



# NTC Thermistors, Low Thermal Gradient Lug Sensors



**CA** US

## ADDITIONAL RESOURCES



3D Models



Design Tools

**SPICE**

Models

- NTC curve computation:  
[www.vishay.com/thermistors/ntc-curve-list/](http://www.vishay.com/thermistors/ntc-curve-list/)

| QUICK REFERENCE DATA                                           |                     |                 |
|----------------------------------------------------------------|---------------------|-----------------|
| PARAMETER                                                      | VALUE               | UNIT            |
| Resistance value at 25 °C <sup>(1)</sup>                       | 4.7K to 100K        | Ω               |
| Tolerance on $R_{25}$ -value <sup>(1)</sup>                    | ± 1; ± 2; ± 3       | %               |
| $B_{25/85}$ value <sup>(1)</sup>                               | 3435 to 4190        | K               |
| Tolerance on $B_{25/85}$ -value                                | ± 0.5; ± 1.0; ± 1.5 | %               |
| Operating temperature range at zero power                      | -55 to +125         | °C              |
| Thermal time constant $\tau$                                   | ≈ 5                 | s               |
| Dissipation factor                                             | 10                  | mW/K            |
| Thermal gradient <sup>(2)</sup>                                | < 0.05              | K/K             |
| Min. dielectric withstanding voltage between terminals and lug | 1500                | V <sub>AC</sub> |
| Climatic category (LCT / UCT / days)                           | 55 / 125 / 56       |                 |
| Weight                                                         | ≈ 1.0               | g               |

### Notes

- (1) Other  $R_{25}$ -values,  $B_{25/85}$ -values, and tolerances are available upon request
- (2) The thermal gradient is the difference per °C between the true temperature of the surface to be sensed and the temperature measured by the sensor

## FEATURES

- Low thermal gradient due to the use of nickel conductor and low profile closed ring tongue
- AEC-Q200 qualified (grade 1)
- cULus recognized, file E148885 (UL category XGPU2/XGPU8)
- Mounting: assembly screw mounting
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



Available



**RoHS**  
COMPLIANT

## APPLICATIONS

Thermistors used for accurate surface temperature sensing and control in:

- Computer equipment
- Power electronics, heat-sink temperature control
- Consumer appliances
- Industrial equipment
- Automotive equipment

## DESCRIPTION

Vishay thermistor chip NTC with epoxy coating and middle buffer layer mounted in a tin plated copper ring lug with PEEK insulated leads AWG#30 (Ø 0.25 mm), mono-stranded silver-plated nickel.

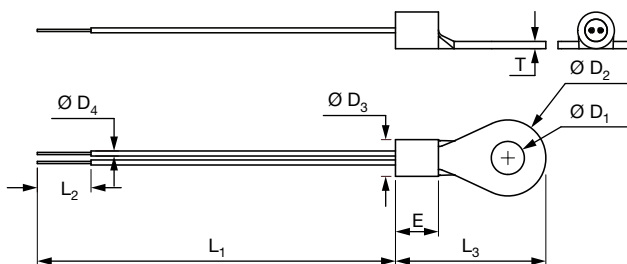
## MOUNTING

- The device is suitable for screwing e.g. on a metal surface through means of an M3 or M3.5 screw
- The connections are suitable for soldering on a PCB or for connector insertion
- The sensor is not suitable for being in permanent contact with water or liquids
- Other applicable screw hole sizes are available, for example M4 or American Stud #8
- AWG#28 or AWG#26 wires available on request
- Consult Vishay for other cable length, cable section, screw sizes, insulation, connector crimping or other features

| ELECTRICAL DATA AND ORDERING INFORMATION |                         |                    |                            |               |                          | SAP MATERIAL AND ORDERING NUMBER                |                        |
|------------------------------------------|-------------------------|--------------------|----------------------------|---------------|--------------------------|-------------------------------------------------|------------------------|
| $R_{25}$<br>(Ω)                          | $R_{25}$ -TOL.<br>(± %) | $B_{25/85}$<br>(K) | $B_{25/85}$ -TOL.<br>(± %) | $L_1$<br>(mm) | UL RECOGNIZED<br>(Y / N) | RoHS COMPLIANT<br>WITH EXEMPTION <sup>(1)</sup> | RoHS COMPLIANT         |
| 4700                                     | 2                       | 3984               | 0.5                        | 45 ± 3        | N                        | NTCALUG02A472G                                  | NTCALUG02A472GA        |
| 4700                                     | 1                       | 3984               | 0.5                        | 45 ± 3        | N                        | NTCALUG02A472F                                  | NTCALUG02A472FA        |
| 5000                                     | 2                       | 3984               | 0.5                        | 45 ± 3        | Y                        | <b>NTCALUG02A502G</b>                           | <b>NTCALUG02A502GA</b> |
| 10 000                                   | 2                       | 3984               | 0.5                        | 45 ± 3        | Y                        | <b>NTCALUG02A103G <sup>(2)</sup></b>            | <b>NTCALUG02A103GA</b> |
| 10 000                                   | 1                       | 3984               | 0.5                        | 45 ± 3        | Y                        | NTCALUG02A103F                                  | NTCALUG02A103FA        |
| 10 000                                   | 1                       | 3984               | 0.5                        | 80 +5 / -3    | Y                        | NTCALUG02A103F800                               | NTCALUG02A103F800A     |
| 10 000                                   | 1                       | 3984               | 0.5                        | 160 +5 / -3   | Y                        | NTCALUG02A103F161                               | NTCALUG02A103F161A     |
| 10 000                                   | 1                       | 3435               | 1.0                        | 45 ± 3        | Y                        | NTCALUG02A103FL                                 | NTCALUG02A103FLA       |
| 10 000                                   | 1                       | 3435               | 1.0                        | 80 +5 / -3    | Y                        | NTCALUG02A103F800L                              | NTCALUG02A103F800LA    |
| 10 000                                   | 1                       | 3435               | 1.0                        | 160 +5 / -3   | Y                        | NTCALUG02A103F161L                              | NTCALUG02A103F161LA    |
| 100 000                                  | 3                       | 4190               | 1.5                        | 45 ± 3        | N                        | NTCALUG02A104H                                  | NTCALUG02A104HA        |

