

■ High temperature, high sensitivity, glass encapsulated thermistor

# NT Thermistor

Semitec's glass encapsulated NT-4 series thermistor features high heat resistance and high sensitivity. Compared with conventional thermistors, the NT-4 thermistors are smaller, faster in response, and more reliable which makes them suitable for various applications.

■ Product number explanation



■ Dimensions



■ Applications

3D printers, HVAC equipment, water heaters, microwave ovens, home appliances, hybrid vehicles, fuel cell vehicles, automotive, medical, disaster prevention, security, office automation

■ Specifications

| Product number   | Rated zero-power resistance <sup>1</sup> |            |                      | B value temperature C <sub>(100,000)</sub> | B value <sup>2</sup> | Operating temperature range (°C) |
|------------------|--|------------|----------------------|--|----------------------|----------------------------------|
|                  | Temperature                              | Resistance | Resistance tolerance |  |                      |                                  |
| 502NT-4-R025H39G | 25 °C                                    | 5 kΩ       | ± 3% <sup>3</sup>    | 25/85                                      | 3964 K ± 2%          | - 50 to 300                      |
| 852NT-4-R050H34G | 50 °C                                    | 3.485 kΩ   |                      | 0/100                                      | 3450 K ± 2%          |                                  |
| 103NT-4-R025H34G | 25 °C                                    | 10 kΩ      |                      | 25/85                                      | 3435 K ± 2%          |                                  |
| 103NT-4-R025H41G | 25 °C                                    | 10 kΩ      |                      | 25/85                                      | 4126 K ± 2%          |                                  |
| 203NT-4-R025H42G | 25 °C                                    | 20 kΩ      |                      | 25/85                                      | 4282 K ± 2%          |                                  |
| 493NT-4-R100H40G | 100 °C                                   | 3.3 kΩ     |                      | 0/100                                      | 3970 K ± 2%          |                                  |
| 503NT-4-R025H42G | 25 °C                                    | 50 kΩ      |                      | 25/85                                      | 4288 K ± 2%          |                                  |
| 104NT-4-R025H42G | 25 °C                                    | 100 kΩ     |                      | 25/85                                      | 4267 K ± 2%          |                                  |
| 104NT-4-R025H43G | 25 °C                                    | 100 kΩ     |                      | 25/85                                      | 4390 K ± 2%          |                                  |
| 204NT-4-R025H43G | 25 °C                                    | 200 kΩ     |                      | 25/85                                      | 4338 K ± 2%          |                                  |
| 234NT-4-R200H42G | 200 °C                                   | 1 kΩ       |                      | 100/200                                    | 4537 K ± 2%          |                                  |
| 504NT-4-R025H45G | 25 °C                                    | 500 kΩ     |                      | 25/85                                      | 4526 K ± 2%          |                                  |
| 105NT-4-R025H46G | 25 °C                                    | 1000 kΩ    |                      | 25/85                                      | 4608 K ± 2%          |                                  |

\* Dissipation factor: 0.8 mw / °C • Thermal time constant<sup>4</sup>: approx. 6 s • Rated power at 25 °C: 4 mW  
<sup>1</sup>: Rated zero-power resistance at each temperature  
<sup>2</sup>: B value calculated from rated zero-power resistance at each temperature  
<sup>3</sup>: If your application requires other tolerance values please contact SEMITEC sales staff.  
<sup>4</sup>: Time required to reach 63.2% of temperature difference. Measured with sensor suspended in mid-air.

■ Reliability data

| Item                              | Test conditions   | Criteria                               |
|-----------------------------------|---|--|
| Resistance to soldering heat      | 10 s at 260 °C (wave soldering)   | ΔR ± 3%, ΔB ± 1% and visual inspection |
|                                   | 3.5 s at 350 °C (soldering iron)  |  |
| Solderability                     | 2 s at 245 °C<br>Flux material: Rosin 25%, ethyl alcohol 75%                                  | More than 90% soldered                 |
| Tensile strength (lead wire)      | 10 s at 1 N (horizontal pull)   | ΔR ± 3%, ΔB ± 1% and visual inspection |
| Termination bending               | 0.5 N, two times, 90°   |  |
| Free fall                         | Three times natural fall to a maple board from 1 m height.                                    |  |
| Voltage proof                     | 500 V AC for one minute   | Less than 1 mA                         |
| Insulation resistance             | 500 V DC  | Over 100 MΩ                            |
| Dry heat                          | 1000 hours at 300 °C  | ΔR ± 3%, ΔB ± 1%                       |
| Damp heat (under electrical load) | 1000 hours at 85 °C and 85% humidity<br>Electrical load: 0.1 mA DC                            |  |
| Temperature cycle (thermal shock) | 100 cycles as below:<br>1. - 30 °C for 3 minutes in fluid<br>2. 150 °C for 3 minutes in fluid |  |

