

# TC Series

## Chip Tantalum Capacitors (Large Capacitance)



### FEATURES

- Ta-MnO<sub>2</sub> technology
- Low DCL
- Parameters stability over voltage and time
- Undertab and J-lead LF



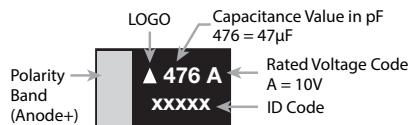
LEAD-FREE  
LEAD-FREE COMPATIBLE  
COMPONENT



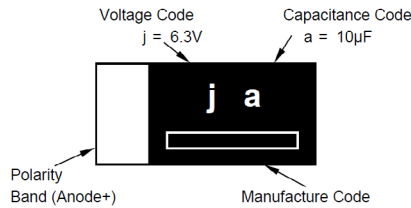
### APPLICATIONS

- DC/DC
- Industrial
- Telecom
- IoT
- Home applications
- Sensors

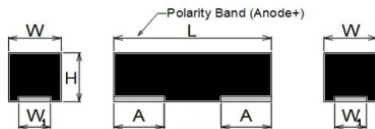
### MARKING A CASE



### M, P CASE



### UNDERTAB M CASE

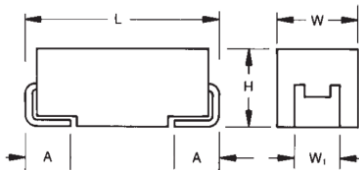


### CASE DIMENSIONS:

millimeters (inches)

Code	EIA Code	EIA Metric	L±0.10 (0.004)	W±0.10 (0.004)	H±0.10 (0.004)	W <sub>1</sub> ±0.10 (0.004)	A±0.10 (0.004)
M	0603	1608-09	1.60 (0.063)	0.85 (0.033)	0.80 (0.031)	0.55 (0.022)	0.50 (0.020)

### J-LEAD A, P CASE



### CASE DIMENSIONS:

millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W±0.20 (0.008)	H±0.20 (0.008)	W <sub>1</sub> ±0.20 (0.008)	A±0.30 (0.012)
A	1206	3216-18	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)
P	0805	2012-12	2.00 (0.079)	1.25 (0.049)	1.20 (0.047) max.	0.90 (0.035)	0.45 (0.018)

### HOW TO ORDER

TC  
Type

M  
Case Size  
See table  
above

0J  
Rated DC Voltage  
0G = 4Vdc  
0J = 6.3Vdc  
1A = 10Vdc  
1C = 16Vdc  
1D = 20Vdc  
1E = 25Vdc  
1H = 50Vdc

475  
Capacitance Code  
pF code: 1st two digits  
represent significant figures,  
3rd digit represents multiplier  
(number of zeros to follow)

M  
Tolerance  
K = ±10%  
M = ±20%

8R  
Packaging  
8 = Tape width  
R = Positive electrode  
on the side opposite to  
sprocket hole

□□□  
Discrimination code

# TC Series

## Chip Tantalum Capacitors (Large Capacitance)

### TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C
Capacitance Range:	0.15µF to 100µF
Capacitance Tolerance:	±20%
Leakage Current DCL:	Please see the ratings and part number reference table below
Temperature Range:	-55°C to +125°C

### CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V <sub>R</sub> ) @ 85°C							Cap Code
µF	Code	4V (g)	6.3V (j)	10V (A)	16V (C)	20V(D)	25V(E)	50V(H)	
0.15	154							A	E
1.0	105			P	A,M,P	A	A,M,P		A
1.5	155				A				E
2.2	225		P	A,M,P	A,M				J
3.3	335			A,P	A		A		N
4.7	475		A,M,P	A,M,P	A	A	A		S
6.8	685		P	A	A				W
10	106	A,M,P	A,M,P	A*,M,P	A*				a
15	156		P	A					e
22	226	A,M,P	A,M,P	A	A				j
33	336	A	A,M	A					n
47	476	A	A						s
68	686	A							w
100	107	A							ā

Released ratings (\*K tolerance is also available)

Note: Voltage ratings are minimum values. KYOCERA AVX reserves the right to supply higher voltage ratings in the same case size, to the same reliability standards.

