NEC/TOKIN vices thru Material Innovation Uol.02 Capacitors Capacitors

> 勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787

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Correct Use of Tantalum Chip Capacitors

Be sure to read this before using NEC TOKIN Tantalum Capacitors.

[Notes]

- Be sure to read "Notes on Using The Solid Tantalum Capacitor" (p34 p42) and "Cautions" (p43)
 before commencing circuit design or using the capacitor.
- Confirm the usage conditions and rated performance of the capacitor before use.
- Ninety percent of the failure that occurs in this capacitor is caused by an increase in leakage current or short-circuiting. It is therefore important to make sufficient allowances for redundant wiring in the circuit design.

[Quality Grades]

NEC TOKIN devices are classified into the following quality grades in accordance with their application (for details of the applications, see p43). The quality grade of all devices in this document is "standard"; the devices in this document cannot be used for "special" or "specific" quality grade applications. Customers who intend to use a product or products in this document for applications other than those specified under the "standard" quality grade must contact NEC TOKIN sales representative in advance (see the reverse side of the cover for contact details).

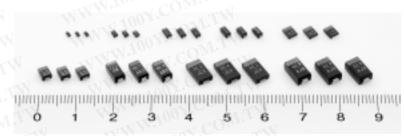
- Standard: This quality grade is intended for applications in which failure or malfunction of the device is highly unlikely to cause harm to persons or damage to property, or be the source of any negative effects or problems in the wider community.
- Special: This quality grade is intended for special applications that have common requirements, such specific industrial fields. Devices with a "special" quality grade are designed, manufactured, and tested using a more stringent quality assurance program than that used for "standard" grade devices. There is a high possibility that failure or malfunction of the device when being used for applications in this category will cause harm to persons or damage to property, or create negative effects or problems in the wider community.
- Specific: Devices with a "specific" quality grade are designed, manufactured, and tested using a quality assurance program that is designated by the customer or that is created in accordance with the customer's specifications. There is an extremely high possibility that failure or malfunction of the device when being used for applications in this category will cause harm to persons or damage to property, or create serious problems in the wider community. Customers who use NEC TOKIN's products for these "specific" applications must conclude an individual quality agreement and/or development agreement with NEC TOKIN. A quality assurance program designated by the customer must also be determined in advance.

NEC TOKIN offers the latest technology

<Tantalum Capacitors>

<Conductive Polymer Tantalum Capacitors>
"NeoCapacitors"





NEC has been manufacturing solid electrolyte tantalum capacitors for more than 30 years. As a result of NEC's active research and development programs, NEC capacitors offer the designer the latest technology plus outstanding performance. NEC capacitors are used extensively in industrial, commercial, entertainment, and medical electronic equipment.

NEC has obtained ISO 9001 and QS9000 certificates of registration for capacitors.

NEC, in response to the wave of the worldwide environment protection consciousness, developed E/SV series by eliminating lead from the terminals. The low-ESR conductive polymer tantalum capacitors are expected to meet an important market need; they are suited for DC/DC converters, video cameras, personal handy phones, etc.

The business of manufacturing and sale of capacitors was divided and transfered to Tokin, as of April 1, 2002. Then Tokin changed its corporate name to "NEC TOKIN Corporation," which has charge of electronic components business within the NEC Group.

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TANTALUM CAPACITORS

Description

NEC TOKIN's tantulum capacitors offer the designer advanced technological design and excellent performance characteristics for filtering, bypassing, coupling, decoupling, blocking, and R C timing circuits. They are used extensively in industrial, commercial, entertainment, and medical electronic equipment.

The tantalum capacitor is inherently very reliable and there is significant evidence that this reliability improves with age-perhaps indefinitely. Capacitance loss with age and other problems often associated with liquid electrolytes are nonexistent in solid electrolyte tantalums.

A process used to further improve the reliability of tantalums is to burn them in at elevated voltages at 85°C for extended periods of time, thus eliminating high leakage and other undesirable characteristics. This process is done because solid electrolyte tantalum capacitors do not conform to the exponential distribution of time ordered failures, but instead exhibit a constantly decreasing failure rate.

If you specify NEC TOKIN tantalums, you can feel confident that you are getting the best available quality, reliability, and price.

TANTALUM CHIP CAPACITORS

Features	Dissipation Factor (%)	DC Leakage Current (μΑ)	Capacitance Tolerance (%)	Capacitance Range (μF)	DC Rated Voltage Range (V)	Operating Temperature Range (°C)	Series
Standard Miniaturized Ultra miniaturized	2.5 Vdc to 10 Vdc ⁽²⁾ : 8 to 30 16 Vdc to 35 Vdc : 4 to 15	0.01 CV ⁽¹⁾ or 0.5 whichever is greater	±20 or ±10 (P, J case;±20)	0.47 to 680	2.5 to 35	-55 to +125	E/SV
Face down terminal Ultra miniaturized Large Capacitance	30	0.01 CV ⁽¹⁾ or 0.5 whichever is greater	±20	33 to 47	2.5 to 4	–55 to +125	F/SV
Low ESR	6 to 14 ⁽³⁾	0.01 CV ⁽¹⁾ or 0.5 whichever is greater	±20 or ±10	6.8 to 330	4 to 35	-55 to +125	SV/Z
Conform to RoHS	Lead-free/	lymer Type)	(Conductive Po	NeoCapacitor			
Ultra-low ESR	4 to 10 ⁽⁴⁾	0.1 CV ⁽¹⁾ or 3, (J case:10) whichever is greater	±20	2.2 to 1000	2.5 to 16	-55 to +105	PS/L
Ultra-low ESR (Single digit ESR)	10	0.1 CV ⁽¹⁾ or 3, whichever is greater	±20	330 to 680	2.5	-55 to +105	PS/G

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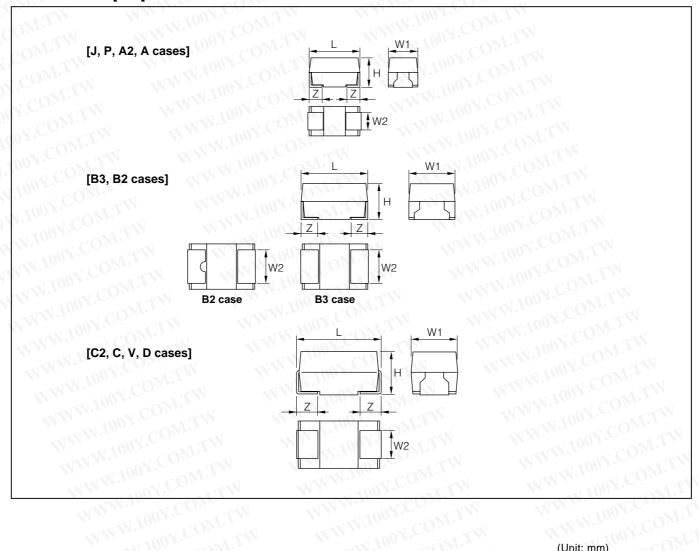
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E/SV Series Tantalum Chip Capacitors

■ FEATURES

- Lead-free Type. In conformity to RoHS.
- Offer a range of small, high-capacity models.
- Succeed to the latest technology plus outstanding peformance.

■ DIMENSIONS [mm]

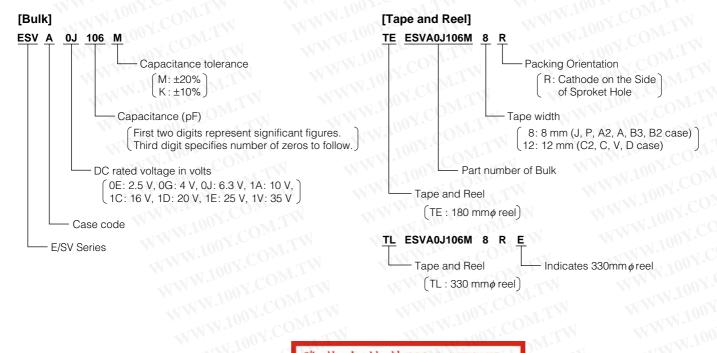


WW.10	COM		WW.1	CON		(Unit: mm
Case Code	EIA code		W ₁	W ₂	H	z
J	700 = CO	1.6 ± 0.1	0.8 ± 0.1	0.6 ± 0.1	0.8 ± 0.1	0.3 ± 0.15
Р	2012	2.0 ± 0.2	1.25 ± 0.2	0.9 ± 0.1	1.1 ± 0.1	0.5 ± 0.1
A2 (U)	3216L	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.1 ± 0.1	0.8 ± 0.2
A	3216	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.6 ± 0.2	0.8 ± 0.2
3 (W)	3528L	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.1 ± 0.1	0.8 ± 0.2
2 (S)	3528	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.9 ± 0.2	0.8 ± 0.2
C2	TN.100	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	1.4 ± 0.1	1.3 ± 0.2
С	6032	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	2.5 ± 0.2	1.3 ± 0.2
V	WIT W.	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	1.9 ± 0.1	1.3 ± 0.2
D	7343	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	2.8 ± 0.2	1.3 ± 0.2

	UR	2.5V	4V	6.3V	10V	16V	20V	25V	35V
μ F		0E	0G	0J	1A	1C	1D	1E	1 V
0.47	474	1	0	TW	1	P	A2	A	A
0.68	684	MAL	100 Y.Co.	TW	MM	P	A2	A	A
1.0	105	WWW.	ON.CO	TW	P	J, P	A2	P, A2, A	A2, A
1.5	155		Jan C	P	J, P	Α	A2	N.	A
2.2	225	1	1.100	MJ	J, P	P, A2, A, [J]	P, A2, A	A, [P]	A, B2
3.3	335	MM	P	JII	P, A2	A2, A	A, B3	A	B2, [B3
4.7	475	WW	M. TOOX	J, P, A	J, P, A2, A	A2, A	A2, A, B3, B2	B3, B2, [A2]	С
6.8	685		J	J, P, A2	A2, A	A, B3	B2	W	С
10	106	J	J, P	J, P, A2, A	P, A2, A, B2	A, B3, B2	B2	C, [B2]	C, D
15	156		P	P, A2, A	B3, [P]	B2, [A]	100°C	C	D
22	226	P, A2	P, A2, A	P, A2, A, B3, B2	A, B3, B2, [A2]	B3, B2, C	C2, C, D	D	
33	336	P, A2	P, A2, A	A, B3, [A2]	B3, B2, [A]	C2, C, [B2]	D	D	
47	476	P, A2, A	P, A2, A, B3	A, B3, B2, C	B2, C2, C, [B3]	C, D	D	[D]	Ţ.
68	686	A	A, B3	B2, C2	B2, C2, C	C, D	M.Ing	COMP.	N.
100	107	B3, B2	A, B3, B2, C2	B2, C2, C, [B3]	C, V, D, [C2]	D	100°	COMI	-1
150	157	A, B3, C2	B2, C2	C	V, D	T)	100	M.O.	
220	227	B2, C2	B2, C	C, V, D	CO D	I	N. W.	O.Y.Co.	W
330	337	B2, C	C, V	D	COM	αÚ	MINN'I	CON	W
470	477	C, D	D	D	COM	-1		100 × CO	1.1
680	687	TI	D	100	7.0	LAN.	M. A.	1007.	WITM

^{[]:}Under development

■ PART NUMBER SYSTEM



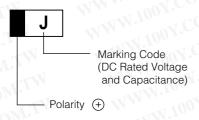
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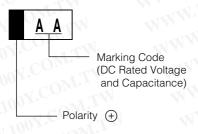
■ MARKINGS

The standard marking shows capacitance, DC rated voltage, and polarity.

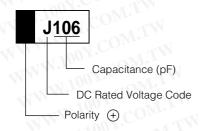
[J case] (ex. $4.7 \,\mu\text{F} / 6.3 \,\text{V}$)



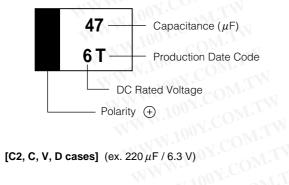
[P case] (ex. 1 μ F / 10 V)

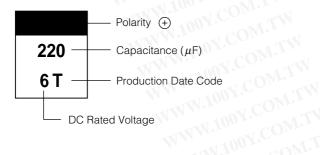


[A2, A cases] (ex. $10 \,\mu\text{F} / 6.3 \,\text{V})$



[B3, B2 cases] (ex. $47 \,\mu\text{F} / 6.3 \,\text{V}$)





[J case Marking Code]

4411					
μ F	2.5 V	4 V	6.3 V	10 V	16 V
1.0	on V.Co	WT			0
1.5	-1 C	DMr.	(1	A	
2.2	1001.	OWITY	ſ	⋖	
3.3	· Any.	O T	W ¬		
4.7	N.Ing	CO_{Mr}	J	≻	
6.8	4 100 X	G	ے		
10	е	G	TIT		

[P case Marking Code]

μ F UR	2.5 V	4 V	6.3 V	10 V	16 V	20V	25V
0.47	- 1	MM	av C	Oh	CS		
0.68	44	-sTVV	100 -	COM	CW		
1	V	14.	100%	AA	CA		EA
1.5	4	NWW	JE	AE	W		
2.2		- 1	N.100	AJ	CJ	DJ	
3.3		GN	- 100	AN	TIM		
4.7		WV	JS	AS	75.	V	
6.8	- 7		JW	JU -	O_{M^*}	- 1	
10		GĀ	JĀ	ΑĀ	Ma	L_{AA}	
15	W	GĒ	JĒ	Voo	Cor	W	
22	еJ	GJ	JJ	Jan	CON		
33	еÑ	GÑ	MA	st 100		V.I.A.	
47	eS	GŜ		14.	V.CU		N

[P, A2, A, cases DC Rated Voltage code]

Code	е	G	J	Α	С	D C	WE .	V
Rated Voltage	2.5 V	4 V	6.3 V	10 V	16 V	20 V	25 V	35V

[B3, B2, C2, C, V, D cases Production date code]

Y	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2003	а	b	С	d	е	f	g	h	Vj.	k	ı C	m
2004	n	р	q	r	s	t	u	٧	W	х	У	Z
2005	Α	В	С	D	E	F	G	H	J	K	L.	М
2006	N	Р	Q	R	S	Т	U	V	W	X	Υ	Z

Note: Production date code will repeat beginning in 2007.

