

SMD PTC Thermistors For Overload Protection



FEATURES

- Compact resettable overload protection
- Low mounting height
- Suitable for reflow soldering
- Small ceramic diameter for faster response
- Low heat transfer to substrate
- Flat terminations for stable positioning and good solderability
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

APPLICATIONS

Over-temperature/over-load protection:

- Telecom
 - Central Office Switching (C.O.)
 - Subscriber Terminal Equipment (T.E.)
 - Set-top Box
 - Modems
- General industry and automotive
 - Low power overload protection
 - Inrush current limitation

DESCRIPTION

The component consists of a high performance PTC ceramic mounted in a lead frame with lead (Pb)-free tin plated contacts. The terminations are joined to the Ag plated ceramic by a high melting solder. The ceramic is covered with a protective high temperature silicone layer.

MARKING

- All SMD PTCs are marked with a 3-digit type number (XXX) and a date code (YYWW)

| QUICK REFERENCE DATA | | | |
|--|-------------------------------|------------------------------|-----------|
| PARAMETER | VALUE | | UNIT |
| | STANDARD TYPES ⁽¹⁾ | TELECOM TYPES ⁽¹⁾ | |
| Resistance value at 25 °C | 2 to 500 | 10 to 70 | Ω |
| Tolerance on R_{25} value | ± 10; ± 15; ± 20 | | % |
| Maximum overload current I_{ol} (V_{max} . dependent) | 2 to 10 | | A |
| Maximum holding current (I_{ht}) | 50 to 500 (at 25 °C) | 50 to 100 (at 70 °C) | |
| Maximum voltage (RMS or DC) | 16 to 400 | 220 to 600 | V_{RMS} |
| Maximum trip time at 1 A | 0.8 to 6 | | s |
| Switching temperature (T_{sw}) | 105 to 140 | | °C |
| Operating temperature range at max. voltage | -40 to 85 | | |
| Storage temperature | -40 to 155 | | |
| Maximum continuous power at 25 °C | 2 | | W |

Note

- ⁽¹⁾ Customized products are available on request in the indicated nominal R_{25} range. Larger 8 mm ceramics for lower resistance values or higher voltages are in use in the PTCCZ08 series.

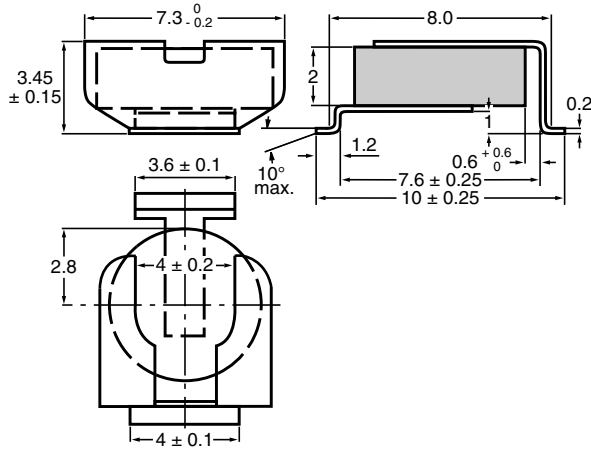
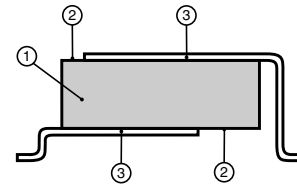
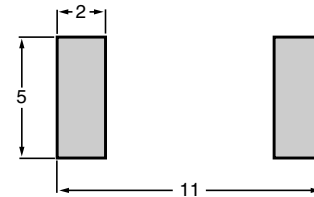
| ELECTRICAL DATA AND ORDERING INFORMATION | | | | | | | | | | | | | |
|--|-----------|--------------|---------------|-------------|------------|---------------------|---------------------------|--------------------------------|----------|---------------------------------------|---------------------|-------------------------------|-----------------|
| RESISTANCE | | MATCHING (Ω) | V_{max} (V) | I_{ht} at | | I_t at 25 °C (mA) | MAX. TRIP-TIME at 1 A (s) | MAX. I_{ol} at V_{max} (A) | T_{sw} | OPERATING TEMP. RANGE AT MAX. VOLTAGE | STORAGE TEMP. RANGE | CATALOG NUMBER | |
| R_{25} (Ω) | TOL. (%) | | | 25 °C (mA) | 70 °C (mA) | | | | | | | SAP ORDERING CODE | TYPE NR MARKING |
| TELECOM AND INDUSTRIAL TYPES | | | | | | | | | | | | | |
| 10 | 20 | - | 245 | 165 | 100 | 270 | 3.0 | 2.0 | 105 | 0 to 70 | -25 to 125 | PTCTZ3NR100GTT ⁽²⁾ | 012 |
| 10 | 20 | 0.5 | 245 | 165 | 100 | 270 | 3.0 | 2.0 | 105 | 0 to 70 | -25 to 125 | PTCTZ3MR100GTT ⁽²⁾ | 016 |
| 40 | 25 | no | 265 | 80 | 50 | 130 | 0.8 | 2.0 | 105 | 0 to 70 | -25 to 125 | PTCTZ3NR400HTT | 002 |
| 25 | 20 | 1 | 265 | 120 | 70 | 220 | 1.3 | 2.0 | 110 | 0 to 70 | -25 to 125 | PTCTZ3MR250HTT ⁽²⁾ | 005 |
| 15 to 20 | - | - | 300 | 150 | 100 | 250 | 1.5 | 1.5 | 115 | 0 to 70 | -25 to 125 | PTCTZ3NR150KTT ⁽²⁾ | 004 |
| 15 to 20 | - | 0.5 | 300 | 150 | 100 | 250 | 1.5 | 2.0 | 115 | 0 to 70 | -25 to 125 | PTCTZ3MR150KTT ⁽²⁾ | 003 |
| 20 | 20 | 0.5 | 300 | 120 | 70 | 250 | 1.4 | 1.5 | 105 | 0 to 70 | -25 to 125 | PTCTZ3MR200KTT ⁽²⁾ | 018 |
| 35 | +15 / -20 | 1 | 425 | 110 | 70 | 175 | 1.0 | 0.7 | 125 | -25 to 85 | -40 to 155 | PTCTZ3MR350MTT ⁽²⁾ | 009 |
| 50 | 20 | 1 | 425 | 90 | 60 | 150 | 0.8 | 0.7 | 125 | -40 to 70 | -40 to 125 | PTCTZ3MR500MTT | 019 |
| GENERAL INDUSTRIAL TYPES | | | | | | | | | | | | | |
| 3.3 | 25 | - | 24 | 400 | - | 650 | 6.0 | 8.0 | 140 | -40 to 85 | -40 to 155 | PTCTZ3NR339CTT | 013 |
| 9.4 | 25 | - | 60 | 150 | 100 | 300 | 1.8 | 3.0 | 115 | -40 to 85 | -40 to 155 | PTCTZ3NR949ETT | 011 |

