

TPM Multianode



Tantalum Ultra Low ESR Capacitor



FEATURES

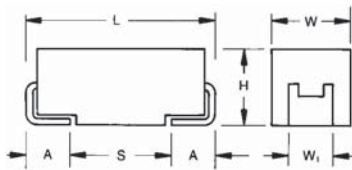
- Multi-anode construction
- Super low ESR
- CV range: 10-2200 μ F / 2.5-50V
- 4 case sizes available
- "Mirror" multi-anode construction used with D, Y case capacitors reduces ESL to half



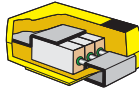
SnPb termination option is not RoHS compliant.

APPLICATIONS

- High power DC/DC general applications



MULTIANODE CONSTRUCTION

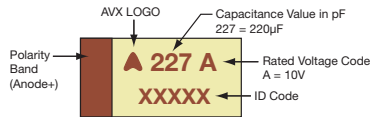


MULTIANODE TPM D, Y LOW SELF INDUCTANCE CONSTRUCTION "MIRROR" DESIGN



MARKING

D, E, V, Y 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 $_1$ \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) |
| V | 2924 | 7361-38 | 7.30 (0.287) | 6.10 (0.240) | 3.55 (0.140) | 3.10 (0.120) | 1.30 (0.051) | 4.40 (0.173) |
| Y | 2917 | 7343-20 | 7.30 (0.287) | 4.30 (0.169) | 2.00 (0.079) max | 2.40 (0.094) | 1.30 (0.051) | 4.40 (0.173) |

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

HOW TO ORDER

TPM

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)

M

Tolerance
K=±10%
M=±20%

004

Rated DC Voltage
002=2.5Vdc
004=4Vdc
006=6.3Vdc
010=10Vdc
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

0018

ESR in m Ω

TECHNICAL SPECIFICATIONS

| | | | | | | | | | | | |
|------------------------------------|---|-----|-----|-----|----|----|----|----|----|----|--|
| Technical Data: | All technical data relate to an ambient temperature of +25°C | | | | | | | | | | |
| Capacitance Range: | 10 μ F to 2200 μ F | | | | | | | | | | |
| Capacitance Tolerance: | \pm 10%, \pm 20% | | | | | | | | | | |
| Rated Voltage (V _R) | \leq +85°C: | 2.5 | 4 | 6.3 | 10 | 16 | 20 | 25 | 35 | 50 | |
| Category Voltage (V _C) | \leq +125°C: | 1.7 | 2.7 | 4 | 7 | 10 | 13 | 17 | 23 | 33 | |
| Surge Voltage (V _S) | \leq +85°C: | 3.3 | 5.2 | 8 | 13 | 20 | 26 | 32 | 46 | 65 | |
| Surge Voltage (V _S) | \leq +125°C: | 2.2 | 3.4 | 5 | 8 | 13 | 16 | 20 | 28 | 40 | |
| Temperature Range: | -55°C to +125°C | | | | | | | | | | |
| Reliability: | 1% per 1000 hours at 85°C, V _R with 0.1 Ω /V series impedance, 60% confidence level | | | | | | | | | | |



TPM 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) | 16V (C) | 20V (D) | 25V (E) | 35V (V) | 50V (T) |
| 6.8 | 685 | | | | | | | | | |
| 10 | 106 | | | | | | | | | D(140) E(120) |
| 15 | 156 | | | | | | | | | E(75,100) |
| 22 | 226 | | | | | | | | D(70) E(60,100) | E(75,100) |
| 33 | 336 | | | | | | | D(65) | E(50,65) | |
| 47 | 476 | | | | | D(100) | D(45,55) | D(55)/E(65) | E(55,65) | |
| 68 | 686 | | | | | D(40,50) | D(40,50) | E(45,55) | | |
| 100 | 107 | | | | Y(45) ^(M) | D(40,50) | E(35,45) | | | |
| 150 | 157 | | | | Y(45) ^(M) | E(30,40) | E(35) | | | |
| 220 | 227 | | | Y(30) ^(M) | D(35) | E(25,40) | | | | |
| 330 | 337 | | D(25,35) | D(25,35) | D(35) E(23,35) | E(50)* | | | | |
| 470 | 477 | | D(25,35) | D(30) E(18,23,30) | E(23,30) | | | | | |
| 680 | 687 | | D(25) E(18,23) | E(18,23) V(23) | | | | | | |
| 1000 | 108 | D(25) | D(25,45) E(18,23), V(18) | E(25) ^(M) V(20) ^(M) | | | | | | |
| 1500 | 158 | E(12,15,18) | E(15,18) | | | | | | | |
| 2200 | 228 | E(18) ^(M) | | | | | | | | |

