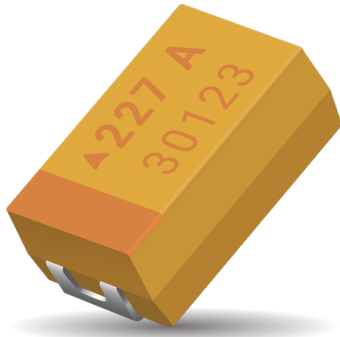


# TRM Professional Multianode Tantalum Ultra Low ESR Capacitor



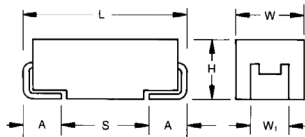
## FEATURES

- Improved Reliability – 0.5%/1khrs (Twice Better than Standard)
- DCL Reduced by 25% to 0.0075 CV
- Robust Against Higher Thermo-mechanical Stresses During Assembly Process
- Multi-anode Construction
- Super Low ESR
- 100% Surge Current Tested
- CV Range 4.7-1500 $\mu$ F / 2.5-50V
- "Mirror" Construction Used With D case Capacitors Reduces ESL to Half
- Automotive, Medical, Aerospace, Military and Other Hi-End Applications



## APPLICATIONS

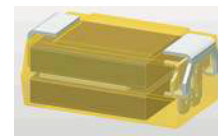
- Automotive, Avionics and Industrial High Power DC/DC Convertors



### MULTIANODE CONSTRUCTION

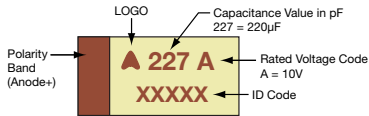


### MULTIANODE TRM D LOW SELF INDUCTANCE CONSTRUCTION "MIRROR" DESIGN



## MARKING

### D, E, U CASE



## CASE DIMENSIONS:

millimeters (inches)

Code	EIA Code	EIA Metric	L $\pm$ 0.20 (0.008)	W $\pm$ 0.20 (0.008) -0.10 (0.004)	H $\pm$ 0.20 (0.008) -0.10 (0.004)	W $\pm$ 0.20 (0.008)	A $\pm$ 0.30 (0.012) -0.20 (0.008)	S Min.
D	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	2917	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
U	2924	7361-43	7.30 (0.287)	6.10 (0.240)	4.10 (0.162)	3.10 (0.122)	1.30 (0.051)	4.40 (0.173)

W<sub>1</sub> dimension applies to the termination width for A dimensional area only.

## HOW TO ORDER

<b>TRM</b>	<b>E</b>	<b>108</b>	<b>*</b>	<b>004</b>	<b>R</b>	<b>0023</b>
<b>Type</b>	<b>Case Size</b> See table above	<b>Capacitance Code</b> pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	<b>Tolerance</b> K = $\pm$ 10% M = $\pm$ 20%	<b>Rated DC Voltage</b> 002 = 2.5Vdc 004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc 012 = 12Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	<b>Packaging</b> R = Pure Tin 7" Reel S = Pure Tin 13" Reel H = Tin Lead 7" Reel K = Tin Lead 13" Reel H, K = Non RoHS H, K = Please Contact Manufacturer	<b>ESR in m<math>\Omega</math></b>

## TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C										
Capacitance Range:	4.7 $\mu$ F to 1500 $\mu$ F										
Capacitance Tolerance:	$\pm$ 10%; $\pm$ 20%										
Rated Voltage (V <sub>R</sub> )	$\leq$ +85°C:	2.5	4	6.3	10	12	16	20	25	35	50
Category Voltage (V <sub>C</sub> )	$\leq$ +125°C:	1.7	2.7	4	7	8	10	13	17	23	33
Surge Voltage (V <sub>S</sub> )	$\leq$ +85°C:	3.3	5.2	8	13	16	20	26	32	46	65
Surge Voltage (V <sub>S</sub> )	$\leq$ +125°C:	2.2	3.4	5	8	10	13	16	20	28	40
Temperature Range:	-55°C to +125°C										
Reliability:	0.5% per 1000 hours at 85°C, V <sub>R</sub> with 0.1 $\Omega$ /V series impedance, 60% confidence level										
	Meets requirements of AEC-Q200										

