



## **NTC thermistors for temperature measurement**

**SMD NTC thermistors  
with nickel barrier termination,  
case size 0603**

**Series/Type:**      **B573\*\*V**  
**Date:**              March 2006



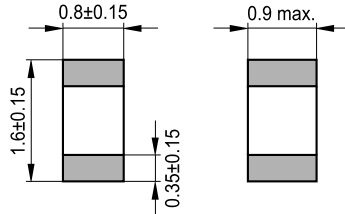
## Applications

- Temperature measurement and compensation in
  - mobile phone applications (e.g. battery pack, TCXO, LCD)
  - data systems
  - automotive electronics

## Features

- Multilayer SMD NTC with inner electrodes
- Excellent long-term ageing stability in high-temperature and high-humidity environment
- Superior resistance stability during soldering (change <1%)

## Dimensional drawing



Termination

TNT0396-Y-E

Dimensions in mm

Approx. weight 6 mg

## Options

Alternative resistance ratings, resistance tolerance and B value tolerances available on request

## Delivery mode

Cardboard tape, 180-mm reel (standard);  
330-mm reel (on request)

## General technical data

|                               |                    |                    |                |      |
|-------------------------------|--------------------|--------------------|----------------|------|
| Climatic category             | (IEC 60068-1)      |                    | 55/125/56      |      |
| Max. power                    | (at 25 °C, on PCB) | $P_{25}^{1)}$      | 180            | mW   |
| Resistance tolerance          |                    | $\Delta R_R/R_R$   | $\pm 3, \pm 5$ | %    |
| Rated temperature             |                    | $T_R$              | 25             | °C   |
| Dissipation factor            | (on PCB)           | $\delta_{th}^{1)}$ | approx. 3      | mW/K |
| Thermal cooling time constant | (on PCB)           | $\tau_c^{1)}$      | approx. 4      | s    |
| Heat capacity                 |                    | $C_{th}^{1)}$      | approx. 12     | mJ/K |

1) Depends on mounting situation



## Electrical specification and ordering codes

| R <sub>25</sub><br>Ω | No. of R/T<br>characteristic | B <sub>25/50</sub><br>K | B <sub>25/85</sub><br>K | B <sub>25/100</sub><br>K | Ordering code   |
|----------------------|------------------------------|-------------------------|-------------------------|--------------------------|-----------------|
| 47                   | 8501                         | 3500                    | 3540                    | 3550 ±3%                 | B57311V2470+060 |
| 100                  | 8501                         | 3500                    | 3540                    | 3550 ±3%                 | B57311V2101+060 |
| 150                  | 8501                         | 3500                    | 3540                    | 3550 ±3%                 | B57311V2151+060 |
| 220                  | 8501                         | 3500                    | 3540                    | 3550 ±3%                 | B57311V2221+060 |
| 330                  | 8501                         | 3500                    | 3540                    | 3550 ±3%                 | B57311V2331+060 |
| 680                  | 8502                         | 3940                    | 3980                    | 4000 ±3%                 | B57321V2681+060 |
| 1.0 k                | 8502                         | 3940                    | 3980                    | 4000 ±3%                 | B57321V2102+060 |
| 1.5 k                | 8502                         | 3940                    | 3980                    | 4000 ±3%                 | B57321V2152+060 |
| 2.2 k                | 8502                         | 3940                    | 3980                    | 4000 ±3%                 | B57321V2222+060 |
| 4.7 k                | 8500                         | 3590                    | 3635                    | 3650 ±3%                 | B57301V2472+060 |
| 10 k                 | 8502                         | 3940                    | 3980                    | 4000 ±3%                 | B57321V2103+060 |
| 10 k                 | 8505                         | 3380                    | 3435                    | 3460 ±3%                 | B57351V2103+060 |
| 47 k                 | 8502                         | 3940                    | 3980                    | 4000 ±3%                 | B57321V2473+060 |

+ = Resistance tolerance

H = ±3%

J = ±5%



### Reliability data

SMD NTC thermistors are tested in accordance with IEC 60068. The parts are mounted on a standardized PCB in accordance with IEC 60539-1.

| Test                               | Standard                     | Test conditions                                                                                                                                                   | $\Delta R_{25}/R_{25}$<br>(typical) | Remarks                    |
|------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------|
| Storage in dry heat                | IEC 60068-2-2<br>JIS C 0021  | Storage at upper category temperature<br>T: (125 $\pm$ 2) °C<br>t: 1000 h                                                                                         | < 2%                                |                            |
| Storage in damp heat, steady state | IEC 60068-2-78<br>JIS C 0022 | Temperature of air: (40 $\pm$ 2) °C<br>Relative humidity of air: (93 $\pm$ 2/−3)%<br>Duration: 56 days                                                            | < 2%                                |                            |
| Rapid temperature cycling          | IEC 60068-2-14<br>JIS C 0025 | Lower test temperature: −55 °C<br>Upper test temperature: 125 °C<br>Number of cycles: 100                                                                         | < 2%                                |                            |
| Endurance                          |                              | P <sub>max</sub> : 180 mW<br>T: (65 $\pm$ 2) °C<br>t: 1000 h                                                                                                      | < 2%                                |                            |
| Solderability                      | IEC 60068-2-58<br>JIS C 0054 | Solderability:<br>(215 $\pm$ 3) °C, (3 $\pm$ 0.3) s<br>(235 $\pm$ 5) °C, (2 $\pm$ 0.2) s<br><br>Resistance to soldering heat:<br>(260 $\pm$ 5) °C, (10 $\pm$ 1) s |                                     | 95% of terminations wetted |
| Resistance drift after soldering   |                              | Reflow soldering profile<br>Wave soldering profile                                                                                                                | < 1%<br>< 2% <sup>2)</sup>          |                            |

2) For B57351V2103+060



## R/T characteristics

|             | B57311V2470H060                                                                                                      |                      |                      |                                      |            |            |
|-------------|----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8501                                                                                                                 |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3550 K, R <sub>25</sub> = 47 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                 | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| –55.0       | 2662                                                                                                                 | 2232                 | 3092                 | 16.1                                 | 2.5        | 6.5        |
| –50.0       | 1933                                                                                                                 | 1642                 | 2224                 | 15.1                                 | 2.4        | 6.3        |
| –45.0       | 1420                                                                                                                 | 1221                 | 1619                 | 14.0                                 | 2.3        | 6.1        |
| –40.0       | 1054                                                                                                                 | 916.7                | 1191                 | 13.0                                 | 2.2        | 5.9        |
| –35.0       | 789.9                                                                                                                | 694.8                | 885.1                | 12.0                                 | 2.1        | 5.7        |
| –30.0       | 597.9                                                                                                                | 531.3                | 664.4                | 11.1                                 | 2.0        | 5.5        |
| –25.0       | 456.6                                                                                                                | 409.8                | 503.4                | 10.2                                 | 1.9        | 5.3        |
| –20.0       | 351.8                                                                                                                | 318.7                | 384.9                | 9.4                                  | 1.8        | 5.1        |
| –15.0       | 273.3                                                                                                                | 249.9                | 296.8                | 8.6                                  | 1.7        | 5.0        |
| –10.0       | 214.0                                                                                                                | 197.3                | 230.7                | 7.8                                  | 1.6        | 4.8        |
| –5.0        | 168.9                                                                                                                | 157.0                | 180.8                | 7.0                                  | 1.5        | 4.7        |
| 0.0         | 134.2                                                                                                                | 125.7                | 142.7                | 6.3                                  | 1.4        | 4.5        |
| 5.0         | 107.4                                                                                                                | 101.4                | 113.5                | 5.6                                  | 1.3        | 4.4        |
| 10.0        | 86.56                                                                                                                | 82.28                | 90.84                | 4.9                                  | 1.2        | 4.3        |
| 15.0        | 70.19                                                                                                                | 67.18                | 73.20                | 4.3                                  | 1.0        | 4.1        |
| 20.0        | 57.27                                                                                                                | 55.17                | 59.36                | 3.7                                  | 0.9        | 4.0        |
| <b>25.0</b> | <b>47.00</b>                                                                                                         | <b>45.59</b>         | <b>48.41</b>         | <b>3.0</b>                           | <b>0.8</b> | <b>3.9</b> |
| 30.0        | 38.79                                                                                                                | 37.38                | 40.20                | 3.6                                  | 1.0        | 3.8        |
| 35.0        | 32.19                                                                                                                | 30.84                | 33.55                | 4.2                                  | 1.1        | 3.7        |
| 40.0        | 26.86                                                                                                                | 25.58                | 28.13                | 4.8                                  | 1.3        | 3.6        |
| 45.0        | 22.52                                                                                                                | 21.32                | 23.71                | 5.3                                  | 1.5        | 3.5        |
| 50.0        | 18.97                                                                                                                | 17.87                | 20.07                | 5.8                                  | 1.7        | 3.4        |
| 55.0        | 16.05                                                                                                                | 15.04                | 17.07                | 6.3                                  | 1.9        | 3.3        |
| 60.0        | 13.65                                                                                                                | 12.72                | 14.58                | 6.8                                  | 2.1        | 3.2        |
| 65.0        | 11.65                                                                                                                | 10.81                | 12.50                | 7.3                                  | 2.3        | 3.1        |
| 70.0        | 9.992                                                                                                                | 9.219                | 10.76                | 7.7                                  | 2.5        | 3.0        |
| 75.0        | 8.601                                                                                                                | 7.897                | 9.304                | 8.2                                  | 2.8        | 3.0        |
| 80.0        | 7.432                                                                                                                | 6.792                | 8.072                | 8.6                                  | 3.0        | 2.9        |
| 85.0        | 6.446                                                                                                                | 5.864                | 7.028                | 9.0                                  | 3.2        | 2.8        |
| 90.0        | 5.611                                                                                                                | 5.081                | 6.141                | 9.4                                  | 3.4        | 2.7        |
| 95.0        | 4.901                                                                                                                | 4.418                | 5.383                | 9.8                                  | 3.7        | 2.7        |
| 100.0       | 4.295                                                                                                                | 3.855                | 4.734                | 10.2                                 | 3.9        | 2.6        |
| 105.0       | 3.776                                                                                                                | 3.375                | 4.176                | 10.6                                 | 4.2        | 2.5        |
| 110.0       | 3.330                                                                                                                | 2.964                | 3.695                | 11.0                                 | 4.4        | 2.5        |
| 115.0       | 2.945                                                                                                                | 2.612                | 3.279                | 11.3                                 | 4.7        | 2.4        |
| 120.0       | 2.613                                                                                                                | 2.308                | 2.918                | 11.7                                 | 4.9        | 2.4        |
| 125.0       | 2.324                                                                                                                | 2.045                | 2.604                | 12.0                                 | 5.2        | 2.3        |



|             | B57311V2470J060                                                                                                      |                      |                      |                                      |            |            |
|-------------|----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8501                                                                                                                 |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3550 K, R <sub>25</sub> = 47 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 5% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                 | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 2662                                                                                                                 | 2179                 | 3145                 | 18.1                                 | 2.8        | 6.5        |
| -50.0       | 1933                                                                                                                 | 1604                 | 2263                 | 17.1                                 | 2.7        | 6.3        |
| -45.0       | 1420                                                                                                                 | 1193                 | 1647                 | 16.0                                 | 2.6        | 6.1        |
| -40.0       | 1054                                                                                                                 | 895.6                | 1212                 | 15.0                                 | 2.6        | 5.9        |
| -35.0       | 789.9                                                                                                                | 679.0                | 900.9                | 14.0                                 | 2.5        | 5.7        |
| -30.0       | 597.9                                                                                                                | 519.4                | 676.4                | 13.1                                 | 2.4        | 5.5        |
| -25.0       | 456.6                                                                                                                | 400.7                | 512.6                | 12.2                                 | 2.3        | 5.3        |
| -20.0       | 351.8                                                                                                                | 311.7                | 391.9                | 11.4                                 | 2.2        | 5.1        |
| -15.0       | 273.3                                                                                                                | 244.4                | 302.2                | 10.6                                 | 2.1        | 5.0        |
| -10.0       | 214.0                                                                                                                | 193.0                | 235.0                | 9.8                                  | 2.0        | 4.8        |
| -5.0        | 168.9                                                                                                                | 153.6                | 184.2                | 9.0                                  | 1.9        | 4.7        |
| 0.0         | 134.2                                                                                                                | 123.1                | 145.4                | 8.3                                  | 1.8        | 4.5        |
| 5.0         | 107.4                                                                                                                | 99.24                | 115.6                | 7.6                                  | 1.7        | 4.4        |
| 10.0        | 86.56                                                                                                                | 80.55                | 92.57                | 6.9                                  | 1.6        | 4.3        |
| 15.0        | 70.19                                                                                                                | 65.77                | 74.60                | 6.3                                  | 1.5        | 4.1        |
| 20.0        | 57.27                                                                                                                | 54.03                | 60.51                | 5.7                                  | 1.4        | 4.0        |
| <b>25.0</b> | <b>47.00</b>                                                                                                         | <b>44.65</b>         | <b>49.35</b>         | <b>5.0</b>                           | <b>1.3</b> | <b>3.9</b> |
| 30.0        | 38.79                                                                                                                | 36.60                | 40.98                | 5.6                                  | 1.5        | 3.8        |
| 35.0        | 32.19                                                                                                                | 30.19                | 34.19                | 6.2                                  | 1.7        | 3.7        |
| 40.0        | 26.86                                                                                                                | 25.04                | 28.67                | 6.8                                  | 1.9        | 3.6        |
| 45.0        | 22.52                                                                                                                | 20.87                | 24.16                | 7.3                                  | 2.1        | 3.5        |
| 50.0        | 18.97                                                                                                                | 17.49                | 20.45                | 7.8                                  | 2.3        | 3.4        |
| 55.0        | 16.05                                                                                                                | 14.72                | 17.39                | 8.3                                  | 2.5        | 3.3        |
| 60.0        | 13.65                                                                                                                | 12.45                | 14.85                | 8.8                                  | 2.7        | 3.2        |
| 65.0        | 11.65                                                                                                                | 10.57                | 12.73                | 9.3                                  | 3.0        | 3.1        |
| 70.0        | 9.992                                                                                                                | 9.019                | 10.96                | 9.7                                  | 3.2        | 3.0        |
| 75.0        | 8.601                                                                                                                | 7.725                | 9.476                | 10.2                                 | 3.4        | 3.0        |
| 80.0        | 7.432                                                                                                                | 6.643                | 8.221                | 10.6                                 | 3.7        | 2.9        |
| 85.0        | 6.446                                                                                                                | 5.735                | 7.157                | 11.0                                 | 3.9        | 2.8        |
| 90.0        | 5.611                                                                                                                | 4.969                | 6.253                | 11.4                                 | 4.2        | 2.7        |
| 95.0        | 4.901                                                                                                                | 4.320                | 5.481                | 11.8                                 | 4.4        | 2.7        |
| 100.0       | 4.295                                                                                                                | 3.769                | 4.820                | 12.2                                 | 4.7        | 2.6        |
| 105.0       | 3.776                                                                                                                | 3.300                | 4.252                | 12.6                                 | 5.0        | 2.5        |
| 110.0       | 3.330                                                                                                                | 2.898                | 3.762                | 13.0                                 | 5.2        | 2.5        |
| 115.0       | 2.945                                                                                                                | 2.553                | 3.338                | 13.3                                 | 5.5        | 2.4        |
| 120.0       | 2.613                                                                                                                | 2.255                | 2.970                | 13.7                                 | 5.8        | 2.4        |
| 125.0       | 2.324                                                                                                                | 1.998                | 2.650                | 14.0                                 | 6.1        | 2.3        |



