Chip tantalum capacitors
(New bottom surface electrode type : Extra large capacitance)
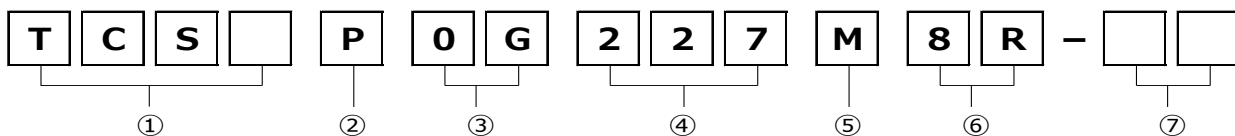**TCS series P case**

Datasheet

● 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

Dimensions	Size
L	2.0±0.2
W$_1$	1.25±0.2
W$_2$	0.85±0.2
H	Max1.20
S	0.5±0.1

(Unit: mm)
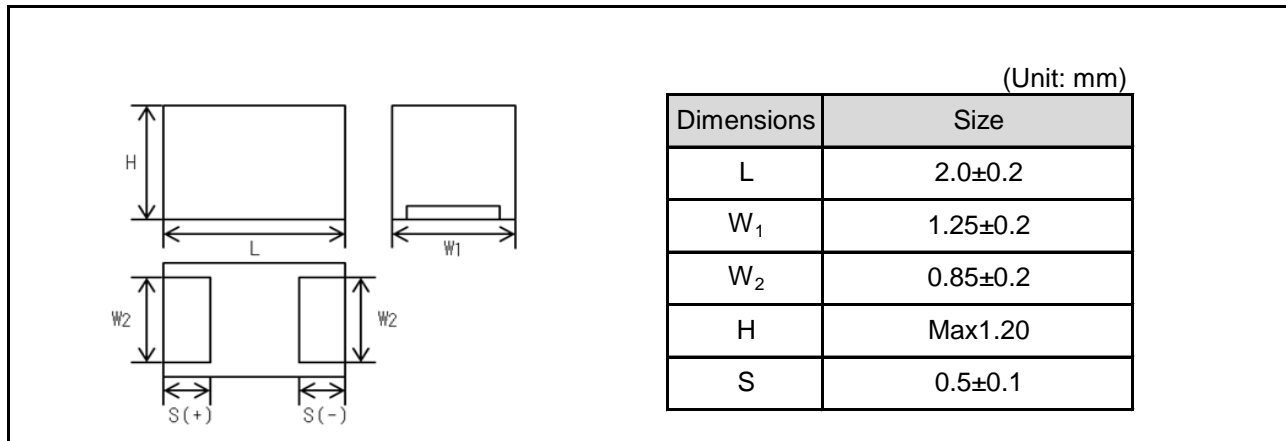
● Part No. Explanation

T	C	S		P	0	G	2	2	7	M	8	R	–		

① ② ③ ④ ⑤ ⑥ ⑦

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)
E	0.15	e	15
N	0.33	j	22
S	0.47	n	33
A	1.0	s	47
E	1.5	w̄	68
J	2.2	ā	100
N	3.3	ē	150
S	4.7	j̄	220
W	6.8	n̄	330
a	10	s̄	470

Visual typical example
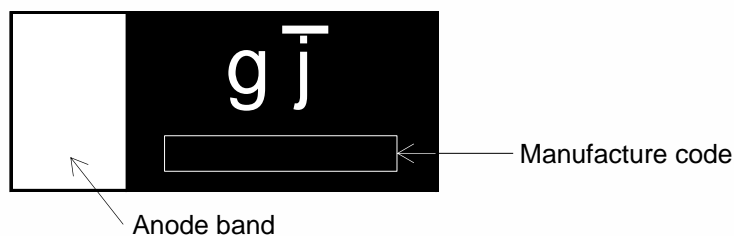voltage code and capacitance code are variable with parts number.

[TCS series P case]

EX.)   g̲   j̲̄
      (1) (2)

(1) voltage code
(2) capacitance code
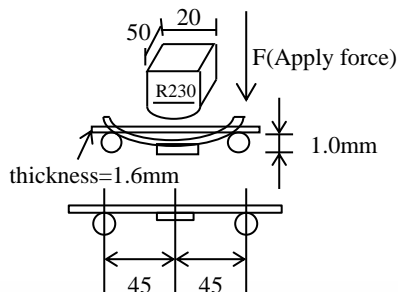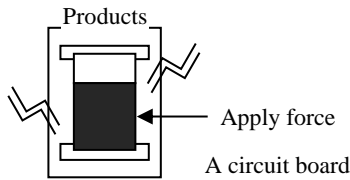
g j̄

