

NTC Disc Thermistors

ND 03/06/09 – NE 03/06/09 – NV 06/09



APPLICATIONS

- ND or NE: Commercial, Industrial and Automotive Applications AEC-Q200 based Qual
NV: Professional Applications
- Alarm and temperature measurement application
- Temperature regulation application
- Level detection application
- Compensation application and more

TECHNOLOGY

- ND: epoxy-phenolic resin coating
NE: epoxy resin coating (recommended for severe mounting conditions)
NV: epoxy varnish coating
- Leads: Radial copper wire tinned
- Marking: on package only for ND03 & NE03
ND/NE 06/09: Nominal resistance and tolerance for $\pm 5\%$, $\pm 10\%$
NV06/09: Nominal resistance and tolerance
- Delivery Mode: Bulk, reeled or ammopacked

PERFORMANCE CHARACTERISTICS

| Types | General purpose | | | Professional | |
|-----------------------------|---|-------------------------------|-------------------------------|-------------------------|-------------------------|
| | ND03 or NE03 | ND06 or NE06 | ND09 or NE09 | NV06 | NV09 |
| Climatic category | | | | 55/125/56-434 | 55/125/56-434 |
| Operating Temperature | -55 to +150°C | -55 to +150°C | -55 to +150°C | -55 to +150°C | -55 to +150°C |
| Tolerance on Rn (25°C) | 330Ω to 1MΩ : $\pm \pm 3^*$, 5, 10, 20% 1500Ω to 150 kΩ : $\pm 3\%$ | $\pm 3^*$, 5, 10, $\pm 20\%$ | $\pm 3^*$, 5, 10, $\pm 20\%$ | $\pm 2, 3, 5, \pm 10\%$ | $\pm 2, 3, 5, \pm 10\%$ |
| Maximum dissipation at 25°C | 0.25 W | 0.71 W | 0.9 W | 0.69 W | 0.85 W |
| Thermal dissipation factor | 5 mW/°C | 7.1 mW/°C | 9 mW/°C | 6.9 mW/°C | 8.5 mW/°C |
| Thermal time constant | 10 s | 22 s | 30 s | 18 s | 30 s |
| Response time | < 3s | | | | |

STANDARDIZATION

NV range : approved by NFC 93271
Type: TN115 A for NV06
TN116 for NV09
List: GAM-T1
List: LNZ

* Optional tolerance, please contact factory

OPTIONS

Consult factory for availability of options:

- other nominal resistance values
- other tolerances
- alternative lead materials or lengths
- controlled dimensions

NTC Disc Thermistors

ND/NE 03



HOW TO ORDER

ND06

Type

ND03
NE03
ND06
NE06
NV06

ND09
NE09
NV09

P0

Material Code

P
(See tables
page 23-25)

0103

Resistance

10 kΩ
(See tables
page 22-24)

K

Tolerance

G (±2%) for NV
H (±3%)*
J (±5%)
K (±10%)
M (±20%)

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Packaging

--: Bulk
Ammopack
(See table page 26)
Tape and reel
(See table page 26)

* Optional tolerance, please contact factory

TABLE OF VALUES

ND03/NE03 TYPE

ND03/NE03



| Part Number | Rn at 25°C (Ω) | Material Code | B (K) (B/B (1) ± 5% (2) ± 3%) | α at 25°C (%/°C) |
|--------------------------|--------------------|---------------|-------------------------------------|------------------|
| N_03J00681 N_03J00102 | 680 1,000 | J | 3480 (2) | - 3.9 |
| N_03K00152 N_03K00222 | 1,500 2,200 | K | 3630 (2) | - 4.0 |
| N_03L00272 N_03L00332 | 2,700 3,300 | L | 3790 (2) | - 4.2 |
| N_03M00472 N_03M00682 | 4,700 6,800 | M | 3950 (2) | - 4.4 |
| N_03N00103 N_03N00153 | 10,000 15,000 | N | 4080 (2) | - 4.6 |
| N_03P00223 N_03P00333 | 22,000 33,000 | P | 4220 (2) | - 4.7 |
| N_03Q00473 N_03Q00683 | 47,000 68,000 | Q | 4300 (2) | - 4.7 |
| N_03R00104 N_03R00154 | 100,000 150,000 | R | 4400 (2) | - 4.8 |
| N_03S00224 | 220,000 | S | 4520 (2) | - 5.0 |
| N_03T00334 N_03T00474 | 330,000 470,000 | T | 4630 (2) | - 5.1 |
| N_03U00105 | 1,000,000 | U | 4840 (2) | - 5.3 |

