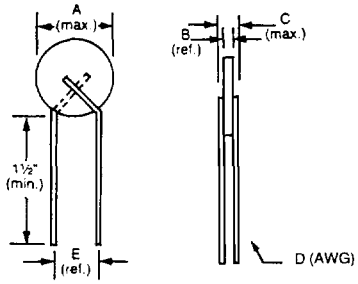
# NTC THERMISTORS:

Resistance range @ 25°C .....5 Ω to 150 Ω†
Temperature coefficient of
resistance (α) @ 25°C.....–3.42%/°C
Operating temperature range .....–50°C to +150°C

| Temp. Range (°C) | Resistance Ratio (Nom.) | Beta (°K) |
|---|---|---|
| 0/50 | 5.6 | 3033 |
| 37.8/104.4 | 5.9 | 3129 |
| 25/125 | 14.1 | 3138 |

†This resistance range is based on the diameter/thickness combinations shown in the table below. Other $R_o$ @ 25°C values are available in this material system.




To calculate $\frac{R_T}{R_{25}}$ at temperatures other than those listed in the table, use the following equation:

$$\frac{R_T}{R_{25}} = e^{(\ln A - C \ln T + \frac{D}{T})}$$

T = temperature in °K and equation constants are as follows:

| Temperature Range (°C) | Ln A | C | D |
|---|---|---|---|
| –50 to 0 | 17.57910 | 4.16718 | 1835.82 |
| 0 to 50 | 7.17807 | 2.59260 | 2264.01 |
| 50 to 100 | 0.58323 | 1.61491 | 2569.59 |
| 100 to 150 | –26.95255 | –2.31696 | 4155.97 |

To calculate the actual thermistor temperature as a function of the thermistor resistance, use the following equation:

$$T = \frac{1}{a + b(\ln \frac{R_T}{R_{25}}) + c(\ln \frac{R_T}{R_{25}})^2 + d(\ln \frac{R_T}{R_{25}})^3}$$

T = temperature in °K and equation constants are as follows:

| $\frac{R_T}{R_{25}}$ Range | a | b | c | d |
|---|---|---|---|---|
| 2.514 to 26.32 | 3.356056E-03 | 3.250625E-04 | 6.261213E-06 | –1.384282E-07 |
| .4510 to 2.514 | 3.354016E-03 | 3.292673E-04 | 4.111564E-06 | –1.651587E-07 |
| .1232 to .4510 | 3.356698E-03 | 3.347387E-04 | 7.730427E-06 | 1.062442E-06 |
| .0442 to .1232 | 3.297579E-03 | 2.913574E-04 | –2.188039E-07 | 7.768265E-07 |

| Temperature (°F) | Temperature (°C) | $\frac{R_T}{R_{25}}$ | Temperature Coef. Of Resistance (α) (%/°C) |
|---|---|---|---|
| –58 | –50 | 26.32 | –5.55 |
| –49 | –45 | 20.04 | –5.35 |
| –40 | –40 | 15.41 | –5.16 |
| –31 | –35 | 11.96 | –4.99 |
| –22 | –30 | 9.357 | –4.82 |
| –13 | –25 | 7.383 | –4.66 |
| – 4 | –20 | 5.870 | –4.51 |
| 5 | –15 | 4.702 | –4.37 |
| 14 | –10 | 3.792 | –4.23 |
| 23 | – 5 | 3.078 | –4.11 |
| 32 | 0 | 2.514 | –3.98 |
| 41 | 5 | 2.067 | –3.86 |
| 50 | 10 | 1.709 | –3.74 |
| 59 | 15 | 1.422 | –3.63 |
| 68 | 20 | 1.189 | –3.56 |
| 77 | 25 | 1.000 | –3.42 |
| 86 | 30 | 0.8450 | –3.32 |
| 95 | 35 | 0.7175 | –3.23 |
| 104 | 40 | 0.6120 | –3.14 |
| 113 | 45 | 0.5243 | –3.05 |
| 122 | 50 | 0.4510 | –2.97 |
| 131 | 55 | 0.3898 | –2.88 |
| 140 | 60 | 0.3382 | –2.80 |
| 149 | 65 | 0.2946 | –2.73 |
| 158 | 70 | 0.2575 | –2.66 |
| 167 | 75 | 0.2259 | –2.59 |
| 176 | 80 | 0.1989 | –2.52 |
| 185 | 85 | 0.1756 | –2.46 |
| 194 | 90 | 0.1556 | –2.40 |
| 203 | 95 | 0.1382 | –2.34 |
| 212 | 100 | 0.1232 | –2.29 |
| 221 | 105 | 0.1097 | –2.23 |
| 230 | 110 | 0.09794 | –2.18 |
| 239 | 115 | 0.08776 | –2.13 |
| 248 | 120 | 0.07889 | –2.09 |
| 257 | 125 | 0.07114 | –2.04 |
| 266 | 130 | 0.06434 | –2.00 |
| 275 | 135 | 0.05835 | –1.95 |
| 284 | 140 | 0.05306 | –1.90 |
| 293 | 145 | 0.04837 | –1.87 |
| 302 | 150 | 0.04421 | –1.83 |

| Type Number | R° @ 25°C Ω | Tolerance* ±% | A (in.) | A (mm) | B (in.) | B (mm) | C (in.) | C (mm) | D (AWG) | E (in.) | E (mm) | δ (mW/°C) | τ (Sec.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RL1006-98.4-59-D1 | 150 | 20 | 0.110 | 2.79 | 0.060 | 1.52 | 0.140 | 3.56 | 26 | 0.100 | 2.54 | 2.7 | 10 |
| RL1005-82-59-D1 | 125 | | | | 0.050 | 1.27 | 0.130 | 3.30 | | | | 2.5 | 10 |
| RL1004-65.6-59-D1 | 100 | | | | 0.040 | 1.02 | 0.120 | 3.05 | | | | 2.5 | 9 |
| RL1003-49.2-59-D1 | 75 | | | | 0.030 | 0.76 | 0.110 | 2.79 | | | | 2.5 | 9 |
| RL2007-32.8-59-D1 | 50 | 20 | 0.220 | 5.59 | 0.070 | 1.78 | 0.160 | 4.06 | 24 | 0.156 | 3.96 | 6.5 | 30 |
| RL2004-16.4-59-D1 | 25 | | | | 0.040 | 1.02 | 0.130 | 3.30 | | | | 6.5 | 20 |
| RL3008-13.1-59-D1 | 20 | 20 | 0.320 | 8.13 | 0.080 | 2.03 | 0.170 | 4.32 | 24 | 0.250 | 6.35 | 8.0 | 50 |
| RL3006-9.84-59-D1 | 15 | | | | 0.060 | 1.52 | 0.150 | 3.81 | | | | 7.5 | 45 |
| RL3004-6.56-59-D1 | 10 | | | | 0.040 | 1.02 | 0.130 | 3.30 | | | | 7.0 | 35 |
| RL4504-3.28-59-D1 | 5 | 20 | 0.480 | 12.19 | 0.040 | 1.02 | 0.140 | 3.56 | 22 | 0.328 | 8.33 | 10.0 | 60 |

*Consult Keystone Thermometrics Engineering Department for information on other tolerances or tolerances at temperatures other than 25°C.


KEYSTONE
THERMOMETRICS

967 WINDFALL ROAD • ST. MARYS • PENNSYLVANIA • 15857-3397 • TEL: (814) 834-9140 • FAX: (814) 781-7969