

We developed low profile series of type 251 which is widely used in portable information and telecommunication equipments such as mobile phone, smartphone and portable AV equipments such as digital video camera, digital still camera and portable audio. Type 251 T series will considerably contribute to ultra-miniaturization, ultra-low profile and improvement of performance of the portable multimedia devices.

FEATURES

1. Using the face-down terminal structure makes it possible to design the land in almost the same size as the terminal. As the result of this, parts can be downsized, and the mounting area can be reduced to 1/2 to 1/3 of that required by conventional structures.
2. Ultra low profile height 0.6mm and 0.8mm is applicable.
3. Type 251 T series in size from 1608L to 3216L are applicable to a wide capacitance range from 0.68 to 68  $\mu$ F.
4. This type of capacitors is suitable for ultra miniaturized, such as DVC, DSC and PCMCIA cards, and high-function compact portable devices, such as mobile phone and smartphone.
5. Case M (face-down terminal type 1608) and case S (face-down terminal type 2012) of this type are listed in the Surface Mounting Device-Outline Registration System of Electronic Device Registration Center of JEITA.
6. Lead-free and RoHS Compliant.

RATING

Item	Rating
Category temperature range (Operating temperature )	-55 ~ +125°C
Rated Temperature (Maximum operating temperature for DC rated Voltage)	+85°C
DC rated voltage range [U <sub>R</sub> ]	See CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS
Rated capacitance (Nominal capacitance range [C <sub>R</sub> ] )	
Rated capacitance tolerance	
Failure rate level	1%/1000 h

Note<sup>(1)</sup>: For operation 125°C, derate voltage linearly to 67% of 85°C voltage rating.

ORDERING INFORMATION

251      T      6301      106      M      R      06M

TYPE      SERIES      RATED VOLTAGE      CAPACITANCE      CAPACITANCE TOLERANCE      STYLE OF REELED PACKAGE      CASE CODE

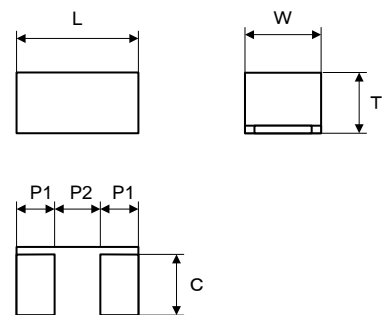
(Taping specification)

Marking	Rated Voltage	Marking	Capacitance	Marking	Capacitance Tolerance	Code	Reel Size	Anode Notation	Case code	max. height (mm)	EIA Code
4001	4VDC	684	0.68 $\mu$ F	M	$\pm 20\%$	R	$\phi 180$	Feed hole:-	06M	0.6	1608
6301	6.3VDC	155	1.5 $\mu$ F						06S	0.6	2012
1002	10VDC	225	2.2 $\mu$ F						08S	0.8	2012
2502	25VDC	335	3.3 $\mu$ F						06A	0.6	3216
		475	4.7 $\mu$ F								
		106	10 $\mu$ F								
		156	15 $\mu$ F								
		226	22 $\mu$ F								
		336	33 $\mu$ F								
		476	47 $\mu$ F								
		686	68 $\mu$ F								

DIMENSIONS

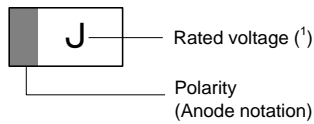
(mm)

Case Code	Max. height of component	L $\pm 0.1$	W $\pm 0.1$	T $\pm 0.1$	P1 $\pm 0.1$	P2 $\pm 0.1$	C $\pm 0.1$
06M	0.6	1.6	0.85	0.5	0.5	0.65	0.7
06S	0.6	2.0	1.25	0.5	0.5	1.05	0.9
08S	0.8	2.0	1.25	0.7	0.5	1.05	0.9
06A	0.6	3.2	1.6	0.5	0.8	1.65	1.2

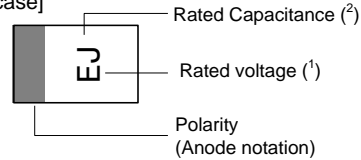


## MARKING

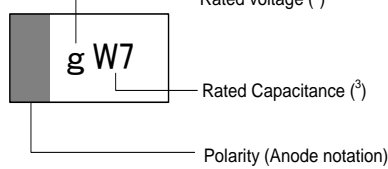
[06M case]



[06S, 08S case]



[06A case]



Note<sup>(1)</sup>: Rated voltage is indicated with one alphabetic letter.

Rated voltage (VDC)	4	6.3	10	25
Rated voltage code	G	J	A	E

\* The rated voltage of case 06A is indicated with a small letter g (4 V) or j (6.3 V).

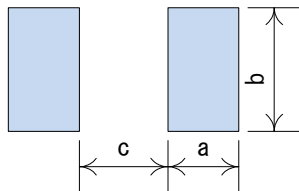
Note<sup>(2)</sup>: Rated Capacitance is indicated with one alphabetic letter or the alphabetic letter with an overbar or underbar as below.

Rated capacitance ( $\mu\text{F}$ )	0.68	1.5	2.2	3.3	4.7	10	15	22	33	47	68
Code	<u>W</u>	E	J	N	S	$\bar{A}$	$\bar{E}$	$\bar{J}$	$\bar{N}$	$\bar{S}$	$\bar{W}$

Note<sup>(3)</sup>: Rated Capacitance is indicated with one alphabetic letter and one numeral.