NTC Disc Thermistors

ND/NE/NV 06



TABLE OF VALUES

ND06/NE06/NV06



| Part Number | R _n at 25°C (Ω) | Material Code | B (K) (B/B) (1) ± 5% (2) ± 3% | α at 25°C (%/°C) |
|-------------|----------------------------|---------------|--|------------------|
| N_06J00151 | 150 | J | 3480 (2) | - 3.9 |
| N_06J00221 | 220 | | | |
| N_06K00331 | 330 | K | 3630 (2) | - 4.0 |
| N_06K00471 | 470 | | | |
| N_06L00681 | 680 | L | 3790 (2) | - 4.2 |
| N_06L00102 | 1,000 | | | |
| N_06M00152 | 1,500 | M | 3950 (2) | - 4.4 |
| N_06N00222 | 2,200 | | | |
| N_06N00332 | 3,300 | N | 4080 (2) | - 4.6 |
| N_06P00472 | 4,700 | | | |
| N_06P00682 | 6,800 | P | 4220 (2) | - 4.7 |
| N_06P00103 | 10,000 | | | |
| N_06Q00153 | 15,000 | Q | 4300 (2) | - 4.7 |
| N_06Q00223 | 22,000 | | | |
| N_06R00333 | 33,000 | R | 4400 (2) | - 4.8 |
| N_06S00473 | 47,000 | | | |
| N_06S00683 | 68,000 | S | 4520 (2) | - 5.0 |
| N_06T00104 | 100,000 | | | |
| N_06U00154 | 150,000 | U | 4840 (2) | - 5.3 |
| N_06U00224 | 220,000 | | | |
| N_06U00334 | 330,000 | | | |

For other resistance values, please consult us.

NTC Disc Thermistors

ND/NE/NV 09



TABLE OF VALUES

ND09/NE09/NV09

ND09/NE09



NV09



| Part Number | Rn at 25°C (Ω) | Material Code | B (K) (B/B (1) ± 5% (2) ± 3%) | α at 25°C (%/°C) |
|-------------|----------------|---------------|--|------------------|
| N_09J00680 | 68 | J | 3480 (2) | - 3.9 |
| N_09J00101 | 100 | | | |
| N_09K00151 | 150 | K | 3630 (2) | - 4.0 |
| N_09K00221 | 220 | | | |
| N_09L00331 | 330 | L | 3790 (2) | - 4.2 |
| N_09M00471 | 470 | M | 3950 (2) | - 4.4 |
| N_09M00681 | 680 | | | |
| N_09N00102 | 1,000 | N | 4080 (2) | - 4.6 |
| N_09N00152 | 1,500 | | | |
| N_09P00222 | 2,200 | P | 4220 (2) | - 4.7 |
| N_09P00332 | 3,300 | | | |
| N_09Q00472 | 4,700 | Q | 4300 (2) | - 4.7 |
| N_09Q00682 | 6,800 | | | |
| N_09R00103 | 10,000 | R | 4400 (2) | - 4.8 |
| N_09R00153 | 15,000 | | | |
| N_09S00223 | 22,000 | S | 4520 (2) | - 5.0 |
| N_09T00333 | 33,000 | T | 4630 (2) | - 5.1 |
| N_09T00473 | 47,000 | | | |
| N_09U00683 | 68,000 | U | 4840 (2) | - 5.3 |
| N_09U00104 | 100,000 | | | |
| N_09U00154 | 150,000 | | | |

NTC Disc Thermistors

Packaging for Automatic Insertion



PACKAGING AND KINK SUFFIXES

Tables below indicate the suffixes to specify when ordering to get the required kink and packaging. For devices on tape, it is necessary to specify the height (H or Ho) which is the distance between the tape axis (sprocket holes axis) and the seating plane on the printed circuit board. The following types can be ordered on tape either in AMMOPACK (fan folder) or on REEL in accordance with IEC 286-2.

