FUJITSU MEDIA DEVICES
DATA SHEET

DS01-41104-1E

TANTALUM CAPACITORS

TANTALUM CAPACITORS

TCMS Series

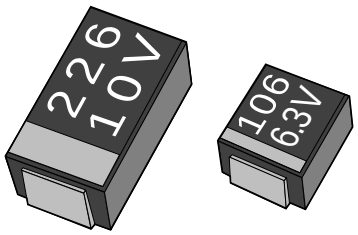
■ DESCRIPTION

Miniaturization of electronic devices (communication devices, audio devices, and AV devices, etc.) has more and more accelerated in recent years. The models downsized into one half to one fifth of conventional TCM series meet the customers' needs for high-density packaging, taking full advantage of our technologies for miniaturization and capacity-increase in tantalum capacitor production.

■ FEATURES

- Compact packaging in the volume reduced to one fifth [A case : 3216] of conventional size [C1 case : 6032 (6.3 V/22 μF)]. (From C1 case into A case : Allows higher-density packaging on mounting area reduced into one fourth.)
- Capacitance ranges from 0.47 μF to 330 μF, and rated voltage ranges from 4 V to 35 V.

■ PACKAGES



■ PRODUCT LINEUP

Model name	Rated voltage (V)	Rated capacitance (μF)	tanδ (%)	Leakage current (μA)	Case size
TA-4R0TCMS6R8M-AR	4	6.8	8	0.50	A
TA-4R0TCMS100M-AR	4	10	8	0.50	A
TA-4R0TCMS150M-AR	4	15	8	0.60	A
TA-4R0TCMS150M-B2R	4	15	8	0.60	B2
TA-4R0TCMS220M-AR	4	22	8	0.88	A
TA-4R0TCMS220M-B2R	4	22	8	0.88	B2
TA-4R0TCMS330M-AR	4	33	8	1.32	A
TA-4R0TCMS330M-B2R	4	33	8	1.32	B2
TA-4R0TCMS470M-B2R	4	47	8	1.88	B2
TA-4R0TCMS470M-C1R	4	47	8	1.88	C1
TA-4R0TCMS680M-B2R	4	68	8	2.72	B2
TA-4R0TCMS680M-C1R	4	68	8	2.72	C1
TA-4R0TCMS101M-C1R	4	100	10	4.00	C1
TA-4R0TCMS101M-ER	4	100	10	4.00	E
TA-4R0TCMS151M-C1R	4	150	10	6.00	C1
TA-4R0TCMS151M-ER	4	150	10	6.00	E
TA-4R0TCMS221M-ER	4	220	10	8.80	E
TA-4R0TCMS331M-ER	4	330	10	13.20	E
TA-6R3TCMS4R7M-AR	6.3	4.7	6	0.50	A
TA-6R3TCMS6R8M-AR	6.3	6.8	8	0.50	A
TA-6R3TCMS100M-AR	6.3	10	8	0.63	A
TA-6R3TCMS100M-B2R	6.3	10	8	0.63	B2
TA-6R3TCMS150M-AR	6.3	15	8	0.95	A
TA-6R3TCMS150M-B2R	6.3	15	8	0.95	B2
TA-6R3TCMS220M-AR	6.3	22	8	1.39	A
TA-6R3TCMS220M-B2R	6.3	22	8	1.39	B2
TA-6R3TCMS330M-B2R	6.3	33	8	2.08	B2
TA-6R3TCMS330M-C1R	6.3	33	8	2.08	C1
TA-6R3TCMS470M-B2R	6.3	47	8	2.96	B2
TA-6R3TCMS470M-C1R	6.3	47	8	2.96	C1
TA-6R3TCMS680M-C1R	6.3	68	8	4.28	C1
TA-6R3TCMS680M-ER	6.3	68	8	4.28	E
TA-6R3TCMS101M-C1R	6.3	100	10	6.30	C1

(Continued)