Note

- ⁽²⁾ These types pass ITU-K20-21-45 telecommunication protection recommendation

PTC OUTLINES

PTC SMD ceramic size: 6.5 mm


DIMENSIONS in millimeters

DIMENSIONS OF SOLDER LANDS in millimeters


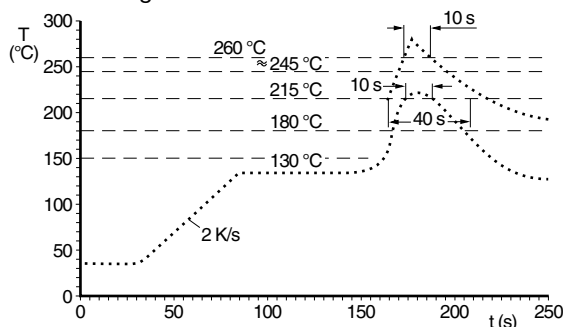
| PACKAGING | | | | | |
|-----------|----------|--|-------|-------|---------------|
| TYPE | QUANTITY | CARRIER TAPE | WIDTH | PITCH | REEL DIAMETER |
| PTCTZ | 1500 | PS conductive blister tape acc. IEC60286-3 | 16 mm | 12 mm | 330 mm |

| MATERIAL INFORMATION | | |
|----------------------|--------------|---|
| REF. | DESCRIPTION | MATERIAL AND REMARKS |
| 1 | Ceramic | BaTiO ₃ doped |
| 2 | Metalization | NiCr Ag layer (vacuum deposition) |
| 3 | Lead frame | Ni plated phosphor bronze material covered by matte tin layer |

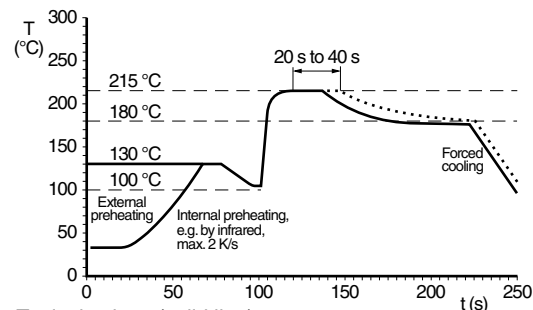
SOLDERING CONDITIONS

This SMD thermistor is only suitable for reflow soldering, in accordance with JEDEC J-STD-020D. Soldering processes which can be used are reflow (infrared and convection heating) and vapor phase. The maximum temperature of 260 °C during 10 s should not be exceeded and no liquid flux should be allowed to reach the ceramic body.

Typical examples of a soldering processes that will provide reliable joints without damage, are shown below.

Reflow soldering


Typical values (solid line)
Process limits (dotted lines)

Vapor phase soldering


Typical values (solid line)
Process limits (dotted lines)

MOUNTING CONDITIONS

A flat pick-up area of minimum 10 mm² and low weight allows for fast placement.

Because of the nature of PTC ceramic material the component should not be touched with bare hands, as the residue of perspiration can influence component behavior at high temperatures.

Handling forces applied to the component should be limited to 5 N in any condition.



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