Jameco Part Number 33719

DIP TANTALUM SOLID ELECTROLYTIC CAPACITOR

CB Series (Lead-Free)

1. General

1.1 Range of Applications

This document applies to miniaturized dip tantalum solid electrolytic capacitors for applications in transistorized circuits of electronic devices.

1.2 Patents

Any claim brought by any third party in respect of patent matters shall be settled between sellers and respective claimants in the country where capacitors are shipped.

1.3 Quality

Capacitors are manufactured under strict quality control and high reliability is maintained. Measuring methods are based on JIS C 5102, 5140 and 5143.

1.4 Test Conditions

Unless specified otherwise, tests are made at temperatures of + 5 to + 35℃ with humidity of 45 to 85% and atmospheric pressure of 86 to 106 kPa. If there is any doubt arising in judgement of the test, Tests are made at the temperature of 20±2℃, humidity of 60% to 70%, atmospheric pressure of 86 to 106 kPa.

1.5 Working Temperature Range

-55℃ to + 125℃ (For use over + 85℃, temperature derated voltage shall be applied.)

2. Designation

C B	O J	4 7 5	M	I	A	B	T
Series Code	Rated Voltage	Nominal Capacitance	Capacitance Tolerance	Format & lead space	Size Code	Wire Length	Bulk & Ammo pack

Refer to Table 1

Symbol	DC Rated Voltage (VDC)
0G	4
0J	6.3
1A	10
1C	16
1D	20
1E	25
1V	35
1H	50

Capacitance (μF)	Symbol	Picofarad (pF)
1.5	155	15×10^5
4.7	475	47×10^5
15	156	15×10^6
22	226	22×10^6
100	107	10×10^7

Symbol	Tolerance (%)
K	±10
M	±20

The symbol shall be expressed by three figures, by taking picofarad (pF) as the unit, the first and the second figures are showing the significant figures of nominal capacitance and the third figure is showing the number of zeroes in succession.

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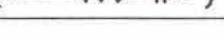
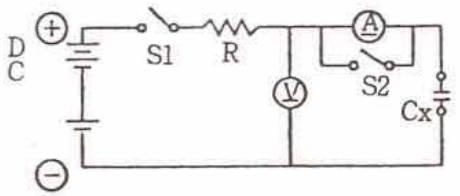
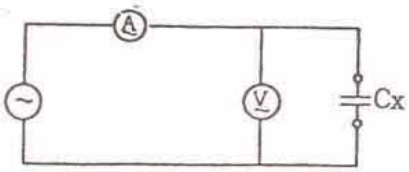
DATE			TITLE/DESCRIPTION CHIP TANTALUM SOLID ELECTROLYTIC CAPACITOR		
PLANNED BY	CHECKED BY	APPROVED BY	PART NO	DRAWING NO	1/12

4.Characteristics

4.1 Electrical characteristics

<table>
<tr><th>No.</th><th>Items</th><th>Conditions</th><th colspan="2">Specifications</th></tr>
<tr><td>1</td><td>Rated voltage</td><td>-55℃ to + 85℃、</td><td colspan="2">6.3 to 50 V DC</td></tr>
<tr><td>2</td><td>Maximum permissible Ripple Voltage</td><td>Keep the sum of peak DC voltage and ripple voltage within the rated voltage and never go over it.</td><td colspan="2">Refer to page 10</td></tr>
<tr><td>3</td><td>Nominal Capacitance</td><td>Measuring frequency 120±12Hz
Measuring voltage 0.5Vrms+0.5～2.0VDC
Measurement circuit Equivalent series circuit
  </td><td colspan="2">0.1μF to 330 μF
(±10% or ±20%)</td></tr>
<tr><td rowspan="4">4</td><td rowspan="4">Tangent of loss angle (tanδ)</td><td rowspan="4">Measurement shall be made under the same conditions as those given for the measurement of capacitance.</td><td>Capacitance(μF)</td><td>tanδ</td></tr>
<tr><td>0.1 to 1.5</td><td>Less than 0.04</td></tr>
<tr><td>2.2 to 6.8</td><td>Less than 0.06</td></tr>
<tr><td>10 to 68</td><td>Less than 0.08</td></tr>
<tr><td>5</td><td>Leakage current</td><td>Apply the rated voltage through 1000±100Ω protective resistor, and measure the current after 5 minutes voltage application.
 
R : Series Protective Resistor
Ⓐ : DC Current Meter or Electronic Current Meter
Ⓥ : DC Voltage Meter
S1 : Switch
S2 : Protective switch for Current Meter.
Cx : Capacitor Sample</td><td colspan="2">Less than 0.01CV(μA) or 0.5(μA) whichever is the greater.</td></tr>
<tr><td>6</td><td>Impedance high frequency</td><td>AC voltage (0.5Vrms or less) of a frequency specified below, shall be applied and the voltage drop across the capacitor terminals shall be measured. The impedance shall be calculated by the following equation.