### Notes

- (1) RoHS exemption 7(c)-I: electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezo-electronic devices, or in a glass or ceramic matrix compound
- (2) Is also known under material number NTCALUGE4C90294

**DIMENSIONS** in millimeters


| L <sub>1</sub>              | L <sub>2</sub> | L <sub>3</sub> | Ø D <sub>1</sub> | Ø D <sub>2</sub> | Ø D <sub>3</sub>  | Ø D <sub>4</sub> | E         | T   |
|-----------------------------|----------------|----------------|------------------|------------------|-------------------|------------------|-----------|-----|
| Refer to the ordering table | 6 ± 1          | 16.8 ± 0.3     | 3.7 + 0.2 / - 0  | 8.5 ± 0.2        | 4.1 + 0.4 / - 0.1 | 0.56 ± 0.1       | 4.8 ± 0.2 | 0.8 |



NTCALUG02A472G\*

NTC LUG02A 4.7K 2 % 3984 K 0.5 %

**RESISTANCE TEMPERATURE CHARACTERISTICS**

| TEMP.<br>(°C) | $R(T)/R_{25}$ | RESISTANCE<br>( $\Omega$ ) | $\Delta R/R$<br>(%) | $\alpha$<br>(%/K) | $\Delta T$<br>(K) | $R_{min.}$<br>( $\Omega$ ) | $R_{max.}$<br>( $\Omega$ ) |
|---------------|---------------|----------------------------|---------------------|-------------------|-------------------|----------------------------|----------------------------|
| -40           | 33.43         | 157 109                    | 3.90                | -6.63             | 0.59              | 150 982                    | 163 236                    |
| -35           | 24.13         | 113 422                    | 3.72                | -6.41             | 0.58              | 109 206                    | 117 638                    |
| -30           | 17.61         | 82 782                     | 3.54                | -6.19             | 0.57              | 79 851                     | 85714                      |
| -25           | 12.99         | 61 053                     | 3.37                | -5.99             | 0.56              | 58 994                     | 63 112                     |
| -20           | 9.68          | 45 478                     | 3.21                | -5.79             | 0.55              | 44 017                     | 46 938                     |
| -15           | 7.276         | 34 199                     | 3.06                | -5.61             | 0.54              | 33 154                     | 35 244                     |
| -10           | 5.522         | 25 953                     | 2.91                | -5.43             | 0.54              | 25 198                     | 26 707                     |
| -5            | 4.227         | 19 866                     | 2.76                | -5.26             | 0.53              | 19 317                     | 20 415                     |
| 0             | 3.262         | 15 333                     | 2.62                | -5.10             | 0.51              | 14 931                     | 15 736                     |
| 5             | 2.538         | 11 929                     | 2.49                | -4.94             | 0.50              | 11 632                     | 12 226                     |
| 10            | 1.990         | 9352                       | 2.36                | -4.80             | 0.49              | 9131                       | 9572                       |
| 15            | 1.571         | 7384                       | 2.24                | -4.65             | 0.48              | 7219                       | 7549                       |
| 20            | 1.249         | 5872                       | 2.12                | -4.52             | 0.47              | 5747                       | 5996                       |
| 25            | 1.000         | 4700                       | 2.00                | -4.39             | 0.46              | 4606                       | 4794                       |
| 30            | 0.8056        | 3786                       | 2.11                | -4.26             | 0.50              | 3706                       | 3866                       |
| 35            | 0.6530        | 3069                       | 2.22                | -4.14             | 0.54              | 3001                       | 3137                       |
| 40            | 0.5324        | 2502                       | 2.33                | -4.03             | 0.58              | 2444                       | 2560                       |
| 45            | 0.4365        | 2052                       | 2.43                | -3.92             | 0.62              | 2002                       | 2102                       |
| 50            | 0.3599        | 1691                       | 2.53                | -3.81             | 0.66              | 1649                       | 1734                       |
| 55            | 0.2982        | 1402                       | 2.62                | -3.71             | 0.71              | 1365                       | 1438                       |
| 60            | 0.2484        | 1167                       | 2.72                | -3.61             | 0.75              | 1136                       | 1199                       |
| 65            | 0.2079        | 977.0                      | 2.81                | -3.51             | 0.80              | 949.6                      | 1004                       |
| 70            | 0.1748        | 821.4                      | 2.89                | -3.42             | 0.85              | 797.6                      | 845.2                      |
| 75            | 0.1476        | 693.7                      | 2.98                | -3.34             | 0.89              | 673.0                      | 714.3                      |
| 80            | 0.1252        | 588.3                      | 3.06                | -3.25             | 0.94              | 570.3                      | 606.4                      |
| 85            | 0.1066        | 501.1                      | 3.14                | -3.17             | 0.99              | 485.3                      | 516.8                      |
| 90            | 0.09116       | 428.4                      | 3.22                | -3.09             | 1.04              | 414.7                      | 442.2                      |
| 95            | 0.07825       | 367.8                      | 3.30                | -3.02             | 1.09              | 355.6                      | 379.9                      |
| 100           | 0.06741       | 316.8                      | 3.37                | -2.94             | 1.14              | 306.2                      | 327.5                      |
| 105           | 0.05828       | 273.9                      | 3.44                | -2.87             | 1.20              | 264.5                      | 283.4                      |
| 110           | 0.05057       | 237.7                      | 3.51                | -2.81             | 1.25              | 229.3                      | 246.0                      |
| 115           | 0.04402       | 206.9                      | 3.58                | -2.74             | 1.31              | 199.5                      | 214.3                      |
| 120           | 0.03844       | 180.7                      | 3.65                | -2.68             | 1.36              | 174.1                      | 187.3                      |
| 125           | 0.03367       | 158.3                      | 3.71                | -2.62             | 1.42              | 152.4                      | 164.1                      |