|             | B57311V2101H060                                                                                                       |                      |                      |                                      |            |            |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8501                                                                                                                  |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3550 K, R <sub>25</sub> = 100 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                  | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 5663                                                                                                                  | 4749                 | 6578                 | 16.1                                 | 2.5        | 6.5        |
| -50.0       | 4113                                                                                                                  | 3494                 | 4733                 | 15.1                                 | 2.4        | 6.3        |
| -45.0       | 3021                                                                                                                  | 2598                 | 3444                 | 14.0                                 | 2.3        | 6.1        |
| -40.0       | 2242                                                                                                                  | 1950                 | 2534                 | 13.0                                 | 2.2        | 5.9        |
| -35.0       | 1681                                                                                                                  | 1478                 | 1883                 | 12.0                                 | 2.1        | 5.7        |
| -30.0       | 1272                                                                                                                  | 1130                 | 1414                 | 11.1                                 | 2.0        | 5.5        |
| -25.0       | 971.6                                                                                                                 | 872.0                | 1071                 | 10.2                                 | 1.9        | 5.3        |
| -20.0       | 748.5                                                                                                                 | 678.2                | 818.9                | 9.4                                  | 1.8        | 5.1        |
| -15.0       | 581.5                                                                                                                 | 531.6                | 631.4                | 8.6                                  | 1.7        | 5.0        |
| -10.0       | 455.4                                                                                                                 | 419.8                | 490.9                | 7.8                                  | 1.6        | 4.8        |
| -5.0        | 359.3                                                                                                                 | 334.0                | 384.6                | 7.0                                  | 1.5        | 4.7        |
| 0.0         | 285.6                                                                                                                 | 267.5                | 303.6                | 6.3                                  | 1.4        | 4.5        |
| 5.0         | 228.6                                                                                                                 | 215.7                | 241.4                | 5.6                                  | 1.3        | 4.4        |
| 10.0        | 184.2                                                                                                                 | 175.1                | 193.3                | 4.9                                  | 1.2        | 4.3        |
| 15.0        | 149.3                                                                                                                 | 142.9                | 155.7                | 4.3                                  | 1.0        | 4.1        |
| 20.0        | 121.8                                                                                                                 | 117.4                | 126.3                | 3.7                                  | 0.9        | 4.0        |
| <b>25.0</b> | <b>100.00</b>                                                                                                         | <b>97.00</b>         | <b>103.0</b>         | <b>3.0</b>                           | <b>0.8</b> | <b>3.9</b> |
| 30.0        | 82.54                                                                                                                 | 79.53                | 85.54                | 3.6                                  | 1.0        | 3.8        |
| 35.0        | 68.49                                                                                                                 | 65.61                | 71.38                | 4.2                                  | 1.1        | 3.7        |
| 40.0        | 57.14                                                                                                                 | 54.42                | 59.86                | 4.8                                  | 1.3        | 3.6        |
| 45.0        | 47.91                                                                                                                 | 45.37                | 50.44                | 5.3                                  | 1.5        | 3.5        |
| 50.0        | 40.36                                                                                                                 | 38.01                | 42.70                | 5.8                                  | 1.7        | 3.4        |
| 55.0        | 34.16                                                                                                                 | 32.00                | 36.32                | 6.3                                  | 1.9        | 3.3        |
| 60.0        | 29.04                                                                                                                 | 27.06                | 31.02                | 6.8                                  | 2.1        | 3.2        |
| 65.0        | 24.80                                                                                                                 | 22.99                | 26.60                | 7.3                                  | 2.3        | 3.1        |
| 70.0        | 21.26                                                                                                                 | 19.61                | 22.90                | 7.7                                  | 2.5        | 3.0        |
| 75.0        | 18.30                                                                                                                 | 16.80                | 19.80                | 8.2                                  | 2.8        | 3.0        |
| 80.0        | 15.81                                                                                                                 | 14.45                | 17.17                | 8.6                                  | 3.0        | 2.9        |
| 85.0        | 13.71                                                                                                                 | 12.48                | 14.95                | 9.0                                  | 3.2        | 2.8        |
| 90.0        | 11.94                                                                                                                 | 10.81                | 13.07                | 9.4                                  | 3.4        | 2.7        |
| 95.0        | 10.43                                                                                                                 | 9.401                | 11.45                | 9.8                                  | 3.7        | 2.7        |
| 100.0       | 9.137                                                                                                                 | 8.203                | 10.07                | 10.2                                 | 3.9        | 2.6        |
| 105.0       | 8.033                                                                                                                 | 7.181                | 8.885                | 10.6                                 | 4.2        | 2.5        |
| 110.0       | 7.085                                                                                                                 | 6.307                | 7.862                | 11.0                                 | 4.4        | 2.5        |
| 115.0       | 6.267                                                                                                                 | 5.556                | 6.977                | 11.3                                 | 4.7        | 2.4        |
| 120.0       | 5.559                                                                                                                 | 4.910                | 6.209                | 11.7                                 | 4.9        | 2.4        |
| 125.0       | 4.945                                                                                                                 | 4.351                | 5.540                | 12.0                                 | 5.2        | 2.3        |



|             | B57311V2101J060                                                                                                       |                      |                      |                                      |            |            |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8501                                                                                                                  |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3550 K, R <sub>25</sub> = 100 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 5% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                  | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 5663                                                                                                                  | 4635                 | 6691                 | 18.1                                 | 2.8        | 6.5        |
| -50.0       | 4113                                                                                                                  | 3412                 | 4815                 | 17.1                                 | 2.7        | 6.3        |
| -45.0       | 3021                                                                                                                  | 2537                 | 3504                 | 16.0                                 | 2.6        | 6.1        |
| -40.0       | 2242                                                                                                                  | 1906                 | 2579                 | 15.0                                 | 2.6        | 5.9        |
| -35.0       | 1681                                                                                                                  | 1445                 | 1917                 | 14.0                                 | 2.5        | 5.7        |
| -30.0       | 1272                                                                                                                  | 1105                 | 1439                 | 13.1                                 | 2.4        | 5.5        |
| -25.0       | 971.6                                                                                                                 | 852.6                | 1091                 | 12.2                                 | 2.3        | 5.3        |
| -20.0       | 748.5                                                                                                                 | 663.2                | 833.9                | 11.4                                 | 2.2        | 5.1        |
| -15.0       | 581.5                                                                                                                 | 520.0                | 643.1                | 10.6                                 | 2.1        | 5.0        |
| -10.0       | 455.4                                                                                                                 | 410.7                | 500.0                | 9.8                                  | 2.0        | 4.8        |
| -5.0        | 359.3                                                                                                                 | 326.8                | 391.8                | 9.0                                  | 1.9        | 4.7        |
| 0.0         | 285.6                                                                                                                 | 261.8                | 309.3                | 8.3                                  | 1.8        | 4.5        |
| 5.0         | 228.6                                                                                                                 | 211.2                | 246.0                | 7.6                                  | 1.7        | 4.4        |
| 10.0        | 184.2                                                                                                                 | 171.4                | 196.9                | 6.9                                  | 1.6        | 4.3        |
| 15.0        | 149.3                                                                                                                 | 139.9                | 158.7                | 6.3                                  | 1.5        | 4.1        |
| 20.0        | 121.8                                                                                                                 | 114.9                | 128.7                | 5.7                                  | 1.4        | 4.0        |
| <b>25.0</b> | <b>100.00</b>                                                                                                         | <b>95.00</b>         | <b>105.0</b>         | <b>5.0</b>                           | <b>1.3</b> | <b>3.9</b> |
| 30.0        | 82.54                                                                                                                 | 77.88                | 87.19                | 5.6                                  | 1.5        | 3.8        |
| 35.0        | 68.49                                                                                                                 | 64.24                | 72.75                | 6.2                                  | 1.7        | 3.7        |
| 40.0        | 57.14                                                                                                                 | 53.28                | 61.00                | 6.8                                  | 1.9        | 3.6        |
| 45.0        | 47.91                                                                                                                 | 44.41                | 51.40                | 7.3                                  | 2.1        | 3.5        |
| 50.0        | 40.36                                                                                                                 | 37.20                | 43.51                | 7.8                                  | 2.3        | 3.4        |
| 55.0        | 34.16                                                                                                                 | 31.32                | 37.00                | 8.3                                  | 2.5        | 3.3        |
| 60.0        | 29.04                                                                                                                 | 26.48                | 31.60                | 8.8                                  | 2.7        | 3.2        |
| 65.0        | 24.80                                                                                                                 | 22.50                | 27.10                | 9.3                                  | 3.0        | 3.1        |
| 70.0        | 21.26                                                                                                                 | 19.19                | 23.33                | 9.7                                  | 3.2        | 3.0        |
| 75.0        | 18.30                                                                                                                 | 16.44                | 20.16                | 10.2                                 | 3.4        | 3.0        |
| 80.0        | 15.81                                                                                                                 | 14.13                | 17.49                | 10.6                                 | 3.7        | 2.9        |
| 85.0        | 13.71                                                                                                                 | 12.20                | 15.23                | 11.0                                 | 3.9        | 2.8        |
| 90.0        | 11.94                                                                                                                 | 10.57                | 13.30                | 11.4                                 | 4.2        | 2.7        |
| 95.0        | 10.43                                                                                                                 | 9.192                | 11.66                | 11.8                                 | 4.4        | 2.7        |
| 100.0       | 9.137                                                                                                                 | 8.020                | 10.25                | 12.2                                 | 4.7        | 2.6        |
| 105.0       | 8.033                                                                                                                 | 7.021                | 9.046                | 12.6                                 | 5.0        | 2.5        |
| 110.0       | 7.085                                                                                                                 | 6.165                | 8.004                | 13.0                                 | 5.2        | 2.5        |
| 115.0       | 6.267                                                                                                                 | 5.431                | 7.102                | 13.3                                 | 5.5        | 2.4        |
| 120.0       | 5.559                                                                                                                 | 4.799                | 6.320                | 13.7                                 | 5.8        | 2.4        |
| 125.0       | 4.945                                                                                                                 | 4.252                | 5.639                | 14.0                                 | 6.1        | 2.3        |



|             | B57311V2151H060                                                                                                       |                      |                      |                                      |            |            |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8501                                                                                                                  |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3550 K, R <sub>25</sub> = 150 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                  | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 8495                                                                                                                  | 7123                 | 9867                 | 16.1                                 | 2.5        | 6.5        |
| -50.0       | 6170                                                                                                                  | 5241                 | 7099                 | 15.1                                 | 2.4        | 6.3        |
| -45.0       | 4531                                                                                                                  | 3896                 | 5166                 | 14.0                                 | 2.3        | 6.1        |
| -40.0       | 3363                                                                                                                  | 2926                 | 3800                 | 13.0                                 | 2.2        | 5.9        |
| -35.0       | 2521                                                                                                                  | 2217                 | 2825                 | 12.0                                 | 2.1        | 5.7        |
| -30.0       | 1908                                                                                                                  | 1696                 | 2120                 | 11.1                                 | 2.0        | 5.5        |
| -25.0       | 1457                                                                                                                  | 1308                 | 1607                 | 10.2                                 | 1.9        | 5.3        |
| -20.0       | 1123                                                                                                                  | 1017                 | 1228                 | 9.4                                  | 1.8        | 5.1        |
| -15.0       | 872.3                                                                                                                 | 797.4                | 947.2                | 8.6                                  | 1.7        | 5.0        |
| -10.0       | 683.1                                                                                                                 | 629.8                | 736.3                | 7.8                                  | 1.6        | 4.8        |
| -5.0        | 539.0                                                                                                                 | 501.0                | 576.9                | 7.0                                  | 1.5        | 4.7        |
| 0.0         | 428.4                                                                                                                 | 401.3                | 455.4                | 6.3                                  | 1.4        | 4.5        |
| 5.0         | 342.9                                                                                                                 | 323.6                | 362.1                | 5.6                                  | 1.3        | 4.4        |
| 10.0        | 276.2                                                                                                                 | 262.6                | 289.9                | 4.9                                  | 1.2        | 4.3        |
| 15.0        | 224.0                                                                                                                 | 214.4                | 233.6                | 4.3                                  | 1.0        | 4.1        |
| 20.0        | 182.8                                                                                                                 | 176.1                | 189.5                | 3.7                                  | 0.9        | 4.0        |
| <b>25.0</b> | <b>150.0</b>                                                                                                          | <b>145.5</b>         | <b>154.5</b>         | <b>3.0</b>                           | <b>0.8</b> | <b>3.9</b> |
| 30.0        | 123.8                                                                                                                 | 119.3                | 128.3                | 3.6                                  | 1.0        | 3.8        |
| 35.0        | 102.7                                                                                                                 | 98.42                | 107.1                | 4.2                                  | 1.1        | 3.7        |
| 40.0        | 85.71                                                                                                                 | 81.63                | 89.79                | 4.8                                  | 1.3        | 3.6        |
| 45.0        | 71.86                                                                                                                 | 68.05                | 75.66                | 5.3                                  | 1.5        | 3.5        |
| 50.0        | 60.54                                                                                                                 | 57.02                | 64.06                | 5.8                                  | 1.7        | 3.4        |
| 55.0        | 51.24                                                                                                                 | 48.00                | 54.47                | 6.3                                  | 1.9        | 3.3        |
| 60.0        | 43.56                                                                                                                 | 40.60                | 46.52                | 6.8                                  | 2.1        | 3.2        |
| 65.0        | 37.19                                                                                                                 | 34.49                | 39.90                | 7.3                                  | 2.3        | 3.1        |
| 70.0        | 31.89                                                                                                                 | 29.42                | 34.35                | 7.7                                  | 2.5        | 3.0        |
| 75.0        | 27.45                                                                                                                 | 25.20                | 29.69                | 8.2                                  | 2.8        | 3.0        |
| 80.0        | 23.72                                                                                                                 | 21.68                | 25.76                | 8.6                                  | 3.0        | 2.9        |
| 85.0        | 20.57                                                                                                                 | 18.71                | 22.43                | 9.0                                  | 3.2        | 2.8        |
| 90.0        | 17.91                                                                                                                 | 16.22                | 19.60                | 9.4                                  | 3.4        | 2.7        |
| 95.0        | 15.64                                                                                                                 | 14.10                | 17.18                | 9.8                                  | 3.7        | 2.7        |
| 100.0       | 13.71                                                                                                                 | 12.30                | 15.11                | 10.2                                 | 3.9        | 2.6        |
| 105.0       | 12.05                                                                                                                 | 10.77                | 13.33                | 10.6                                 | 4.2        | 2.5        |
| 110.0       | 10.63                                                                                                                 | 9.461                | 11.79                | 11.0                                 | 4.4        | 2.5        |
| 115.0       | 9.400                                                                                                                 | 8.335                | 10.47                | 11.3                                 | 4.7        | 2.4        |
| 120.0       | 8.339                                                                                                                 | 7.365                | 9.313                | 11.7                                 | 4.9        | 2.4        |
| 125.0       | 7.418                                                                                                                 | 6.526                | 8.310                | 12.0                                 | 5.2        | 2.3        |



|             | B57311V2151J060                                                                                                       |                      |                      |                                      |            |            |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8501                                                                                                                  |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3550 K, R <sub>25</sub> = 150 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 5% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                  | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 8495                                                                                                                  | 6953                 | 10037                | 18.1                                 | 2.8        | 6.5        |
| -50.0       | 6170                                                                                                                  | 5118                 | 7222                 | 17.1                                 | 2.7        | 6.3        |
| -45.0       | 4531                                                                                                                  | 3806                 | 5257                 | 16.0                                 | 2.6        | 6.1        |
| -40.0       | 3363                                                                                                                  | 2858                 | 3868                 | 15.0                                 | 2.6        | 5.9        |
| -35.0       | 2521                                                                                                                  | 2167                 | 2875                 | 14.0                                 | 2.5        | 5.7        |
| -30.0       | 1908                                                                                                                  | 1658                 | 2159                 | 13.1                                 | 2.4        | 5.5        |
| -25.0       | 1457                                                                                                                  | 1279                 | 1636                 | 12.2                                 | 2.3        | 5.3        |
| -20.0       | 1123                                                                                                                  | 994.8                | 1251                 | 11.4                                 | 2.2        | 5.1        |
| -15.0       | 872.3                                                                                                                 | 779.9                | 964.6                | 10.6                                 | 2.1        | 5.0        |
| -10.0       | 683.1                                                                                                                 | 616.1                | 750.0                | 9.8                                  | 2.0        | 4.8        |
| -5.0        | 539.0                                                                                                                 | 490.2                | 587.7                | 9.0                                  | 1.9        | 4.7        |
| 0.0         | 428.4                                                                                                                 | 392.7                | 464.0                | 8.3                                  | 1.8        | 4.5        |
| 5.0         | 342.9                                                                                                                 | 316.7                | 369.0                | 7.6                                  | 1.7        | 4.4        |
| 10.0        | 276.2                                                                                                                 | 257.1                | 295.4                | 6.9                                  | 1.6        | 4.3        |
| 15.0        | 224.0                                                                                                                 | 209.9                | 238.1                | 6.3                                  | 1.5        | 4.1        |
| 20.0        | 182.8                                                                                                                 | 172.4                | 193.1                | 5.7                                  | 1.4        | 4.0        |
| <b>25.0</b> | <b>150.0</b>                                                                                                          | <b>142.5</b>         | <b>157.5</b>         | <b>5.0</b>                           | <b>1.3</b> | <b>3.9</b> |
| 30.0        | 123.8                                                                                                                 | 116.8                | 130.8                | 5.6                                  | 1.5        | 3.8        |
| 35.0        | 102.7                                                                                                                 | 96.36                | 109.1                | 6.2                                  | 1.7        | 3.7        |
| 40.0        | 85.71                                                                                                                 | 79.91                | 91.50                | 6.8                                  | 1.9        | 3.6        |
| 45.0        | 71.86                                                                                                                 | 66.62                | 77.10                | 7.3                                  | 2.1        | 3.5        |
| 50.0        | 60.54                                                                                                                 | 55.81                | 65.27                | 7.8                                  | 2.3        | 3.4        |
| 55.0        | 51.24                                                                                                                 | 46.98                | 55.50                | 8.3                                  | 2.5        | 3.3        |
| 60.0        | 43.56                                                                                                                 | 39.73                | 47.39                | 8.8                                  | 2.7        | 3.2        |
| 65.0        | 37.19                                                                                                                 | 33.74                | 40.64                | 9.3                                  | 3.0        | 3.1        |
| 70.0        | 31.89                                                                                                                 | 28.78                | 34.99                | 9.7                                  | 3.2        | 3.0        |
| 75.0        | 27.45                                                                                                                 | 24.65                | 30.24                | 10.2                                 | 3.4        | 3.0        |
| 80.0        | 23.72                                                                                                                 | 21.20                | 26.24                | 10.6                                 | 3.7        | 2.9        |
| 85.0        | 20.57                                                                                                                 | 18.30                | 22.84                | 11.0                                 | 3.9        | 2.8        |
| 90.0        | 17.91                                                                                                                 | 15.86                | 19.96                | 11.4                                 | 4.2        | 2.7        |
| 95.0        | 15.64                                                                                                                 | 13.79                | 17.49                | 11.8                                 | 4.4        | 2.7        |
| 100.0       | 13.71                                                                                                                 | 12.03                | 15.38                | 12.2                                 | 4.7        | 2.6        |
| 105.0       | 12.05                                                                                                                 | 10.53                | 13.57                | 12.6                                 | 5.0        | 2.5        |
| 110.0       | 10.63                                                                                                                 | 9.248                | 12.01                | 13.0                                 | 5.2        | 2.5        |
| 115.0       | 9.400                                                                                                                 | 8.147                | 10.65                | 13.3                                 | 5.5        | 2.4        |
| 120.0       | 8.339                                                                                                                 | 7.198                | 9.480                | 13.7                                 | 5.8        | 2.4        |
| 125.0       | 7.418                                                                                                                 | 6.378                | 8.458                | 14.0                                 | 6.1        | 2.3        |



