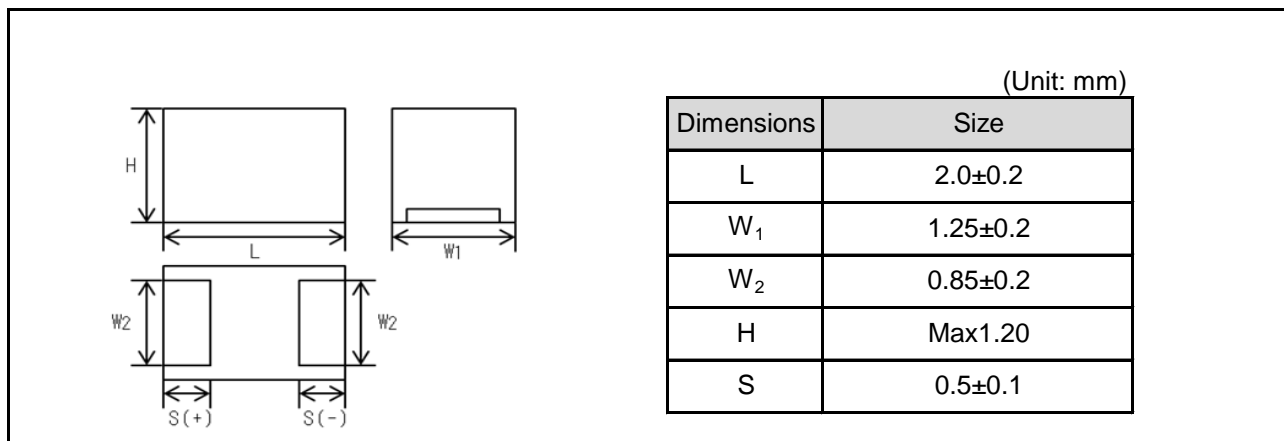


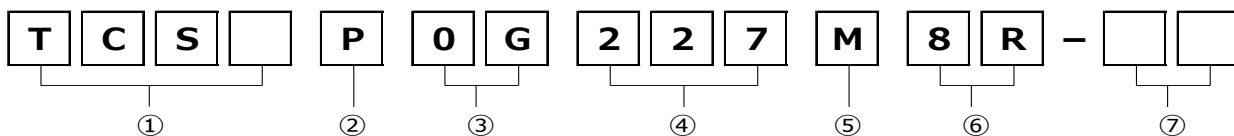
●Features

- 1) New bottom electrode configuration results in greater compactness, low profile, and higher capacitance.
- 2) Compact, low profile, ultra-high capacitance contribute to smaller, thinner sets with greater functionality.
- 3) Ideal for noise removal on power supply lines with limited space.
- 4) Eco-friendly halogen-free products.

●Dimensions



●Part No. Explanation



① Series name

TCS

② Case style

P : 2012-2012(12)size

③ Rated voltage

CODE	Rated voltage(V)
0E	2.5
0G	4
0J	6.3
1A	10
1C	16
1D	20
1E	25
1V	35
1H	50

④ Nominal capacitance

Nominal capacitance in pF in 3 digits:

2 significant figures followed by the figure representing the number of 0's.

⑤ Capacitance tolerance

M : ±20%

⑥ Taping

8: Tape width

R: Positive electrode on the side opposite to sprocket hole

⑦ Discrimination code

● Rated table

ESR (Ω)

Capacitance (μF)	Rated voltage (V.DC)								
	2.5	4	6.3	10	16	20	25	35	50
1.0 (105)									
2.2 (225)									
3.3 (335)									
4.7 (475)									
6.8 (685)									
10 (106)						6			
15 (156)									
22 (226)									
33 (336)									
47 (476)				4					
68 (686)									
100 (107)			3						
150 (157)			3						
220 (227)		3							

● Marking

The indications listed below should be given on the surface of a capacitor.

- (1) Polarity: The polarity should be shown by bar. (on the anode side)
- (2) Rated DC voltage: A voltage code is shown as below table.
- (3) Capacitance: A capacitance code is shown as below table.

