESR of the NeoCapacitor is low, a ripple current 3.5 times higher than the manganese tantalum capacitor is allowed to flow through the Neo-Capacitor over a temperature rise of 5°C.



Structure of NeoCapacitor

Comparison of output ripple current in DC/DC converter (example of using B2 case)

Shown below are the output ripple current of the NeoCapacitor (PS/L series) in a B2 case (3528 size) used in a 10 W class DC/DC converter, and the output ripple current of the manganese tantalum capacitor in the same circuit. The output ripple current of the NeoCapacitor is less than 1/2 of that of the manganese tantalum capacitor, demonstrating the superb noise absorption of the NeoCapacitor. This indicates that the NeoCapacitor can help reduce the number of components and mounting space.

With NeoCapacitor
(B2 case 6.3 V/47 μF)

60 mVp-p

With manganese tantalum capacitor
(B2 case 6.3 V/47 μF)

150 mVp-p

DC/DC converter

PS/L series product lineup

DC rated voltage [V(DC)] Capacitance (μF)	2.5	4	6.3	10	16	20	25
1.0							
2.2			J 500		J 500		
3.3			J 500 P 300		A 300		A 800
4.7			J 500 P 300		A2 300 A 300		B2 200
6.8			P 300 A 300		A2 300 A 300 B2 200		B2 200
10		J 300 P 200 A 200	P 200 A2 200 A 200	A2 200 A 200 B2 200	A 180 B2 150 C 200		B2 100
15			A2 200 A 200 B2 150	A 180 B3 70 B2 150	A 180 B3 70 B2 150 C 150		
22	P 200	P 200 A2 200 B2 150	A2 200 A 180 B3 70 B2 150	A 200 B3 70 B2 150 C2 70 C 100	V 70		
33	A2 150	A2 150 A 180	A 180 B3 70 B2 150	B3 70 B2 70 C2 70 C 100	B3 70 B2 70 C2 70 C 55 V 60 D 100	V 70 D 70	
47	A2 150	A 180 B3 70	A 180 B3 70 B2 70 C2 70 C 100	C2 55 C 55 V 60 D 100	C2 55 C 55 V 60 D 100		
68		A 180 C2 55 C 100	B3 70 B2 55 C2 55 C 100	C2 55 C 55 V 60 D 100			
100	B3 70	B3 70 B2 35 C2 55	B2 35 C2 70 C 55	C2 55 C 55 V 25 D 55			
150		B2 25 C 100	B2 45 C2 55 C 25 V 18 D 25	C 55 V 40 D 40			
220	B2 25	B2 45 C 18 V 12 D 12	V 12 D 40	D 25			
330	B2 45 C 18 V 12	C 55 V 12 D 15	V 25 D 18				
470	V 12	D 10					
680	D 12	D 12					
1000	D 15						

Letter: Case code
 Numeral: ESR (mΩ) at 100 kHz, 25°C
 *Models with a different ESR value are also available.

□ For the case size, refer to page 8. For the part number, refer to page 9.



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Single Digit ESR/RoHS compliant. conductive polymer tantalum chip capacitors *NeoCapacitor*™ PS/G series

Features

- Extreme low ESR (6mΩ) and excellent noise absorption performance.
- High capacitance and ultra low ESR based upon on our original Conductive Polymer technology.
- Same outer dimension an conventional PS/L series.
- Lead-free plating employed for terminal plating.
- RoHS compliant.

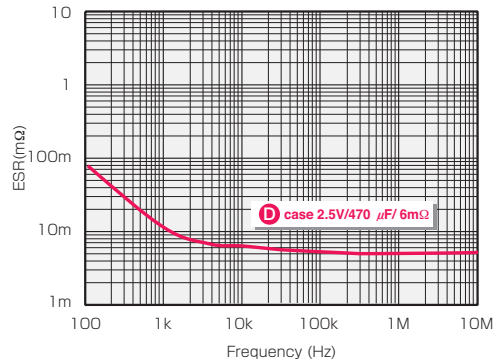
PS/G series product lineup

DC rated vltage (V DC)	2.5		4	
Capacitance (μF)	2.5		4	
220	V 7*		V 9	
330	V 6*	D 7*		
470	V 9	D 6*		
680		D 6*		

