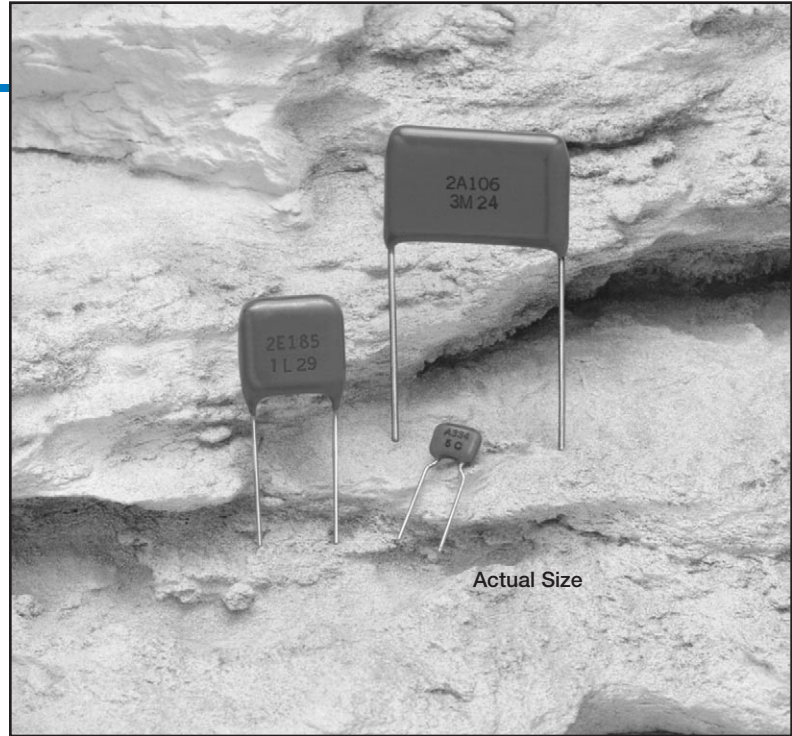


- **Y5U Ceramic**
- **Radial Lead**
- **High CV**
- **+125°C
Maximum
Temperature**



The TCD series are radial lead ceramic capacitors from UCC/NCC. These capacitors have a very low ESR and impedance which makes these capacitors ideal for filtering switching power supplies and DC-DC converters. The TCD series has a maximum 250VDC rated voltage making them more applicable for use in higher voltage power supplies than our ceramic chip capacitors. All of our radial capacitors with 5mm lead spacing are also available with ammo pack taping.

Refer to Mini-Glossary at the end of the multilayer ceramic capacitors section for additional technical information and specifications.

Summary of Specifications

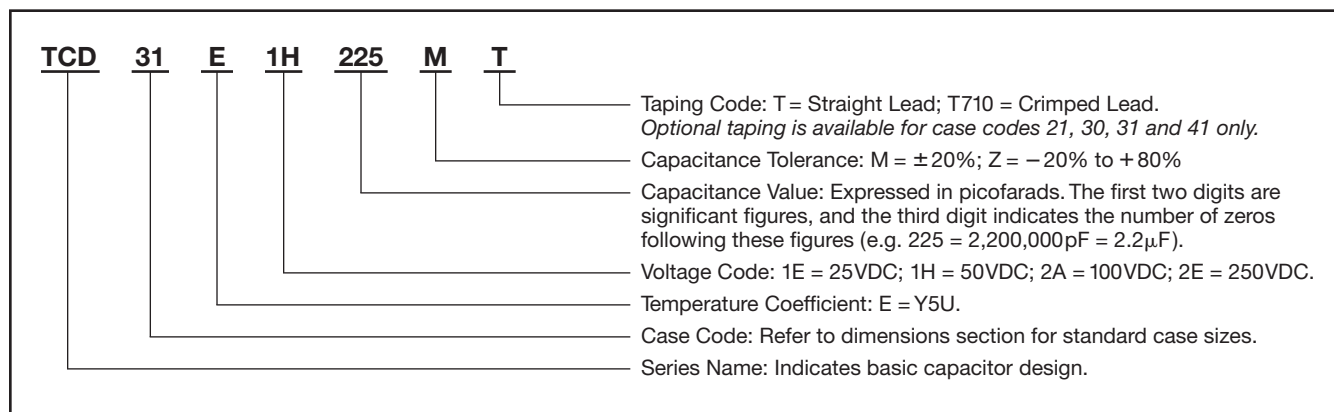
- **Radial lead terminals.**
- **Capacitance range: 0.1 to 100 μ F.**
- **Voltage range: 25 to 250VDC.**
- **Operating temperature range: -55°C to +125°C.**
- **Standard capacitance tolerance: $\pm 20\%$ or -20% to +80%**
- **Nominal case size (L \times W \times H): 5.0 \times 3.5 \times 6.0mm to 28.5 \times 8.5 \times 20.0mm.**
- **Rated lifetime: 1,000 hours at +125°C.**