NTCALUG02A472F\*

NTC LUG02A 4.7K 1 % 3984 K 0.5 %

**RESISTANCE TEMPERATURE CHARACTERISTICS**

| TEMP.<br>(°C) | $R(T)/R_{25}$ | RESISTANCE<br>( $\Omega$ ) | $\Delta R/R$<br>(%) | $\alpha$<br>(%/K) | $\Delta T$<br>(K) | $R_{min.}$<br>( $\Omega$ ) | $R_{max.}$<br>( $\Omega$ ) |
|---------------|---------------|----------------------------|---------------------|-------------------|-------------------|----------------------------|----------------------------|
| -40           | 33.43         | 157 109                    | 2.88                | -6.63             | 0.43              | 152 582                    | 161 636                    |
| -35           | 24.13         | 113 422                    | 2.70                | -6.41             | 0.42              | 110 359                    | 116 484                    |
| -30           | 17.61         | 82 782                     | 2.53                | -6.19             | 0.41              | 80 691                     | 84 874                     |
| -25           | 12.99         | 61 053                     | 2.36                | -5.99             | 0.39              | 59 612                     | 62 494                     |
| -20           | 9.68          | 45 478                     | 2.20                | -5.79             | 0.38              | 44 477                     | 46 478                     |
| -15           | 7.276         | 34 199                     | 2.05                | -5.61             | 0.36              | 33 500                     | 34 899                     |
| -10           | 5.522         | 25 953                     | 1.90                | -5.43             | 0.35              | 25 460                     | 26 445                     |
| -5            | 4.227         | 19 866                     | 1.75                | -5.26             | 0.33              | 19 517                     | 20 215                     |
| 0             | 3.262         | 15 333                     | 1.62                | -5.10             | 0.32              | 15 085                     | 15 581                     |
| 5             | 2.538         | 11 929                     | 1.49                | -4.94             | 0.30              | 11 752                     | 12 106                     |
| 10            | 1.990         | 9352                       | 1.36                | -4.80             | 0.28              | 9225                       | 9478                       |
| 15            | 1.571         | 7384                       | 1.23                | -4.65             | 0.27              | 7293                       | 7475                       |
| 20            | 1.249         | 5872                       | 1.12                | -4.52             | 0.25              | 5806                       | 5937                       |
| 25            | 1.000         | 4700                       | 1.00                | -4.39             | 0.23              | 4653                       | 4747                       |
| 30            | 0.8056        | 3786                       | 1.11                | -4.26             | 0.26              | 3744                       | 3828                       |
| 35            | 0.6530        | 3069                       | 1.22                | -4.14             | 0.29              | 3032                       | 3106                       |
| 40            | 0.5324        | 2502                       | 1.32                | -4.03             | 0.33              | 2469                       | 2535                       |
| 45            | 0.4365        | 2052                       | 1.42                | -3.92             | 0.36              | 2022                       | 2081                       |
| 50            | 0.3599        | 1691                       | 1.52                | -3.81             | 0.40              | 1666                       | 1717                       |
| 55            | 0.2982        | 1402                       | 1.62                | -3.71             | 0.44              | 1379                       | 1424                       |
| 60            | 0.2484        | 1167                       | 1.71                | -3.61             | 0.47              | 1147                       | 1187                       |
| 65            | 0.2079        | 977.0                      | 1.80                | -3.51             | 0.51              | 959.4                      | 994.5                      |
| 70            | 0.1748        | 821.4                      | 1.88                | -3.42             | 0.55              | 805.9                      | 836.9                      |
| 75            | 0.1476        | 693.7                      | 1.97                | -3.34             | 0.59              | 680.0                      | 707.3                      |
| 80            | 0.1252        | 588.3                      | 2.05                | -3.25             | 0.63              | 576.3                      | 600.4                      |
| 85            | 0.1066        | 501.1                      | 2.13                | -3.17             | 0.67              | 490.4                      | 511.7                      |
| 90            | 0.09116       | 428.4                      | 2.21                | -3.09             | 0.71              | 419.0                      | 437.9                      |
| 95            | 0.07825       | 367.8                      | 2.28                | -3.02             | 0.76              | 359.4                      | 376.2                      |
| 100           | 0.06741       | 316.8                      | 2.36                | -2.94             | 0.80              | 309.4                      | 324.3                      |
| 105           | 0.05828       | 273.9                      | 2.43                | -2.87             | 0.84              | 267.3                      | 280.6                      |
| 110           | 0.05057       | 237.7                      | 2.50                | -2.81             | 0.89              | 231.7                      | 243.6                      |
| 115           | 0.04402       | 206.9                      | 2.56                | -2.74             | 0.94              | 201.6                      | 212.2                      |
| 120           | 0.03844       | 180.7                      | 2.63                | -2.68             | 0.98              | 175.9                      | 185.4                      |
| 125           | 0.03367       | 158.3                      | 2.69                | -2.62             | 1.03              | 154.0                      | 162.5                      |



