

# TCM Series



## Conductive Polymer Solid Electrolytic Chip Multianode Capacitors



### FEATURES

- Conductive polymer electrode, multianode design
- Benign failure mode under recommended use conditions
- Extremely Low ESR
- 3x reflow 260°C compatible
- Volumetric efficiency
- High frequency capacitance retention



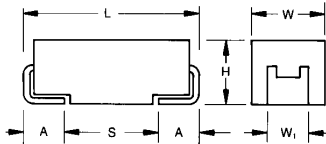
Elektra Award 2010



LEAD-FREE  
LEAD-FREE COMPATIBLE  
COMPONENT



SnPb termination option is not  
RoHS compliant.

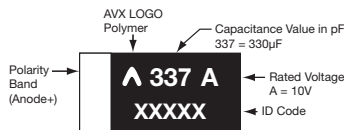


### APPLICATIONS

- Telecommunication routers
- Basestations with high power DC/DCs

### MARKING

#### E, V 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) | W <sub>1</sub> ±0.20 (0.008) | A+0.30 (0.012) -0.20 (0.008) | S Min.       |
|------|----------|------------|----------------|------------------------------|------------------------------|------------------------------|------------------------------|--------------|
| 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) |

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

### HOW TO ORDER

#### TCM

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  
M=±20%

#### 004

Rated DC Voltage  
002 = 2.5Vdc  
004 = 4Vdc  
006 = 6.3Vdc  
010 = 10Vdc  
016 = 16Vdc  
025 = 25Vdc  
035 = 35Vdc  
100 = 100Vdc

#### R

Packaging  
R = Pure Tin 7" Reel  
S = Pure Tin 13" Reel  
H = Tin Lead 7" Reel  
K = Tin Lead 13" Reel

#### 0010

ESR in mΩ

#### E

Additional Character  
E = Black resin

### TECHNICAL SPECIFICATIONS

|                        |                                                                                              |
|------------------------|----------------------------------------------------------------------------------------------|
| Technical Data:        | All technical data relate to an ambient temperature of +25°C                                 |
| Capacitance Range:     | 10µF to 1000µF                                                                               |
| Capacitance Tolerance: | ±20%                                                                                         |
| Leakage Current DCL:   | 0.1CV                                                                                        |
| Temperature Range:     | -55°C to +125°C                                                                              |
| Reliability:           | 1% per 1000 hours at 85°C, V <sub>R</sub> with 0.1Ω/V series impedance, 60% confidence level |
| Termination Finish:    | Sn Plating (standard) and SnPb Plating                                                       |

NOTE: Conductive Polymer Capacitors are designed to operate within the limits of the environmental conditions specified for each series. If operated continuously at their maximum temperature and / or humidity limit, or beyond these limits, capacitors may exhibit a parametric shift in capacitance and increases in ESR. These changes may occur earlier if the specified environmental conditions are exceeded. Similarly, their normal operational time period will be significantly extended if their general duty cycle includes operation below maximum temperature within humidity controlled environments. Careful attention should be paid to maximum temperature with associated high humidity environments as well as voltage derating, ripple current and current surges. Please reference the AVX Conductive Polymer Capacitor Guidelines for more information or contact factory for application assistance.

### 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)  | 16V (C) | 25V (E) | 35V (V) | 100V (A) |
| 10          | 106  |                                            |              |          |          |         |         |         | V(50)    |
| 22          | 226  |                                            |              |          |          |         |         | E(25)   |          |
| 33          | 336  |                                            |              |          |          |         | E(60)   | E(60)   |          |
| 47          | 476  |                                            |              |          |          |         | E(60)   |         |          |
| 68          | 686  |                                            |              |          |          |         |         |         |          |
| 100         | 107  |                                            |              |          |          |         |         |         |          |
| 150         | 157  |                                            |              |          |          |         |         |         |          |
| 220         | 227  |                                            |              |          |          | E(40)   |         |         |          |
| 330         | 337  |                                            |              | E(10,15) | E(10,15) |         |         |         |          |
| 470         | 477  |                                            |              | E(7,10)  |          |         |         |         |          |
| 680         | 687  |                                            | E(12)        | E(12)    |          |         |         |         |          |
| 1000        | 108  | E(6,10)                                    | E(6,8,10,12) |          |          |         |         |         |          |

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.