– **Straight leads:**

H represents the distance between the sprocket holes axis and the bottom plane of component body (base of resin or base of stand off).

– **Kinked leads and flat leads:**

Ho represents the distance between the sprocket holes axis and the base on the knee (kinked leads) or the bottom of the flat part (flat leads).

• **Reel & Ammopack**

millimeters (inches)

| Types | Suffix | H or Ho | Leads | Quantity/Size | Packaging |
|----------------|--------|-------------------------------|----------|---------------|-----------|
| ND/NE03 & NJ28 | CA | 16 ± 0.5 (0.630 ± 0.020) | Straight | 3000 | AMMOPACK |
| | CB | 16 ± 0.5 (0.630 ± 0.020) | Straight | 3000 | REEL |
| | CC | 19.5 ± 0.5 (0.768 ± 0.020) | Straight | 3000 | AMMOPACK |
| | CD | 19.5 ± 0.5 (0.768 ± 0.020) | Straight | 3000 | REEL |
| NP30 | CA | 16 ± 0.5 (0.630 ± 0.020) | Straight | 2000 | AMMOPACK |
| | CB | 16 ± 0.5 (0.630 ± 0.020) | Straight | 2000 | REEL |
| | CC | 19.5 ± 0.5 (0.768 ± 0.020) | Straight | 2000 | AMMOPACK |
| | CD | 19.5 ± 0.5 (0.768 ± 0.020) | Straight | 2000 | REEL |
| ND/NE/NV 06/09 | DA | 16 ± 0.5 (0.630 ± 0.020) | Straight | 1500 | AMMOPACK |
| | DB | 16 ± 0.5 (0.630 ± 0.020) | Straight | 1500 | REEL |
| | DC | 19.5 ± 0.5 (0.768 ± 0.020) | Straight | 1500 | AMMOPACK |
| | DD | 19.5 ± 0.5 (0.768 ± 0.020) | Straight | 1500 | REEL |
| | DL | 16 ± 0.5 (0.630 ± 0.020) | Kinked | 1500 | AMMOPACK |
| | DM | 16 ± 0.5 (0.630 ± 0.020) | Kinked | 1500 | REEL |
| | DN | 19.5 ± 0.5 (0.768 ± 0.020) | Kinked | 1500 | AMMOPACK |
| | DP | 19.5 ± 0.5 (0.768 ± 0.020) | Kinked | 1500 | REEL |

NTC

Type
ND03
NE03
NJ28
NP30



NTC

Types
ND/NE/NV
06/09



• **Bulk**

| Type | Quantity/box |
|------------------------------|--------------|
| ND/NE03 | 3000 |
| ND/NE06 | 1500 |
| ND/NE09 | 1500 |
| NV06 | 100 |
| NV09 | 100 |
| NI24 NJ28 NK20 NP30 | 1000 |

ND03 / NE03
NJ28 / NP30

ND/NE/NV
06/09



TAPING CHARACTERISTICS

Missing components

A maximum of 3 consecutive components may be missing from the bandolier, surrounded by at least 6 filled positions. The number of missing components may not exceed 0.5% of the total per packing module.

The beginning and the end of tape exhibit 8 or 9 blank positions.

