

TC Series Tantalum Solid Electrolytic Capacitors - Resin Molded Chip Type, Standard Type

TC SERIES: The TC Series is designed for hybrid circuit and low profile printed circuit board applications where inductance is to be minimized, or where substrate space is at a premium. They can be attached to substrates or circuit boards by dipsoldering, welding, re-flow soldering or other conventional methods. These units have the further advantage of being compatible with automatic assembly equipment-minus the problems associated with flexible terminal lead wires. Our chip tantalums meet all EIA sizes.

RATINGS

Capacitance Range: 0.1 μ F to 220 μ F
Tolerance Range: M(\pm 20%), K(\pm 10%)
Rated Voltage: 4V to 50V

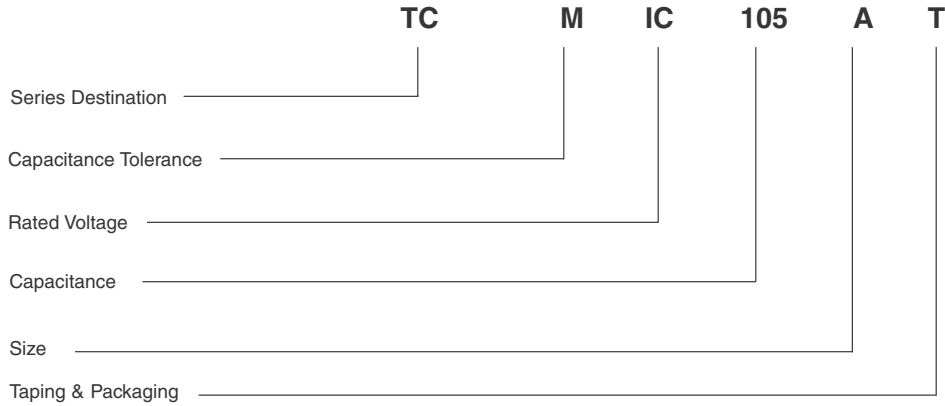


ITEMS		SPECIFICATIONS, PERFORMANCE			TEST CONDITIONS	
Operating Temperature Range		-55°C~+85°C(+125°C)				
Maximum Working Temperature		+85°C (+125°C with derating)			See Table of Standard Ratings	
Rated Voltage Range		4 VDC ~ 50 VCD				
Capacitance Range		0.1 μ F ~ 220 μ F				
Standard Capacitance Tolerance		\pm 20% (M) \pm 10%(K)			JIS-C-5102 20°C 120Hz	
Dissipation factor (tan δ)		0.1~1.0 μ F	4.0%		JIS-C-5102 20°C 120Hz	
		1.5~100 μ F	6.0%			
Leakage Current		Not more than 0.01CV or 0.5 μ A, whichever is greater			JIS-C-5102 20°C (5 minutes) (after rated voltage applied)	
Temperature Stability	Temp.	Δ C	Max. tan δ		Max. Leakage Current	Procedure: 1. 20 \pm 2°C 2. -55 $^{+0}_{-3}$ °C Stabilized 3. 20 \pm 2°C 15 min. 4. +125 $^{+3}_{-0}$ °C 2 hrs.
	-55°C	Max \pm 12%	0.1 ~ 1.0 μ F 6.0% 1.5 ~ 100 μ F 8.0%		NA	
	+125°C	Max. \pm 15%	0.1 ~ 1.0 μ F 6.0% 1.5 ~ 100 μ F 8.0%		0.125CV or 6.25 μ A whichever is greater	
Surge Voltage		Capacitance Change	Less than \pm 5%		JIS-C-5140 and 5102 85°C Surge voltage applied, 1000 times with series resistance of 1000 Ω for 30 seconds at intermittent intervals of 5 minutes	
		Dissipation Factor	Less than specified value			
		Leakage Current				
Solder Heat Resistance		Withstand solder immersion 5 seconds at 260°C or reflow 10 seconds at 260°C				
Humidity Test		Capacitance Change	Less than \pm 5%		JIS-C-5102 at 60°C humidity 90% ~ 95% RH, 500 Hours	
		Dissipation Factor	Less than initial specified value			
		Leakage Current				
High Temperature Test		Capacitance Change	Less than \pm 10%		JIS-C-5102 85°C, Rated voltage 2000 hours or 125°C Derating voltage 1000 hours with circuit resistance of 1 Ω /V	
		Dissipation Factor	Less than initial specified value			
		Leakage Current				
Failure Rate at 85°C		1% per 1,000 hours			MTBF 5 X 10 ⁴ Hr.	