■ PERFORMANCE CHARACTERISTICS

Test Conditions: Conform to IEC 60384-1

ITEM			A COD	1.	PERFO	RMANCE	1.10	A'COM	TW	TEST CONDITION
Operating temperating	ature	W.100	-100	Mi	-55°C t	to +125°C	W.Inc	A CO	VI.	Derate voltage at 85°C at more
Rated voltage (V.	dc)	2.5V	4V	6.3\	/ 10V	16V	20V	25V	35V	at 85°C
Derated voltage (V.dc)	1.6V	2.5V	4V	6.3V	10V	13V	16V	22V	at 125°C
Surge voltage (V.	dc)	3.3V	5.2V	8V	13V	20V	26V	33V	46V	at 85°C
Capacitance		MMM	YOUN	Co.	0.47 μF	to 680 μF	MAL	100Y.		1,40011
Capacitance tolera	ance	WW	N.Fo	(C±	20% or ±10%	(P,J case: ±	20%)	1003	COR	at 120 Hz
DC Leakage Curr	ent (L.C)	WW	M.10	.01C • '	V(μA) or 0.5 μ	ιA , whicheve	er is greate	er 100	V.CO	Voltage: Rated voltage for 5min.
Dissipation Factor	In	- 11	TW.1	003.	Refer to Sta	andard Rating	gs	WW.10	•	at 120 Hz
Equivalent Series	Resistance		TAN.	1002	Refer to Sta	andard Rating	gs	- W.1	001.	at 100 kHz
100 Y.Co.	WELL	Capac	citance char	nge 🕔	D	F(%)		L.C	700 X.	COMITY
Surge voltage test		Refer to	Standard R	atings		Lower than initial specification			nitial on	Temperature: 85±2°C Applied voltage: Surge voltage Series resistance: 33 ohm Duration of surge: 30±5 sec Time between surge: 5.5min. Number of cycle: 1000
-55°C		Not to exce or -12%	ed -20% (P,	J case)	Refer to Sta	andard Rating	gs		N V	Step 1: 25±2°C
Characteristic at high and low temperature	+85°C	Not to exce or +12%	ed +20% (P,	J case)		than initial ification		1C•V(μA) o ich ever is		Step 2: -55.3°C Step 3: 25±2°C
temperature	+125°C	Not to exce or +15%	ed +20% (P,	J case)	Refer to Sta	Refer to Standard Ratings			r 6.25μA, greater	Step 4: 125.3°C
Rapid change of temperature		Refer to	Standard R	atings		than initial ification	OM.TV OM.T COM.	Lower than i		Parts shall be temperature cycled over a temperature range of -55 to +125°C, five times continuously as follow. Step 1: -55.3°C, 30±3min. Step 2: room temp. , 10 to 15min. Step 3: 125.3°C, 30±3min. Step 4: room temp, 10 to 15min.
Resistance to Sol heat	dering	Refer to	Standard R	atings		Lower than initial specification			nitial on	solder dip : 260°C, 5sec solder reflow : 260°C,10sec
Damp heat		Refer to	Standard R	atings		1.5 times initification	al	ower than i		at 40°C at 90 to 95% RH 500 hour
Endurance		Refer to	Standard R	atings		Lower than initial specification			nes initial ase) or 1.25 cification	at 85°C: Rated voltage at 125°C: Derated voltage 2000 hour
Failure Rate	W	M.10	λ₀=1% / 1000 hour						MIW	at 85°C: Rated voltage at 125°C: Derated voltage 2000 hour
Terminal Strength	V	MW.	Vis The		ll be no evide	nce of mecha	anical dam	age	OM.T	Strength: 4.9N Time: 10±0.5sec. (two directions)

Reference: Derated voltage (85 to 125°C)

$$[U_T] = [U_R] - \frac{[U_R] - [U_C]}{40} (T-85)$$

[U_T] : Derated voltage at operating temperature

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[U_R]: Rated voltage

[Uc] : Derated voltage at 125°C T : Ambient temperature

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■ STANDARD RATINGS

					-501 1		D	: (%)	0	
Rated Voltage	Capacitance (μF)	Case Code	Part Number	Leakage Current	DF (%)	ESR	–55°C		Change	
(V)	" , 1	VY .	(Bulk)	(μA)	1	(Ω)	COM	+125°C	Change 1	Change 2
TV	10	J. J.	ESVJ0E106M	0.5	20	6.5	30	30	±20%	±20%
1	22	P	ESVP0E226M	0.5	20	4	30	30	±20%	±20%
\mathbf{M}^{T}	22	A2	ESVA20E226M	0.5	12	3	20	14	±12%	±12%
71	33	A2	ESVA20E336M	0.8	12	4	22	14	±12%	±12%
M_{ij}	33	P	ESVP0E336M	0.8	20	4	30	30	±20%	±20%
- N	47 47	A2	ESVP0E476M	1.1	30 12	6	60	14	±20%	±20%
O_{N_I}	47	AZ A	ESVA20E476M ESVA0E476M	1.1	12	4.5	22	16	±12% ±12%	±12% ±12%
	68	A	ESVA0E686M	1.7	18	4.5	34	20	±12%	±12%
CO	100	B3	ESVB30E107M	2.5	18	1.3	34	20	±15%	±15%
2.5	100	B2	ESVB20E107M	2.5	8	1.0	14	10	±12%	±12%
Y.C.	150	A	ESVA0E157M	3.7	30	2	60	40	±20%	±20%
<1 C	150	В3	ESVB30E157M	3.7	20	1	40	30	±15%	±15%
01.	150	C2	ESVC20E157M	3.7	12	0.8	26	18	±12%	±12%
.Vac	220	B2	ESVB20E227M	5.5	18	0.6	34	20	±12%	±12%
00 -	220	C2	ESVC20E227M	5.5	12	0.8	26	18	±12%	±12%
OOX	330	B2	ESVB20E337M	8.2	25	0.6	50	30	±12%	±20%
In.	330	C	ESVC0E337M	8.2	16	0.3	34	18	±12%	±12%
100	470	С	ESVC0E477M	11.7	18	1.5	34	20	±12%	±12%
1	470	D	ESVD0E477M	11.7	14	0.5	18	16	±12%	±12%
N.In	3.3	Р	ESVP0G335M	0.5	20	20	30	30	±20%	±20%
- 1	6.8	J	ESVJ0G685M	0.5	20	7.5	30	30	±20%	±20%
M.7	10	J	ESVJ0G106M	0.5	20	6.5	30	30	±20%	±20%
- 1	10	Р	ESVP0G106M	0.5	20	6	30	30	±20%	±20%
MAN	15	P	ESVP0G156M	0.6	20	5	30	30	±20%	±20%
-11	22	P	ESVP0G226M	0.8	20	4	30	30	±20%	±20%
1111	22	A2	ESVA20G226M	0.8	12	2.8	22	16	±12%	±12%
TIN	22	Α	ESVA0G226M	0.8	8	2.5	12	10	±12%	±12%
M	33	P	ESVP0G336M	1.3	20	4	30	30	±20%	±20%
W	33	A2	ESVA20G336M	1.3	8	4.5	14	10	±12%	±12%
	33	Α	ESVA0G336M	1.3	10	3	14	12	±12%	±12%
W	47	P	ESVP0G476M	1.8	30	3	60	40	±20%	±20%
,	47	A2	ESVA20G476M	1.8	15	4.5	30	20	±12%	±12%
	47	A	ESVA0G476M	1.8	12	2.5	22	14	±12%	±12%
4	47	B3	ESVB30G476M	1.8	12	1.7	18	15	±15%	±15%
	68	A	ESVA0G686M	2.7	12	2.5	22	14	±12%	±12%
	68	B3	ESVB30G686M	2.7	15	1.5	28	17	±15%	±15%
	100 100	A B3	ESVA0G107M ESVB30G107M	4	30 20	1.3	60 38	22	±20% ±15%	±20% ±15%
	100	B2		4	12	0.8	22	14	±12%	
	100	C2	ESVB20G107M ESVC20G107M	4	10	0.8	18	12	±12% ±12%	±12%
	150	B2	ESVB20G157M	6	18	0.8	34	20	±12%	±12%
	150	C2	ESVC20G157M	6	10	0.7	18	12	±12%	±12%
	220	B2	ESVB20G227M	8.8	18	0.5	34	20	±12%	±12%
	220	C	ESVC0G227M	8.8	12	0.6	22	14	±12%	±12%
	330	С	ESVC0G337M	13.2	14	0.2	26	16	±12%	±12%
	330	V	ESVV0G337M	13.2	12	0.5	18	14	±12%	±12%
	470	D	ESVD0G477M	18.8	16	0.3	30	18	±12%	±12%
	680	D	ESVD0G687M	27.2	24	0.3	46	26	±12%	±12%
	1.5	Р	ESVP0J155M	0.5	10	25	15	15	±20%	±20%
	2.2	J	ESVJ0J225M	0.5	20	17.5	30	30	±20%	±20%
	3.3	J	ESVJ0J335M	0.5	20	13.5	30	30	±20%	±20%
	4.7	J	ESVJ0J475M	0.5	20	8.5	30	30	±20%	±20%
	4.7	Р	ESVP0J475M	0.5	20	10	30	30	±20%	±20%
	4.7	Α	ESVA0J475M	0.5	8	5.5	12	10	± 5%	±10%
	6.8	J	ESVJ0J685M	0.5	20	7	30	30	±20%	±20%
6.3	6.8	P	ESVP0J685M	0.5	20	7	30	30	±20%	±20%
5.5	6.8	A2	ESVA20J685M	0.5	8	6.5	12	10	±12%	±12%
	10	J	ESVJ0J106M	0.6	20	8	38	22	±20%	±20%
	10	P	ESVP0J106M	0.6	20	6	30	30	±20%	±20%
	10	A2	ESVA20J106M	0.6	8	4.5	12	10	±12%	±12%
	10	A	ESVA0J106M	0.6	8	3.2	12	10	±12%	±12%
	15	P	ESVP0J156M	0.9	20	5	30	30	±20%	±20%
	15	A2	ESVA20J156M	0.9	12	4	22	14	±12%	±12%
	15	Α	ESVA0J156M	0.9	8	3	12	10	±12%	±12%

WWW.100Y.C

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Rated		_	Part	Leakage	W W		O DF	(%)	Capaci	tance
Voltage (V)	Capacitance (μF)	Case Code	Number (Bulk)	Current (μA)	DF (%)	ESR (Ω)	−55°C	+125°C	Change 1	Change 2
	22	P	ESVP0J226M	1.3	20	4	38	22	±20%	±20%
	22	A2	ESVA20J226M	1.3	12	2.8	22	14	±12%	±12%
-11	22	A	ESVA0J226M	1.3	10	3	14	12	±12%	±12%
$O_{N_{\pi}}$	22	B3 B2	ESVB30J226M ESVB20J226M	1.3 1.3	8	1.6	12	10	±15% ± 5%	±15% ±10%
4ON	33	A	ESVA0J336M	2	12	2.5	22	14	±12%	±10% ±12%
	33	B3	ESVB30J336M	2	12	1.7	18	15	±15%	±15%
CO	47	A	ESVA0J476M	2.9	12	2	22	14	±12%	±12%
· ~(47	B3	ESVB30J476M	2.9	12	1.7	18	15	±15%	±15%
Y.C.	47	B2	ESVB20J476M	2.9	8	1.3	12	10	± 5%	±10%
6.3	47	С	ESVC0J476M	2.9	8	0.9	12	10	± 5%	±10%
0.5	68	B2	ESVB20J686M	4.2	10	1	18	12	±12%	±12%
MY.	68	C2	ESVC20J686M	4.2	10	0.8	14	12	±12%	±12%
~ <	100	B2	ESVB20J107M	6.3	12 10	0.9	22 14	14	±12%	±12%
700.	100	C2 C	ESVC20J107M ESVC0J107M	6.3 6.3	10	0.8	14	12	±12% ±12%	±12% ±12%
. 00	150	C	ESVC0J157M	9.4	10	0.6	18	12	±12%	±12%
1.70.	220	С	ESVC0J227M	13.8	14	1.2	26	16	±12%	±12%
xī 10	220	V	ESVV0J227M	13.8	12	0.5	18	14	±12%	±12%
11	220	D	ESVD0J227M	13.8	12	0.5	18	14	±12%	±12%
JW.	330	D	ESVD0J337M	20.7	14	0.5	26	16	±12%	±12%
1	470	D	ESVD0J477M	29.6	20	0.3	38	22	±20%	±20%
WW	1, (Р	ESVP1A105M	0.5	10	25	15	15	±20%	±20%
XXIV	1.5 1.5	J P	ESVJ1A155M ESVP1A155M	0.5 0.5	20	25.5 25	30	30	±20% ±20%	±20% ±20%
	2.2	J	ESVJ1A225M	0.5	20	17.5	30	30	±20%	±20% ±20%
WW	2.2	P	ESVP1A225M	0.5	20	19	30	30	±20%	±20%
	3.3	P P	ESVP1A335M	0.5	20	13	30	30	±20%	±20%
W	3.3	A2	ESVA21A335M	0.5	8	8	12	10	±12%	±12%
- 1	4.7	JU	ESVJ1A475M	0.5	20	10	30	30	±20%	±20%
	4.7	Р	ESVP1A475M	0.5	20	6	30	30	±20%	±20%
1	4.7	A2	ESVA21A475M	0.5	8	8	12	10	±12%	±12%
-	4.7	Α Α	ESVA1A475M	0.5	8	4.5	12 12	10	±12%	±12%
	6.8	A2 A	ESVA21A685M ESVA1A685M	0.6	8	4.5	12	10	±12%	±12% ±12%
ŀ	10	P	ESVP1A106M	1	20	6	30	30	±20%	±20%
	10	A2	ESVA21A106M	1 🔊	8	8	12	10	±12%	±12%
	10	Α	ESVA1A106M	1	8	3.2	12	10	±12%	±12%
	10	B2	ESVB21A106M	1	8	2.4	12	10	± 5%	±10%
10	15	B3	ESVB31A156M	1.5	8	2.7	12	10	±15%	±15%
	22	Α	ESVA1A226M	2.2	12	2.5	22	14	±12%	±12%
	22	B3	ESVB31A226M	2.2	8	1.9	12	10	±15%	±15%
-	22 33	B2 B3	ESVB21A226M ESVB31A336M	2.2	12	1.4	12	10	± 5% ±15%	±10% ±15%
	33	B2	ESVB31A336M	3.3	8	1.4	12	10	± 5%	±10%
	47	B2	ESVB21A476M	4.7	8	14.00	12	10	±12%	±12%
	47	C2	ESVC21A476M	4.7	8	1	12	10	±12%	±12%
ļ	47	С	ESVC1A476M	4.7	8	0.9	12	10	± 5%	±10%
	68	C2	ESVC21A686M	6.8	10	1	18	14	±12%	±12%
	68	B2	ESVB21A686M	6.8	12	0.9	14	14	±12%	±12%
	68	С	ESVC1A686M	6.8	8	0.7	12	10	±12%	±12%
-	100 100	C	ESVC1A107M ESVV1A107M	10	10	0.5	18	12	±12% ±12%	±12% ±12%
-	100	D	ESVV1A107M ESVD1A107M	10	8	0.5	18 18	10	±12% ± 5%	±12% ±10%
-	150	V	ESVV1A157M	15	8	0.6	18	10	±12%	±10%
ŀ	150	D	ESVD1A157M	15	10	0.6	18	12	±12%	±12%
	220	D	ESVD1A227M	22	12	0.6	22	14	±12%	±12%
	0.47	Р	ESVP1C474M	0.5	10	35	15	15	±20%	±20%
	0.68	Р	ESVP1C684M	0.5	10	25	15	15	±20%	±20%
	1	J	ESVJ1C105M	0.5	10	25.5	30	15	±20%	±20%
40	1	P	ESVP1C105M	0.5	10	20	15	15	±20%	±20%
16	1.5 2.2	A P	ESVA1C155M ESVP1C225M	0.5	4	6 19	8 15	6	± 5% ±20%	±10% ±20%
-	2.2	A2	ESVA21C225M	0.5	10	19	10	8	±20% ±12%	±20% ±12%
	2.2	AZ A	ESVA21C225M	0.5	6	6	10	8	±12% ±5%	±12% ±10%
	3.3	A2	ESVA21C335M	0.5	8	7	14	10	±12%	±10%