|             | B57311V2221H060                                                                                                       |                      |                      |                                      |            |            |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8501                                                                                                                  |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3550 K, R <sub>25</sub> = 220 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                  | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 12459                                                                                                                 | 10447                | 14471                | 16.1                                 | 2.5        | 6.5        |
| -50.0       | 9049                                                                                                                  | 7687                 | 10412                | 15.1                                 | 2.4        | 6.3        |
| -45.0       | 6646                                                                                                                  | 5715                 | 7577                 | 14.0                                 | 2.3        | 6.1        |
| -40.0       | 4932                                                                                                                  | 4291                 | 5574                 | 13.0                                 | 2.2        | 5.9        |
| -35.0       | 3698                                                                                                                  | 3252                 | 4143                 | 12.0                                 | 2.1        | 5.7        |
| -30.0       | 2799                                                                                                                  | 2487                 | 3110                 | 11.1                                 | 2.0        | 5.5        |
| -25.0       | 2137                                                                                                                  | 1918                 | 2356                 | 10.2                                 | 1.9        | 5.3        |
| -20.0       | 1647                                                                                                                  | 1492                 | 1802                 | 9.4                                  | 1.8        | 5.1        |
| -15.0       | 1279                                                                                                                  | 1170                 | 1389                 | 8.6                                  | 1.7        | 5.0        |
| -10.0       | 1002                                                                                                                  | 923.7                | 1080                 | 7.8                                  | 1.6        | 4.8        |
| -5.0        | 790.5                                                                                                                 | 734.8                | 846.2                | 7.0                                  | 1.5        | 4.7        |
| 0.0         | 628.3                                                                                                                 | 588.6                | 668.0                | 6.3                                  | 1.4        | 4.5        |
| 5.0         | 502.9                                                                                                                 | 474.6                | 531.1                | 5.6                                  | 1.3        | 4.4        |
| 10.0        | 405.2                                                                                                                 | 385.1                | 425.2                | 4.9                                  | 1.2        | 4.3        |
| 15.0        | 328.5                                                                                                                 | 314.5                | 342.6                | 4.3                                  | 1.0        | 4.1        |
| 20.0        | 268.1                                                                                                                 | 258.2                | 277.9                | 3.7                                  | 0.9        | 4.0        |
| <b>25.0</b> | <b>220.0</b>                                                                                                          | <b>213.4</b>         | <b>226.6</b>         | <b>3.0</b>                           | <b>0.8</b> | <b>3.9</b> |
| 30.0        | 181.6                                                                                                                 | 175.0                | 188.2                | 3.6                                  | 1.0        | 3.8        |
| 35.0        | 150.7                                                                                                                 | 144.3                | 157.0                | 4.2                                  | 1.1        | 3.7        |
| 40.0        | 125.7                                                                                                                 | 119.7                | 131.7                | 4.8                                  | 1.3        | 3.6        |
| 45.0        | 105.4                                                                                                                 | 99.81                | 111.0                | 5.3                                  | 1.5        | 3.5        |
| 50.0        | 88.79                                                                                                                 | 83.63                | 93.95                | 5.8                                  | 1.7        | 3.4        |
| 55.0        | 75.15                                                                                                                 | 70.40                | 79.89                | 6.3                                  | 1.9        | 3.3        |
| 60.0        | 63.89                                                                                                                 | 59.54                | 68.23                | 6.8                                  | 2.1        | 3.2        |
| 65.0        | 54.55                                                                                                                 | 50.58                | 58.52                | 7.3                                  | 2.3        | 3.1        |
| 70.0        | 46.77                                                                                                                 | 43.15                | 50.39                | 7.7                                  | 2.5        | 3.0        |
| 75.0        | 40.26                                                                                                                 | 36.97                | 43.55                | 8.2                                  | 2.8        | 3.0        |
| 80.0        | 34.79                                                                                                                 | 31.79                | 37.78                | 8.6                                  | 3.0        | 2.9        |
| 85.0        | 30.17                                                                                                                 | 27.45                | 32.90                | 9.0                                  | 3.2        | 2.8        |
| 90.0        | 26.26                                                                                                                 | 23.78                | 28.74                | 9.4                                  | 3.4        | 2.7        |
| 95.0        | 22.94                                                                                                                 | 20.68                | 25.20                | 9.8                                  | 3.7        | 2.7        |
| 100.0       | 20.10                                                                                                                 | 18.05                | 22.16                | 10.2                                 | 3.9        | 2.6        |
| 105.0       | 17.67                                                                                                                 | 15.80                | 19.55                | 10.6                                 | 4.2        | 2.5        |
| 110.0       | 15.59                                                                                                                 | 13.88                | 17.30                | 11.0                                 | 4.4        | 2.5        |
| 115.0       | 13.79                                                                                                                 | 12.22                | 15.35                | 11.3                                 | 4.7        | 2.4        |
| 120.0       | 12.23                                                                                                                 | 10.80                | 13.66                | 11.7                                 | 4.9        | 2.4        |
| 125.0       | 10.88                                                                                                                 | 9.572                | 12.19                | 12.0                                 | 5.2        | 2.3        |



|             | B57311V2221J060                                                                                            |                          |                          |                         |                          |                 |
|-------------|------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------|--------------------------|-----------------|
| R/T No.     | 8501                                                                                                       |                          |                          |                         |                          |                 |
| T (°C)      | $B_{25/100} = 3550 \text{ K}$ , $R_{25} = 220 \Omega$ , $T_R = 25 \text{ °C}$ , $\Delta R_R/R_R = \pm 5\%$ |                          |                          |                         |                          |                 |
|             | $R_{\text{nom}}[\Omega]$                                                                                   | $R_{\text{min}}[\Omega]$ | $R_{\text{max}}[\Omega]$ | $\Delta R_R/R_R[\pm\%]$ | $\Delta T[\pm\text{°C}]$ | $\alpha (\%/K)$ |
| -55.0       | 12459                                                                                                      | 10198                    | 14721                    | 18.1                    | 2.8                      | 6.5             |
| -50.0       | 9049                                                                                                       | 7506                     | 10593                    | 17.1                    | 2.7                      | 6.3             |
| -45.0       | 6646                                                                                                       | 5582                     | 7710                     | 16.0                    | 2.6                      | 6.1             |
| -40.0       | 4932                                                                                                       | 4192                     | 5673                     | 15.0                    | 2.6                      | 5.9             |
| -35.0       | 3698                                                                                                       | 3178                     | 4217                     | 14.0                    | 2.5                      | 5.7             |
| -30.0       | 2799                                                                                                       | 2431                     | 3166                     | 13.1                    | 2.4                      | 5.5             |
| -25.0       | 2137                                                                                                       | 1876                     | 2399                     | 12.2                    | 2.3                      | 5.3             |
| -20.0       | 1647                                                                                                       | 1459                     | 1835                     | 11.4                    | 2.2                      | 5.1             |
| -15.0       | 1279                                                                                                       | 1144                     | 1415                     | 10.6                    | 2.1                      | 5.0             |
| -10.0       | 1002                                                                                                       | 903.6                    | 1100                     | 9.8                     | 2.0                      | 4.8             |
| -5.0        | 790.5                                                                                                      | 719.0                    | 862.0                    | 9.0                     | 1.9                      | 4.7             |
| 0.0         | 628.3                                                                                                      | 576.0                    | 680.5                    | 8.3                     | 1.8                      | 4.5             |
| 5.0         | 502.9                                                                                                      | 464.5                    | 541.2                    | 7.6                     | 1.7                      | 4.4             |
| 10.0        | 405.2                                                                                                      | 377.0                    | 433.3                    | 6.9                     | 1.6                      | 4.3             |
| 15.0        | 328.5                                                                                                      | 307.9                    | 349.2                    | 6.3                     | 1.5                      | 4.1             |
| 20.0        | 268.1                                                                                                      | 252.9                    | 283.2                    | 5.7                     | 1.4                      | 4.0             |
| <b>25.0</b> | <b>220.0</b>                                                                                               | <b>209.0</b>             | <b>231.0</b>             | <b>5.0</b>              | <b>1.3</b>               | <b>3.9</b>      |
| 30.0        | 181.6                                                                                                      | 171.3                    | 191.8                    | 5.6                     | 1.5                      | 3.8             |
| 35.0        | 150.7                                                                                                      | 141.3                    | 160.0                    | 6.2                     | 1.7                      | 3.7             |
| 40.0        | 125.7                                                                                                      | 117.2                    | 134.2                    | 6.8                     | 1.9                      | 3.6             |
| 45.0        | 105.4                                                                                                      | 97.70                    | 113.1                    | 7.3                     | 2.1                      | 3.5             |
| 50.0        | 88.79                                                                                                      | 81.85                    | 95.73                    | 7.8                     | 2.3                      | 3.4             |
| 55.0        | 75.15                                                                                                      | 68.90                    | 81.40                    | 8.3                     | 2.5                      | 3.3             |
| 60.0        | 63.89                                                                                                      | 58.26                    | 69.51                    | 8.8                     | 2.7                      | 3.2             |
| 65.0        | 54.55                                                                                                      | 49.49                    | 59.61                    | 9.3                     | 3.0                      | 3.1             |
| 70.0        | 46.77                                                                                                      | 42.22                    | 51.32                    | 9.7                     | 3.2                      | 3.0             |
| 75.0        | 40.26                                                                                                      | 36.16                    | 44.36                    | 10.2                    | 3.4                      | 3.0             |
| 80.0        | 34.79                                                                                                      | 31.10                    | 38.48                    | 10.6                    | 3.7                      | 2.9             |
| 85.0        | 30.17                                                                                                      | 26.84                    | 33.50                    | 11.0                    | 3.9                      | 2.8             |
| 90.0        | 26.26                                                                                                      | 23.26                    | 29.27                    | 11.4                    | 4.2                      | 2.7             |
| 95.0        | 22.94                                                                                                      | 20.22                    | 25.66                    | 11.8                    | 4.4                      | 2.7             |
| 100.0       | 20.10                                                                                                      | 17.64                    | 22.56                    | 12.2                    | 4.7                      | 2.6             |
| 105.0       | 17.67                                                                                                      | 15.45                    | 19.90                    | 12.6                    | 5.0                      | 2.5             |
| 110.0       | 15.59                                                                                                      | 13.56                    | 17.61                    | 13.0                    | 5.2                      | 2.5             |
| 115.0       | 13.79                                                                                                      | 11.95                    | 15.62                    | 13.3                    | 5.5                      | 2.4             |
| 120.0       | 12.23                                                                                                      | 10.56                    | 13.90                    | 13.7                    | 5.8                      | 2.4             |
| 125.0       | 10.88                                                                                                      | 9.354                    | 12.41                    | 14.0                    | 6.1                      | 2.3             |



|             | B57311V2331H060                                                                                                       |                      |                      |                                      |            |            |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8501                                                                                                                  |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3550 K, R <sub>25</sub> = 330 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                  | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 18689                                                                                                                 | 15671                | 21707                | 16.1                                 | 2.5        | 6.5        |
| -50.0       | 13574                                                                                                                 | 11530                | 15618                | 15.1                                 | 2.4        | 6.3        |
| -45.0       | 9969                                                                                                                  | 8572                 | 11365                | 14.0                                 | 2.3        | 6.1        |
| -40.0       | 7399                                                                                                                  | 6436                 | 8361                 | 13.0                                 | 2.2        | 5.9        |
| -35.0       | 5546                                                                                                                  | 4878                 | 6215                 | 12.0                                 | 2.1        | 5.7        |
| -30.0       | 4198                                                                                                                  | 3731                 | 4665                 | 11.1                                 | 2.0        | 5.5        |
| -25.0       | 3206                                                                                                                  | 2878                 | 3535                 | 10.2                                 | 1.9        | 5.3        |
| -20.0       | 2470                                                                                                                  | 2238                 | 2702                 | 9.4                                  | 1.8        | 5.1        |
| -15.0       | 1919                                                                                                                  | 1754                 | 2084                 | 8.6                                  | 1.7        | 5.0        |
| -10.0       | 1503                                                                                                                  | 1385                 | 1620                 | 7.8                                  | 1.6        | 4.8        |
| -5.0        | 1186                                                                                                                  | 1102                 | 1269                 | 7.0                                  | 1.5        | 4.7        |
| 0.0         | 942.4                                                                                                                 | 882.9                | 1002                 | 6.3                                  | 1.4        | 4.5        |
| 5.0         | 754.3                                                                                                                 | 711.9                | 796.7                | 5.6                                  | 1.3        | 4.4        |
| 10.0        | 607.7                                                                                                                 | 577.7                | 637.8                | 4.9                                  | 1.2        | 4.3        |
| 15.0        | 492.8                                                                                                                 | 471.7                | 514.0                | 4.3                                  | 1.0        | 4.1        |
| 20.0        | 402.1                                                                                                                 | 387.4                | 416.8                | 3.7                                  | 0.9        | 4.0        |
| <b>25.0</b> | <b>330.0</b>                                                                                                          | <b>320.1</b>         | <b>339.9</b>         | <b>3.0</b>                           | <b>0.8</b> | <b>3.9</b> |
| 30.0        | 272.4                                                                                                                 | 262.5                | 282.3                | 3.6                                  | 1.0        | 3.8        |
| 35.0        | 226.0                                                                                                                 | 216.5                | 235.5                | 4.2                                  | 1.1        | 3.7        |
| 40.0        | 188.6                                                                                                                 | 179.6                | 197.5                | 4.8                                  | 1.3        | 3.6        |
| 45.0        | 158.1                                                                                                                 | 149.7                | 166.5                | 5.3                                  | 1.5        | 3.5        |
| 50.0        | 133.2                                                                                                                 | 125.4                | 140.9                | 5.8                                  | 1.7        | 3.4        |
| 55.0        | 112.7                                                                                                                 | 105.6                | 119.8                | 6.3                                  | 1.9        | 3.3        |
| 60.0        | 95.83                                                                                                                 | 89.31                | 102.4                | 6.8                                  | 2.1        | 3.2        |
| 65.0        | 81.82                                                                                                                 | 75.87                | 87.78                | 7.3                                  | 2.3        | 3.1        |
| 70.0        | 70.15                                                                                                                 | 64.73                | 75.58                | 7.7                                  | 2.5        | 3.0        |
| 75.0        | 60.39                                                                                                                 | 55.45                | 65.33                | 8.2                                  | 2.8        | 3.0        |
| 80.0        | 52.18                                                                                                                 | 47.69                | 56.68                | 8.6                                  | 3.0        | 2.9        |
| 85.0        | 45.26                                                                                                                 | 41.17                | 49.35                | 9.0                                  | 3.2        | 2.8        |
| 90.0        | 39.39                                                                                                                 | 35.67                | 43.11                | 9.4                                  | 3.4        | 2.7        |
| 95.0        | 34.41                                                                                                                 | 31.02                | 37.79                | 9.8                                  | 3.7        | 2.7        |
| 100.0       | 30.15                                                                                                                 | 27.07                | 33.24                | 10.2                                 | 3.9        | 2.6        |
| 105.0       | 26.51                                                                                                                 | 23.70                | 29.32                | 10.6                                 | 4.2        | 2.5        |
| 110.0       | 23.38                                                                                                                 | 20.81                | 25.94                | 11.0                                 | 4.4        | 2.5        |
| 115.0       | 20.68                                                                                                                 | 18.34                | 23.02                | 11.3                                 | 4.7        | 2.4        |
| 120.0       | 18.35                                                                                                                 | 16.20                | 20.49                | 11.7                                 | 4.9        | 2.4        |
| 125.0       | 16.32                                                                                                                 | 14.36                | 18.28                | 12.0                                 | 5.2        | 2.3        |