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Ordering Information & Marking

Ordering Information Example: 1 MFD 16 volt 20%

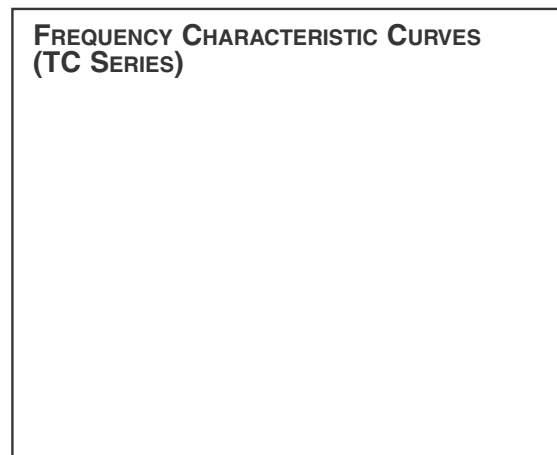
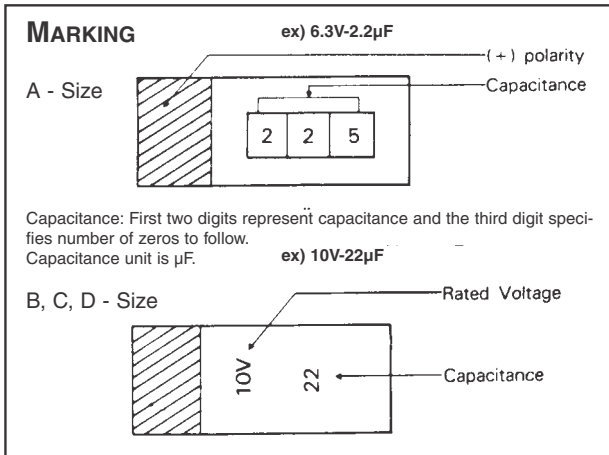


Capacitance Tolerance	±20%	±10%
Code	M	K

Rated Voltage	2	4	6.3	10	16	20	25	35	50
Code	OD	OG	OJ	IA	IC	ID	IE	IV	IX

Capacitance (ex)	0.1 ~ 0.68μF	1.0 ~ 6.8μF	10 ~ 470μF
Code	104 ~ 684	105 ~ 685	106 ~ 477

R: Decimal Point - First two digits represent significant figures and the third digit specifies number of zeros to follow. Capacitance unit is μF.



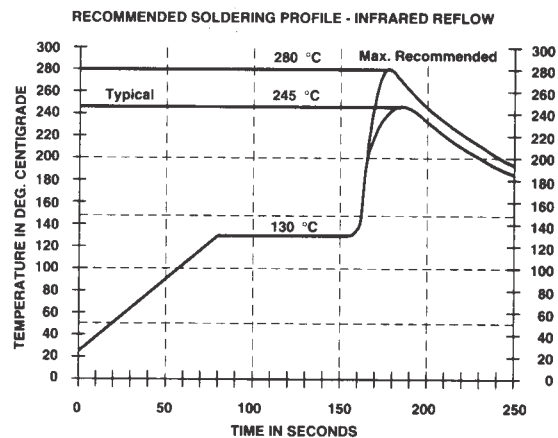
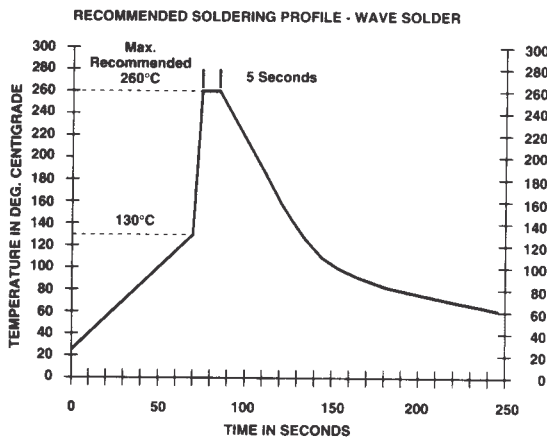
Note: See back cover for low ESR information