### RATINGS & PART NUMBER REFERENCE

Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Maximum Operating Temp. (°C)	DCL Max. (µA)	DF Max. (%)	Impedance @100kHz (Ω)	MSL
<b>4 Volt</b>								
TCA0G106M8R	A	10	4	125	0.5	8	4.2	1
TCM0G106M8R	M	10	4	125	0.5	20	9	1
TCP0G106M8R	P	10	4	125	0.5	20	9.3	1
TCA0G226M8R	A	22	4	125	0.9	8	3	1
TCM0G226M8R	M	22	4	125	0.9	20	9	1
TCP0G226M8R	P	22	4	125	0.9	20	7.7	1
TCA0G336M8R	A	33	4	125	1.3	10	3.5	1
TCA0G476M8R	A	47	4	125	1.9	12	3.2	1
TCA0G686M8R	A	68	4	125	2.7	18	3	1
TCA0G107M8R	A	100	4	125	4.0	30	3	1
TCA0G107M8R-02	A	100	4	125	3.8	30	4	1
<b>6.3 Volt</b>								
TCP0J225M8R	P	2.2	6.3	125	0.5	20	17.5	1
TCA0J475M8R	A	4.7	6.3	125	0.5	8	4.9	1
TCM0J475M8R	M	4.7	6.3	125	0.5	20	9	1
TCP0J475M8R	P	4.7	6.3	125	0.5	20	11.8	1
TCP0J685M8R	P	6.8	6.3	125	0.5	20	9.3	1
TCA0J106M8R	A	10	6.3	125	0.6	8	4	1
TCM0J106M8R	M	10	6.3	125	0.6	20	9	1
TCM0J106M8R-02	M	10	6.3	125	0.6	20	9	1
TCM0J106M8R-CA2	M	10	6.3	125	0.3	20	8	1
TCP0J106M8R	P	10	6.3	125	0.6	20	8.3	1
TCP0J106M8R-02	P	10	6.3	125	0.1	20	6	1
TCP0J106M8R-Y1	P	10	6.3	125	0.6	20	8.3	1
TCP0J156M8R	P	15	6.3	125	0.9	20	7.7	1
TCA0J226M8R	A	22	6.3	125	1.4	10	3.5	1
TCM0J226M8R-CA2	M	22	6.3	125	6.9	20	8	1
TCM0J226M8R-EV2	M	22	6.3	125	13.0	30	9	1
TCM0J226M8R-V1	M	22	6.3	125	13.0	30	9	1
TCP0J226M8R	P	22	6.3	125	1.4	25	5	1
TCP0J226M8R-02	P	22	6.3	125	1.4	25	5	1

