# TLN Series

## Tantalum Solid Electrolytic Chip Capacitors - Undertab Series


### FEATURES

- Undertab Terminations Layout:
  - High Volumetric Efficiency
  - High PCB Assembly Density
  - High Capacitance in Smaller Dimensions
- 3x Reflow 260°C Compatible
- 100% Surge Current Tested
- Consumer Applications (e.g. PCMCIA/USB Wireless Express Cards, Mobiles, MP3 etc.)
- 3 Case Sizes Available
- CV Range: 47-220µF / 4-10V

LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

### APPLICATIONS

- Mobile Phones
- Tablets
- MP3/4 Players

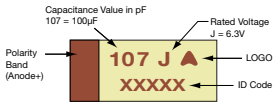
### CASE DIMENSIONS:

millimeters (inches)

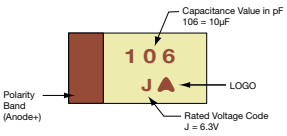
| Code | EIA Code | EIA Metric | L±0.20 (0.008) | W+0.20 (0.008) -0.10 (0.004) | H max. | $W_P$±0.10 (0.004) | $W_N$±0.10 (0.004) | $A_P$±0.10 (0.004) | $A_N$±0.10 (0.004) | S Min. |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 0805 | 2012-09 | 2.05 (0.081) | 1.30 (0.051) | 0.90 (0.035) | 1.00 (0.039) | 1.00 (0.039) | 0.85 (0.033) | 0.85 (0.033) | 0.40 (0.016) |
| N | 0805 | 2012-10 | 2.05 (0.081) | 1.30 (0.051) | 1.00 (0.039) | 1.00 (0.039) | 1.00 (0.039) | 0.85 (0.033) | 0.85 (0.033) | 0.40 (0.016) |
| 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) |

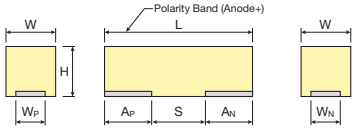
### MARKING

#### T, CASE




#### M, N CASE




### HOW TO ORDER

| TLN | N | 107 | M | 004 | R | 5200 |
|---|---|---|---|---|---|---|
| **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** M = ±20% | **Rated DC Voltage** 004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc | **Packaging** R = Pure Tin 7" Reel S = Pure Tin 13" Reel | **ESR in mΩ** |

### TECHNICAL SPECIFICATIONS

| | | | | | |
|---|---|---|---|---|---|
| Technical Data: | | All technical data relate to an ambient temperature of +25°C | | | |
| Capacitance Range: | | 47 µF to 220 µF | | | |
| Capacitance Tolerance: | | ±20% | | | |
| Rated Voltage ($V_R$) | -55°C ≤ +40°C: | 4 | 6.3 | 10 | |
| Category Voltage ($V_C$) | at 85°C: | 2 | 3.2 | 5 | |
| Category Voltage ($V_C$) | at 125°C: | 0.8 | 1.3 | 2 | |
| Temperature Range: | | -55°C to +125°C with category voltage | | | |
| Reliability: | | 0.2% per 1000 hours at 85°C, 0.5x$V_R$ with 0.1Ω/V series impedance with 60% confidence level | | | |

### CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

| Capacitance | | Rated Voltage DC to 40°C / 0.5DC to 85°C/ 0.2DC to 125°C | | |
|---|---|---|---|---|
| µF | Code | 4V (G) | 6.3V (J) | 10V (A) |
| 47 | 476 | | | M(6000)/N(6000) |
| 100 | 107 | N(5200) | | |
| 150 | 157 | | | T(1500) |
| 220 | 227 | T(1500) | T(1500) | T(1300) |

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.