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STANDARD RATINGS AND CASE SIZE DISTRIBUTION*

Rated Voltage @ +85°C	4	6.3	10	16	20	25	35	50
Surge Voltage @ +85°C	5.2	8	13	20	26	32	46	65
Derated Voltage @ 125°C	2.7	4	7	10	13	17	23	33
Derated Surge Voltage @ +125°C	3.4	5	9	12	16	22	28	40
Capacitance μ F	STD/EXT	STD/EXT	STD/EXT	STD/EXT	STD/EXT	STD/EXT	STD/EXT	STD/EXT
0.1							A	A
0.15							A	B/A
0.22							A	B
0.33						A	A	B
0.47				A	A	A	B/A	C/B
0.68				A	A	A	B/A	C
1.0			A	A	A	B/A	B/A	C
1.5		A	A	A	/A	B/A	C/B	/C
2.2	A	A	A	B/A	B/A	C/B	C/B	D/C
3.3	A	A	/A	B/A	C/B	C/B	C	D/
4.7	A	/A	B/A	C/B/A	C/B	C/B	D/C	D
6.8	A	B/A	B/A	C/B	C/B	D/C	D/	D/E
10	B/A	B/A	C/B/A	C/B	D/C/B	D/C	D	
15	B/A	A/C/B	D/C/B	C/B	D/C	D/C	D/E	
22	C/B	A/C/B	D/C/B	D/C/B	D/C	D/C	/E	
33	C/B	B/C	D/C/B	D/C/B	/D	E/D		
47	C/B	D/C/B	D/C	/D	D/E	E		
68	D/C	D/	/D	E/D	/E			
100	D/	D/C	E/D	E/D				
150	D/	D/E	D/E					
220	E	C/D/E	D/E					

*Letter code after / indicates new extended range. Please indicate size code on ordering.



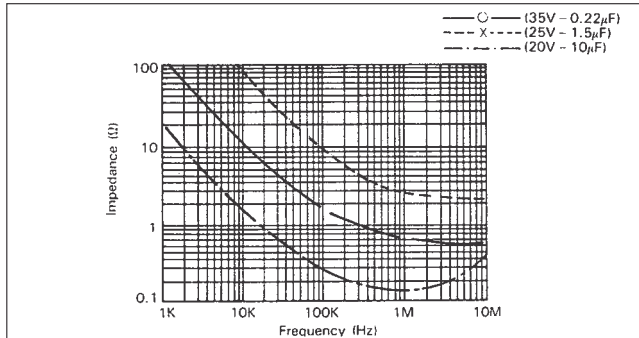
NOTES

1. Be sure polarity. Positive (+) side has white belt.
2. For cleaning, freon® TE, TES and TMS are recommended at a temperature less than 50°C for a period less than 5 minutes.
3. When ultrasonic cleaning is necessary, fixing capacitor body by epoxy adhesive before soldering is recommended.
Establish adequate cleaning conditions by experiment to avoid damaging capacitor terminations.
4. Limit reverse voltage to 1.0V or less than 5% of rated voltage whichever is smaller.
5. In case of low impedance circuit use (Less than 3 Ω /V), adequate voltage derating is recommended to improve M.T.B.F.
6. In case of automatic mounting, the tweezer pressure shall be less than 500 grams and should not exceed 5 seconds.