Model name	Rated voltage (V)	Rated capacitance (μF)	tanδ (%)	Leakage current (μA)	Case size
TA-6R3TCMS101M-ER	6.3	100	10	6.30	E
TA-6R3TCMS151M-ER	6.3	150	10	9.45	E
TA-6R3TCMS221M-ER	6.3	220	10	13.86	E
TA-010TCMS3R3M-AR	10	3.3	6	0.50	A
TA-010TCMS4R7M-AR	10	4.7	6	0.50	A
TA-010TCMS6R8M-AR	10	6.8	8	0.68	A
TA-010TCMS6R8M-B2R	10	6.8	8	0.68	B2
TA-010TCMS100M-AR	10	10	8	1.00	A
TA-010TCMS100M-B2R	10	10	8	1.00	B2
TA-010TCMS150M-B2R	10	15	8	1.50	B2
TA-010TCMS220M-B2R	10	22	8	2.20	B2
TA-010TCMS220M-C1R	10	22	8	2.20	C1
TA-010TCMS330M-B2R	10	33	8	3.30	B2
TA-010TCMS330M-C1R	10	33	8	3.30	C1
TA-010TCMS470M-C1R	10	47	8	4.70	C1
TA-010TCMS470M-ER	10	47	8	4.70	E
TA-010TCMS680M-C1R	10	68	8	6.80	C1
TA-010TCMS680M-ER	10	68	8	6.80	E
TA-010TCMS101M-ER	10	100	10	10.00	E
TA-010TCMS151M-ER	10	150	10	15.00	E
TA-016TCMS2R2M-AR	16	2.2	6	0.50	A
TA-016TCMS3R3M-AR	16	3.3	6	0.53	A
TA-016TCMS4R7M-AR	16	4.7	6	0.75	A
TA-016TCMS4R7M-B2R	16	4.7	6	0.75	B2
TA-016TCMS6R8M-B2R	16	6.8	8	1.09	B2
TA-016TCMS100M-B2R	16	10	8	1.60	B2
TA-016TCMS150M-B2R	16	15	8	2.40	B2
TA-016TCMS150M-C1R	16	15	8	2.40	C1
TA-016TCMS220M-C1R	16	22	8	3.52	C1
TA-016TCMS330M-C1R	16	33	8	5.28	C1
TA-016TCMS330M-ER	16	33	8	5.28	E
TA-016TCMS470M-C1R	16	47	8	7.52	C1

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Model name	Rated voltage (V)	Rated capacitance (μF)	tanδ (%)	Leakage current (μA)	Case size
TA-016TCMS470M-ER	16	47	8	7.52	E
TA-016TCMS680M-ER	16	68	8	10.88	E
TA-016TCMS101M-ER	16	100	10	16.00	E
TA-020TCMS1R5M-AR	20	1.5	6	0.50	A
TA-020TCMS2R2M-AR	20	2.2	6	0.50	A
TA-020TCMS3R3M-AR	20	3.3	6	0.66	A
TA-020TCMS3R3M-B2R	20	3.3	6	0.66	B2
TA-020TCMS4R7M-B2R	20	4.7	6	0.94	B2
TA-020TCMS6R8M-B2R	20	6.8	8	1.36	B2
TA-020TCMS100M-B2R	20	10	8	2.00	B2
TA-020TCMS100M-C1R	20	10	8	2.00	C1
TA-020TCMS150M-C1R	20	15	8	3.00	C1
TA-020TCMS220M-C1R	20	22	8	4.40	C1
TA-025TCMS1R0M-AR	25	1	6	0.50	A
TA-025TCMS1R5M-AR	25	1.5	6	0.50	A
TA-025TCMS2R2M-AR	25	2.2	6	0.55	A
TA-025TCMS2R2M-B2R	25	2.2	6	0.55	B2
TA-025TCMS3R3M-B2R	25	3.3	6	0.83	B2
TA-025TCMS4R7M-B2R	25	4.7	6	1.18	B2
TA-025TCMS6R8M-C1R	25	6.8	8	1.70	C1
TA-025TCMS100M-C1R	25	10	8	2.50	C1
TA-035TCMSR47M-AR	35	0.47	6	0.50	A
TA-035TCMSR68M-AR	35	0.68	6	0.50	A
TA-035TCMS1R0M-AR	35	1	6	0.50	A
TA-035TCMS1R5M-B2R	35	1.5	6	0.53	B2
TA-035TCMS2R2M-B2R	35	2.2	6	0.77	B2
TA-035TCMS3R3M-B2R	35	3.3	6	1.16	B2
TA-035TCMS4R7M-C1R	35	4.7	6	1.65	C1
TA-035TCMS6R8M-C1R	35	6.8	8	2.38	C1