DIMENSIONS: millimeters (inches)



| Value | Tolerance | Dimensions Characteristics | |
|---------|--------------|----------------------------|---|
| 18 | +1 / -0.5 | W | Leading tape width |
| 6 | ±0.3 | W ₀ | Adhesive tape width |
| 9 | +0.75 / -0.5 | W ₁ | Sprocket hole position |
| 3 max. | | W ₂ | Distance between the top of the tape and the adhesive |
| 4 | ±0.2 | D ₀ | Diameter of sprocket hole |
| 16/19.5 | ±0.5 | H ₀ | Distance between the tape axis and the seating plane of the component |
| | | H ₁ | Distance between the tape axis and the top of component body |

| Value | Tolerance | Dimensions Characteristics | |
|-------------|--------------|----------------------------|---|
| 12.7 | ±0.2 | P ₀ | Sprocket holes pitch |
| 254 | ±1 | - | Distance between 21 consecutive holes 20 pitches |
| 0.7 | ±0.2 | t | Total thickness of tape |
| 2.54 5.08 | +0.6 -0.1 | E | Lead spacing |
| 5.08 3.85 | ± 0.7 | P ₁ | Distance between the sprocket hole axis and the lead axis |
| 12.7 | ±1.0 | P | Spacing of components |
| 0.5 0.6 | ±5% | d | Lead diameter |
| 0 | ±1.3 | ³ P | Verticality of components |
| 0 | ±2 | ³ h | Alignment of components |