# TC Series

## Chip Tantalum Capacitors (Large Capacitance)



### RATINGS & PART NUMBER REFERENCE

Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Maximum Operating Temp. (°C)	DCL Max. (µA)	DF Max. (%)	Impedance @100kHz (Ω)	MSL
TCA0J336M8R	A	33	6.3	125	2.1	12	3.2	1
TCA0J336M8R-E1	A	33	6.3	125	2.1	12	3.2	1
TCM0J336M8R-V1	M	33	6.3	125	208.0	30	9	1
TCA0J476M8R	A	47	6.3	125	3.0	18	3.2	1
TCA0J476M8R-02	A	47	6.3	125	3.0	18	3.2	1
TCA0J476M8R-E1	A	47	6.3	125	3.0	18	3.2	1
<b>10 Volt</b>								
TCP1A105M8R	P	1.0	10	125	0.5	10	17.5	1
TCA1A225M8R	A	2.2	10	125	0.5	6	5.6	1
TCM1A225M8R	M	2.2	10	125	0.5	20	13.5	1
TCP1A225M8R	P	2.2	10	125	0.5	20	14.4	1
TCA1A335M8R	A	3.3	10	125	0.5	8	4.9	1
TCP1A335M8R	P	3.3	10	125	0.5	20	11.8	1
TCA1A475M8R	A	4.7	10	125	0.5	8	4.2	1
TCM1A475M8R	M	4.7	10	125	0.5	20	9	1
TCM1A475M8R-E1	M	4.7	10	125	0.5	20	9	1
TCP1A475M8R	P	4.7	10	125	0.5	20	9.3	1
TCA1A685M8R	A	6.8	10	125	0.7	8	4	1
TCA1A106*8R	A	10	10	125	1.0	8	3	1
TCM1A106M8R	M	10	10	125	10.0	20	9	1
TCM1A106M8R-02	M	10	10	125	10.0	20	9	1
TCM1A106M8R-CA2	M	10	10	125	2.0	20	8	1
TCP1A106M8R	P	10	10	125	1.0	20	7.7	1
TCP1A106M8R-02	P	10	10	125	1.0	20	7.7	1
TCA1A156M8R	A	15	10	125	1.5	10	3.5	1
TCA1A226M8R	A	22	10	125	2.2	12	3.2	1
TCA1A336M8R	A	33	10	125	3.3	8	1.7	1
<b>16 Volt</b>								
TCA1C105M8R	A	1.0	16	125	0.5	6	7	1
TCM1C105M8R	M	1.0	16	125	0.5	10	15	1
TCM1C105M8R-02	M	1.0	16	125	0.5	10	15	1
TCP1C105M8R	P	1.0	16	125	0.5	10	16.1	1
TCA1C155M8R	A	1.5	16	125	0.5	6	5.6	1
TCA1C225M8R	A	2.2	16	125	0.5	6	4.9	1
TCM1C225M8R	M	2.2	16	125	0.5	20	13.5	1
TCM1C225M8R-CA2	M	2.2	16	125	0.5	20	13.5	1
TCA1C335M8R	A	3.3	16	125	0.5	6	4.8	1
TCA1C475M8R	A	4.7	16	125	0.8	6	3.9	1
TCA1C685M8R	A	6.8	16	125	1.1	6	3.8	1
TCA1C106*8R	A	10	16	125	1.6	8	3.5	1
TCA1C106K8R-02	A	10	16	125	1.6	8	3.5	1
TCA1C106M8R-02	A	10	16	125	1.3	8	2.6	1
TCA1C226M8R	A	22	16	125	3.5	30	2.3	1
<b>20 Volt</b>								
TCA1D105M8R	A	1.0	20	125	0.5	6	7	1
TCA1D475M8R	A	4.7	20	125	0.9	6	3.9	1
<b>25 Volt</b>								
TCA1E105M8R	A	1.0	25	125	0.5	6	7	1
TCM1E105M8R	M	1.0	25	125	0.5	10	10	1
TCP1E105M8R	P	1.0	25	125	0.6	20	9.3	1
TCA1E335M8R	A	3.3	25	125	0.8	6	4.8	1
TCA1E475M8R	A	4.7	25	125	1.2	8	3.4	1
<b>50 Volt</b>								
TCA1H154M8R	A	0.15	50	125	0.5	4	15	1

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.  
All technical data relates to an ambient temperature of +25C.

Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 1.5 volts.  
DCL is measured at rated voltage after 5 minutes.  
Impedance allowed to move up to 1.25 times catalog limit post mounting.

**NOTE: KYOCERA AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.**

# TC Series

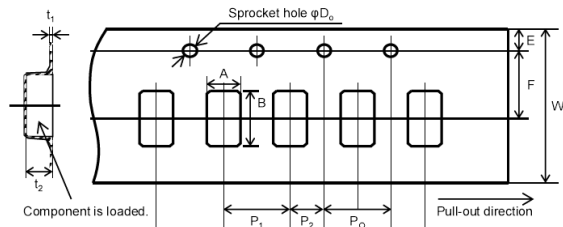
## Chip Tantalum Capacitors (Large Capacitance)

