

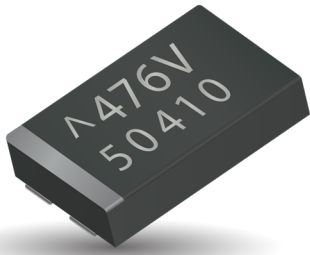


**THE DATASHEET OF
TCNT157M006R0200E**



TCN Series

Highest CV/CC Conductive Polymer Chip Capacitors Undertab

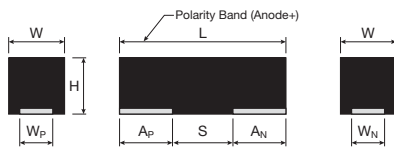


FEATURES

- Highest CV/cc in Broad Range of Low Profiles
- Conductive Polymer Electrode
- Benign Failure Mode Under Recommended use Conditions
- Lower ESR
- Undertab Terminations Layout:
 - » High Volumetric Efficiency
 - » High PCB Assembly Density
 - » High Capacitance in Smaller Dimensions
- 3x reflow cycles according to J-STD-020
- 100% Surge Current Tested
- 8 Case Sizes Available

APPLICATIONS

- Consumer Applications (e.g. Mobiles, MP3 etc.)
- Bulk Decoupling of SoC (System on Chip)

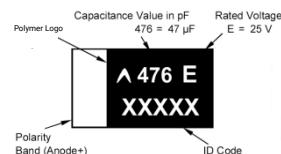


CASE DIMENSIONS millimeters (inches)

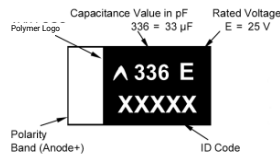
| Code | EIA Code | EIA Metric | L±0.20 (0.008) | W±0.20 (0.008) -0.10 (0.004) | H max. | W _P ±0.10 (0.004) | W _N ±0.10 (0.004) | A _P ±0.10 (0.004) | A _N ±0.10 (0.004) | S Min. |
|------|----------|------------|-----------------------------|------------------------------|--------------|------------------------------|------------------------------|------------------------------|------------------------------|--------------|
| H | 1210 | 3528-15 | 3.50 (0.138) | 2.80 (0.110) | 1.50 (0.059) | 2.50 (0.098) | 2.10 (0.083) | 1.15 (0.045) | 1.35 (0.053) | 1.00 (0.039) |
| L | 1210 | 3528-10 | 3.50 (0.138) | 2.80 (0.110) | 1.00 (0.039) | 2.50 (0.098) | 2.10 (0.083) | 1.15 (0.045) | 1.35 (0.053) | 1.00 (0.039) |
| T | 1210 | 3528-12 | 3.50 (0.138) | 2.80 (0.110) | 1.20 (0.047) | 2.50 (0.098) | 2.10 (0.083) | 1.15 (0.045) | 1.35 (0.053) | 1.00 (0.039) |
| X | 2917 | 7343-15 | 7.30 (0.287) | 4.30 (0.169) | 1.50 (0.059) | 3.25 (0.128) | 3.25 (0.128) | 2.00 (0.079) | 3.20 (0.126) | 2.10 (0.083) |
| Y | 2917 | 7343-20 | 7.30 (0.287) | 4.30 (0.169) | 2.00 (0.079) | 3.25 (0.128) | 3.25 (0.128) | 2.00 (0.079) | 3.20 (0.126) | 2.10 (0.083) |
| Z | 2917 | 7343-15 | 7.30 ± 0.30 (0.287 ± 0.012) | 4.30 ± 0.30 (0.169 ± 0.012) | 1.50 (0.059) | 2.40 (0.094) | 2.40 (0.094) | 1.30 ± 0.30 (0.051 ± 0.012) | 1.30 ± 0.30 (0.051 ± 0.012) | 4.40 (0.173) |
| 4 | 2924 | 7361-20 | 7.30 (0.287) | 6.10 (0.240) | 2.00 (0.079) | 4.75 (0.187) | 4.75 (0.187) | 2.00 (0.079) | 3.20 (0.126) | 2.10 (0.083) |
| 8 | 2924 | 7360-20 | 7.30 ± 0.30 (0.287 ± 0.012) | 6.00 ± 0.30 (0.236 ± 0.012) | 2.00 (0.079) | 4.45 (0.175) | 4.45 (0.175) | 1.60 ± 0.30 (0.063 ± 0.012) | 1.60 ± 0.30 (0.063 ± 0.012) | 3.80 (0.150) |