|             | B57311V2331J060                                                                                                       |                      |                      |                                      |            |            |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8501                                                                                                                  |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3550 K, R <sub>25</sub> = 330 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 5% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                  | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 18689                                                                                                                 | 15297                | 22081                | 18.1                                 | 2.8        | 6.5        |
| -50.0       | 13574                                                                                                                 | 11259                | 15889                | 17.1                                 | 2.7        | 6.3        |
| -45.0       | 9969                                                                                                                  | 8373                 | 11565                | 16.0                                 | 2.6        | 6.1        |
| -40.0       | 7399                                                                                                                  | 6288                 | 8509                 | 15.0                                 | 2.6        | 5.9        |
| -35.0       | 5546                                                                                                                  | 4767                 | 6326                 | 14.0                                 | 2.5        | 5.7        |
| -30.0       | 4198                                                                                                                  | 3647                 | 4749                 | 13.1                                 | 2.4        | 5.5        |
| -25.0       | 3206                                                                                                                  | 2813                 | 3599                 | 12.2                                 | 2.3        | 5.3        |
| -20.0       | 2470                                                                                                                  | 2189                 | 2752                 | 11.4                                 | 2.2        | 5.1        |
| -15.0       | 1919                                                                                                                  | 1716                 | 2122                 | 10.6                                 | 2.1        | 5.0        |
| -10.0       | 1503                                                                                                                  | 1355                 | 1650                 | 9.8                                  | 2.0        | 4.8        |
| -5.0        | 1186                                                                                                                  | 1078                 | 1293                 | 9.0                                  | 1.9        | 4.7        |
| 0.0         | 942.4                                                                                                                 | 864.0                | 1021                 | 8.3                                  | 1.8        | 4.5        |
| 5.0         | 754.3                                                                                                                 | 696.8                | 811.7                | 7.6                                  | 1.7        | 4.4        |
| 10.0        | 607.7                                                                                                                 | 565.6                | 649.9                | 6.9                                  | 1.6        | 4.3        |
| 15.0        | 492.8                                                                                                                 | 461.8                | 523.8                | 6.3                                  | 1.5        | 4.1        |
| 20.0        | 402.1                                                                                                                 | 379.3                | 424.8                | 5.7                                  | 1.4        | 4.0        |
| <b>25.0</b> | <b>330.0</b>                                                                                                          | <b>313.5</b>         | <b>346.5</b>         | <b>5.0</b>                           | <b>1.3</b> | <b>3.9</b> |
| 30.0        | 272.4                                                                                                                 | 257.0                | 287.7                | 5.6                                  | 1.5        | 3.8        |
| 35.0        | 226.0                                                                                                                 | 212.0                | 240.1                | 6.2                                  | 1.7        | 3.7        |
| 40.0        | 188.6                                                                                                                 | 175.8                | 201.3                | 6.8                                  | 1.9        | 3.6        |
| 45.0        | 158.1                                                                                                                 | 146.6                | 169.6                | 7.3                                  | 2.1        | 3.5        |
| 50.0        | 133.2                                                                                                                 | 122.8                | 143.6                | 7.8                                  | 2.3        | 3.4        |
| 55.0        | 112.7                                                                                                                 | 103.3                | 122.1                | 8.3                                  | 2.5        | 3.3        |
| 60.0        | 95.83                                                                                                                 | 87.40                | 104.3                | 8.8                                  | 2.7        | 3.2        |
| 65.0        | 81.82                                                                                                                 | 74.24                | 89.41                | 9.3                                  | 3.0        | 3.1        |
| 70.0        | 70.15                                                                                                                 | 63.33                | 76.98                | 9.7                                  | 3.2        | 3.0        |
| 75.0        | 60.39                                                                                                                 | 54.24                | 66.54                | 10.2                                 | 3.4        | 3.0        |
| 80.0        | 52.18                                                                                                                 | 46.64                | 57.72                | 10.6                                 | 3.7        | 2.9        |
| 85.0        | 45.26                                                                                                                 | 40.26                | 50.25                | 11.0                                 | 3.9        | 2.8        |
| 90.0        | 39.39                                                                                                                 | 34.89                | 43.90                | 11.4                                 | 4.2        | 2.7        |
| 95.0        | 34.41                                                                                                                 | 30.33                | 38.48                | 11.8                                 | 4.4        | 2.7        |
| 100.0       | 30.15                                                                                                                 | 26.47                | 33.84                | 12.2                                 | 4.7        | 2.6        |
| 105.0       | 26.51                                                                                                                 | 23.17                | 29.85                | 12.6                                 | 5.0        | 2.5        |
| 110.0       | 23.38                                                                                                                 | 20.35                | 26.41                | 13.0                                 | 5.2        | 2.5        |
| 115.0       | 20.68                                                                                                                 | 17.92                | 23.44                | 13.3                                 | 5.5        | 2.4        |
| 120.0       | 18.35                                                                                                                 | 15.84                | 20.86                | 13.7                                 | 5.8        | 2.4        |
| 125.0       | 16.32                                                                                                                 | 14.03                | 18.61                | 14.0                                 | 6.1        | 2.3        |



|             | <b>B57321V2681H060</b>                                                                                                |                      |                      |                                      |            |            |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                  |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 680 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                  | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 65387                                                                                                                 | 53742                | 77033                | 17.8                                 | 2.4        | 7.4        |
| -50.0       | 45486                                                                                                                 | 37946                | 53027                | 16.6                                 | 2.3        | 7.1        |
| -45.0       | 32046                                                                                                                 | 27112                | 36981                | 15.4                                 | 2.2        | 6.9        |
| -40.0       | 22852                                                                                                                 | 19591                | 26113                | 14.3                                 | 2.1        | 6.6        |
| -35.0       | 16485                                                                                                                 | 14311                | 18659                | 13.2                                 | 2.1        | 6.4        |
| -30.0       | 12023                                                                                                                 | 10562                | 13485                | 12.2                                 | 2.0        | 6.2        |
| -25.0       | 8862                                                                                                                  | 7873                 | 9851                 | 11.2                                 | 1.9        | 6.0        |
| -20.0       | 6597                                                                                                                  | 5924                 | 7271                 | 10.2                                 | 1.8        | 5.8        |
| -15.0       | 4959                                                                                                                  | 4498                 | 5419                 | 9.3                                  | 1.7        | 5.6        |
| -10.0       | 3761                                                                                                                  | 3445                 | 4077                 | 8.4                                  | 1.5        | 5.4        |
| -5.0        | 2878                                                                                                                  | 2661                 | 3095                 | 7.6                                  | 1.4        | 5.3        |
| 0.0         | 2221                                                                                                                  | 2071                 | 2370                 | 6.7                                  | 1.3        | 5.1        |
| 5.0         | 1727                                                                                                                  | 1625                 | 1830                 | 5.9                                  | 1.2        | 4.9        |
| 10.0        | 1354                                                                                                                  | 1284                 | 1424                 | 5.2                                  | 1.1        | 4.8        |
| 15.0        | 1069                                                                                                                  | 1021                 | 1116                 | 4.4                                  | 1.0        | 4.7        |
| 20.0        | 849.6                                                                                                                 | 817.9                | 881.4                | 3.7                                  | 0.8        | 4.5        |
| <b>25.0</b> | <b>680.0</b>                                                                                                          | <b>659.6</b>         | <b>700.4</b>         | <b>3.0</b>                           | <b>0.7</b> | <b>4.4</b> |
| 30.0        | 547.8                                                                                                                 | 527.4                | 568.1                | 3.7                                  | 0.9        | 4.3        |
| 35.0        | 444.0                                                                                                                 | 424.6                | 463.3                | 4.4                                  | 1.1        | 4.1        |
| 40.0        | 362.0                                                                                                                 | 343.9                | 380.0                | 5.0                                  | 1.2        | 4.0        |
| 45.0        | 296.8                                                                                                                 | 280.2                | 313.3                | 5.6                                  | 1.4        | 3.9        |
| 50.0        | 244.7                                                                                                                 | 229.6                | 259.8                | 6.2                                  | 1.6        | 3.8        |
| 55.0        | 202.8                                                                                                                 | 189.1                | 216.4                | 6.7                                  | 1.8        | 3.7        |
| 60.0        | 168.9                                                                                                                 | 156.6                | 181.2                | 7.3                                  | 2.0        | 3.6        |
| 65.0        | 141.4                                                                                                                 | 130.3                | 152.4                | 7.8                                  | 2.2        | 3.5        |
| 70.0        | 118.9                                                                                                                 | 109.0                | 128.8                | 8.3                                  | 2.4        | 3.4        |
| 75.0        | 100.4                                                                                                                 | 91.53                | 109.3                | 8.8                                  | 2.6        | 3.3        |
| 80.0        | 85.16                                                                                                                 | 77.22                | 93.09                | 9.3                                  | 2.9        | 3.2        |
| 85.0        | 72.54                                                                                                                 | 65.43                | 79.64                | 9.8                                  | 3.1        | 3.2        |
| 90.0        | 62.03                                                                                                                 | 55.67                | 68.40                | 10.3                                 | 3.3        | 3.1        |
| 95.0        | 53.26                                                                                                                 | 47.56                | 58.96                | 10.7                                 | 3.6        | 3.0        |
| 100.0       | 45.89                                                                                                                 | 40.78                | 51.00                | 11.1                                 | 3.8        | 2.9        |
| 105.0       | 39.69                                                                                                                 | 35.10                | 44.28                | 11.6                                 | 4.0        | 2.9        |
| 110.0       | 34.44                                                                                                                 | 30.31                | 38.57                | 12.0                                 | 4.3        | 2.8        |
| 115.0       | 29.99                                                                                                                 | 26.27                | 33.70                | 12.4                                 | 4.5        | 2.7        |
| 120.0       | 26.19                                                                                                                 | 22.85                | 29.54                | 12.8                                 | 4.8        | 2.7        |
| 125.0       | 22.95                                                                                                                 | 19.93                | 25.97                | 13.2                                 | 5.0        | 2.6        |



|             | B57321V2681J060                                                                                                       |                      |                      |                                      |            |            |
|-------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                  |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 680 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 5% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                  | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 65387                                                                                                                 | 52434                | 78341                | 19.8                                 | 2.7        | 7.4        |
| -50.0       | 45486                                                                                                                 | 37036                | 53936                | 18.6                                 | 2.6        | 7.1        |
| -45.0       | 32046                                                                                                                 | 26471                | 37622                | 17.4                                 | 2.5        | 6.9        |
| -40.0       | 22852                                                                                                                 | 19134                | 26570                | 16.3                                 | 2.4        | 6.6        |
| -35.0       | 16485                                                                                                                 | 13981                | 18989                | 15.2                                 | 2.4        | 6.4        |
| -30.0       | 12023                                                                                                                 | 10322                | 13725                | 14.2                                 | 2.3        | 6.2        |
| -25.0       | 8862                                                                                                                  | 7696                 | 10028                | 13.2                                 | 2.2        | 6.0        |
| -20.0       | 6597                                                                                                                  | 5792                 | 7403                 | 12.2                                 | 2.1        | 5.8        |
| -15.0       | 4959                                                                                                                  | 4399                 | 5518                 | 11.3                                 | 2.0        | 5.6        |
| -10.0       | 3761                                                                                                                  | 3370                 | 4153                 | 10.4                                 | 1.9        | 5.4        |
| -5.0        | 2878                                                                                                                  | 2603                 | 3153                 | 9.6                                  | 1.8        | 5.3        |
| 0.0         | 2221                                                                                                                  | 2027                 | 2415                 | 8.7                                  | 1.7        | 5.1        |
| 5.0         | 1727                                                                                                                  | 1590                 | 1864                 | 7.9                                  | 1.6        | 4.9        |
| 10.0        | 1354                                                                                                                  | 1256                 | 1451                 | 7.2                                  | 1.5        | 4.8        |
| 15.0        | 1069                                                                                                                  | 999.8                | 1138                 | 6.4                                  | 1.4        | 4.7        |
| 20.0        | 849.6                                                                                                                 | 800.9                | 898.4                | 5.7                                  | 1.3        | 4.5        |
| <b>25.0</b> | <b>680.0</b>                                                                                                          | <b>646.0</b>         | <b>714.0</b>         | <b>5.0</b>                           | <b>1.1</b> | <b>4.4</b> |
| 30.0        | 547.8                                                                                                                 | 516.5                | 579.1                | 5.7                                  | 1.3        | 4.3        |
| 35.0        | 444.0                                                                                                                 | 415.7                | 472.2                | 6.4                                  | 1.5        | 4.1        |
| 40.0        | 362.0                                                                                                                 | 336.7                | 387.2                | 7.0                                  | 1.7        | 4.0        |
| 45.0        | 296.8                                                                                                                 | 274.3                | 319.3                | 7.6                                  | 1.9        | 3.9        |
| 50.0        | 244.7                                                                                                                 | 224.7                | 264.6                | 8.2                                  | 2.1        | 3.8        |
| 55.0        | 202.8                                                                                                                 | 185.1                | 220.5                | 8.7                                  | 2.4        | 3.7        |
| 60.0        | 168.9                                                                                                                 | 153.2                | 184.6                | 9.3                                  | 2.6        | 3.6        |
| 65.0        | 141.4                                                                                                                 | 127.5                | 155.2                | 9.8                                  | 2.8        | 3.5        |
| 70.0        | 118.9                                                                                                                 | 106.6                | 131.1                | 10.3                                 | 3.0        | 3.4        |
| 75.0        | 100.4                                                                                                                 | 89.52                | 111.3                | 10.8                                 | 3.2        | 3.3        |
| 80.0        | 85.16                                                                                                                 | 75.52                | 94.80                | 11.3                                 | 3.5        | 3.2        |
| 85.0        | 72.54                                                                                                                 | 63.98                | 81.09                | 11.8                                 | 3.7        | 3.2        |
| 90.0        | 62.03                                                                                                                 | 54.43                | 69.64                | 12.3                                 | 4.0        | 3.1        |
| 95.0        | 53.26                                                                                                                 | 46.49                | 60.02                | 12.7                                 | 4.2        | 3.0        |
| 100.0       | 45.89                                                                                                                 | 39.86                | 51.92                | 13.1                                 | 4.5        | 2.9        |
| 105.0       | 39.69                                                                                                                 | 34.30                | 45.07                | 13.6                                 | 4.7        | 2.9        |
| 110.0       | 34.44                                                                                                                 | 29.63                | 39.25                | 14.0                                 | 5.0        | 2.8        |
| 115.0       | 29.99                                                                                                                 | 25.67                | 34.30                | 14.4                                 | 5.3        | 2.7        |
| 120.0       | 26.19                                                                                                                 | 22.32                | 30.06                | 14.8                                 | 5.5        | 2.7        |
| 125.0       | 22.95                                                                                                                 | 19.47                | 26.43                | 15.2                                 | 5.8        | 2.6        |



|             | B57321V2102H060                                                                                                        |                      |                      |                                      |            |            |
|-------------|------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                   |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 1000 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                   | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 96158                                                                                                                  | 79032                | 113280               | 17.8                                 | 2.4        | 7.4        |
| -50.0       | 66892                                                                                                                  | 55803                | 77980                | 16.6                                 | 2.3        | 7.1        |
| -45.0       | 47127                                                                                                                  | 39870                | 54384                | 15.4                                 | 2.2        | 6.9        |
| -40.0       | 33606                                                                                                                  | 28810                | 38402                | 14.3                                 | 2.1        | 6.6        |
| -35.0       | 24243                                                                                                                  | 21045                | 27440                | 13.2                                 | 2.1        | 6.4        |
| -30.0       | 17681                                                                                                                  | 15532                | 19830                | 12.2                                 | 2.0        | 6.2        |
| -25.0       | 13032                                                                                                                  | 11578                | 14486                | 11.2                                 | 1.9        | 6.0        |
| -20.0       | 9702                                                                                                                   | 8712                 | 10692                | 10.2                                 | 1.8        | 5.8        |
| -15.0       | 7292                                                                                                                   | 6615                 | 7969                 | 9.3                                  | 1.7        | 5.6        |
| -10.0       | 5531                                                                                                                   | 5067                 | 5996                 | 8.4                                  | 1.5        | 5.4        |
| -5.0        | 4232                                                                                                                   | 3913                 | 4552                 | 7.6                                  | 1.4        | 5.3        |
| 0.0         | 3266                                                                                                                   | 3046                 | 3486                 | 6.7                                  | 1.3        | 5.1        |
| 5.0         | 2540                                                                                                                   | 2389                 | 2691                 | 5.9                                  | 1.2        | 4.9        |
| 10.0        | 1991                                                                                                                   | 1888                 | 2094                 | 5.2                                  | 1.1        | 4.8        |
| 15.0        | 1572                                                                                                                   | 1502                 | 1641                 | 4.4                                  | 1.0        | 4.7        |
| 20.0        | 1249                                                                                                                   | 1203                 | 1296                 | 3.7                                  | 0.8        | 4.5        |
| <b>25.0</b> | <b>1000.0</b>                                                                                                          | <b>970.0</b>         | <b>1030</b>          | <b>3.0</b>                           | <b>0.7</b> | <b>4.4</b> |
| 30.0        | 805.5                                                                                                                  | 775.6                | 835.4                | 3.7                                  | 0.9        | 4.3        |
| 35.0        | 652.9                                                                                                                  | 624.4                | 681.3                | 4.4                                  | 1.1        | 4.1        |
| 40.0        | 532.3                                                                                                                  | 505.8                | 558.8                | 5.0                                  | 1.2        | 4.0        |
| 45.0        | 436.4                                                                                                                  | 412.1                | 460.8                | 5.6                                  | 1.4        | 3.9        |
| 50.0        | 359.8                                                                                                                  | 337.6                | 382.0                | 6.2                                  | 1.6        | 3.8        |
| 55.0        | 298.2                                                                                                                  | 278.1                | 318.3                | 6.7                                  | 1.8        | 3.7        |
| 60.0        | 248.4                                                                                                                  | 230.3                | 266.4                | 7.3                                  | 2.0        | 3.6        |
| 65.0        | 207.9                                                                                                                  | 191.6                | 224.1                | 7.8                                  | 2.2        | 3.5        |
| 70.0        | 174.8                                                                                                                  | 160.2                | 189.3                | 8.3                                  | 2.4        | 3.4        |
| 75.0        | 147.6                                                                                                                  | 134.6                | 160.7                | 8.8                                  | 2.6        | 3.3        |
| 80.0        | 125.2                                                                                                                  | 113.6                | 136.9                | 9.3                                  | 2.9        | 3.2        |
| 85.0        | 106.7                                                                                                                  | 96.23                | 117.1                | 9.8                                  | 3.1        | 3.2        |
| 90.0        | 91.23                                                                                                                  | 81.87                | 100.6                | 10.3                                 | 3.3        | 3.1        |
| 95.0        | 78.32                                                                                                                  | 69.94                | 86.70                | 10.7                                 | 3.6        | 3.0        |
| 100.0       | 67.49                                                                                                                  | 59.97                | 75.01                | 11.1                                 | 3.8        | 2.9        |
| 105.0       | 58.36                                                                                                                  | 51.61                | 65.11                | 11.6                                 | 4.0        | 2.9        |
| 110.0       | 50.65                                                                                                                  | 44.58                | 56.71                | 12.0                                 | 4.3        | 2.8        |
| 115.0       | 44.10                                                                                                                  | 38.64                | 49.56                | 12.4                                 | 4.5        | 2.7        |
| 120.0       | 38.52                                                                                                                  | 33.60                | 43.44                | 12.8                                 | 4.8        | 2.7        |
| 125.0       | 33.75                                                                                                                  | 29.31                | 38.19                | 13.2                                 | 5.0        | 2.6        |