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Rated Canasitanes			_1	1111-7	N.Cl	DF (%)		Capacitance		
Rated /oltage (V)	Capacitance (μF)	Case Code	Part Number (Bulk)	Leakage Current (μΑ)	DF (%)	ESR (Ω)	−55°C	+125°C	Change 1	Change 2
	3.3	A	ESVA1C335M	0.5	6	4.5	10	8	±12%	±12%
TV	4.7 4.7	A2 A	ESVA21C475M ESVA1C475M	0.7 0.7	8	4.5	14	10	±12% ±12%	±12% ±12%
11.	6.8	A	ESVA1C685M	0.7	6	4	10	8	±12%	±12%
M_{JJ}	6.8	В3	ESVB31C685M	1	6	4.1	10	8	±15%	±15%
7	10	Α	ESVA1C106M	1.6	8	3.2	12	10	±12%	±12%
O_{Mr} .	10	B3	ESVB31C106M	1.6	8	3.5	14	10	±15%	±15%
MO	10 15	B2 B2	ESVB21C106M ESVB21C156M	1.6 2.4	6	2	10	8	± 5% ± 5%	±10% ±10%
16	22	B2 B3	ESVB21C156M ESVB31C226M	3.5	10	2.2	18	12	± 5% ±15%	±10% ±15%
$C_{iQ_{\bar{p}}}$	22	B2	ESVB21C226M	3.5	6	2.2	10	8	± 5%	±10%
- 00	22	С	ESVC1C226M	3.5	6	1.5	10	8	± 5%	±10%
Y	33	C2	ESVC21C336M	5.2	6	1.4	10	8	±12%	±12%
V.C	33	С	ESVC1C336M	5.2	6	0.9	10	8	± 5%	±10%
-7	47 47	C D	ESVC1C476M ESVD1C476M	7.5 7.5	6	0.8	10	8	±12% ± 5%	±12% ±10%
001.	68	С	ESVC1C686M	10.8	6	0.7	16	10	±12%	±10%
You.	68	N D	ESVD1C686M	10.8	6	0.7	10	8	± 5%	±10%
100	100	D	ESVD1C107M	16	8	0.5	18	10	±12%	±12%
1100	0.47	A2	ESVA21D474M	0.5	6	25	10	8	± 5%	±10%
1.	0.68	A2 A2	ESVA21D684M	0.5 0.5	6	15 12	10	8	± 5%	±10%
11.10	1 1.5	A2 A2	ESVA21D105M ESVA21D155M	0.5	6	7.4	10	8	±12% ±12%	±12% ±12%
	2.2	P	ESVP1D225M	0.5	10	8	15	15	±20%	±20%
	2.2	A2	ESVA21D225M	0.5	6	7	10	8	±12%	±12%
WW	2.2	Α	ESVA1D225M	0.5	6	6	10	8	±12%	±12%
	3.3	Α	ESVA1D335M	0.6	6	5	10	8	±12%	±12%
MAN A	3.3	B3 A2	ESVB31D335M	0.6	6 15	3.9	10 30	8 20	±15%	±15%
20	4.7	AZ A	ESVA21D475M ESVA1D475M	0.9	6	5	10	8	±15% ±12%	±15% ±12%
20	4.7	B3	ESVB31D475M	0.9	6	3	10	8	±15%	±15%
	4.7	B2	ESVB21D475M	0.9	6	3	10	8	± 5%	±10%
AN	6.8	B2	ESVB21D685M	1.3	6	2.8	10	8	± 5%	±10%
	10	B2	ESVB21D106M	2	6	2.5	10	8	± 5%	±10%
	15	C	ESVC1D156M	3	6	1.7	10	8	± 5%	±10%
	22	C2 C	ESVC21D226M ESVC1D226M	4.4	6	1.4	10	8	±12% ± 5%	±12% ±10%
-	22	D	ESVD1D226M	4.4	6	0.8	10	8	± 5%	±10%
	33	D	ESVD1D336M	6.6	6	0.8	10	8	± 5%	±10%
	47	D	ESVD1D476M	9.4	6	0.7	10	8	± 5%	±10%
-	0.47	A	ESVA1E474M	0.5	4	13	8	6	± 5%	±10%
-	0.68	A	ESVA1E684M ESVP1E105M	0.5 0.5	6	9	10	8	± 5% ±20%	±10% ±20%
-	1	A2	ESVA21E105M	0.5	6	13	10	8	±12%	±12%
	1	Α	ESVA1E105M	0.5	6	8	10	8	± 5%	±10%
	2.2	Α	ESVA1E225M	0.5	6	7	10	8	±12%	±12%
25	3.3	A	ESVA1E335M	0.8	6	7	10	8	±12%	±12%
	4.7 4.7	B3 B2	ESVB31E475M ESVB21E475M	1.1	6	3	10	8	±15% ± 5%	±15% ±10%
-	10	C	ESVC1E106M	2.5	6	1.2	10	8	± 5%	±10%
	15	C	ESVC1E156M	3.7	6	1.5	10	8	±12%	±12%
Ţ	22	D	ESVD1E226M	5.5	6	0.8	10	8	± 5%	±10%
	33	D	ESVD1E336M	8.2	6	0.7	10	8	± 5%	±10%
	0.47 0.68	A	ESVA1V474M	0.5 0.5	6	12	10	8	± 5%	±10%
F	1	A2	ESVA1V684M ESVA21V105M	0.5	6	13	10	8	± 5% ±12%	±10% ±12%
	1	A	ESVA1V105M	0.5	6	7	10	8	±12%	±12%
	1.5	Α	ESVA1V155M	0.5	6	7	10	8	±12%	±12%
	2.2	Α	ESVA1V225M	0.7	6	7	10	8	±12%	±12%
35	2.2	B2	ESVB21V225M	0.7	6	4	10	8	± 5%	±10%
-	3.3 4.7	B2 C	ESVB21V335M ESVC1V475M	1.1	6	3.5	10	8	± 5% ± 5%	±10% ±10%
	6.8	C	ESVC1V475M ESVC1V685M	2.3	6	1.3	10	8	± 5%	±10%
	10	С	ESVC1V106M	3.5	6	1.5	10	8	± 5%	±10%
	10	D	ESVD1V106M	3.5	6	1	10	8	± 5%	±10%
	15	D	ESVD1V156M	5.2	6	0.9	10	8	± 5%	±10%

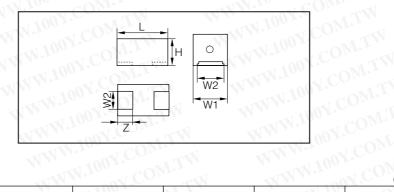
F/SV Series Tantalum Chip Capacitors

New Product

■ FEATURE

- Lead-free type. In conformity to RoHS.
- Face down terminal
- The low-profile of height 0.9mm Max and large capacitance of 47μF available in 1608 size.
- Enable fillet bonding

■ DIMENSIONS



Case Code	L	W ₁ CC	W ₂	H	OY.CZN
T CDM.	1.6±0.1	0.85±0.1	0.65±0.1	0.8±0.1	0.5±0.05
P2 *	2.0±0.1	1.25±0.1	0.9±0.1	0.9±0.1	0.5±0.1
A3 *	3.2±0.2	1.6±0.2	1.2±0.1	0.9±0.1	0.8±0.2

^{*} Under development

■ STANDARD C-V VALUE REFERENCE BY CASE CODE

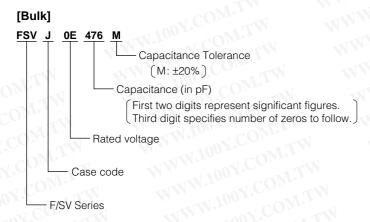
UR :Rated Voltage

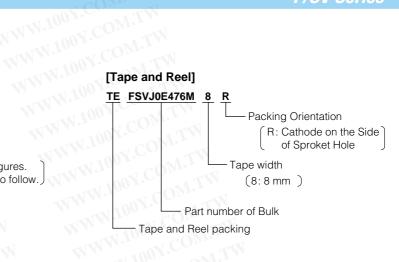
μ F	UR	2.5	4	6.3	10	16	20	25
	$\overline{}$	0E	0G	0J	1A	1C	1D	1E
1		1		11.	1XXI 1	Mr.	[J]	(7)
1.5		NV			144.	LOO	UU-	- 1
2.2	M.			1	W.	Too	-c0	[P2]
3.3						100		-1
4.7	475		T		TWV	[J]	[P2]	[A3]
6.8	685	$V_{i,T,A}$	1		-11	N 10	3 -	Mo
10	106	- 11	N		[1]	[P2]	[A3]	
15	156	Mroz			-137	11.7	S T	CO_{i}
22	226	1100	LAA	[J]	[P2]	[A3]	100 x	
33	336	Oh	J	[P2]	W	MAL	. 00	1.00
47	476	J		[P2]	[A3]	- TV	Jan	-1 (
68	686		[P2]	N		N. A.	x1 10	27.
100	107	[P2]	[P2]	[A3]		WW	14.0	N.
220	227	[A3]	[A3]				T. W	00

MMM.100X.

WWW.100Y.COM.T

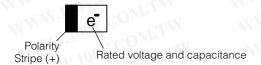
■ PART NUMBER SYSTEM



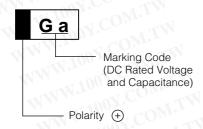


■ MARKINGS

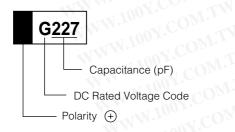
[J case]



[P2 case] Under development



[A3 case] Under development



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WWW.100Y.COM.T [Rated voltage and capacitance]

UR :Rated Voltage

	UR	2.5	4	6.3	10	16	20
μ F		0E <	0G	OJ.	1A	1C	1D
1.0	105		-731	Viran	-7 C	O_{Mr} ,	[0-]
1.5	155		M.	- XI 10	Dir	Mo	LA
2.2	225		WW	14.	on V.		TV
3.3	335		-11		00 ≤1	$CO_{\overline{D}}$	L. 0
4.7	475				100_{3}	[ɔ-]	$V_{1,T}$
6.8	685		17	MAG	. 00	V.CO	
10	106	≪ 1		TINV	[∢⁻]	47 CS	Dir.
15	156	MA			xi 10	Or.	M
22	226	W		[J ⁻]	N 1 - A	WY.	
33	336	-31	G ⁻	- 11	11/1/1	051	CO_{2}
47	476	e ⁻			-31	100 x	

[]: Under development

[P2 case Marking code]

UR :Rated Voltage

	UR	2.5	4	6.3	10	16	20	25
μ F		0E	0G	0J	1A	1C	1D	1E
2.2	225	COP	WT.		W	Mari	1007	EJ
3.3	335	COI	1. 1	ίĬ		TWW	To	J C
4.7	475		T.M.			-11	DS	7.
6.8	685	V.Cu		V		WW	- 40	U.Y.C
10	106	-1 C	0_{Mr} .			CĀ	M.r.	
15	156	D.A.	Mo	LAL		14.	TXV 1	00 r.
22	226	N.		TW	ΑJ	W		100
33	336	00	CON	JN	ī		WW	To
47	476	1002	- 01	JS				1.10
68	686	. 00	GW	- 1	N	-		10
100	107	ea	Ga	DIAT			111	M.r.

[A3 case DC Rated Voltage code]

Į	Code	е	G	J C	A	С	D	E
	Rated Voltage	2.5 V	4 V	6.3 V	10 V	16 V	20 V	25 V

■ PERFORMANCE CHARACTERISTICS

Test Conditions: Conform to IEC 60384-1

ITEM		~	COMP.	PI	ERFORMAN	ICE	ON CO	W	TEST CONDITION
Operating temper	ature	W.100	TOM.	Y .	55°C to +125°	°C	Jun Co	Mr.	Derate voltage at 85°C at more
Rated voltage (V.	dc)	2.5V	4V	[6.3V]	[10V]	[16V]	[20V]	[25V]	at 85°C
Derated voltage (V.dc)	1.6V	2.5V	[4V]	[6.3V]	[10V]	[13V]	[16V]	at 125°C
Surge voltage (V.	dc)	3.3V	5.2V	[8V]	[13V]	[20V]	[26V]	[33V]	at 85°C
Capacitance		MM.	Anny.C) N (1)	33 μF to 47 μ	uF W	1005	CO	I_M
Capacitance toler	ance	WWW	±20%				Y.COP	at 120 Hz	
DC Leakage Curr	ent (L.C)	WW	0.010	11 111 • VIII A) Or II SII A WOICHEVER IS GREATER				Voltage: Rated voltage for 5min.	
Dissipation Factor	1.11		MW.100	Refer	to Standard I	Ratings	TWW.	100 ×	at 120 Hz
Equivalent Series	Resistance	1/1	W.100	Refer	to Standard I	Ratings	W	100 1.	at 100 kHz
100 Y.CO	WILL	Capacit	ance change	O.X.C.	DF(%)		L.C	V 100 Y	COMITW
Surge voltage tes	OM.TW OM.TV	Refer to Standard Ratings			Lower than init				Temperature : 85±2°C Applied voltage : Surge voltage Series resistance : 33 ohm Duration of surge : 30±5 sec Time between surge : 5.5min. Number of cycle : 1000
NW.100Y	-55°C	Not to e	exceed -20%	Refer	to Standard I	Ratings			_ Step 1: 25±2°C
Characteristic at high and low	+85°C	Not to e	exceed +20%	NW.L	ower than init		0.1C•V(μA) or 5μA, which ever is greater		Step 2: -55.3°C Step 3: 25±2°C
temperature	+125°C	Not to e	exceed +20%	Refer	to Standard F	Ratings	0.125C•V(μA) which ever i		Step 4: 125.3°C
Rapid change of temperature	M.100X. M.100X.C 1.100X.C	Refer to St	tandard Rating		ower than init	4 % 7 -	Lower than initial specification		Parts shall be temperature cycled over a temperature range of -55 to +125°C, five times continuously as follow. Step 1: -55.3°C, 30±3min. Step 2: room temp., 10 to 15min. Step 3: 125.3°C, 30±3min. Step 4: room temp, 10 to 15min.
Resistance to Sol neat	esistance to Soldering at		Refer to Standard Ratings		ower than init		Lower tha specific		solder dip : 260°C, 5sec solder reflow : 260°C, 10sec
Damp heat	WWW.1	Refer to S	Standard Rating	s Lower	r than 1.5 time specification		Lower tha specific		at 40°C at 90 to 95% RH 500 hour
Endurance	MM	Refer to S	Standard Rating	s L	ower than init		Lower than 2 specific		at 85°C : Rated voltage at 125°C : Derated voltage 2000 hour
Failure Rate	W	VW.100	OX.COM	λα	n=1% / 1000 h	our	100 X C	OM.TW	at 85°C: Rated voltage at 125°C: Derated voltage 2000 hour
Terminal Strength	V	WW.	Visual: There sl	nall be no	evidence of r	nechanica	al damage	.co _{M.} T	Strength : 4.9N Time : 10±0.5sec. (two directions)

[]: Under development

Reference: Derated voltage (85 to 125°C)

$$[U_T] = [U_R] - \frac{[U_R] - [U_C]}{40} (T-85)$$

[U_T] : Derated voltage at operating temperature

[U_R]: Rated voltage

[Uc]: Derated voltage at 125°C

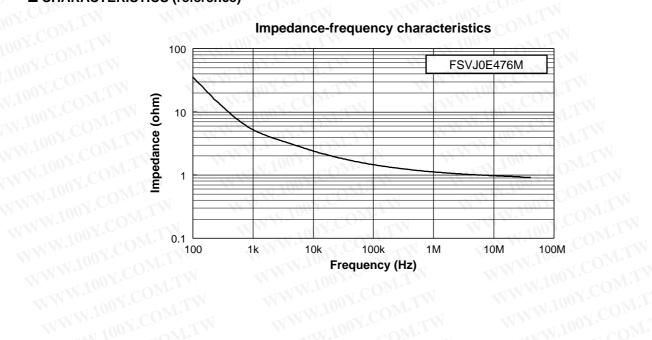
T: Ambient temperature

■ RATINGS

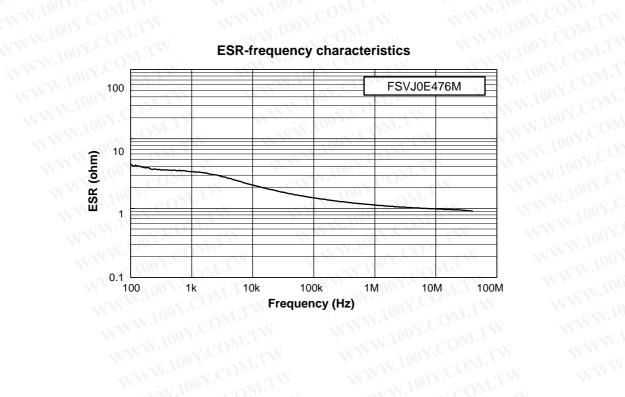
		. 0	V.CO	N N	M.	JONY C	DF (%)	Capac	itance
Rated Voltage (V)	Capacitance (μF)	Case Code	Part Number (Bulk)	Leakage Current (μA)	DF (%)	ESR (Ω)	−55°C	+125°C	Change 1	Change 2
2.5	47	J	FSVJ0E476M	1.1	30	4	60	40	±20%	±20%
4	33	J	FSVJ0G336M	1.3	30	4	60	30	±20%	±20%