Frequency : 100±10kHz
Impedance : (Z)=E/I
where
E : Voltage drop across the capacitor terminals
I : Current flowing throgh the capacitor
  </td><td colspan="2">Cx : Capacitor Sample
⊖ : AC Power Source
Ⓐ : AC Current Meter
Ⓥ : AC Voltage Meter</td></tr>
</table>

Capacitance(μF)	Impedance Value
Less than 0.47	————
0.68 to 1.5	Less than 20Ω
2.2 to 6.8	Less than 10Ω
More than 10	Less than 4Ω

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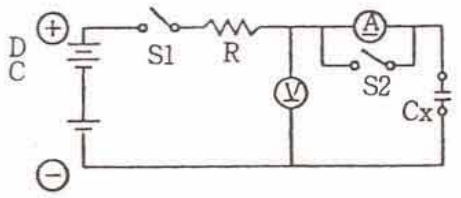
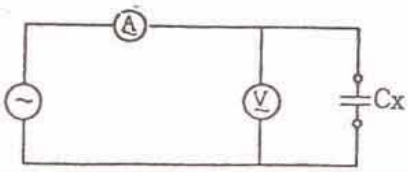
4.Characteristics

4.1 Electrical characteristics

No.	Items	Conditions	Specifications
1	Rated voltage	-55℃ to + 85℃	6.3 to 50 V DC
2	Maximum permissible Ripple Voltage	Keep the sum of peak DC voltage and ripple voltage within the rated voltage and never go over it.	Refer to page 10
3	Nominal Capacitance	Measuring frequency 120±12Hz Measuring voltage 0.5Vrms+0.5~2.0VDC Measurement circuit Equivalent series circuit 	0.1μF to 330 μF (±10% or ±20%)
4	Tangent of loss angle (tanδ)	Measurement shall be made under the same conditions as those given for the measurement of capacitance.	Capacitance(μF) / tanδ 0.1 to 1.5 / Less than 0.04 2.2 to 6.8 / Less than 0.06 10 to 68 / Less than 0.08
5	Leakage current	Apply the rated voltage through 1000±100Ω protective resistor, and measure the current after 5 minutes voltage application.  R : Series Protective Resistor Ⓐ : DC Current Meter or Electronic Current Meter Ⓥ : DC Voltage Meter S1 : Switch S2 : Protective switch for Current Meter. Cx : Capacitor Sample	Less than 0.01CV(μA) or 0.5(μA) whichever is the greater.
6	Impedance high frequency	AC voltage (0.5Vrms or less) of a frequency specified below, shall be applied and the voltage drop across the capacitor terminals shall be measured. The impedance shall be calculated by the following equation. Frequency : 100±10kHz Impedance : (Z)=E/I where E : Voltage drop across the capacitor terminals I : Current flowing throgh the capacitor 	Capacitance(μF) / Impedance Value Less than 0.47 / ———— 0.68 to 1.5 / Less than 20Ω 2.2 to 6.8 / Less than 10Ω More than 10 / Less than 4Ω Cx : Capacitor Sample ⊖ : AC Power Source Ⓐ : AC Current Meter Ⓥ : AC Voltage Meter

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No.	Items	Conditions	Specifications

7 Temperature characteristics

Step	Temperature	Duration
1	20±2℃	———
2	−55±3℃	2 hours
3	20±2℃	0.25 hours
4	85±2℃	2 hours
5	125±2℃	2 hours

Table 3

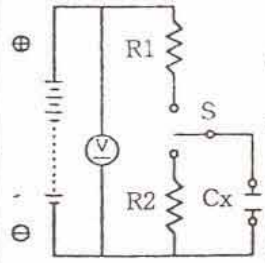
Capacitance (μF)	−55℃	+85℃	+125℃
0.1 to 1.0	Less than 0.09	Less than 0.07	Less than 0.09
1.5 to 6.8	Less than 0.10	Less than 0.08	Less then 0.10
10 to 220	Less than 0.12	Less than 0.10	Less than 0.12

Step 2	Change in capacitance	Relative to the value in step 1 −10 to 0%
	Tangent of loss angle	Not more than the value in Table 3
Step 4	Change in capacitance	Relative to the value in step 1 0 to +10%
	Leakage current	0.1CV or 5μA or less
	Tangent of loss angle	Not more than the value in Table 3
Step 5	Change in capacitance	Relative to the value in step 1 0 to + 12%
	Leakage current	0.125CV or 6.25 μA or less
	Tangent of loss angle	Not more than the value in Table 3

Step1 : Capacitance and tangent of loss angle shall be measured.
Step2 : After the capacitor being stored for 2 hours, capacitance and tangent of loss angle shall be measured. The measurement shall be made at thermal equilibrium.
Step4.5 : After the capacitor being stored for 2 hours, capacitance, tangent of loss angle and leakage current shall be measured. The measurement shall be made at thermal equilibrium. However, measurement shall be made at a temperature derating voltage in step 5.

8 Surge test

The capacitor shall be subjected to the surge voltage as specified befow in a cycle of 6±0.5min. which consists of a charge period of 30±5 sec, followed by a discharge period of approx. 5 min. 30 sec. at 85±2℃ for 1000 cycles. And the capacitor shall be stored under standard atmospheric conditions to obtain thermal equilibrium. after which measurement shall be made.



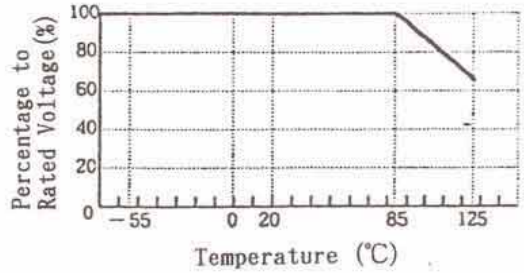
R1 : Series Protective Resister (33Ω)
R2 : Discharge Resister (33Ω)
Ⓥ : DC Voltmeter
Cx : Test capacitor
S : Switch

Change in capacitance	Relative to the value before test ±5%
Tangent of loss angle	Clause 4.1.4 shall be satisfied
Leakage current	Clause 4.1.5 shall be satisfied

Rated voltage (V)	4	6.3	10	16	20	25	35	50
Surge voltage (V)	5	8	13	20	26	32	45	63

9 Temperature derated voltage

When operating at an ambient temperature range from 85℃ to 125℃, the operation shall be carried out at a derating voltage or less as shown below.