■ PRINCIPAL CHARACTERISTICS

Parameter		Test method (JIS-C-5101-1, 3)	Value		Unit
			Min.	Max.	
Category temperature range		—	–55	+125	°C
Maximum temperature at rated voltage		—	—	+85	°C
Rated voltage range		—	4	35	V
Capacitance range			0.47	330	μF
Rated capacitance allowable error			–20	+20	%
Tangent of loss angle (tanδ)	4.7 μF or less		—	6	%
	6.8 μF to 68 μF		—	8	%
	100 μF or more		—	10	%
Leakage current		Apply a rated voltage through 1000 Ω protection resistor connected in series, and measure leakage current in 5 min.	—	Either 0.01 CV or 0.5 μA, whichever is greater.	μA
Heat resistance against soldering	Appearance	After preheating in 150 °C for 2 min, expose to the heat under the following conditions : • Immerse in soldering bath at 260 °C ± 5 °C, for 10 s ± 1 s, or • Perform reflow soldering at 260 °C ± 5 °C, for 10 s ± 1 s.	No fault such as a crack is found on external package.		—
	Capacitance		Lower than initial value by 5.	Higher than initial value by 5.	%
	tanδ		—	Rated initial value	—
	Leakage current		—	Rated initial value	—
Quick change of temperature	Capacitance	Place under 5 cycles of temperature change between –55 °C and +125 °C.	Lower than initial value by 5.	Higher than initial value by 5.	%
	tanδ		—	Rated initial value	—
	Leakage current		—	Rated initial value	—
High temperature and humidity (steady-state)	Capacitance	Place under a circumstance of 60 °C, 90% to 95% RH for 500 h with no load. Measurement must be taken after placing under room temperature and humidity for 1 h to 2 h.	Lower than initial value by 10. (Lower than initial value by 15 for products marked with "*" in family.)	Higher than initial value by 10. (Higher than initial value by 15 for products marked with "*" in family.)	%
	tanδ		—	120 of rated initial value.	%
	Leakage current		—	Rated initial value	

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Parameter		Test method (JIS-C-5101-1, 3)	Value		Unit
			Min.	Max.	
Durability	Capacitance	Apply rated voltage at 85 °C, and apply specified derating voltage at 125 °C for 2000 h. (1000 hours for products marked with “*” in family.) Power supply impedance shall be 3 Ω or lower.	Lower than initial value by 10.	Higher than initial value by 10.	%
	tanδ		—	Rated initial value	—
	Leakage current		—	125 of rated initial value. (200 of rated initial value for products marked with “*” in family.)	%
Failure rate after soldering		After heat resistance test against soldering, perform durability test under 85 °C.	—	1% / 1000 h (60%CL)	—

■ SERIES LIST

TCMS series

WV / C (μF)	4 V (0 G)	6.3 V (0 J)	10 V (1 A)	16 V (1 C)	20 V (1 D)	25 V (1 E)	35 V (1 V)
0.47							A
0.68							A
1.0						A	*A
1.5					A	*A	B2
2.2				A	*A	*A, B2	*B2
3.3			A	A	*A, B2	*B2	*B2
4.7		A	A	*A, B2	*B2	*B2	C1
6.8	A	A	*A, B2	B2	*B2	C1	*C1
10	A	*A, B2	*A, B2	*B2	*B2, C1	*C1	
15	*A, B2	*A, B2	*B2	*B2, C1	*C1		
22	*A, B2	*A, *B2	*B2, C1	C1	*C1		
33	*A, *B2	*B2, C1	*B2, C1	*C1, E			
47	*B2, C1	*B2, C1	*C1, E	*C1, E			
68	*B2, C1	*C1, E	*C1, E	*E			
100	*C1, E	*C1, E	*E	*E			
150	*C1, E	*E	*E				
220	*E	*E					
330	*E						

■ PART NUMBER DESIGNATION

Indication example) B2 case, 35 V/1.5 μF

TA	–	035	TCMS	1R5	M	–	B2	R
Product type		Rated voltage	Series name	Capacitance	Allowable error		Size	Taping specifications

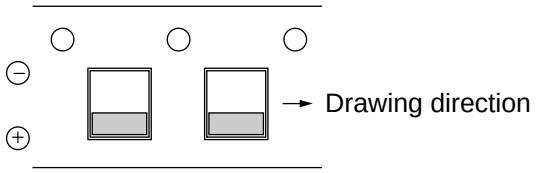
(Example)
6.3 V → 6R3
35 V → 035

(Example)
1.5 μF → 1R5
10 μF → 100
(Last digit indicates 10th power)

M →±20%

A
B2
C1
E

R : Taping



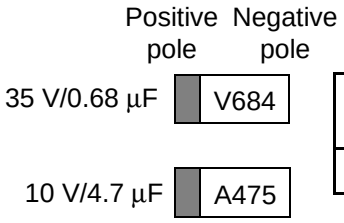
Specify “R” if a positive pole is on the right side against drawing direction. (A positive pole is on the other side of sending holes.)

■ MARKING AND POLARITY INDICATION

(1) A case (Polarity of (+) is indicated by a stripe.)

Rated voltage and capacitance (picofarad : pF) are indicated by symbols. Capacitance is indicated in 3 digits. The first and second digits are significant digits, and the third digit indicates the number of zeros after the significant value in the unit of picofarad (pF) .

(Indication example)

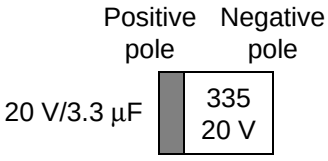


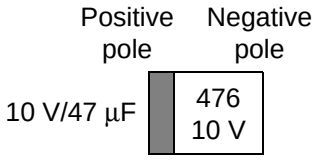
Rated voltage	4 V (0 G)	6.3 V (0 J)	10 V (1 A)	16 V (1 C)	20 V (1 D)	25 V (1 E)	35 V (1 V)
Symbol	G	J	A	C	D	E	V

(2) B2, C1, and E case (Polarity of (+) is indicated by a stripe.)