Voltage Code	Rated DC Voltage (V)
e	2.5
g	4
j	6.3
A	10
C	16
D	20
E	25
V	35
H	50

Capacitance Code	Nominal Capacitance (μF)	Capacitance Code	Nominal Capacitance (μF)
<u>E</u>	0.15	e	15
<u>N</u>	0.33	j	22
<u>S</u>	0.47	n	33
A	1.0	s	47
E	1.5	<u>w</u>	68
J	2.2	<u>a</u>	100
N	3.3	<u>e</u>	150
S	4.7	<u>j</u>	220
W	6.8	<u>n</u>	330
a	10	<u>s</u>	470

Visual typical example

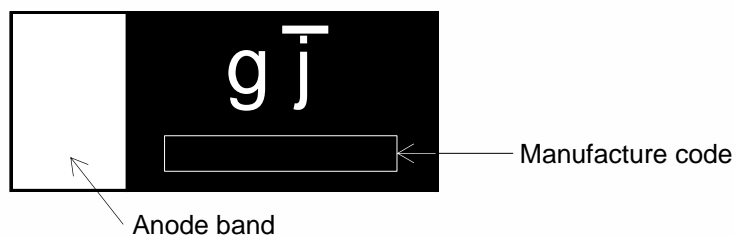
voltage code and capacitance code are variable with parts number.

[TCS series P case]

EX.) $\frac{g}{(1)}$ $\frac{\overline{j}}{(2)}$

(1) voltage code

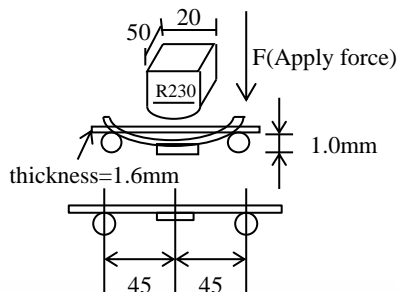
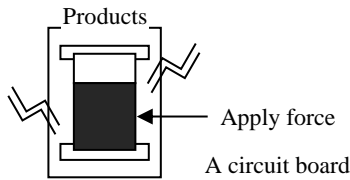
(2) capacitance code



● Characteristics

Item		Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)															
Operating Temperature		-55°C~+125°C	Voltage reduction when temperature exceeds +85°C															
Maximum operating temperature with no voltage derating		+85°C																
Rated voltage (V.DC)		Refer to " Standard list ".	at 85°C															
Category voltage (V.DC)		Refer to " Standard list ".	at 125°C															
Surge voltage (V.DC)		Refer to " Standard list ".	at 85°C															
DC Leakage current		Shall be satisfied the value on " Standard list ".	As per 4.9 JIS C 5101-1 As per 4.5.1 JIS C 5101-3 Voltage : Rated voltage for 5min															
Capacitance tolerance		Shall be satisfied allowance range. ±20%	As per 4.7 JIS C 5101-1 As per 4.5.2 JIS C 5101-3 Measuring frequency :120 ± 12Hz Measuring voltage :0.5Vrms + 1.5V.DC Measuring circuit :DC Equivalent series circuit															
Tangent of loss angle (Df,tanδ)		Shall be satisfied the value on " Standard list ".	As per 4.8 JIS C 5101-1 As per 4.5.3 JIS C 5101-3 Measuring frequency :120 ± 12Hz Measuring voltage :0.5Vrms + 1.5V.DC Measuring circuit :DC Equivalent series circuit															
Impedance		Shall be satisfied the value on " Standard list ".	As per 4.10 JIS C 5101-1 As per 4.5.4 JIS C 5101-3 Measuring frequency :100 ± 10kHz Measuring voltage :0.5Vrms or less Measuring circuit :DC Equivalent series circuit															
Resistance to Soldering heat	Appearance	There should be no significant abnormality. The indications should be clear.	As per 4.14 JIS C 5101-1 As per 4.6 JIS C 5101-3 Dip in the solder bath Solder temp :240 ± 5°C Duration :10 ± 0.5s Repetition :1 After the specimens, leave it at room temperature for over 24h and then measure the sample.															
	L.C.	Less than 200% of initial limit.																
	ΔC/C	Within ±30% of initial value.																
	DF (tanδ)	Less than 200% of initial limit.																
Temperature cycle	Appearance	There should be no significant abnormality. The indications should be clear.	As per 4.16 JIS C 5101-1 As per 4.10 JIS C 5101-3 Repetition : 5 cycles (1 cycle : steps 1 to 4) without discontinuation. <table><tr><td></td><td>Temp.</td><td>Time</td></tr><tr><td>1</td><td>-55±3°C</td><td>30±3min</td></tr><tr><td>2</td><td>Room Temp.</td><td>3min or less</td></tr><tr><td>3</td><td>125±2°C</td><td>30±3min</td></tr><tr><td>4</td><td>Room Temp.</td><td>3min or less</td></tr></table> After the specimens, leave it at room temperature for over 24h and then measure the sample. Initial value for ΔC/C shall be the value after mounted.		Temp.	Time	1	-55±3°C	30±3min	2	Room Temp.	3min or less	3	125±2°C	30±3min	4	Room Temp.	3min or less
		Temp.		Time														
	1	-55±3°C		30±3min														
	2	Room Temp.		3min or less														
3	125±2°C	30±3min																
4	Room Temp.	3min or less																
L.C.	Less than 200% of initial limit.																	
ΔC/C	Within ±30% of initial value.																	
DF (tanδ)	Less than 200% of initial limit.																	