Tables of Resistance vs Temperature



| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | I 3250 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 42.35 | 21.9 | -5.98 |
| -50 | 31.48 | 20.0 | -5.78 |
| -45 | 23.63 | 18.1 | -5.59 |
| -40 | 17.91 | 16.3 | -5.41 |
| -35 | 13.70 | 14.6 | -5.23 |
| -30 | 10.58 | 13.1 | -5.06 |
| -25 | 8.232 | 11.6 | -4.90 |
| -20 | 6.460 | 10.1 | -4.74 |
| -15 | 5.110 | 8.8 | -4.59 |
| -10 | 4.072 | 7.5 | -4.45 |
| -5 | 3.268 | 6.3 | -4.31 |
| 0 | 2.641 | 5.1 | -4.18 |
| 5 | 2.148 | 4.0 | -4.05 |
| 10 | 1.759 | 2.9 | -3.92 |
| 15 | 1.449 | 1.9 | -3.81 |
| 20 | 1.200 | 0.9 | -3.69 |
| 25 | 1.000 | 0.0 | -3.58 |
| 30 | 0.8377 | 0.9 | -3.48 |
| 35 | 0.7054 | 1.8 | -3.38 |
| 40 | 0.5969 | 2.6 | -3.28 |
| 45 | 0.5076 | 3.5 | -3.19 |
| 50 | 0.4336 | 4.3 | -3.10 |
| 55 | 0.3720 | 5.1 | -3.01 |
| 60 | 0.3206 | 5.9 | -2.93 |
| 65 | 0.2774 | 6.6 | -2.85 |
| 70 | 0.2410 | 7.4 | -2.77 |
| 75 | 0.2102 | 8.1 | -2.70 |
| 80 | 0.1839 | 8.8 | -2.63 |
| 85 | 0.1616 | 9.5 | -2.56 |
| 90 | 0.1424 | 10.2 | -2.49 |
| 95 | 0.1259 | 10.9 | -2.43 |
| 100 | 0.1117 | 11.5 | -2.36 |
| 105 | 0.09938 | 12.2 | -2.30 |
| 110 | 0.08869 | 12.8 | -2.25 |
| 115 | 0.07938 | 13.4 | -2.19 |
| 120 | 0.07124 | 14.0 | -2.14 |
| 125 | 0.06410 | 14.6 | -2.08 |
| 130 | 0.05783 | 15.2 | -2.03 |
| 135 | 0.05230 | 15.7 | -1.98 |
| 140 | 0.04741 | 16.3 | -1.94 |
| 145 | 0.04308 | 16.8 | -1.89 |
| 150 | 0.03924 | 17.4 | -1.85 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | J-J5 3480 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 51.75 | 20.5 | -6.23 |
| -50 | 37.98 | 17.7 | -6.03 |
| -45 | 28.15 | 15.2 | -5.84 |
| -40 | 21.07 | 13.0 | -5.65 |
| -35 | 15.91 | 11.0 | -5.48 |
| -30 | 12.13 | 9.3 | -5.31 |
| -25 | 9.321 | 7.8 | -5.15 |
| -20 | 7.222 | 6.4 | -4.99 |
| -15 | 5.640 | 5.2 | -4.84 |
| -10 | 4.438 | 4.2 | -4.69 |
| -5 | 3.517 | 3.3 | -4.55 |
| 0 | 2.807 | 2.5 | -4.42 |
| 5 | 2.255 | 1.8 | -4.29 |
| 10 | 1.824 | 1.2 | -4.17 |
| 15 | 1.484 | 0.7 | -4.05 |
| 20 | 1.215 | 0.3 | -3.93 |
| 25 | 1.0000 | 0.0 | -3.82 |
| 30 | 0.8278 | 0.3 | -3.71 |
| 35 | 0.6889 | 0.7 | -3.61 |
| 40 | 0.5763 | 1.1 | -3.51 |
| 45 | 0.4845 | 1.5 | -3.41 |
| 50 | 0.4092 | 2.0 | -3.32 |
| 55 | 0.3472 | 2.5 | -3.23 |
| 60 | 0.2960 | 3.0 | -3.15 |
| 65 | 0.2533 | 3.5 | -3.06 |
| 70 | 0.2177 | 4.1 | -2.98 |
| 75 | 0.1879 | 4.7 | -2.90 |
| 80 | 0.1628 | 5.3 | -2.83 |
| 85 | 0.1415 | 5.9 | -2.76 |
| 90 | 0.12349 | 6.5 | -2.69 |
| 95 | 0.10813 | 7.1 | -2.62 |
| 100 | 0.09499 | 7.7 | -2.55 |
| 105 | 0.08372 | 8.4 | -2.49 |
| 110 | 0.07402 | 9.0 | -2.43 |
| 115 | 0.06564 | 9.7 | -2.37 |
| 120 | 0.05837 | 10.3 | -2.31 |
| 125 | 0.05206 | 11.0 | -2.26 |
| 130 | 0.04656 | 11.6 | -2.21 |
| 135 | 0.04175 | 12.3 | -2.15 |
| 140 | 0.03753 | 13.0 | -2.10 |
| 145 | 0.03382 | 13.6 | -2.06 |