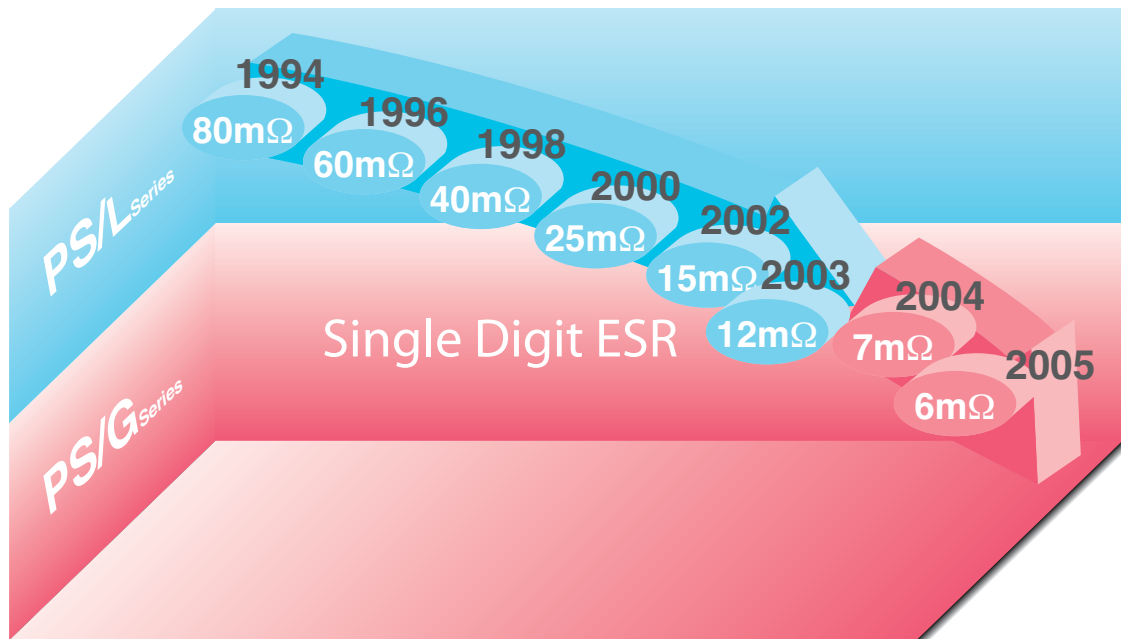
Letter : Case code
 Numeral : ESR (mΩ) at 100 kHz, 25°C
 *Models with a different ESR value are also available.

For the case size, refer to page 8. For the part number, refer to page 9.

Frequency characteristics (reference)



The pursuit of Ultra-Low ESR *NeoCapacitor*™



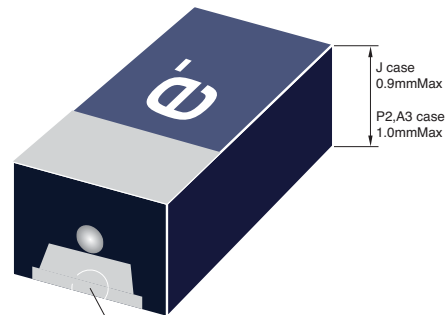
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Face down terminal and High capacitance Lead-free/RoHS compliant Tantalum chip capacitors F/SV series

The face down terminal structure minimizes its occupied internal volume, making space for installing a larger capacitor element.

Features

- The low profile of height 0.9mm Max and large capacitance of 47 mF available in 1608 size.
- Enable fillet bonding.
- Lead-free plating is employed for terminal plating.
- RoHS compliant.



Enable fillet bonding
Lead-free plating
employed for
terminal plating

F/SV series product lineup

DC rated voltage(V DC) Capacitance(μF)	2.5	4	6.3	10	16	20	25
1.5							
2.2							
3.3							
4.7							
6.8							
10							
15							
22			J				
33		J					
47	J						
68		P2					
100	P2						
220	A3						

For the case size, refer to page 8. For the part number, refer to page 11.

Face down terminal, high capacitance and ultra-low ESR Conductive Polymer Tantalum Capacitor *NeoCapacitor* F/PS Series

Lead-free/RoHS compliant

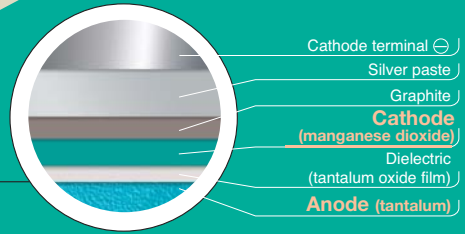
F/PS series Product lineup

DC rated voltage(V DC) Capacitance(μF)	6.3	10
10		
15		
22		
33		A3 200
47	A3 200	

Letter: Case code Numeral: ESR(mΩ) at 100 kHz, 25°C For the case size, refer to page 8. For the part number, refer to page 11.