■ CHARACTERISTICS (reference) NW.1007.CC WW.100Y.COM.TW

JOY.COM.TW



W.100Y.COM.TW **ESR-frequency characteristics**



WWW.100Y.COM.TW WWW.100Y.COM.TW WWW.100 COM.TW 勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 Http://www. 100y. com. tw

WWW.I

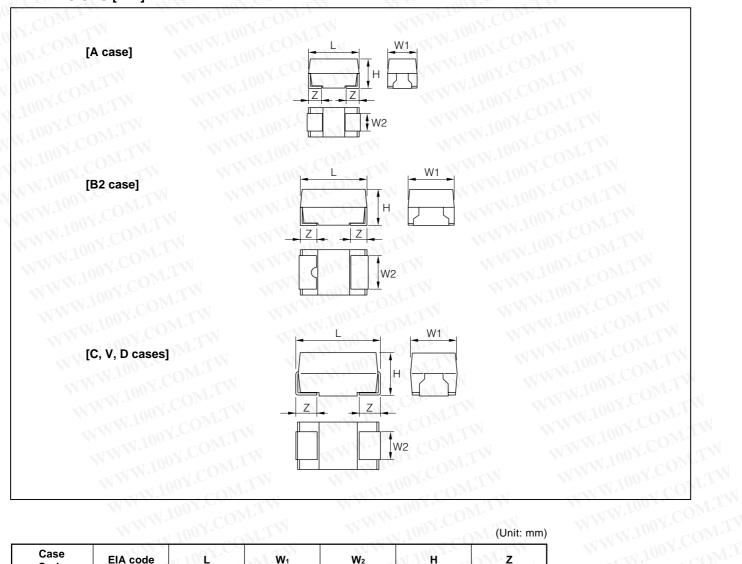
ox.com.TW

SV/Z Series Tantalum Chip Capacitors (Low-ESR Type) WWW.100Y.COM.TW

■ FEATURES

- Lead-free Type. In conformity to RoHS.
- Low-ESR Type.
- For decoupling with CPU, for absorbing the noise.
- Same Dimension as E/SV series.

■ DIMENSIONS [mm]



Case Code	EIA code	W.1027.C	W ₁	W ₂	W.10HY.C	oM Z
Α	3216	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.6 ± 0.2	$0.8 \pm 0.$
B2	3528	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.9 ± 0.2	0.8 ± 0.
С	6032	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	2.5 ± 0.2	1.3 ± 0.
V	7343L	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	1.9 ± 0.1	1.3 ± 0.2
D	7343	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	2.8 ± 0.2	1.3 ± 0.2

WWW.100Y.CO

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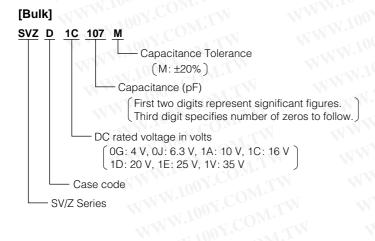
Http://www.100y.com.tw

■ STANDARD C-V VALUE REFERENCE BY CASE CODE

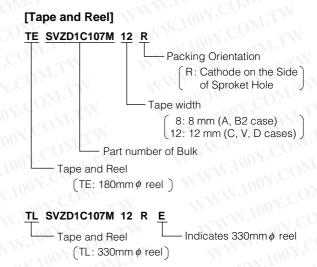
	UR	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V
μ F		0G	01	1A	1C	1D 1D	1E	1V
6.8	685	WWW.	OOX.CO	LTW	MMM	100 Y.COJ	C 600	C 600
10	106	WWW	A 800	B2 600	WWV	N.100A.CO	M.TW	D 300
15	156	WW	W.100X.C	OM.TW	W	MAN. 100X.	D 250	D 300
22	226	W	B2 800	COMITY	W	MN.1001	D 200	N
33	336	M .	MMM:100	N.COM.T	M	D 200	OX.COM.	LM.
47	476	LM	MMM.	C 300	D 150	D 150	ON.COM	TW
68	686	U.I.M.	MMM	B2 250	C, D 200, 150	WWW	1.100X·CO3	M.TW
100	107	M.TW	C, D 150, 150	C, V, D 125, 150, 100	D 100	WW	M.100X.C	OM.TV
150	157	ON.IV	C, D 125, 100	V, D 150, 100	COM.TW	WY	AN.100X	COM
220	227	D 100	V, D 150, 100	D 100	I.COM.T	N N	AMM:100	y.co ^M
330	337	V, D 150, 100	D 100	WWW.10	M.COM.	TW	MMM.TO	ON.CO

Number : ESR $(m\Omega)$

■ PART NUMBER SYSTEM



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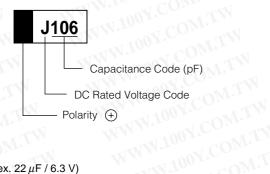


NEC/TOKIN

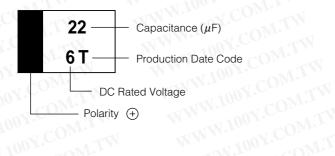
WW.100Y.COM.T The standard marking shows capacitance, DC rated voltage, and polarity.

[A case] (ex 10 uF / 2000) WWW.100Y.COM.TW WWW.100Y.COM.TW

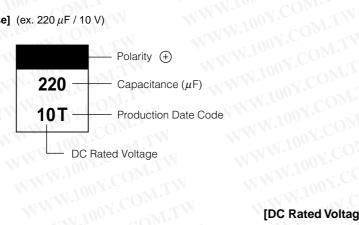
[A case] (ex. $10 \mu F / 6.3 V$)



WW.100Y.COM **[B2 case]** (ex. $22 \mu F / 6.3 V$) WWW.100Y



[C, V, D case] (ex. $220 \,\mu\text{F} / 10 \,\text{V}$)



[DC Rated Voltage code]

WWW.1001

Rated '	Voltage	code]					
Code	G	1	Α	С	D	1750 x	V
Rated /oltage	4 V	6.3 V	10 V	16 V	20 V	25 V	35V

[B2, C, V, D cases production date code]

2004	n	р	q	Vr.	s	t	g u	V	w	х	у	1
2005	Α	В	С	D	E	F	G	Н	J	K	NÈ	١
2006	N	Р	Q	R	S	T	U	V	W	Х	Y	Z

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WWW.100Y.

■ PERFORMANCE CHARACTERISTICS

ITEM		al			DECRMANAGE	uv	COM		TEST CONDITION
Operating tempor		1110 Z.C.	ON THE		RFORMANCE	700	N.Co	TW	TEST CONDITION
Operating tempera		4007	0.01/		5°C to +125°C	001/	05/5	051/	Derate voltage at 85°C at more
Rated voltage (V.o		4V	6.3V	10V	16V	20V	7.00	35V	at 85°C
Derated voltage (\ Surge voltage (V.o		2.5V	- CON-	6.3V 13V	10V 20V	13V 26V	- CO	22V 46V	at 125°C
Capacitance	ac)	5.2V	ov	.41	-1	26 V	330	46V	at 65°C
	200	X W.10			3 μF to 330 μF	- - N	N.100 1.	OMI	at 120 Hz
Capacitance tolera	ance	71.7	ODY.CO	± T	20% or ±10%	77	1N-100 x	COMI	VY
DC Leakage Curre	ent (L.C)	WW.	0.01C •	V(μA) or	0.5μA , whiche	ver is	greater	V.COM.	Voltage: Rated voltage for 5min.
Dissipation Factor		N TAX	1.100 1.	Refer to	o Standard Rati	ngs	WW.100	CON	at 120 Hz
Equivalent Series	Resistance	N T	N.100Y.	Refer to	o Standard Rati	ngs	W.10	0,1	at 100 kHz
OY.CO	TW	Capacit	ance change	M	DF(%)		L.C	90 x .	M.TV
Surge voltage test		Refer to St	andard Ratings		Lower than initial Lower th specification specif				Temperature: 85±2°C Applied voltage: Surge voltage Series resistance: 33 other Duration of surge: 30±5 sec Time between surge: 5.5min. Number of cycle: 1000
100Y.CO	-55°C	Not to 6	exceed -12%	Refer to	to Standard Rati	ngs	WWW.100		Step 1: 25±2°C
Characteristic at high and low	+85°C	Not to e	exceed +12%		ower than initial specification	N	0.1C • V(μA which ever i		Step 1: 25±2 C Step 2: -55.3°C Step 3: 25±2°C
temperature	+125°C	Not to e	exceed +15%	100	o Standard Rati	ngs	0.125C • V(μA) which ever i	or 6.25μA,	Step 4: 125.3°C
Rapid change of temperature	Y.COM. 0Y.COM. 00Y.CO. 100Y.CO	Refer to St	Refer to Standard Ratings		Lower than initial specification		Lower than initial specification		Parts shall be temperature cycled over a temperature range of -55 +125°C, five times continuously a follow. Step 1: -55.3°C, 30±3min. Step 2: room temp., 10 to 15min. Step 3: 125.3°C, 30±3min. Step 4: room temp, 10 to 15min.
Resistance to Solo heat	dering	Refer to S	tandard Ratings	J. 101 4 .	ower than initial specification	CO	Lower tha specific		solder dip : 260°C, 5sec solder reflow : 260°C, 10sec
Damp heat	VV.100	Refer to S	Refer to Standard Ratings		ard Ratings Lower than 1.25 times initial specification		Lower tha specific		at 40°C at 90 to 95% RH 500 hour
Endurance	NNN'I	Refer to S	tandard Ratings		ower than initial specification	700. 20.z	Lower than 1.25 specification		at 85°C : Rated voltage at 125°C : Derated voltage 2000 hour
Failure Rate	MMA	100Y.C	COMITY	λο =	= 1% / 1000 hou	10 11	OX.COM	TW LTW	at 85°C : Rated voltage at 125°C : Derated voltage 2000 hour
Terminal Strength	WW	W.1007	Visual: There sha	II be no e	evidence of med	hanic	al damage	M.TW	Strength: 4.9N Time: 10±0.5sec. (two directions)

$$[U_T] = [U_R] - \frac{[U_R] - [U_C]}{40} (T-85)$$

[U_T] : Derated voltage at operating temperature

[U_R]: Rated voltage

[Uc]: Derated voltage at 125°C T : Ambient temperature

NEC/TOKIN

■ STANDARD RATINGS

			COM		TWW	•	DF	(%)	Capac	itance
Rated Voltage (V)	Capacitance (μF)	Case Code	Part Number (Bulk)	Leakage Current (μA)	DF (%)	ESR (mΩ)	−55°C	+125°C	Change 1	Change 2
-17	220	D	SVZD0G227M	8.8	8	100	18	10	± 5%	± 5%
4	330	V	SVZV0G337M	13.2	12	150	18	14	±12%	±12%
Mo	330	D	SVZD0G337M	13.2	14	100	18	16	±12%	±12%
	10	Α	SVZA0J106M	0.6	8	800	12	10	±12%	±12%
	22	B2	SVZB20J226M	1.3	8	800	12	10	± 5%	± 5%
	100	С	SVZC0J107M	6.3	10	150	14	12	±12%	±12%
V.CU	100	D	SVZD0J107M	6.3	8	150	12	10	± 5%	± 5%
6.3	150	С	SVZC0J157M	9.4	10	125	18	12	±12%	±12%
101.0	150	D	SVZD0J157M	9.4	8	100	18	10	± 5%	± 5%
~J (220	V	SVZV0J227M	13.8	12	150	18	14	±12%	±12%
00 τ .	220	D	SVZD0J227M	13.8	12	100	18	14	±12%	±12%
Voor	330	D	SVZD0J337M	20.7	14	100	26	16	±12%	±12%
Jac	10	B2	SVZB21A106M	of COMP.	8	600	12	10	± 5%	± 5%
100	47	С	SVZC1A476M	4.7	8	300	12	10	± 5%	± 5%
N	68	B2	SVZB21A686M	6.8	12	250	14	14	±12%	±12%
W.10	100	С	SVZC1A107M	10	10	125	18	12	±12%	±12%
10	100	V	SVZV1A107M	10	8	150	18	10	±12%	±12%
MW.1	100	D	SVZD1A107M	10	8	100	18	10	± 5%	± 5%
	150	V	SVZV1A157M	15	8	150	14	10	±12%	±12%
MAN.	150	D	SVZD1A157M	15	10	100	18	12	±12%	±12%
·	220	D	SVZD1A227M	22	12	100	22	14	±12%	±12%
MA.	47	D	SVZD1C476M	7.5	6	150	10	8	± 5%	± 5%
16	68	С	SVZC1C686M	10.8	6	200	16	10	±12%	±12%
16	68	D	SVZD1C686M	10.8	6	150	10	8	± 5%	± 5%
	100	D	SVZD1C107M	16	8	100	18	10	±12%	±12%
20	33	D	SVZD1D336M	6.6	6	200	10	8	± 5%	± 5%
20	47	D	SVZD1D476M	9.4	6	150	10	8	± 5%	± 5%
1	6.8	C	SVZC1E685M	1.7	6	600	10	8	± 5%	± 5%
25	15	D	SVZD1E156M	3.7	6	250	10	8	± 5%	± 5%
	22	D	SVZD1E226M	5.5	6	200	10	8	± 5%	± 5%
	6.8	С	SVZC1V685M	2.3	6	600	10	8	± 5%	± 5%
35	10	D	SVZD1V106M	3.5	6	300	10	8	± 5%	± 5%
	15	D.	SVZD1V156M	5.2	6	300	10	8	± 5%	± 5%

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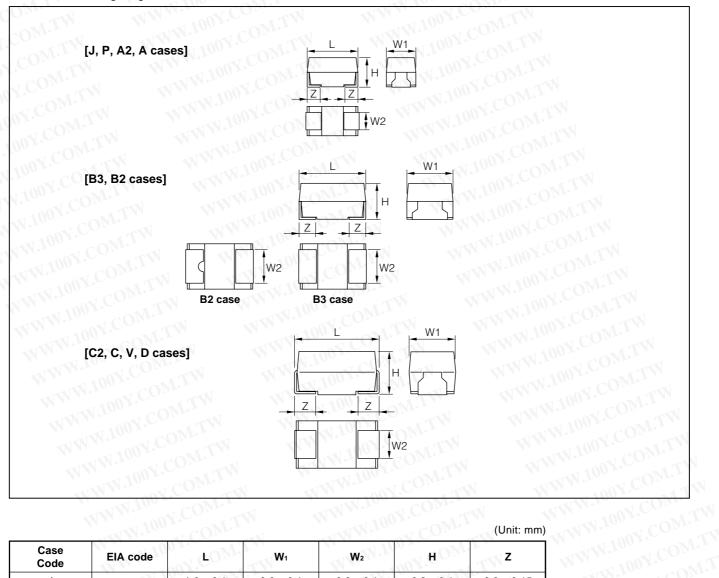
V.100Y.COM.TW

PS/L Series NeoCapacitor CONDUCTIVE POLYMER TANTALUM CAPACITORS

■ FEATURES

- Lead-free Type. In conformity to RoHS.
- Ultra-Low ESR
- Same Dimension as E/SV series

■ DIMENSIONS [mm]