NTCALUG02A502G\*

NTC LUG02A 5K 2 % 3984 K 0.5 %

**RESISTANCE TEMPERATURE CHARACTERISTICS**

| TEMP.<br>(°C) | $R(T)/R_{25}$ | RESISTANCE<br>( $\Omega$ ) | $\Delta R/R$<br>(%) | $\alpha$<br>(%/K) | $\Delta T$<br>(K) | $R_{min.}$<br>( $\Omega$ ) | $R_{max.}$<br>( $\Omega$ ) |
|---------------|---------------|----------------------------|---------------------|-------------------|-------------------|----------------------------|----------------------------|
| -40           | 33.43         | 167 137                    | 3.90                | -6.63             | 0.59              | 160 619                    | 173 655                    |
| -35           | 24.13         | 120 661                    | 3.72                | -6.41             | 0.58              | 116 177                    | 125 146                    |
| -30           | 17.61         | 88 066                     | 3.54                | -6.19             | 0.57              | 84 947                     | 91 185                     |
| -25           | 12.99         | 64 950                     | 3.37                | -5.99             | 0.56              | 62 759                     | 67 141                     |
| -20           | 9.68          | 48 381                     | 3.21                | -5.79             | 0.55              | 46 827                     | 49 934                     |
| -15           | 7.276         | 36 382                     | 3.06                | -5.61             | 0.54              | 35 270                     | 37 494                     |
| -10           | 5.522         | 27 609                     | 2.91                | -5.43             | 0.54              | 26 807                     | 28 411                     |
| -5            | 4.227         | 21 134                     | 2.76                | -5.26             | 0.53              | 20 550                     | 21 718                     |
| 0             | 3.262         | 16 312                     | 2.62                | -5.10             | 0.51              | 15 884                     | 16 740                     |
| 5             | 2.538         | 12 691                     | 2.49                | -4.94             | 0.50              | 12 375                     | 13 007                     |
| 10            | 1.990         | 9948                       | 2.36                | -4.80             | 0.49              | 9714                       | 10 183                     |
| 15            | 1.571         | 7856                       | 2.24                | -4.65             | 0.48              | 7680                       | 8031                       |
| 20            | 1.249         | 6246                       | 2.12                | -4.52             | 0.47              | 6114                       | 6379                       |
| 25            | 1.000         | 5000                       | 2.00                | -4.39             | 0.46              | 4900                       | 5100                       |
| 30            | 0.8056        | 4028                       | 2.11                | -4.26             | 0.50              | 3943                       | 4113                       |
| 35            | 0.6530        | 3265                       | 2.22                | -4.14             | 0.54              | 3192                       | 3337                       |
| 40            | 0.5324        | 2662                       | 2.33                | -4.03             | 0.58              | 2600                       | 2724                       |
| 45            | 0.4365        | 2183                       | 2.43                | -3.92             | 0.62              | 2130                       | 2236                       |
| 50            | 0.3599        | 1799                       | 2.53                | -3.81             | 0.66              | 1754                       | 1845                       |
| 55            | 0.2982        | 1491                       | 2.62                | -3.71             | 0.71              | 1452                       | 1530                       |
| 60            | 0.2484        | 1242                       | 2.72                | -3.61             | 0.75              | 1208                       | 1276                       |
| 65            | 0.2079        | 1039                       | 2.81                | -3.51             | 0.80              | 1010                       | 1068                       |
| 70            | 0.1748        | 873.8                      | 2.89                | -3.42             | 0.85              | 848.5                      | 899.1                      |
| 75            | 0.1476        | 738.0                      | 2.98                | -3.34             | 0.89              | 716.0                      | 759.9                      |
| 80            | 0.1252        | 625.9                      | 3.06                | -3.25             | 0.94              | 606.7                      | 645.1                      |
| 85            | 0.1066        | 533.1                      | 3.14                | -3.17             | 0.99              | 516.3                      | 549.8                      |
| 90            | 0.09116       | 455.8                      | 3.22                | -3.09             | 1.04              | 441.1                      | 470.5                      |
| 95            | 0.07825       | 391.2                      | 3.30                | -3.02             | 1.09              | 378.3                      | 404.1                      |
| 100           | 0.06741       | 337.1                      | 3.37                | -2.94             | 1.14              | 325.7                      | 348.4                      |
| 105           | 0.05828       | 291.4                      | 3.44                | -2.87             | 1.20              | 281.4                      | 301.5                      |
| 110           | 0.05057       | 252.8                      | 3.51                | -2.81             | 1.25              | 244.0                      | 261.7                      |
| 115           | 0.04402       | 220.1                      | 3.58                | -2.74             | 1.31              | 212.2                      | 228.0                      |
| 120           | 0.03844       | 192.2                      | 3.65                | -2.68             | 1.36              | 185.2                      | 199.2                      |
| 125           | 0.03367       | 168.4                      | 3.71                | -2.62             | 1.42              | 162.1                      | 174.6                      |



