

## SMD 0402, Glass Protected NTC Thermistors



### 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)



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

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

### 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/)

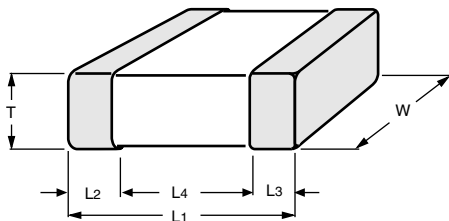
| ELECTRICAL DATA AND ORDERING INFORMATION |                         |                    |                            |   |
|--|-------------------------|--------------------|----------------------------|---|
| $R_{25}$<br>(Ω)                          | $R_{25}$ -TOL.<br>(± %) | $B_{25/85}$<br>(K) | $B_{25/85}$ -TOL.<br>(± %) | SAP MATERIAL AND ORDERING NUMBER ... <sup>(1)</sup> |
| 4700                                     | 3, 5                    | 3595               | 3                          | NTCS0402E3472*MT                                    |
| 10 000                                   | 1, 2, 3, 5              | 3490               | 3                          | NTCS0402E3103*L1T <sup>(2)</sup>                    |
| 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                                    |

#### Notes

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

<sup>(2)</sup> The digit 1 at the end of this part number NTCS0402E3103\*L1T differentiates it from the legacy P/N

**DIMENSIONS** in millimeters

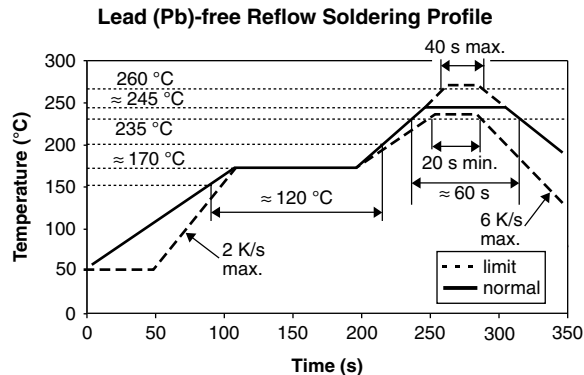
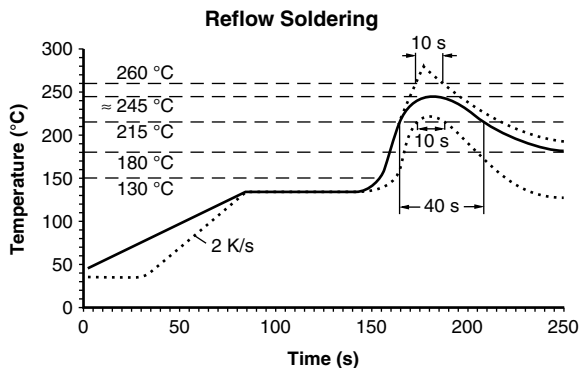


| L <sub>1</sub> | W          | T          | L <sub>2</sub> AND L <sub>3</sub> MIN. | L <sub>4</sub> MIN. |
|----------------|------------|------------|--|---------------------|
| 1.0 ± 0.15     | 0.5 ± 0.15 | 0.5 ± 0.15 | 0.1                                    | 0.3                 |

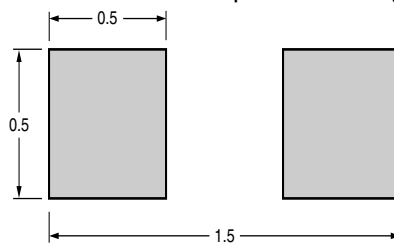
**SOLDERING CONDITIONS**

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.



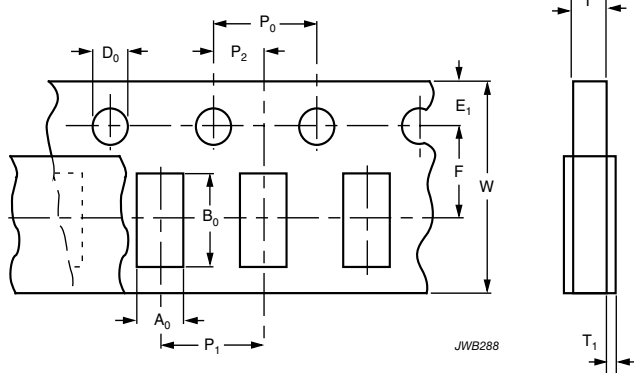
Recommended solder land pattern dimensions (mm)



**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**

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



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