MARKING

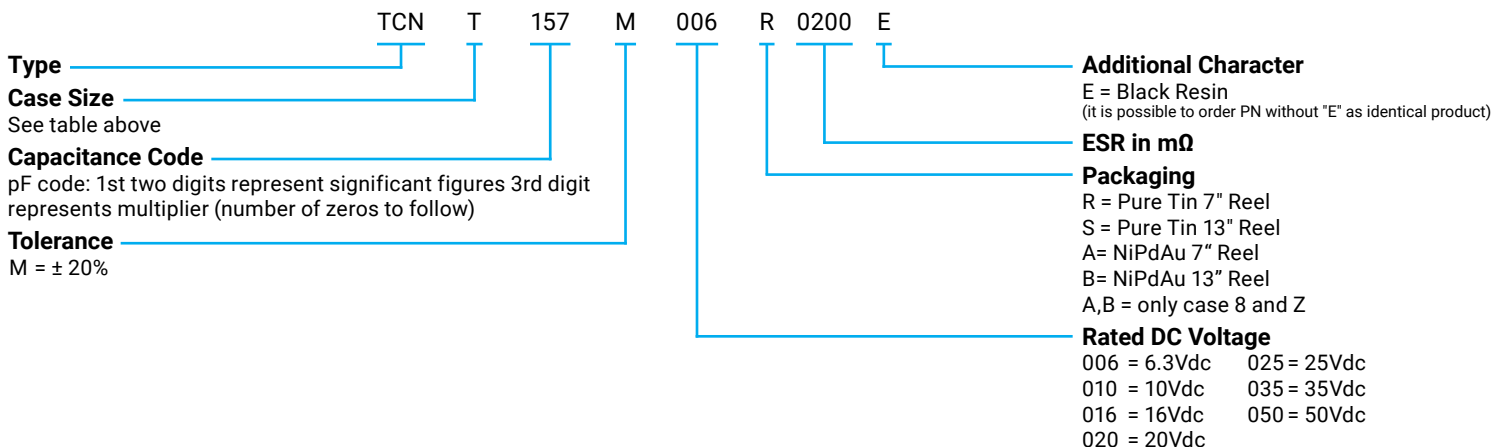
H, L, T, X, Y, Z CASE



4, 8 CASE



HOW TO ORDER



TCN Series

Highest CV/CC Conductive Polymer Chip Capacitors Undertab

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: | ±20% | | | | | | | | |
| Leakage Current DCL: | 0.1CV | | | | | | | | |
| Rated Voltage DC (V _R) | ≤ +85°C: | 6.3 | 10 | 16 | 20 | 25 | 35 | 50 | |
| Category Voltage (V _C) | ≤ +105°C: | 5 | 8 | 13 | 16 | 20 | 28 | 40 | |
| Surge Voltage (V _S) | ≤ +85°C: | 8 | 13 | 21 | 26 | 33 | 46 | 65 | |
| Surge Voltage (V _S) | ≤ +105°C: | 6 | 10 | 16 | 20 | 25 | 35 | 50 | |
| Temperature Range: | -55°C to +105°C | | | | | | | | |

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 KYOCERA 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 to 85°C / 0.66DC to 105°C | | | | | | | |
|-------------|------|--|---------|---------------|---------|-------------|-------------------|---------|---------|
| μF | Code | 6.3V (J) | 10V (A) | 16V (C) | 20V (D) | 25V (E) | 35V (V) | 40V (G) | 50V (T) |
| 4.7 | 475 | | | | | | T(200) | | |
| 10 | 106 | | | | | | T(150, 200) | | |
| 22 | 226 | | | | | T(200) | | | |
| 33 | 336 | | | L(200)/T(200) | | H(250) | | | 4(200) |
| 47 | 476 | | | T(150) | | X(100) | X(150)/Z(100,150) | Z(150) | |
| 68 | 686 | | | | | | Y(100,150) | | |
| 100 | 107 | | | | Z(100) | 4(100) | 4(100)/8(100) | | |
| 150 | 157 | T(200) | | X(100) | | 4(70)/8(70) | | | |
| 220 | 227 | | | 4(70) | 4(100) | 4(100) | | | |
| 330 | 337 | | | 4(70) | 4(100) | | | | |
| 470 | 477 | X(50) | | 4(70,100) | | | | | |
| 680 | 687 | | 4(70) | | | | | | |
| 1000 | 108 | X(200)/4(55) | | | | | | | |
| 1500 | 158 | 4(55) | | | | | | | |