NTCALUG02A103G\*

NTC LUG02A 10K 2 % 3984 K 0.5 %

**RESISTANCE TEMPERATURE CHARACTERISTICS**

| TEMP.<br>(°C) | $R(T)/R_{25}$ | RESISTANCE<br>( $\Omega$ ) | $\Delta R/R$<br>(%) | $\alpha$<br>(%/K) | $\Delta T$<br>(K) | $R_{min.}$<br>( $\Omega$ ) | $R_{max.}$<br>( $\Omega$ ) |
|---------------|---------------|----------------------------|---------------------|-------------------|-------------------|----------------------------|----------------------------|
| -40           | 33.43         | 334 274                    | 3.90                | -6.63             | 0.59              | 321 238                    | 347 311                    |
| -35           | 24.13         | 241 323                    | 3.72                | -6.41             | 0.58              | 232 353                    | 250 293                    |
| -30           | 17.61         | 176 133                    | 3.54                | -6.19             | 0.57              | 169 895                    | 182 370                    |
| -25           | 12.99         | 129 900                    | 3.37                | -5.99             | 0.56              | 125 518                    | 134 282                    |
| -20           | 9.68          | 96 761                     | 3.21                | -5.79             | 0.55              | 93 654                     | 99 869                     |
| -15           | 7.276         | 72 765                     | 3.06                | -5.61             | 0.54              | 70 541                     | 74 988                     |
| -10           | 5.522         | 55 218                     | 2.91                | -5.43             | 0.54              | 53 613                     | 56 823                     |
| -5            | 4.227         | 42 268                     | 2.76                | -5.26             | 0.53              | 41 100                     | 43 435                     |
| 0             | 3.262         | 32 624                     | 2.62                | -5.10             | 0.51              | 31 768                     | 33 480                     |
| 5             | 2.538         | 25 381                     | 2.49                | -4.94             | 0.50              | 24 749                     | 26 013                     |
| 10            | 1.990         | 19 897                     | 2.36                | -4.80             | 0.49              | 19 427                     | 20 367                     |
| 15            | 1.571         | 15 711                     | 2.24                | -4.65             | 0.48              | 15 360                     | 16 063                     |
| 20            | 1.249         | 12 493                     | 2.12                | -4.52             | 0.47              | 12 228                     | 12 757                     |
| 25            | 1.000         | 10 000                     | 2.00                | -4.39             | 0.46              | 9800                       | 10 200                     |
| 30            | 0.8056        | 8056                       | 2.11                | -4.26             | 0.50              | 7886                       | 8226                       |
| 35            | 0.6530        | 6530                       | 2.22                | -4.14             | 0.54              | 6385                       | 6675                       |
| 40            | 0.5324        | 5324                       | 2.33                | -4.03             | 0.58              | 5200                       | 5448                       |
| 45            | 0.4365        | 4365                       | 2.43                | -3.92             | 0.62              | 4259                       | 4471                       |
| 50            | 0.3599        | 3599                       | 2.53                | -3.81             | 0.66              | 3508                       | 3690                       |
| 55            | 0.2982        | 2982                       | 2.62                | -3.71             | 0.71              | 2904                       | 3060                       |
| 60            | 0.2484        | 2484                       | 2.72                | -3.61             | 0.75              | 2416                       | 2551                       |
| 65            | 0.2079        | 2079                       | 2.81                | -3.51             | 0.80              | 2020                       | 2137                       |
| 70            | 0.1748        | 1748                       | 2.89                | -3.42             | 0.85              | 1697                       | 1798                       |
| 75            | 0.1476        | 1476                       | 2.98                | -3.34             | 0.89              | 1432                       | 1520                       |
| 80            | 0.1252        | 1252                       | 3.06                | -3.25             | 0.94              | 1213                       | 1290                       |
| 85            | 0.1066        | 1066                       | 3.14                | -3.17             | 0.99              | 1033                       | 1100                       |
| 90            | 0.09116       | 911.6                      | 3.22                | -3.09             | 1.04              | 882.2                      | 940.9                      |
| 95            | 0.07825       | 782.5                      | 3.30                | -3.02             | 1.09              | 756.7                      | 808.2                      |
| 100           | 0.06741       | 674.1                      | 3.37                | -2.94             | 1.14              | 651.4                      | 696.8                      |
| 105           | 0.05828       | 582.8                      | 3.44                | -2.87             | 1.20              | 562.8                      | 602.9                      |
| 110           | 0.05057       | 505.7                      | 3.51                | -2.81             | 1.25              | 487.9                      | 523.4                      |
| 115           | 0.04402       | 440.2                      | 3.58                | -2.74             | 1.31              | 424.4                      | 455.9                      |
| 120           | 0.03844       | 384.4                      | 3.65                | -2.68             | 1.36              | 370.4                      | 398.4                      |
| 125           | 0.03367       | 336.7                      | 3.71                | -2.62             | 1.42              | 324.2                      | 349.2                      |