|             | B57321V2102J060                                                                                             |                          |                          |                         |                          |                 |
|-------------|-------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------|--------------------------|-----------------|
| R/T No.     | 8502                                                                                                        |                          |                          |                         |                          |                 |
| T (°C)      | $B_{25/100} = 4000 \text{ K}$ , $R_{25} = 1000 \Omega$ , $T_R = 25 \text{ °C}$ , $\Delta R_R/R_R = \pm 5\%$ |                          |                          |                         |                          |                 |
|             | $R_{\text{nom}}[\Omega]$                                                                                    | $R_{\text{min}}[\Omega]$ | $R_{\text{max}}[\Omega]$ | $\Delta R_R/R_R[\pm\%]$ | $\Delta T[\pm\text{°C}]$ | $\alpha (\%/K)$ |
| −55.0       | 96158                                                                                                       | 77109                    | 115210                   | 19.8                    | 2.7                      | 7.4             |
| −50.0       | 66892                                                                                                       | 54465                    | 79318                    | 18.6                    | 2.6                      | 7.1             |
| −45.0       | 47127                                                                                                       | 38927                    | 55326                    | 17.4                    | 2.5                      | 6.9             |
| −40.0       | 33606                                                                                                       | 28138                    | 39074                    | 16.3                    | 2.4                      | 6.6             |
| −35.0       | 24243                                                                                                       | 20560                    | 27925                    | 15.2                    | 2.4                      | 6.4             |
| −30.0       | 17681                                                                                                       | 15179                    | 20184                    | 14.2                    | 2.3                      | 6.2             |
| −25.0       | 13032                                                                                                       | 11317                    | 14747                    | 13.2                    | 2.2                      | 6.0             |
| −20.0       | 9702                                                                                                        | 8518                     | 10886                    | 12.2                    | 2.1                      | 5.8             |
| −15.0       | 7292                                                                                                        | 6469                     | 8115                     | 11.3                    | 2.0                      | 5.6             |
| −10.0       | 5531                                                                                                        | 4956                     | 6107                     | 10.4                    | 1.9                      | 5.4             |
| −5.0        | 4232                                                                                                        | 3828                     | 4637                     | 9.6                     | 1.8                      | 5.3             |
| 0.0         | 3266                                                                                                        | 2981                     | 3551                     | 8.7                     | 1.7                      | 5.1             |
| 5.0         | 2540                                                                                                        | 2338                     | 2742                     | 7.9                     | 1.6                      | 4.9             |
| 10.0        | 1991                                                                                                        | 1848                     | 2134                     | 7.2                     | 1.5                      | 4.8             |
| 15.0        | 1572                                                                                                        | 1470                     | 1673                     | 6.4                     | 1.4                      | 4.7             |
| 20.0        | 1249                                                                                                        | 1178                     | 1321                     | 5.7                     | 1.3                      | 4.5             |
| <b>25.0</b> | <b>1000.0</b>                                                                                               | <b>950.0</b>             | <b>1050</b>              | <b>5.0</b>              | <b>1.1</b>               | <b>4.4</b>      |
| 30.0        | 805.5                                                                                                       | 759.5                    | 851.5                    | 5.7                     | 1.3                      | 4.3             |
| 35.0        | 652.9                                                                                                       | 611.4                    | 694.4                    | 6.4                     | 1.5                      | 4.1             |
| 40.0        | 532.3                                                                                                       | 495.1                    | 569.4                    | 7.0                     | 1.7                      | 4.0             |
| 45.0        | 436.4                                                                                                       | 403.4                    | 469.5                    | 7.6                     | 1.9                      | 3.9             |
| 50.0        | 359.8                                                                                                       | 330.4                    | 389.2                    | 8.2                     | 2.1                      | 3.8             |
| 55.0        | 298.2                                                                                                       | 272.2                    | 324.2                    | 8.7                     | 2.4                      | 3.7             |
| 60.0        | 248.4                                                                                                       | 225.3                    | 271.4                    | 9.3                     | 2.6                      | 3.6             |
| 65.0        | 207.9                                                                                                       | 187.5                    | 228.3                    | 9.8                     | 2.8                      | 3.5             |
| 70.0        | 174.8                                                                                                       | 156.7                    | 192.8                    | 10.3                    | 3.0                      | 3.4             |
| 75.0        | 147.6                                                                                                       | 131.6                    | 163.6                    | 10.8                    | 3.2                      | 3.3             |
| 80.0        | 125.2                                                                                                       | 111.1                    | 139.4                    | 11.3                    | 3.5                      | 3.2             |
| 85.0        | 106.7                                                                                                       | 94.09                    | 119.3                    | 11.8                    | 3.7                      | 3.2             |
| 90.0        | 91.23                                                                                                       | 80.05                    | 102.4                    | 12.3                    | 4.0                      | 3.1             |
| 95.0        | 78.32                                                                                                       | 68.37                    | 88.27                    | 12.7                    | 4.2                      | 3.0             |
| 100.0       | 67.49                                                                                                       | 58.62                    | 76.36                    | 13.1                    | 4.5                      | 2.9             |
| 105.0       | 58.36                                                                                                       | 50.45                    | 66.28                    | 13.6                    | 4.7                      | 2.9             |
| 110.0       | 50.65                                                                                                       | 43.57                    | 57.73                    | 14.0                    | 5.0                      | 2.8             |
| 115.0       | 44.10                                                                                                       | 37.76                    | 50.44                    | 14.4                    | 5.3                      | 2.7             |
| 120.0       | 38.52                                                                                                       | 32.83                    | 44.21                    | 14.8                    | 5.5                      | 2.7             |
| 125.0       | 33.75                                                                                                       | 28.64                    | 38.87                    | 15.2                    | 5.8                      | 2.6             |



|             | B57321V2152H060                                                                                                        |                      |                      |                                      |            |            |
|-------------|------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                   |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 1500 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                   | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 144240                                                                                                                 | 118550               | 169930               | 17.8                                 | 2.4        | 7.4        |
| -50.0       | 100340                                                                                                                 | 83704                | 116970               | 16.6                                 | 2.3        | 7.1        |
| -45.0       | 70690                                                                                                                  | 59805                | 81576                | 15.4                                 | 2.2        | 6.9        |
| -40.0       | 50409                                                                                                                  | 43215                | 57603                | 14.3                                 | 2.1        | 6.6        |
| -35.0       | 36364                                                                                                                  | 31567                | 41160                | 13.2                                 | 2.1        | 6.4        |
| -30.0       | 26522                                                                                                                  | 23299                | 29746                | 12.2                                 | 2.0        | 6.2        |
| -25.0       | 19548                                                                                                                  | 17367                | 21730                | 11.2                                 | 1.9        | 6.0        |
| -20.0       | 14553                                                                                                                  | 13068                | 16038                | 10.2                                 | 1.8        | 5.8        |
| -15.0       | 10938                                                                                                                  | 9923                 | 11954                | 9.3                                  | 1.7        | 5.6        |
| -10.0       | 8297                                                                                                                   | 7600                 | 8994                 | 8.4                                  | 1.5        | 5.4        |
| -5.0        | 6349                                                                                                                   | 5869                 | 6828                 | 7.6                                  | 1.4        | 5.3        |
| 0.0         | 4899                                                                                                                   | 4569                 | 5228                 | 6.7                                  | 1.3        | 5.1        |
| 5.0         | 3810                                                                                                                   | 3584                 | 4036                 | 5.9                                  | 1.2        | 4.9        |
| 10.0        | 2986                                                                                                                   | 2831                 | 3141                 | 5.2                                  | 1.1        | 4.8        |
| 15.0        | 2357                                                                                                                   | 2253                 | 2462                 | 4.4                                  | 1.0        | 4.7        |
| 20.0        | 1874                                                                                                                   | 1804                 | 1944                 | 3.7                                  | 0.8        | 4.5        |
| <b>25.0</b> | <b>1500</b>                                                                                                            | <b>1455</b>          | <b>1545</b>          | <b>3.0</b>                           | <b>0.7</b> | <b>4.4</b> |
| 30.0        | 1208                                                                                                                   | 1163                 | 1253                 | 3.7                                  | 0.9        | 4.3        |
| 35.0        | 979.3                                                                                                                  | 936.7                | 1022                 | 4.4                                  | 1.1        | 4.1        |
| 40.0        | 798.4                                                                                                                  | 758.7                | 838.2                | 5.0                                  | 1.2        | 4.0        |
| 45.0        | 654.7                                                                                                                  | 618.1                | 691.2                | 5.6                                  | 1.4        | 3.9        |
| 50.0        | 539.7                                                                                                                  | 506.5                | 573.0                | 6.2                                  | 1.6        | 3.8        |
| 55.0        | 447.3                                                                                                                  | 417.2                | 477.4                | 6.7                                  | 1.8        | 3.7        |
| 60.0        | 372.6                                                                                                                  | 345.4                | 399.7                | 7.3                                  | 2.0        | 3.6        |
| 65.0        | 311.8                                                                                                                  | 287.5                | 336.2                | 7.8                                  | 2.2        | 3.5        |
| 70.0        | 262.2                                                                                                                  | 240.4                | 284.0                | 8.3                                  | 2.4        | 3.4        |
| 75.0        | 221.5                                                                                                                  | 201.9                | 241.0                | 8.8                                  | 2.6        | 3.3        |
| 80.0        | 187.8                                                                                                                  | 170.3                | 205.4                | 9.3                                  | 2.9        | 3.2        |
| 85.0        | 160.0                                                                                                                  | 144.3                | 175.7                | 9.8                                  | 3.1        | 3.2        |
| 90.0        | 136.8                                                                                                                  | 122.8                | 150.9                | 10.3                                 | 3.3        | 3.1        |
| 95.0        | 117.5                                                                                                                  | 104.9                | 130.1                | 10.7                                 | 3.6        | 3.0        |
| 100.0       | 101.2                                                                                                                  | 89.96                | 112.5                | 11.1                                 | 3.8        | 2.9        |
| 105.0       | 87.54                                                                                                                  | 77.42                | 97.67                | 11.6                                 | 4.0        | 2.9        |
| 110.0       | 75.97                                                                                                                  | 66.87                | 85.07                | 12.0                                 | 4.3        | 2.8        |
| 115.0       | 66.15                                                                                                                  | 57.96                | 74.34                | 12.4                                 | 4.5        | 2.7        |
| 120.0       | 57.78                                                                                                                  | 50.40                | 65.16                | 12.8                                 | 4.8        | 2.7        |
| 125.0       | 50.63                                                                                                                  | 43.97                | 57.29                | 13.2                                 | 5.0        | 2.6        |



|             | B57321V2152J060                                                                                                        |                      |                      |                                      |            |            |
|-------------|------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                   |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 1500 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 5% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                   | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 144240                                                                                                                 | 115660               | 172810               | 19.8                                 | 2.7        | 7.4        |
| -50.0       | 100340                                                                                                                 | 81697                | 118980               | 18.6                                 | 2.6        | 7.1        |
| -45.0       | 70690                                                                                                                  | 58391                | 82989                | 17.4                                 | 2.5        | 6.9        |
| -40.0       | 50409                                                                                                                  | 42207                | 58611                | 16.3                                 | 2.4        | 6.6        |
| -35.0       | 36364                                                                                                                  | 30840                | 41888                | 15.2                                 | 2.4        | 6.4        |
| -30.0       | 26522                                                                                                                  | 22768                | 30276                | 14.2                                 | 2.3        | 6.2        |
| -25.0       | 19548                                                                                                                  | 16976                | 22121                | 13.2                                 | 2.2        | 6.0        |
| -20.0       | 14553                                                                                                                  | 12777                | 16329                | 12.2                                 | 2.1        | 5.8        |
| -15.0       | 10938                                                                                                                  | 9704                 | 12173                | 11.3                                 | 2.0        | 5.6        |
| -10.0       | 8297                                                                                                                   | 7434                 | 9160                 | 10.4                                 | 1.9        | 5.4        |
| -5.0        | 6349                                                                                                                   | 5742                 | 6955                 | 9.6                                  | 1.8        | 5.3        |
| 0.0         | 4899                                                                                                                   | 4471                 | 5326                 | 8.7                                  | 1.7        | 5.1        |
| 5.0         | 3810                                                                                                                   | 3507                 | 4113                 | 7.9                                  | 1.6        | 4.9        |
| 10.0        | 2986                                                                                                                   | 2772                 | 3200                 | 7.2                                  | 1.5        | 4.8        |
| 15.0        | 2357                                                                                                                   | 2205                 | 2509                 | 6.4                                  | 1.4        | 4.7        |
| 20.0        | 1874                                                                                                                   | 1767                 | 1982                 | 5.7                                  | 1.3        | 4.5        |
| <b>25.0</b> | <b>1500</b>                                                                                                            | <b>1425</b>          | <b>1575</b>          | <b>5.0</b>                           | <b>1.1</b> | <b>4.4</b> |
| 30.0        | 1208                                                                                                                   | 1139                 | 1277                 | 5.7                                  | 1.3        | 4.3        |
| 35.0        | 979.3                                                                                                                  | 917.1                | 1042                 | 6.4                                  | 1.5        | 4.1        |
| 40.0        | 798.4                                                                                                                  | 742.7                | 854.2                | 7.0                                  | 1.7        | 4.0        |
| 45.0        | 654.7                                                                                                                  | 605.0                | 704.3                | 7.6                                  | 1.9        | 3.9        |
| 50.0        | 539.7                                                                                                                  | 495.7                | 583.8                | 8.2                                  | 2.1        | 3.8        |
| 55.0        | 447.3                                                                                                                  | 408.2                | 486.3                | 8.7                                  | 2.4        | 3.7        |
| 60.0        | 372.6                                                                                                                  | 338.0                | 407.1                | 9.3                                  | 2.6        | 3.6        |
| 65.0        | 311.8                                                                                                                  | 281.2                | 342.4                | 9.8                                  | 2.8        | 3.5        |
| 70.0        | 262.2                                                                                                                  | 235.1                | 289.3                | 10.3                                 | 3.0        | 3.4        |
| 75.0        | 221.5                                                                                                                  | 197.5                | 245.4                | 10.8                                 | 3.2        | 3.3        |
| 80.0        | 187.8                                                                                                                  | 166.6                | 209.1                | 11.3                                 | 3.5        | 3.2        |
| 85.0        | 160.0                                                                                                                  | 141.1                | 178.9                | 11.8                                 | 3.7        | 3.2        |
| 90.0        | 136.8                                                                                                                  | 120.1                | 153.6                | 12.3                                 | 4.0        | 3.1        |
| 95.0        | 117.5                                                                                                                  | 102.6                | 132.4                | 12.7                                 | 4.2        | 3.0        |
| 100.0       | 101.2                                                                                                                  | 87.93                | 114.5                | 13.1                                 | 4.5        | 2.9        |
| 105.0       | 87.54                                                                                                                  | 75.67                | 99.42                | 13.6                                 | 4.7        | 2.9        |
| 110.0       | 75.97                                                                                                                  | 65.35                | 86.59                | 14.0                                 | 5.0        | 2.8        |
| 115.0       | 66.15                                                                                                                  | 56.63                | 75.66                | 14.4                                 | 5.3        | 2.7        |
| 120.0       | 57.78                                                                                                                  | 49.24                | 66.32                | 14.8                                 | 5.5        | 2.7        |
| 125.0       | 50.63                                                                                                                  | 42.95                | 58.30                | 15.2                                 | 5.8        | 2.6        |