Manufacture code

Anode band

● 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℃	
Rated voltage (V.DC)		Refer to " Standard list ".	at 85℃
Category voltage (V.DC)		Refer to " Standard list ".	at 125°C
Surge voltage (V.DC)		Refer to " Standard list ".	at 85℃
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	Appe-arance	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.	
	⊿C/C	Within ±30% of initial value.	
	DF (tanδ)	Less than 200% of initial limit.	
Temperature cycle	Appe-arance	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.
	L.C.	Less than 200% of initial limit.	
	⊿C/C	Within ±30% of initial value.	
	DF (tanδ)	Less than 200% of initial limit.	

	Temp.	Time
1	-55±3℃	30±3min
2	Room Temp.	3min or less
3	125±2℃	30±3min
4	Room Temp.	3min or less

After the specimens, leave it at room temperature for over 24h and then measure the sample.
Initial value for ⊿C/C shall be the value after mounted.

Item		Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)
Moisture resistance	Appe-arance	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 ⊿C/C shall be the value after mounted.
	L.C.	Less than 200% of initial limit.	
	⊿C/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 As per 4.13 JIS C 5101-3 Initial value for ⊿C/C shall be the value after mounted.
	⊿C/C	Within +15/-50% of initial value.	
	DF (tanδ)	Shall be satisfied the value on " Standard list "	
	L.C.	–	
	Temp. : +85°C		
	⊿C/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		
	⊿C/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	Appe-arance	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 ⊿C/C shall be the value after mounted.
	L.C.	Less than 200% of initial limit.	
	⊿C/C	Within ±30% of initial value.	
	DF (tanδ)	Less than 200% of initial limit.	
Loading at High temperature	Appe-arance	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 ⊿C/C shall be the value after mounted.
	L.C.	Less than 200% of initial limit.	
	⊿C/C	Within ±30% of initial value.	
	DF (tanδ)	Less than 200% of initial limit.	

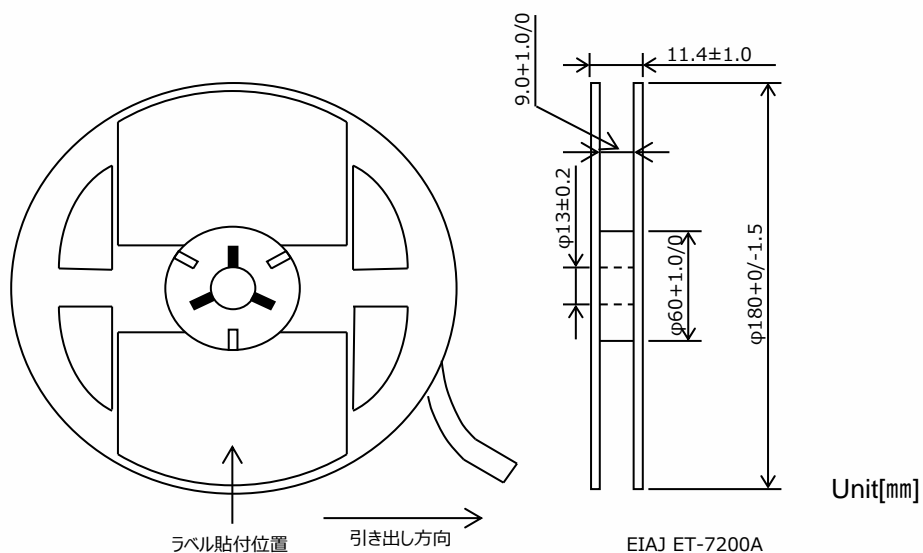| Item		Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)
Terminal strength	Capa-citance	The measured value should be stable.	As per 4.35 JIS C 5101-1 As per 4.9 JIS C 5101-3 A force is applied to the terminal until it bends to 1mm and by a prescribed tool maintains the condition for 5s. (See the figure below)
	Appe-arance	There should be no significant abnormality.	
Adhesiveness		The terminal should not come off.	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.
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.	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.
Solderability		3/4 or more surface area of the solder coated terminal dipped in the soldering bath should be covered with the new solder.	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%
Vibration	Capa-citance	Measure value should not fluctuate during the measurement.	As per 4.17 JIS C 5101-1 Frequency : 10 to 55 to 10Hz/min. Amplitude : 1.5mm Time : 2h each in X and Y directions Mounting : The terminal is soldered on a print circuit board.
	Appe-arance	There should be no significant abnormality.	