NTCALUG02A103F\*

NTC LUG02A 10K 1 % 3984 K 0.5 %

**RESISTANCE TEMPERATURE CHARACTERISTICS**

| TEMP.<br>(°C) | $R(T)/R_{25}$ | RESISTANCE<br>( $\Omega$ ) | $\Delta R/R$<br>(%) | $\alpha$<br>(%/K) | $\Delta T$<br>(K) | $R_{min.}$<br>( $\Omega$ ) | $R_{max.}$<br>( $\Omega$ ) |
|---------------|---------------|----------------------------|---------------------|-------------------|-------------------|----------------------------|----------------------------|
| -40           | 33.43         | 334 274                    | 2.88                | -6.63             | 0.43              | 324 643                    | 343 906                    |
| -35           | 24.13         | 241 323                    | 2.70                | -6.41             | 0.42              | 234 807                    | 247 839                    |
| -30           | 17.61         | 176 133                    | 2.53                | -6.19             | 0.41              | 171 683                    | 180 582                    |
| -25           | 12.99         | 129 900                    | 2.36                | -5.99             | 0.39              | 126 835                    | 132 965                    |
| -20           | 9.68          | 96 761                     | 2.20                | -5.79             | 0.38              | 94 633                     | 98 889                     |
| -15           | 7.276         | 72 765                     | 2.05                | -5.61             | 0.36              | 71 276                     | 74 253                     |
| -10           | 5.522         | 55 218                     | 1.90                | -5.43             | 0.35              | 54 170                     | 56 266                     |
| -5            | 4.227         | 42 268                     | 1.75                | -5.26             | 0.33              | 41 526                     | 43 010                     |
| 0             | 3.262         | 32 624                     | 1.62                | -5.10             | 0.32              | 32 096                     | 33 152                     |
| 5             | 2.538         | 25 381                     | 1.49                | -4.94             | 0.30              | 25 004                     | 25 758                     |
| 10            | 1.990         | 19 897                     | 1.36                | -4.80             | 0.28              | 19 627                     | 20 167                     |
| 15            | 1.571         | 15 711                     | 1.23                | -4.65             | 0.27              | 15 517                     | 15 905                     |
| 20            | 1.249         | 12 493                     | 1.12                | -4.52             | 0.25              | 12 353                     | 12 632                     |
| 25            | 1.000         | 10 000                     | 1.00                | -4.39             | 0.23              | 9900                       | 10 100                     |
| 30            | 0.8056        | 8056                       | 1.11                | -4.26             | 0.26              | 7966                       | 8145                       |
| 35            | 0.6530        | 6530                       | 1.22                | -4.14             | 0.29              | 6450                       | 6609                       |
| 40            | 0.5324        | 5324                       | 1.32                | -4.03             | 0.33              | 5253                       | 5394                       |
| 45            | 0.4365        | 4365                       | 1.42                | -3.92             | 0.36              | 4303                       | 4427                       |
| 50            | 0.3599        | 3599                       | 1.52                | -3.81             | 0.40              | 3544                       | 3653                       |
| 55            | 0.2982        | 2982                       | 1.62                | -3.71             | 0.44              | 2934                       | 3030                       |
| 60            | 0.2484        | 2484                       | 1.71                | -3.61             | 0.47              | 2441                       | 2526                       |
| 65            | 0.2079        | 2079                       | 1.80                | -3.51             | 0.51              | 2041                       | 2116                       |
| 70            | 0.1748        | 1748                       | 1.88                | -3.42             | 0.55              | 1715                       | 1781                       |
| 75            | 0.1476        | 1476                       | 1.97                | -3.34             | 0.59              | 1447                       | 1505                       |
| 80            | 0.1252        | 1252                       | 2.05                | -3.25             | 0.63              | 1226                       | 1277                       |
| 85            | 0.1066        | 1066                       | 2.13                | -3.17             | 0.67              | 1043                       | 1089                       |
| 90            | 0.09116       | 911.6                      | 2.21                | -3.09             | 0.71              | 891.5                      | 931.7                      |
| 95            | 0.07825       | 782.5                      | 2.28                | -3.02             | 0.76              | 764.6                      | 800.3                      |
| 100           | 0.06741       | 674.1                      | 2.36                | -2.94             | 0.80              | 658.2                      | 690.0                      |
| 105           | 0.05828       | 582.8                      | 2.43                | -2.87             | 0.84              | 568.7                      | 597.0                      |
| 110           | 0.05057       | 505.7                      | 2.50                | -2.81             | 0.89              | 493.0                      | 518.3                      |
| 115           | 0.04402       | 440.2                      | 2.56                | -2.74             | 0.94              | 428.9                      | 451.5                      |
| 120           | 0.03844       | 384.4                      | 2.63                | -2.68             | 0.98              | 374.3                      | 394.5                      |
| 125           | 0.03367       | 336.7                      | 2.69                | -2.62             | 1.03              | 327.7                      | 345.8                      |