Derating voltage Vt at any temperature T between 85℃ and 125℃ shall be calculated by the following formula.

$$V_t = V_r - \frac{V_r - V_d}{40}(T - 85)$$

Vr : Rated voltage
Vd : Derating voltage at 125℃

Rated voltage (V)	4	7	10	16	20	25	35	50
Derating voltage at 125℃ (V)	2.5	4	6.3	10	13	16	22	32

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4.2 Endurance characteristics

No.	Items	Conditions	Specifications	
1	Solderability	Test Temperature : 235±5℃ for 2±0.5 seconds. Others are based on JIS C 5102 clause 8.4 (Test Method is according to Clause 1.)	A new unifrom coating of solder shall cover a minimum of 75% of the surface being immersed.	
2	Resistance to soldering heat	The methods are in accordance with JIS C 5143 Appendix Ⅰ and Ⅱ. After preheat of 5 minutes at 150℃ Immersion at 260±5℃ 10±1 seconds for A,B cases. 5±0.5 seconds for C,D,E cases. Reflow at 260±5℃ 10±1 seconds. Soldering iron method (1)25 watt soldering iron : Less than 3 seconds at one side with 350^{0}_{-10}℃ (2)30 watt soldering iron : Less than 3 seconds at one side with 300±10℃ Re-soldering shall be one time only.	Change in capacitance	Relative to the value before test ±5%
			Tangent of loss angle	Clause 4.1.4 shall be satisfited
			Leakage current	Clause 4.1.5 shall be satisfited
			Appearance	There shall be no defomation of case or distinct looseness of electrodes.
3	Vibration	Only endurance conditioning by sweeping shall be made. The entire frequency range, from 10 to 55Hz and return to 10Hz. shall be transversed in 1 min. Amplitude (total excursion) : 1.5mm This motion shall be applied for a period of 2 hours in each of 3 mutually perpendicular directions(a total of 6 hours) during the last 30 min. of vibration in each direction, electrical test shall be conducted.	Capacitance	There shall be no intermittent contacts, or open or short-circuiting.
			Appearance	There shall be no such mechanical damage as terminal damage etc. or leakage of electrolyte or swelling of the case. The marking shall be legible.
4	Damp heat (steady state)	The capacitor shall be stored at a temperature of 40±2℃ and ralative humidity of 90% to 95% for 500^{+24}_{0} hours. And then the capacitor shall be subjected to standard atmopheric conditions for 1 to 2 hours, after which measurements shall be made.	Change in capacitance	Relative to the value before test ±10%
			Tangent of loss angle	Clause 4.1.4 shall be satisfited
			Leakage current	Clause 4.1.5 shall be satisfited
			Appearance	No remarkable abnomality and markings shall be legible.
5	Electrical endurance	The rated voltage shall be applied continuously to the capacitor at a temperature of 85±2℃ for 2000^{+72}_{0} hours. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurements shall be made. (Power sourse impedance shall be 3 ohms.)	Change in capacitance	Relative to the value before test ±10%
			Tangent of loss angle	Clause 4.1.4 shall be satisfited
			Leakage current	Not more than 125% of initial value (Clause 4.1.5)
			Appearance	No remarkable abnomality and markings shall be legible.

<table>
<tr><th>No.</th><th>Items</th><th>Conditions</th><th colspan="2">Specifications</th></tr>
<tr><td>6</td><td>Change in temperature</td><td>The capacitor shall be subjected to each specified temperature for each specified period shown in the table below. These 4 steps constitutes one rotation. 5 contiuous rotations shall be carried out.
<table>
<tr><th>Step</th><th>Temperature (℃)</th><th>Duration</th></tr>
<tr><td>1</td><td>-55^{0}_{-3}</td><td>30±3 min</td></tr>
<tr><td>2</td><td>Normal temperature</td><td>3 max</td></tr>
<tr><td>3</td><td>125^{+3}_{0}</td><td>30±3 min</td></tr>
<tr><td>4</td><td>Normal temperature</td><td>3 max</td></tr>
</table></td><td>Change in capacitance</td><td>Relative to the value before test ±10%</td></tr>
<tr><td></td><td></td><td></td><td>Tangent of loss angle</td><td>Clause 4.1.4 shall be satisfited</td></tr>
<tr><td></td><td></td><td></td><td>Leakage current</td><td>Clause 4.1.5 shall be satisfited</td></tr>
<tr><td>7</td><td>Resisitance to Damp Heat</td><td>Expose the capacitor to 40±2℃ at 90～95% RH and apply DC voltage equal to rated voltage through 1K ohm series protective resistor 500±12 hours. After then expose it for 4 hours in the standard atmospheric conditions and then, carry out the measurment.</td><td>Change in capacitance</td><td>Relative to the value before test ±10%</td></tr>
<tr><td></td><td></td><td></td><td>Tangent of loss angle</td><td>Not more than 150% of initial value (Clause 4.1.4)</td></tr>
<tr><td></td><td></td><td></td><td>Leakage current</td><td>Not more than 200% of initial value (Clause 4.1.5)</td></tr>
<tr><td></td><td></td><td></td><td>Appearance</td><td>No remarkable abnomality and markings shall be legible.</td></tr>
<tr><td>8</td><td>Terminal Strength</td><td>The solder bath to use shall be composed in tin/lead. Let the tin be 59.5 to 61.5%. The temperature of the bath is maintained at 235℃ (±5℃). The flux to use shall be colophane or isopropylic alcohol. The temperature of the flux is maintained at room temperature. Flux bath for 5 to 10 seconds.</td><td colspan="2">It shall with no evidance of mechanical degradation in terminals and the unit.</td></tr>
<tr><td>9</td><td>Resistance to Solvent</td><td>(1)Cleaning by Immersion I
Solvent : IPA
Immersion time : 5±1 minutes
Temperature : 20～25℃