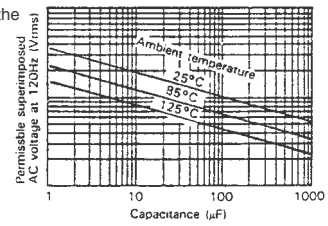
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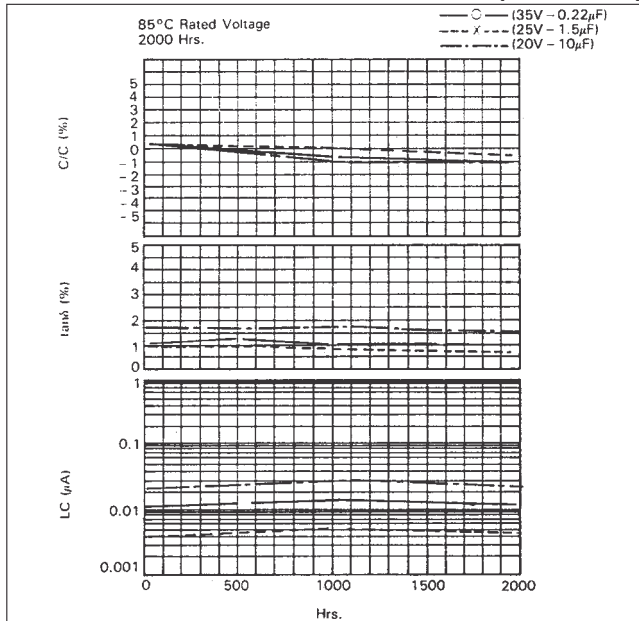
CHARACTERISTIC DATA & CURVES



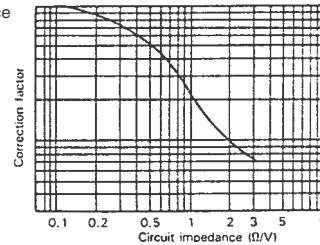
Frequency Dependence of the Permissible Superimposed AC Voltage



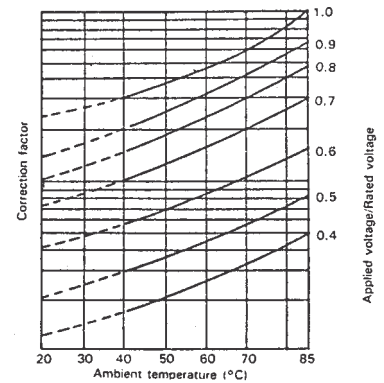
LOAD LIFE CHARACTERISTIC CURVES (TC SERIES)



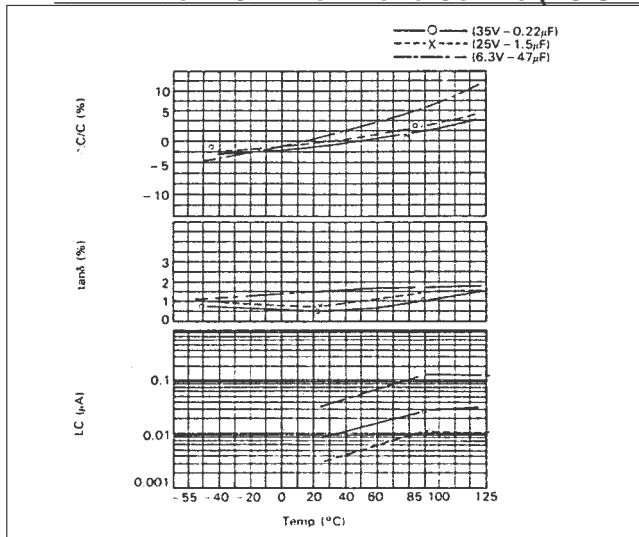
Effect of Circuit Impedance on the Failure Rate



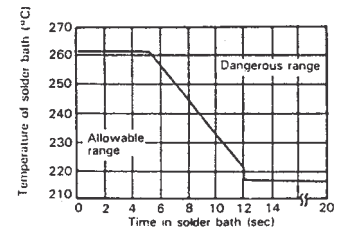
Effect of the Applied Voltage and Ambient Temperature on the Failure Rate