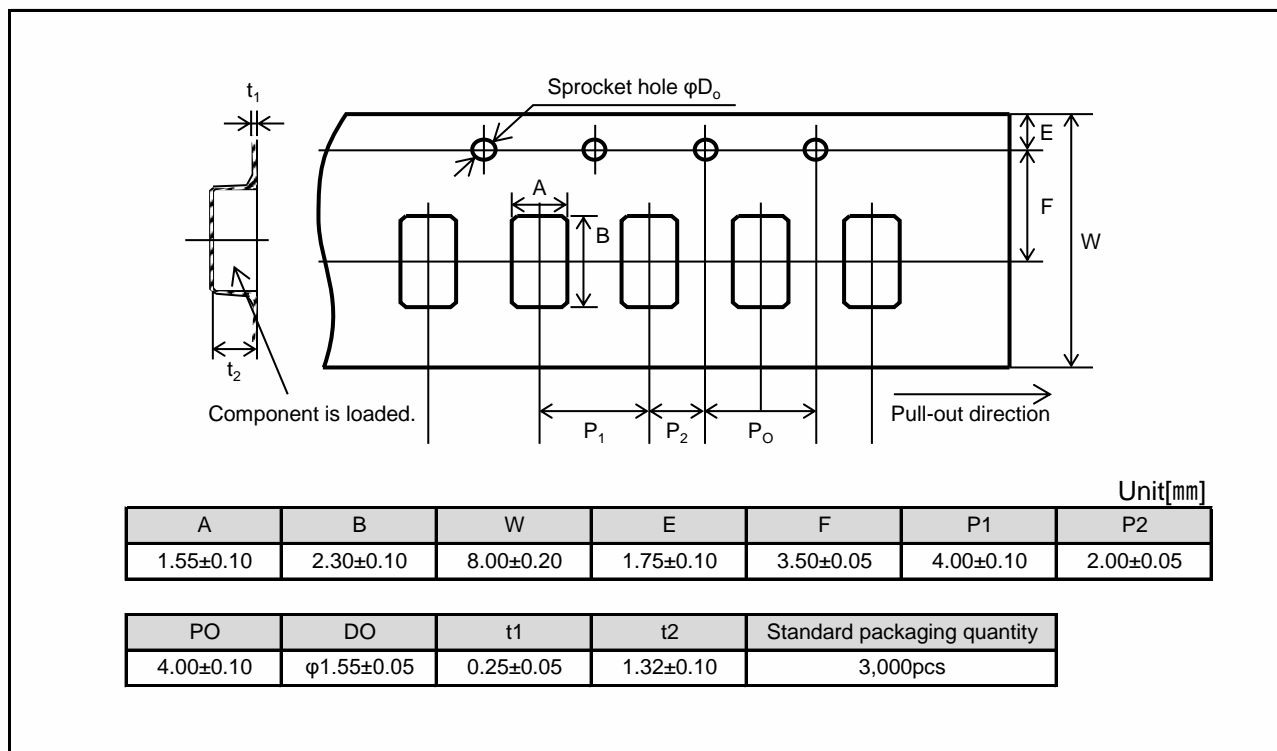
Item		Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)		
Moisture resistance	Appearance	There should be no significant abnormality. The indications should be clear.	As per 4.22 JIS C 5101-1 As per 4.12 JIS C 5101-3 After leaving the sample under such atmospheric condition that the temperature and humidity are 60±2°C and 90 to 95% RH, respectively, for 500+12/0h leave it at room temperature for over 24h and then measure the sample. Initial value for ΔC/C shall be the value after mounted.		
	L.C.	Less than 200% of initial limit.			
	ΔC/C	Within ±30% of initial value.			
	DF (tanδ)	Less than 200% of initial limit.			
Temperature Stability	Temp. : -55°C		As per 4.29 JIS C 5101-1		
	ΔC/C	Within +15/-50% of initial value.	As per 4.13 JIS C 5101-3 Initial value for ΔC/C shall be the value after mounted.		
	DF (tanδ)	Shall be satisfied the value on " Standard list "			
	L.C.	—			
	Temp. : +85°C				
	ΔC/C	Within +15/-5% of initial value.			
	DF (tanδ)	Shall be satisfied the value on " Standard list "			
	L.C.	Less than 1000% of initial limit.			
	Temp. : +125°C				
	ΔC/C	Within +20/-5% of initial value.			
	DF (tanδ)	Shall be satisfied the value on " Standard list "			
	L.C.	Less than 1250% of initial limit.			
	Surge voltage	Appearance		There should be no significant abnormality. The indications should be clear.	As per 4.26JIS C 5101-1 As per 4.14JIS C 5101-3 Apply the specified surge voltage via the serial resistance of 1kΩ ever 5±0.5 min. for 30±5 s. each time in the atmospheric condition of 85±2°C. Repeat this procedure 1,000 times. After the specimens, leave it at room temperature for over 24h and then measure the sample. Initial value for ΔC/C shall be the value after mounted.
		L.C.		Less than 200% of initial limit.	
ΔC/C		Within ±30% of initial value.			
DF (tanδ)		Less than 200% of initial limit.			
Loading at High temperature	Appearance	There should be no significant abnormality. The indications should be clear.	As per 4.23 JIS C 5101-1 As per 4.15 JIS C 5101-3 After applying the rated voltage for 1000+36/0 h without discontinuation via the serial resistance of 3Ω or less at a temperature of 85±2°C, leave the sample at room temperature / humidity for over 24h and measure the value. Initial value for ΔC/C shall be the value after mounted.		
	L.C.	Less than 200% of initial limit.			
	ΔC/C	Within ±30% of initial value.			
	DF (tanδ)	Less than 200% of initial limit.			

