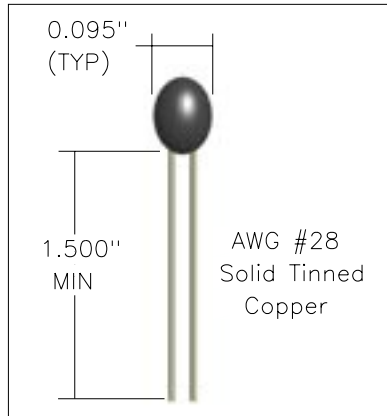


NTC Thermistor COATED CHIP STYLE

Features:

- Very fast response time
- -50°C to 150°C operation
- Epoxy or phenolic resin coatings
- Values from 100Ω to 1 MegΩ
- Bare or insulated lead wires
- Time Constant: 10 sec. (max.)
- Dissipation Factor:
1 mW/°C (nom.)

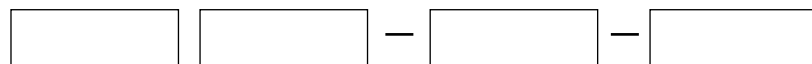


Coated Chip Style

| ATP Standard Values | | | | | |
|---------------------|-------------|-----------|---|-----------|-----------|
| R ₂₅ (Ω) | Part Number | Material* | TYPES OF THERMISTOR TOLERANCES | STANDARDS | |
| | | | | Code | Tolerance |
| 100 | A1002 | K | Point Matched: Thermistor resistance value is specified at one temperature (25°C standard). Tolerance is given as ± % of nominal resistance. | -1 | ± 1% |
| 500 | A5002 | K | | -2 | ± 2% |
| 1,000 | A1003 | K | | -5 | ± 5% |
| 1,000 | A1003 | Z | | -10 | ± 10% |
| 3,000 | A3003 | Z | Curve Matched:** Thermistor accuracy guaranteed over a temperature range (0°C to 70°C standard). Often called interchangeable thermistors, these sensors allow direct replacement without the need for recalibration. Other temperature ranges available. Maximum operating temperature for curve matched thermistors is 105°C. | Code | Accuracy |
| 5,000 | A5003 | Z | | -A3 | ± 1.0°C |
| 10,000 | A1004 | Z | | -B3 | ± 0.5°C |
| 10,000 | A1004 | C | | -C3 | ± 0.2°C |
| 20,000 | A2004 | C | | | |
| 30,000 | A3004 | D | | | |
| 50,000 | A5004 | D | | | |
| 100k | A1005 | D | | | |
| 250k | A2505 | H | | | |
| 500k | A5005 | H | | | |
| 1 Meg | A1006 | H | | | |

* See R/T Tables on opposite page.

**Contact factory to determine which parts are offered with curve matching.



Basic P/N

Material

Tol. Code

Point-match
Temperature (°C)

(only used if other than 25°C)

- Examples:
- A1003K-2..... Curve "K" Material, 1000Ω ± 2% at 25°C
 - A1004Z-C3 Curve "Z" Material, 10kΩ at 25°C with ± 0.2°C accuracy from 0°C to 70°C
 - A5005H-5-150 Curve "H" Material, 500kΩ at 25°C with tolerance rating of ± 5% at 150°C