Released ratings, (ESR ratings in mOhms in parentheses)

Engineering Samples - Please Contact KYOCERA AVX

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.

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RATINGS & PART NUMBER REFERENCE

| Part Number | Case Size | Capacitance (μF) | Rated Voltage (V) | Maximum Operating Temperature (°C) | DCL Max. (μA) | DF Max. (%) | ESR Max. @ 100kHz (mΩ) | 100kHz RMS Current (mA) | | | Product Category | MSL |
|-------------------|-----------|------------------|-------------------|------------------------------------|---------------|-------------|------------------------|-------------------------|------|-------|------------------|-----|
| | | | | | | | | 45°C | 85°C | 105°C | | |
| 6.3 Volt | | | | | | | | | | | | |
| TCNT157M006#0200E | T | 150 | 6.3 | 105 | 90 | 10 | 200 | 700 | 500 | 300 | 3 | 4 |
| TCNX477M006#0050E | X | 470 | 6.3 | 85 | 282 | 10 | 50 | 1900 | 1300 | - | 5 | 5 |
| TCNX108M006#0200E | X | 1000 | 6.3 | 85 | 600 | 30 | 200 | 900 | 600 | - | 5 | 5 |
| TCN4108M006#0055E | 4 | 1000 | 6.3 | 85 | 600 | 20 | 55 | 1860 | 1302 | - | 5 | 4 |
| TCN4158M006#0055E | 4 | 1500 | 6.3 | 85 | 900 | 20 | 55 | 1860 | 1302 | - | 5 | 4 |
| 10 Volt | | | | | | | | | | | | |
| TCN4687M010#0070E | 4 | 680 | 10 | 105 | 680 | 20 | 70 | 1650 | 1155 | 660 | 3 | 4 |
| 16 Volt | | | | | | | | | | | | |
| TCNL336M016#0200E | L | 33 | 16 | 85 | 52.8 | 6 | 200 | 700 | 500 | - | 5 | 5 |
| TCNT336M016#0200E | T | 33 | 16 | 105 | 52.8 | 6 | 200 | 700 | 500 | 300 | 3 | 4 |
| TCNT476M016#0150E | T | 47 | 16 | 105 | 75.2 | 6 | 150 | 800 | 600 | 400 | 3 | 4 |
| TCNX157M016#0100E | X | 150 | 16 | 105 | 240 | 6 | 100 | 1300 | 900 | 600 | 3 | 4 |
| TCN4227M016#0070E | 4 | 220 | 16 | 105 | 352 | 20 | 70 | 1650 | 1155 | 660 | 2 | 4 |
| TCN4337M016#0070E | 4 | 330 | 16 | 105 | 528 | 20 | 70 | 1650 | 1155 | 660 | 3 | 4 |
| TCN4477M016#0070E | 4 | 470 | 16 | 105 | 752 | 20 | 70 | 1650 | 1155 | 660 | 3 | 4 |
| TCN4477M016#0100E | 4 | 470 | 16 | 105 | 752 | 20 | 100 | 1380 | 966 | 552 | 3 | 4 |
| 20 Volt | | | | | | | | | | | | |
| TCNZ107M020#0100E | Z | 100 | 20 | 105 | 200 | 8 | 100 | 1300 | 900 | 600 | 3 | 4 |
| TCN4227M020#0100E | 4 | 220 | 20 | 85 | 440 | 10 | 100 | 1380 | 966 | - | 5 | 4 |
| TCN4337M020#0100E | 4 | 330 | 20 | 105 | 660 | 20 | 100 | 1380 | 966 | 552 | 3 | 4 |
| 25 Volt | | | | | | | | | | | | |
| TCNT226M025#0200E | T | 22 | 25 | 105 | 55 | 6 | 200 | 700 | 500 | 300 | 3 | 4 |
| TCNH336M025#0250E | H | 33 | 25 | 105 | 82.5 | 10 | 250 | 600 | 400 | 300 | 3 | 4 |
| TCNX476M025#0100E | X | 47 | 25 | 105 | 117.5 | 6 | 100 | 1300 | 900 | 600 | 2 | 5 |
| TCN4107M025#0100E | 4 | 100 | 25 | 105 | 250 | 6 | 100 | 1380 | 966 | 552 | 2 | 4 |
| TCN4157M025#0070E | 4 | 150 | 25 | 105 | 375 | 6 | 70 | 1650 | 1155 | 660 | 2 | 4 |
| TCN8157M025#0070E | 8 | 150 | 25 | 105 | 375 | 8 | 70 | 1650 | 1155 | 660 | 2 | 3 |
| TCN4227M025#0100E | 4 | 220 | 25 | 105 | 550 | 10 | 100 | 1380 | 966 | 552 | 3 | 4 |
| 35 Volt | | | | | | | | | | | | |
| TCNT475M035#0200E | T | 4.7 | 35 | 105 | 16.5 | 10 | 200 | 700 | 500 | 300 | 3 | 4 |
| TCNT106M035#0150E | T | 10 | 35 | 105 | 35 | 10 | 150 | 800 | 600 | 400 | 3 | 4 |
| TCNT106M035#0200E | T | 10 | 35 | 105 | 35 | 10 | 200 | 700 | 500 | 300 | 3 | 4 |
| TCNZ476M035#0100E | Z | 47 | 35 | 105 | 165 | 10 | 100 | 1300 | 900 | 600 | 3 | 4 |
| TCNX476M035#0150E | X | 47 | 35 | 105 | 165 | 10 | 150 | 1100 | 800 | 500 | 3 | 4 |
| TCNZ476M035#0150E | Z | 47 | 35 | 105 | 165 | 10 | 150 | 1100 | 800 | 500 | 3 | 4 |
| TCNY686M035#0100E | Y | 68 | 35 | 105 | 238 | 10 | 100 | 1400 | 1000 | 600 | 3 | 4 |
| TCNY686M035#0150E | Y | 68 | 35 | 105 | 238 | 10 | 150 | 1100 | 800 | 500 | 3 | 4 |
| TCN4107M035#0100E | 4 | 100 | 35 | 105 | 350 | 10 | 100 | 1380 | 966 | 552 | 2 | 3 |
| TCN8107M035#0100E | 8 | 100 | 35 | 105 | 350 | 10 | 100 | 1380 | 966 | 552 | 2 | 3 |
| 40 Volt | | | | | | | | | | | | |
| TCNZ476M040#0150E | Z | 47 | 40 | 105 | 188 | 10 | 150 | 1100 | 800 | 500 | 3 | 4 |
| 50 Volt | | | | | | | | | | | | |
| TCN4336M050#0200E | 4 | 33 | 50 | 85 | 165 | 12 | 200 | 970 | 679 | - | 5 | 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.