# TRM Professional Multianode Tantalum Ultra Low ESR Capacitor



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

Capacitance		Rated Voltage DC (V <sub>R</sub> ) to 85°C									
µF	Code	2.5V (e)	4V (G)	6.3V (J)	10V (A)	12V (B)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
4.7	475										D(200)
6.8	685										
10	106									D(120)	
15	156										
22	226									D(70) E(60,100)	
33	336								D(65)	E(50,65)	
47	476						D(100)	D(55)	E(65)	E(65)	
68	686										
100	107							E(35,45)			
150	157				D(45)		E(30,40)	E(35)			
220	227				D(35)	E(35)	U(30,40)				
330	337		D(35)	D(35)	E(35)						
470	477		D(35)	E(30)	U(23,30)						
680	687		E(23)	U(18,23)							
1000	108	D(25)	E(23) U(18,23)								
1500	158	E(18) U(18,23)									

Released ratings, (ESR ratings in mOhms in parentheses)

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.

# TRM Professional Multianode Tantalum Ultra Low ESR Capacitor



## RATINGS & PART NUMBER REFERENCE

Part Number	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (A)			MSL
										25°C	85°C	125°C	
<b>2.5 Volt @ 85°C</b>													
TRMD108*002#0025	D	1000	2.5	85	1.7	125	18.8	8	25	3.194	2.874	1.277	3
TRME158*002#0018	E	1500	2.5	85	1.7	125	28.1	6	18	3.873	3.486	1.549	3
TRMU158*002R0018	U	1500	2.5	85	1.7	125	22.5	6	18	4.048	3.643	1.619	3
TRMU158*002R0023	U	1500	2.5	85	1.7	125	22.5	6	23	3.581	3.223	1.433	3
<b>4 Volt @ 85°C</b>													
TRMD337*004#0035	D	330	4	85	2.7	125	9.9	8	35	2.699	2.429	1.080	3
TRMD477*004#0035	D	470	4	85	2.7	125	14.1	8	35	2.699	2.429	1.080	3
TRME687*004#0023	E	680	4	85	2.7	125	20.4	6	23	3.426	3.084	1.370	3
TRME108*004#0023	E	1000	4	85	2.7	125	30	6	23	3.426	3.084	1.370	3
TRMU108*004R0018	U	1000	4	85	2.7	125	30	6	18	4.048	3.643	1.619	3
TRMU108*004R0023	U	1000	4	85	2.7	125	30	6	23	3.581	3.223	1.433	3
<b>6.3 Volt @ 85°C</b>													
TRMD337*006#0035	D	330	6.3	85	4	125	14.9	8	35	2.699	2.429	1.080	3
TRME477*006#0030	E	470	6.3	85	4	125	21.2	6	30	3.000	2.700	1.200	3
TRMU687*006R0018	U	680	6.3	85	4	125	30.6	6	18	4.048	3.643	1.619	3
TRMU687*006R0023	U	680	6.3	85	4	125	30.6	6	23	3.581	3.223	1.433	3
<b>10 Volt @ 85°C</b>													
TRMD157*010#0045	D	150	10	85	7	125	11.3	8	45	2.380	2.142	0.952	3
TRMD227*010#0035	D	220	10	85	7	125	16.5	8	35	2.699	2.429	1.080	3
TRME337*010#0035	E	330	10	85	7	125	24.8	6	35	2.777	2.500	1.111	3
TRMU477*010R0023	U	470	10	85	7	125	35.3	8	23	3.581	3.223	1.433	3
TRMU477*010R0030	U	470	10	85	7	125	35.3	8	30	3.136	2.822	1.254	3
<b>12 Volt @ 85°C</b>													
TRME227*012#0035	E	220	12	85	8.4	125	19.8	6	35	2.777	2.500	1.111	3
<b>16 Volt @ 85°C</b>													
TRMD476*016#0100	D	47	16	85	10	125	5.6	8	100	1.597	1.437	0.639	3
TRME157*016#0030	E	150	16	85	10	125	18	6	30	3.000	2.700	1.200	3
TRME157*016#0040	E	150	16	85	10	125	18	6	40	2.598	2.338	1.039	3
TRMU227*016R0030	U	220	16	85	10	125	26.4	8	30	3.136	2.822	1.254	3
TRMU227*016R0040	U	220	16	85	10	125	26.4	8	40	2.716	2.444	1.086	3
<b>20 Volt @ 85°C</b>													
TRMD476*020#0055	D	47	20	85	13	125	7.1	8	55	2.153	1.938	0.861	3
TRME107*020#0035	E	100	20	85	13	125	15	6	35	2.777	2.500	1.111	3
TRME107*020#0045	E	100	20	85	13	125	15	6	45	2.449	2.205	0.980	3
TRME157*020#0035	E	150	20	85	13	125	30	10	35	2.777	2.500	1.111	3
<b>25 Volt @ 85°C</b>													
TRMD336*025#0065	D	33	25	85	17	125	6.2	8	65	1.981	1.783	0.792	3
TRME476*025#0065	E	47	25	85	17	125	8.8	6	65	2.038	1.834	0.815	3
<b>35 Volt @ 85°C</b>													
TRMD106*035#0120	D	10	35	85	23	125	2.6	8	120	1.458	1.312	0.583	3
TRMD226*035#0070	D	22	35	85	23	125	5.8	8	70	1.909	1.718	0.763	3
TRME226*035#0060	E	22	35	85	23	125	5.8	6	60	2.121	1.909	0.849	3
TRME226*035#0100	E	22	35	85	23	125	5.8	6	100	1.643	1.479	0.657	3
TRME336*035#0050	E	33	35	85	23	125	8.7	6	50	2.324	2.091	0.930	3
TRME336*035#0065	E	33	35	85	23	125	8.7	6	65	2.038	1.834	0.815	3
TRME476*035#0065	E	47	35	85	23	125	12.3	6	65	2.038	1.834	0.815	3
<b>50 Volt @ 85°C</b>													
TRMD475*050#0200	D	4.7	50	85	33	125	1.8	8	200	1.129	1.016	0.452	3