Released codes ^(M tolerance only)

Engineering samples - please contact manufacturer

*Codes under development - subject to change

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

TPM Multianode



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 (µA) Max. | DF % Max. | ESR Max. (mΩ) @ 100kHz | MSL | 100kHz RMS Current (A) | | |
|------------------------|-----------|------------------|-------------------|------------------------|----------------------|---------------------------|---------------|-----------|------------------------|-----|------------------------|-------|-------|
| | | | | | | | | | | | 25°C | 85°C | 125°C |
| 2.5 Volt @ 85°C | | | | | | | | | | | | | |
| TPMD108*002#0025 | D | 1000 | 2.5 | 85 | 1.7 | 125 | 25 | 8 | 25 | 3 | 3.194 | 2.874 | 1.277 |
| TPME158*002#0012 | E | 1500 | 2.5 | 85 | 1.7 | 125 | 38 | 6 | 12 | 3 | 4.743 | 4.269 | 1.897 |
| TPME158*002#0015 | E | 1500 | 2.5 | 85 | 1.7 | 125 | 38 | 6 | 15 | 3 | 4.243 | 3.818 | 1.697 |
| TPME158*002#0018 | E | 1500 | 2.5 | 85 | 1.7 | 125 | 38 | 6 | 18 | 3 | 3.873 | 3.486 | 1.549 |
| TPME228M002#0018 | E | 2200 | 2.5 | 85 | 1.7 | 125 | 44 | 10 | 18 | 3 | 3.873 | 3.486 | 1.549 |
| 4 Volt @ 85°C | | | | | | | | | | | | | |
| TPMD337*004#0025 | D | 330 | 4 | 85 | 2.7 | 125 | 13.2 | 8 | 25 | 3 | 3.194 | 2.874 | 1.277 |
| TPMD337*004#0035 | D | 330 | 4 | 85 | 2.7 | 125 | 13.2 | 8 | 35 | 3 | 2.699 | 2.429 | 1.080 |
| TPMD477*004#0025 | D | 470 | 4 | 85 | 2.7 | 125 | 18.8 | 8 | 25 | 3 | 3.194 | 2.874 | 1.277 |
| TPMD477*004#0035 | D | 470 | 4 | 85 | 2.7 | 125 | 18.8 | 8 | 35 | 3 | 2.699 | 2.429 | 1.080 |
| TPMD687*004#0025 | D | 680 | 4 | 85 | 2.7 | 125 | 27.2 | 8 | 25 | 3 | 3.194 | 2.874 | 1.277 |
| TPME687*004#0018 | E | 680 | 4 | 85 | 2.7 | 125 | 27 | 6 | 18 | 3 | 3.873 | 3.486 | 1.549 |
| TPME687*004#0023 | E | 680 | 4 | 85 | 2.7 | 125 | 27 | 6 | 23 | 3 | 3.426 | 3.084 | 1.370 |
| TPMD108*004#0025 | D | 1000 | 4 | 85 | 2.7 | 125 | 40 | 8 | 25 | 3 | 3.194 | 2.874 | 1.277 |
| TPMD108*004#0045 | D | 1000 | 4 | 85 | 2.7 | 125 | 40 | 8 | 45 | 3 | 2.380 | 2.142 | 0.952 |
| TPME108*004#0018 | E | 1000 | 4 | 85 | 2.7 | 125 | 40 | 6 | 18 | 3 | 3.873 | 3.486 | 1.549 |
| TPME108*004#0023 | E | 1000 | 4 | 85 | 2.7 | 125 | 40 | 6 | 23 | 3 | 3.426 | 3.084 | 1.370 |
| TPMV108*004#0018 | V | 1000 | 4 | 85 | 2.7 | 125 | 40 | 6 | 18 | 3 | 3.979 | 3.581 | 1.592 |
