

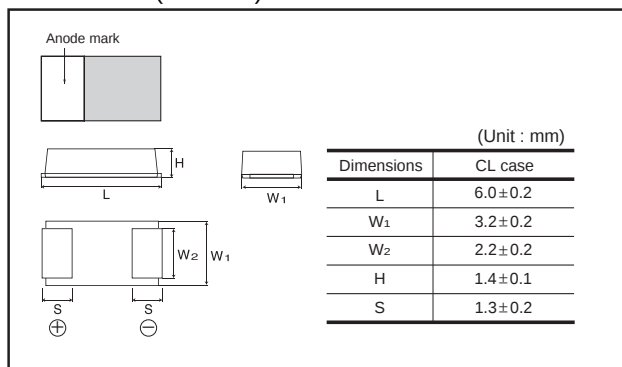
Chip tantalum capacitors

TCT Series CL Case

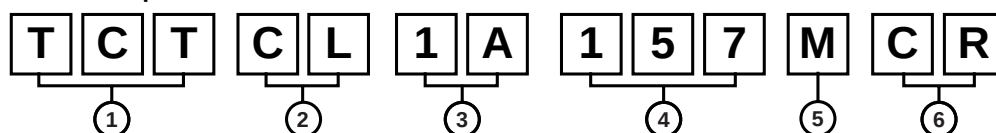
●Features (CL)

- 1) Vital for all hybrid integrated circuits board application.
- 2) Wide capacitance range.
- 3) Screening by thermal shock.

●Dimensions (Unit : mm)



●Part No. Explanation



① Series name
TCT

② Case style
TC.....CL

③ Rated voltage

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

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
C : Tape width (12mm)
R : Positive electrode on the side opposite to sprocket hole

●Rated table

(μF)	Rated voltage (V)							
	2.5 0E	4 0G	6.3 0J	10 1A	16 1C	20 1D	25 1E	35 1V
10 (106)								* CL
100 (107)					* CL			
150 (157)				CL				
220(227)			CL					
330(337)		* CL						
470(477)	* CL							

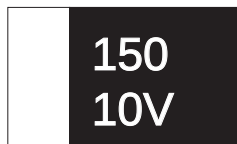
Remark) Case size codes (CL) in the above show products line-up.
* Under development

● Marking

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

- (1) Polarity
 (2) Rated DC voltage
 (3) Visual typical example (1) capacitance code (2) voltage code

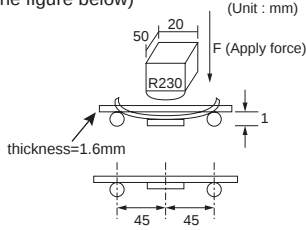
[CL case] note 1) $\frac{10V}{(1)}$ $\frac{150}{(2)}$

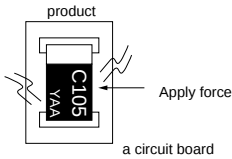


note 2) voltage code and capacitance code are variable with parts number

● Characteristics

Item		Performance								Test conditions (based on JIS C 5101-1 and JIS C 5101-3)														
Operating Temperature		-55°C to +125°C								Voltage reduction when temperature exceeds +85°C														
Maximum operating temperature with no voltage derating		+85°C																						
Rated voltage (VDC)		2.5	4	6.3	10	16	20	25	35	at 85°C														
Category voltage (VDC)		1.6	2.5	4	6.3	10	13	16	22	at 125°C														
Surge voltage (VDC)		3.2	5.0	8	13	20	26	32	44	at 85°C														
DC Leakage current		Shall be satisfied the voltage 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 +1.5 to 2V.DC Measuring circuit : DC Equivalent series circuit														
Tangent of loss angle (Df, tan δ)		Shall be satisfied the voltage 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 +1.5 to 2V.DC Measuring circuit : DC Equivalent series circuit														
Impedance		Shall be satisfied the voltage 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														
	L.C.	Less than 200% of initial limit								Solder temp : 260±5°C														
	ΔC / C	Within ±20% of initial value								Duration : 5±0.5s														
	Df (tan δ)	Less than 200% of initial limit								Repetition : 1 After the specimens, leave it at room temperature for over 24h and then measure the sample.														
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.														
	L.C.	Less than 200%of initial limit																						
	ΔC / C	Within ±20% of initial value																						
	Df (tan δ)	Less than 200%of initial limit								<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.		Temp.	Time	1	-55±3°C	30±3min.	2	Room temp.	3min. or less	3	125±2°C	30±3min.	4	Room temp.
	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																						
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														
	L.C.	Less than 200% of initial limit								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±12h leave it at room														
	ΔC / C	Within ±20% of initial value								temperature for over 24h and then measure the sample.														
	Df (tan δ)	Less than 200% of initial limit																						