(2)Cleaning by Immersion II
Solvent : Water
Immersion time : 5±1 minutes
Temperature : 55±5℃</td><td>Change in capacitance</td><td>Relative to the value before test ±3%</td></tr>
<tr><td></td><td></td><td></td><td>Tangent of loss angle</td><td>Clause 4.1.4 shall be satisfited</td></tr>
<tr><td></td><td></td><td></td><td>Leakage current</td><td>Clause 4.1.5 shall be satisfited</td></tr>
<tr><td></td><td></td><td></td><td>Appearance</td><td>No abnormality between the capacitor and terminals.</td></tr>
<tr><td></td><td></td><td>(3)Ultrasonic cleaning
Frequency : 25±4kHz or 40^{+6}_{-4} kHz
Out put power : Less than 20W/ℓ
Time : 5 minutes
Temperature :
IPA : 20～25℃ Water : 55±5℃</td><td colspan="2"></td></tr>
</table>

5. FEATURES:

* Specially designed of general purpose.
* Highly reliable resin dipped type.
* Excellent frequency and temperature characteristics.
* Non-flammable epoxy resin (UL94-V-0)

Ratings and Part Number Reference

Part No.	Case Size	Capacitance µF	DCL (µA) Max.	DF % Max.	ESR max. (Ω) @ 100kHz
6.3 volt @ 85°C (4 volt, @125°C)					
CB 0J335##A##	A	3.3	0.5	6	13.0
CB 0J475##A##	A	4.7	0.5	6	10.0
CB 0J685##A##	A	6.8	0.5	6	8.0
CB 0J106##B##	B	10	0.5	8	6.0
CB 0J156##B##	B	15	0.8	8	5.0
CB 0J226##C##	C	22	1.1	8	3.7
CB 0J336##C##	C	33	1.7	8	3.0
CB 0J476##D##	D	47	2.4	8	2.0
CB 0J686##D##	D	68	3.4	8	1.8
CB 0J107##E##	E	100	5.0	10	1.6
CB 0J157##E##	E	150	7.6	10	0.9
CB 0J227##E##	E	220	11.0	10	0.9
CB 0J337##F##	F	330	16.6	10	0.7
10 volt @ 85°C (6.3 volt, @125°C)					
CB 1A225##A##	A	2.2	0.5	6	13.0
CB 1A335##A##	A	3.3	0.5	6	10.0
CB 1A475##A##	A	4.7	0.5	6	8.0
CB 1A685##B##	B	6.8	0.5	6	6.0
CB 1A106##B##	B	10	0.8	8	5.0
CB 1A156##C##	C	15	1.2	8	3.7
CB 1A226##C##	C	22	1.7	8	2.7
CB 1A336##D##	D	33	2.6	8	2.1
CB 1A476##D##	D	47	3.7	8	1.7
CB 1A686##D##	D	68	5.4	8	1.3
CB 1A107##E##	E	100	8.0	10	1.0
CB 1A157##E##	E	150	12.0	10	0.8
CB 1A227##F##	F	220	17.6	10	0.8
16 volt @ 85°C (10 volt, @125°C)					
CB 1C155##A##	A	1.5	0.5	4	10.0
CB 1C225##A##	A	2.2	0.5	6	8.0
CB 1C335##A##	A	3.3	0.5	6	6.0
CB 1C475##B##	B	4.7	0.6	6	5.0
CB 1C685##B##	B	6.8	0.8	8	4.0
CB 1C106##B##	B	10	1.2	8	3.2
CB 1C156##C##	C	15	1.9	8	2.5
CB 1C226##C##	C	22	2.8	8	2.0
CB 1C336##D##	D	33	4.2	8	1.6
CB 1C476##D##	D	47	6.0	8	1.3
CB 1C686##E##	E	68	8.7	8	1.0
CB 1C107##E##	E	100	12.8	10	0.8
CB 1C157##F##	F	150	19.2	10	0.6