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Lead-free/RoHS compliant tantalum chip capacitors E/SV series



Structure of tantalum capacitor

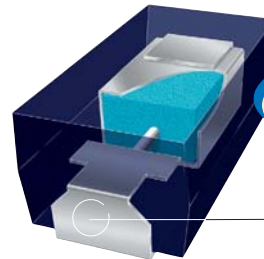


Features

- Ideal for producing environment-friendly products because no lead is used
- Extensive lineup for easy replacement of the existing R and SV/S series

Excellent electrical specifications and reliability help you produce RoHS compliant environment-friendly products. An extensive lineup is available.

The E/SV series tantalum chip capacitors boast excellent electrical characteristics, stable performance, and high reliability. Conventional manganese dioxide is used for the cathode and these tantalum chip capacitors are used in a wide variety of application fields from audio/visual and information systems to communications equipment. In addition, new lead-free models are also available to realize RoHS compliant environment-friendly products. Because the case size and characteristics of these new models are identical to those of the existing models, they can easily replace models in the existing series.



Lead-free plating employed for terminal plating

E/SV series product lineup

P Letter: Case code
 Bold letter: Recommended case code

DC rated voltage(V DC) Capacitance(μF)	2.5	4	6.3	10	16	20	25	35
0.47					P	A2	A	A
0.68					P	A2	A	A
1				P	J P	A2	P A2 A	A2 A
1.5			P	J P	J A	A2		A
2.2			J	J P	P A2 A	P A2 A	A	A B2
3.3		P	J	J P A2	P A2 A	A2 A B3	A	B3 B2
4.7			J P A	J P A2 A	A2 A	A2 A B3 B2 B3 B2	B3 B2	C
6.8		J	J P A2	A2 A	A B3	B3 B2	B2	C
10	J	J P	J P A2 A	P A2 A B2	A B3 B2	B2	C2 C	C D
15	J	P	P A2 A	A2 B3	A B2	C	C	D
22	P A2	P A2 A	P A2 A B3 B2	A B3 B2	B3 B2 C	C2 C D	D	
33	P A2	P A2 A	A2 A B3	B3 B2	B2 C2 C	D	D	
47	P A2 A	P A2 A B3	A B3 B2 C	B2 C2 C	C D	D		
68	A	A B3	A B3 B2 C2	B2 C2 C	C D			
100	A B3 B2	A B3 B2 C2	A B3 B2 C2 C	C2 C V D	D			
150	A B3 C2	B2 C2	B2	V D				
220	B3 B2 C2	B2 C	C V D	D				
330	B2 C	C V	V D					
470	B2 C D	D	D					
680		D						

□ For the case size, refer to page 8. For the part number, refer to page 10.

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NEC TOKIN Tantalum capacitor Compliance to RoHS Directive

Tantalum Capacitor

Y: Under the limit =COMPLIANT E: Exemptions =COMPLIANT N: Greater or equal to the Limit =NOT COMPLIANT -: Contact NEC TOKIN for details

Product Family/ Product Type	Series Name	Part Number ex. Bulk Taping	Compliance with RoHS Substance Restriction						RoHS Status Compliant: Y, Not compliant: N	Compliant Product Status Under mass production, Expected date or Not planned	Remarks
			Cd <100ppm	Cr+6 <1000ppm	Pb <1000ppm	Hg <1000ppm	PBB <1000ppm	PBDE <1000ppm			
Chip type/SMD											
Face down terminal	F/SV	FSV*** TEFSV***	Y	Y	Y	Y	Y	Y	Y	Under mass production	
Standard	E/SV	ESV*** TEESV***	Y	Y	Y	Y	Y	Y	Y	Under mass production	
Low ESR	SV/Z	SVZ*** TESVZ***	Y	Y	Y	Y	Y	Y	Y	Under mass production	
NeoCapacitor/ polymer	PS/G	PSG*** TEPSG***	Y	Y	Y	Y	Y	Y	Y	Under mass production	
	PS/L	PSL*** TEPSL***	Y	Y	Y	Y	Y	Y	Y	Under mass production	
NeoCapacitor/ polymer/ face down terminal	F/PS	FPS*** TEFPS***	Y	Y	Y	Y	Y	Y	Y	Under mass production	
With fuse	SV/F	SVF*** TESVF***	Y	Y	N	Y	Y	Y	N	Not planned	
High-performance product	SV/H	SVH*** TESVH***	Y	Y	N	Y	Y	Y	N	Not planned	
Conventional	SV/S	SVS*** TESVS***	Y	Y	N	Y	Y	Y	N	-	Compatible with E/SV series
	R (extended)	NR***	Y	Y	N	Y	Y	Y	N	-	
	R	NR***	Y	Y	N	Y	Y	Y	N	-	
Resin coated exterior type/insert											
	DN	DN*** TPDN***	Y	Y	N	Y	Y	Y	N	Not planned	
		DHR*** TPDHR***	Y	Y	N	Y	Y	Y	N	Not planned	
	D	ND***	Y	Y	N	Y	Y	Y	N	Discontinued	