Item	Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)
Temperature Stability	Temp.	-55°C
	$\Delta C / C$	Within 0/-15% of initial value
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "
	L.C.	—
	Temp.	+85°C
	$\Delta C / C$	Within +15/-5% of initial value
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "
	L.C.	5 μ A or 0.1CV whichever is greater
	Temp.	+125°C
	$\Delta C / C$	Within +20/-5% of initial value
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "
	L.C.	6.3 μ A or 0.2CV whichever is greater
Surge voltage	Appearance	There should be no significant abnormality.
	L.C.	Less than 200% of initial limit
	$\Delta C / C$	Within $\pm 20\%$ of initial value
	Df (tan δ)	Less than 200% of initial limit
Loading at High temperature	Appearance	There should be no significant abnormality.
	L.C.	Less than 200% of initial limit
	$\Delta C / C$	Within $\pm 20\%$ of initial value
	Df (tan δ)	Less than 200% of initial limit
Terminal strength	Capacitance	The measured value should be stable.
	Appearance	There should be no significant abnormality.
		As per 4.26 JIS C 5101-1 As per 4.14 JIS C 5101-3 Apply the specified surge voltage every 5$\pm$0.5 min. for 30$\pm$5 s. each time in the atmospheric condition of 85$\pm$2°C. Repeat this procedure 1,000 times. After the specimens, leave it at room temperature for over 24h and then measure the sample. As per 4.23 JIS C 5101-1 As per 4.15 JIS C 5101-3 After applying the rated voltage for 1000+36/0 h without discontinuation via the serial resistance of 3Ω or less at a temperature of 85$\pm$2°C, leave the sample at room temperature / humidity for over 24h and measure the value. 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 maintain the condition for 5s. (See the figure below)  (Unit : mm) 50 20 1 R230 F (Apply force) thickness=1.6mm 45 45

Item		Performance	Test conditions (JIS C 5101-1 and JIS C 5101-3)
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 5N 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 1 h. Solder temp. : 245±5°C Duration : 3±0.5s Solder : M705 Flux : Rosin 25% IPA 75%
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. Amplitude : 1.5mm Time : 2h each in X and Y directions Mounting : The terminal is soldered on a print circuit board.
	Appearance	There should be no significant abnormality.	

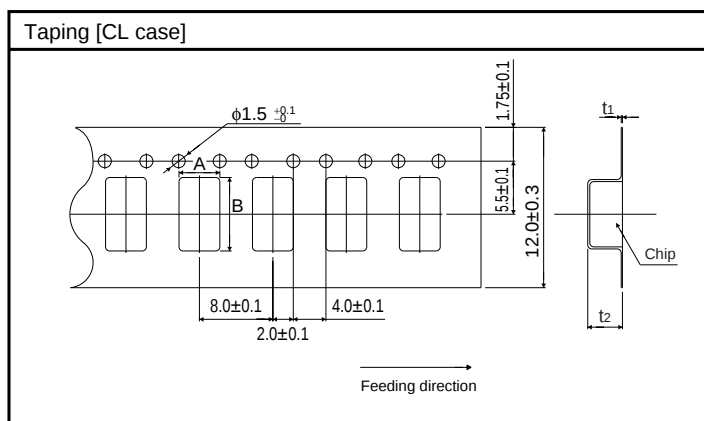
● Standard products list, TCT series CL case

Part No.	Rated voltage 85°C	Category voltage 125°C	Surge voltage 85°C	Cap. 120Hz	Tolerance	Leakage current 25°C	Df 120Hz (%)			Impedance 100kHz
	(V)	(V)	(V)	(μF)	(%)	1WV.60s (μA)	-55°C	25°C 85°C	125°C	(Ω)
TCT CL 0J 227M	6.3	4	8	220	±20	13.9	32	14	20	0.8
TCT CL 1A 157M	10	6.3	13	150	±20	15	30	12	16	1.3

□=Tolerance (M : ±20%)

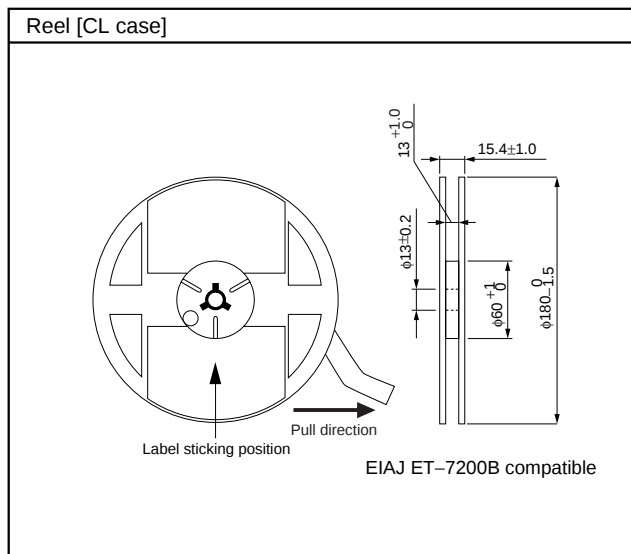
● Packaging specifications

Case code	A±0.1	B±0.1	t ₁ ±0.05	t ₂ ±0.1
CL	3.5	6.6	0.3	1.7



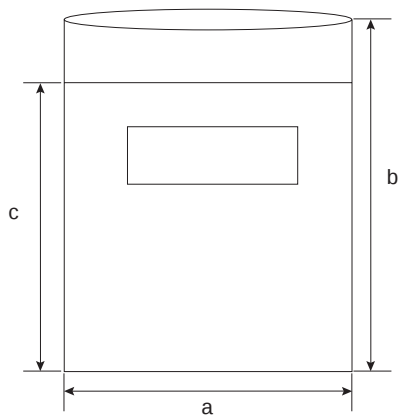
● Packaging style

Case code	Packaging	Packaging style		Symbol	Basic ordering units
CL case	Taping	plastic taping	φ180mm Reel	R	1,000pcs



● Damp proof package

- ① One reel is packed in aluminum bag.
The size of aluminum bag is 240(a) × 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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