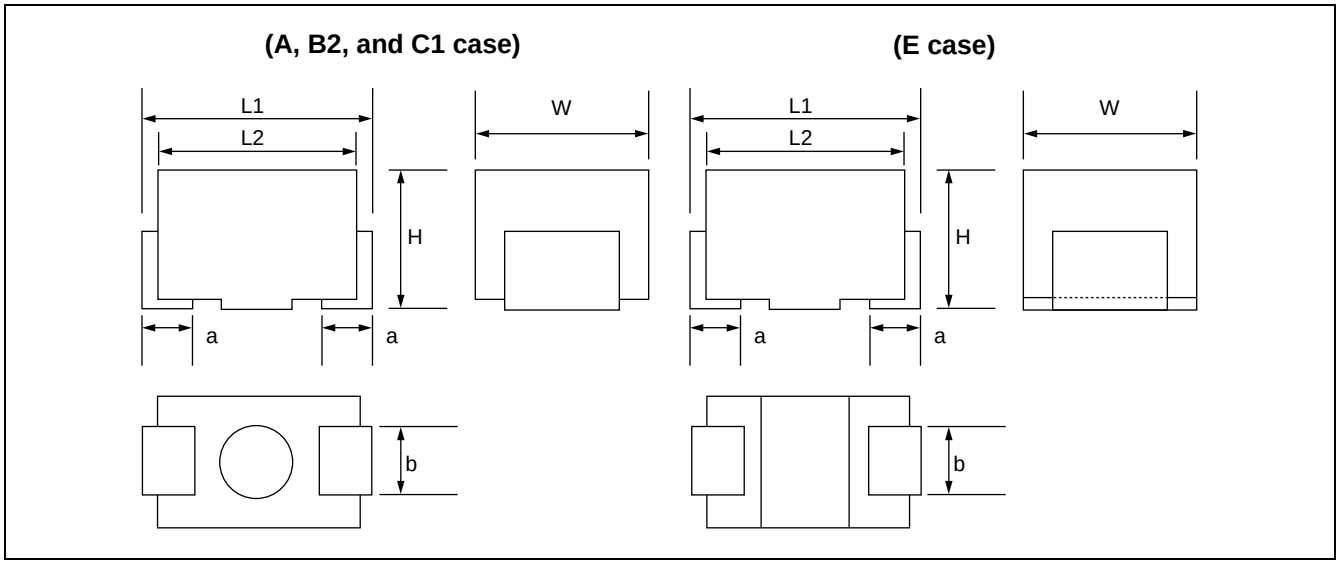
Rated voltage and capacitance are indicated by symbols. Just as A case, capacitance is indicated in picofarad symbol in 3 digits.

(Indication example)





■ PACKAGE DIMENSION



Unit : mm

Case size	L1	L2	W	H	a	b
A	3.2 ± 0.2	2.9 ± 0.2	1.6 ± 0.2	1.6 ± 0.2	0.8 ± 0.2	1.2 ± 0.2
B2	3.5 ± 0.2	3.3 ± 0.2	2.8 ± 0.2	1.9 ± 0.2	0.8 ± 0.2	2.2 ± 0.2
C1	5.8 ± 0.2	5.5 ± 0.2	3.2 ± 0.2	2.5 ± 0.2	1.2 ± 0.2	2.0 ± 0.2
E	7.3 ± 0.2	7.0 ± 0.2	4.3 ± 0.2	2.9 ± 0.2	1.3 ± 0.2	2.4 ± 0.2

■ OTHER REQUIREMENTS

(1) Surge voltage and reduction voltage

(Rated voltage and reduction voltage by temperature)