Part No.	Case Size	Capacitance µF	DCL (µF) Max.	DF % Max.	ESR max. (Ω) @ 100kHz
25 volt @ 85°C (16 volt, @125°C)					
CB 1E105##A##	A	1.0	0.5	4	10.0
CB 1E155##A##	A	1.5	0.5	4	8.0
CB 1E225##A##	A	2.2	0.5	6	6.0
CB 1E335##B##	B	3.3	0.6	6	5.0
CB 1E475##B##	B	4.7	0.9	6	4.0
CB 1E685##C##	C	6.8	1.3	6	3.1
CB 1E106##C##	C	10	2.0	8	2.5
CB 1E156##D##	D	15	3.0	8	2.0
CB 1E226##D##	D	22	4.4	8	1.5
CB 1E336##E##	E	33	6.6	8	1.2
CB 1E476##E##	E	47	9.4	8	1.0
CB 1E686##F##	F	68	13.6	8	0.8
CB 1E107##F##	F	100	20	10	0.8
35 volt @ 85°C (23 volt, @125°C)					
CB 1V104##A##	A	0.1	0.5	4	26.0
CB 1V154##A##	A	0.15	0.5	4	21.0
CB 1V224##A##	A	0.22	0.5	4	17.0
CB 1V334##A##	A	0.33	0.5	4	15.0
CB 1V474##A##	A	0.47	0.5	4	13.0
CB 1V684##A##	A	0.68	0.5	4	10.0
CB 1V105##A##	A	1.0	0.5	4	8.0
CB 1V155##A##	A	1.5	0.5	4	6.0
CB 1V225##B##	B	2.2	0.6	6	5.0
CB 1V335##B##	B	3.3	0.9	6	4.0
CB 1V475##C##	C	4.7	1.3	6	3.0
CB 1V685##D##	D	6.8	1.9	6	2.5
CB 1V106##D##	D	10	2.8	8	2.0
CB 1V156##E##	E	15	4.2	8	1.6
CB 1V226##E##	E	22	6.1	8	1.3
CB 1V336##F##	F	33	9.2	8	1.0
CB 1V476##F##	F	47	10.0	8	0.8
50 volt @ 85°C (33 volt, @125°C)					
CB 1H104##A##	A	0.1	0.5	4	26.0
CB 1H154##A##	A	0.15	0.5	4	21.0
CB 1H224##A##	A	0.22	0.5	4	17.0
CB 1H334##A##	A	0.33	0.5	4	15.0
CB 1H474##A##	A	0.47	0.5	4	13.0
CB 1H684##A##	A	0.68	0.5	4	10.0
CB 1H105##B##	B	1.0	0.5	4	8.0
CB 1H155##C##	C	1.5	0.6	4	6.0
CB 1H225##C##	C	2.2	0.8	6	3.5
CB 1H335##D##	D	3.3	1.3	6	3.0
CB 1H475##D##	D	4.7	1.8	6	2.5
CB 1H685##E##	E	6.8	2.7	6	2.0
CB 1H106##E##	E	10	4.0	8	1.6
CB 1H156##F##	F	15	6.0	8	1.2
CB 1H226##F##	F	22	8.8	8	1.0

NOTE: All ## A ## to ambient temperature of + 20°C measured at 120Hz, 0.5V rms unless otherwise stated

- insert capacitance tolerance; K for ±10% and M for ±20%
- insert format 1. for pitch 2.54mm; format 2. for pitch 5.08mm
- insert wire length see page 8
- insert Bulk: Code B or Ammo pack: Code T

6.Quality

6.1 Failure Rate

Not more than 1.0% per 1,000 hours

6.2 Series Circuit Resistance

Obtain series circuit resistance from Figure 1 (Percentage of Failure Rate vs Circuit Resistance) and Figure 2 (Failure Rate Improvement Factors).
As Failure Rate is based on 1 Ω/V of series circuit resistance, if is 0.38% for 1,000 hours in case of 3 Ω/V, for example.

6.3 Quality Assurance Requirements.

MIL-STD-105D Inspection level II, Nomal Inspection, Single Sampling.

Table 6

Items	AQL
Short, open	0.1%
Capacitance, Dissipation Factor, Leakage Current	0.4%
Appearance Dimensions, Constructions	0.65%

6.4 Endurance test

Table 7

Group	Items	Sample Quantity	Permissible Number of Defectives	
1	Vibration	6	0	0
2	Solderability Terminal Strength, Humidity Resistance	6	0	
3	Stability at low and high temperature Surge Voltage	6	0	
4	High Temperature Load	6	0	
5	Resistance to Soldering Heat	6	0	