Item		Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)
Terminal strength	Capacitance	The measured value should be stable.	As per 4.35 JIS C 5101-1 As per 4.9 JIS C 5101-3
	Appearance	There should be no significant abnormality.	<p>A force is applied to the terminal until it bends to 1mm and by a prescribed tool maintains the condition for 5s. (See the figure below)</p> 
Adhesiveness		The terminal should not come off.	<p>As per 4.34 JIS C 5101-1 As per 4.8 JIS C 5101-3 Apply force of 2N in the two directions shown in the figure below for 10±1s after mounting the terminal on a circuit board.</p> 
Dimensions		Refer to "External dimensions".	Measure using a caliper of JIS B 7507 Class 2 or higher grade.
Resistance to solvents		The indication should be clear.	<p>As per 4.32 JIS C 5101-1 As per 4.18 JIS C 5101-3 Dip in the isopropyl alcohol for 30±5s, at room temperature.</p>
Solderability		3/4 or more surface area of the solder coated terminal dipped in the soldering bath should be covered with the new solder.	<p>As per 4.15.2 JIS C 5101-1 As per 4.7 JIS C 5101-3 Dip speed=25±2.5mm / s Pre-treatment (accelerated aging): Leave the sample on the boiling distilled water for 1h. Solder temp. : 245±5°C Duration : 3±0.5s Solder : M705 Flux : Rosin 25% IPA 75%</p>
Vibration	Capacitance	Measure value should not fluctuate during the measurement.	As per 4.17 JIS C 5101-1 Frequency : 10 to 55 to 10Hz/min.
	Appearance	There should be no significant abnormality.	<p>Amplitude : 1.5mm Time : 2h each in X and Y directions Mounting : The terminal is soldered on a print circuit board.</p>