|             | B57321V2222H060                                                                                                        |                      |                      |                                      |            |            |
|-------------|------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                   |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 2200 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                   | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 211550                                                                                                                 | 173870               | 249220               | 17.8                                 | 2.4        | 7.4        |
| -50.0       | 147160                                                                                                                 | 122770               | 171560               | 16.6                                 | 2.3        | 7.1        |
| -45.0       | 103680                                                                                                                 | 87714                | 119640               | 15.4                                 | 2.2        | 6.9        |
| -40.0       | 73933                                                                                                                  | 63383                | 84484                | 14.3                                 | 2.1        | 6.6        |
| -35.0       | 53334                                                                                                                  | 46299                | 60368                | 13.2                                 | 2.1        | 6.4        |
| -30.0       | 38899                                                                                                                  | 34171                | 43627                | 12.2                                 | 2.0        | 6.2        |
| -25.0       | 28671                                                                                                                  | 25471                | 31870                | 11.2                                 | 1.9        | 6.0        |
| -20.0       | 21344                                                                                                                  | 19166                | 23523                | 10.2                                 | 1.8        | 5.8        |
| -15.0       | 16043                                                                                                                  | 14553                | 17533                | 9.3                                  | 1.7        | 5.6        |
| -10.0       | 12169                                                                                                                  | 11146                | 13192                | 8.4                                  | 1.5        | 5.4        |
| -5.0        | 9311                                                                                                                   | 8608                 | 10015                | 7.6                                  | 1.4        | 5.3        |
| 0.0         | 7185                                                                                                                   | 6701                 | 7668                 | 6.7                                  | 1.3        | 5.1        |
| 5.0         | 5588                                                                                                                   | 5256                 | 5920                 | 5.9                                  | 1.2        | 4.9        |
| 10.0        | 4379                                                                                                                   | 4153                 | 4606                 | 5.2                                  | 1.1        | 4.8        |
| 15.0        | 3457                                                                                                                   | 3304                 | 3611                 | 4.4                                  | 1.0        | 4.7        |
| 20.0        | 2749                                                                                                                   | 2646                 | 2851                 | 3.7                                  | 0.8        | 4.5        |
| <b>25.0</b> | <b>2200</b>                                                                                                            | <b>2134</b>          | <b>2266</b>          | <b>3.0</b>                           | <b>0.7</b> | <b>4.4</b> |
| 30.0        | 1772                                                                                                                   | 1706                 | 1838                 | 3.7                                  | 0.9        | 4.3        |
| 35.0        | 1436                                                                                                                   | 1374                 | 1499                 | 4.4                                  | 1.1        | 4.1        |
| 40.0        | 1171                                                                                                                   | 1113                 | 1229                 | 5.0                                  | 1.2        | 4.0        |
| 45.0        | 960.2                                                                                                                  | 906.6                | 1014                 | 5.6                                  | 1.4        | 3.9        |
| 50.0        | 791.6                                                                                                                  | 742.8                | 840.4                | 6.2                                  | 1.6        | 3.8        |
| 55.0        | 656.0                                                                                                                  | 611.9                | 700.2                | 6.7                                  | 1.8        | 3.7        |
| 60.0        | 546.4                                                                                                                  | 506.6                | 586.2                | 7.3                                  | 2.0        | 3.6        |
| 65.0        | 457.3                                                                                                                  | 421.6                | 493.0                | 7.8                                  | 2.2        | 3.5        |
| 70.0        | 384.5                                                                                                                  | 352.5                | 416.6                | 8.3                                  | 2.4        | 3.4        |
| 75.0        | 324.8                                                                                                                  | 296.1                | 353.5                | 8.8                                  | 2.6        | 3.3        |
| 80.0        | 275.5                                                                                                                  | 249.8                | 301.2                | 9.3                                  | 2.9        | 3.2        |
| 85.0        | 234.7                                                                                                                  | 211.7                | 257.7                | 9.8                                  | 3.1        | 3.2        |
| 90.0        | 200.7                                                                                                                  | 180.1                | 221.3                | 10.3                                 | 3.3        | 3.1        |
| 95.0        | 172.3                                                                                                                  | 153.9                | 190.7                | 10.7                                 | 3.6        | 3.0        |
| 100.0       | 148.5                                                                                                                  | 131.9                | 165.0                | 11.1                                 | 3.8        | 2.9        |
| 105.0       | 128.4                                                                                                                  | 113.6                | 143.2                | 11.6                                 | 4.0        | 2.9        |
| 110.0       | 111.4                                                                                                                  | 98.08                | 124.8                | 12.0                                 | 4.3        | 2.8        |
| 115.0       | 97.02                                                                                                                  | 85.00                | 109.0                | 12.4                                 | 4.5        | 2.7        |
| 120.0       | 84.74                                                                                                                  | 73.92                | 95.57                | 12.8                                 | 4.8        | 2.7        |
| 125.0       | 74.25                                                                                                                  | 64.48                | 84.03                | 13.2                                 | 5.0        | 2.6        |



|             | B57321V2222J060                                                                                                        |                      |                      |                                      |            |            |
|-------------|------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                   |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 2200 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 5% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                   | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 211550                                                                                                                 | 169640               | 253460               | 19.8                                 | 2.7        | 7.4        |
| -50.0       | 147160                                                                                                                 | 119820               | 174500               | 18.6                                 | 2.6        | 7.1        |
| -45.0       | 103680                                                                                                                 | 85640                | 121720               | 17.4                                 | 2.5        | 6.9        |
| -40.0       | 73933                                                                                                                  | 61904                | 85963                | 16.3                                 | 2.4        | 6.6        |
| -35.0       | 53334                                                                                                                  | 45232                | 61435                | 15.2                                 | 2.4        | 6.4        |
| -30.0       | 38899                                                                                                                  | 33393                | 44405                | 14.2                                 | 2.3        | 6.2        |
| -25.0       | 28671                                                                                                                  | 24898                | 32444                | 13.2                                 | 2.2        | 6.0        |
| -20.0       | 21344                                                                                                                  | 18739                | 23949                | 12.2                                 | 2.1        | 5.8        |
| -15.0       | 16043                                                                                                                  | 14232                | 17854                | 11.3                                 | 2.0        | 5.6        |
| -10.0       | 12169                                                                                                                  | 10903                | 13435                | 10.4                                 | 1.9        | 5.4        |
| -5.0        | 9311                                                                                                                   | 8422                 | 10201                | 9.6                                  | 1.8        | 5.3        |
| 0.0         | 7185                                                                                                                   | 6557                 | 7812                 | 8.7                                  | 1.7        | 5.1        |
| 5.0         | 5588                                                                                                                   | 5144                 | 6032                 | 7.9                                  | 1.6        | 4.9        |
| 10.0        | 4379                                                                                                                   | 4065                 | 4694                 | 7.2                                  | 1.5        | 4.8        |
| 15.0        | 3457                                                                                                                   | 3235                 | 3680                 | 6.4                                  | 1.4        | 4.7        |
| 20.0        | 2749                                                                                                                   | 2591                 | 2906                 | 5.7                                  | 1.3        | 4.5        |
| <b>25.0</b> | <b>2200</b>                                                                                                            | <b>2090</b>          | <b>2310</b>          | <b>5.0</b>                           | <b>1.1</b> | <b>4.4</b> |
| 30.0        | 1772                                                                                                                   | 1671                 | 1873                 | 5.7                                  | 1.3        | 4.3        |
| 35.0        | 1436                                                                                                                   | 1345                 | 1528                 | 6.4                                  | 1.5        | 4.1        |
| 40.0        | 1171                                                                                                                   | 1089                 | 1253                 | 7.0                                  | 1.7        | 4.0        |
| 45.0        | 960.2                                                                                                                  | 887.4                | 1033                 | 7.6                                  | 1.9        | 3.9        |
| 50.0        | 791.6                                                                                                                  | 727.0                | 856.2                | 8.2                                  | 2.1        | 3.8        |
| 55.0        | 656.0                                                                                                                  | 598.8                | 713.3                | 8.7                                  | 2.4        | 3.7        |
| 60.0        | 546.4                                                                                                                  | 495.7                | 597.1                | 9.3                                  | 2.6        | 3.6        |
| 65.0        | 457.3                                                                                                                  | 412.5                | 502.2                | 9.8                                  | 2.8        | 3.5        |
| 70.0        | 384.5                                                                                                                  | 344.8                | 424.3                | 10.3                                 | 3.0        | 3.4        |
| 75.0        | 324.8                                                                                                                  | 289.6                | 360.0                | 10.8                                 | 3.2        | 3.3        |
| 80.0        | 275.5                                                                                                                  | 244.3                | 306.7                | 11.3                                 | 3.5        | 3.2        |
| 85.0        | 234.7                                                                                                                  | 207.0                | 262.4                | 11.8                                 | 3.7        | 3.2        |
| 90.0        | 200.7                                                                                                                  | 176.1                | 225.3                | 12.3                                 | 4.0        | 3.1        |
| 95.0        | 172.3                                                                                                                  | 150.4                | 194.2                | 12.7                                 | 4.2        | 3.0        |
| 100.0       | 148.5                                                                                                                  | 129.0                | 168.0                | 13.1                                 | 4.5        | 2.9        |
| 105.0       | 128.4                                                                                                                  | 111.0                | 145.8                | 13.6                                 | 4.7        | 2.9        |
| 110.0       | 111.4                                                                                                                  | 95.85                | 127.0                | 14.0                                 | 5.0        | 2.8        |
| 115.0       | 97.02                                                                                                                  | 83.06                | 111.0                | 14.4                                 | 5.3        | 2.7        |
| 120.0       | 84.74                                                                                                                  | 72.22                | 97.26                | 14.8                                 | 5.5        | 2.7        |
| 125.0       | 74.25                                                                                                                  | 63.00                | 85.51                | 15.2                                 | 5.8        | 2.6        |



|             | B57301V2472H060                                                                                                        |                      |                      |                                      |            |            |
|-------------|------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8500                                                                                                                   |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 3650 K, R <sub>25</sub> = 4700 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                   | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 300410                                                                                                                 | 250790               | 350030               | 16.5                                 | 2.4        | 6.8        |
| -50.0       | 215680                                                                                                                 | 182480               | 248880               | 15.4                                 | 2.4        | 6.5        |
| -45.0       | 156720                                                                                                                 | 134280               | 179150               | 14.3                                 | 2.3        | 6.3        |
| -40.0       | 115170                                                                                                                 | 99862                | 130470               | 13.3                                 | 2.2        | 6.1        |
| -35.0       | 85545                                                                                                                  | 75020                | 96069                | 12.3                                 | 2.1        | 5.8        |
| -30.0       | 64190                                                                                                                  | 56900                | 71480                | 11.4                                 | 2.0        | 5.6        |
| -25.0       | 48632                                                                                                                  | 43550                | 53714                | 10.5                                 | 1.9        | 5.5        |
| -20.0       | 37184                                                                                                                  | 33622                | 40745                | 9.6                                  | 1.8        | 5.3        |
| -15.0       | 28679                                                                                                                  | 26172                | 31186                | 8.7                                  | 1.7        | 5.1        |
| -10.0       | 22303                                                                                                                  | 20534                | 24073                | 7.9                                  | 1.6        | 4.9        |
| -5.0        | 17483                                                                                                                  | 16232                | 18735                | 7.2                                  | 1.5        | 4.8        |
| 0.0         | 13808                                                                                                                  | 12923                | 14694                | 6.4                                  | 1.4        | 4.6        |
| 5.0         | 10985                                                                                                                  | 10360                | 11610                | 5.7                                  | 1.3        | 4.5        |
| 10.0        | 8799                                                                                                                   | 8360                 | 9239                 | 5.0                                  | 1.1        | 4.4        |
| 15.0        | 7095                                                                                                                   | 6788                 | 7402                 | 4.3                                  | 1.0        | 4.2        |
| 20.0        | 5757                                                                                                                   | 5546                 | 5969                 | 3.7                                  | 0.9        | 4.1        |
| <b>25.0</b> | <b>4700</b>                                                                                                            | <b>4559</b>          | <b>4841</b>          | <b>3.0</b>                           | <b>0.8</b> | <b>4.0</b> |
| 30.0        | 3859                                                                                                                   | 3718                 | 4000                 | 3.7                                  | 0.9        | 3.9        |
| 35.0        | 3186                                                                                                                   | 3051                 | 3322                 | 4.2                                  | 1.1        | 3.8        |
| 40.0        | 2645                                                                                                                   | 2518                 | 2772                 | 4.8                                  | 1.3        | 3.7        |
| 45.0        | 2207                                                                                                                   | 2089                 | 2325                 | 5.4                                  | 1.5        | 3.6        |
| 50.0        | 1851                                                                                                                   | 1742                 | 1960                 | 5.9                                  | 1.7        | 3.5        |
| 55.0        | 1559                                                                                                                   | 1459                 | 1659                 | 6.4                                  | 1.9        | 3.4        |
| 60.0        | 1319                                                                                                                   | 1228                 | 1411                 | 6.9                                  | 2.1        | 3.3        |
| 65.0        | 1122                                                                                                                   | 1039                 | 1204                 | 7.4                                  | 2.3        | 3.2        |
| 70.0        | 957.4                                                                                                                  | 882.1                | 1033                 | 7.9                                  | 2.5        | 3.1        |
| 75.0        | 820.6                                                                                                                  | 752.3                | 888.9                | 8.3                                  | 2.7        | 3.0        |
| 80.0        | 706.1                                                                                                                  | 644.1                | 768.0                | 8.8                                  | 3.0        | 3.0        |
| 85.0        | 609.8                                                                                                                  | 553.7                | 665.9                | 9.2                                  | 3.2        | 2.9        |
| 90.0        | 528.6                                                                                                                  | 477.7                | 579.5                | 9.6                                  | 3.4        | 2.8        |
| 95.0        | 459.8                                                                                                                  | 413.7                | 506.0                | 10.0                                 | 3.6        | 2.8        |
| 100.0       | 401.4                                                                                                                  | 359.5                | 443.2                | 10.4                                 | 3.9        | 2.7        |
| 105.0       | 351.5                                                                                                                  | 313.4                | 389.5                | 10.8                                 | 4.1        | 2.6        |
| 110.0       | 308.7                                                                                                                  | 274.2                | 343.3                | 11.2                                 | 4.4        | 2.6        |
| 115.0       | 272.1                                                                                                                  | 240.6                | 303.5                | 11.6                                 | 4.6        | 2.5        |
| 120.0       | 240.4                                                                                                                  | 211.8                | 269.1                | 11.9                                 | 4.9        | 2.4        |
| 125.0       | 213.1                                                                                                                  | 186.9                | 239.2                | 12.3                                 | 5.1        | 2.4        |



|             | B57301V2472J060                                                                                                                   |                          |                          |                         |                               |                 |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------|-------------------------------|-----------------|
| R/T No.     | 8500                                                                                                                              |                          |                          |                         |                               |                 |
| T (°C)      | $B_{25/100} = 3650 \text{ K}$ , $R_{25} = 4700 \text{ } \Omega$ , $T_R = 25 \text{ } ^\circ\text{C}$ , $\Delta R_R/R_R = \pm 5\%$ |                          |                          |                         |                               |                 |
|             | $R_{\text{nom}}[\Omega]$                                                                                                          | $R_{\text{min}}[\Omega]$ | $R_{\text{max}}[\Omega]$ | $\Delta R_R/R_R[\pm\%]$ | $\Delta T[\pm^\circ\text{C}]$ | $\alpha (\%/K)$ |
| -55.0       | 300410                                                                                                                            | 244780                   | 356040                   | 18.5                    | 2.7                           | 6.8             |
| -50.0       | 215680                                                                                                                            | 178170                   | 253190                   | 17.4                    | 2.7                           | 6.5             |
| -45.0       | 156720                                                                                                                            | 131140                   | 182290                   | 16.3                    | 2.6                           | 6.3             |
| -40.0       | 115170                                                                                                                            | 97559                    | 132780                   | 15.3                    | 2.5                           | 6.1             |
| -35.0       | 85545                                                                                                                             | 73309                    | 97780                    | 14.3                    | 2.4                           | 5.8             |
| -30.0       | 64190                                                                                                                             | 55616                    | 72764                    | 13.4                    | 2.4                           | 5.6             |
| -25.0       | 48632                                                                                                                             | 42577                    | 54687                    | 12.5                    | 2.3                           | 5.5             |
| -20.0       | 37184                                                                                                                             | 32878                    | 41489                    | 11.6                    | 2.2                           | 5.3             |
| -15.0       | 28679                                                                                                                             | 25598                    | 31759                    | 10.7                    | 2.1                           | 5.1             |
| -10.0       | 22303                                                                                                                             | 20088                    | 24519                    | 9.9                     | 2.0                           | 4.9             |
| -5.0        | 17483                                                                                                                             | 15882                    | 19084                    | 9.2                     | 1.9                           | 4.8             |
| 0.0         | 13808                                                                                                                             | 12647                    | 14970                    | 8.4                     | 1.8                           | 4.6             |
| 5.0         | 10985                                                                                                                             | 10140                    | 11830                    | 7.7                     | 1.7                           | 4.5             |
| 10.0        | 8799                                                                                                                              | 8184                     | 9415                     | 7.0                     | 1.6                           | 4.4             |
| 15.0        | 7095                                                                                                                              | 6646                     | 7544                     | 6.3                     | 1.5                           | 4.2             |
| 20.0        | 5757                                                                                                                              | 5430                     | 6084                     | 5.7                     | 1.4                           | 4.1             |
| <b>25.0</b> | <b>4700</b>                                                                                                                       | <b>4465</b>              | <b>4935</b>              | <b>5.0</b>              | <b>1.3</b>                    | <b>4.0</b>      |
| 30.0        | 3859                                                                                                                              | 3641                     | 4077                     | 5.7                     | 1.5                           | 3.9             |
| 35.0        | 3186                                                                                                                              | 2988                     | 3385                     | 6.2                     | 1.7                           | 3.8             |
| 40.0        | 2645                                                                                                                              | 2465                     | 2825                     | 6.8                     | 1.9                           | 3.7             |
| 45.0        | 2207                                                                                                                              | 2045                     | 2369                     | 7.4                     | 2.1                           | 3.6             |
| 50.0        | 1851                                                                                                                              | 1705                     | 1997                     | 7.9                     | 2.3                           | 3.5             |
| 55.0        | 1559                                                                                                                              | 1428                     | 1690                     | 8.4                     | 2.5                           | 3.4             |
| 60.0        | 1319                                                                                                                              | 1202                     | 1437                     | 8.9                     | 2.7                           | 3.3             |
| 65.0        | 1122                                                                                                                              | 1016                     | 1227                     | 9.4                     | 2.9                           | 3.2             |
| 70.0        | 957.4                                                                                                                             | 862.9                    | 1052                     | 9.9                     | 3.2                           | 3.1             |
| 75.0        | 820.6                                                                                                                             | 735.8                    | 905.3                    | 10.3                    | 3.4                           | 3.0             |
| 80.0        | 706.1                                                                                                                             | 630.0                    | 782.1                    | 10.8                    | 3.6                           | 3.0             |
| 85.0        | 609.8                                                                                                                             | 541.5                    | 678.1                    | 11.2                    | 3.9                           | 2.9             |
| 90.0        | 528.6                                                                                                                             | 467.2                    | 590.1                    | 11.6                    | 4.1                           | 2.8             |
| 95.0        | 459.8                                                                                                                             | 404.5                    | 515.2                    | 12.0                    | 4.4                           | 2.8             |
| 100.0       | 401.4                                                                                                                             | 351.5                    | 451.3                    | 12.4                    | 4.6                           | 2.7             |
| 105.0       | 351.5                                                                                                                             | 306.4                    | 396.5                    | 12.8                    | 4.9                           | 2.6             |
| 110.0       | 308.7                                                                                                                             | 268.0                    | 349.5                    | 13.2                    | 5.2                           | 2.6             |
| 115.0       | 272.1                                                                                                                             | 235.1                    | 309.0                    | 13.6                    | 5.4                           | 2.5             |
| 120.0       | 240.4                                                                                                                             | 206.9                    | 273.9                    | 13.9                    | 5.7                           | 2.4             |
| 125.0       | 213.1                                                                                                                             | 182.7                    | 243.5                    | 14.3                    | 6.0                           | 2.4             |