● Standard products list

Part No.	Rated voltage 85℃ (V)	Category voltage 125℃ (V)	Surge voltage 85℃ (V)	Cap. 120Hz (μF)	Tole-rance (%)	Leakage current 25℃ 1WV 5min (μA)	tanδ 120Hz -55℃ (%)	25℃ (%)	125°C (%)	ESR 100kHz (Ω)
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

Sprocket hole φD₀

Component is loaded.

Pull-out direction

Unit[mm]

A	B	W	E	F	P1	P2
1.55±0.10	2.30±0.10	8.00±0.20	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05

PO	DO	t1	t2	Standard packaging quantity
4.00±0.10	φ1.55±0.05	0.25±0.05	1.32±0.10	3,000pcs

● Reel dimensions

11.4±1.0

9.0+1.0/0

φ13±0.2

φ60+1.0/0

φ180+0/-1.5

Unit[mm]

ラベル貼付位置

引き出し方向

EIAJ ET-7200A
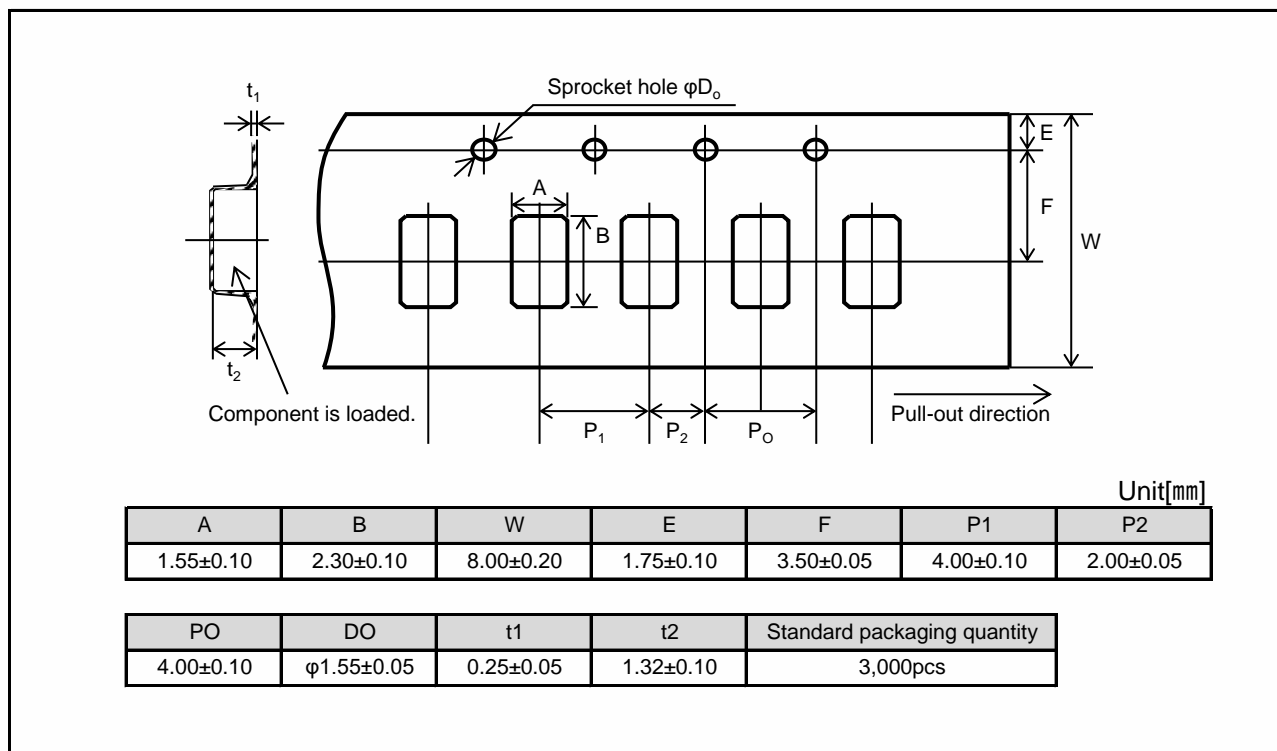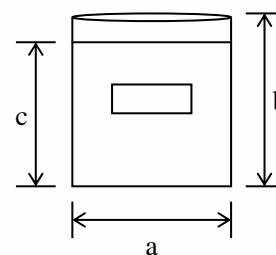
● Damp proof package

①One 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.
②A desiccant is packed with a reel.
③The aluminum bag is heat-sealed.
④The label of the same as the label on the reel is placed on the aluminum bag.

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