TCD Series

TCD Specifications

| Item | Characteristics |
|------------------------------------|--|
| Operating Temperature Range | -55 to +125°C |
| Rated Voltage Range | 25 to 250VDC |
| Capacitance Range | 0.1 to 100 μ F |
| Capacitance Tolerance | $\pm 20\%$ (M) or -20% to $+80\%$ (Z) at $+20 \pm 2^\circ\text{C}$, $1 \pm 0.1\text{kHz}$, and $1 \pm 0.2\text{Vrms}$ |
| Dissipation Factor (Tan δ) | 2.5% maximum at $+20 \pm 2^\circ\text{C}$, $1 \pm 0.1\text{kHz}$, and $1 \pm 0.2\text{Vrms}$ |
| Ripple Current | At $+125^\circ\text{C}$, the maximum ripple current at 10kHz - 1MHz is specified in the Ratings Tables. |
| Withstand Voltage | No abnormality after applying 250% of the DC rated voltage from terminal-to-terminal and terminal-to-resin coating for 1 to 5 seconds at $+20 \pm 2^\circ\text{C}$. |
| Insulation Resistance | 1,000 $\Omega \cdot \text{F}$ or 10,000M Ω , whichever is less, after applying the DC rated voltage for 60 ± 5 seconds at $+20 \pm 2^\circ\text{C}$. |
| Solderability | Using H60A or H63A solder at a solder temperature of $+235 \pm 5^\circ\text{C}$ and a dip time of 2 ± 0.5 seconds, a minimum of 75% of the circumferential surface of the dipped lead wires shall be covered with new solder. |
| Soldering Heat Resistance | Using H60A or H63A solder at a solder temperature of $+350 \pm 10^\circ\text{C}$ and a dip time of 3 ± 0.5 seconds at a depth of 2 to 2.5mm from the resin coating, the following specifications shall be satisfied when the capacitors are restored to $+20^\circ\text{C}$. Appearance : no abnormality Capacitance change : $\leq \pm 15\%$ of initial measured value Tan δ (DF) : $\leq 2.5\%$ |
| Humidity Load Life Test | The following specifications shall be satisfied when the capacitors are restored to $+20^\circ\text{C}$ after applying the DC rated voltage for $500+24,-0$ hours at $+40 \pm 2^\circ\text{C}$, 90-95% RH. After the initial load test, the withstand voltage shall be tested by applying 250% of the DC rated voltage for 5 seconds. Appearance : no abnormality Capacitance change : $\leq \pm 20\%$ of initial measured value Tan δ (DF) : $\leq 5\%$ Insulation resistance : 50 $\Omega \cdot \text{F}$ or 1,000M Ω , whichever is less |
| Load Life Test | The following specifications shall be satisfied when the capacitors are restored to $+20^\circ\text{C}$ after applying 200% of the DC rated voltage for $1,000+48,-0$ hours at $+85 \pm 2^\circ\text{C}$, or $1,000+48,-0$ hours at $+125 \pm 3^\circ\text{C}$ with the initial DC rated voltage applied. After the initial load test, the withstand voltage shall be tested by applying 250% of the DC rated voltage for 5 seconds. Appearance : no abnormality Capacitance change : $\leq \pm 20\%$ of initial measured value Tan δ (DF) : $\leq 5\%$ Insulation resistance : 100 $\Omega \cdot \text{F}$ or 1,000M Ω , whichever is less |

Part Numbering System for TCD Series When ordering, always specify complete catalog number for TCD Series.