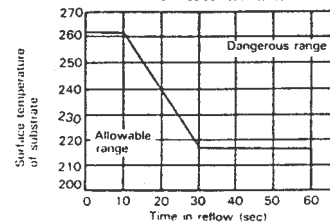
TEMPERATURE CHARACTERISTIC CURVES (TC SERIES)



Immersion Method



Reflow Method

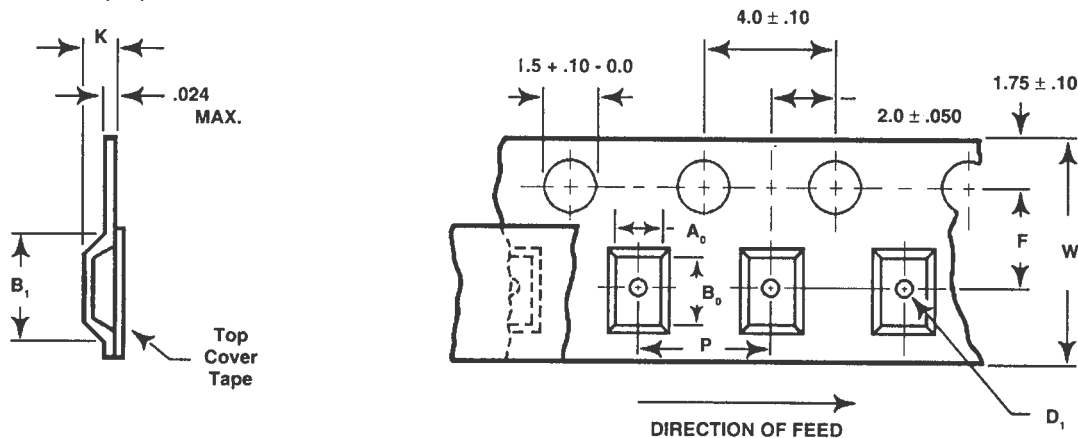


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TAPING SPECIFICATIONS

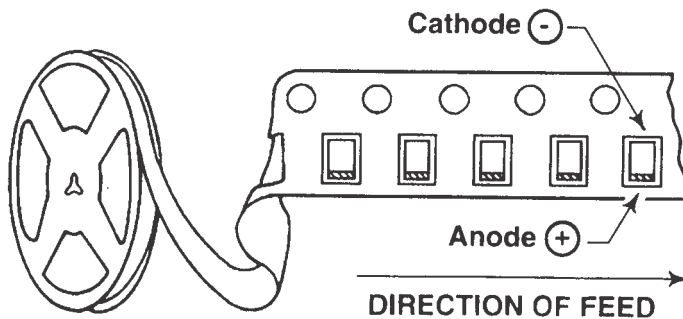
Dimensions in mm

Embossed Plastic Tape per EIA-481-1



EIA SIZE	CASE CODE	$A_0 \pm 0.2$	$B_0 \pm 0.2$	W	F	P	D_1	B_1	KMAX	TAPE SIZE	QUANTITY PER REEL	
											7" REEL	13" REEL
3216	A	1.9	3.9	$8.0 \pm .30$	$3.5 \pm .05$	4.0	1.0	4.2	2.4	8mm	2000	9000
3528	B	3.1	3.9	$8.0 \pm .30$	$3.5 \pm .05$	4.0	1.0	4.2	2.4	8mm	2000	8000
6032	C	3.9	6.3	$12.0 \pm .30$	$5.5 \pm .05$	8.0	1.5	8.2	4.5	12mm	500	3000
7343	D	4.7	7.7	$12.0 \pm .30$	$5.5 \pm .05$	8.0	1.5	8.2	4.5	12mm	500	2500
7343H	E	4.7	7.7	$12.0 \pm .30$	$5.5 \pm .05$	8.0	1.5	8.2	4.5	12mm	500	2500

STANDARD ORIENTATION



Standard reel diameter is 7" and 13" reels are available on special order with (13) added to the end of the part number.

- Cover tape peel-off specification
1. Peel-off speed: 300 mm/min.
 2. Peel-off force: $F = 30 - 75g$
 3. Peel-off angle: $\Theta = 0 - 15^\circ$