NTCALUG02A103FL\*

NTC LUG02A 10K 1 % 3435 K 1 %

**RESISTANCE TEMPERATURE CHARACTERISTICS**

| TEMP.<br>(°C) | $R(T)/R_{25}$ | RESISTANCE<br>( $\Omega$ ) | $\Delta R/R$<br>(%) | $\alpha$<br>(%/K) | $\Delta T$<br>(K) | $R_{min.}$<br>( $\Omega$ ) | $R_{max.}$<br>( $\Omega$ ) |
|---------------|---------------|----------------------------|---------------------|-------------------|-------------------|----------------------------|----------------------------|
| -40           | 19.10         | 190 953                    | 4.24                | -5.46             | 0.78              | 182 848                    | 199 057                    |
| -35           | 14.60         | 145 953                    | 3.93                | -5.30             | 0.74              | 140 213                    | 151 693                    |
| -30           | 11.24         | 112 440                    | 3.63                | -5.14             | 0.71              | 108 354                    | 116 526                    |
| -25           | 8.729         | 87 285                     | 3.35                | -4.99             | 0.67              | 84 364                     | 90 206                     |
| -20           | 6.826         | 68 260                     | 3.07                | -4.85             | 0.63              | 66 164                     | 70 355                     |
| -15           | 5.376         | 53 762                     | 2.80                | -4.71             | 0.60              | 52 254                     | 55 270                     |
| -10           | 4.264         | 42 636                     | 2.55                | -4.57             | 0.56              | 41 549                     | 43 723                     |
| -5            | 3.404         | 34 038                     | 2.30                | -4.44             | 0.52              | 33 254                     | 34 822                     |
| 0             | 2.735         | 27 348                     | 2.07                | -4.31             | 0.48              | 26 783                     | 27 913                     |
| 5             | 2.211         | 22 108                     | 1.84                | -4.19             | 0.44              | 21 702                     | 22 515                     |
| 10            | 1.798         | 17 979                     | 1.62                | -4.08             | 0.40              | 17 689                     | 18 270                     |
| 15            | 1.471         | 14 706                     | 1.40                | -3.96             | 0.35              | 14 499                     | 14 912                     |
| 20            | 1.209         | 12 094                     | 1.20                | -3.86             | 0.31              | 11 949                     | 12 239                     |
| 25            | 1.000         | 10 000                     | 1.00                | -3.75             | 0.27              | 9900                       | 10 100                     |
| 30            | 0.8311        | 8311                       | 1.19                | -3.65             | 0.33              | 8212                       | 8410                       |
| 35            | 0.6941        | 6941                       | 1.38                | -3.55             | 0.39              | 6845                       | 7037                       |
| 40            | 0.5825        | 5825                       | 1.56                | -3.46             | 0.45              | 5734                       | 5916                       |
| 45            | 0.4911        | 4911                       | 1.73                | -3.37             | 0.51              | 4826                       | 4996                       |
| 50            | 0.4158        | 4158                       | 1.90                | -3.28             | 0.58              | 4079                       | 4237                       |
| 55            | 0.3536        | 3536                       | 2.06                | -3.20             | 0.65              | 3463                       | 3609                       |
| 60            | 0.3020        | 3020                       | 2.22                | -3.12             | 0.71              | 2953                       | 3087                       |
| 65            | 0.2589        | 2589                       | 2.38                | -3.04             | 0.78              | 2527                       | 2650                       |
| 70            | 0.2228        | 2228                       | 2.53                | -2.96             | 0.85              | 2172                       | 2284                       |
| 75            | 0.1925        | 1925                       | 2.67                | -2.89             | 0.92              | 1873                       | 1976                       |
| 80            | 0.1668        | 1668                       | 2.81                | -2.82             | 1.00              | 1621                       | 1715                       |
| 85            | 0.1451        | 1451                       | 2.95                | -2.75             | 1.07              | 1409                       | 1494                       |
| 90            | 0.1267        | 1267                       | 3.08                | -2.69             | 1.15              | 1228                       | 1306                       |
| 95            | 0.1109        | 1109                       | 3.21                | -2.62             | 1.22              | 1074                       | 1145                       |
| 100           | 0.09743       | 974.3                      | 3.34                | -2.56             | 1.30              | 941.7                      | 1007                       |
| 105           | 0.08583       | 858.3                      | 3.46                | -2.50             | 1.38              | 828.6                      | 888.0                      |
| 110           | 0.07584       | 758.4                      | 3.58                | -2.45             | 1.46              | 731.2                      | 785.6                      |
| 115           | 0.06720       | 672.0                      | 3.70                | -2.39             | 1.55              | 647.1                      | 696.8                      |
| 120           | 0.05971       | 597.1                      | 3.81                | -2.34             | 1.63              | 574.3                      | 619.8                      |
| 125           | 0.05319       | 531.9                      | 3.92                | -2.29             | 1.72              | 511.0                      | 552.7                      |