### RATINGS & PART NUMBER REFERENCE

| AVX Part No.            | Case Size | Capacitance (µF) | Rated Voltage (V) | Maximum Operating Temperature (°C) | DCL Max. (µA) | DF Max. (%) | ESR Max. @ 100kHz (mΩ) | 100kHz RMS Current (mA) |      |       | MSL |
|-------------------------|-----------|------------------|-------------------|------------------------------------|---------------|-------------|------------------------|-------------------------|------|-------|-----|
|                         |           |                  |                   |                                    |               |             |                        | 45°C                    | 85°C | 125°C |     |
| <b>2.5 Volt @ 105°C</b> |           |                  |                   |                                    |               |             |                        |                         |      |       |     |
| TCME108M002#0006E       | E         | 1000             | 2.5               | 125                                | 250           | 10          | 6                      | 8300                    | 5800 | 2100  | 3   |
| TCME108M002#0010E       | E         | 1000             | 2.5               | 125                                | 250           | 10          | 10                     | 6400                    | 4500 | 1600  | 3   |
| <b>4 Volt @ 105°C</b>   |           |                  |                   |                                    |               |             |                        |                         |      |       |     |
| TCME687M004#0012E       | E         | 680              | 4                 | 125                                | 272           | 8           | 12                     | 5800                    | 4100 | 1500  | 3   |
| TCME108M004#0006E       | E         | 1000             | 4                 | 125                                | 400           | 8           | 6                      | 8300                    | 5800 | 2100  | 3   |
| TCME108M004#0008E       | E         | 1000             | 4                 | 125                                | 400           | 8           | 8                      | 7200                    | 5000 | 1800  | 3   |
| TCME108M004#0010E       | E         | 1000             | 4                 | 125                                | 400           | 8           | 10                     | 6400                    | 4500 | 1600  | 3   |
| TCME108M004#0012E       | E         | 1000             | 4                 | 125                                | 400           | 8           | 12                     | 5800                    | 4100 | 1500  | 3   |
| <b>6.3 Volt @ 105°C</b> |           |                  |                   |                                    |               |             |                        |                         |      |       |     |
| TCME337M006#0010E       | E         | 330              | 6.3               | 125                                | 198           | 8           | 10                     | 6400                    | 4500 | 1600  | 3   |
| TCME337M006#0015E       | E         | 330              | 6.3               | 125                                | 198           | 8           | 15                     | 5200                    | 3600 | 1300  | 3   |
| TCME477M006#0007E       | E         | 470              | 6.3               | 125                                | 296           | 10          | 7                      | 7700                    | 5400 | 1900  | 3   |
| TCME477M006#0010E       | E         | 470              | 6.3               | 125                                | 296           | 10          | 10                     | 6400                    | 4500 | 1600  | 3   |
| TCME687M006#0012E       | E         | 680              | 6.3               | 125                                | 408           | 8           | 12                     | 5800                    | 4100 | 1500  | 3   |
| <b>10 Volt @ 105°C</b>  |           |                  |                   |                                    |               |             |                        |                         |      |       |     |
| TCME337M010#0010E       | E         | 330              | 10                | 125                                | 330           | 8           | 10                     | 6400                    | 4500 | 1600  | 3   |
| TCME337M010#0015E       | E         | 330              | 10                | 125                                | 330           | 8           | 15                     | 5200                    | 3600 | 1300  | 3   |
| <b>16 Volt @ 105°C</b>  |           |                  |                   |                                    |               |             |                        |                         |      |       |     |
| TCME227M016#0040E       | E         | 220              | 16                | 125                                | 352           | 8           | 40                     | 3200                    | 2200 | 800   | 3   |
| <b>25 Volt @ 105°C</b>  |           |                  |                   |                                    |               |             |                        |                         |      |       |     |
| TCME336M025#0060E       | E         | 33               | 25                | 125                                | 82.5          | 8           | 60                     | 2600                    | 1800 | 700   | 3   |
| TCME476M025#0060E       | E         | 47               | 25                | 125                                | 117.5         | 8           | 60                     | 2600                    | 1800 | 700   | 3   |
| <b>35 Volt @ 105°C</b>  |           |                  |                   |                                    |               |             |                        |                         |      |       |     |
| TCME226M035#0025E       | E         | 22               | 35                | 125                                | 77            | 8           | 25                     | 4000                    | 2800 | 1000  | 3   |
| TCME336M035#0060E       | E         | 33               | 35                | 125                                | 115.5         | 8           | 60                     | 2600                    | 1800 | 700   | 3   |
| <b>100 Volt @ 105°C</b> |           |                  |                   |                                    |               |             |                        |                         |      |       |     |
| TCMV106M100#0050E       | V         | 10               | 100               | 125                                | 100           | 8           | 50                     | 2900                    | 2000 | 700   | 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, 0.5RMS with DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

ESR allowed to move up to 1.25 times catalog limit post mounting.