### RATINGS & PART NUMBER REFERENCE

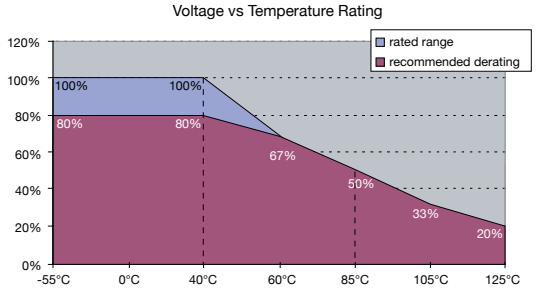
| Part Number | Case Size | Capacitance (µF) | Rated Voltage (V) | Rated Temperature (°C) | Category Voltage (V) | Category Temperature (°C) | Maximum Surge Current (A) | DCL Max. (µA) | ESR Max. @ 100kHz (mΩ) | 100kHz RMS Current (mA) | | | MSL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 25°C | 85°C | 125°C | |
| **4 Volt @ 40°C** | | | | | | | | | | | | | |
| TLNN107M004#5200 | N | 100 | 4 | 40 | 0.8 | 125 | 0.4 | 20 | 5200 | 88 | 79 | 35 | 3 |
| TLNT227M004#1500 | T | 220 | 4 | 40 | 0.8 | 125 | 1.0 | 17.6 | 1500 | 216 | 194 | 86 | 3 |
| **6.3 Volt @ 40°C** | | | | | | | | | | | | | |
| TLNT227M006#1500 | T | 220 | 6.3 | 40 | 1.3 | 125 | 1.6 | 26.4 | 1500 | 216 | 194 | 86 | 3 |
| **10 Volt @ 40°C** | | | | | | | | | | | | | |
| TLNM476M010#6000 | M | 47 | 10 | 40 | 2 | 125 | 0.8 | 9.4 | 6000 | 82 | 73 | 33 | 3 |
| TLNN476M010#6000 | N | 47 | 10 | 40 | 2 | 125 | 0.8 | 9.4 | 6000 | 82 | 73 | 33 | 3 |
| TLNT157M010#1500 | T | 150 | 10 | 40 | 2 | 125 | 2.6 | 30 | 1500 | 216 | 194 | 86 | 3 |
| TLNT227M010#1300 | T | 220 | 10 | 40 | 2 | 125 | 2.9 | 44 | 1300 | 232 | 209 | 93 | 3 |

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.
All technical data relates to an ambient temperature of +25°C. Capacitance is measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts.
DCL is measured at rated voltage after 5 minutes.
ESR allowed to move up to 1.25 times catalogue limit post mounting
DCL allowed to move up to 2.00 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.**