### QUALIFICATION TABLE

TEST	TC series (Temperature range -55°C to +125°C)			
	Condition		Characteristics	
Endurance	Apply rated voltage ( $U_r$ ) at 85°C for 1000hrs (for M and P case) 2000hrs (for A case) through a serial resistance of $\leq 3.0\Omega$ .		Visual examination	no visible damage
			DCL	2x initial limit
			$\Delta C/C$	within $\pm 30\%$ of initial value (M case), $\pm 20\%$ (A,P case)
			DF	2x initial limit
Humidity	Store at $60\pm 2^\circ\text{C}$ , 90-95% relative humidity for 500 hours.		Visual examination	no visible damage
			DCL	2x initial limit
			$\Delta C/C$	within $\pm 30\%$ of initial value (M case), $\pm 20\%$ (A,P case)
			DF	2x initial limit
Temperature Stability	Step	Temperature°C	Duration(min)	
	1	-55	15	-55°C
	2	+85	15	+85°C
	3	+125	15	+125°C
			DCL	n/a
			$\Delta C/C$	0/-30%
			DF	IL*
Surge Voltage	Apply 1.3x rated voltage ( $U_r$ ) at $85\pm 2^\circ\text{C}$ for 1000 cycles, duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge /discharge resistance of 1000 $\Omega$ .		Visual examination	no visible damage
			DCL	2x initial limit
			$\Delta C/C$	$\pm 20\%$ of initial limit
			DF	2x initial limit
Vibration	4.17 JIS C 5101-1 Frequency: 10 to 55 to 10Hz/min. Amplitude: 1.5mm Time: 2hours each in X and Y directions		Visual examination	no visible damage
			DCL	initial limit
			$\Delta C/C$	within $\pm 5\%$ of initial value
			DF	initial limit

\*Initial Limit  
For use outside of recommended conditions and special request, please contact KYOCERA AVX.

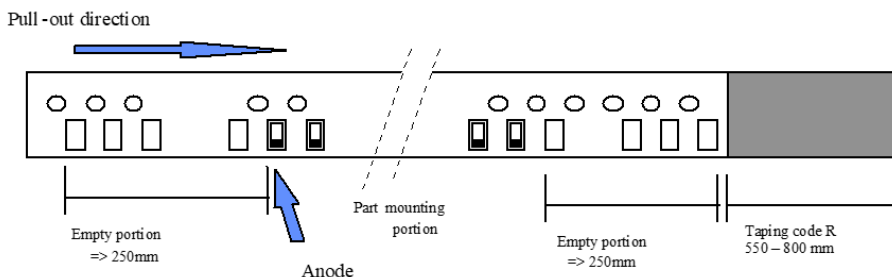
### PACKAGING SPECIFICATIONS



Unit (mm)

Case	A $\pm 0.10$	B $\pm 0.10$	W $\pm 0.20$	E $\pm 0.10$	F $\pm 0.05$	P1 $\pm 0.10$	P2 $\pm 0.05$	PO $\pm 0.10$	DO $\pm 0.10/0$	t1 $\pm 0.05$	t2 $\pm 0.10$	Standard packaging quantity
A	1.83	3.57	8.00	1.75	3.50	4.00	2.00	4.00	$\phi 1.50$	0.17	1.87	2,000 pcs
M	1.00	1.85	8.00	1.75	3.50	4.00	2.00	4.00	$\phi 1.50$	0.20	1.00	4,000 pcs
P	1.55	2.30	8.00	1.75	3.50	4.00	2.00	4.00	$\phi 1.55\pm 0.05$	0.25	1.32	3,000 pcs

Polarity of parts: as indicated in the drawing below, the anodes (+) are at the right with respect to the direction of the tape pull out (on the opposite side to the feeding holes).



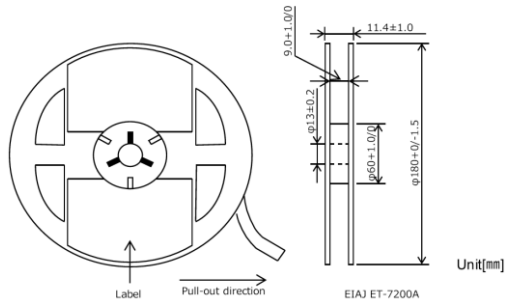
End

Beginning

# TC Series

## Chip Tantalum Capacitors (Large Capacitance)

### REEL DIMENSIONS M, P CASE



### REEL DIMENSIONS A CASE