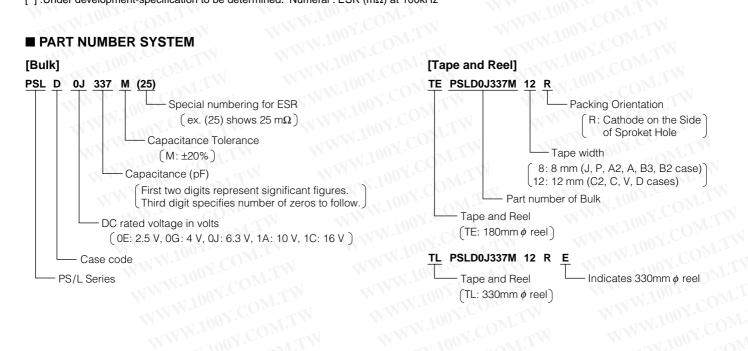


	TWW.IO	T COMP.	- 55		of COh.	(Unit:
ase ode	EIA code	ON GOM	W 1	W ₂	ON.HOM	Z
J	T.WW.	1.6 ± 0.1	0.8 ± 0.1	0.6 ± 0.1	0.8 ± 0.1	0.3 ± 0.1
Р	2012	2.0 ± 0.2	1.25 ± 0.2	0.9 ± 0.1	1.1 ± 0.1	0.5 ± 0.1
2 (U)	3216L	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.1 ± 0.1	0.8 ± 0.2
Α	3216	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.6 ± 0.2	0.8 ± 0.2
3 (W)	3528L	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.1 ± 0.1	0.8 ± 0.2
2 (S)	3528	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.9 ± 0.2	0.8 ± 0.2
C2	_ //	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	1.4 ± 0.1	1.3 ± 0.2
С	6032	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	2.5 ± 0.2	1.3 ± 0.2
V	7343L	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	1.9 ± 0.1	1.3 ± 0.2
D	7343	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	2.8 ± 0.2	1.3 ± 0.2

	UR	2.5 V	4V	6.3V	10V	16V	20V
μ F		0E	0G	0J	1A	1C	1D
2.2	225	N 11 1001	TIMOS	J	100 r. 1 COM:		
3.3	335	100	W.T.	J, P	A A	A	
4.7	475	WWW.	Y.COM-	J, P	A2, A	B2	
6.8	685	A. M. In.	COM	P, A	A, B2	B2	
10	106	W	J, P, A	P, A2, A	A2, A, B2	B2	
15	156	WW.	007. OM.T	A2, A, B2	B2, C	OWIT	
22	226	P	P, A2, B2	A2, A, B3, B2	B3, B2, C	[C2(70)]	[V(80]
33	336	WWW	ACOM	A, B3, B2	B3, B2, C2, C	[V(70)]	[V(80)]
47	476		A, B3	B3, B2, C2, C	B2, C2, C, V, D	D, [V(70)]	
68	686	W.	C2, C	B2, C2, C	V, D, [C(100/55)]	COM.	
100	107	В3	B3, B2, C2	B2, C, [C2(70)]	V, D, [C(100/55)]	Y. COM.TW	
150	157	W W	B2, C	C, V, D, [C(18)]	D	OY.Com.TY	
220	227	B2	C, V, D, [B2(45)]	V, D	D	ON CONT	N
330	337	C, V, [B2(45)], V, [C(18)]	C, V, D	OM D	WW.	COMP.	OXX
470	477	v	D 100 y	COMITY	N T	100 F. COM.	
680	687	D	D 100	I.V.	MAL	1100Y.	TW
1000	108	D	WWW.	V.COM	WW	TOON.CO	TW

^{[]:}Under development-specification to be determined. Numeral : ESR (m Ω) at 100kHz

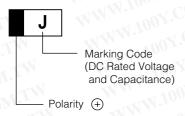
■ PART NUMBER SYSTEM



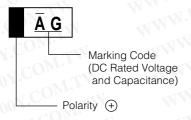
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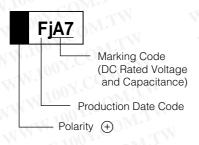
[J case] (ex. 4.7 μ F / 6.3 V)



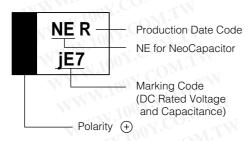
[P case] (ex. $10 \mu F / 4 V$)



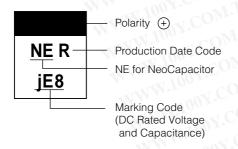
[A2, A cases] (ex. $10 \mu F / 6.3 V$)



[B3, B2 cases] (ex. 15 μ F / 6.3 V)



[C2, C, D cases] (ex. 150 μ F / 6.3 V)



[J case Marking Code]

μ F	44	6.3 V	10 V
2.2	on Con	ſ	⋖
3.3	Too LOWI.	7	
4.7	1001.	J	
6.8	. any.Co	TW	
10	0 0		

[P case Marking Code]

μ F	2.5V	4V	6.3 V	10 V
3.3	, TANN TO	- LCONI	NJ	
4.7	W 1	107	SJ	
6.8	MM	OUT.CO.	WJ	
10		ĀG	ĀJ	
15	N. Tan	100 7.	M.I.	
22	Je	JG	WTI	

[A2, A, B3, B2, C2, C, V, D cases Marking Code]

μF	UR	2.5 V	4 V	6.3 V	10 V	16 V	20V
	W.	е	g	W.10	A	С	D
3.3	N6	IN		-311	AN6	CN6	
4.7	S6	TV	V	MAG	AS6	CS6	V
6.8	W6	1.1		jW6	AW6	CW6	- 1
10	A7	TI	g A7	jA7	AA7	CA7	
15	W7	TW		jE7	AE7	Co	TW
22	J7	$0M_{1T}$	gJ7	jJ7	AJ7	COM	[DJ7]
33	N7	TIME	gN7	jN7	AN7		[DN7]
47	S7		gS7	jS7	AS7	CS7	TV
68	W7	COM.	gW7	jW7	AW7	41 CO	Mr.
100	A8	eA8	gA8	jA8	AA8	10 x.	MI
150	E8	A'COR	gE8	jE8	AE8	any.C	, N 11
220	J8	eJ8	gJ8	jJ8	AJ8	- * 7 (OMr.
330	N8	eN8	gN8	jN8	M. A.	700	Mor
470	S8	eS8	gS8		MM	1007	
680	W8	eW8	gW8	·sī		N. In.	
1000	A9	eA9	Time	N.A.	11.	-x1 100	

[]: Under development

[A2, A, B3, B2, C2, C, V, D cases production date code]

		11 1 0 -			1 2-1							
YM	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2003	а	b	С	d	е	f	g	h	j	k	4.1	m
2004	n	р	q	r	S	t	u	٧	W	Х	У	Z
2005	Α	В	С	D	E	F	G	Н	J	K	L	М
2006	N	Р	Q	R	S) T .	U	V	W	Χ	Υ	Z

Note: Production date code will resume beginning in 2007.

■ PERFORMANCE CHARACTERISTICS

Test Conditions: Conform to IEC 60384-1

ITEM		~ 1	COM	PERFOR	RMANCE	W.CC	M	TEST CONDITION
Operating tempera	ature	W.100 x	COMI	-55°C to	+105°C	100 x	OM.	Derate voltage at 85°C at more
Rated voltage (V.o	dc)	2.5V	4V	6.3V	10V	16V	[20V]	at 85°C
Derated voltage (\	V.dc)	2V	3.3V	5V	8V	12.8V	[16V]	at 105°C
Surge voltage (V.o	dc)	3.3V	5.2V	8V	13V	20V	[26V]	at 85°C
Capacitance		MM	OUN.Co.	2.2 μF to	1000 μF	100	Y.CO	TW
Capacitance tolera	ance	WWW.	OON.CC	±2	0%	MAA	O.Y.CO.	at 120 Hz
DC Leakage Curre	ent (L.C)	WWW	0.1C • V(μA) (or 3μΑ (J case:	10μA) , whiche	ver is greater	OOY.CO	Voltage: Rated voltage for 5min.
Dissipation Factor	J.A.	11.4	W.100x.	Refer to Star	ndard Ratings	Win	100 -	at 120 Hz
Equivalent Series	Resistance	1/1/	100	Refer to Star	ndard Ratings	111	N.100 x.	at 100 kHz
100 Y.Co.	WILL	Capacitar	ice change	DF	(%)	The state of the s	.C. 100X	T.I.I.
Surge voltage test	M.TW M.TW	Refer to Star	ndard Ratings	AII 1	nan initial ication		nan initial ication	Temperature: 85±2°C Applied voltage: Surge voltage Series resistance: 33 ohm Duration of surge: 30±5 sec Time between surge: 5.5min. Number of cycle: 1000
Characteristic	-55°C	from 0 to	-20%		nan initial ication		NN.	Step 1: 25±2°C Step 2: -55.3°C
at high and low temperature	+105°C	from 0 to	+50%	- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	n 1.5 times ecification	Lower tha	n 10 times ecification	Step 3: 25±2°C Step 4: 105.3°C
Rapid change of temperature		Refer to Star	ndard Ratings		nan initial ication		nan initial ication	Parts shall be temperature cycled over a temperature range of -55 to +105°C, five times continuously as follow. Step 1: -55.3°C, 30±3min. Step 2: room temp., 10 to 15min. Step 3: 105.3°C, 30±3min. Step 4: room temp, 10 to 15min.
Resistance to Solo heat	dering	Refer to Sta	ndard Ratings	Lower than 1 specif	.3 times initial ication		nan initial ication	Reflow soldering method 240°C, 10 sec.Max.
Damp heat	WW.10	from +30% t	to -20%	Lower than 1 specif	.5 times initial ication		nan initial ication	at 40°C at 90 to 95% RH 500 hour
Endurance I	WWW	Refer to Sta	ndard Ratings		.5 times initial ication		nan initial ication	at 85°C at rated voltage 1000 hour
Endurance II	WW	Refer to Sta	ndard Ratings		3 times initial ication		nan initial ication	at 105°C at Derated voltage 1000 hour
Failure Rate	W	MN.100	Y.COM	λο = 1% /	1000 hour	N.100Y.C	COM.T	at 85°C: rated voltage at 105°C: derated voltage
Terminal Strength	4	Visual: There shall I	pe no evidence	of mechanical	damage	M.100	Y COM	Strength: 4.9N Time: 10±0.5sec. (two directions)
Permissible ripple	current	Refer to Rat	ings Table	DWIN	4	MW.100	N.COJ	at 100 kHz
Other		Conform to I	EC60384-1	OWIT	1	MMMT	ONY.CO	Conform to IEC60384-1
			ALMI E			111	LUV	

Reference: Derated voltage (85 to 125°C)

$$[U_T] = [U_R] - \frac{[U_R] - [U_C]}{20} (T-85)$$

[U_T]: Derated voltage at operating temperature

[U_R]: Rated voltage

 $\begin{array}{l} \hbox{[Uc]: Derated voltage at } 105^{\circ}C \\ \hbox{T: Ambient temperature} \end{array}$

[]: Under development

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■ STANDARD RATINGS

Rated Voltage (V)	Capacitance (μF)	Case Code	Part Number (Bulk)	Leakage Current (μA)	DF (%)	ESR (mΩ)	Permissible Ripple Current (mA rms.)	TV	(%) +105°C	Capad Change 1	Change :
WT	22	Р	PSLP0E226M	5.5	6	200	354	6	9	±20%	±20%
7	100	B3	PSLB30E107M	25	8	70	1035	8	12	±20%	±20%
T.M	220	B2	PSLB20E227M	55	8	45	1374	8	12	±20%	±20%
- 17	220	B2	PSLB20E227M(35)	55	8	35	1558	8	12	±20%	±20%
OM^{\bullet}	330	С	PSLC0E337M(25)	82.5	10	25	2345	10	15	±20%	±20%
100	330	V	PSLV0E337M	82.5	10	25	2236	10	15	±20%	±20%
	330	V	PSLV0E337M(15)	82.5	10	15	2887	10	15	±20%	±20%
2.5	330	V	PSLV0E337M(12)	82.5	10	12	3227	10	15	±20%	±20%
	470	V	PSLV0E477M(15)	117.5	10	15	2887	10	15	±20%	±20%
J CO	470	_	PSLV0E477M(12)	117.5	10	12	3227	10	15	±20%	±20%
	680 680	D D	PSLD0E687M PSLD0E687M(15)	170 170	10	25 15	2449 3162	10 10	15 15	±20% ±20%	±20% ±20%
NY.C	680	D	PSLD0E687M(12)	170	10	12	3536	10	15	±20%	±20%
~ * 7	1000	D	PSLD0E108M	250	10	25	2449	10	15	±20%	±20%
00x.	1000	D D	PSLD0E108M(15)	250	10	15	3162	10	15	±20%	±20%
M	10	J	PSLJ0G106M	10	4	300	183	4	6	±20%	±20%
Ing	10	Р	PSLP0G106M	4	6	200	354	6	9	±20%	±20%
100	10	A	PSLA0G106M	4	6	200	612	6	9	±20%	±20%
1.5	22	P	PSLP0G226M	8.8	6	200	354	6	9	±20%	±20%
N.10	22	A2	PSLA20G226M	8.8	6	200	548	6	9	±20%	±20%
×1 1	22	B2	PSLB20G226M	8.8	8	150	753	8	12	±20%	±20%
111.7	33	A	PSLA0G336M	13.2	6	180	645	6	9	±20%	±20%
NIN.	47	Α	PSLA0G476M	18.8	6	180	645	6	9	±20%	±20%
11	47	В3	PSLB30G476M	18.8	8	70	1035	8	12	±20%	±20%
WW	68	C2	PSLC20G686M	27.2	8	55	1279	8	12	±20%	±20%
4 4 ,	68	C	PSLC0G686M	27.2	9	100	1049	9	14	±20%	±20%
WW	100	В3	PSLB30G107M	40	8	70	1035	8	12	±20%	±20%
	100	B2	PSLB20G107M	40	8	70	1102	8	12	±20%	±20%
W	100	B2	PSLB20G107M(45)	40	8	45	1374	8	12	±20%	±20%
N.	100	C2	PSLC20G107M	40	9	55	1279	9	14	±20%	±20%
1	150	B2	PSLB20G157M	60	8	45	1374	8	12	±20%	±20%
	150	B2	PSLB20G157M(35)	60	8	35	1558	8	12	±20%	±20%
	150	С	PSLC0G157M	60	9	100	1049	9	14	±20%	±20%
ļ	220	С	PSLC0G227M	88	9	55	1414	9	14	±20%	±20%
	220	C	PSLC0G227M(45)	88	9	45	1563	9	14	±20%	±20%
-	220	C	PSLC0G227M(25)	88	9	25	2098	9	14	±20%	±20%
	220	V	PSLV0G227M	88	10	45	1667	10	15	±20%	±20%
4	220	V	PSLV0G227M(25)	88	10	25	2236	10	15	±20%	±20%
-	220	V	PSLV0G227M(18)	88	10	18	2635	10	15	±20%	±20%
}	220	V	PSLV0G227M(15) PSLV0G227M(12)	88	10	15 12	2887 3227	10	15 15	±20% ±20%	±20% ±20%
-	220	D	PSLD0G227M(12)	88	10	55	1651	10	15	±20% ±20%	±20% ±20%
-	220	D	PSLD0G227M(40)	00 (N 88	10	40	1936	10	15	±20%	±20%
ŀ	220	D	PSLD0G227M(40) PSLD0G227M(25)	88	10	25	2449	10	15	±20% ±20%	±20%
	220	D	PSLD0G227M(25)	88	10	15	3162	10	15	±20%	±20%
ŀ	220	D	PSLD0G227M(13)	88	10	12	3536	10	15	±20%	±20%
ŀ	330	С	PSLC0G337M	132	10	55	1414	10	15	±20%	±20%
ļ	330	V	PSLV0G337M	132	10	45	1667	10	15	±20%	±20%
ļ	330	V	PSLV0G337M(25)	132	10	25	2887	10	15	±20%	±20%
	330	V	PSLV0G337M(12)	132	10	12	3227	10	15	±20%	±20%
İ	330	D	PSLD0G337M	132	10	40	1936	10	15	±20%	±20%
Ī	330	D	PSLD0G337M(25)	132	10	25	2449	10	15	±20%	±20%
İ	330	D	PSLD0G337M(15)	132	10	15	3162	10	15	±20%	±20%
ľ	470	D	PSLD0G477M	188	10	25	2449	10	15	±20%	±20%
Ī	470	D	PSLD0G477M(18)	188	10	18	2887	10	15	±20%	±20%
	470	D	PSLD0G477M(15)	188	10	15	3162	10	15	±20%	±20%
	470	D	PSLD0G477M(12)	188	10	12	3536	10	15	±20%	±20%
[680	D	PSLD0G687M	272	10	25	2449	10	15	±20%	±20%
	680	D	PSLD0G687M(15)	272	10	15	3162	10	15	±20%	±20%
-	680	D	PSLD0G687M(12)	272	10	12	3536	10	15	±20%	±20%

