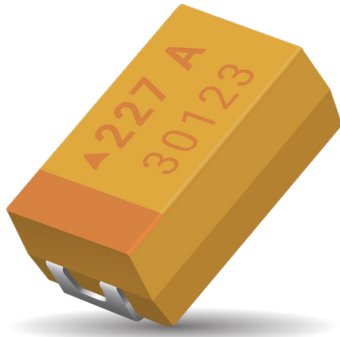


TRM Professional Multianode Tantalum Ultra Low ESR Capacitor



FEATURES

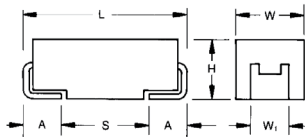
- Improved Reliability – 0.5%/1khrs (Twice Better than Standard)
- DCL Reduced by 25% to 0.0075 CV
- Robust Against Higher Thermo-mechanical Stresses During Assembly Process
- Multi-anode Construction
- Super Low ESR
- 100% Surge Current Tested
- CV Range 4.7-1500 μ F / 2.5-50V
- "Mirror" Construction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



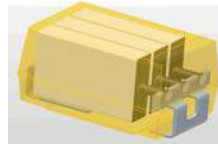
SnPb termination option is not RoHS compliant.

APPLICATIONS

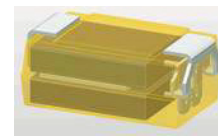
- Automotive, Avionics and Industrial High Power DC/DC Convertors



MULTIANODE CONSTRUCTION

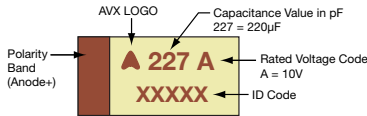


MULTIANODE TRM D LOW SELF INDUCTANCE CONSTRUCTION "MIRROR" DESIGN



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) |

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

HOW TO ORDER

| | | | | | | |
|------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| TRM | E | 108 | * | 004 | R | 0023 |
| Type | Case Size See table above | Capacitance Code pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow) | Tolerance K = \pm 10% M = \pm 20% | 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 | 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 | ESR in m Ω |

TECHNICAL SPECIFICATIONS

| | | | | | | | | | | | |
|------------------------------------|---------------------------------------------------------------------------------------------------------|-----|-----|-----|----|----|----|----|----|----|----|
| Technical Data: | All technical data relate to an ambient temperature of +25°C | | | | | | | | | | |
| Capacitance Range: | 4.7 μ F to 1500 μ F | | | | | | | | | | |
| Capacitance Tolerance: | \pm 10%; \pm 20% | | | | | | | | | | |
| Rated Voltage (V _R) | \leq +85°C: | 2.5 | 4 | 6.3 | 10 | 12 | 16 | 20 | 25 | 35 | 50 |
| Category Voltage (V _C) | \leq +125°C: | 1.7 | 2.7 | 4 | 7 | 8 | 10 | 13 | 17 | 23 | 33 |
| Surge Voltage (V _S) | \leq +85°C: | 3.3 | 5.2 | 8 | 13 | 16 | 20 | 26 | 32 | 46 | 65 |
| Surge Voltage (V _S) | \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 _R with 0.1 Ω /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 _R) 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. 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 | |
| 2.5 Volt @ 85°C | | | | | | | | | | | | | |
| 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 |
| 4 Volt @ 85°C | | | | | | | | | | | | | |
| 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 |
| 6.3 Volt @ 85°C | | | | | | | | | | | | | |
| 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 |
| 10 Volt @ 85°C | | | | | | | | | | | | | |
| 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 |
| 12 Volt @ 85°C | | | | | | | | | | | | | |
| TRME227*012#0035 | E | 220 | 12 | 85 | 8.4 | 125 | 19.8 | 6 | 35 | 2.777 | 2.500 | 1.111 | 3 |
| 16 Volt @ 85°C | | | | | | | | | | | | | |
| 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 |
| 20 Volt @ 85°C | | | | | | | | | | | | | |
| 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 |
| 25 Volt @ 85°C | | | | | | | | | | | | | |
| 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 |
| 35 Volt @ 85°C | | | | | | | | | | | | | |
| 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 |
| 50 Volt @ 85°C | | | | | | | | | | | | | |
| 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 259.

