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## SMD 0402, Glass Protected NTC Thermistors



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

### FEATURES

- TCR ranging from -6.5 %/K at -40 °C to -2 %/K at 150 °C
- Tolerance on  $R_{25}$  down to 1 %
- Suitable for wave or reflow soldering
- NiSn terminations
- Fully glass coated and protected
- cUL recognized for safety applications (file E148885)
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### APPLICATIONS

- Temperature sensing, protection and compensation in automotive, industrial, telecom and consumer applications. Examples are:
  - Battery chargers
  - Power suppliers
  - Office equipment
  - LCD compensation
  - In-car entertainment

### DESCRIPTION

Size 0402 (M1005) glass protected SMD chip thermistor with negative temperature coefficient (TCR) and tin (Sn) plated terminations. The device has no marking.

### PACKAGING

Available in 8 mm punched paper tape on reel package of 10 000 units.

### DESIGN-IN SUPPORT

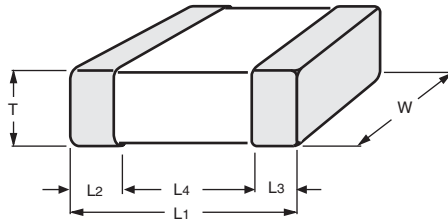
For complete curve computation, please visit: [www.vishay.com/thermistors/curve-computation-list/](http://www.vishay.com/thermistors/curve-computation-list/)

| QUICK REFERENCE DATA                      |                                       |          |
|---|---------------------------------------|----------|
| PARAMETER                                 | VALUE                                 | UNIT     |
| Resistance value at 25 °C                 | 4.7K to 100K                          | $\Omega$ |
| Tolerance on $R_{25}$ -value              | $\pm 1$ ; $\pm 2$ ; $\pm 3$ ; $\pm 5$ | %        |
| $B_{25/85}$ -value                        | 3490 to 4075                          | K        |
| Tolerance on $B_{25/85}$ -value           | $\pm 3$                               | %        |
| Maximum dissipation at 25 °C              | 70                                    | mW       |
| Thermal time constant $\tau$              | $\approx 5$                           | s        |
| Dissipation factor D                      | $\approx 2.0$                         | mW/K     |
| Operating temperature range at zero power | -40 to +150                           | °C       |
| Weight                                    | $\approx 1.2$                         | mg       |

| ELECTRICAL DATA AND ORDERING INFORMATION |                              |                    |                                 |  |
|--|------------------------------|--------------------|---------------------------------|--|
| $R_{25}$<br>( $\Omega$ )                 | $R_{25}$ -TOL.<br>( $\pm$ %) | $B_{25/85}$<br>(K) | $B_{25/85}$ -TOL.<br>( $\pm$ %) | SAP MATERIAL AND ORDERING NUMBER ... (1) |
| 4700                                     | 3, 5                         | 3595               | 3                               | NTCS0402E3472*MT                         |
| 10 000                                   | 3, 5                         | 3950               | 3                               | NTCS0402E3103*HT                         |
| 15 000                                   | 3, 5                         | 3965               | 3                               | NTCS0402E3153*HT                         |
| 22 000                                   | 3, 5                         | 3590               | 3                               | NTCS0402E3223*MT                         |
| 33 000                                   | 3, 5                         | 3670               | 3                               | NTCS0402E3333*MT                         |
| 47 000                                   | 1, 2, 3, 5                   | 4075               | 3                               | NTCS0402E3473*XT                         |
| 68 000                                   | 3, 5                         | 3910               | 3                               | NTCS0402E3683*HT                         |
| 100 000                                  | 1, 2, 3, 5                   | 3950               | 3                               | NTCS0402E3104*HT                         |

#### Note

(1) Replace \* in SAP by J for  $\pm 5$  %, H for  $\pm 3$  %, G for  $\pm 2$  %, F for  $\pm 1$  % tolerance on  $R_{25}$