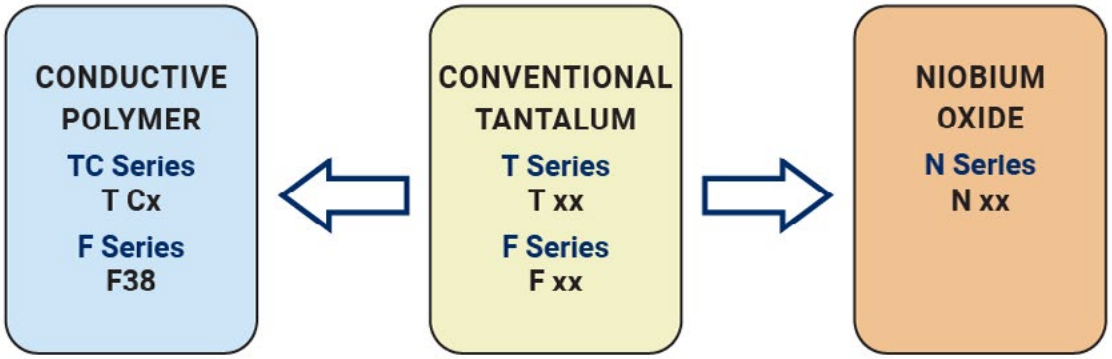
### QUALIFICATION TABLE

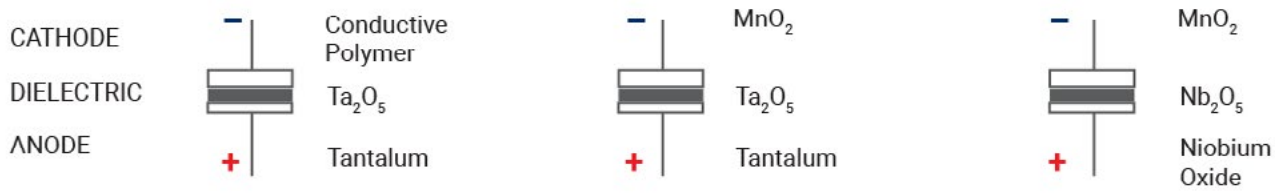
| TEST | TLN series (Temperature range -55°C to +125°C) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Condition | | | Characteristics | | | | |
| Endurance | Apply rated voltage (Ur) at 40°C and / or category voltage (Uc) at 85°C for 2000 hours through a circuit impedance of ≤0.1Ω/V. Stabilize at room temperature for 1-2 hours before measuring. | | | Visual examination | no visible damage | | | |
| | | | | DCL | 2 x initial limit | | | |
| | | | | ΔC/C | within +5/-30% of initial value | | | |
| | | | | ESR | 1.25 x initial limit | | | |
| Humidity | Store at 65°C and 90-95% 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 | 2 x initial limit | | | |
| | | | | ΔC/C | within ±10% of initial value | | | |
| | | | | 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 | DCL | 2 x IL* | n/a | 2 x IL* | 20 x IL* | 25 x IL* | 2 x IL* |
| | 2 | -55 | 15 | ΔC/C | n/a | +5/-20% | ±10% | +20/-0% | +25/-0% | ±10% |
| | 3 | +20 | 15 | ESR | 1.25 x IL* | 2.5 x IL* | 1.25 x IL* | 1.25 x IL* | 1.25 x IL* | 1.25x IL* |
| | 4 | +85 | 15 | | | | | | | |
| | 5 | +125 | 15 | | | | | | | |
| | 6 | +20 | 15 | | | | | | | |
| Surge Voltage | Apply 1.3x rated voltage (Ur) at 40°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 | 2 x initial limit | | | |
| | | | | ΔC/C | within ±5% of initial value | | | |
| | | | | ESR | 1.25 x initial limit | | | |
| Mechanical Shock | MIL-STD-202, Method 213, Condition C | | | Visual examination | no visible damage | | | |
| | | | | DCL | initial limit | | | |
| | | | | ΔC/C | within ±5% of initial value | | | |
| | | | | DF | initial limit | | | |
| | | | | ESR | initial limit | | | |
| Vibration | MIL-STD-202, Method 204, Condition D | | | Visual examination | no visible damage | | | |
| | | | | DCL | initial limit | | | |
| | | | | ΔC/C | within ±5% of initial value | | | |
| | | | | DF | initial limit | | | |
| | | | | ESR | initial limit | | | |

*Initial Limit

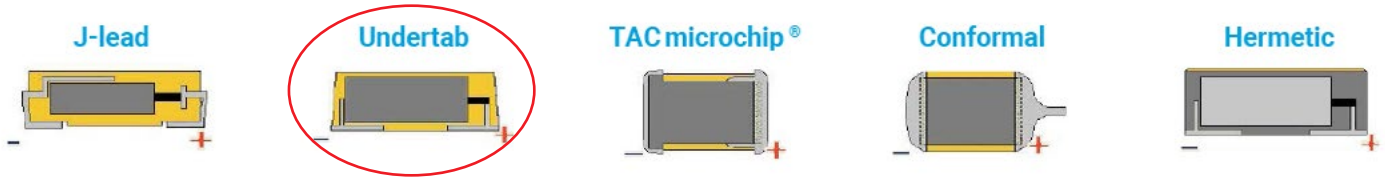


### SOLID ELECTROLYTIC CAPACITOR ROADMAP




### FIVE CAPACITOR CONSTRUCTION STYLES




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