| 150 | 0.03055 | 14.3 | -2.01 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | K 3630 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 56.27 | 21.4 | -6.25 |
| -50 | 41.22 | 18.5 | -6.06 |
| -45 | 30.48 | 15.9 | -5.89 |
| -40 | 22.74 | 13.6 | -5.71 |
| -35 | 17.11 | 11.5 | -5.55 |
| -30 | 12.98 | 9.7 | -5.39 |
| -25 | 9.931 | 8.1 | -5.24 |
| -20 | 7.655 | 6.7 | -5.09 |
| -15 | 5.945 | 5.4 | -4.95 |
| -10 | 4.651 | 4.4 | -4.81 |
| -5 | 3.663 | 3.4 | -4.67 |
| 0 | 2.905 | 2.6 | -4.54 |
| 5 | 2.319 | 1.9 | -4.42 |
| 10 | 1.862 | 1.3 | -4.30 |
| 15 | 1.505 | 0.8 | -4.18 |
| 20 | 1.223 | 0.3 | -4.07 |
| 25 | 1.0000 | 0.0 | -3.96 |
| 30 | 0.8219 | 0.3 | -3.85 |
| 35 | 0.6792 | 0.7 | -3.75 |
| 40 | 0.5641 | 1.1 | -3.65 |
| 45 | 0.4708 | 1.6 | -3.55 |
| 50 | 0.3949 | 2.1 | -3.46 |
| 55 | 0.3327 | 2.6 | -3.37 |
| 60 | 0.2816 | 3.1 | -3.28 |
| 65 | 0.2393 | 3.7 | -3.20 |
| 70 | 0.2043 | 4.3 | -3.12 |
| 75 | 0.1751 | 4.9 | -3.04 |
| 80 | 0.1506 | 5.5 | -2.96 |
| 85 | 0.1301 | 6.1 | -2.89 |
| 90 | 0.1128 | 6.8 | -2.82 |
| 95 | 0.09811 | 7.4 | -2.75 |
| 100 | 0.08564 | 8.1 | -2.68 |
| 105 | 0.07501 | 8.7 | -2.61 |
| 110 | 0.06591 | 9.4 | -2.55 |
| 115 | 0.05809 | 10.1 | -2.49 |
| 120 | 0.05136 | 10.8 | -2.43 |
| 125 | 0.04554 | 11.5 | -2.37 |
| 130 | 0.04049 | 12.2 | -2.32 |
| 135 | 0.03611 | 12.8 | -2.26 |
| 140 | 0.03228 | 13.5 | -2.21 |
| 145 | 0.02893 | 14.2 | -2.16 |
| 150 | 0.02600 | 14.9 | -2.11 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | KA 3625 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 61.22 | 7.1 | -6.55 |
| -50 | 44.25 | 6.1 | -6.33 |
| -45 | 32.34 | 5.3 | -6.12 |
| -40 | 23.88 | 4.5 | -5.92 |
| -35 | 17.81 | 3.8 | -5.73 |
| -30 | 13.41 | 3.2 | -5.54 |
| -25 | 10.19 | 2.7 | -5.37 |
| -20 | 7.815 | 2.2 | -5.20 |
| -15 | 6.041 | 1.8 | -5.04 |
| -10 | 4.707 | 1.5 | -4.89 |
| -5 | 3.696 | 1.1 | -4.74 |
| 0 | 2.923 | 0.9 | -4.60 |
| 5 | 2.329 | 0.6 | -4.46 |
| 10 | 1.867 | 0.4 | -4.33 |
| 15 | 1.507 | 0.3 | -4.21 |
| 20 | 1.224 | 0.1 | -4.09 |
| 25 | 1.0000 | 0.0 | -3.97 |
| 30 | 0.8217 | 0.1 | -3.86 |
| 35 | 0.6788 | 0.2 | -3.75 |
| 40 | 0.5638 | 0.4 | -3.65 |
| 45 | 0.4707 | 0.5 | -3.55 |
| 50 | 0.3948 | 0.7 | -3.46 |
| 55 | 0.3328 | 0.9 | -3.37 |
| 60 | 0.2817 | 1.0 | -3.28 |
| 65 | 0.2396 | 1.2 | -3.19 |
| 70 | 0.2046 | 1.4 | -3.11 |
| 75 | 0.1754 | 1.6 | -3.03 |
| 80 | 0.1510 | 1.8 | -2.96 |
| 85 | 0.1305 | 2.0 | -2.88 |
| 90 | 0.1131 | 2.3 | -2.81 |
| 95 | 0.09844 | 2.5 | -2.74 |
| 100 | 0.08596 | 2.7 | -2.68 |
| 105 | 0.07530 | 2.9 | -2.61 |
| 110 | 0.06618 | 3.1 | -2.55 |
| 115 | 0.05833 | 3.4 | -2.49 |
| 120 | 0.05157 | 3.6 | -2.43 |
| 125 | 0.04573 | 3.8 | -2.38 |
| 130 | 0.04065 | 4.0 | -2.32 |
| 135 | 0.03624 | 4.3 | -2.27 |
| 140 | 0.03239 | 4.5 | -2.22 |
| 145 | 0.02902 | 4.7 | -2.17 |