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts.

DCL is measured at rated voltage after 5 minutes.

The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting.

For typical weight and composition see page 253.

**NOTE: KYOCERA AVX reserves the right to supply higher voltage ratings or tighter tolerance part in the same case size, to the same reliability standards.**

# TRM Professional Multianode Tantalum Ultra Low ESR Capacitor



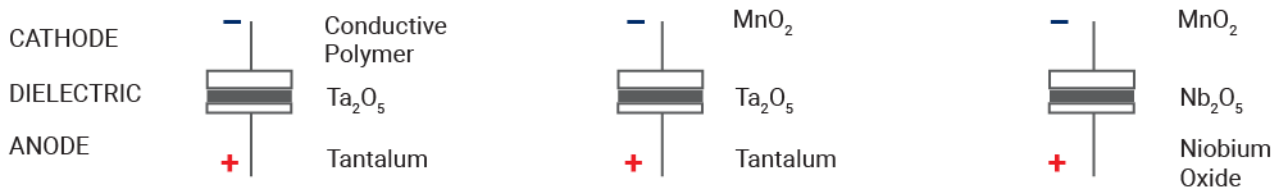
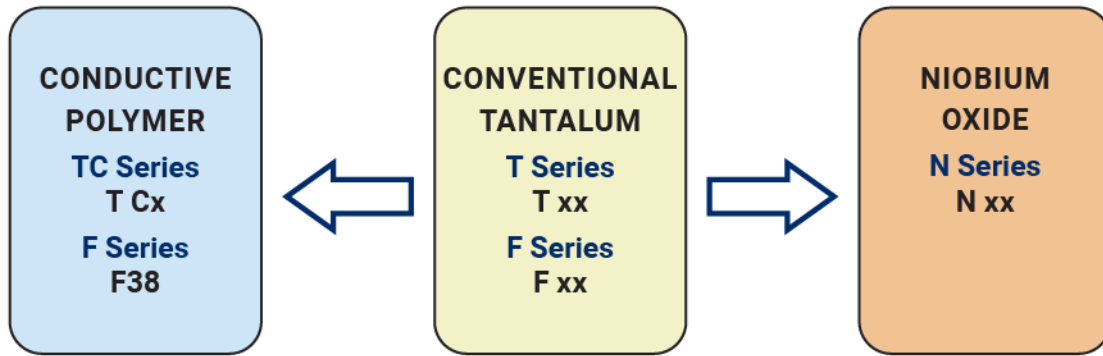
## QUALIFICATION TABLE