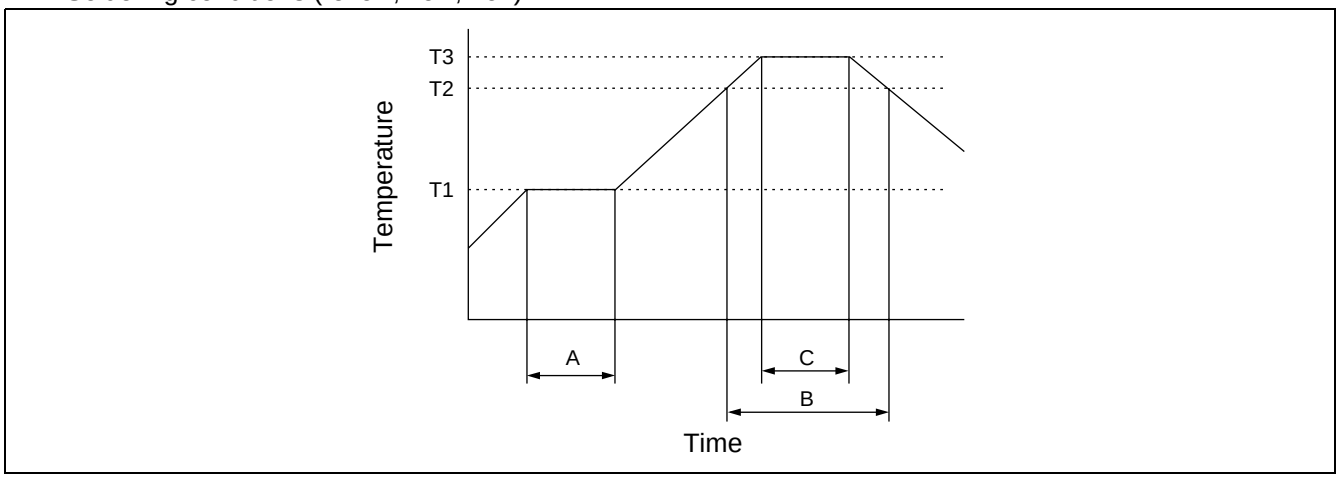
85 ºC	**Rated voltage**	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V
	Surge voltage	5 V	8 V	13 V	20 V	26 V	32 V	44 V
125 ºC	**Reduction voltage**	2.5 V	4 V	6.3 V	10 V	13 V	16 V	22 V
	Surge voltage	3.2 V	5 V	8 V	13 V	16 V	20 V	28 V

(2) Storage conditions

20 °C ± 15 °C, 65% ± 20% RH, no longer than 2 years.

■ RECOMMENDED MOUNTING CONDITIONS

- Soldering conditions (reflow, flow, iron)



1. Reflow

- Reflow (peak) temperature
  T1 : 150 °C to 160 °C
  T2 : 210 °C
  T3 : 230 °C (240 °C at maximum)
- Reflow time
  A : 30 s to 120 s
  B : 30 s to 40 s
  C : 15 s to 25 s
- Number of times of reflow soldering processes
  Twice or less.
- Flux
  Use of rosin-type flux with low chlorine (0.2 wt% chlorine or less) is recommended.

2. Flow

- Flow temperature and time : 250 °C, 5 s
  (preheating at 150 °C to 160 °C, for 15 s to 120 s is recommended)
- Number of flow soldering processes : 1
- Flux : Use of rosin-type flux with low chlorine (0.2 wt% chlorine or less) is recommended.

3. Iron soldering

- Soldering temperature, time : 350 °C, 3 s to 6 s
  (with iron power of 30 W. Preheating : Preheating similar to flow soldering is recommended.)
- Number of iron soldering processes : 3 or less.
- Flux : Use of rosin-type flux with low chlorine (0.2 wt% chlorine or less) is recommended.

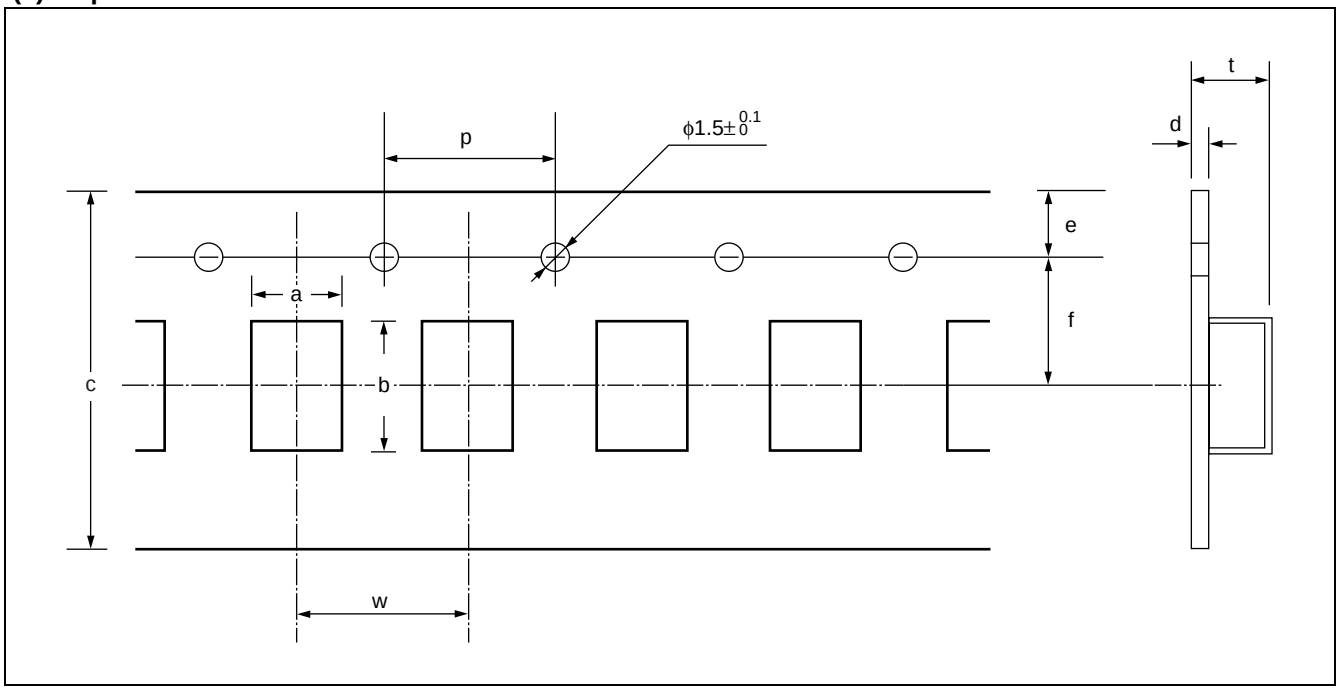
Quick heating of a capacitor after long-term storage, which took up moisture, causes high-pressure inside the product by vaporization of moist and may result in cracks on external resin. Pre-baking at 60 °C to 120 °C for 12 h to 72 h removes the moist and prevents such cracks.