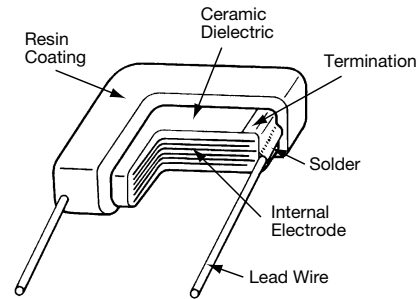
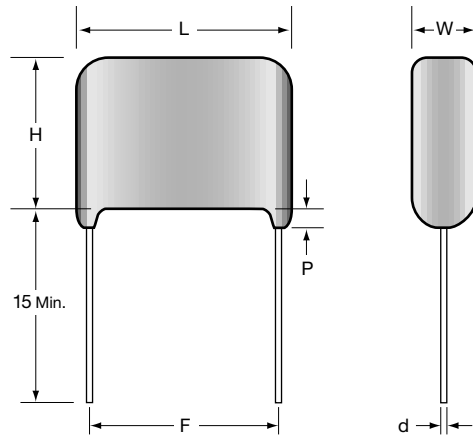


TCD Series

Construction and Diagram of Dimensions

Radial Lead Multilayer Ceramic

Unit: mm



Case Dimensions

| UCC Case Code | L max. | W max. | H max. | P max. | F ±0.8 | ød ±0.05 |
|---------------|--------|--------|--------|--------|--------|----------|
| 21 | 5.0 | 3.5 | 4.5 | 1.5 | 5.0 | 0.5 |
| 30 | 6.3 | 4.0 | 5.0 | 1.5 | 5.0 | 0.5 |
| 31 | 7.5 | 4.0 | 7.5 | 1.5 | 5.0 | 0.5 |
| 41 | 10.0 | 5.0 | 10.0 | 1.5 | 5.0 | 0.5 |
| 51 | 13.5 | 5.5 | 13.5 | 1.5 | 10.0 | 0.6 |
| 60 | 22.5 | 8.5 | 17.5 | 2.5 | 20.0 | 0.8 |
| 61 | 28.5 | 8.5 | 17.5 | 2.5 | 25.0 | 0.8 |

Standard Voltage Ratings - Radial Lead Multilayer Ceramic

| Rated Voltage (WVDC) | Capacitance (µF) | Catalog Part Number † | UCC Case Code* | Maximum Ripple Current (A rms) at +125°C, 10kHz-1MHz |
|----------------------|------------------|-----------------------|----------------|--|
| 25 Volts | 0.68 | TCD21E1E684M | 21 | 0.3 |
| | 1.0 | TCD21E1E105M | 21 | 0.3 |
| | 1.5 | TCD30E1E155M | 30 | 0.8 |
| | 2.2 | TCD30E1E225M | 30 | 0.8 |
| | 3.3 | TCD31E1E335M | 31 | 1.0 |
| | 4.7 | TCD31E1E475M | 31 | 1.0 |
| | 6.8 | TCD41E1E685M | 41 | 1.5 |
| | 10 | TCD41E1E106M | 41 | 1.5 |
| | 15 | TCD51E1E156M | 51 | 2.0 |
| | 22 | TCD51E1E226M | 51 | 2.0 |
| | 33 | TCD60E1E336M | 60 | 3.0 |
| | 47 | TCD60E1E476M | 60 | 3.0 |
| 68 | TCD61E1E686M | 61 | 4.0 | |
| 100 | TCD61E1E107M | 61 | 4.0 | |
| 50 Volts | 0.1 | TCD21E1H104M | 21 | 0.11 |
| | 0.15 | TCD21E1H154M | 21 | 0.16 |
| | 0.22 | TCD21E1H224M | 21 | 0.24 |
| | 0.33 | TCD21E1H334M | 21 | 0.3 |
| | 0.47 | TCD21E1H474M | 21 | 0.3 |
| | 0.68 | TCD30E1H684M | 30 | 0.75 |
| | 1.0 | TCD30E1H105M | 30 | 0.8 |
| | 1.5 | TCD31E1H155M | 31 | 1.0 |
| | 2.2 | TCD31E1H225M | 31 | 1.0 |
| | 3.3 | TCD31E1H335M | 31 | 1.0 |
| | 4.7 | TCD41E1H475M | 41 | 1.5 |
| | 6.8 | TCD41E1H685M | 41 | 1.5 |
| | 10 | TCD51E1H106M | 51 | 2.0 |
| | 15 | TCD51E1H156M | 51 | 2.0 |
| | 22 | TCD60E1H226M | 60 | 3.0 |

† M indicates ±20% tolerance. Substitute code letter Z in part number for -20%, +80% tolerance.

* Refer to diagram of dimensions for actual case sizes.

