

SMD PTC - Nickel Thin Film Linear Thermistors



FEATURES

- Alumina substrate base with nickel based PTC thin film element
- 0603, 0805, and 1206 sizes available
- Available in tape and reel packaging
- Standard R_{25} tolerances: $\pm 0.5\%$, $\pm 1\%$, $\pm 5\%$
- Operation range $-55\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}$
- High stability over the entire temperature range
- cUL recognized component: File E148885
- AEC-Q200 qualified (grade 1)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

| QUICK REFERENCE DATA | | | | |
|--|-----------------------------------|-----------|------------|--------------------|
| PARAMETER | VALUE | | | UNIT |
| DESCRIPTION | TFPT0603 | TFPT0805 | TFPT1206 | |
| Resistance value at $25\text{ }^{\circ}\text{C}$ ⁽²⁾ | 100 to 1K | 100 to 5K | 100 to 10K | Ω |
| Tolerance on R_{25} -value ⁽²⁾ | ± 0.5 ; ± 1 ; ± 5 | | | % |
| TCR at $25\text{ }^{\circ}\text{C}$ | 4110 | | | ppm/K |
| Tolerance on TCR at $25\text{ }^{\circ}\text{C}$ ⁽¹⁾ | ± 400 | | | |
| Operating temperature range: at rated power at zero dissipation ⁽⁴⁾ | -55 to $+70$ -55 to $+150$ | | | $^{\circ}\text{C}$ |
| Dissipation factor δ (for information only) | 1.8 | 2.3 | 4 | mW/K |
| Maximum rated power at $70\text{ }^{\circ}\text{C}$ (P_{70}) | 75 | 100 | 125 | mW |
| Maximum working voltage RCWV ⁽³⁾ | 30 | 40 | 50 | V |
| Climatic category (LCT/UCT/days) | 55/150/56 | | | - |
| Weight | 2 | 5.5 | 10 | mg |

Notes

- (1) Contact Vishay if closer TCR lot tolerance is desired.
- (2) Other R_{25} -values and tolerances are available upon request.
- (3) Rated continuous working voltage is maximum working voltage or $\sqrt{P_{70} \times R}$ whichever is less.
- (4) Zero power or zero dissipation is considered as measuring power max. 1% of rated power P_{70} .

| STANDARD RESISTANCE VALUES at $25\text{ }^{\circ}\text{C}$ in Ω | | | | | | | | | |
|--|-----|-----|-----|------|------|------|------|-------|--|
| 100 | 180 | 330 | 560 | 1.0K | 1.8K | 3.3K | 5.0K | 8.2K | |
| 120 | 220 | 390 | 680 | 1.2K | 2.2K | 3.9K | 5.6K | 10.0K | |
| 150 | 270 | 470 | 820 | 1.5K | 2.7K | 4.7K | 6.8K | | |

Note

- Rated continuous working voltage is maximum working voltage or $\sqrt{P_{70} \times R}$ whichever is less.

| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | |
|---|---|---|---|----------------|---|------------------|---|---|---|---|--|---|---|---|
| Global Part Numbering: TFPT1206L1002FM (preferred part number format) | | | | | | | | | | | | | | |
| T | F | P | T | 1 | 2 | 0 | 6 | L | 1 | 0 | 0 | 2 | F | M |
| GLOBAL MODEL | | | | CHARACTERISTIC | | RESISTANCE VALUE | | TOLERANCE CODE | | | PACKAGING | | | |
| TFPT0603 TFPT0805 TFPT1206 | | | | L = Linear | | 1002 = 10K | | D = $\pm 0.5\%$ F = $\pm 1\%$ J = $\pm 5\%$ | | | M = Lead (Pb)-free, T/R (5000 pieces) V = Lead (Pb)-free, T/R (1000 pieces) Z = Tin/lead, T/R (5000 pieces) Y = Tin/lead, T/R (1000 pieces) | | | |

DIMENSIONS in millimeters

CONSTRUCTION


| PART NUMBER | A | B | C | D | E |
|-------------|----------------|----------------|----------------|----------------|----------------|
| TFPT 0603 | 1.55 ± 0.10 | 0.80 ± 0.10 | 0.45 ± 0.10 | 0.30 ± 0.20 | 0.30 ± 0.20 |
| TFPT 0805 | 2.00 ± 0.15 | 1.25 ± 0.15 | 0.45 ± 0.10 | 0.40 ± 0.20 | 0.40 ± 0.20 |
| TFPT 1206 | 3.05 ± 0.15 | 1.50 ± 0.15 | 0.55 ± 0.10 | 0.50 ± 0.25 | 0.50 ± 0.25 |


Note

- Zero power is considered as measuring power max. 1 % of rated power P_{70} .

| TESTS AND REQUIREMENTS | | |
|-------------------------------------|--|--|
| TEST | CONDITIONS ⁽¹⁾ | REQUIREMENTS MAX $ \Delta R_{25}/R_{25} $ |
| High temperature exposure (storage) | AEC-Q200, 1000 h at 150 °C | 0.25 % |
| Temperature cycling | AEC-Q200, 1000 cycles -55 °C / +125 °C | 0.25 % |
| Biased humidity | 1000 h, 1 mA biased at 85 °C / 85 % RH | 0.25 % |
| | 1000 h, 1 mA biased at 40 °C / 95 % RH | 0.25 % |
| Operational life | 1000 h, P_{70} max biased at 85 °C | 0.25 % |
| Mechanical shock and vibration | MIL-STD 202, method 213 - 204 | 0.50 % |
| Resistance to soldering heat | MIL-STD 202, method 210, solderbath dipping 10 s at 260°C | 0.25 % |
| ESD ⁽²⁾ | AEC-Q200-002, HBM (CD) 0.5 kV (0603), 1.0 kV (0805), 1.0 kV (1206) | 0.25 % |
| Board flex | AEC-Q200-005, 2 mm during 60 s | 0.25 % |
| Terminal strength | AEC-Q200-006, shear test 17.7 N during 60 s | 0.25 % |

Notes

- ⁽¹⁾ Environmental performance specifications use test procedures as outlined in MIL-R23648D, MIL-STD 202 and AEC-Q200.
⁽²⁾ TFPTs are ESD sensitive.





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