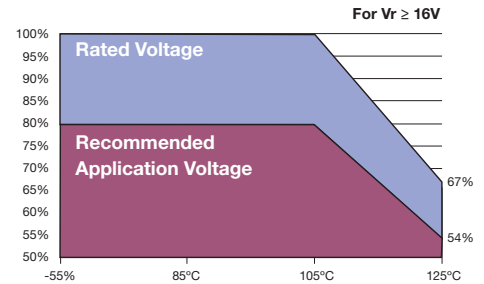
For typical weight and composition see page 269.

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

### RECOMMENDED DERATING FACTOR

Voltage and temperature derating as percentage of Vr.

| Rated voltage | Operating Temperature |       |       |
|---------------|-----------------------|-------|-------|
|               | ≤85°C                 | 105°C | 125°C |
| ≤10V          | 90%                   | 90%   | 60%   |
| ≥16V          | 80%                   | 80%   | 54%   |



### QUALIFICATION TABLE

| TCM series (Temperature range -55°C to +125°C) |                                                                                                                                                                                           |                    |                                  |      |       |           |       |           |            |       |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------|------|-------|-----------|-------|-----------|------------|-------|
| TEST                                           | Condition                                                                                                                                                                                 | Characteristics    |                                  |      |       |           |       |           |            |       |
| <b>Endurance</b>                               | Apply rated voltage (Ur) at 105°C and category voltage (Uc) at 125°C for 2000 hours through a circuit impedance of ≤0.1Ω/V. Stabilize at room temperature for 1-2 hours before measuring. | Visual examination | no visible damage                |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | DCL                | 1.25 x initial limit             |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | ΔC/C               | within ±20% of initial value     |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | DF                 | 1.5 x initial limit              |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | ESR                | 2 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                | 2 x initial limit                |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | ΔC/C               | within ±20% of initial value     |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | DF                 | 1.5 x initial limit              |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | ESR                | 2 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                | 3 x initial limit                |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | ΔC/C               | within +30/-20% of initial value |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | DF                 | 1.5 x initial limit              |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | ESR                | 2 x initial limit                |      |       |           |       |           |            |       |
| <b>Temperature Stability</b>                   | Step                                                                                                                                                                                      | Temperature°C      | Duration(min)                    |      |       |           |       |           |            |       |
|                                                | 1                                                                                                                                                                                         | +20                | 15                               |      | +20°C | -55°C     | +20°C | +85°C     | +125°C     | +20°C |
|                                                | 2                                                                                                                                                                                         | -55                | 15                               | DCL  | IL*   | n/a       | IL*   | 10 x IL*  | 12.5 x IL* | IL*   |
|                                                | 3                                                                                                                                                                                         | +20                | 15                               | ΔC/C | n/a   | +0/-20%   | ±10%  | +20/-0%   | +30/-0%    | ±10%  |
|                                                | 4                                                                                                                                                                                         | +85                | 15                               | DF   | IL*   | 1.5 x IL* | IL*   | 1.5 x IL* | 2 x IL*    | 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 1000Ω                      | Visual examination | no visible damage                |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | DCL                | initial limit                    |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | ΔC/C               | within +20/-30% of initial value |      |       |           |       |           |            |       |
|                                                |                                                                                                                                                                                           | DF                 | 1.25 x initial limit             |      |       |           |       |           |            |       |

\*Initial Limit

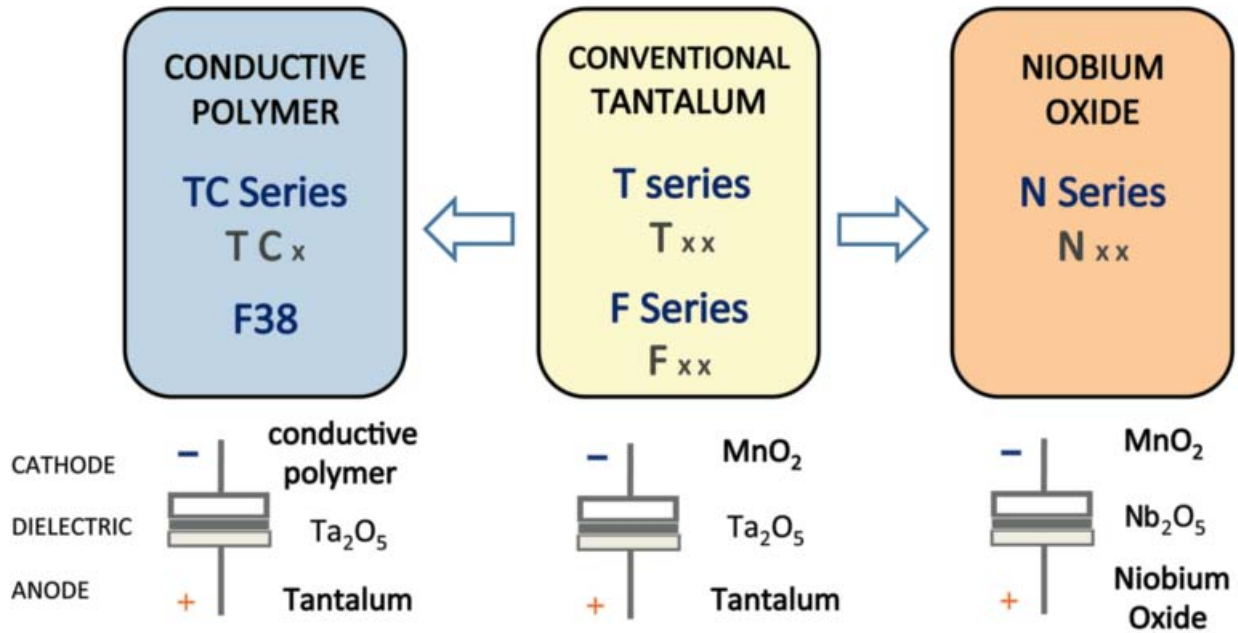
Initial measurement max. 1hr after the removal from dry pack or after pretreatment at 85°C for 24 hours.