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Color	Rated	0		Part	Leakage	DE .	FOR	Permissible	DF	(%)	Сара	citance
3.3 J P PSLIDJ355M 10 4 500 141 4 6 6 120% 24 4.7 J PSLIDJ35M 3 6 300 289 6 9 120% 24 4.7 J PSLIDJA75M 10 4 500 141 4 6 6 120% 24 4.7 J PSLIDJA75M 13 6 300 289 6 9 120% 24 6.8 P PSLIDJA85M 4.2 6 300 289 6 9 120% 24 6.8 P PSLIDJA85M 4.2 6 300 289 6 9 120% 24 6 6.8 P PSLIDJA85M 4.2 6 300 500 6 9 120% 24 6 6.8 P PSLIDJA85M 4.2 6 300 500 6 9 120% 24 6 6.8 P PSLIDJA85M 4.2 6 300 500 6 9 120% 24 6 6 6.8 P PSLIDJA85M 4.2 6 300 500 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 24 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 9 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0 120% 25 6 6 6 6 0	oltage	Capacitance (μF)	Case Code	Number	Current	DF (%)	ESR (mΩ)		–55°C	+105°C	Change 1	Change 2
13.3 P PSLPQJ3SSM 3 6 300 288 6 9 1:20% 1:20% 1:40 4.7 J PSLDJA75M 3 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 3 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 3 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 4.2 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 4.2 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 4.2 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 4.2 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 4.2 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 4.2 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 4.2 6 300 289 6 9 1:20% 1:40 4.7 P PSLPQJA75M 4.2 6 300 364 6 9 1:20% 1:40 4.1 P P PSLPQJA75M 6.3 6 200 364 6 9 1:20% 1:20% 1:40 P P PSLPQJA75M 9.4 6 200 612 6 9 1:20% 1:40 P P P P P P P P P	0 × 1		J	PSLJ0J225M		4			4	6		±20%
4.77 J PSLLOJATSM 10 4 500 1411 4 6 220% 22 22%	OD							- AI				±20%
6.8 P PSLPOJATÓM 3 6 300 289 6 9 1.20% 15 6.8 P PSLPOJASÓM 4.2 6 300 500 6 9 1.20% 15 6.8 A PSLAOJAGÉM 4.2 6 300 500 6 9 1.20% 15 10 A PSLAOJAGÉM 6.3 6 200 548 6 9 1.20% 15 110 A PSLAOJAGÉM 6.3 6 200 548 6 9 1.20% 15 115 A PSLAOJAGÉM 6.3 6 200 612 6 9 1.20% 15 115 A PSLAOJAGÉM 9.4 6 200 612 6 9 1.20% 15 115 A PSLAOJAGÉM 9.4 6 200 612 6 9 1.20% 15 115 B PSLAOJAGÉM 9.4 6 200 612 6 9 1.20% 15 115 B PSLAOJAGÉM 9.4 6 200 612 6 9 1.20% 15 115 B PSLAOJAGÉM 9.4 6 200 612 6 9 1.20% 15 115 B PSLAOJAGÉM 9.4 6 200 612 6 9 1.20% 15 115 B PSLAOJAGÉM 9.4 6 200 612 6 9 1.20% 15 115 B PSLAOJAGÉM 9.4 6 200 612 6 9 1.20% 15 115 B PSLAOJAGÉM 13.8 6 200 548 6 9 1.20% 15 115 B PSLAOJAGÉM 13.8 6 200 548 6 9 1.20% 15 115 B PSLAOJAGÉM 13.8 6 200 548 6 9 1.20% 15 115 B PSLAOJAGÉM 13.8 6 180 645 6 9 1.20% 15 115 B PSLAOJAGÉM 13.8 8 170 1035 8 12 1.20% 15 115 B PSLEOJAGÉM 13.8 8 170 1035 8 12 1.20% 15 115 B PSLEOJAGÉM 13.8 8 170 1035 8 12 1.20% 15 115 B PSLEOJAGÉM 20 6 180 645 6 9 1.20% 15 115 B PSLEOJAGÉM 20 6 180 645 6 9 1.20% 15 115 B PSLEOJAGÉM 20 6 180 645 6 9 1.20% 15 115 B PSLEOJAGÉM 20 6 180 70 1035 8 12 1.20% 15 115 B PSLEOJAGÉM 20 6 8 70 1035 8 12 1.20% 15 115 B PSLEOJAGÉ	001	***	-						\rightarrow	J 2	- C	±20%
6.8 P PSLPOJESSM 4.2 6 300 289 6 9 120% 12 6.8 A PSLA0JESSM 4.2 6 300 500 6 9 120% 12 10 P PSLPOJIOSM 6.3 6 200 534 6 9 120% 12 110 A2 PSLA0JIOSM 6.3 6 200 548 6 9 120% 12 110 A PSLA0JIOSM 6.3 6 200 548 6 9 120% 12 115 A2 PSLA0JIOSM 9.4 6 200 548 6 9 120% 12 115 A2 PSLA0JIOSM 9.4 6 200 548 6 9 120% 12 115 A PSLA0JIOSM 9.4 6 200 548 6 9 120% 12 115 A PSLA0JIOSM 9.4 6 200 548 6 9 120% 12 115 A PSLA0JIOSM 9.4 6 200 548 6 9 120% 12 115 A PSLA0JIOSM 9.4 6 200 548 6 9 120% 12 115 A PSLA0JIOSM 9.4 6 200 548 6 9 120% 12 115 B PSLB20JIOSM 9.4 8 150 753 8 12 120% 12 115 B PSLB20JIOSM 9.4 8 150 753 8 12 120% 12 115 B PSLB20JIOSM 13.8 6 180 645 6 9 120% 12 115 B PSLB20JIOSM 13.8 6 180 645 6 9 120% 12 115 B PSLB30JIOSM 13.8 8 150 753 8 12 120% 12 115 B PSLB30JIOSM 13.8 8 150 753 8 12 120% 12 116 B PSLB30JIOSM 13.8 8 150 753 8 12 120% 14 120 B PSLB30JIOSM 20.7 6 180 646 6 9 120% 14 133 A PSLA0JISSM 20.7 8 70 1035 8 12 120% 14 133 B PSLB20JIOSM 20.7 8 70 1035 8 12 120% 14 147 B PSLB20JIOSM 20.6 8 70 1035 8 12 120% 14 147 B PSLB20JIOSM 20.6 8 70 1035 8 12 120% 14 147 B PSLB20JIOSM 20.6 8 70 1035 8 12 120% 14 147 B PSLB20JIOSM 20.6 8 70 1035 8 12 120% 14 147 B PSLB20JIOSM 20.6 8 70 1035 8 12 120% 14 147 B PSLB20JIOSM 20.6 8 70 1035 8 12 120% 14 147 B PSLB20JIOSM 20.6 8 70 1035 8 12 120% 14 147 B PSLB20JIOSM 20.6 8 70 1036 8 12 120% 14 147 C PSLC0JIOSM 20.6 8 70 100 1049 9 14 120% 14 147 C PSLC0JIOSM 20.6 9 100 1049 9 14 120% 14 150 C PSLC0JIOSM 42.8 9 55 1243 8 12 120% 14 150 C PSLC0JIOSM 42.8 9 55 1243 8 12 120% 14 150 C PSLCOJIOSM 42.8 9 55 1243 8 12 120% 14 150 C PSLCOJIOSM 42.8 9 55 1243 8 12 120% 14 150 C PSLCOJIOSM 94.5 9 15 100 1049 9 14 120% 14 150 C PSLCOJIOSM 94.5 9 100 1049 9 14 120% 14 150 C PSLCOJIOSM 94.5 9 100 1049 9 14 120% 14 150 C PSLCOJIOSM 94.5 9 15 100 1049 9 14 120% 14 150 C PSLCOJIOSM 94.5 9 100 1049 9 14 120% 14 150 C PSLCOJIOSM 94.5 9 100 1049 9 14 120% 14 150 C PSLCOJIOSM 94.5 9 100 1049 9 14 120% 14 150 C PSLCOJIOSM 94.5 9 100 1049 9 14 120% 14 150 C PSLCOJIOSM 94.5 9 100 1049 9 14 120% 14 150 C PSLCO				~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~					177			±20% ±20%
6.8 A PSLAUJESSM 4.2 6 300 500 6 9 ±20% ± ± 10 P PSLAUJOSSM 6.3 6 200 5548 6 9 ±20% ± ± 10 A PSLAUJOSM 6.3 6 200 5548 6 9 ±20% ± ± 10 A PSLAUJOSM 6.3 6 200 548 6 9 ±20% ± ± 15 A2 PSLAUJOSM 9.4 6 200 548 6 9 ±20% ± ± 15 A2 PSLAUJOSM 9.4 6 200 612 6 9 ±20% ± ± 15 B2 PSLEQUISSM 9.4 8 150 753 8 12 ±20% ± ± 15 B2 PSLEQUISSM 9.4 8 150 753 8 12 ±20% ± ± 22 A2 PSLAUJZSM 13.8 6 200 548 6 9 ±20% ± ± 22 A2 PSLAUJZSM 13.8 6 180 645 6 9 ±20% ± ± 22 A2 PSLAUJZSM 13.8 6 180 645 6 9 ±20% ± ± 22 A2 PSLAUJZSM 13.8 8 170 1035 8 12 ±20% ± ± 33 A PSLB3UJSSM 20.7 8 70 1035 8 12 ±20% ± ± 33 B3 PSLB3UJSSM 20.7 8 70 1035 8 12 ±20% ± ± 33 B3 PSLB3UJSSM 20.7 8 70 1035 8 12 ±20% ± ± 33 B2 PSLB3UJSSM 20.7 8 70 1035 8 12 ±20% ± ± 47 B2 PSLB2UJ7FM 29.6 8 70 1035 8 12 ±20% ± ± 47 B2 PSLB2UJ4FM 29.6 8 70 1035 8 12 ±20% ± ± 47 B2 PSLB2UJ4FM 29.6 8 70 1035 8 12 ±20% ± ± 47 B2 PSLB2UJ4FM 29.6 8 70 1035 8 12 ±20% ± ± 47 B2 PSLB2UJ4FM 29.6 8 70 1035 8 12 ±20% ± ± 47 B2 PSLB2UJ4FM 29.6 9 70 1103 8 12 ±20% ± ± 47 B2 PSLB2UJ4FM 29.6 9 70 1103 8 12 ±20% ± ± 68 B2 PSLB2UJ4FM 29.6 9 70 1103 8 12 ±20% ± ± 68 B2 PSLB2UJ4FM 29.6 9 70 1103 8 12 ±20% ± ± 10 ± 10 ± 10 ± 10 ± 10 ± 10 ± 10	J.C4	17						-3 44 .		/		±20%
10			-									±20%
10	O.X.A											±20%
15	Vo	44 117 2	A2	4 446	6.3	6	200		6			±20%
15	00 -		Α	PSLA0J106M	6.3	6	200	612	6	9	±20%	±20%
15 B2 PSLB2DJ156M	100]		A2			6			6		111	±20%
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勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787

Rated Voltage (V)	Capacitance (μF)	Case Code	Part Number (Bulk)	Leakage Current (μA)	DF (%)	ESR (mΩ)	Permissible Ripple Current	DF -55°C	(%) +105°C	Capa Change 1	citance Change 2
1:1:			1.700				(mA rms.)	0_{Nr}			
	15	B2	PSLB21A156M	15	8	150	753	8	12	±20%	±20%
	15	C	PSLC1A156M	15	9	200	742	9	14	±20%	±20%
	22	B3	PSLB31A226M	22	8	70	1035	8	12	±20%	±20%
	22	B2	PSLB21A226M	22	8	150	753	8	12	±20%	±20%
	22	С	PSLC1A226M	22	9	150	856	9	14	±20%	±20%
	33	B3	PSLB31A336M	33	8	70	1035	8	12	±20%	±20%
	33	B2	PSLB21A336M	33	8	150	753	8	12	±20%	±20%
	33	C2	PSLC21A336M	33	9	70	1134	9	14	±20%	±20%
	33	С	PSLC1A336M	33	9	100	1049	9	14	±20%	±20%
	47	B2	PSLB21A476M	47	8	70	1102	8	12	±20%	±20%
	47	C2	PSLC21A476M	47	9	70	1134	9	14	±20%	±20%
	47	С	PSLC1A476M	47	9	100	1049	9	14	±20%	±20%
10	47	С	PSLC1A476M(55)	47	9	55	1414	9	14	±20%	±20%
	47	V	PSLV1A476M	47	10	60	1443	10	15	±20%	±20%
	47	D	PSLD1A476M	47	10	100	1225	10	15	±20%	±20%
	68	V	PSLV1A686M	68	10	60	1443	10	15	±20%	±20%
	68	D	PSLD1A686M	68	10	100	1225	10	15	±20%	±20%
	100	V	PSLV1A107M	100	10	45	1667	10	15	±20%	±20%
	100	V	PSLV1A107M(25)	100	10	25	2236	10	15	±20%	±20%
	100	D	PSLD1A107M	100	10	55	1651	10	15	±20%	±20%
	150	D	PSLD1A157M	150	10	55	1651	10	15	±20%	±20%
	150	D	PSLD1A157M(40)	150	10	40	1936	10	15	±20%	±20%
	220	D	PSLD1A227M	220	10	55	1651	10	15	±20%	±20%
	220	D	PSLD1A227M(40)	220	10	40	1936	10	15	±20%	±20%
	220	D	PSLD1A227M(25)	220	10	25	2449	10	15	±20%	±20%
*	3.3	Α	PSLA1C335M	5.2	6	800	306	6	9	±20%	±20%
	4.7	B2	PSLB21C475M	7.5	8	200	652	8	12	±20%	±20%
16	6.8	B2	PSLB21C685M	10.8	8	200	652	8	12	±20%	±20%
	10	B2	PSLB21C106M	16	8	100	922	8	12	±20%	±20%
	47	D	PSLD1C476M	75.2	10	70	1464	10	15	±20%	±20%

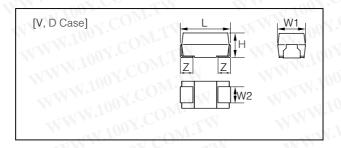
PS/G Series NeoCapacitor

New Product

■ FEATURE

- Lead-free type. In conformity to RoHS.
- Extreme low ESR (7mhom) 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.

