




Product Family: [High Precision Thick Film Chip Resistors](#)

Part Number Series: [TFH Series](#)

| | | |
|---|--|--|
|  | <p>Construction:</p> <ul style="list-style-type: none"> • High Purity Alumina Substrate • Thick Film resistive element • Wrap around electrodes • RoHS 2011/65/EU compliant | <p>Features:</p> <ul style="list-style-type: none"> • 0201,0402, 0603, 0805, 1206, 1210,2010,and 2512 sizes • Tolerance $\pm 0.1\%$ and $\pm 0.5\%$ • Resistance down to 1Ω • TCR's down to $\pm 50 \text{ ppm}/^\circ\text{C}$ • High volume production suitable for commercial and special applications |
|---|--|--|

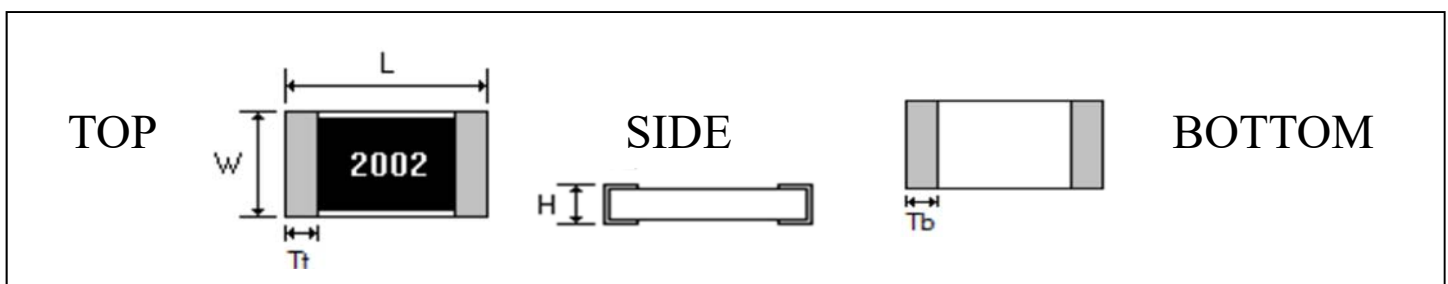
Description:

These high precision thick film chip resistors are constructed on a high grade ceramic body for extreme durability. Utilizing a proprietary thick film resistive element to deliver a wide range of size, power handling and resistive values to make this series suitable for most applications. Very competitive pricing for all volume levels.

Product Dimensions:

| Dimension (Metric) | TFH0201 (0603) | TFH0402 (1005) | TFG0603 (1608) | TFH0805 (2012) | TFH1206 (3216) | TFH1210 (3226) | TFH2010 (5025) | TFH2512 (6432) |
|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| L | 0.024 \pm 0.001 | 0.039 \pm 0.002 | 0.063 \pm 0.004 | 0.079 \pm 0.004 | 0.122 \pm 0.004 | 0.122 \pm 0.004 | 0.197 \pm 0.008 | 0.252 \pm 0.008 |
| W | 0.012 \pm 0.001 | 0.020 \pm 0.002 | 0.031 \pm 0.004 | 0.049 \pm 0.004 | 0.063 \pm 0.004 | 0.102 \pm 0.004 | 0.098 \pm 0.008 | 0.126 \pm 0.008 |
| H | 0.009 \pm 0.001 | 0.014 \pm 0.002 | 0.018 \pm 0.006 | 0.020 \pm 0.006 | 0.026 \pm 0.006 | 0.022 \pm 0.004 | 0.022 \pm 0.004 | 0.024 \pm 0.004 |
| Tb | 0.006 \pm 0.002 | 0.010 \pm 0.004 | 0.012 \pm 0.008 | 0.016 \pm 0.008 | 0.018 \pm 0.008 | 0.020 \pm 0.008 | 0.024 \pm 0.010 | 0.035 \pm 0.010 |
| Tt | 0.004 \pm 0.002 | 0.008 \pm 0.004 | 0.012 \pm 0.004 | 0.016 \pm 0.008 | 0.020 \pm 0.008 | 0.020 \pm 0.008 | 0.026 \pm 0.010 | 0.026 \pm 0.010 |

All dimensions are shown in inches, Metric case sizes are shown in parenthesis.