TCD Series

Standard Voltage Ratings - Radial Lead Multilayer Ceramic

| Rated Voltage (WVDC) | Capacitance (μF) | Catalog Part Number † | UCC Case Code* | Maximum Ripple Current (A rms) at +125°C, 10kHz-1MHz |
|----------------------|------------------|-----------------------|----------------|--|
| 50 Volts | 33 | TCD60E1H336M | 60 | 3.0 |
| | 47 | TCD61E1H476M | 61 | 4.0 |
| | 68 | TCD61E1H686M | 61 | 4.0 |
| 100 Volts | 0.1 | TCD21E2A104M | 21 | 0.22 |
| | 0.15 | TCD21E2A154M | 21 | 0.3 |
| | 0.22 | TCD21E2A224M | 21 | 0.3 |
| | 0.33 | TCD30E2A334M | 30 | 0.73 |
| | 0.47 | TCD30E2A474M | 30 | 0.8 |
| | 0.68 | TCD31E2A684M | 31 | 1.0 |
| | 1.0 | TCD31E2A105M | 31 | 1.0 |
| | 1.5 | TCD31E2A155M | 31 | 1.0 |
| | 2.2 | TCD41E2A225M | 41 | 1.5 |
| | 3.3 | TCD41E2A335M | 41 | 1.5 |
| | 4.7 | TCD51E2A475M | 51 | 2.0 |
| | 6.8 | TCD51E2A685M | 51 | 2.0 |
| | 10 | TCD60E2A106M | 60 | 3.0 |
| | 15 | TCD60E2A156M | 60 | 3.0 |
| 22 | TCD61E2A226M | 61 | 4.0 | |
| 33 | TCD61E2A336M | 61 | 4.0 | |
| 250 Volts | 0.1 | TCD30E2E104M | 30 | 0.55 |
| | 0.15 | TCD30E2E154M | 30 | 0.8 |
| | 0.22 | TCD31E2E224M | 31 | 1.0 |
| | 0.33 | TCD31E2E334M | 31 | 1.0 |
| | 0.47 | TCD41E2E474M | 41 | 1.5 |
| | 0.68 | TCD41E2E684M | 41 | 1.5 |
| | 1.0 | TCD51E2E105M | 51 | 2.0 |
| | 1.5 | TCD51E2E155M | 51 | 2.0 |
| | 2.2 | TCD60E2E225M | 60 | 3.0 |
| | 3.3 | TCD60E2E335M | 60 | 3.0 |
| | 4.7 | TCD61E2E475M | 61 | 4.0 |
| | 6.8 | TCD61E2E685M | 61 | 4.0 |

† M indicates ±20% tolerance. Substitute code letter Z in part number for -20%, +80% tolerance.

* Refer to diagram of dimensions for actual case sizes.

Ammo Pack Taping Specifications

Radial Lead Multilayer Ceramics
Available for Case Codes 21, 30, 31 and 41
Conforms to JIS-C-0805
Ammo Pack