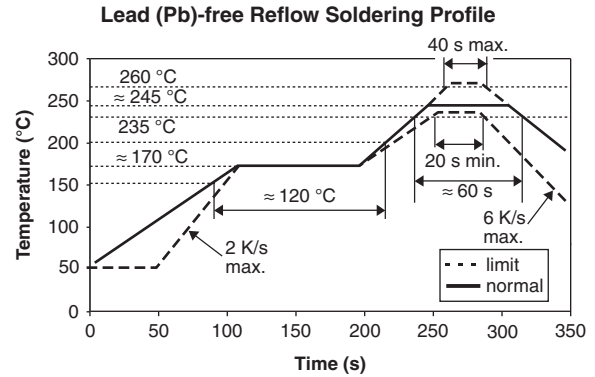
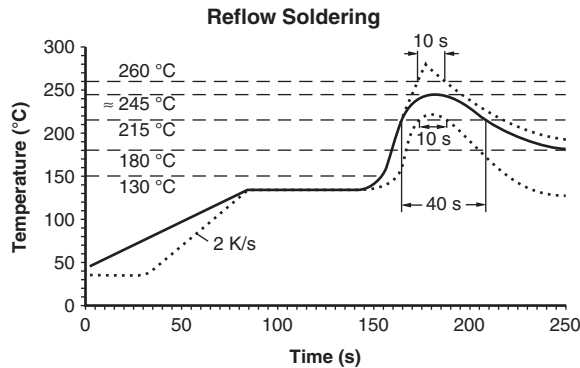
**DIMENSIONS** in millimeters


| L <sub>1</sub> | W          | T          | L <sub>2</sub> AND L <sub>3</sub> MIN. | L <sub>4</sub> MIN. |
|----------------|------------|------------|--|---------------------|
| 1.0 ± 0.15     | 0.5 ± 0.15 | 0.5 ± 0.15 | 0.1                                    | 0.3                 |

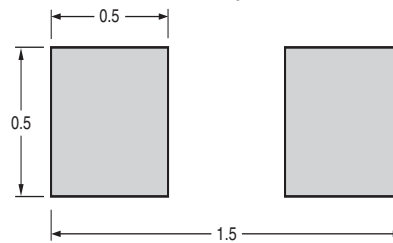
**SOLDERING CONDITIONS**

This SMD thermistor is only suitable for wave or reflow soldering, in accordance with JEDEC® J-STD-020. The maximum temperature of 260 °C during 40 s should not be exceeded.

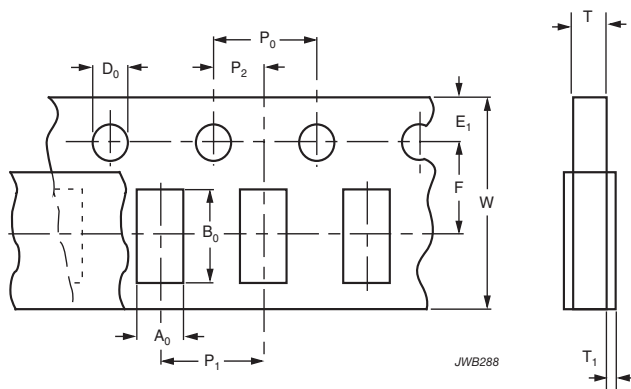
Typical examples of a soldering processes that will provide reliable joints without damage, are shown below.



Recommended solder land pattern dimensions (mm)


**PACKAGING**
**TAPE SPECIFICATIONS**

All tape specifications are in accordance with IEC 60286-3. Basic dimensions are given below. Carrier tape material is paper.


**DIMENSIONS OF PAPER TAPE** in millimeters

| PARAMETER                                | DIMENSION   |
|--|-------------|
| A <sub>0</sub> <sup>(1)</sup>            | 0.65 ± 0.1  |
| B <sub>0</sub> <sup>(1)</sup>            | 1.15 ± 0.1  |
| W  | 8.0 ± 0.2   |
| E <sub>1</sub>                           | 1.75 ± 0.1  |
| F  | 3.5 ± 0.05  |
| D <sub>0</sub>                           | 1.55 ± 0.05 |
| P <sub>0</sub> <sup>(2)</sup>            | 4.0 ± 0.1   |
| P <sub>1</sub>                           | 4.0 ± 0.1   |
| P <sub>2</sub>                           | 2.0 ± 0.05  |
| T tape thickness max.                    | 0.8         |
| T <sub>1</sub> cover tape thickness max. | 0.1         |

**Notes**

- (1) Measured 0.3 mm above base pocket
- (2) P<sub>0</sub> pitch cumulative error over any 10 pitches ± 0.2 mm



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