NTCALUG02A104H\*

NTC LUG02A 100K 3 % 4190 K 1.50 %

**RESISTANCE TEMPERATURE CHARACTERISTICS**

| TEMP.<br>(°C) | $R(T)/R_{25}$ | RESISTANCE<br>( $\Omega$ ) | $\Delta R/R$<br>(%) | $\alpha$<br>(%/K) | $\Delta T$<br>(K) | $R_{min.}$<br>( $\Omega$ ) | $R_{max.}$<br>( $\Omega$ ) |
|---------------|---------------|----------------------------|---------------------|-------------------|-------------------|----------------------------|----------------------------|
| -40           | 36.66         | 3 666 299                  | 9.05                | -6.69             | 1.35              | 3 334 354                  | 3 998 244                  |
| -35           | 26.38         | 2 637 588                  | 8.47                | -6.49             | 1.31              | 2 414 139                  | 2 861 036                  |
| -30           | 19.17         | 1 916 576                  | 7.91                | -6.29             | 1.26              | 1 764 917                  | 2 068 236                  |
| -25           | 14.06         | 1 406 111                  | 7.38                | -6.10             | 1.21              | 1 302 387                  | 1 509 836                  |
| -20           | 10.41         | 1 041 184                  | 6.86                | -5.92             | 1.16              | 969 745                    | 1 112 622                  |
| -15           | 7.778         | 777 846                    | 6.37                | -5.75             | 1.11              | 728 330                    | 827 362                    |
| -10           | 5.861         | 586 097                    | 5.89                | -5.58             | 1.06              | 551 581                    | 620 613                    |
| -5            | 4.453         | 445 257                    | 5.43                | -5.42             | 1.00              | 421 079                    | 469 435                    |
| 0             | 3.409         | 340 942                    | 4.99                | -5.26             | 0.95              | 323 936                    | 357 948                    |
| 5             | 2.631         | 263 054                    | 4.56                | -5.11             | 0.89              | 251 054                    | 275 054                    |
| 10            | 2.044         | 204 446                    | 4.15                | -4.97             | 0.84              | 195 960                    | 212 931                    |
| 15            | 1.600         | 160 014                    | 3.75                | -4.83             | 0.78              | 154 008                    | 166 020                    |
| 20            | 1.261         | 126 087                    | 3.37                | -4.70             | 0.72              | 121 837                    | 130 336                    |
| 25            | 1.000         | 100 000                    | 3.00                | -4.57             | 0.66              | 97 000                     | 103 000                    |
| 30            | 0.7981        | 79 808                     | 3.36                | -4.45             | 0.75              | 77 128                     | 82 488                     |
| 35            | 0.6408        | 64 077                     | 3.70                | -4.33             | 0.86              | 61 703                     | 66 451                     |
| 40            | 0.5175        | 51 745                     | 4.04                | -4.22             | 0.96              | 49 655                     | 53 836                     |
| 45            | 0.4202        | 42 021                     | 4.36                | -4.11             | 1.06              | 40 187                     | 43 855                     |
| 50            | 0.3431        | 34 308                     | 4.68                | -4.00             | 1.17              | 32 702                     | 35 913                     |
| 55            | 0.2816        | 28 156                     | 4.98                | -3.90             | 1.28              | 26 752                     | 29 559                     |
| 60            | 0.2322        | 23 222                     | 5.28                | -3.80             | 1.39              | 21 996                     | 24 449                     |
| 65            | 0.1925        | 19 246                     | 5.57                | -3.71             | 1.50              | 18 174                     | 20 318                     |
| 70            | 0.1602        | 16 025                     | 5.85                | -3.62             | 1.62              | 15 088                     | 16 961                     |
| 75            | 0.1340        | 13 402                     | 6.12                | -3.53             | 1.73              | 12 582                     | 14 222                     |
| 80            | 0.1126        | 11 258                     | 6.38                | -3.45             | 1.85              | 10 539                     | 11 976                     |
| 85            | 0.09496       | 9496                       | 6.64                | -3.36             | 1.97              | 8866                       | 10 126                     |
| 90            | 0.08042       | 8042                       | 6.89                | -3.28             | 2.10              | 7488                       | 8596                       |
| 95            | 0.06837       | 6837                       | 7.13                | -3.21             | 2.22              | 6350                       | 7325                       |
| 100           | 0.05835       | 5835                       | 7.36                | -3.13             | 2.35              | 5405                       | 6265                       |
| 105           | 0.04998       | 4998                       | 7.59                | -3.06             | 2.48              | 4618                       | 5377                       |
| 110           | 0.04296       | 4296                       | 7.82                | -2.99             | 2.61              | 3960                       | 4632                       |
| 115           | 0.03705       | 3705                       | 8.03                | -2.93             | 2.75              | 3407                       | 4003                       |
| 120           | 0.03206       | 3206                       | 8.25                | -2.86             | 2.88              | 2942                       | 3470                       |
| 125           | 0.02783       | 2783                       | 8.45                | -2.80             | 3.02              | 2548                       | 3018                       |



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