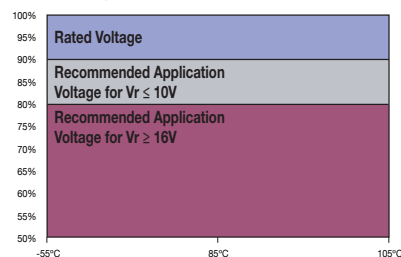
ESR allowed to move up to 1.25 times catalog limit post mounting. For typical weight and composition see page 253.

NOTE: KYOCERA AVX reserves the right to supply higher voltage ratings in the same case size to the same reliability standards.

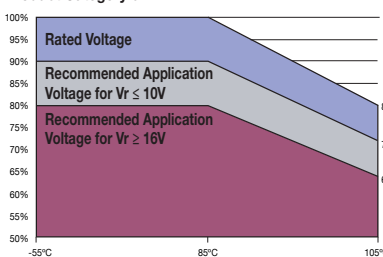
RECOMMENDED DERATING FACTOR

Voltage and temperature derating as percentage of Vr

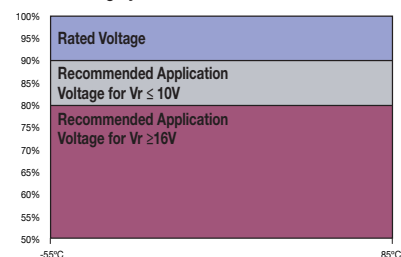
Product Category 2



Product Category 3



Product Category 5



TCN Series

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PRODUCT CATEGORY 2, 3 (TEMPERATURE RANGE -55°C TO +105°C)

| TEST | Condition | | | Characteristics | | | | | | |
|------------------------------|--|---------------|---------------|------------------------|--|-----------|-----------|-----------|------------|-----------|
| Endurance | Apply rated voltage (Ur) at 85°C for 2000 hours through a circuit impedance of $\leq 0.1\Omega/V$ (all CATEGORIES). And / or apply rated voltage (Ur) (CATEGORY 2) or 0.8x rated voltage (CATEGORY 3) at 105°C for 2000 hours through a circuit impedance of $\leq 0.1\Omega/V$. Always 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 $\pm 20\%$ of initial value | | | | | |
| | | | | DF | 1.5 x initial limit | | | | | |
| | | | | ESR | 2 x initial limit | | | | | |
| Storage Life | Store at 105°C, no voltage applied, for 2000 hours. Stabilize at room temperature for 1-2 hours before measuring. | | | Visual examination | no visible damage | | | | | |
| | | | | DCL ($V_R \leq 75V$) | 1.25 x initial limit | | | | | |
| | | | | DCL ($V_R > 75V$) | 2 x initial limit | | | | | |
| | | | | $\Delta C/C$ | within $\pm 20\%$ of initial value | | | | | |
| | | | | DF | 1.5 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 | 3 x initial limit | | | | | |
| | | | | $\Delta C/C$ | within +30/-20% of initial value | | | | | |
| | | | | DF | 1.5 x initial limit | | | | | |
| | | | | ESR | 2 x initial limit | | | | | |
| Temperature Stability | Step | Temperature°C | Duration(min) | | +20°C | -55°C | +20°C | +85°C | +105°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/-20% | $\pm 5\%$ | +20/-0% | +30/-0% | $\pm 5\%$ |
| | 4 | +85 | 15 | DF | IL* | 1.5 x IL* | IL* | 1.5 x IL* | 2 x IL* | IL* |
| | 5 | +105 | 15 | | | | | | | |
| | 6 | +20 | 15 | | | | | | | |
| Surge Voltage | Apply 1.3x rated voltage (Ur) at 105°C for CATEGORY 2, or apply 1.3x 0.8x rated voltage (Ur) at 105°C for CATEGORY 3 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 +10/-20% of initial value for $V_R \leq 10V$ within +20/-30% of initial value for $V_R \geq 16V$ | | | | | |
| | | | | DF | 1.25 x initial limit | | | | | |
| Mechanical Shock | MIL-STD-202, Method 213, Condition C | | | 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

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

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PRODUCT CATEGORY 5 (TEMPERATURE RANGE -55°C TO +85°C)