ATP Resistance vs. Temperature Conversion Table Coated Chip NTC Thermistor

| Material | | K | | | C | | | Z | | | D | | | H | | |
|-------------------------------------|---------------------|----------|----------|-------|----------|----------|-------|----------|----------|-------|----------|----------|-------|----------|----------|-------|
| Temp. Coef. @25°C (α_{25}) | | -3.9%/°C | | | -4.0%/°C | | | -4.4%/°C | | | -4.7%/°C | | | -5.3%/°C | | |
| Resistance Ratio R_0/R_{50} | | 6.93 | | | 7.58 | | | 9.07 | | | 10.45 | | | 14.09 | | |
| Beta ($\beta_{25/85}$) | | 3498 | | | 3694 | | | 3976 | | | 4262 | | | 4851 | | |
| Temperature (°F) | Temperature (°C) | R_1 | α | Curve | R_1 | α | Curve | R_1 | α | Curve | R_1 | α | Curve | R_1 | α | Curve |
| | | R_{25} | (%/°C) | Dev. | R_{25} | (%/°C) | Dev. | R_{25} | (%/°C) | Dev. | R_{25} | (%/°C) | Dev. | R_{25} | (%/°C) | Dev. |
| -58 | -50 | 39.46 | 6.2 | 8.2 | 44.20 | 6.3 | 4.3 | 66.75 | 7.1 | 5.5 | 83.47 | 7.4 | 7.0 | 110.1 | 7.4 | 17.4 |
| -40 | -40 | 21.68 | 5.8 | 6.8 | 23.99 | 5.9 | 3.6 | 33.56 | 6.6 | 4.3 | 40.70 | 6.9 | 5.1 | 55.50 | 7.2 | 15.6 |
| -22 | -30 | 12.38 | 5.4 | 5.6 | 13.53 | 5.6 | 2.9 | 17.67 | 6.2 | 3.5 | 20.78 | 6.5 | 4.1 | 28.40 | 7.0 | 14.6 |
| -4 | -20 | 7.329 | 5.1 | 4.4 | 7.894 | 5.2 | 2.3 | 9.697 | 5.8 | 2.7 | 11.07 | 6.1 | 3.2 | 14.65 | 6.8 | 13.7 |
| 14 | -10 | 4.482 | 4.8 | 3.3 | 4.755 | 4.9 | 1.7 | 5.530 | 5.4 | 2.0 | 6.124 | 5.7 | 2.4 | 7.609 | 6.4 | 11.7 |
| 32 | 0 | 2.825 | 4.5 | 2.3 | 2.949 | 4.6 | 1.2 | 3.265 | 5.1 | 1.4 | 3.510 | 5.4 | 1.6 | 4.094 | 6.0 | 9.9 |
| 50 | 10 | 1.830 | 4.2 | 1.2 | 1.879 | 4.4 | 0.7 | 1.990 | 4.8 | 0.8 | 2.078 | 5.1 | 1.0 | 2.277 | 5.7 | 8.2 |
| 68 | 20 | 1.216 | 4.0 | 0.3 | 1.227 | 4.1 | 0.2 | 1.249 | 4.5 | 0.3 | 1.267 | 4.8 | 0.3 | 1.306 | 5.4 | 6.6 |
| 77 | 25 | 1.000 | 3.9 | 0.0 | 1.000 | 4.0 | 0.0 | 1.000 | 4.4 | 0.0 | 1.000 | 4.7 | 0.0 | 1.000 | 5.3 | 5.9 |
| 86 | 30 | 0.8270 | 3.7 | 0.6 | 0.8196 | 3.9 | 0.2 | 0.8056 | 4.3 | 0.3 | 0.7943 | 4.5 | 0.3 | 0.7709 | 5.1 | 5.2 |
| 104 | 40 | 0.5747 | 3.5 | 1.4 | 0.5594 | 3.7 | 0.6 | 0.5325 | 4.0 | 0.7 | 0.5106 | 4.3 | 0.9 | 0.4674 | 4.9 | 3.7 |
| 122 | 50 | 0.4074 | 3.3 | 2.2 | 0.3893 | 3.5 | 1.0 | 0.3601 | 3.8 | 1.2 | 0.3360 | 4.1 | 1.4 | 0.2905 | 4.6 | 2.4 |
| 140 | 60 | 0.2942 | 3.2 | 3.0 | 0.2760 | 3.4 | 1.3 | 0.2487 | 3.6 | 1.6 | 0.2259 | 3.9 | 1.9 | 0.1848 | 4.4 | 1.1 |
| 158 | 70 | 0.2161 | 3.0 | 3.6 | 0.1990 | 3.2 | 1.7 | 0.1752 | 3.4 | 2.0 | 0.1550 | 3.7 | 2.3 | 0.1202 | 4.2 | 0.0 |
| 176 | 80 | 0.1612 | 2.9 | 4.3 | 0.1458 | 3.0 | 2.0 | 0.1256 | 3.2 | 2.3 | 0.1084 | 3.5 | 2.7 | 0.07980 | 4.0 | 1.0 |
| 185 | 85 | 0.1401 | 2.8 | 4.6 | 0.1255 | 3.0 | 2.2 | 0.1071 | 3.2 | 2.5 | 0.09121 | 3.4 | 2.9 | 0.06550 | 3.9 | 1.5 |
| 194 | 90 | 0.1221 | 2.7 | 4.9 | 0.1084 | 2.9 | 2.3 | 0.09162 | 3.1 | 2.7 | 0.07710 | 3.3 | 3.1 | 0.05400 | 3.8 | 2.1 |
| 212 | 100 | 0.09375 | 2.6 | 5.5 | 0.08169 | 2.8 | 2.5 | 0.06787 | 2.9 | 3.0 | 0.05574 | 3.2 | 3.5 | 0.03720 | 3.6 | 3.1 |
| 230 | 110 | 0.07292 | 2.5 | 6.1 | 0.06238 | 2.6 | 2.8 | 0.05102 | 2.8 | 3.3 | 0.04092 | 3.0 | 3.9 | 0.02618 | 3.5 | 4.0 |
| 248 | 120 | 0.05738 | 2.3 | 6.7 | 0.04822 | 2.5 | 3.0 | 0.03887 | 2.7 | 3.6 | 0.03047 | 2.9 | 4.2 | 0.01860 | 3.3 | 4.9 |
| 257 | 125 | 0.05112 | 2.3 | 6.9 | 0.04258 | 2.5 | 3.1 | 0.03409 | 2.6 | 3.8 | 0.02642 | 2.8 | 4.5 | 0.01580 | 3.2 | 5.3 |
| 266 | 130 | | | | 0.03770 | 2.4 | 3.3 | 0.02999 | 2.5 | 3.9 | 0.02299 | 2.8 | 4.8 | 0.01340 | 3.2 | 5.8 |
| 284 | 140 | | | | 0.02979 | 2.3 | 3.5 | 0.02342 | 2.4 | 4.1 | 0.01756 | 2.6 | 5.4 | 0.00980 | 3.1 | 6.6 |
| 302 | 150 | | | | 0.02377 | 2.2 | 3.7 | 0.01849 | 2.3 | 4.4 | 0.01357 | 2.5 | 6.1 | 0.00730 | 2.9 | 7.3 |