| 150 | 0.02607 | 5.0 | -2.12 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | KC 3470 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 60.08 | 34.0 | -7.00 |
| -50 | 43.19 | 29.4 | -6.71 |
| -45 | 31.42 | 25.3 | -6.44 |
| -40 | 23.13 | 21.6 | -6.18 |
| -35 | 17.22 | 18.4 | -5.94 |
| -30 | 12.95 | 15.5 | -5.71 |
| -25 | 9.842 | 12.9 | -5.49 |
| -20 | 7.550 | 10.7 | -5.29 |
| -15 | 5.845 | 8.7 | -5.10 |
| -10 | 4.564 | 6.9 | -4.91 |
| -5 | 3.594 | 5.4 | -4.74 |
| 0 | 2.853 | 4.1 | -4.58 |
| 5 | 2.281 | 3.0 | -4.42 |
| 10 | 1.838 | 2.0 | -4.27 |
| 15 | 1.491 | 1.2 | -4.13 |
| 20 | 1.217 | 0.5 | -4.00 |
| 25 | 1.0000 | 0.0 | -3.90 |
| 30 | 0.8267 | 0.5 | -3.74 |
| 35 | 0.6873 | 1.1 | -3.63 |
| 40 | 0.5747 | 1.8 | -3.52 |
| 45 | 0.4830 | 2.5 | -3.41 |
| 50 | 0.4081 | 3.3 | -3.31 |
| 55 | 0.3465 | 4.1 | -3.21 |
| 60 | 0.2955 | 5.0 | -3.12 |
| 65 | 0.2532 | 5.9 | -3.03 |
| 70 | 0.2179 | 6.8 | -2.94 |
| 75 | 0.1883 | 7.8 | -2.86 |
| 80 | 0.1634 | 8.7 | -2.78 |
| 85 | 0.1423 | 9.7 | -2.71 |
| 90 | 0.1244 | 10.8 | -2.63 |
| 95 | 0.10915 | 11.8 | -2.56 |
| 100 | 0.09608 | 12.9 | -2.50 |
| 105 | 0.08486 | 13.9 | -2.43 |
| 110 | 0.07519 | 15.0 | -2.37 |
| 115 | 0.06683 | 16.1 | -2.31 |
| 120 | 0.05957 | 17.2 | -2.25 |
| 125 | 0.05325 | 18.3 | -2.20 |
| 130 | 0.04774 | 19.4 | -2.14 |
| 135 | 0.04290 | 20.5 | -2.09 |
| 140 | 0.03866 | 21.6 | -2.04 |
| 145 | 0.03492 | 22.7 | -1.99 |
| 150 | 0.03162 | 23.8 | -1.95 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | KC 3470 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 82.54 | 22.3 | -7.12 |
| -50 | 58.03 | 19.3 | -6.87 |
| -45 | 41.31 | 16.6 | -6.63 |
| -40 | 29.75 | 14.2 | -6.40 |
| -35 | 21.68 | 12.0 | -6.18 |
| -30 | 15.97 | 10.1 | -5.98 |
| -25 | 11.88 | 8.5 | -5.78 |
| -20 | 8.931 | 7.0 | -5.59 |
| -15 | 6.777 | 5.7 | -5.40 |
| -10 | 5.188 | 4.5 | -5.23 |
| -5 | 4.007 | 3.6 | -5.06 |
| 0 | 3.120 | 2.7 | -4.90 |
| 5 | 2.449 | 2.0 | -4.75 |
| 10 | 1.937 | 1.3 | -4.60 |
| 15 | 1.543 | 0.8 | -4.46 |
| 20 | 1.238 | 0.4 | -4.33 |
| 25 | 1.0000 | 0.0 | -4.20 |
| 30 | 0.8128 | 0.3 | -4.07 |
| 35 | 0.6648 | 0.7 | -3.95 |
| 40 | 0.5469 | 1.2 | -3.84 |
| 45 | 0.4525 | 1.6 | -3.73 |
| 50 | 0.3764 | 2.2 | -3.62 |
| 55 | 0.3148 | 2.7 | -3.52 |
| 60 | 0.2646 | 3.3 | -3.42 |
| 65 | 0.2235 | 3.8 | -3.33 |
| 70 | 0.1896 | 4.5 | -3.24 |
| 75 | 0.1616 | 5.1 | -3.15 |
| 80 | 0.1383 | 5.7 | -3.07 |
| 85 | 0.1189 | 6.4 | -2.98 |
| 90 | 0.1026 | 7.1 | -2.91 |
| 95 | 0.08888 | 7.7 | -2.83 |
| 100 | 0.07728 | 8.4 | -2.76 |
| 105 | 0.06744 | 9.1 | -2.69 |
| 110 | 0.05905 | 9.8 | -2.62 |
| 115 | 0.05188 | 10.5 | -2.56 |
| 120 | 0.04572 | 11.3 | -2.49 |
| 125 | 0.04042 | 12.0 | -2.43 |
| 130 | 0.03585 | 12.7 | -2.37 |
| 135 | 0.03188 | 13.4 | -2.32 |
| 140 | 0.02843 | 14.1 | -2.26 |
| 145 | 0.02542 | 14.8 | -2.21 |
| 150 | 0.02279 | 15.6 | -2.16 |