■ RECOMMENDED CLEANSING CONDITIONS

- Avoid ultrasonic cleansing in principle. Bubble cleansing is recommended. If ultrasonic cleansing is unavoidable, cleansing in under one minute is recommended to avoid cavitation.
- Use non-chlorine type or alcoholic organic solvent that is easily dryable and residue-free (e.g. isopropyl alcohol, toluene, benzene, etc.) for cleansing.
- Soaking a capacitor in solvent may erase a stamp. Soaking must be within 20 min. No limitation is applicable if stamp is not taken in account. For similar reason, vapor-phase cleansing must be done within 10 min.
- Use of the following solvents, that cause swelling or dissolving on external resin, are not allowed : ester-family methoxy-butyl acetate, amide-family N, N-dimethylformamide (DMF) , polyhydric alcohol dielectric diethylene glycol, and monobutyl ether.

■ PACKING

(1) Tape Dimension



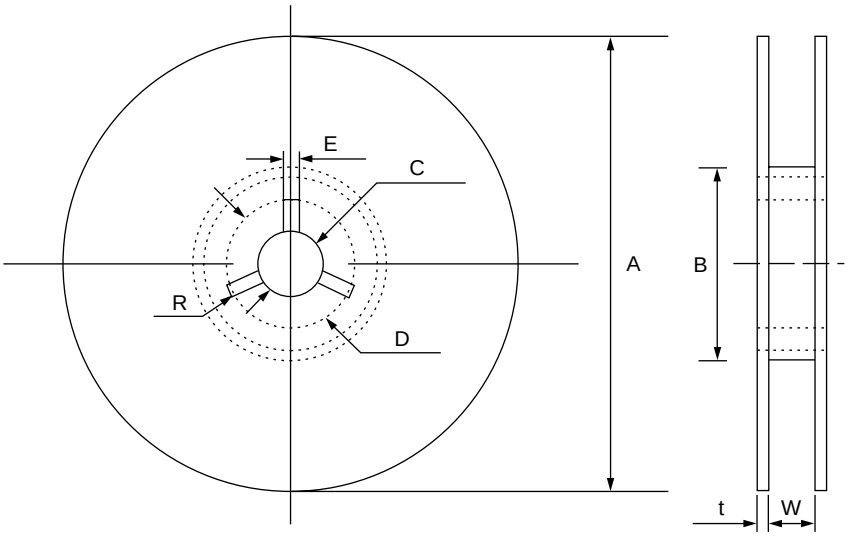
Unit : mm

Case size	a	b	c	e	f	t	p	w	d
A	1.9 ± 0.1	3.9 ± 0.1	8 ± 0.3	1.75 ± 0.1	3.5 ± 0.1	2.0 ± 0.1	4 ± 0.1	4 ± 0.1	0.2
B2	3.3 ± 0.1	3.9 ± 0.1	8 ± 0.3	1.75 ± 0.1	3.5 ± 0.1	2.2 ± 0.1	4 ± 0.1	4 ± 0.1	0.3
C1	3.9 ± 0.1	6.3 ± 0.1	12 ± 0.3	1.75 ± 0.1	5.5 ± 0.1	2.7 ± 0.1	4 ± 0.1	8 ± 0.1	0.3
E	4.6 ± 0.1	7.7 ± 0.1	12 ± 0.3	1.75 ± 0.1	5.65 ± 0.1	3.3 ± 0.1	4 ± 0.1	8 ± 0.1	0.3

("a" and "b" are inside diameters.)

