

## SMD 0402, Glass Protected NTC Thermistors



### LINKS TO ADDITIONAL RESOURCES



| QUICK REFERENCE DATA                                     |                                       |      |
|----------------------------------------------------------|---------------------------------------|------|
| PARAMETER                                                | VALUE                                 | UNIT |
| Resistance value at 25 °C                                | 4.7K to 470K                          | Ω    |
| Tolerance on $R_{25}$ -value                             | $\pm 1$ ; $\pm 2$ ; $\pm 3$ ; $\pm 5$ | %    |
| $B_{25/85}$ -value                                       | 3490 to 4311                          | K    |
| Tolerance on $B_{25/85}$ -value                          | $\pm 3$                               | %    |
| Maximum power dissipation at 25 °C $P_{max25}$           | 70                                    | mW   |
| Thermal time constant $\tau$                             | $\approx 5$                           | s    |
| Dissipation factor D                                     | $\approx 2.0$                         | mW/K |
| Operating temperature range at zero power <sup>(1)</sup> | -55 to +150                           | °C   |
| Storage temperature range                                | -55 to +150                           | °C   |
| Weight                                                   | $\approx 1.2$                         | mg   |

#### Note

<sup>(1)</sup> Zero power is considered as measuring power maximum 1 % of  $P_{max25}$

### AGENCY APPROVALS

Agency approval documents, please see:

[www.vishay.com/ppg?29003&documents](http://www.vishay.com/ppg?29003&documents)

### DESIGN-IN SUPPORT

For complete curve computation, please visit:

[www.vishay.com/thermistors/ntc-rt-calculator/](http://www.vishay.com/thermistors/ntc-rt-calculator/)

### 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
- cULus recognized, file E148885 (UL category XGPU2 / XGPU8)
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?299912](http://www.vishay.com/doc?299912)



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

### APPLICATIONS

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

### DESCRIPTION

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

### PACKAGING

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

### CAUTIONS AND WARNINGS ON MOUNTING AND HANDLING

Please read the special instructions:

see [www.vishay.com/doc?29224](http://www.vishay.com/doc?29224).

| 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               | 1                          | 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               | 1                          | NTCS0402E3104*HT                                    |
| 100 000                                  | 1, 2, 3, 5              | 4311               | 1                          | NTCS0402E3104*XT                                    |
| 470 000                                  | 3, 5                    | 3807               | 3                          | NTCS0402E3474*HT <sup>(3)</sup>                     |

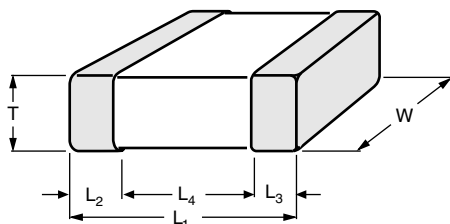
#### Notes

<sup>(1)</sup> Replace \* in SAP by J for  $\pm 5$  %, H for  $\pm 3$  %, G for  $\pm 2$  %, F for  $\pm 1$  % 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

<sup>(3)</sup> This P/N is not UL recognized

## DIMENSIONS in millimeters

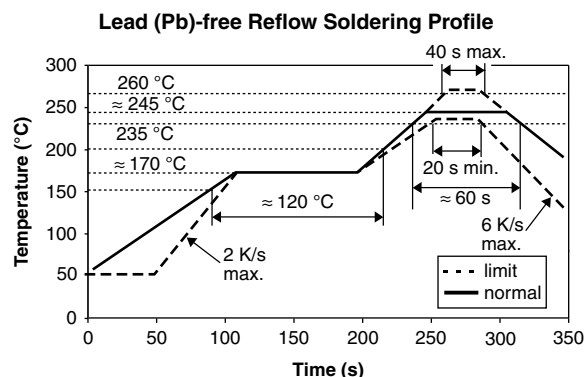
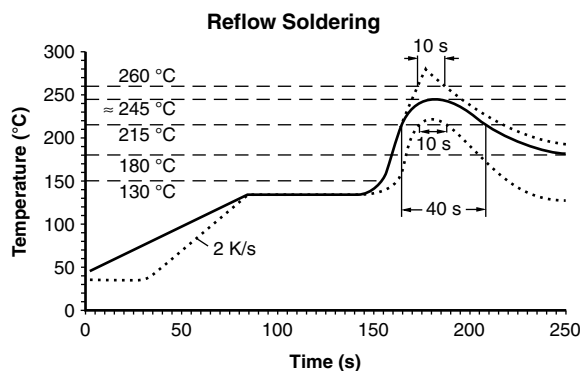


| L <sub>1</sub> | W          | T          | L <sub>2</sub> AND L <sub>3</sub><br>MIN. | L <sub>4</sub><br>MIN. |
|----------------|------------|------------|-------------------------------------------|------------------------|
| 1.0 ± 0.15     | 0.5 ± 0.15 | 0.5 ± 0.15 | 0.1                        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

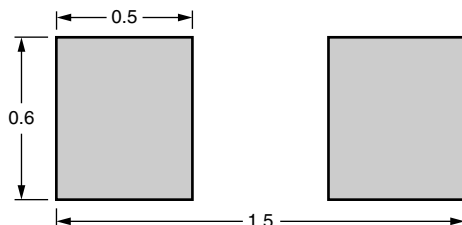
## SOLDERING CONDITIONS

Soldering, handling, and mounting conditions are detailed in the instructions document: see [www.vishay.com/doc?29224](http://www.vishay.com/doc?29224).

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



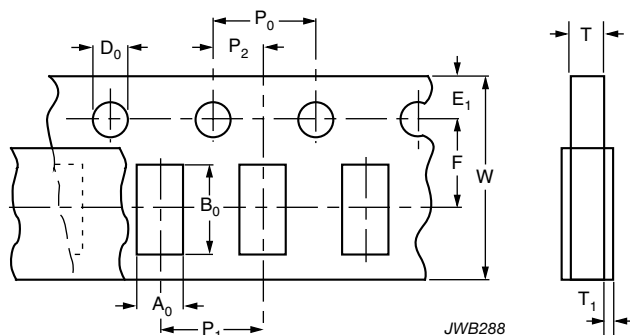
## Recommended solder land pattern dimensions (mm)



## 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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