| TPME158*004#0015 | E | 1500 | 4 | 85 | 2.7 | 125 | 40 | 6 | 15 | 3 | 4.243 | 3.818 | 1.697 |
| TPME158*004#0018 | E | 1500 | 4 | 85 | 2.7 | 125 | 40 | 6 | 18 | 3 | 3.873 | 3.486 | 1.549 |
| 6.3 Volt @ 85°C | | | | | | | | | | | | | |
| TPMY227M006#0030 | Y | 220 | 6.3 | 85 | 4 | 125 | 13.2 | 6 | 30 | 3 | 2.646 | 2.381 | 1.058 |
| TPMD337*006#0025 | D | 330 | 6.3 | 85 | 4 | 125 | 19.8 | 8 | 25 | 3 | 3.194 | 2.874 | 1.277 |
| TPMD337*006#0035 | D | 330 | 6.3 | 85 | 4 | 125 | 19.8 | 8 | 35 | 3 | 2.699 | 2.429 | 1.080 |
| TPMD477*006#0030 | D | 470 | 6.3 | 85 | 4 | 125 | 28.2 | 8 | 30 | 3 | 2.915 | 2.624 | 1.166 |
| TPME477*006#0018 | E | 470 | 6.3 | 85 | 4 | 125 | 28 | 6 | 18 | 3 | 3.873 | 3.486 | 1.549 |
| TPME477*006#0023 | E | 470 | 6.3 | 85 | 4 | 125 | 28 | 6 | 23 | 3 | 3.426 | 3.084 | 1.370 |
| TPME477*006#0030 | E | 470 | 6.3 | 85 | 4 | 125 | 28 | 6 | 30 | 3 | 3.000 | 2.700 | 1.200 |
| TPME687*006#0018 | E | 680 | 6.3 | 85 | 4 | 125 | 41 | 6 | 18 | 3 | 3.873 | 3.486 | 1.549 |
| TPME687*006#0023 | E | 680 | 6.3 | 85 | 4 | 125 | 41 | 6 | 23 | 3 | 3.426 | 3.084 | 1.370 |
| TPMV687*006#0023 | V | 680 | 6.3 | 85 | 4 | 125 | 41 | 6 | 23 | 3 | 3.520 | 3.168 | 1.408 |
| TPME108M006#0025 | E | 1000 | 6.3 | 85 | 4 | 125 | 63 | 8 | 25 | 3 | 3.286 | 2.958 | 1.315 |
| TPMV108M006#0020 | V | 1000 | 6.3 | 85 | 4 | 125 | 63 | 8 | 20 | 3 | 3.775 | 3.397 | 1.510 |
| 10 Volt @ 85°C | | | | | | | | | | | | | |
| TPMY107M010#0045 | Y | 100 | 10 | 85 | 7 | 125 | 10 | 8 | 45 | 3 | 2.160 | 1.944 | 0.864 |
| TPMY157M010#0045 | Y | 150 | 10 | 85 | 7 | 125 | 15 | 8 | 45 | 3 | 2.160 | 1.944 | 0.864 |
| TPMD227*010#0035 | D | 220 | 10 | 85 | 7 | 125 | 22 | 8 | 35 | 3 | 2.699 | 2.429 | 1.080 |
| TPMD337*010#0035 | D | 330 | 10 | 85 | 7 | 125 | 33 | 8 | 35 | 3 | 2.699 | 2.429 | 1.080 |
| TPME337*010#0023 | E | 330 | 10 | 85 | 7 | 125 | 33 | 6 | 23 | 3 | 3.426 | 3.084 | 1.370 |
| TPME337*010#0035 | E | 330 | 10 | 85 | 7 | 125 | 33 | 6 | 35 | 3 | 2.777 | 2.500 | 1.111 |
| TPME477*010#0023 | E | 470 | 10 | 85 | 7 | 125 | 47 | 6 | 23 | 3 | 3.426 | 3.084 | 1.370 |
| TPME477*010#0030 | E | 470 | 10 | 85 | 7 | 125 | 47 | 6 | 30 | 3 | 3.000 | 2.700 | 1.200 |
| 16 Volt @ 85°C | | | | | | | | | | | | | |
| TPMD476*016#0100 | D | 47 | 16 | 85 | 10 | 125 | 7.5 | 8 | 100 | 3 | 1.597 | 1.437 | 0.639 |