(2) Reel Dimension

Material : Polystyrene



Unit : mm

Case size	A	B	C	D	E	W	t	R
A, B2	$180 \pm {}^{0}_{3.0}$	$60 \pm {}^{1.0}_{0}$	13 ± 0.2	21 ± 0.8	2 ± 0.5	9 ± 0.3	2 ± 0.5	1
C1, E	$180 \pm {}^{0}_{3.0}$	$60 \pm {}^{1.0}_{0}$	13 ± 0.2	21 ± 0.8	2 ± 0.5	13 ± 0.3	2 ± 0.5	1

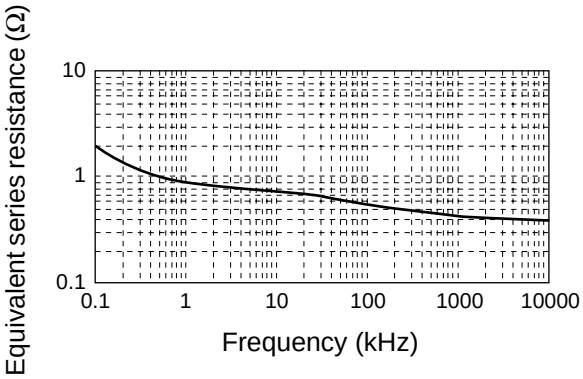
(3) Carrier Tape Packaging Unit

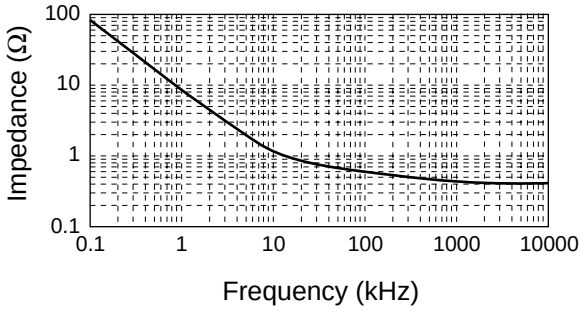
Case size	Quantity (capacitors/reel)
A, B2	2,000
C1, E	500

■ APPENDIX (Typ. value)