|             | B57321V2103H060                                                                                                                    |                          |                          |                         |                               |                 |
|-------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------|-------------------------------|-----------------|
| R/T No.     | 8502                                                                                                                               |                          |                          |                         |                               |                 |
| T (°C)      | $B_{25/100} = 4000 \text{ K}$ , $R_{25} = 10000 \text{ } \Omega$ , $T_R = 25 \text{ } ^\circ\text{C}$ , $\Delta R_R/R_R = \pm 3\%$ |                          |                          |                         |                               |                 |
|             | $R_{\text{nom}}[\Omega]$                                                                                                           | $R_{\text{min}}[\Omega]$ | $R_{\text{max}}[\Omega]$ | $\Delta R_R/R_R[\pm\%]$ | $\Delta T[\pm^\circ\text{C}]$ | $\alpha (\%/K)$ |
| -55.0       | 961580                                                                                                                             | 790320                   | 1132800                  | 17.8                    | 2.4                           | 7.4             |
| -50.0       | 668920                                                                                                                             | 558030                   | 779810                   | 16.6                    | 2.3                           | 7.1             |
| -45.0       | 471270                                                                                                                             | 398700                   | 543840                   | 15.4                    | 2.2                           | 6.9             |
| -40.0       | 336060                                                                                                                             | 288100                   | 384020                   | 14.3                    | 2.1                           | 6.6             |
| -35.0       | 242430                                                                                                                             | 210450                   | 274400                   | 13.2                    | 2.1                           | 6.4             |
| -30.0       | 176810                                                                                                                             | 155320                   | 198300                   | 12.2                    | 2.0                           | 6.2             |
| -25.0       | 130320                                                                                                                             | 115780                   | 144860                   | 11.2                    | 1.9                           | 6.0             |
| -20.0       | 97020                                                                                                                              | 87120                    | 106920                   | 10.2                    | 1.8                           | 5.8             |
| -15.0       | 72923                                                                                                                              | 66151                    | 79695                    | 9.3                     | 1.7                           | 5.6             |
| -10.0       | 55314                                                                                                                              | 50666                    | 59962                    | 8.4                     | 1.5                           | 5.4             |
| -5.0        | 42325                                                                                                                              | 39128                    | 45522                    | 7.6                     | 1.4                           | 5.3             |
| 0.0         | 32657                                                                                                                              | 30458                    | 34856                    | 6.7                     | 1.3                           | 5.1             |
| 5.0         | 25400                                                                                                                              | 23890                    | 26910                    | 5.9                     | 1.2                           | 4.9             |
| 10.0        | 19907                                                                                                                              | 18875                    | 20938                    | 5.2                     | 1.1                           | 4.8             |
| 15.0        | 15716                                                                                                                              | 15017                    | 16415                    | 4.4                     | 1.0                           | 4.7             |
| 20.0        | 12494                                                                                                                              | 12027                    | 12961                    | 3.7                     | 0.8                           | 4.5             |
| <b>25.0</b> | <b>10000</b>                                                                                                                       | <b>9700</b>              | <b>10300</b>             | <b>3.0</b>              | <b>0.7</b>                    | <b>4.4</b>      |
| 30.0        | 8055                                                                                                                               | 7756                     | 8354                     | 3.7                     | 0.9                           | 4.3             |
| 35.0        | 6529                                                                                                                               | 6244                     | 6813                     | 4.4                     | 1.1                           | 4.1             |
| 40.0        | 5323                                                                                                                               | 5058                     | 5588                     | 5.0                     | 1.2                           | 4.0             |
| 45.0        | 4364                                                                                                                               | 4121                     | 4608                     | 5.6                     | 1.4                           | 3.9             |
| 50.0        | 3598                                                                                                                               | 3376                     | 3820                     | 6.2                     | 1.6                           | 3.8             |
| 55.0        | 2982                                                                                                                               | 2781                     | 3183                     | 6.7                     | 1.8                           | 3.7             |
| 60.0        | 2484                                                                                                                               | 2303                     | 2664                     | 7.3                     | 2.0                           | 3.6             |
| 65.0        | 2079                                                                                                                               | 1916                     | 2241                     | 7.8                     | 2.2                           | 3.5             |
| 70.0        | 1748                                                                                                                               | 1602                     | 1893                     | 8.3                     | 2.4                           | 3.4             |
| 75.0        | 1476                                                                                                                               | 1346                     | 1607                     | 8.8                     | 2.6                           | 3.3             |
| 80.0        | 1252                                                                                                                               | 1136                     | 1369                     | 9.3                     | 2.9                           | 3.2             |
| 85.0        | 1067                                                                                                                               | 962.3                    | 1171                     | 9.8                     | 3.1                           | 3.2             |
| 90.0        | 912.3                                                                                                                              | 818.7                    | 1006                     | 10.3                    | 3.3                           | 3.1             |
| 95.0        | 783.2                                                                                                                              | 699.4                    | 867.0                    | 10.7                    | 3.6                           | 3.0             |
| 100.0       | 674.9                                                                                                                              | 599.7                    | 750.1                    | 11.1                    | 3.8                           | 2.9             |
| 105.0       | 583.6                                                                                                                              | 516.1                    | 651.1                    | 11.6                    | 4.0                           | 2.9             |
| 110.0       | 506.5                                                                                                                              | 445.8                    | 567.1                    | 12.0                    | 4.3                           | 2.8             |
| 115.0       | 441.0                                                                                                                              | 386.4                    | 495.6                    | 12.4                    | 4.5                           | 2.7             |
| 120.0       | 385.2                                                                                                                              | 336.0                    | 434.4                    | 12.8                    | 4.8                           | 2.7             |
| 125.0       | 337.5                                                                                                                              | 293.1                    | 381.9                    | 13.2                    | 5.0                           | 2.6             |



|             | B57321V2103J060                                                                                                         |                      |                      |                                      |            |            |
|-------------|-------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                    |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 10000 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 5% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                    | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 961580                                                                                                                  | 771090               | 1152100              | 19.8                                 | 2.7        | 7.4        |
| -50.0       | 668920                                                                                                                  | 544650               | 793180               | 18.6                                 | 2.6        | 7.1        |
| -45.0       | 471270                                                                                                                  | 389270               | 553260               | 17.4                                 | 2.5        | 6.9        |
| -40.0       | 336060                                                                                                                  | 281380               | 390740               | 16.3                                 | 2.4        | 6.6        |
| -35.0       | 242430                                                                                                                  | 205600               | 279250               | 15.2                                 | 2.4        | 6.4        |
| -30.0       | 176810                                                                                                                  | 151790               | 201840               | 14.2                                 | 2.3        | 6.2        |
| -25.0       | 130320                                                                                                                  | 113170               | 147470               | 13.2                                 | 2.2        | 6.0        |
| -20.0       | 97020                                                                                                                   | 85179                | 108860               | 12.2                                 | 2.1        | 5.8        |
| -15.0       | 72923                                                                                                                   | 64693                | 81153                | 11.3                                 | 2.0        | 5.6        |
| -10.0       | 55314                                                                                                                   | 49560                | 61068                | 10.4                                 | 1.9        | 5.4        |
| -5.0        | 42325                                                                                                                   | 38282                | 46368                | 9.6                                  | 1.8        | 5.3        |
| 0.0         | 32657                                                                                                                   | 29805                | 35510                | 8.7                                  | 1.7        | 5.1        |
| 5.0         | 25400                                                                                                                   | 23382                | 27418                | 7.9                                  | 1.6        | 4.9        |
| 10.0        | 19907                                                                                                                   | 18477                | 21336                | 7.2                                  | 1.5        | 4.8        |
| 15.0        | 15716                                                                                                                   | 14703                | 16729                | 6.4                                  | 1.4        | 4.7        |
| 20.0        | 12494                                                                                                                   | 11778                | 13211                | 5.7                                  | 1.3        | 4.5        |
| <b>25.0</b> | <b>10000</b>                                                                                                            | <b>9500</b>          | <b>10500</b>         | <b>5.0</b>                           | <b>1.1</b> | <b>4.4</b> |
| 30.0        | 8055                                                                                                                    | 7595                 | 8515                 | 5.7                                  | 1.3        | 4.3        |
| 35.0        | 6529                                                                                                                    | 6114                 | 6944                 | 6.4                                  | 1.5        | 4.1        |
| 40.0        | 5323                                                                                                                    | 4951                 | 5694                 | 7.0                                  | 1.7        | 4.0        |
| 45.0        | 4364                                                                                                                    | 4034                 | 4695                 | 7.6                                  | 1.9        | 3.9        |
| 50.0        | 3598                                                                                                                    | 3304                 | 3892                 | 8.2                                  | 2.1        | 3.8        |
| 55.0        | 2982                                                                                                                    | 2722                 | 3242                 | 8.7                                  | 2.4        | 3.7        |
| 60.0        | 2484                                                                                                                    | 2253                 | 2714                 | 9.3                                  | 2.6        | 3.6        |
| 65.0        | 2079                                                                                                                    | 1875                 | 2283                 | 9.8                                  | 2.8        | 3.5        |
| 70.0        | 1748                                                                                                                    | 1567                 | 1928                 | 10.3                                 | 3.0        | 3.4        |
| 75.0        | 1476                                                                                                                    | 1316                 | 1636                 | 10.8                                 | 3.2        | 3.3        |
| 80.0        | 1252                                                                                                                    | 1111                 | 1394                 | 11.3                                 | 3.5        | 3.2        |
| 85.0        | 1067                                                                                                                    | 940.9                | 1193                 | 11.8                                 | 3.7        | 3.2        |
| 90.0        | 912.3                                                                                                                   | 800.5                | 1024                 | 12.3                                 | 4.0        | 3.1        |
| 95.0        | 783.2                                                                                                                   | 683.7                | 882.7                | 12.7                                 | 4.2        | 3.0        |
| 100.0       | 674.9                                                                                                                   | 586.2                | 763.6                | 13.1                                 | 4.5        | 2.9        |
| 105.0       | 583.6                                                                                                                   | 504.5                | 662.8                | 13.6                                 | 4.7        | 2.9        |
| 110.0       | 506.5                                                                                                                   | 435.7                | 577.3                | 14.0                                 | 5.0        | 2.8        |
| 115.0       | 441.0                                                                                                                   | 377.6                | 504.4                | 14.4                                 | 5.3        | 2.7        |
| 120.0       | 385.2                                                                                                                   | 328.3                | 442.1                | 14.8                                 | 5.5        | 2.7        |
| 125.0       | 337.5                                                                                                                   | 286.4                | 388.7                | 15.2                                 | 5.8        | 2.6        |



|             | B57351V2103H060                                                                                                                    |                          |                          |                         |                               |                 |
|-------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------|-------------------------------|-----------------|
| R/T No.     | 8505                                                                                                                               |                          |                          |                         |                               |                 |
| T (°C)      | $B_{25/100} = 3460 \text{ K}$ , $R_{25} = 10000 \text{ } \Omega$ , $T_R = 25 \text{ } ^\circ\text{C}$ , $\Delta R_R/R_R = \pm 3\%$ |                          |                          |                         |                               |                 |
|             | $R_{\text{nom}}[\Omega]$                                                                                                           | $R_{\text{min}}[\Omega]$ | $R_{\text{max}}[\Omega]$ | $\Delta R_R/R_R[\pm\%]$ | $\Delta T[\pm^\circ\text{C}]$ | $\alpha (\%/K)$ |
| -55.0       | 503650                                                                                                                             | 423990                   | 583310                   | 15.8                    | 2.5                           | 6.3             |
| -50.0       | 369790                                                                                                                             | 315240                   | 424330                   | 14.8                    | 2.4                           | 6.1             |
| -45.0       | 274310                                                                                                                             | 236640                   | 311970                   | 13.7                    | 2.3                           | 5.9             |
| -40.0       | 205500                                                                                                                             | 179280                   | 231710                   | 12.8                    | 2.2                           | 5.7             |
| -35.0       | 155410                                                                                                                             | 137040                   | 173780                   | 11.8                    | 2.2                           | 5.5             |
| -30.0       | 118600                                                                                                                             | 105640                   | 131550                   | 10.9                    | 2.1                           | 5.3             |
| -25.0       | 91293                                                                                                                              | 82104                    | 100480                   | 10.1                    | 2.0                           | 5.1             |
| -20.0       | 70862                                                                                                                              | 64316                    | 77409                    | 9.2                     | 1.9                           | 5.0             |
| -15.0       | 55444                                                                                                                              | 50762                    | 60126                    | 8.4                     | 1.7                           | 4.8             |
| -10.0       | 43713                                                                                                                              | 40356                    | 47071                    | 7.7                     | 1.6                           | 4.7             |
| -5.0        | 34718                                                                                                                              | 32306                    | 37129                    | 6.9                     | 1.5                           | 4.5             |
| 0.0         | 27767                                                                                                                              | 26036                    | 29499                    | 6.2                     | 1.4                           | 4.4             |
| 5.0         | 22359                                                                                                                              | 21117                    | 23600                    | 5.6                     | 1.3                           | 4.3             |
| 10.0        | 18120                                                                                                                              | 17233                    | 19007                    | 4.9                     | 1.2                           | 4.1             |
| 15.0        | 14776                                                                                                                              | 14147                    | 15405                    | 4.3                     | 1.1                           | 4.0             |
| 20.0        | 12121                                                                                                                              | 11679                    | 12563                    | 3.6                     | 0.9                           | 3.9             |
| <b>25.0</b> | <b>10000</b>                                                                                                                       | <b>9700</b>              | <b>10300</b>             | <b>3.0</b>              | <b>0.8</b>                    | <b>3.8</b>      |
| 30.0        | 8295                                                                                                                               | 7995                     | 8596                     | 3.6                     | 1.0                           | 3.7             |
| 35.0        | 6918                                                                                                                               | 6629                     | 7207                     | 4.2                     | 1.2                           | 3.6             |
| 40.0        | 5798                                                                                                                               | 5525                     | 6072                     | 4.7                     | 1.4                           | 3.5             |
| 45.0        | 4883                                                                                                                               | 4628                     | 5139                     | 5.2                     | 1.5                           | 3.4             |
| 50.0        | 4132                                                                                                                               | 3895                     | 4370                     | 5.7                     | 1.7                           | 3.3             |
| 55.0        | 3512                                                                                                                               | 3293                     | 3731                     | 6.2                     | 1.9                           | 3.2             |
| 60.0        | 2998                                                                                                                               | 2797                     | 3200                     | 6.7                     | 2.1                           | 3.1             |
| 65.0        | 2570                                                                                                                               | 2386                     | 2755                     | 7.2                     | 2.4                           | 3.0             |
| 70.0        | 2212                                                                                                                               | 2044                     | 2381                     | 7.6                     | 2.6                           | 3.0             |
| 75.0        | 1911                                                                                                                               | 1758                     | 2065                     | 8.0                     | 2.8                           | 2.9             |
| 80.0        | 1658                                                                                                                               | 1517                     | 1798                     | 8.5                     | 3.0                           | 2.8             |
| 85.0        | 1443                                                                                                                               | 1315                     | 1571                     | 8.9                     | 3.2                           | 2.7             |
| 90.0        | 1260                                                                                                                               | 1143                     | 1377                     | 9.3                     | 3.5                           | 2.7             |
| 95.0        | 1104                                                                                                                               | 997.4                    | 1211                     | 9.7                     | 3.7                           | 2.6             |
| 100.0       | 970.7                                                                                                                              | 873.1                    | 1068                     | 10.0                    | 3.9                           | 2.5             |
| 105.0       | 856.0                                                                                                                              | 766.8                    | 945.1                    | 10.4                    | 4.2                           | 2.5             |
| 110.0       | 757.1                                                                                                                              | 675.5                    | 838.7                    | 10.8                    | 4.4                           | 2.4             |
| 115.0       | 671.6                                                                                                                              | 596.9                    | 746.3                    | 11.1                    | 4.7                           | 2.4             |
| 120.0       | 597.4                                                                                                                              | 528.9                    | 665.9                    | 11.5                    | 5.0                           | 2.3             |
| 125.0       | 532.8                                                                                                                              | 470.0                    | 595.7                    | 11.8                    | 5.2                           | 2.3             |



