

## SMD 0603, Glass Protected NTC Thermistors



### LINKS TO ADDITIONAL RESOURCES



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

### FEATURES

- TCR ranging from -7 %/K at -40 °C to -2 %/K at 150 °C
- Tolerance on  $R_{25}$  down to 1 %, and on  $B_{25/85}$  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?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 supplies
  - Office equipment
  - LCD compensation
  - In-car entertainment

### DESCRIPTION

Size 0603 (M1608) glass protected SMD chip thermistor with negative temperature coefficient (TCR) and matte tin (Sn) plated terminations. The device has no marking.

### CAUTIONS AND WARNINGS ON MOUNTING AND HANDLING

Please read the special instructions: see [www.vishay.com/doc?29224](http://www.vishay.com/doc?29224).

### PACKAGING

Available in 8 mm punched paper tape on reel package of 4000 units.

| QUICK REFERENCE DATA                                     |                                       |          |
|----------------------------------------------------------|---------------------------------------|----------|
| PARAMETER                                                | VALUE                                 | UNIT     |
| Resistance value at 25 °C                                | 1K to 100K                            | $\Omega$ |
| Tolerance on $R_{25}$ -value                             | $\pm 1$ ; $\pm 2$ ; $\pm 3$ ; $\pm 5$ | %        |
| $B_{25/85}$ -value                                       | 3170 to 4100                          | K        |
| Tolerance on $B_{25/85}$ -value                          | $\pm 1$                               | %        |
| Maximum power dissipation at 25 °C $P_{max25}$           | 125                                   | mW       |
| Thermal time constant $\tau$                             | < 4                                   | s        |
| Dissipation factor D                                     | 3.0                                   | mW/K     |
| Operating temperature range at zero power <sup>(1)</sup> | -55 to +150                           | °C       |
| Storage temperature range                                | -55 to +150                           | °C       |
| Weight                                                   | $\approx 0.006$                       | g        |

#### Note

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

### DESIGN-IN SUPPORT

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

### AGENCY APPROVALS

Agency approval documents, please see: [www.vishay.com/ppg?29056&documents](http://www.vishay.com/ppg?29056&documents)

| ELECTRICAL DATA AND ORDERING INFORMATION |                              |                    |                                 |                                                                                                  |                                                 |
|------------------------------------------|------------------------------|--------------------|---------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------|
| $R_{25}$<br>( $\Omega$ )                 | $R_{25}$ -TOL.<br>( $\pm$ %) | $B_{25/85}$<br>(K) | $B_{25/85}$ -TOL.<br>( $\pm$ %) | UL RECOG.<br> | SAP MATERIAL AND ORDERING NUMBER <sup>(1)</sup> |
| 1000                                     | 3, 5                         | 3170               | 1                               |                                                                                                  | NTCS0603E3102*LT                                |
| 1500                                     | 3, 5                         | 3280               | 1                               |                                                                                                  | NTCS0603E3152*LT                                |
| 2000                                     | 1, 2, 3, 5                   | 3420               | 1                               | ✓                                                                                                | NTCS0603E3202*LT                                |
| 2200                                     | 1, 2, 3, 5                   | 3520               | 1                               | ✓                                                                                                | NTCS0603E3222*MT                                |
| 2700                                     | 1, 2, 3, 5                   | 3600               | 1                               | ✓                                                                                                | NTCS0603E3272*MT                                |
| 4700                                     | 1, 2, 3, 5                   | 3830               | 1                               | ✓                                                                                                | NTCS0603E3472*HT                                |
| 5000                                     | 1, 2, 3, 5                   | 3480               | 1                               |                                                                                                  | NTCS0603E3502*LT                                |
| 10 000                                   | 1, 2, 3, 5                   | 3435               | 1                               | ✓                                                                                                | NTCS0603E3103*LT                                |
| 10 000                                   | 1, 2, 3, 5                   | 3610               | 1                               | ✓                                                                                                | NTCS0603E3103*MT                                |
| 10 000                                   | 1, 2, 3, 5                   | 3960               | 1                               | ✓                                                                                                | NTCS0603E3103*HT                                |
| 15 000                                   | 1, 2, 3, 5                   | 3600               | 1                               |                                                                                                  | NTCS0603E3153*MT                                |
| 22 000                                   | 1, 2, 3, 5                   | 3730               | 1                               | ✓                                                                                                | NTCS0603E3223*MT                                |
| 33 000                                   | 1, 2, 3, 5                   | 3860               | 1                               | ✓                                                                                                | NTCS0603E3333*HT                                |
| 47 000                                   | 1, 2, 3, 5                   | 3960               | 1                               | ✓                                                                                                | NTCS0603E3473*HT                                |
| 68 000                                   | 1, 2, 3, 5                   | 3985               | 1                               | ✓                                                                                                | NTCS0603E3683*HT                                |
| 100 000                                  | 1, 2, 3, 5                   | 4100               | 1                               | ✓                                                                                                | NTCS0603E3104*XT                                |