7.Others

7.1 Based on JIS C 5143 (1991 Edition) Characteristic LB and EIAJ RC 3813 characteristic B

7.2 Methode of Testing : JIS C 5102 (1994 Edition), and EIAJ RC 3813.

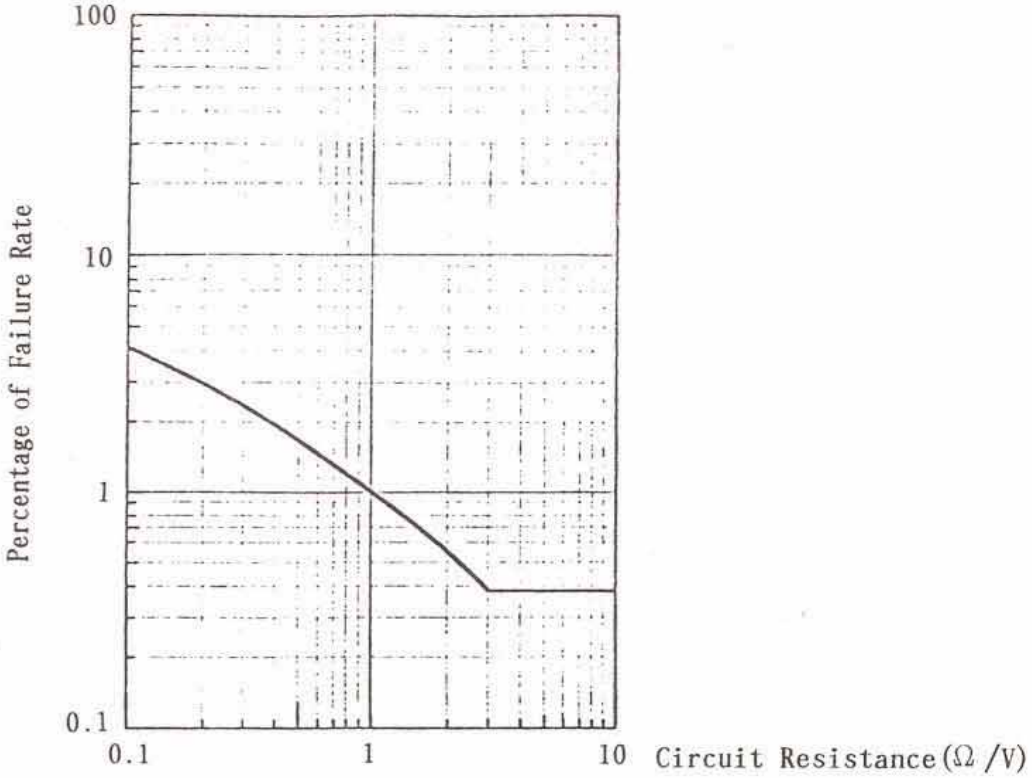


Fig. 1 Circuit resistance vs Percentage of Failure Rate

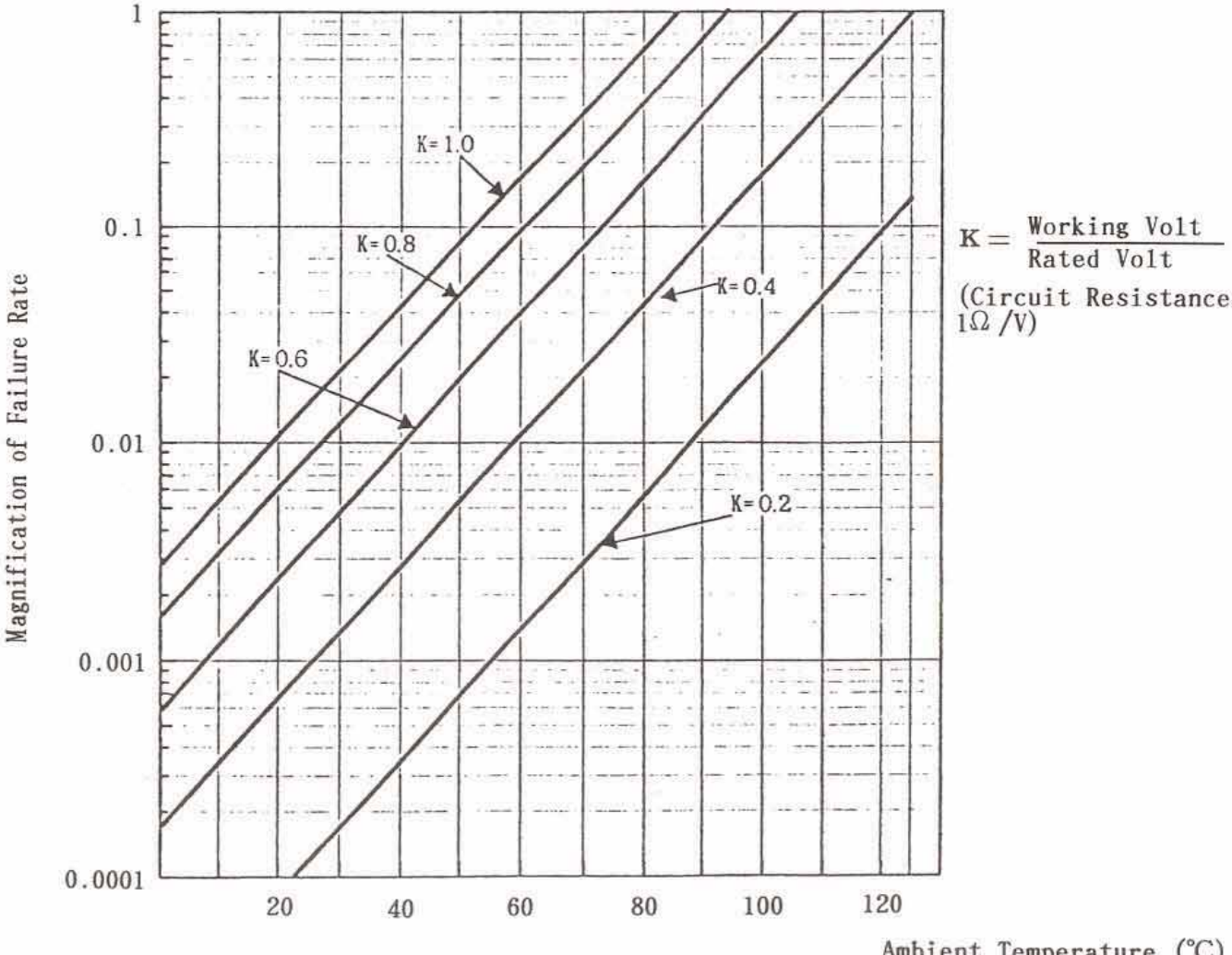


Fig. 2 Failure Rate Improvement Factors

△	REVISION	DATE	SIGN	△	REVISION	DATE	SIGN

Carrier Tape Packaging Specifications

Packaging of bead tantalum capactiors
Explantion of Part Numbers

C B	O J	4 7 5	M	I	A	B	T
Series Code	Rated Voltage	Nominal Capacitance	Capacitance Tolerance	Format & lead space	Size Code	Wire Length	Bulk & Ammo pack

Quantity per bag: Code B
The capacity of the plastic bags depends on

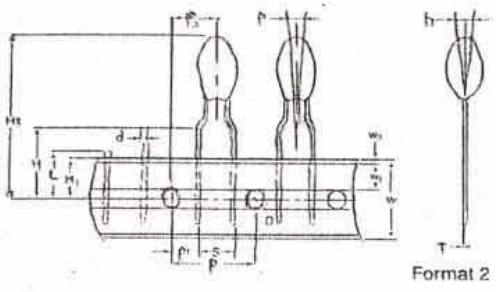
CASE SIZE FORMAT ①	Qty per bag (cut ≤ 7mm)
From A to B	1000
From C to D	1000
From E to F	500

CASE SIZE FORMAT ①	Qty per bag (cut ≥ 14mm)
From A to B	1000
From C to D	500
From E to F	500

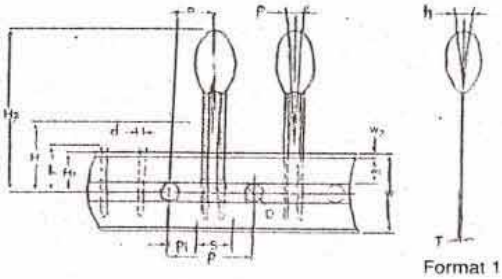
CASE SIZE FORMAT ②	Qty per bag (cut ≤ 7mm)
From A to B	1000
From C to D	500
From E to F	500

TAPE & AMMO PACKING (conform to: IEC286-2) Code T.