Unit: mm

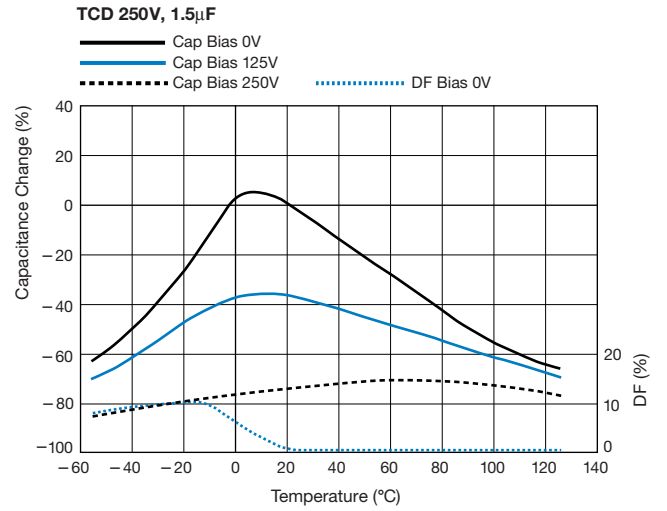
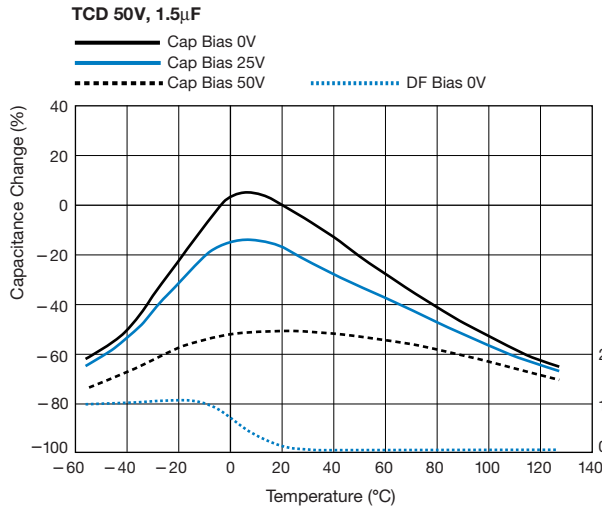
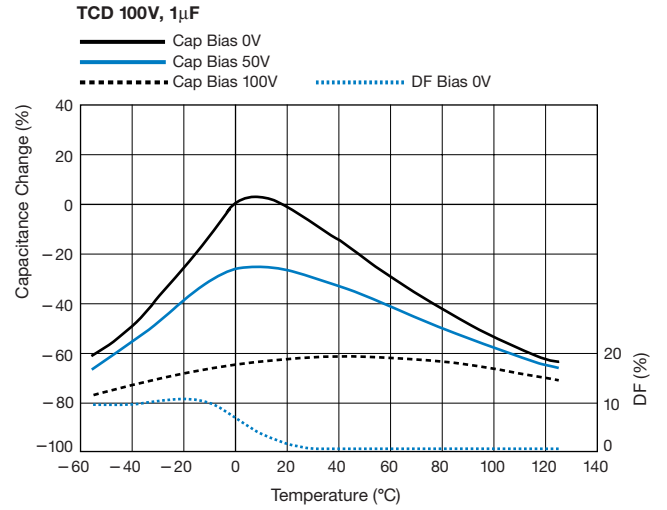
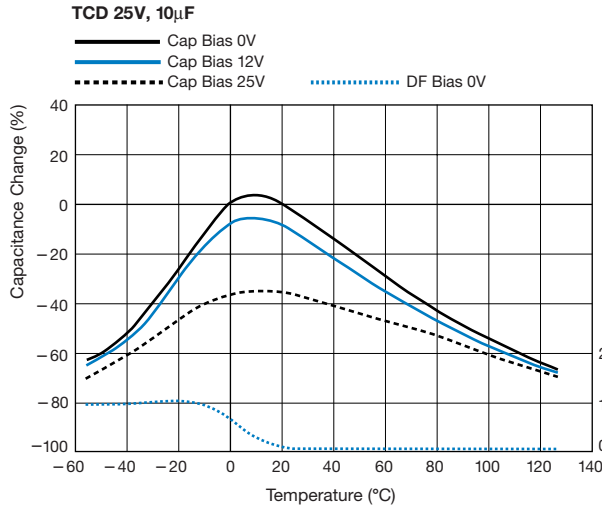
Dimensions and Quantity Per Box

| UCC Case Code | 21 | 30 | 31 | 41 |
|------------------------|-------|-------|-------|-------|
| H max. Straight Lead | 23 | 24 | 26 | 29 |
| H max. Crimped Lead | 25 | 26 | 28 | 30 |
| H ₀ ± 0.5 | 16.0 | 16.0 | 16.0 | 16.0 |
| P ± 1.0 | 12.7 | 12.7 | 12.7 | 12.7 |
| P ₀ ± 0.3 | 12.7 | 12.7 | 12.7 | 12.7 |
| P ₁ ± 0.7 | 3.85 | 3.85 | 3.85 | 3.85 |
| P _{0/2} ± 1.3 | 6.35 | 6.35 | 6.35 | 6.35 |
| F ± 1.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| W - 0.5, +1.0 | 18.0 | 18.0 | 18.0 | 18.0 |
| W/2 ± 0.5 | 9.0 | 9.0 | 9.0 | 9.0 |
| M ± 1.0 | 13.0 | 13.0 | 13.0 | 13.0 |
| M ₀ ± 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| øD ± 0.2 | 4.0 | 4.0 | 4.0 | 4.0 |
| ød ± 0.05 | 0.5 | 0.5 | 0.5 | 0.5 |
| t ± 0.2 | 0.6 | 0.6 | 0.6 | 0.6 |
| Δh ± 2 | 0 | 0 | 0 | 0 |
| Pieces Per Box* | 2,000 | 2,000 | 2,000 | 1,500 |

*Specified quantity may vary for rating of capacitor.

TCD Series

Capacitance and DF Variation with Temperature and Applied DC Voltage



Impedance/ESR – Frequency Characteristics