# TCM Series

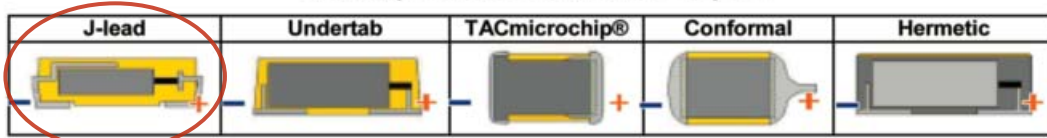


## Conductive Polymer Solid Electrolytic Chip Multianode Capacitors

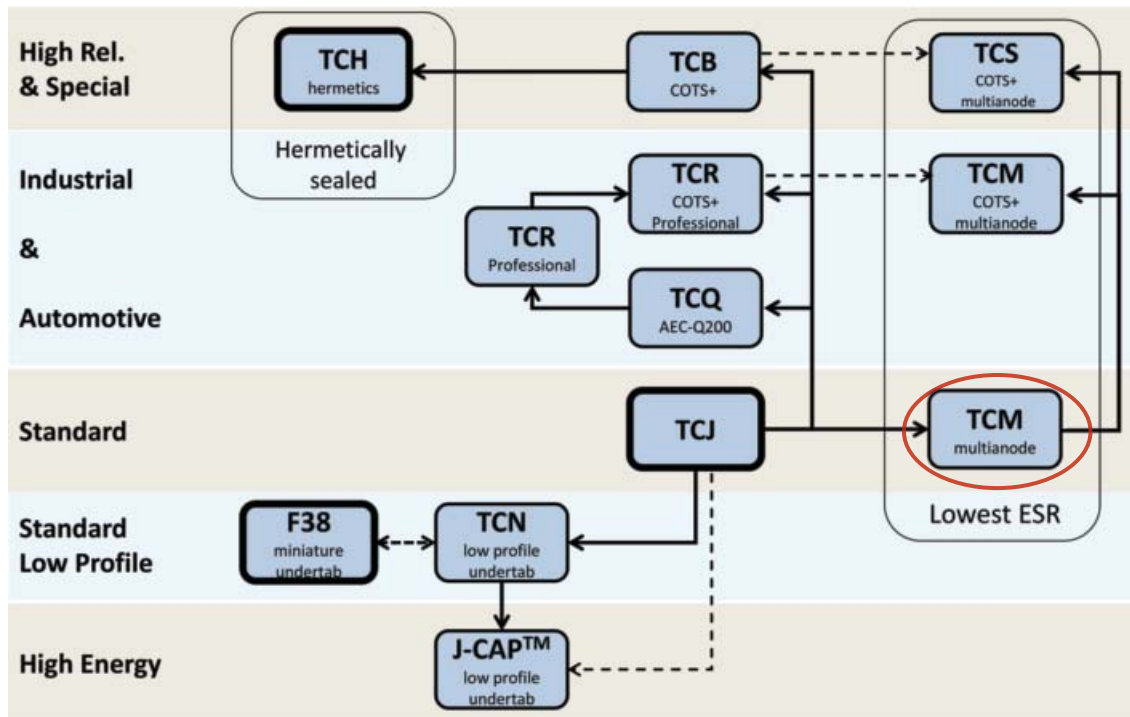
### AVX SOLID ELECTROLYTIC CAPACITOR ROADMAP



### Five Capacitor Construction Styles



### SERIES LINE UP: CONDUCTIVE POLYMER



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