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



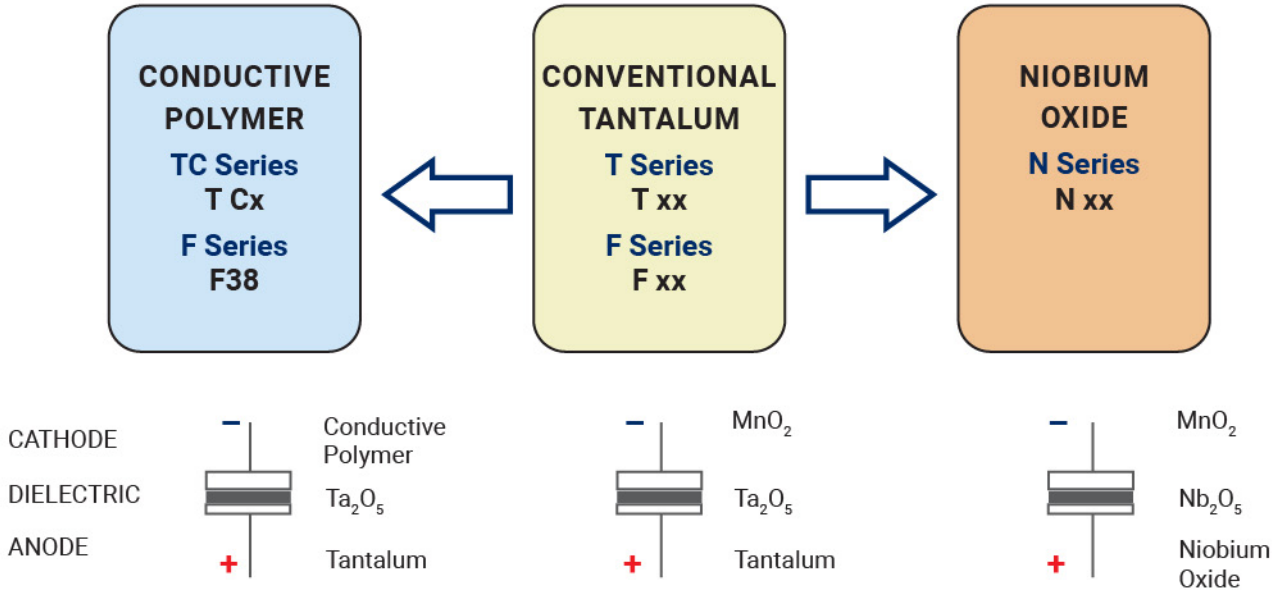
QUALIFICATION TABLE

| TEST | TRM professional multianode series (Temperature range -55°C to +125°C) | | | | | | | | | |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|--------------------|------------------------------------|-----------|-----------|-----------|------------|-----------|
| | Condition | | | Characteristics | | | | | | |
| Endurance | 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 | | | | | |
| Storage Life | 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 | | | | | |
| Humidity | 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 | | | | | |
| Biased Humidity | 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 | | | | | |
| Temperature Stability | 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* |
| Surge Voltage | 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 Ω | | | 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 | | | | | |
| Mechanical Shock | 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 | | | | | |
| Vibration | 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 | | | | | |

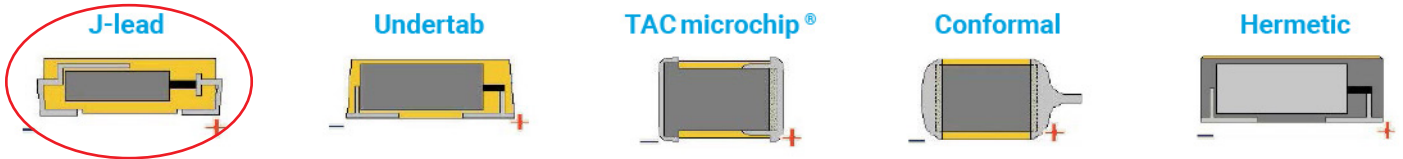
*Initial Limit

TRM Professional Multianode Tantalum Ultra Low ESR Capacitor

SOLID ELECTROLYTIC CAPACITOR ROADMAP



FIVE CAPACITOR CONSTRUCTION STYLES



SERIES LINE UP : CONVENTIONAL SMD MnO₂