■ DIMENSIONS



211	N W	M 11.	MIT	N/	(Unit: n
Case Code	L	W ₁	W ₂	N H	Z
CV	7.3± 0.2	4.3 ± 0.2	2.4 ± 0.2	1.9 ± 0.1	1.3 ± 0.2
DOM	7.3± 0.2	4.3 ± 0.2	2.4 ± 0.2	2.8 ± 0.2	1.3 ± 0.2

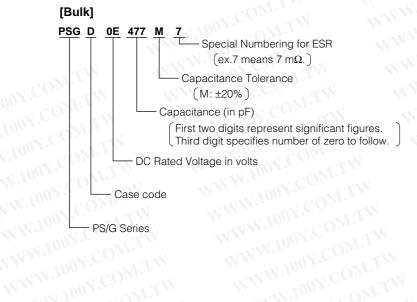
■ STANDARD C-V VALUE REFERENCE BY CASE CODE

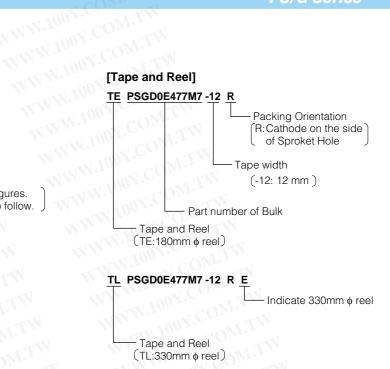
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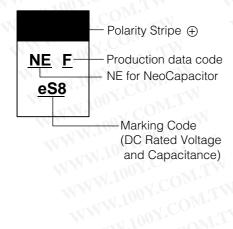
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■ PART NUMBER SYSTEM





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UR :Rated Voltage UR 2.5 μ F 0E 220 227 [eJ8] eN8 330 337 eS8 470 477

eW8

[]: Under development

687

[Production date code]

\\\	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2003	а	b	С	d	е	f	g	h	dV	k	I	m
2004	n	р	q	r	s	t	u	V	W	X	у	Z
2005	Α	В	С	D	Е	F	G	Н	J	K	L	М
2006	Ν	Р	Q	R	S	Т	U	V	W	Х	Y	Z

Note: Production date code will resume beginning in 2007. WWW.100Y.COM.TW

WWW.100Y.C

WWW.100Y.COM.TW

680

■ PERFORMANCE CHARACTERISTICS

Test Conditions: Conform to IEC 60384-1

ITEM		ON COM	PERFORMANCE	any.Co. TV	TEST CONDITION	
Operating temper	ature	W.100 COM.	-55°C to +105°C	In COM.	Derate voltage at 85°C at more	
Rated voltage (V.	dc)	W.1001. COM.	2.5V	Ton COM.	at 85°C	
Derated voltage (V.dc)	100Y.	2V	N.100 J. COM.	at 105°C	
Surge voltage (V.dc)		MALT TOOL CO.	at 85°C			
Capacitance		MAM. TOUX CO.	330 μF to 680 μF	100X.Co	TYN	
Capacitance toler	ance	MMM. TOOK.CO	at 120 Hz			
DC Leakage Curr	ent (L.C)	0.1C •	Voltage: Rated voltage for 5min.			
Dissipation Factor	TW	M. 1007.	at 120 Hz			
Equivalent Series	Resistance	MM 1003	at 100 kHz			
100X.COB	WT	Capacitance change DF(%) L.C			. W.T.W	
Surge voltage tes	OM.TW OM.TV	Refer to Standard Ratings	Lower than initial specification	Lower than initial specification	Temperature: 85±2°C Applied voltage: Surge voltage Series resistance: 33 ohm Duration of surge: 30±5 sec Time between surge: 5.5min. Number of cycle: 1000	
Characteristic at high and low	-55°C	from 0 to -20%	Lower than initial specification	WW	Step 1: 25±2°C Step 2: -55\frac{9}{3}\circ\$C Step 3: 25±2\circ\$C Step 4: 105\frac{9}{3}\circ\$C	
temperature	+105°C	from 0 to +50%	Lower than 1.5 times initial specification	Lower than 10 times initial specification		
Rapid change of semperature		Refer to Standard Ratings	Lower than initial specification	Lower than initial specification	Parts shall be temperature cycled over a temperature range of -55 to +105°C, five times continuously as follow. Step 1: -55.3°C, 30±3min. Step 2: room temp., 10 to 15min. Step 3: 105.3°C, 30±3min. Step 4: room temp, 10 to 15min.	
Resistance to Sol heat	dering	Refer to Standard Ratings	Lower than 1.3 times initial specification	Lower than initial specification	Reflow soldering mehod 240°C, 10 sec.Max.	
Damp heat	MW.10	from +30% to -20%	Lower than 1.5 times initial specification	Lower than initial specification	at 40°C at 90 to 95% RH 500 hour	
Endurance I	MMM.	Refer to Standard Ratings	Lower than 1.5 times initial specification	Lower than initial specification	at 85°C at rated voltage 1000 hour	
Endurance II		Refer to Standard Ratings	Lower than 3 times initial specification	Lower than initial specification	at 105°C at Derated voltage 1000 hour	
Failure Rate	W	MM.100X.COM	at 85°C: rated voltage at 105°C: derated voltage			
Terminal Strength		Visual: There shall be no evidence	of mechanical damage	M.100X.COM	Strength : 4.9N Time : 10±0.5sec. (two directions)	
Permissible ripple	current	Refer to Ratings Table	M.T.	M.M. 100 7. CO.	at 100 kHz	
Other		Conform to IEC60384-1			Conform to IEC60384-1	

$$[U_T] = [U_R] - \frac{[U_R] - [U_C]}{20} (T-85)$$

[U_T]: Derated voltage at operating temperature

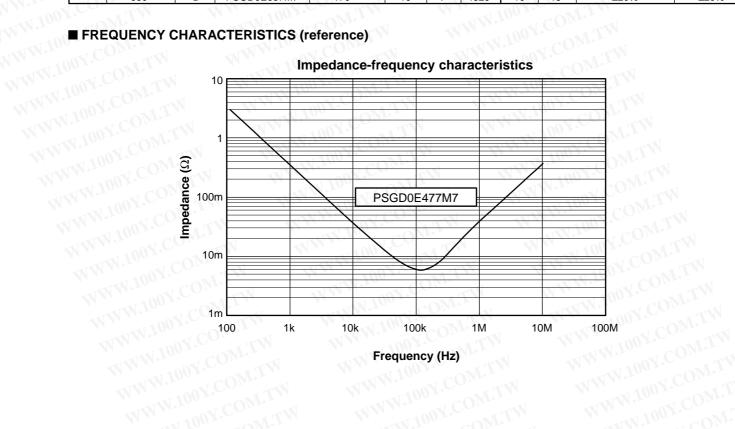
[U_R]: Rated voltage

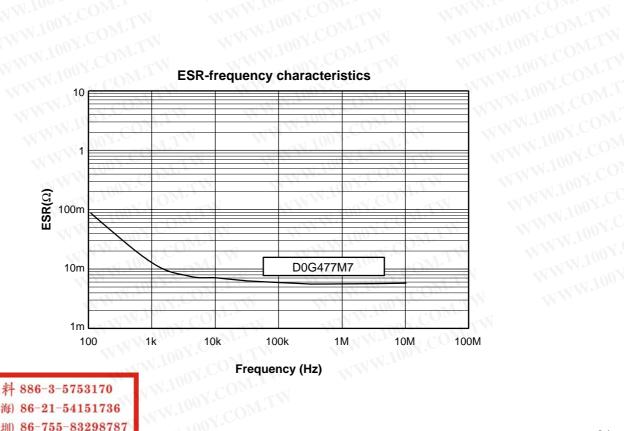
[Uc] : Derated voltage at $105^{\circ}C$ T : Ambient temperature

■ STANDARD RATINGS

										1 5/ (1 361163
∎ STA	NDARD RA	TINGS	-on.TW	W	WW.19	1002 1007 1007	COM:	TY ITW MTV			
D. 4. I			ON COST OF	N	MAN .	1100	Permissible		F (%)	Capaci	tance
Rated Voltage (V)	Capacitance (μF)	Case Code	Part Number (Bulk)	Leakage Current (μA)	DF (%)	ESR (mΩ)	ESR Ripple	–55°C	+125°C	Change 1	Change 2
1.11	330	V	PSGV0E337M9	82.5	10	9	3726	10	15	±20%	±20%
- 17	330	D	PSGD0E337M9	82.5	10	9	4082	10	15	±20%	±20%
Mr. z	330	D	PSGD0E337M7	82.5	10	7	4629	10	15	±20%	±20%
26 1	470	D	PSGD0E477M9	117.5	10	9	4082	10	15	±20%	±20%
2.5	470	D	PSGD0E477M7	117.5	10	7	4629	10	15	±20%	±20%
100	470	D	PSGD0E477M6	117.5	10	6	5000	10	15	±20%	±20%
Ω_{M}	680	D	PSGD0E687M9	170	10	9	4082	10	15	±20%	±20%
	680	D	PSGD0E687M7	170	10	7	4629	10	15	±20%	±20%

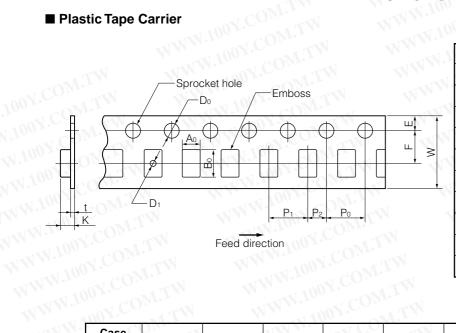
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TAPE AND REEL SPECIFICATIONS

■ Plastic Tape Carrier



	-51		Unit:
Case Code	$\textbf{A}_0 \pm \textbf{0.2}$	B ₀ ± 0.2	K ± (
100 J	1.0	1.8	1.1
P	1.4	2.2	1.4
A2 (U)	1.9	3.5	1.4
A	1.9	3.5	1.9
В3	3.2	3.8	1.4
B2 (S)	3.3	3.8	2.1
C2	3.7	6.4	1.7
C 1.10	3.7	6.4	3.0
V	4.6	7.7	2.4
D	4.8	7.7	3.3

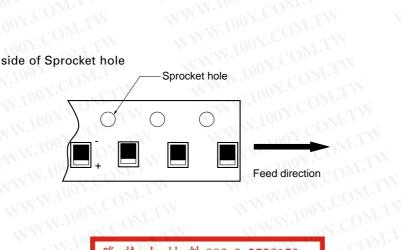
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J P A2 (U) A 8 3.5 4	OM.T
A2 (U) A 8 3.5 4	COM.T.
A 8 3.5 4	
	0.2
	0.2
33 (W) 2 4 φ1.5 φ1.0	Y.CON
B2 (S) (VI.3)	ON.CON
C2	0.3
<u>C</u> 12 5.5 8 φ1.5 -	00 7.0.5
V 12 3.5 (V 1.5)	0.4

■ Packing Orientation

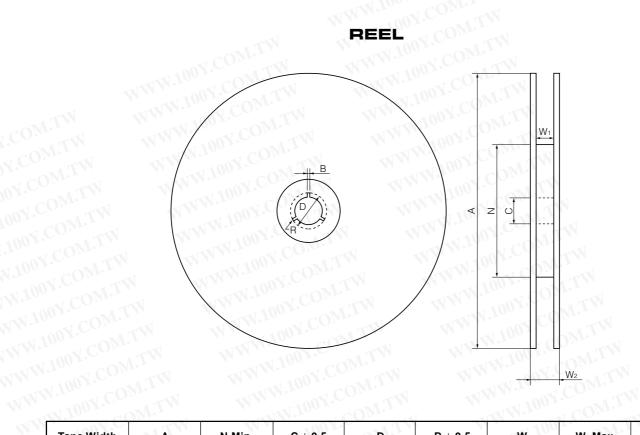
ex. R:Cathode on the side of Sprocket hole



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REEL



N.100Y.	MTW	WW	W.100X.	COM.TW	N	WW.100 x	COMIT	Unit: mm	
Tape Width	OMATW	N Min.	C ± 0.5	D	B ± 0.5	W ₁	W ₂ Max.	R	
8 mm	4.00+0	nm φ180 ⁺⁰ ₋₃	.50	W 100°	12410 F		9.0 ± 1.0	11.4 ± 1.0	
12 mm	φ180_3	ϕ^{-1} ϕ	2	13.0 ± 1.0	15.4 ± 1.0				
8 mm	1220 1 2	100	112	(24.5.4.0	TW	10.0 Max.	14.5 Max.	V.T.	
12 mm	ϕ 330 ± 2	ϕ 80	φ13	φ21± 1.0	2	14.0 Max.	18.5 Max.	M.T.W	

J 4000 - P 3000 -	ovi.C
	~1
	* UII J .
A2 (U) 3000 10000	100
A 2000 9000	1.700
B3 (W) 3000 10000	W.In.
B2 (S) 2000 5000	W.10
C2 1000 4000	WW.
V 1000 3000	W XX
C, D 500 2500	

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NOTES ON USING THE SOLID TANTALUM CAPACITORS

About 90% of the failure mode of the solid tantalum capacitor is short-circuit. Please take surplus for the operating condition.

1. Circuit Design

(1) Reliability

The reliability of the solid tantalum capacitor is heavily influenced by environmental conditions such as temperature, humidity, shock, vibration, mechanical stresses, and electric stresses, including applied voltage, current, ripple current, transient current and voltage, and frequency. When using solid tantalum capacitors, therefore, provide enough margin so that the reliability of the capacitors is maintained.

Voltage and temperature are important parameters when estimating the reliability (field failure rate).

The field failure rate of a solid tantalum capacitor can be calculated by the following expression if emphasis is placed only on the voltage and temperature:

$$\lambda = \lambda_0 (V/V_0)^3 \times 2^{(T-T_0)/10}$$

Where

λ: estimated failure rate in actual working condition

temperature: T; voltage: V

 λ_0 : failure rate under rated load (See table

below.)

temperature: To; voltage: Vo

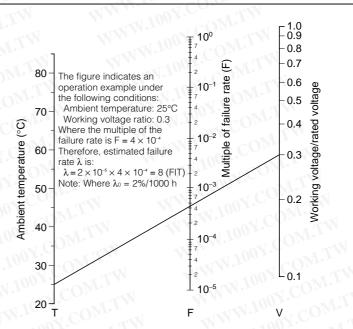
Failure rate level λο of each series

Series	Failure rate level
PS/L	1%/1000 h
E/SV	1%/1000 h
F/SV	1%/1000 h
PS/G	1%/1000 h
SV/Z	1%/1000 h

<Test conditions>

Temperature: 85°C Voltage: rated voltage

Rs: 3 Ω



This figure graphically indicates $(V/V_0)^3 \times 2^{(T-T_0)/10}$ in the expression $\lambda = \lambda_0 \ (V/V_0)^3 \times 2^{(T-T_0)/10}$. By using this figure, the estimated failure rate can be easily calculated.

Connect the desired temperature and voltage ratio with a straight line (from the left most vertical axis in the figure to the right most axis) in the figure. The multiple of the failure rate can be obtained at the intersection of the line drawn and the middle vertical axis in the figure.

Therefore,

 $\lambda = \lambda_0 \times F$

Where

F: multiple of failure rate at given temperature and ratio of working voltage to rated voltage.

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2. Ripple Current and Ripple Voltage

If ripple current is applied, heat is generated within capacitor by Joule's heat (power dissipation) and it may affect to the reliability of the capacitor.

(1) Power Dissipation

The actual power dissipated in the capacitor is calculated using the formula1.

$$P = I^2 \times ESR.....Formura1$$

P : Power Dissipation (Watts)
I : Ripple Current (Arms)

ESR : Equivalent Series Resistance (Ω)

(2) Ripple Current

Using P Max from TABLE1, maximum ripple current $\ I\ (Arms)$ may be determined as follow:

$$I = \sqrt{P_{Max}/ESR} \times K \times F.....Formura2$$

K: Temperature Derating Factor TABLE2 E/SV, F/SV, SV/Z....TABLE2-1, P/SL, PS/G....TABLE2-2

F : Frequency Derating Factor.....TABLE3

ESR: refer to Ratings

Ripple voltage E is calculated using the formura3.