Part Numbering: Ex: TFH0603Q1002D-T5

| Product Designator | Size L x W | Temp. Coefficient of Resistance (TCR) | Resistance Value | Resistance Tolerance | T&R Packaging Quantity |
|--------------------|--|---|---|------------------------------------|--|
| TFH | 0201 0402 0603 0805 1206 1210 2010 2512 | Q = $\pm 50 \text{ ppm}/^\circ\text{C}$ R = $\pm 100 \text{ ppm}/^\circ\text{C}$ S = $\pm 200 \text{ ppm}/^\circ\text{C}$ | 4 digits with the first 3 being significant. The last digit specifies the number of zeros. "R" denotes decimal position as necessary Jumper = JUMP | B = $\pm 0.1\%$ D = $\pm 0.5\%$ | -T5 = 5,000/reel -T10 = 10,000/reel -T15 = 15,000/reel (see electrical table for offerings) |

Electrical Specifications:

| Type | TFH0201 | TFH0402 | TFH0603 | TFH0805 |
|-------------------------------|--|--|---|-----------------------------------|
| English Size | 0201 | 0402 | 0603 | 0805 |
| Power | 1/20 Watt | 1/16 Watt | 1/10 Watt | 1/8 Watt |
| Resistance Range (Ω) | 51 Ω ~ 1M Ω E-24 and E-96 | 10 Ω ~ 1M Ω (R) 100 Ω ~1M Ω (Q) E-24 and E-96 | 10 Ω ~1M Ω E-24 and E-96 | |
| Resistance Tolerance (code) | $\pm 0.5\%$ (D) | $\pm 0.1\%$ (B) $\pm 0.5\%$ (D) | | |
| TCR ppm/ $^{\circ}$ C (code) | 51 Ω ~976 Ω = 100ppm (R) 1K Ω ~1M Ω = 50ppm (Q) | 10 Ω ~1M Ω = ± 100 ppm (R) 100 Ω ~1M Ω = ± 50 ppm (Q) | 10 Ω ~1M Ω = ± 50 ppm (Q), or ± 100 ppm (R) | |
| Max Voltage DC or RMS | Operating 25 V Overload 50 V | Operating 50 V Overload 100 V | | Operating 150 V Overload 300 V |
| Operating Temp. Range | -55 $^{\circ}$ C ~ 125 $^{\circ}$ C | -55 $^{\circ}$ C ~ 155 $^{\circ}$ C (derating from 100% at 70 $^{\circ}$ C to 0% at 155 $^{\circ}$ C) | | |
| Packaging | 15,000 pcs/reel | 10,000 pcs/reel | 5,000 pcs/reel | 5,000 pcs/reel |

| Type | TFH1206 | TFH1210 | TFH2010 | TFH2512 |
|-------------------------------|--|----------|--|-----------------------------------|
| English Size | 1206 | 1210 | 2010 | 2512 |
| Max Power @ 70 $^{\circ}$ C | 1/4 Watt | 1/3 Watt | 0.5 Watt | 1 Watt |
| Resistance Range (Ω) | 10 Ω ~1M Ω E-24 and E-96 | | 1 Ω ~ 10M Ω E-24 and E-96 | |
| Resistance Tolerance (code) | $\pm 0.1\%$ (B) $\pm 0.5\%$ (D) (E96+E24) | | | |
| TCR ppm/ $^{\circ}$ C (code) | 10 Ω ~1M Ω = ± 100 ppm | | 1 Ω ~10 Ω = ± 200 ppm (S) 10.2 Ω -10M Ω = ± 100 ppm (R) | |
| Max Voltage: DC or RMS | Operating 200 V Overload 400 V | | | Operating 250 V Overload 500 V |
| Operating Temp. Range | -55 $^{\circ}$ C ~ 155 $^{\circ}$ C (derating from 100% at 70 $^{\circ}$ C to 0% at 155 $^{\circ}$ C) | | | |
| Packaging | 5,000 pcs/reel | | | |

Reliability Specifications:

| Test | Test Method | Specification |
|------------------------------|--|---------------------------------------|
| Short Time Overload | Applied voltage: 2.5X rated voltage or 2X maximum operating voltage, whichever is less. Test duration: 5 seconds | $\pm 0.5\%$ +0.05 Ω |
| Resistance to Soldering Heat | Dip into 260 $^{\circ}$ C solder bath until fully immersed 10 \pm 1 seconds | $\pm 0.5\%$ +0.05 Ω |
| Load Life | Test Temperature: 70 $^{\circ}$ C Applied voltage: rated voltage Test period: 1000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF, | $\pm 1.0\%$ +0.05 Ω |
| Moisture Load Life | Test Condition: 40 $^{\circ}$ C/95% RH Applied voltage: rated voltage Test period: 1000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF | $\pm 1.0\%$ +0.05 Ω |
| Temperature Cycle | Repeat 5 cycles as follows: -55 $^{\circ}$ C(30 min.) / Room temp (2 min) / +125 $^{\circ}$ C(30 min.) / Room temp (2 min) | $\pm 0.5\%$ +0.05 Ω |
| Solderability | Dip into 235 $^{\circ}$ C solder bath until fully immersed (SAC solder) 2 \pm 0.5 seconds | Minimum 95% coverage of new solder |