| TEST | Condition | | | Characteristics | | | | | | |
|------------------------------|--|---------------|---------------|--------------------|--|-----------|-----------|-----------|-----------|--|
| Endurance | Apply rated voltage (Ur) at 85°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 | 1.25 x initial limit | | | | | |
| | | | | $\Delta C/C$ | within $\pm 20\%$ of initial value | | | | | |
| | | | | DF | 1.5 x initial limit | | | | | |
| | | | | ESR | 2 x initial limit | | | | | |
| Storage Life | Store at 85°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 $\pm 20\%$ of initial value | | | | | |
| | | | | DF | 1.5 x initial limit | | | | | |
| | | | | ESR | 2 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 | 5 x initial limit | | | | | |
| | | | | $\Delta C/C$ | within +40/-20% of initial value | | | | | |
| | | | | DF | 1.5 x initial limit | | | | | |
| | | | | ESR | 2 x initial limit | | | | | |
| Temperature Stability | Step | Temperature°C | Duration(min) | | | | | | | |
| | 1 | +20 | 15 | | | | | | | |
| | 2 | -55 | 15 | DCL | IL* | n/a | IL* | 10 x IL* | IL* | |
| | 3 | +20 | 15 | $\Delta C/C$ | n/a | +0/-20% | $\pm 5\%$ | +20/-0% | $\pm 5\%$ | |
| | 4 | +85 | 15 | DF | IL* | 1.5 x IL* | IL* | 1.5 x IL* | IL* | |
| | 5 | +20 | 15 | | | | | | | |
| Surge Voltage | Apply 1.3x rated voltage (Ur) at 85°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 +10/-20% of initial value for Vr $\leq 10V$ within +20/-30% of initial value for Vr $\geq 16V$ | | | | | |
| | | | | DF | 1.25 x initial limit | | | | | |
| Mechanical Shock | MIL-STD-202, Method 213, Condition C | | | 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 | | | | | |