#### Note

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

## DIMENSIONS in millimeters

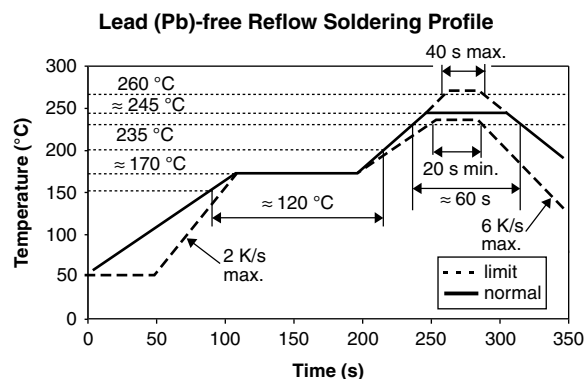
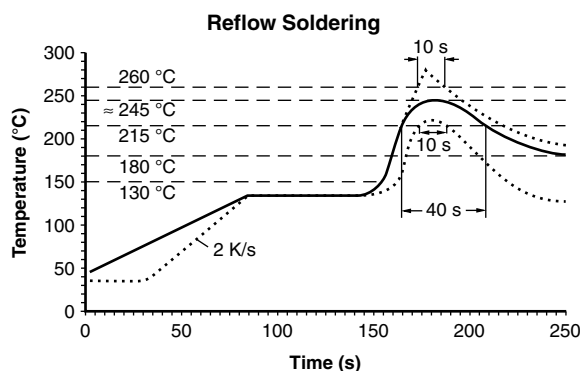


| L <sub>1</sub> | W          | T          | L <sub>2</sub> AND L <sub>3</sub><br>MIN. | L <sub>4</sub><br>MIN. |
|----------------|------------|------------|-------------------------------------------|------------------------|
| 1.6 ± 0.15     | 0.8 ± 0.15 | 0.8 ± 0.15 | 0.2                                       | 0.4                    |

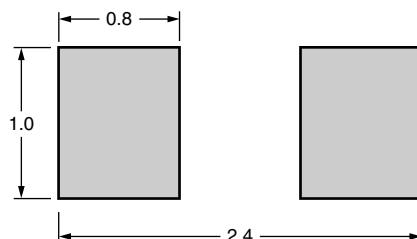
## SOLDERING CONDITIONS

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.



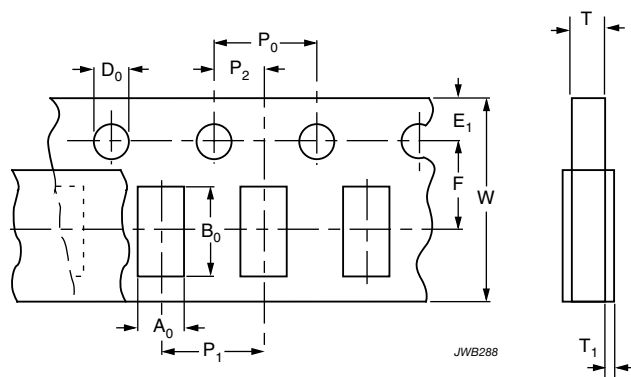
## Recommended solder land pattern dimensions (mm)



## PACKAGING TAPE SPECIFICATIONS

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

## PAPER TAPE



| DIMENSIONS OF PAPER TAPE in millimeters  |             |
|------------------------------------------|-------------|
| PARAMETER                                | DIMENSION   |
| A <sub>0</sub> <sup>(1)</sup>            | 1.15 ± 0.1  |
| B <sub>0</sub> <sup>(1)</sup>            | 1.9 ± 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.                    | 1.1         |
| 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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