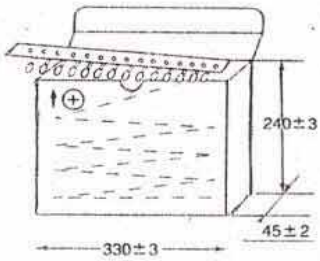
Tape & Ammo Packing (conform to: IEC286 - 2)



Format 2



Format 1



Item	Code	Dimension (mm)
Carrier tape width	W	$18.0^{+1.0}_{-0.5}$
Hold down tape width	W_1	6.0 ± 0.5
Hold down tape position	W_2	1.0max
Feed hole diameter	D	4.0 ± 0.2
Feed hole pitch	P	12.7 ± 0.3
Hole center to lead	P_1	Format 1: 5.05 ± 0.7
		Format 2: 3.85 ± 0.7
Hole center to component center	P	6.35 ± 1.0
Lead wire clench height	H	16 ± 0.5
Hole position	H1	9.0 ± 0.5
Base of component height	H_2	0.8min
Component height	H_3	32.2max
Component alignment	ΔP	0 ± 1.3
	Δh	0 ± 2.0
Lead spacing	S	'S' wires: $2.5^{+0.6}_{-0.1}$
		'B' wires: $5.0^{+0.6}_{-0.5}$
Lead diameter	d	0.5 ± 0.05
length of snipped lead	L	11.0max
Carrier tape thickness	T	0.5 ± 0.1

Case Code	A~B	C~D	E~F
QTY. (PCS/box)	2500	2000	1000

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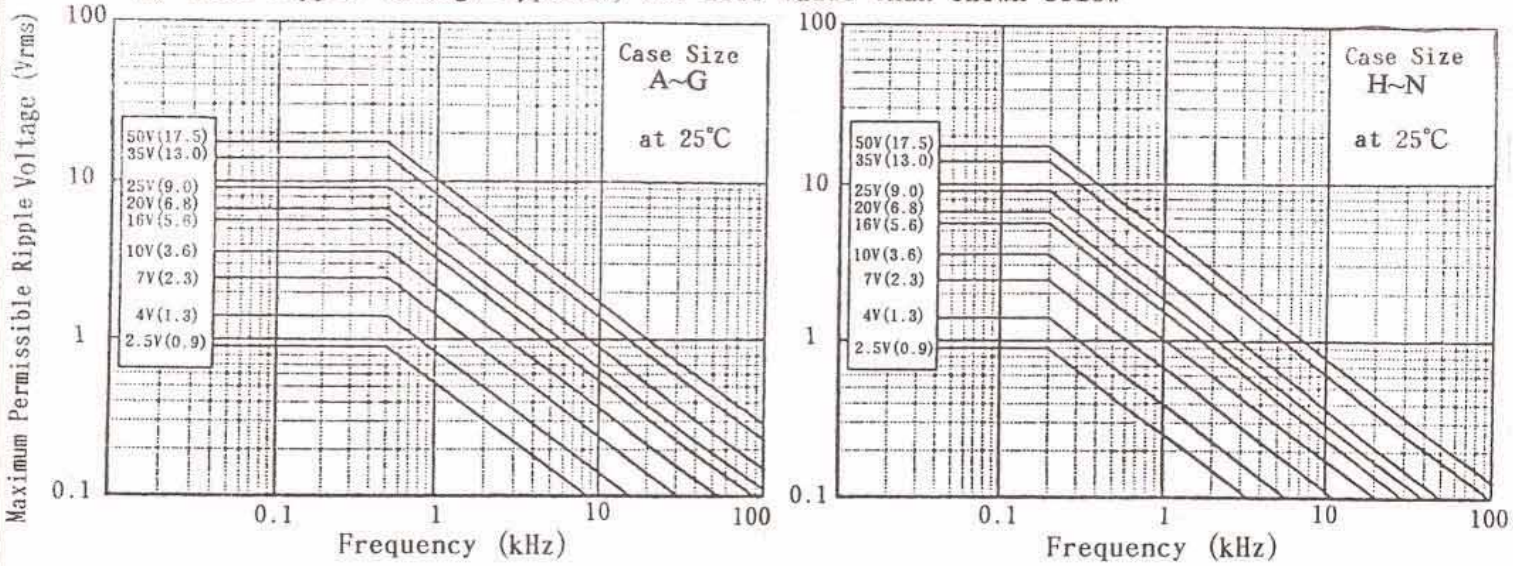
Handing cautions for use of CB Type Tantalum Solid Electrolytic Capacitors.