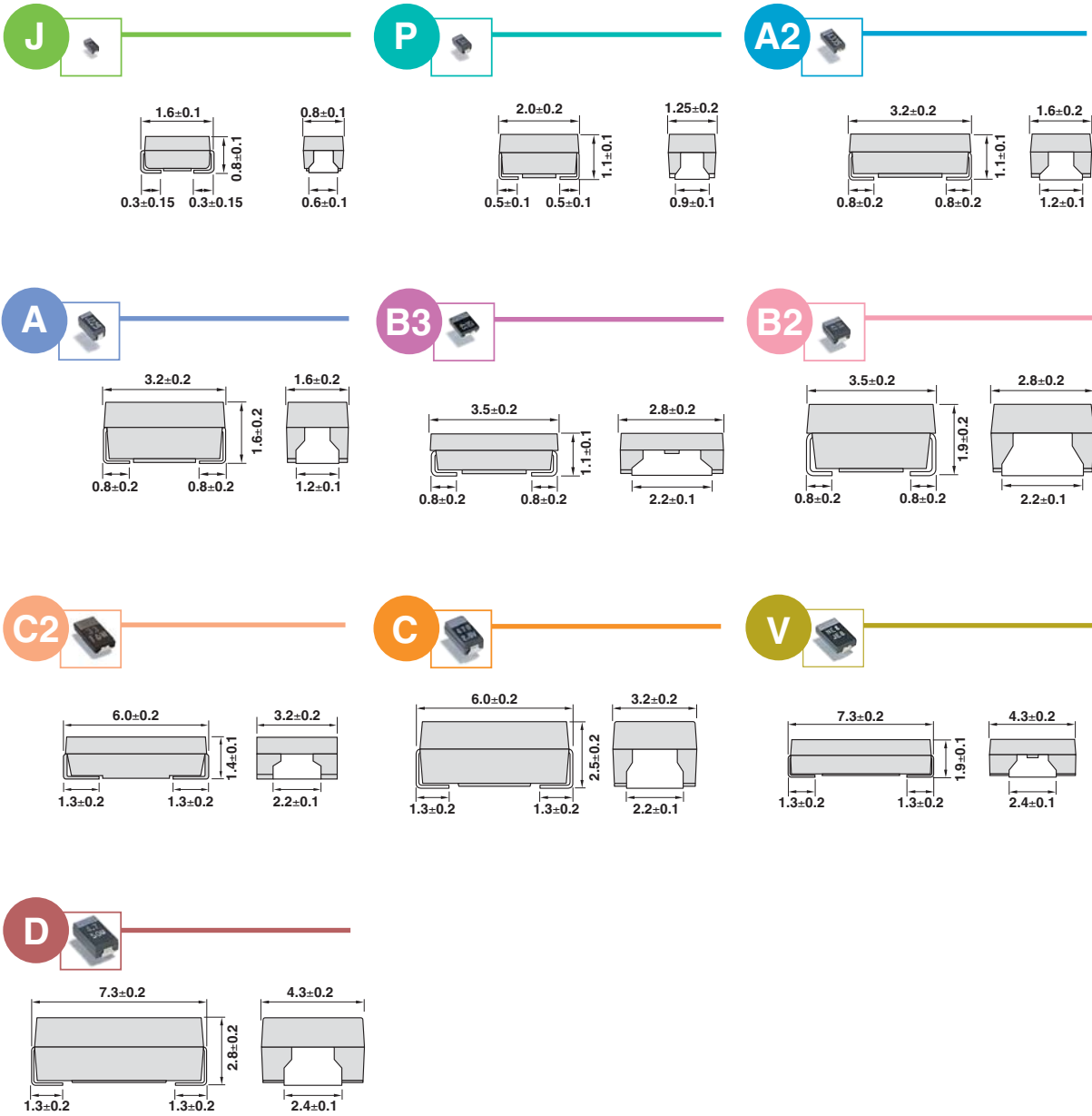
- The RoHS compliance means that we judge from EU Directive 2002/95/EC the products do not contain lead, cadmium, mercury, hexavalent chromium, PBB and PBDE, except impurities existing in natural world.
- This statement does not insure the compliance of any of the listed parts with any laws or legal imperatives developed by any EU members individually with regards to the RoHS Directive.
- The descriptions given in this catalogue are based on product information as of January 2006. Please contact us for information about our current products.
- This catalogue uses only representative series names for products. In order to ensure correct and safe product usage, please request a delivery specification sheet so you can confirm detailed product characteristics.
- Please note that these descriptions are subject to change without notification due to improvements or other reasons.
Please contact NEC TOKIN regarding custom-made products that are not listed here.