|             | B57351V2103J060                                                                                                                    |                          |                          |                         |                               |                 |
|-------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------|-------------------------------|-----------------|
| R/T No.     | 8505                                                                                                                               |                          |                          |                         |                               |                 |
| T (°C)      | $B_{25/100} = 3460 \text{ K}$ , $R_{25} = 10000 \text{ } \Omega$ , $T_R = 25 \text{ } ^\circ\text{C}$ , $\Delta R_R/R_R = \pm 5\%$ |                          |                          |                         |                               |                 |
|             | $R_{\text{nom}}[\Omega]$                                                                                                           | $R_{\text{min}}[\Omega]$ | $R_{\text{max}}[\Omega]$ | $\Delta R_R/R_R[\pm\%]$ | $\Delta T[\pm^\circ\text{C}]$ | $\alpha (\%/K)$ |
| -55.0       | 503650                                                                                                                             | 413910                   | 593390                   | 17.8                    | 2.8                           | 6.3             |
| -50.0       | 369790                                                                                                                             | 307840                   | 431730                   | 16.8                    | 2.8                           | 6.1             |
| -45.0       | 274310                                                                                                                             | 231150                   | 317460                   | 15.7                    | 2.7                           | 5.9             |
| -40.0       | 205500                                                                                                                             | 175170                   | 235820                   | 14.8                    | 2.6                           | 5.7             |
| -35.0       | 155410                                                                                                                             | 133930                   | 176890                   | 13.8                    | 2.5                           | 5.5             |
| -30.0       | 118600                                                                                                                             | 103270                   | 133920                   | 12.9                    | 2.4                           | 5.3             |
| -25.0       | 91293                                                                                                                              | 80278                    | 102310                   | 12.1                    | 2.3                           | 5.1             |
| -20.0       | 70862                                                                                                                              | 62898                    | 78826                    | 11.2                    | 2.3                           | 5.0             |
| -15.0       | 55444                                                                                                                              | 49653                    | 61235                    | 10.4                    | 2.2                           | 4.8             |
| -10.0       | 43713                                                                                                                              | 39482                    | 47945                    | 9.7                     | 2.1                           | 4.7             |
| -5.0        | 34718                                                                                                                              | 31612                    | 37823                    | 8.9                     | 2.0                           | 4.5             |
| 0.0         | 27767                                                                                                                              | 25480                    | 30054                    | 8.2                     | 1.9                           | 4.4             |
| 5.0         | 22359                                                                                                                              | 20670                    | 24047                    | 7.6                     | 1.8                           | 4.3             |
| 10.0        | 18120                                                                                                                              | 16871                    | 19369                    | 6.9                     | 1.7                           | 4.1             |
| 15.0        | 14776                                                                                                                              | 13851                    | 15701                    | 6.3                     | 1.6                           | 4.0             |
| 20.0        | 12121                                                                                                                              | 11437                    | 12805                    | 5.6                     | 1.4                           | 3.9             |
| <b>25.0</b> | <b>10000</b>                                                                                                                       | <b>9500</b>              | <b>10500</b>             | <b>5.0</b>              | <b>1.3</b>                    | <b>3.8</b>      |
| 30.0        | 8295                                                                                                                               | 7829                     | 8762                     | 5.6                     | 1.5                           | 3.7             |
| 35.0        | 6918                                                                                                                               | 6490                     | 7345                     | 6.2                     | 1.7                           | 3.6             |
| 40.0        | 5798                                                                                                                               | 5409                     | 6188                     | 6.7                     | 1.9                           | 3.5             |
| 45.0        | 4883                                                                                                                               | 4530                     | 5237                     | 7.2                     | 2.1                           | 3.4             |
| 50.0        | 4132                                                                                                                               | 3812                     | 4452                     | 7.7                     | 2.4                           | 3.3             |
| 55.0        | 3512                                                                                                                               | 3223                     | 3802                     | 8.2                     | 2.6                           | 3.2             |
| 60.0        | 2998                                                                                                                               | 2737                     | 3260                     | 8.7                     | 2.8                           | 3.1             |
| 65.0        | 2570                                                                                                                               | 2335                     | 2806                     | 9.2                     | 3.0                           | 3.0             |
| 70.0        | 2212                                                                                                                               | 2000                     | 2425                     | 9.6                     | 3.2                           | 3.0             |
| 75.0        | 1911                                                                                                                               | 1719                     | 2104                     | 10.0                    | 3.5                           | 2.9             |
| 80.0        | 1658                                                                                                                               | 1484                     | 1831                     | 10.5                    | 3.7                           | 2.8             |
| 85.0        | 1443                                                                                                                               | 1286                     | 1600                     | 10.9                    | 4.0                           | 2.7             |
| 90.0        | 1260                                                                                                                               | 1118                     | 1402                     | 11.3                    | 4.2                           | 2.7             |
| 95.0        | 1104                                                                                                                               | 975.3                    | 1233                     | 11.7                    | 4.5                           | 2.6             |
| 100.0       | 970.7                                                                                                                              | 853.7                    | 1088                     | 12.0                    | 4.7                           | 2.5             |
| 105.0       | 856.0                                                                                                                              | 749.7                    | 962.2                    | 12.4                    | 5.0                           | 2.5             |
| 110.0       | 757.1                                                                                                                              | 660.4                    | 853.8                    | 12.8                    | 5.3                           | 2.4             |
| 115.0       | 671.6                                                                                                                              | 583.5                    | 759.7                    | 13.1                    | 5.5                           | 2.4             |
| 120.0       | 597.4                                                                                                                              | 517.0                    | 677.8                    | 13.5                    | 5.8                           | 2.3             |
| 125.0       | 532.8                                                                                                                              | 459.3                    | 606.4                    | 13.8                    | 6.1                           | 2.3             |



|             | B57321V2473H060                                                                                                         |                      |                      |                                      |            |            |
|-------------|-------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                    |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 47000 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 3% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                    | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 4519400                                                                                                                 | 3714500              | 5324300              | 17.8                                 | 2.4        | 7.4        |
| -50.0       | 3143900                                                                                                                 | 2622700              | 3665100              | 16.6                                 | 2.3        | 7.1        |
| -45.0       | 2215000                                                                                                                 | 1873900              | 2556000              | 15.4                                 | 2.2        | 6.9        |
| -40.0       | 1579500                                                                                                                 | 1354100              | 1804900              | 14.3                                 | 2.1        | 6.6        |
| -35.0       | 1139400                                                                                                                 | 989110               | 1289700              | 13.2                                 | 2.1        | 6.4        |
| -30.0       | 831030                                                                                                                  | 730020               | 932030               | 12.2                                 | 2.0        | 6.2        |
| -25.0       | 612510                                                                                                                  | 544150               | 680860               | 11.2                                 | 1.9        | 6.0        |
| -20.0       | 456000                                                                                                                  | 409460               | 502530               | 10.2                                 | 1.8        | 5.8        |
| -15.0       | 342740                                                                                                                  | 310910               | 374570               | 9.3                                  | 1.7        | 5.6        |
| -10.0       | 259980                                                                                                                  | 238130               | 281820               | 8.4                                  | 1.5        | 5.4        |
| -5.0        | 198930                                                                                                                  | 183900               | 213950               | 7.6                                  | 1.4        | 5.3        |
| 0.0         | 153490                                                                                                                  | 143150               | 163830               | 6.7                                  | 1.3        | 5.1        |
| 5.0         | 119380                                                                                                                  | 112280               | 126480               | 5.9                                  | 1.2        | 4.9        |
| 10.0        | 93561                                                                                                                   | 88713                | 98409                | 5.2                                  | 1.1        | 4.8        |
| 15.0        | 73864                                                                                                                   | 70580                | 77149                | 4.4                                  | 1.0        | 4.7        |
| 20.0        | 58723                                                                                                                   | 56529                | 60917                | 3.7                                  | 0.8        | 4.5        |
| <b>25.0</b> | <b>47000</b>                                                                                                            | <b>45590</b>         | <b>48410</b>         | <b>3.0</b>                           | <b>0.7</b> | <b>4.4</b> |
| 30.0        | 37860                                                                                                                   | 36454                | 39266                | 3.7                                  | 0.9        | 4.3        |
| 35.0        | 30685                                                                                                                   | 29348                | 32022                | 4.4                                  | 1.1        | 4.1        |
| 40.0        | 25018                                                                                                                   | 23772                | 26263                | 5.0                                  | 1.2        | 4.0        |
| 45.0        | 20513                                                                                                                   | 19368                | 21658                | 5.6                                  | 1.4        | 3.9        |
| 50.0        | 16911                                                                                                                   | 15869                | 17954                | 6.2                                  | 1.6        | 3.8        |
| 55.0        | 14015                                                                                                                   | 13072                | 14958                | 6.7                                  | 1.8        | 3.7        |
| 60.0        | 11673                                                                                                                   | 10824                | 12523                | 7.3                                  | 2.0        | 3.6        |
| 65.0        | 9770                                                                                                                    | 9007                 | 10533                | 7.8                                  | 2.2        | 3.5        |
| 70.0        | 8215                                                                                                                    | 7531                 | 8899                 | 8.3                                  | 2.4        | 3.4        |
| 75.0        | 6939                                                                                                                    | 6326                 | 7551                 | 8.8                                  | 2.6        | 3.3        |
| 80.0        | 5886                                                                                                                    | 5337                 | 6434                 | 9.3                                  | 2.9        | 3.2        |
| 85.0        | 5014                                                                                                                    | 4523                 | 5505                 | 9.8                                  | 3.1        | 3.2        |
| 90.0        | 4288                                                                                                                    | 3848                 | 4727                 | 10.3                                 | 3.3        | 3.1        |
| 95.0        | 3681                                                                                                                    | 3287                 | 4075                 | 10.7                                 | 3.6        | 3.0        |
| 100.0       | 3172                                                                                                                    | 2819                 | 3525                 | 11.1                                 | 3.8        | 2.9        |
| 105.0       | 2743                                                                                                                    | 2426                 | 3060                 | 11.6                                 | 4.0        | 2.9        |
| 110.0       | 2380                                                                                                                    | 2095                 | 2666                 | 12.0                                 | 4.3        | 2.8        |
| 115.0       | 2073                                                                                                                    | 1816                 | 2329                 | 12.4                                 | 4.5        | 2.7        |
| 120.0       | 1810                                                                                                                    | 1579                 | 2042                 | 12.8                                 | 4.8        | 2.7        |
| 125.0       | 1586                                                                                                                    | 1378                 | 1795                 | 13.2                                 | 5.0        | 2.6        |



|             | B57321V2473J060                                                                                                         |                      |                      |                                      |            |            |
|-------------|-------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|--------------------------------------|------------|------------|
| R/T No.     | 8502                                                                                                                    |                      |                      |                                      |            |            |
| T (°C)      | B <sub>25/100</sub> = 4000 K, R <sub>25</sub> = 47000 Ω, T <sub>R</sub> = 25 °C, ΔR <sub>R</sub> /R <sub>R</sub> = ± 5% |                      |                      |                                      |            |            |
|             | R <sub>nom</sub> [Ω]                                                                                                    | R <sub>min</sub> [Ω] | R <sub>max</sub> [Ω] | ΔR <sub>R</sub> /R <sub>R</sub> [±%] | ΔT[±°C]    | α (%/K)    |
| -55.0       | 4519400                                                                                                                 | 3624100              | 5414700              | 19.8                                 | 2.7        | 7.4        |
| -50.0       | 3143900                                                                                                                 | 2559900              | 3728000              | 18.6                                 | 2.6        | 7.1        |
| -45.0       | 2215000                                                                                                                 | 1829600              | 2600300              | 17.4                                 | 2.5        | 6.9        |
| -40.0       | 1579500                                                                                                                 | 1322500              | 1836500              | 16.3                                 | 2.4        | 6.6        |
| -35.0       | 1139400                                                                                                                 | 966320               | 1312500              | 15.2                                 | 2.4        | 6.4        |
| -30.0       | 831030                                                                                                                  | 713400               | 948650               | 14.2                                 | 2.3        | 6.2        |
| -25.0       | 612510                                                                                                                  | 531900               | 693110               | 13.2                                 | 2.2        | 6.0        |
| -20.0       | 456000                                                                                                                  | 400340               | 511650               | 12.2                                 | 2.1        | 5.8        |
| -15.0       | 342740                                                                                                                  | 304060               | 381420               | 11.3                                 | 2.0        | 5.6        |
| -10.0       | 259980                                                                                                                  | 232930               | 287020               | 10.4                                 | 1.9        | 5.4        |
| -5.0        | 198930                                                                                                                  | 179920               | 217930               | 9.6                                  | 1.8        | 5.3        |
| 0.0         | 153490                                                                                                                  | 140080               | 166900               | 8.7                                  | 1.7        | 5.1        |
| 5.0         | 119380                                                                                                                  | 109900               | 128860               | 7.9                                  | 1.6        | 4.9        |
| 10.0        | 93561                                                                                                                   | 86841                | 100280               | 7.2                                  | 1.5        | 4.8        |
| 15.0        | 73864                                                                                                                   | 69102                | 78626                | 6.4                                  | 1.4        | 4.7        |
| 20.0        | 58723                                                                                                                   | 55355                | 62092                | 5.7                                  | 1.3        | 4.5        |
| <b>25.0</b> | <b>47000</b>                                                                                                            | <b>44650</b>         | <b>49350</b>         | <b>5.0</b>                           | <b>1.1</b> | <b>4.4</b> |
| 30.0        | 37860                                                                                                                   | 35696                | 40023                | 5.7                                  | 1.3        | 4.3        |
| 35.0        | 30685                                                                                                                   | 28735                | 32636                | 6.4                                  | 1.5        | 4.1        |
| 40.0        | 25018                                                                                                                   | 23272                | 26763                | 7.0                                  | 1.7        | 4.0        |
| 45.0        | 20513                                                                                                                   | 18958                | 22068                | 7.6                                  | 1.9        | 3.9        |
| 50.0        | 16911                                                                                                                   | 15531                | 18292                | 8.2                                  | 2.1        | 3.8        |
| 55.0        | 14015                                                                                                                   | 12792                | 15239                | 8.7                                  | 2.4        | 3.7        |
| 60.0        | 11673                                                                                                                   | 10590                | 12757                | 9.3                                  | 2.6        | 3.6        |
| 65.0        | 9770                                                                                                                    | 8812                 | 10729                | 9.8                                  | 2.8        | 3.5        |
| 70.0        | 8215                                                                                                                    | 7367                 | 9064                 | 10.3                                 | 3.0        | 3.4        |
| 75.0        | 6939                                                                                                                    | 6187                 | 7690                 | 10.8                                 | 3.2        | 3.3        |
| 80.0        | 5886                                                                                                                    | 5220                 | 6552                 | 11.3                                 | 3.5        | 3.2        |
| 85.0        | 5014                                                                                                                    | 4422                 | 5605                 | 11.8                                 | 3.7        | 3.2        |
| 90.0        | 4288                                                                                                                    | 3762                 | 4813                 | 12.3                                 | 4.0        | 3.1        |
| 95.0        | 3681                                                                                                                    | 3213                 | 4149                 | 12.7                                 | 4.2        | 3.0        |
| 100.0       | 3172                                                                                                                    | 2755                 | 3589                 | 13.1                                 | 4.5        | 2.9        |
| 105.0       | 2743                                                                                                                    | 2371                 | 3115                 | 13.6                                 | 4.7        | 2.9        |
| 110.0       | 2380                                                                                                                    | 2048                 | 2713                 | 14.0                                 | 5.0        | 2.8        |
| 115.0       | 2073                                                                                                                    | 1775                 | 2371                 | 14.4                                 | 5.3        | 2.7        |
| 120.0       | 1810                                                                                                                    | 1543                 | 2078                 | 14.8                                 | 5.5        | 2.7        |
| 125.0       | 1586                                                                                                                    | 1346                 | 1827                 | 15.2                                 | 5.8        | 2.6        |



## Cautions and warnings

### General

See "Important notes" at the end of this document.

### Storage

- Store thermistors only in original packaging. Do not open the package before storage.
- Storage conditions in original packaging: storage temperature  $-25\text{ }^{\circ}\text{C} \dots +45\text{ }^{\circ}\text{C}$ , relative humidity  $\leq 75\%$  annual mean, maximum 95%, dew precipitation is inadmissible.
- Do not store SMDs where they are exposed to heat or direct sunlight. Otherwise, the packing material may be deformed or SMDs may stick together, causing problems during mounting.
- Avoid contamination of thermistors surface during storage, handling and processing.
- Avoid storage of thermistor in harmful environments like corrosive gases (SO<sub>x</sub>, Cl etc).
- After opening the factory seals, such as polyvinyl-sealed packages, use the SMDs as soon as possible.
- Solder thermistors after shipment from EPCOS within the time specified:  
SMDs: 12 months  
Leaded components: 24 months

### Handling

- NTC thermistors must not be dropped. Chip-offs must not be caused during handling of NTCs.
- Components must not be touched with bare hands. Gloves are recommended.
- Avoid contamination of thermistor surface during handling.

### Soldering

- Use resin-type flux or non-activated flux.
- Insufficient preheating may cause ceramic cracks.
- Rapid cooling by dipping in solvent is not recommended.
- Complete removal of flux is recommended.

### Mounting

- When NTC thermistors are encapsulated with sealing material or overmolded with plastic material, the precautions given in chapter "Mounting instructions", "Sealing, potting and overmolding" must be observed.
- Electrode must not be scratched before/during/after the mounting process.
- Contacts and housings used for assembly with thermistor have to be clean before mounting.
- During operation, the thermistor's surface temperature can be very high (ICL). Ensure that adjacent components are placed at a sufficient distance from the thermistor to allow for proper cooling of the thermistors.
- Ensure that adjacent materials are designed for operation at temperatures comparable to the surface temperature of the thermistor. Be sure that surrounding parts and materials can withstand this temperature.
- Make sure that thermistors (ICLs) are adequately ventilated to avoid overheating.
- Avoid contamination of thermistor surface during processing.



## Operation

- Use thermistors only within the specified operating temperature range.
- Use thermistors only within the specified voltage and current ranges (ICLs).
- Environmental conditions must not harm the thermistors. Use thermistors only in normal atmospheric conditions.
- Contact of NTC thermistors with any liquids and solvents should be prevented. It must be ensured that no water enters the NTC thermistor (e.g. through plug terminals). For measurement purposes (checking the specified resistance vs. temperature), the component must not be immersed in water but in suitable liquids (e.g. Galden).
- Avoid dewing and condensation.
- Be sure to provide an appropriate fail-safe function to prevent secondary product damage caused by malfunction (e.g. use VDR for limitation of overvoltage condition).

## Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of passive electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of a passive electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of a passive electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as “hazardous”)**. Useful information on this will be found in our Material Data Sheets on the Internet ([www.epcos.com/material](http://www.epcos.com/material)). Should you have any more detailed questions, please contact our sales offices.
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