1. Ripple Voltage
   (1) Keep the sum of peak DC voltage and ripple voltage within the rated voltage and never go over it.
   (2) When ripple voltage applied, use less value than shown below



In case for high temperture use, calculate permissible ripple voltage by using the following formula.
Vrms (at 50℃) =0.7×Vrms (at 25℃)
Vrms (at 85℃) =0.5×Vrms (at 25℃)

2. Reverse Polarity Voltage
   (1) CB Type Solid Tantalium Capacitors are polar and reverse polality voltage must not be applied. But , for short time application, the peak reverse polarity voltage applied to the capacitor must not exceed :
   at 25℃ 10% of rated voltage or 1V, whichever is smaller.
   at 85℃ 5% of rated voltage or 0.5V, whichever is smaller.
   (2) Careless contact of the tester to the capacitor will cause reverse polarity voltage and excessive voltage.

3. Voltage Derating
   Have voltage derating ratio as large as possible. Expecially, in case of low impedance circuit use, not more than 1/3 of rated voltage is recommended. For moment heavy current run like switching or pulse voltage, The value of resistor is recommended to be more than 3 ohms per volt. (Limit to less than 300mA for rush current)

4. Applications
   (1) Limit of stress put on the capacitor by the mounting machine
   Stress given to the capacitor by sucking tools and centering tweezers must not exceed 4.9N (Stress time not more than 5 sec.) with the 1.5φ point. Especially,the setting position of sucking tools is too low will cause not only overloading to the capacitor, but also wire — snapping on PC boards and scattering of capacitors and other parts, when consolidated mounting with other chip components of less than 1mm in height.
   (2) Flux
   Use login – family flux and avoid the use of strong acid and high activiational materials.
   (3) Solderability
   Carry out soldering under following conditions. We recommend soldering at a lower temperature and at a shorter time.

   A) Soldering Iron
   Temperature at the point of soldering iron; Not higher than + 350℃
   Soldering Time ; Less than 3 seconds.
   Output ; Less than 30W.

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B) Reflow (Atomospheric and Hot-Plate)
Capacitor Body Temperature : Not higher
Time : Not more than 10 seconds
A permissible range for peak temperature and time as per Fig. 1

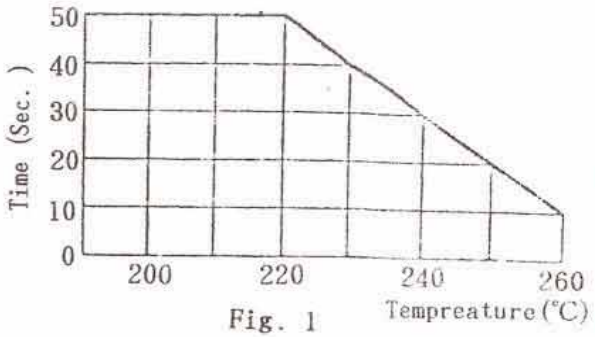

Fig. 1

Note 1) There is no problem in such a hot - plate heating method which will heat the bottom side, but in case of the top side heating by infra - red, the temperature of capacitor body becomes higher than care must be taken of.

2) In case of near infra - red heating with big power output, sudden temperature increase will occur and preheating at 130℃ - 160℃ for more than one minute is recommended. Please be sure that the temperature between maximum reflow temperature and the one used will remain less than 100℃

3) If solder land is bigger than the capacitor terminal, slipping - off of the capacitor in its position will happen. Please care of this not happening.

C) Solder Immersion

Solder Bath Temperature : Not higher than 260℃
Time : A~G Cases : Not more than 10 seconds
H~N Cases : Not more than 5 seconds

A permissible range for peak temperature and time as per Fig. 2

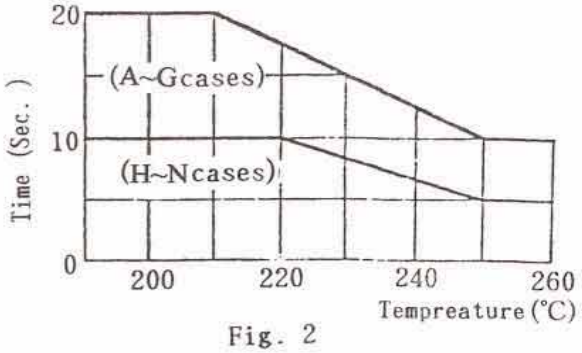

Fig. 2

Note 1) Consideration must be taken to remove "gas"because solderability is sometimes bad for high density of components.

2) Give pre - Heating as much as possible and avoid a sudden heating to the capacitor. Recommended pre - heat temp. is 130 ~ 160℃ for more than one minute and the temperature between peak temp. and pre - heat temp. remain less than 100℃

(4) Cleaning

Board surface temperature drop to nomal temperature fully, after which cleaning shall be made.
Usable solvent are as follows ;

- Halogen system organic solvent (HCFC225, methylene chloride and the like.)
- Alcohol type solvent (IPA, ethylalcohol and the like.)
- Petroleum type solvent, alkaline saponification agent, water and the like.

Cleaning must be made under following conditions.

Temperature : Not higher than + 50℃
Immersion Time : Not more than 30 minutes.

In case of ultrasonic cleaning, it must be made with a frequency of less than 45kHz, an output of less than 0.02W/cm² within 5 minutes at less than + 40℃

Note 1) Ultrasonic cleaning should be avoided as much as possible. but when above cleaning is carried out, please see to it that mounted capacitors do not bump against other parts and no hard brush will be used to rub circuit boards with.
Bumping of capacitor against other parts will cause the capacitor termination to break.

2) Ulutrasonic cleanings mentioned above are based on thyrister - inveter method. So, for cleanings with other methods, Please carry out much of pre -tests.

(5) Conductive Adhesive

The use of conductive Adhesive for capacitor mounting should be avoided.
Please consult us for use if it is necessary.