| TPMD686*016#0040 | D | 68 | 16 | 85 | 10 | 125 | 10.9 | 8 | 40 | 3 | 2.525 | 2.272 | 1.010 |
| TPMD686*016#0050 | D | 68 | 16 | 85 | 10 | 125 | 10.9 | 8 | 50 | 3 | 2.258 | 2.032 | 0.903 |
| TPMD107*016#0040 | D | 100 | 16 | 85 | 10 | 125 | 16 | 8 | 40 | 3 | 2.525 | 2.272 | 1.010 |
| TPMD107*016#0050 | D | 100 | 16 | 85 | 10 | 125 | 16 | 8 | 50 | 3 | 2.258 | 2.032 | 0.903 |
| TPME157*016#0030 | E | 150 | 16 | 85 | 10 | 125 | 24 | 6 | 30 | 3 | 3.000 | 2.700 | 1.200 |
| TPME157*016#0040 | E | 150 | 16 | 85 | 10 | 125 | 24 | 6 | 40 | 3 | 2.598 | 2.338 | 1.039 |
| TPME227*016#0025 | E | 220 | 16 | 85 | 10 | 125 | 35 | 6 | 25 | 3 | 3.286 | 2.958 | 1.315 |
| TPME227*016#0040 | E | 220 | 16 | 85 | 10 | 125 | 35 | 6 | 40 | 3 | 2.598 | 2.338 | 1.039 |
| 20 Volt @ 85°C | | | | | | | | | | | | | |
| TPMD476*020#0045 | D | 47 | 20 | 85 | 13 | 125 | 9.4 | 8 | 45 | 3 | 2.380 | 2.142 | 0.952 |
| TPMD476*020#0055 | D | 47 | 20 | 85 | 13 | 125 | 9.4 | 8 | 55 | 3 | 2.153 | 1.938 | 0.861 |
| TPME107*020#0035 | E | 100 | 20 | 85 | 13 | 125 | 20 | 6 | 35 | 3 | 2.777 | 2.500 | 1.111 |
| TPME107*020#0045 | E | 100 | 20 | 85 | 13 | 125 | 20 | 6 | 45 | 3 | 2.449 | 2.205 | 0.980 |
| TPME157*020#0035 | E | 150 | 20 | 85 | 13 | 125 | 30 | 10 | 35 | 3 | 2.777 | 2.500 | 1.111 |
| 25 Volt @ 85°C | | | | | | | | | | | | | |
| TPMD336*025#0065 | D | 33 | 25 | 85 | 17 | 125 | 8.3 | 8 | 65 | 3 | 1.981 | 1.783 | 0.792 |
| TPMD476*025#0055 | D | 47 | 25 | 85 | 17 | 125 | 11.8 | 8 | 55 | 3 | 2.153 | 1.938 | 0.861 |
| TPME476*025#0065 | E | 47 | 25 | 85 | 17 | 125 | 11.8 | 6 | 65 | 3 | 2.038 | 1.834 | 0.815 |
| TPME686*025#0045 | E | 68 | 25 | 85 | 17 | 125 | 17 | 6 | 45 | 3 | 2.449 | 2.205 | 0.980 |
| TPME686*025#0055 | E | 68 | 25 | 85 | 17 | 125 | 17 | 6 | 55 | 3 | 2.216 | 1.994 | 0.886 |
| 35 Volt @ 85°C | | | | | | | | | | | | | |
| TPMD226*035#0070 | D | 22 | 35 | 85 | 23 | 125 | 7.7 | 8 | 70 | 3 | 1.909 | 1.718 | 0.763 |
| TPME226*035#0060 | E | 22 | 35 | 85 | 23 | 125 | 8 | 6 | 60 | 3 | 2.121 | 1.909 | 0.849 |
| TPME226*035#0100 | E | 22 | 35 | 85 | 23 | 125 | 8 | 6 | 100 | 3 | 1.643 | 1.479 | 0.657 |
| TPME336*035#0050 | E | 33 | 35 | 85 | 23 | 125 | 12 | 6 | 50 | 3 | 2.324 | 2.091 | 0.930 |
| TPME336*035#0065 | E | 33 | 35 | 85 | 23 | 125 | 12 | 6 | 65 | 3 | 2.038 | 1.834 | 0.815 |