 $E = Z \times I.....Formura3$

E: Ripple voltage
Z: Impedance at specified frequency

(3) Ripple Voltage

The ripple voltage which may be applied is limited by three criteria :

- (a) The power dissipated in the ESR of the capacitor must not exceed the appropriate value specified in TABLE1.
- (b) The sum of the DC voltage and peak value of the ripple voltage must not exceed the rated voltage.
- (c) The negative peak value of the ripple voltage must not exceed the permissible reverse voltage value specified in the following section, Reverse Voltage.

3. Reverse Voltage

- Because the solid tantalum capacitor is of polar type, do not apply a reverse voltage to it.
- (2) The figure on the right shows the relationship between current and reverse voltage.

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TABLE 1 Dissipation Ratings

Case Code	Maximum Power Disspation Watts, 100kHz, at 25°C
J	0.010
J P.U	0.025
A2	0.060
Α	0.075
B3	0.075
B2	0.085
C2	0.090
C	0.110
V	0.125
D	0.150

TABLE 2-1 E/SV, F/SV, SV/Z Series

Temp.	Temperature Derating Factor K
25°C	1 CON 1
85°C	0.9
125°C	0.4

TABLE 2-2 P/SL, PS/G Series

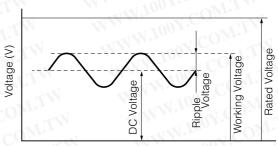
Temp.	Temperature Derating Factor K
25°C	W. F. CON
85°C	0.9
105°C	0.4

TABLE 3 Frequency Derating Factor F

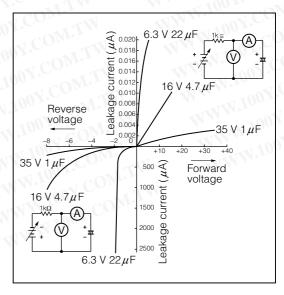
		7 0			
Series	10kHz	100kHz	500kHz	1MHz	
I	0.80	1.00	1.15	1.20	
П	0.75	1.00	1.10	1.30	

I: E/SV, F/SV, SV/Z

Ⅱ: PS/L, PS/G



Time (seconds)



4. Applied Voltage

- (1) For general applications, apply 70% or less of the rated voltage to the capacitor.
- (2) When the capacitor is used in a power line or a low-impedance circuit, keep the applied voltage within 30% (50% max.) of the rated voltage to avoid the adverse influence of inrush current.
- (3) For conductive polymer type, NeoCapacitor, apply 80% or less of the rated voltage to the capacitor.

Recommended Ratio of Operating Voltage to Rated Voltage

Circuit	Manganese dioxide type E/SV, F/SV, SV/Z series	Conductive polymer type (NeoCapacitor) PS/L, PS/G series	
high-impedance	70% or less	80% or less	
low-impedance	within 30% (50% max)	80% or less	

(4) Derated voltage at 85°C or more.

When using a Chip-type capacitor at a temperature of 85° C or higher, calculate reduced voltage U_T from the following expression. Note, however, that the ambient temperature must not exceed the maximum operating temperature.

The rated voltage ratio is as shown in the figure on the right.

$$U_T = U_R - \frac{U_R - U_C}{T_{max} - 85}$$
 (T-85)

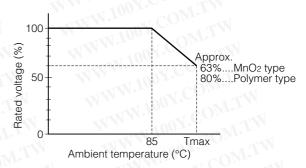
Where

UR: rated voltage (V)

Uc: derated voltage at 125°C T: ambient temperature (°C)

Tmax: Maximum Operating temperature

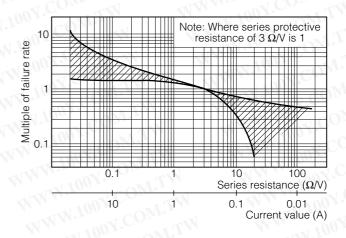
MnO₂ type E/SV, F/SV, SV/Z......125°C Conductive Polymer type PS/L,PS/G ...105°C



5. Current (Series Resistance)

As shown in the figure on the right, reliability is increased by inserting a series resistance of at least $3\Omega/V$ into circuits where current flow is momentary (switching circuits, charge/discharge circuits, etc). If the capacitor is in a low-impedance circuit, the voltage applied to the capacitor should be less than 1/2 to 1/3 of the DC rated voltage.

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6. In the Case of Short-Circuit

- (1) Manganese oxide tantalum capacitor (conventional tantalum capacitor) is heated and may generate fire and be burned depending upon its excess current, time and other factors.
- (2) Conductive polymer tantalum capacitor (NeoCapacitor) is heated and may generate smoke emission depending upon its excess current, time and other factors.

Conductive polymer used for electrolyte is superior in insulanting the damaged portion to manganese oxide (used in conventional tantalum capacitor).

When designing the circuit, provide as much margin as possible to maintain capacitor reliability.

NOTES ON USING THE CHIP TANTALUM CAPACITORS, EXCLUDING NeoCapacitors

1. Mounting

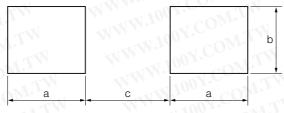
(1) Direct Soldering

Keep the following points in mind when soldering the capacitor by means of jet soldering or dip soldering:

(a) Temporarily fixing resin

Because chip tantalum capacitors are larger and subject to more force than chip multilayer ceramic capacitors or chip resistors, more resin is required to temporarily secure the solid tantalum capacitors. However, if too much resin is used, the resin adhering to the patterns on a printed circuit board may adversely affect the solderability.

(b) Pattern design



(mm)

Case	а	b .100	c
Р	2.2	1.4	0.7
A2 (U), A	2.9	1.7	1.2
B3 (W), B2 (S)	3.0	2.8	1.6
C2, C	4.1	2.3	2.4
V, D	5.2	2.9	3.7

The above dimensions are for reference only. If the capacitor is to be mounted by this method, and if the pattern is too small, the solderability may be degraded.

(c) Temperature and time

Keep the peak temperature and time within the following values:

Solder temperature 260°C max.

Time 5 seconds max.

Whenever possible, perform preheating (at 150°C max.) for a smooth temperature profile. To maintain reliability, mount the capacitor at low temperature and in a short time.

(d) Component layout

If many types of chip components are mounted on a printed circuit board that is to be soldered by means of jet soldering, solderability may not be uniform over the entire board, depending on the layout and density of the components on the board (also take into consideration generation of flux gas).

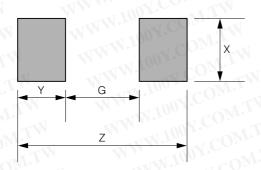
(e) Flux

Use resin-based flux. Do not use flux with strong acidity.

(2) Reflow Soldering

Keep the following points in mind when soldering the capacitor in a soldering oven or with a hot plate:

(a) Pattern design (in accordance with IEC61188)



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(mm)

				,
Case	G Max.	Z Min.	X Min.	Y (reference)
J*	0.65	1.65	0.65	0.5
P2*	1.05	2.05	0.80	0.5
A3*	1.65	3.25	1.1	0.8
P	0.5	2.6	1.2	0.9
A2 (U), A	1.1	3.8	1.5	1.05
B3 (W), B2 (S)	1.4	4.1	2.7	1.35
C2, C	2.9	6.9	2.7	2.0
V, D	4.1	8.2	2.9	2.05

^{*} F/SV Series only (Conform to IEC 61188-5-2)

The above dimensions are recommended. Note that if the pattern is too big, the component may not be mounted in place.

(b) Temperature and time

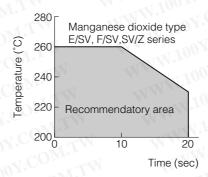
Keep the peak temperature and time within the following values:

Solder temperature...... 260°C max.

Time 10 seconds max.

Whenever possible, perform preheating (at 150°C max.) for a smooth temperature profile. To maintain reliability, mount the capacitor at low temperature and in a short time. The peak temperature and time shown above are applicable when the capacitor is to be soldered in a soldering oven or with a hot plate. When the capacitor is soldered by means of infrared reflow soldering, the internal temperature of the capacitor may rise beyond the surface temperature.

Temperature and Time



(3) Using a Soldering Iron

When soldering the capacitor with a soldering iron, controlling the temperature at the tip of the soldering iron is very difficult. However, it is recommended that the following temperature and time be observed to maintain the reliability of the capacitor:

2. Cleaning

Generally, several organic solvents are used for flux cleaning of an electronic component after soldering. Many cleaning methods, such as immersion cleaning, rinse cleaning, brush cleaning, shower cleaning, vapor cleaning, and ultrasonic cleaning, are available; cleaning methods may be used alone or two or more may be used in combination. The temperature of the organic solvent may vary from room temperature to several 10°C, depending on the desired effect. If cleaning is carried out with emphasis placed only on the cleaning effect, however, the marking on the electronic component cleaned may be erased, the appearance of the component may be damaged, and, in the worst case, the component may be functionally damaged. It is therefore recommended that the R series solid tantalum capacitor be cleaned under the following conditions:

Recommended conditions of flux cleaning

- (1) Cleaning solvent Chlorosen, isopropyl alcohol
- (2) Cleaning method Shower cleaning, rinse cleaning, vapor cleaning
- (3) Cleaning time5 minutes max.

Note. Ultrasonic cleaning

This cleaning method is extremely effective for eliminating dust generated by mechanical processes, but may pose problems depending on the condition. An experiment conducted by NEC TOKIN confirmed that the external terminals of the capacitor were cut when it was cleaned with some ultrasonic cleaning machines. The cause of this phenomenon is metal fatigue of the capacitor terminals due to ultrasonic cleaning. To prevent the terminal from being cut, decreasing the output power of the ultrasonic cleaning machine or shortening the cleaning time may be effective. However, it is difficult to specify the cleaning conditions because there are many factors involved, such as the conversion efficiency of the ultrasonic oscillator, transfer efficiency of the cleaning bath, difference in cleaning effect depending on the location in the cleaning bath, the size and quantity of the printed circuit boards to be cleaned, and the securing states of the components on the boards. It is therefore recommended that ultrasonic cleaning be avoided as much as possible.

If ultrasonic cleaning is essential, make sure through experiments that no abnormalities occur as a result of the cleaning. For further information, consult NEC TOKIN.

3. Other

- (1) Do not subject the capacitor to excessive vibration and shock.
- (2) The solderability of the capacitor may be degraded by humidity. Store the capacitor at room temperature (-5 to +40°C) and humidity (40 to 60% RH).
- (3) Take care that no external force is applied to tape-packaged products (if the packaging material is deformed, the capacitor may not be automatically mounted by a chip mounter).

NOTES ON USING NeoCapacitor

1. Permissible Ripple Current

Permissible ripple current shall be derated as follows:

(1) Temperature Change

25°C: Rating value

85°C: 0.9 times rating value

105°C: 0.4 times rating value

(2) Switching Frequency

10 kHz: 0.75 times rating value

100 kHz: rating value

500 kHz: 1.1 times rating value 1 MHz: 1.3 times rating value

2. Mounting

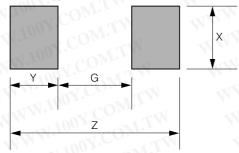
This capacitor is designed to be surface mounted by means of reflow soldering.

(The conditions under which the capacitor should be soldered with a soldering iron are explained in (2) Using a Soldering Iron. Because the capacitor is not designed to be soldered by means of laser beam soldering, VPS, or flow soldering, the conditions for these soldering methods are not explained in this document.

(1) Reflow Soldering

Keep the following points in mind when soldering the capacitor in a soldering oven with a hot plate:

(a) Pattern design (in accordance with IEC61188)



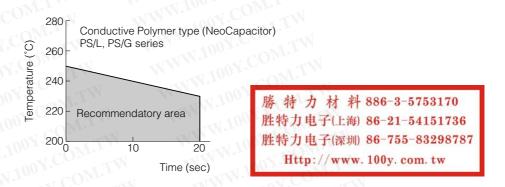
(mm)

Case	G Max.	Z Min.	X Min.	Y (reference)
U	0.7	2.5	1.0	0.9
Р	0.5	2.6	1.2	1.05
A2 (U), A	1.1	3.8	1.5	1.35
B3 (W), B2 (S)	1.4	4.1	2.7	1.35
C2, C	2.9	6.9	2.7	2.0
V, D	4.1	8.2	2.9	2.05

The above dimensions are recommended. Note that if the pattern is too big, the component may not be mounted in place.

(b) Temperature and time

Keep the peak temperature and time within the following recommended conditions.



Whenever possible, perform preheating (at 150°C max.) for a smooth temperature profile. To maintain reliability, mount the capacitor at low temperature and in a short time. The peak temperature and time shown above are applicable when the capacitor is to be soldered in a soldering oven or with a hot plate. When the capacitor is soldered by means of infrared reflow soldering, the internal temperature of the capacitor may rise beyond the surface temperature.

(2) Using a Soldering Iron

When soldering the capacitor with a soldering iron, controlling the temperature at the tip of the soldering iron is very difficult. However, it is recommended that the following temperature and time be observed to maintain the reliability of the capacitor:

3. Cleaning

Generally, several organic solvents are used for flux cleaning of an electronic component after soldering. Many cleaning methods, such as immersion cleaning, rinse cleaning, brush cleaning, shower cleaning, vapor cleaning, and ultrasonic cleaning, are available, whith may be used alone or in combination. The temperature of the organic solvent may vary from room temperature to several 10°C, depending on the desired effect. If cleaning is carried out with emphasis placed only on the cleaning effect, however, the marking on the electronic component cleaned may be erased, the appearance of the component may be damaged, and, in the worst case, the component may be functionally damaged. It is therefore recommended that the NeoCapacitor be cleaned under the following conditions:

[Recommended conditions of flux cleaning]

- (1) Cleaning solvent Isopropyl alcohol
- (2) Cleaning method Shower cleaning, rinse cleaning, vapor cleaning
- (3) Cleaning time 5 minutes max.

Note: Ultrasonic cleaning

This cleaning method is extremely effective for eliminating dust generated by mechanical processes, but may pose problems, depending on the condition. An experiment conducted by NEC TOKIN confirmed that the external terminals of the capacitor were cut when it was cleaned with some ultrasonic cleaning machines. The cause of this phenomenon is metal fatigue of the capacitor terminals due to ultrasonic cleaning. To prevent the terminal from being cut, decreasing the output power of the ultrasonic cleaning machine or decreasing the cleaning time may be effective. However, it is difficult to specify safe cleaning conditions because there are many factors involved, such as the conversion efficiency of the ultrasonic oscillator, transfer efficiency of the cleaning bath, difference in cleaning effect depending on the location in the cleaning bath, the size and quantity of the printed circuit boards to be cleaned, and the securing states of the components on the boards. It is therefore recommended that ultrasonic cleaning be avoided as much as possible.

If ultrasonic cleaning is essential, make sure through experiments that no abnormalities occur as a result of the cleaning. For further information, contact NEC TOKIN.

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4. Derating

WW.100Y.COM.T Apply appropriate voltage to the capacitors according to the failure rate estimation. It is recommended that the applied voltage be less than 80% of the rated voltage.

5. Other

- (1) Do not subject the capacitor to excessive vibration and shock.
- (2) The solderability of the capacitor may be degraded by humidity. Store the capacitor at room temperature (-5 to +40°C) and humidity (40 to 60% RH).
- (3) Take care that no external force is applied to tape-packaged products (if the packaging material is deformed, the capacitor may not be automatically mounted by automatic insertion equipment). 100Y.COM.TV

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The information in this document is based on documents issued in Jan. 2005 at the latest. The information is subject to change without notice. For actual design-in, refer to the latest of data sheets, etc., for the most up-to-date specifications of the device.

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"Standard," "Special," and "Specific." The Specific quality grade applies only to devices developed based on a customer-designated quality assurance program for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment, and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment, and medical equipment (not specifically designed for life support)

Specific: Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems, or medical equipment for life support, etc.

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(Note)

- (1) "NEC TOKIN" as used in this statement means NEC TOKIN Corporation and also includes its majority-owned subsidiaries.
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