■ Resistance / temperature characteristics

| Temperature (°C) | 502NT-4-R025H39G | 852NT-4-R050H34G | 103NT-4-R025H34G | 103NT-4-R025H41G | 203NT-4-R025H42G | 493NT-4-R100H40G | 503NT-4-R025H42G | 104NT-4-R025H42G | 104NT-4-R025H43G | 204NT-4-R025H43G | 234NT-4-R200H42G | 504NT-4-R025H45G | 105NT-4-R025H46G |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| -50              | 339.5            | 346.8            | 394.7            | 830.9            | 1931             | 3376             | 3576             | 8887             | 10090            | 19040            | 17900            | 52600            | 110900           |
| -30              | 92.34            | 106.1            | 122.0            | 207.7            | 459.2            | 885.4            | 965.0            | 2156             | 2353             | 4524.0           | 4633.0           | 12290            | 25610            |
| -10              | 28.48            | 38.02            | 44.09            | 60.87            | 129.3            | 275.5            | 302.8            | 623.2            | 657.0            | 1284.0           | 1393.0           | 3396             | 6979             |
| 0                | 16.64            | 23.92            | 27.86            | 34.85            | 72.67            | 162.2            | 175.2            | 354.6            | 368.1            | 724.5            | 804.8            | 1887             | 3849             |
| 10               | 10.06            | 15.49            | 18.13            | 20.65            | 42.33            | 98.65            | 104.0            | 208.8            | 213.5            | 423.0            | 479.2            | 1084             | 2195             |
| 25               | 5.000            | 8.487            | 10.00            | 10.00            | 20.00            | 49.41            | 50.00            | 100.0            | 100.0            | 200.0            | 232.1            | 500.0            | 1000             |
| 40               | 2.649            | 4.899            | 5.806            | 5.166            | 10.10            | 26.23            | 25.42            | 50.90            | 49.90            | 100.6            | 119.0            | 245.2            | 484.7            |
| 50               | 1.790            | 3.485            | 4.144            | 3.437            | 6.613            | 17.70            | 16.69            | 33.45            | 32.42            | 65.72            | 78.46            | 157.3            | 308.4            |
| 60               | 1.238            | 2.524            | 3.011            | 2.341            | 4.440            | 12.20            | 11.19            | 22.48            | 21.54            | 43.89            | 52.84            | 103.1            | 200.7            |
| 80               | 0.6306           | 1.391            | 1.668            | 1.159            | 2.138            | 6.134            | 5.343            | 10.80            | 10.13            | 20.81            | 25.39            | 47.24            | 90.54            |
| 85               | 0.3591           | 1.209            | 1.451            | 0.9843           | 1.803            | 5.222            | 4.494            | 9.094            | 8.486            | 17.48            | 21.38            | 39.31            | 75.08            |
| 100              | 0.3455           | 0.8104           | 0.9754           | 0.6189           | 1.112            | 3.300            | 2.741            | 5.569            | 5.122            | 10.61            | 13.06            | 23.27            | 43.96            |
| 120              | 0.2014           | 0.4952           | 0.5920           | 0.3525           | 0.6175           | 1.882            | 1.498            | 3.058            | 2.763            | 5.759            | 7.130            | 12.23            | 22.78            |
| 140              | 0.1238           | 0.3108           | 0.3679           | 0.2121           | 0.3631           | 1.127            | 0.8635           | 1.770            | 1.574            | 3.301            | 4.098            | 6.787            | 12.48            |
| 160              | 0.07968          | 0.2000           | 0.2365           | 0.1339           | 0.2245           | 0.7057           | 0.5225           | 1.074            | 0.9414           | 1.985            | 2.466            | 3.957            | 7.188            |
| 180              | 0.05341          | 0.1325           | 0.1568           | 0.08811          | 0.1448           | 0.4592           | 0.3296           | 0.6793           | 0.5873           | 1.244            | 1.544            | 2.406            | 4.322            |
| 200              | 0.03708          | 0.09036          | 0.1068           | 0.06015          | 0.09698          | 0.3092           | 0.2158           | 0.4452           | 0.3804           | 0.8098           | 1.000            | 1.519            | 2.703            |
| 220              | 0.02656          | 0.06329          | 0.07467          | 0.04239          | 0.06713          | 0.2145           | 0.1459           | 0.3016           | 0.2549           | 0.5442           | 0.6674           | 0.9937           | 1.750            |
| 240              | 0.01956          | 0.04543          | 0.05345          | 0.03072          | 0.04784          | 0.1529           | 0.1016           | 0.2104           | 0.1760           | 0.3765           | 0.4574           | 0.6712           | 1.168            |
| 260              | 0.01477          | 0.03337          | 0.03907          | 0.02285          | 0.03499          | 0.1117           | 0.07261          | 0.1507           | 0.1250           | 0.2676           | 0.3210           | 0.4663           | 0.8019           |
| 280              | 0.01141          | 0.02506          | 0.02912          | 0.01743          | 0.02619          | 0.08336          | 0.05319          | 0.1105           | 0.09101          | 0.1950           | 0.2302           | 0.3317           | 0.5651           |
| 300              | 0.00900          | 0.01919          | 0.02209          | 0.01361          | 0.02003          | 0.06345          | 0.03981          | 0.08278          | 0.06772          | 0.1452           | 0.1683           | 0.2410           | 0.4074           |

■ Caution

- When soldering make sure to have a minimum distance from the glass encapsulated sensor head of 5 mm.
- When working the lead wire make sure to fix the wire at a minimum distance from the glass encapsulated sensor head of 5 mm.

Unit: kΩ