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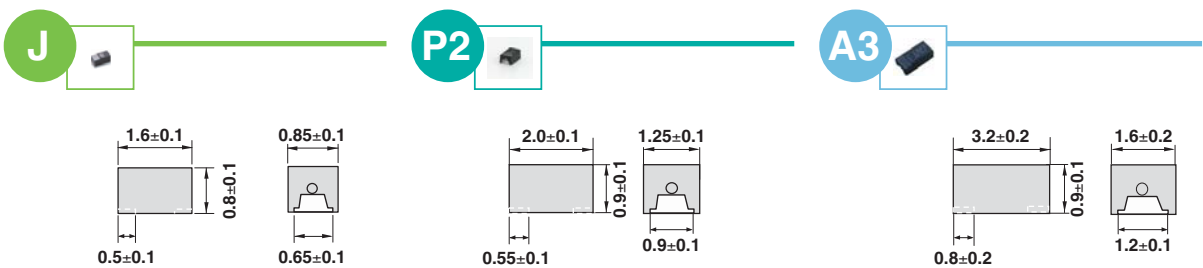
Dimensions

Unit: mm



Dimensions (F/SV series and F/PS series)

Unit: mm



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Table with columns: DC rated voltage (V DC), Capacitance (µF), Dissipation factor (%), DC leakage current (µA), ESR (mΩ), Permissible ripple current (mA rms), Case code, Part number (tape model*2).

Table with columns: DC rated voltage (V DC), Capacitance (µF), Dissipation factor (%), DC leakage current (µA), ESR (mΩ), Permissible ripple current (mA rms), Case code, Part number (tape model*2).

*1: 5 minutes after application of rated voltage
*2: The part number of the bulk model is without the prefix TE and suffix 12R.

*1: 5 minutes after application of rated voltage
*2: The part number of the bulk model is without the prefix TE and suffix 12R.



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Lead-free Tantalum chip capacitors

E/SV series (J•P•A2•A•B3•B2•C•C•V•D)

Test conditions: Conform to IEC 60384-1.