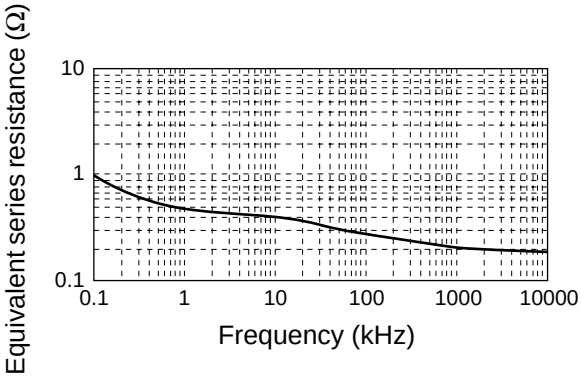
- **Frequency characteristics**

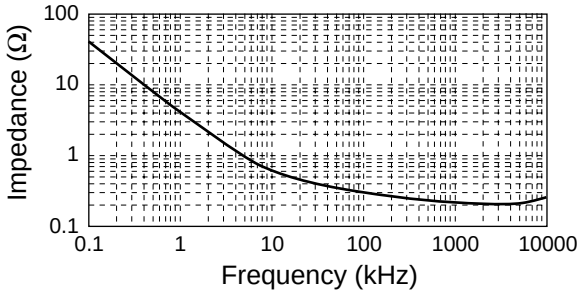
Test Samples : TA-6R3 TCMS 220 M-A



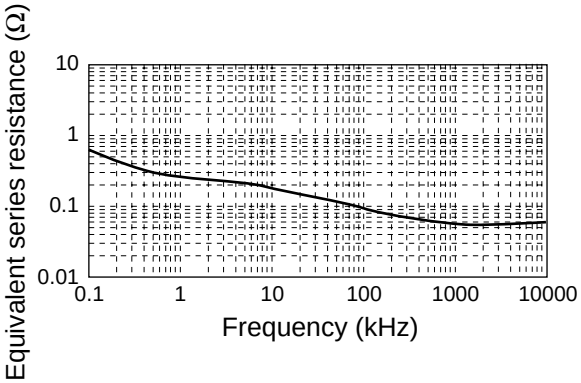


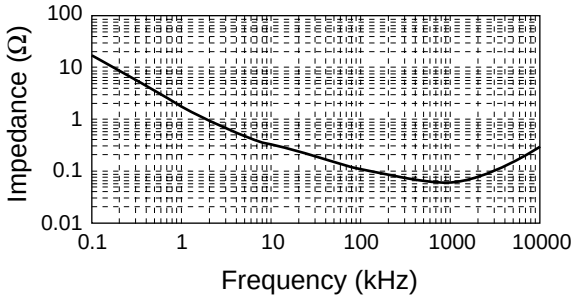
Test Samples : TA-6R3 TCMS 470 M-B2





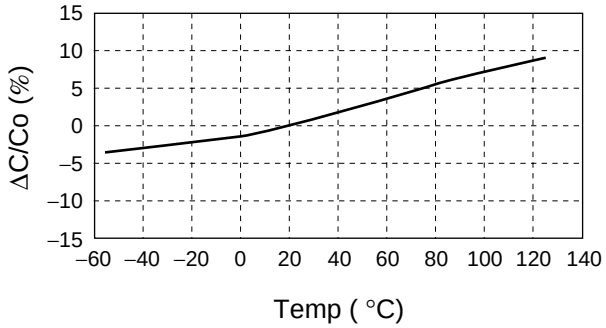
Test Samples : TA-6R3 TCMS 101 M-E

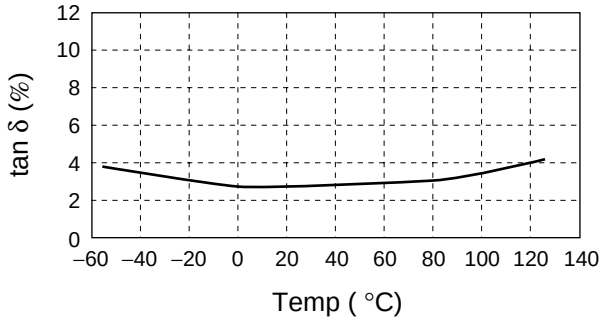


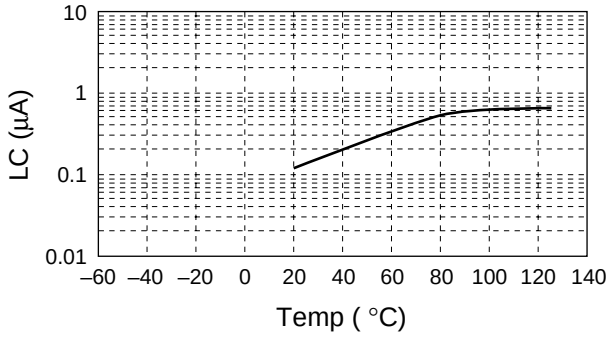


- **High/low temperature stability**

Test Samples : TA-6R3 TCMS 470 M-B2

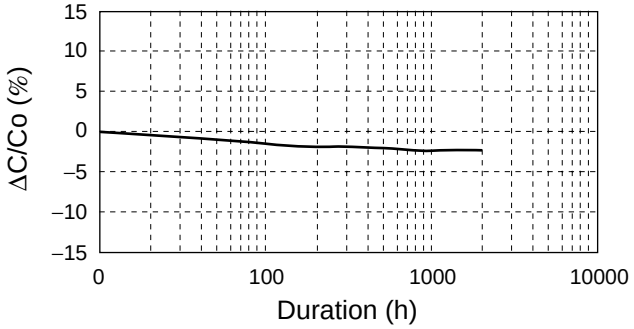


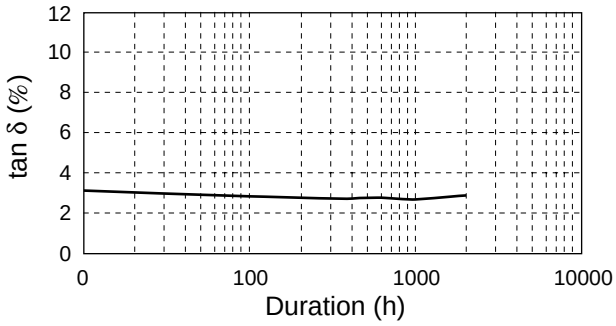


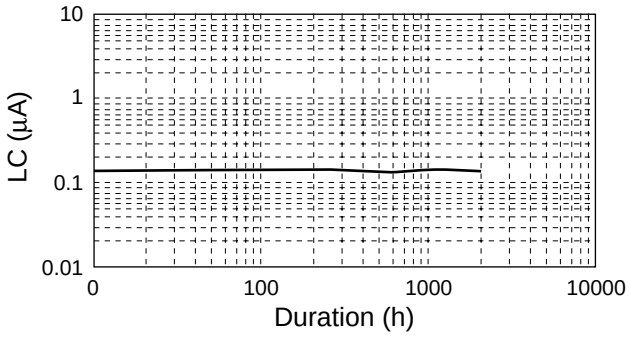


- **Loaded conditions at elevated temperature (85 degrees Celsius)**

Test Samples : TA-6R3 TCMS 470 M-B2







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