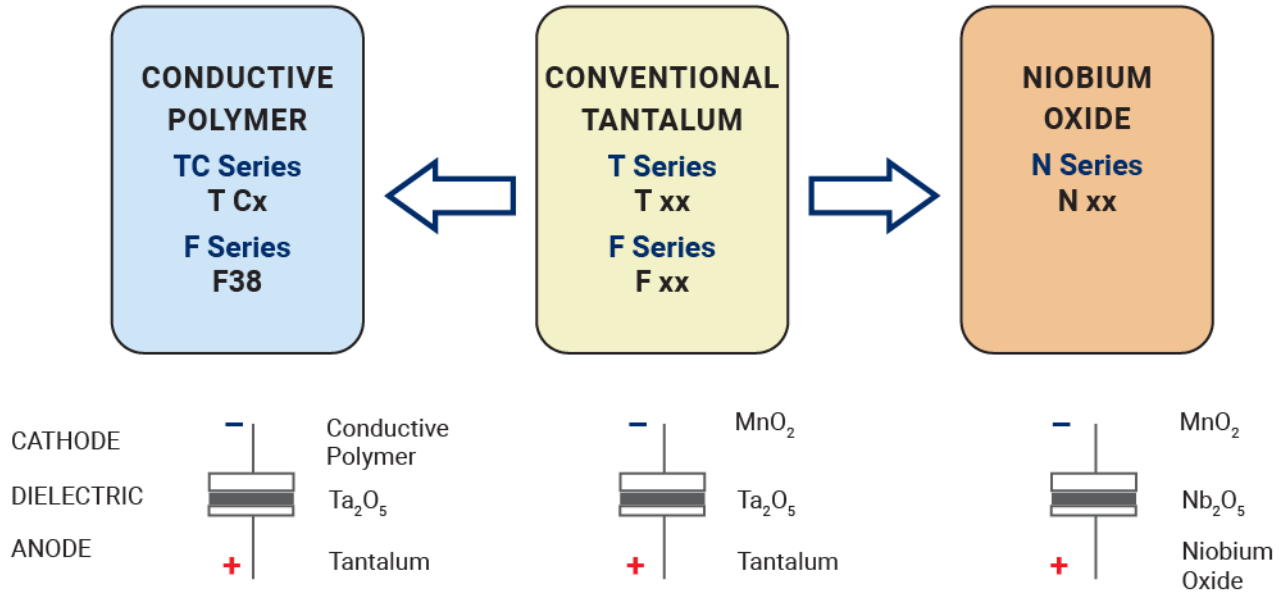
*Initial Limit

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

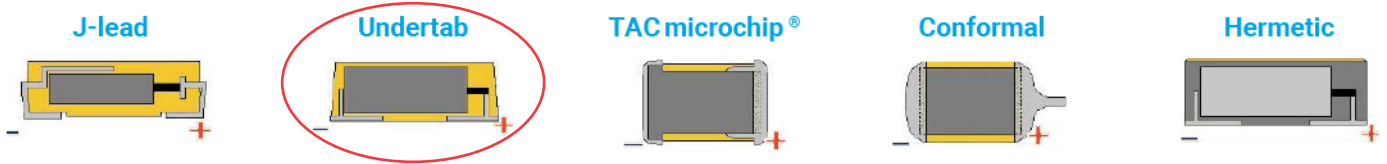
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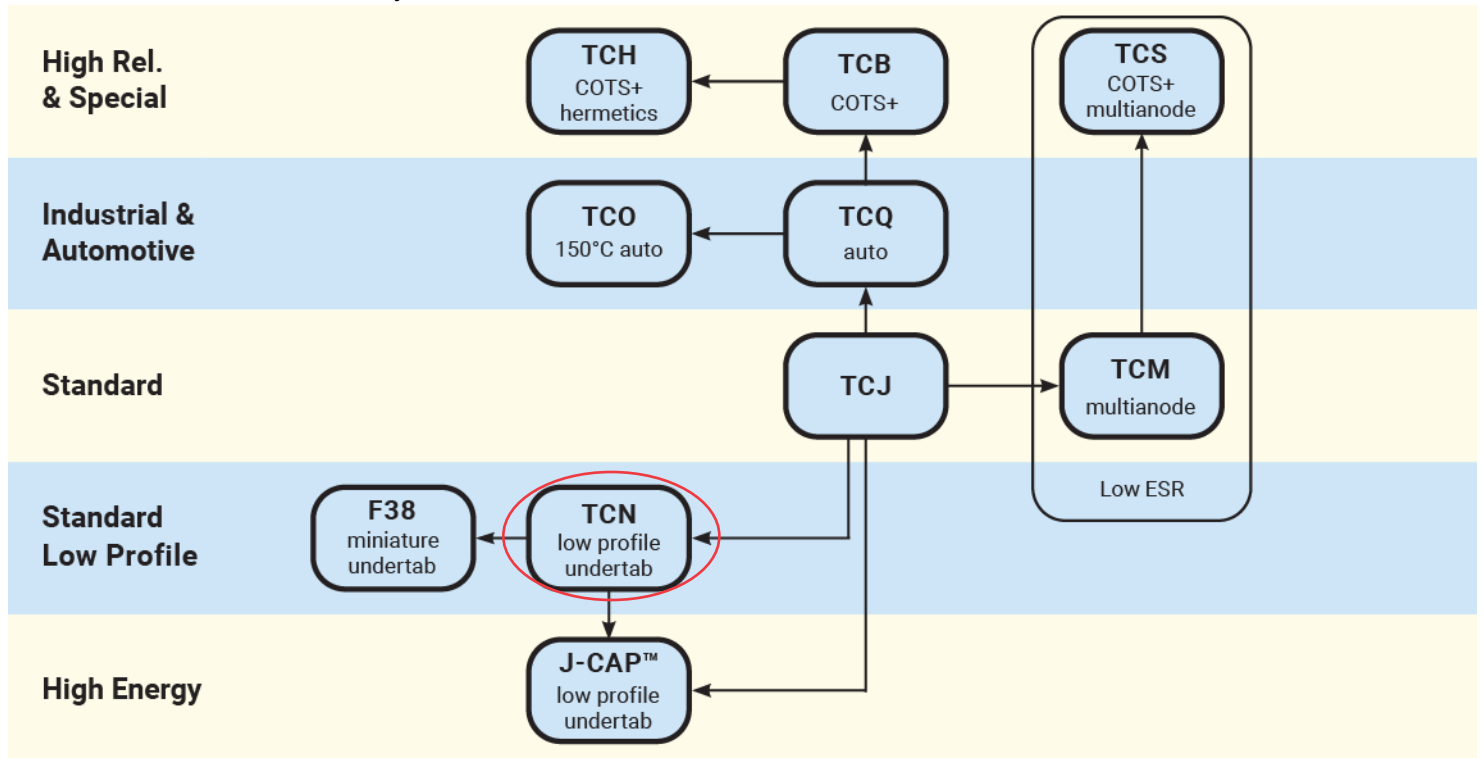
SOLID ELECTROLYTIC CAPACITOR ROADMAP



FIVE CAPACITOR CONSTRUCTION STYLES



SERIES LINE UP : Conductive Polymer



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 [AVX Corp/Kyocera Corp](#) Information

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-  Shortage Management
-  Alternative Solution
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