

# 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

| QUICK REFERENCE DATA   |                                   |           |            |                    |
|--|-----------------------------------|-----------|------------|--------------------|
| PARAMETER  | VALUE                             |           |            | UNIT               |
| DESCRIPTION  | TFPT0603                          | TFPT0805  | TFPT1206   |                    |
| Resistance value at $25\text{ }^{\circ}\text{C}$ <sup>(2)</sup>                      | 100 to 1K                         | 100 to 5K | 100 to 10K | $\Omega$           |
| Tolerance on $R_{25}$ -value <sup>(2)</sup>  | $\pm 0.5$ ; $\pm 1$ ; $\pm 5$     |           |            | %                  |
| TCR at $25\text{ }^{\circ}\text{C}$  | 4110                              |           |            | ppm/K              |
| Tolerance on TCR at $25\text{ }^{\circ}\text{C}$ <sup>(1)</sup>                      | $\pm 400$                         |           |            |                    |
| Operating temperature range:<br>at rated power<br>at zero dissipation <sup>(4)</sup> | $-55$ to $+70$<br>$-55$ to $+150$ |           |            | $^{\circ}\text{C}$ |
| Dissipation factor $\delta$ (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 <sup>(3)</sup>  | 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 $\Omega$ |     |     |     |      |      |      |      |       |  |
|--|-----|-----|-----|------|------|------|------|-------|--|
| 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 |       |  |

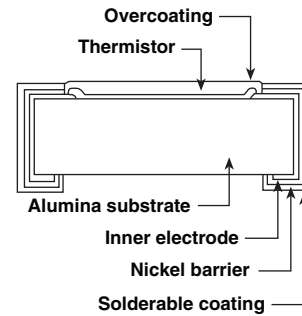
### Note

- 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<br>TFPT0805<br>TFPT1206                                      |   |   |   | L = Linear     |   | 1002 = 10K       |   | D = $\pm 0.5\%$<br>F = $\pm 1\%$<br>J = $\pm 5\%$ |   |   | M = Lead (Pb)-free, T/R (5000 pieces)<br>V = Lead (Pb)-free, T/R (1000 pieces)<br>Z = Tin/lead, T/R (5000 pieces)<br>Y = Tin/lead, T/R (1000 pieces) |   |   |   |

**DIMENSIONS** in millimeters


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

**CONSTRUCTION**

**Note**

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

| TESTS AND REQUIREMENTS              |  |  |
|-------------------------------------|--|--|
| TEST                                | CONDITIONS <sup>(1)</sup>  | REQUIREMENTS<br>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 <sup>(2)</sup>                  | 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**

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







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