

# 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
- CV range 4.7-1500µF / 2.5-50V
- “Mirror” construction used with D case capacitors reduces ESL to half
- Automotive, industrial and other higher end applications



SnPb termination option is not RoHS compliant.

### APPLICATIONS

- Automotive, Avionics and Industrial high power DC/DC converters



#### MULTIANODE CONSTRUCTION



#### MULTIANODE TPM D, Y LOW SELF INDUCTANCE CONSTRUCTION “MIRROR” DESIGN



### MARKING

#### D, E, U CASE



### CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W1±0.20 (0.008)	A+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)

W1 dimension applies to the termination width for A dimensional area only.

### HOW TO ORDER

TRM

Type

E

Case Size  
See table above

108

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

\*

Tolerance  
K = ±10%  
M = ±20%

004

Rated DC Voltage  
002 = 2.5Vdc  
004 = 4Vdc  
006 = 6.3Vdc  
010 = 10Vdc  
012 = 12Vdc  
016 = 16Vdc  
020 = 20Vdc  
025 = 25Vdc  
035 = 35Vdc  
050 = 50Vdc

R

Packaging  
R = Pure Tin 7" Reel  
S = Pure Tin 13" Reel  
H = Tin Lead 7" Reel (Contact Manufacturer)  
K = Tin Lead 13" Reel (Contact Manufacturer)  
H, K = Non RoHS

0023

ESR in mΩ

### TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C										
Capacitance Range:	4.7 µF to 1500 µF										
Capacitance Tolerance:	±10%; ±20%										
Rated Voltage (V <sub>R</sub> )	≤ +85°C:	2.5	4	6.3	10	12	16	20	25	35	50
Category Voltage (V <sub>C</sub> )	≤ +125°C:	1.7	2.7	4	7	8	10	13	17	23	33
Surge Voltage (V <sub>S</sub> )	≤ +85°C:	3.3	5.2	8	13	16	20	26	32	46	65
Surge Voltage (V <sub>S</sub> )	≤ +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 0.1Ω/V series impedance, 60% confidence level										
	Meets requirements of AEC-Q200										



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### 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)		
68	686										
100	107							E(35,45)			
150	157				D(45)		E(30,40)				
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. AVX reserves the right to supply higher voltage ratings in the same case size, to the same reliability standards.

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## Tantalum Ultra Low ESR Capacitor



### RATINGS & PART NUMBER REFERENCE

AVX Part No.	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
<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
<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 274.

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



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## 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	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	2	-55	15	$\Delta C/C$	n/a	+0/-10%	$\pm 5\%$	+10/-0%	+12/-0%	$\pm 5\%$	
	3	+20	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*	
	4	+85	15	ESR	1.25 x IL*	2.5 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	
	5	+125	15								
	6	+20	15								
<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



### AVX SOLID ELECTROLYTIC CAPACITOR ROADMAP



### FIVE CAPACITOR CONSTRUCTION STYLES



### SERIES LINE UP: CONVENTIONAL SMD $MnO_2$



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