This R/T Conversion Table is provided for reference only. ATP uses the Steinhart-Hart equation to calculate the nominal R_t/R_{25} value. 1°C tables are available upon request.

- R_t/R_{25}** - The ratio of the thermistor resistance at any temperature divided by its resistance at 25°C. For example, if you select a 10kΩ at 25°C thermistor in Material "Z", you can calculate its nominal resistance at 100°C to be $10,000 \times .06787 = 678.7\Omega$.
- α** - Negative Temperature Coefficient of Resistance expressed in %/°C. This is the percentage change in thermistor resistance for a 1°C change in its body temperature. α is particularly useful in calculating the required resistance tolerance necessary to guarantee sensor accuracy. For example, a Material "C" thermistor has an α of -3.5%/°C at 50°C. If you require a sensor that is accurate to within $\pm 2.0^\circ\text{C}$ at 50°C, the thermistor must have a resistance tolerance of $\pm 2.0^\circ\text{C} \times 3.5\%/^\circ\text{C} = \pm 7.0\%$.
- Curve Dev.** — Applies to thermistors that are point matched at 25°C. The Curve Dev. (%) must be added to the thermistor tolerance at 25°C to calculate the total tolerance or maximum deviation at any temperature. Curve Dev. accounts for the curve variance that occurs within any given batch or lot of thermistors. For example, if you specify a Material "Z" device with a $\pm 5\%$ tolerance at 25°C, it will have a total tolerance at 80°C of $(\pm 5\%) + (\pm 2.3\%) = \pm 7.3\%$.