Code	A6	E6	J6	N6	S6	W6
Rated capacitance ( $\mu\text{F}$ )	1.0	1.5	2.2	3.3	4.7	6.8
Code	A7	E7	J7	N7	S7	W7
Rated capacitance ( $\mu\text{F}$ )	10	15	22	33	47	68

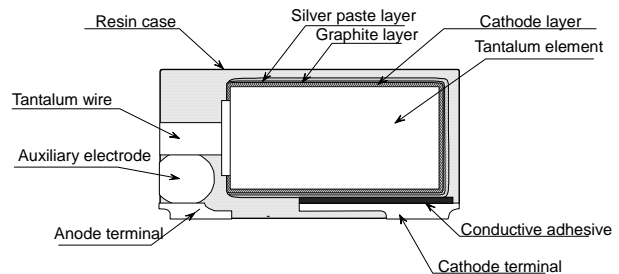
## RECOMMENDED SOLDER PAD LAYOUT



Case Size	a	b	c	Mask Thickness (mm)
06M	more than 0.50	0.65	0.65	$\leq 100 \mu\text{m}$
06S, 08S	more than 0.50	0.8	1.05	$\leq 100 \mu\text{m}$
06A	more than 0.80	1.1	1.65	$\leq 100 \mu\text{m}$

In order to expect the self alignment effect, it is recommended that land width is almost the same size as terminal of capacitor, and space between lands (c) nearly equal to the space between terminals for appropriate soldering.

## STRUCTURE (TYPICAL)



## STANDARD RATING

R.V.(VDC) Cap.(mF)	4	6.3	10	25
0.68				06M
1.5				06S
2.2				08S
3.3				06A
4.7			06M	
10		06M	06S	
15	06M		08S	
22		06S	06A	
33	06S	08S		
47	08S	06A		
68	06A			

# PERFORMANCE

No.	Item	Performance	Test method	
1	Leakage Current (μA)	Shall not exceed 0.01 CV or 0.5 whichever is greater.	JIS C 5101-1, 4.9 Applied Voltage : Rated Voltage for 5 min. Temperature : 20°C	
2	Capacitance (μF)	Shall be within tolerance of the nominal value specified.	JIS C 5101-1, 4.7 Frequency : 120 Hz± 20% Voltage : 0.5Vrms+1.5 ~2VDC Temperature : 20°C	
3	Dissipation Factor	Shall not exceed the values shown in CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS.	JIS C 5101-1, 4.8 Frequency : 120 Hz± 20% Voltage : 0.5Vrms+1.5 ~2VDC Temperature : 20°C	
4	ESR (Equivalent series resistance)	Shall not exceed the values shown in CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS.	Frequency : 100kHz Temperature : 20°C	
5	Characteristics at High and Low Temperature		JIS C 5101-1, 4.29	
	Step 1	Leakage Current	Shall not exceed the value in No.1.	Measuring temperature : 20 ± 2°C
		Capacitance	Shall be within the specified tolerance.	
		Dissipation Factor	Shall not exceed the value in No.3.	
	Step 2	Capacitance Change	Shall be within any of the following ranges and specified according to CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS. · Within $\frac{0}{-15}$ % of the value at Step 1 · Within $\frac{0}{-30}$ % of the value at Step 1	Measuring temperature : -55±3 °C
		Dissipation Factor	Shall not exceed the values shown in CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS.	
	Step 3	Leakage Current	Shall not exceed the value in No.1.	Measuring temperature : 20 ± 2°C
		Capacitance Change	Shall be within ± 2% of the value at Step 1.	
	Step 4	Dissipation Factor	Shall not exceed the value in No.3.	Measuring temperature : 85±2°C
		Leakage Current	Shall be within any of the following ranges and specified according to CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS. · Larger value of 0.1 CV or 5 μA · 0.2 CV or less	
Capacitance Change		Shall be within any of the following ranges and specified according to CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS. · Within $\frac{+10}{0}$ % of the value at Step 1 · Within $\frac{+20}{0}$ % of the value at Step 1		
Step 5	Dissipation Factor	Shall not exceed the values shown in CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS.	Measuring temperature : 125±2°C Measuring voltage : Derated voltage at 125°C	
	Leakage Current	Shall be within any of the following ranges and specified according to CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS. · Larger value of 0.125 CV or 6.3 μA · 0.25 CV or less		
Step 6	Capacitance Change	Shall be within any of the following ranges and specified according to CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS. · Within $\frac{+15}{0}$ % of the value at Step 1 · Within $\frac{+20}{0}$ % of the value at Step 1	Measuring temperature : 20 ± 2°C	
	Dissipation Factor	Shall not exceed the values shown in CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS.		
	Leakage Current	Shall not exceed the value in No.1.		
6	Surge	Capacitance Change	Shall be within ± 2% of the value at Step 1.	
		Dissipation Factor	Shall not exceed the value in No.3.	
		Appearance	Shall not exceed the value in No.3.	
6	Surge	Leakage Current	Shall be within any of the following ranges and specified according to CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS. · Not exceeding the value in No.1 : Leakage current code A · Not exceeding twice the value in No.1 : Leakage current code B	
		Capacitance Change	Shall be within any of the following ranges and specified according to CATALOG NUMBERS AND RATING OF STANDARD PRODUCTS. · Within ± 15% of the value before test · Within ± 20% of the value before test	
		Dissipation Factor	Shall not exceed the value in No.3.	
7	Shear Test	There shall be no evidence of mechanical damage.	JIS C 5101-1, 4.34 Capacitors mounted under conditions JIS C 5101-1, 4.33 are used as specimens. · Soldering : Indirect heating · Temperature : 240 ± 10°C · Duration : 10s or less Applied pressure : 5N Duration : 10 ± 1 s	