TPM Multianode



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 (µA) Max. | DF % Max. | ESR Max. (mΩ) @ 100kHz | MSL | 100kHz RMS Current (A) | | |
|-----------------------|-----------|------------------|-------------------|------------------------|----------------------|---------------------------|---------------|-----------|------------------------|-----|------------------------|-------|-------|
| | | | | | | | | | | | 25°C | 85°C | 125°C |
| TPME476*035#0055 | E | 47 | 35 | 85 | 23 | 125 | 16 | 6 | 55 | 3 | 2.216 | 1.994 | 0.886 |
| TPME476*035#0065 | E | 47 | 35 | 85 | 23 | 125 | 16 | 6 | 65 | 3 | 2.038 | 1.834 | 0.815 |
| 50 Volt @ 85°C | | | | | | | | | | | | | |
| TPMD106*050#0140 | D | 10 | 50 | 85 | 33 | 125 | 5 | 8 | 140 | 3 | 1.350 | 1.215 | 0.540 |
| TPME106*050#0120 | E | 10 | 50 | 85 | 33 | 125 | 5 | 6 | 120 | 3 | 1.500 | 1.350 | 0.600 |
| TPME156*050#0075 | E | 15 | 50 | 85 | 33 | 125 | 7.5 | 6 | 75 | 3 | 1.897 | 1.708 | 0.759 |
| TPME156*050#0100 | E | 15 | 50 | 85 | 33 | 125 | 7.5 | 6 | 100 | 3 | 1.643 | 1.479 | 0.657 |
| TPME226*050#0075 | E | 22 | 50 | 85 | 33 | 125 | 11 | 8 | 75 | 3 | 1.897 | 1.708 | 0.759 |
| TPME226*050#0100 | E | 22 | 50 | 85 | 33 | 125 | 11 | 8 | 100 | 3 | 1.643 | 1.479 | 0.657 |

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 220.

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

QUALIFICATION TABLE

| TEST | TPM series (Temperature range -55°C to +125°C) | | | | | | | | | | |
|-----------------------|---|---------------|---------------|--------------------|------------------------------|------------|-----------|------------|------------|------------|------------|
| | Condition | | | Characteristics | | | | | | | |
| Endurance | Determine after application of rated voltage for 2000 +48/-0 hours at 85±2°C and then leaving 1-2 hours at room temperature. Also determine of 125°C temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V. | | | Visual examination | no visible damage | | | | | | |
| | | | | DCL | initial limit | | | | | | |
| | | | | ΔC/C | within ±10% of initial value | | | | | | |
| | | | | DF | initial limit | | | | | | |
| | | | | ESR | 1.25 x initial limit | | | | | | |
| Humidity | Determine after storage without applied voltage at 65±2°C and 95±2% relative humidity for 500 hours and then recovery 1-2 hours at room temperature. | | | Visual examination | no visible damage | | | | | | |
| | | | | DCL | 1.5 x initial limit | | | | | | |
| | | | | ΔC/C | within ±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±2 | 15 | DCL | IL* | n/a | IL* | 10 x IL* | 12.5 x IL* | IL* | |
| | 2 | -55±0/-3 | 15 | | ΔC/C | n/a | +0/-10% | ±5% | +10/-0% | +12/-0% | ±5% |
| | 3 | +20±2 | 15 | DF | | IL* | 1.5 x IL* | IL* | 1.5 x IL* | 2 x IL* | IL* |
| | 4 | +85±3/-0 | 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±3/-0 | 15 | | | | | | | | |
| | 6 | +20±2 | 15 | | | | | | | | |
| Surge Voltage | Test temperature: 125°C±3/0°C Test voltage: Category voltage at 125°C Surge voltage: 1.3 x category voltage at 125°C Series protection resistance 1000±100Ω Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6 min; 30 sec charge, 5 min 30 sec discharge | | | Visual examination | no visible damage | | | | | | |
| | | | | DCL | initial limit | | | | | | |
| | | | | ΔC/C | within ±5% of initial value | | | | | | |
| | | | | DF | initial limit | | | | | | |
| | | | | ESR | 1.25 x initial limit | | | | | | |

*Initial Limit