TEST	TRM professional multianode series (Temperature range -55°C to +125°C)									
	Condition			Characteristics						
<b>Endurance</b>	Apply rated voltage (Ur) at 85°C and / or category voltage (Uc) at 125°C for 2000 hours through a circuit impedance of $\leq 0.1\Omega/V$ . Stabilize at room temperature for 1-2 hours before measuring.			Visual examination	no visible damage					
				DCL	initial limit					
				$\Delta C/C$	within $\pm 10\%$ of initial value					
				DF	initial limit					
				ESR	1.25 x initial limit					
<b>Storage Life</b>	Store at 125°C, no voltage applied, for 2000 hours. Stabilize at room temperature for 1-2 hours before measuring.			Visual examination	no visible damage					
				DCL	1.25 x initial limit					
				$\Delta C/C$	within $\pm 10\%$ of initial value					
				DF	initial limit					
				ESR	1.25 x initial limit					
<b>Humidity</b>	Store at 65°C and 95% relative humidity for 500 hours, with no applied voltage. Stabilize at room temperature and humidity for 1-2 hours before measuring.			Visual examination	no visible damage					
				DCL	1.5 x initial limit					
				$\Delta C/C$	within $\pm 10\%$ of initial value					
				DF	1.2 x initial limit					
				ESR	1.25 x initial limit					
<b>Biased Humidity</b>	Apply rated voltage (Ur) at 85°C, 85% relative humidity for 1000 hours. Stabilize at room temperature and humidity for 1-2 hours before measuring.			Visual examination	no visible damage					
				DCL	2 x initial limit					
				$\Delta C/C$	within $\pm 10\%$ of initial value					
				DF	1.2 x initial limit					
				ESR	1.25 x initial limit					
<b>Temperature Stability</b>	Step	Temperature°C	Duration(min)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C
	1	+20	15							
	2	-55	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*
	3	+20	15	$\Delta C/C$	n/a	+0/-10%	$\pm 5\%$	+10/-0%	+12/-0%	$\pm 5\%$
	4	+85	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	5	+125	15							
	6	+20	15	ESR	1.25xIL*	2.5xIL*	1.25xIL*	1.25xIL*	1.25xIL*	1.25xIL*
<b>Surge Voltage</b>	Apply 1.3x category voltage (Uc) at 125°C for 1000 cycles of 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	initial limit					
				$\Delta C/C$	within $\pm 5\%$ of initial value					
				DF	initial limit					
				ESR	1.25 x initial limit					
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Condition F			Visual examination	no visible damage					
				DCL	initial limit					
				$\Delta C/C$	within $\pm 5\%$ of initial value					
				DF	initial limit					
				ESR	1.25 x initial limit					
<b>Vibration</b>	MIL-STD-202, Method 204, Condition D			Visual examination	no visible damage					
				DCL	initial limit					
				$\Delta C/C$	within $\pm 5\%$ of initial value					
				DF	initial limit					
				ESR	1.25 x initial limit					

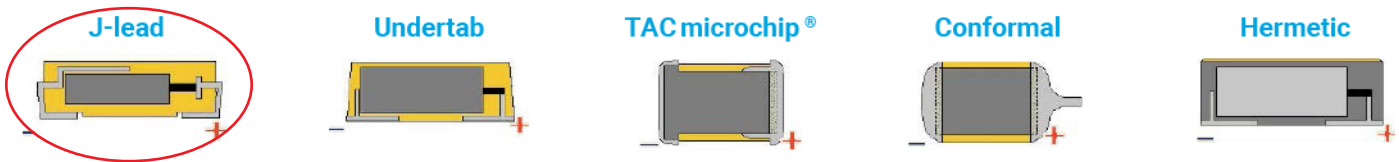
\*Initial Limit

# TRM Professional Multianode Tantalum Ultra Low ESR Capacitor

## SOLID ELECTROLYTIC CAPACITOR ROADMAP



## FIVE CAPACITOR CONSTRUCTION STYLES



## SERIES LINE UP : CONVENTIONAL SMD $MnO_2$