DC rated voltage (V DC)	Capacitance (μF) 120 Hz	Dissipation factor (%) 120 Hz	DC leakage current ^{*1} (μA)	ESR (Ω) 100 kHz	Case code	Part number (tape model ^{*2})
20	1	6	0.5	12	A2	TEESVA21D105M8R
	1.5	6	0.5	7.4	A2	TEESVA21D155M8R
	2.2	10	0.5	8	P	TEESVP1D225M8R
	2.2	6	0.5	7	A2	TEESVA21D225M8R
	2.2	6	0.5	6	A	TEESVA1D225M8R
	3.3	8	0.6	5	A2	TEESVA21D335M8R
	3.3	6	0.6	5	A	TEESVA1D335M8R
	3.3	6	0.6	3.9	B3	TEESVB31D335M8R
	4.7	15	0.9	5	A2	TEESVA21D475M8R
	4.7	6	0.9	5	A	TEESVA1D475M8R
	4.7	6	0.9	3	B3	TEESVB31D475M8R
	4.7	6	0.9	3	B2	TEESVB21D475M8R
	6.8	6	1.3	3	B3	TEESVB31D685M8R
	6.8	6	1.3	2.8	B2	TEESVB21D685M8R
	10	6	2	2.5	B2	TEESVB21D106M8R
	15	6	3	1.7	C	TEESVC1D156M12R
	22	6	4.4	1.4	C2	TEESVC21D226M12R
	22	6	4.4	1.4	C	TEESVC1D226M12R
	22	6	4.4	0.8	D	TEESVD1D226M12R
	33	6	6.6	0.8	D	TEESVD1D336M12R
47	6	9.4	0.7	D	TEESVD1D476M12R	
0.47	4	0.5	13	A	TEESVA1E474M8R	
0.68	6	0.5	9	A	TEESVA1E684M8R	
25	1	6	0.5	8	P	TEESVP1E105M8R
	1	6	0.5	13	A2	TEESVA21E105M8R
	1	6	0.5	8	A	TEESVA1E105M8R
	2.2	6	0.5	7	A	TEESVA1E225M8R
	3.3	6	0.8	7	A	TEESVA1E335M8R
	4.7	6	1.1	3	B3	TEESVB31E475M8R
	4.7	6	1.1	3	B2	TEESVB21E475M8R
	6.8	6	1.7	2.5	B2	TEESVB21E685M8R
	10	6	2.5	2	C2	TEESVC21E106M12R
	10	6	2.5	1.5	C	TEESVC1E106M12R
	15	6	3.7	1.5	C	TEESVC1E156M12R
	22	6	5.5	0.8	D	TEESVD1E226M12R
	33	6	8.2	0.7	D	TEESVD1E336M12R
	0.47	6	0.5	12	A	TEESVA1V474M8R
	0.68	6	0.5	8	A	TEESVA1V684M8R
35	1	6	0.5	13	A2	TEESVA21V105M8R
	1	6	0.5	7	A	TEESVA1V105M8R
	1.5	6	0.5	7	A	TEESVA1V155M8R
	2.2	6	0.7	5	A	TEESVA1V225M8R
	2.2	6	0.7	4	B2	TEESVB21V225M8R
	3.3	6	1.1	3	B3	TEESVB31V335M8R
	3.3	6	1.1	3.5	B2	TEESVB21V335M8R
	4.7	6	1.6	2.2	C	TEESVC1V475M12R
	6.8	6	2.3	1.9	C	TEESVC1V685M12R
	10	6	3.5	1.5	C	TEESVC1V106M12R
	10	6	3.5	1	D	TEESVD1V106M12R
	15	6	5.2	0.9	D	TEESVD1V156M12R

*1 : 5 minutes after application of rated voltage

*2 : The part number of the bulk model is without the prefix TE and suffix 8R or12R.

Example: Tape model TEESVJ1A155M8R → Bulk model ESVJ1A155M
Tape model TEESVD0J477M12R → Bulk model ESVD0J477M

Face down terminal

F/SV series (J, P2 case)

Test conditions: IEC 60384-1.

DC rated voltage (V DC)	Capacitance (μF) 120 Hz	Dissipation factor (%) 120 Hz	DC leakage current ^{*1} (μA)	ESR (Ω) 100 kHz	Case code	Part number (tape model ^{*2})
2.5	47	30	1.1	4	J	TEFSVJ0E476M8R
	100	35	2.5	3	P2	TEFSVP20E107M8R
	220	20	5.5	1	A3	TEFSVA30E227M8R
4	33	30	1.3	4	J	TEFSVJ0G336M8R
	68	18	2.7	2.5	P2	TEFSVP20G686M8R
6.3	22	20	1.3	4	J	TEFSVJ0J226M8R

*1 : 5 minutes after application of rated voltage

*2 : The part number of the bulk model is without the prefix TE and suffix 8R.

Example: Tape model: TEFSVP20E107M8R Bulk model: FSVP20E107M
Tape model: TEFPSA31A336M8R → Bulk model: FPSA31A336M

Face down terminal

F/PS series (A3 case)

Test conditions: Conform to IEC 60384-1.

DC rated voltage (V DC)	Capacitance (μF) 120 Hz	Dissipation factor (%) 120 Hz	DC leakage current ^{*1} (μA)	ESR (mΩ) 100 kHz	Permissible ripple current (mA _{rms}) 100kHz	Case code	Part number (tape model ^{*2})
6.3	47	6	29.6	200	548	A3	TEPSA31A336M8R
10	33	6	33	200	548	A3	TEPSA31A336M8R



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