

# Enhanced Leadless NTC Thermistor Die Suitable for Wire Bonding



## LINKS TO ADDITIONAL RESOURCES

### SPICE

[Models](#)

| QUICK REFERENCE DATA                                                    |                    |      |
|-------------------------------------------------------------------------|--------------------|------|
| PARAMETER                                                               | VALUE              | UNIT |
| Resistance value at 25 °C                                               | 4.7K to 20K        | Ω    |
| Tolerance on $R_{25}$ -value                                            | ± 1; ± 2; ± 3; ± 5 | %    |
| $B_{25/85}$ -value                                                      | 3435 to 3865       | K    |
| Tolerance on $B_{25/85}$ -value                                         | ± 1                | %    |
| Operating temperature range                                             | -55 to +175        | °C   |
| Response time (63.2 %)<br>25 °C to 85 °C still air (for info)           | 3                  | s    |
| Dissipation factor $\delta$ in still air<br>(for info, non-mounted die) | 3                  | mW   |
| Maximum power dissipation                                               | 50                 | mW   |
| Weight                                                                  | 3                  | mg   |

## MOUNTING

The thermistors are primarily intended for wire bonding or sintering. Contact specifications (thickness material) and bonding parameters are available on request. The parameters of the assembly process should be chosen in accordance with the lead-wire material.

The mounting process should be in compliance with the following guidelines and recommendations:

Die bonding: reflow soldering under vacuum or with formic acid / forming gases, with SAC or HMP / silver epoxy gluing / nano silver paste sintering.

Cleaning:

- Detergent spraying
- Ultrasonic cleaning is allowed if limited in time to 5 minutes

## FEATURES

- Flat chip contacted top and bottom (NTCC201E4 series)
- Green thermistor - does not use RoHS exemptions
- Wide temperature range from -55 °C to +175 °C (resistant to repetitive short periods at 200 °C, as for example, 10 times 10 s)
- Highly resistant to mounting conditions
- Ideal for aluminum wire
- Resistance to leaching during reflow soldering process
- Delivered on blister tape
- 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**  
**GREEN**  
(5-2008)

## APPLICATIONS

- High temperature sensing, control and compensation in power semiconductor modules (e.g. IGBT, SiC MOSFET, Diodes, ...), inverters in EV/HEV vehicles, and windmills
- IC and semiconductor protecting
- DC/AC power inverters and HIC overheat protecting

## DESIGN-IN SUPPORT

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

## MARKING

The thermistors have no marking and have electrode termination design without orientation.

Wire bonding:

- The silver electrode has been tested for aluminum wire bonding with a wire diameter of max. 300 μm

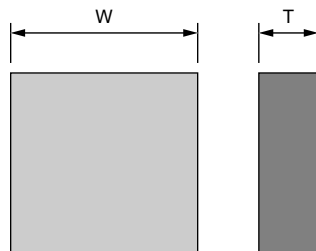
Encapsulation:

- In order to preserve the characteristics of the bonded die at long term an encapsulation is mandatory
- The encapsulation is defined by the user. Silicon and epoxy encapsulations have been tested. For recommendations on compatible encapsulants contact Vishay

| ELECTRICAL DATA AND ORDERING INFORMATION |                         |                    |                            |                                                |                                                 |
|------------------------------------------|-------------------------|--------------------|----------------------------|------------------------------------------------|-------------------------------------------------|
| $R_{25}$<br>(Ω)                          | $R_{25}$ -TOL.<br>(± %) | $B_{25/85}$<br>(K) | $B_{25/85}$ -TOL.<br>(± %) | DESCRIPTION                                    | SAP MATERIAL AND ORDERING NUMBER <sup>(1)</sup> |
| 4700                                     | 1, 2, 3, 5              | 3435               | 1                          | Bare die with top / bottom silver terminations | NTCC201E4472*T                                  |
| 5000                                     | 1, 2, 3, 5              | 3435               | 1                          | Bare die with top / bottom silver terminations | NTCC201E4502*T                                  |
| 10 000                                   | 1, 2, 3, 5              | 3435               | 1                          | Bare die with top / bottom silver terminations | NTCC201E4103*T                                  |
| 20 000                                   | 1, 2, 3, 5              | 3865               | 1                          | Bare die with top / bottom silver terminations | NTCC201E4203*T                                  |

### Note

<sup>(1)</sup> In order to define  $R_{25}$ -tolerance, replace \* in SAP part number by F (± 1 %), G (± 2 %), H (± 3 %), or J (± 5 %)

**DIMENSIONS** in millimeters


Wire bondable surface

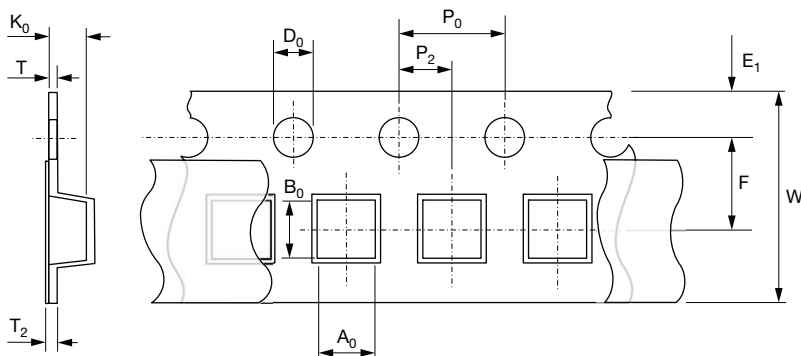
| PARAMETER | VALUE                    |                |
|-----------|--------------------------|----------------|
| W         | NTCC201E4472/502*T/203*T | $2.0 \pm 0.1$  |
|           | NTCC201E4103*T           | $1.4 \pm 0.1$  |
| T         | NTCC201E4472*T           | $0.6 \pm 0.1$  |
|           | NTCC201E4502*T           | $0.66 \pm 0.1$ |
|           | NTCC201E4103*T           | $0.62 \pm 0.1$ |
|           | NTCC201E4203*T           | $0.71 \pm 0.1$ |

**Note**

- Non-dimensioned details do not affect the performance of the thermistors

**PACKAGING**

The components are delivered on 8 mm embossed blister tape (0.3 mm conductive PS) conforming to EIA-481 and IEC 60286-3, with 2000 parts per reel.



| PARAMETER      | VALUE                     |
|----------------|---------------------------|
| A <sub>0</sub> | Adapted to die dimensions |
| B <sub>0</sub> | Adapted to die dimensions |
| K <sub>0</sub> | Adapted to die dimensions |
| W              | $8 \pm 0.3$               |
| F              | $3.5 \pm 0.05$            |
| E <sub>1</sub> | $1.75 \pm 0.1$            |
| P <sub>0</sub> | $4.0 \pm 0.1$             |
| P <sub>2</sub> | $2.0 \pm 0.05$            |
| D <sub>0</sub> | $1.5 \pm 0.1$             |
| T              | 0.35 max.                 |
| T <sub>2</sub> | 0.50 max.                 |



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