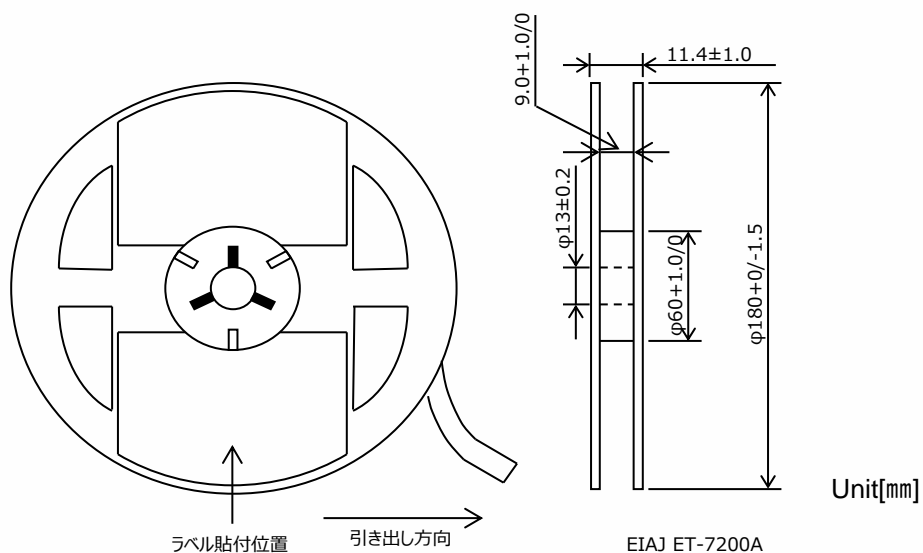
● Standard products list

Part No.	Rated voltage 85°C (V)	Category voltage 125°C (V)	Surge voltage 85°C (V)	Cap. 120Hz (μF)	Tol- erance (%)	Leakage current 25°C 1WV 5min (μA)	tanδ 120Hz			ESR 100kHz (Ω)
							-55°C	25°C	125°C	
TCSP0G227M8R-V1	4	2.5	4	220	±20	88.0	80	40	60	3
TCSP0J107M8R-V1	6.3	4	6.3	100	±20	63.0	80	40	60	3
TCSP0J157M8R-V1	6.3	4	6.3	150	±20	95.0	80	40	60	3
TCSP1A476M8R	10	6.3	13	47	±20	24.0	60	30	40	4
TCSP1D106M8R	20	13	26	10	±20	10.0	30	20	30	6

● Packaging specifications



● Reel dimensions



● Damp proof package

① One reel is packed in aluminum bag.

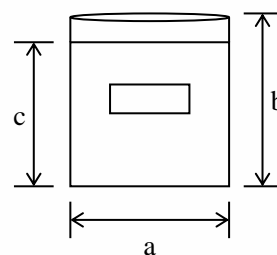
The size of aluminum bag is 240(a) x 250(b)mm.

The size up to 230(c)mm is to zipper.

② A desiccant is packed with a reel.

③ The aluminum bag is heat-sealed.

④ The label of the same as the label on the reel is placed on the aluminum bag.



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