Tables of Resistance vs Temperature



| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | L2 3805 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 62.45 | 22.4 | -6.41 |
| -50 | 45.40 | 19.3 | -6.22 |
| -45 | 33.33 | 16.6 | -6.03 |
| -40 | 24.70 | 14.2 | -5.85 |
| -35 | 18.47 | 12.1 | -5.68 |
| -30 | 13.92 | 10.2 | -5.52 |
| -25 | 10.58 | 8.5 | -5.36 |
| -20 | 8.110 | 7.0 | -5.21 |
| -15 | 6.260 | 5.7 | -5.07 |
| -10 | 4.867 | 4.6 | -4.93 |
| -5 | 3.810 | 3.6 | -4.80 |
| 0 | 3.003 | 2.7 | -4.67 |
| 5 | 2.382 | 2.0 | -4.55 |
| 10 | 1.901 | 1.3 | -4.43 |
| 15 | 1.526 | 0.8 | -4.31 |
| 20 | 1.232 | 0.4 | -4.20 |
| 25 | 1.0000 | 0.0 | -4.10 |
| 30 | 0.8161 | 0.3 | -4.00 |
| 35 | 0.6694 | 0.7 | -3.90 |
| 40 | 0.5518 | 1.2 | -3.80 |
| 45 | 0.4570 | 1.7 | -3.71 |
| 50 | 0.3802 | 2.2 | -3.62 |
| 55 | 0.3178 | 2.7 | -3.53 |
| 60 | 0.2667 | 3.3 | -3.45 |
| 65 | 0.2248 | 3.9 | -3.37 |
| 70 | 0.1902 | 4.5 | -3.29 |
| 75 | 0.1615 | 5.1 | -3.22 |
| 80 | 0.1377 | 5.8 | -3.14 |
| 85 | 0.1179 | 6.4 | -3.07 |
| 90 | 0.1012 | 7.1 | -3.00 |
| 95 | 0.08721 | 7.8 | -2.94 |
| 100 | 0.07539 | 8.5 | -2.87 |
| 105 | 0.06538 | 9.2 | -2.81 |
| 110 | 0.05688 | 9.9 | -2.75 |
| 115 | 0.04963 | 10.6 | -2.69 |
| 120 | 0.04343 | 11.3 | -2.63 |
| 125 | 0.03812 | 12.0 | -2.58 |
| 130 | 0.03354 | 12.7 | -2.53 |
| 135 | 0.02960 | 13.5 | -2.47 |
| 140 | 0.02618 | 14.2 | -2.42 |
| 145 | 0.02322 | 14.9 | -2.37 |
| 150 | 0.02064 | 15.6 | -2.33 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | M 3950 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 99.59 | 15.6 | -7.42 |
| -50 | 68.97 | 14.3 | -7.16 |
| -45 | 48.40 | 12.9 | -6.91 |
| -40 | 34.38 | 11.7 | -6.67 |
| -35 | 24.71 | 10.5 | -6.45 |
| -30 | 17.97 | 9.4 | -6.23 |
| -25 | 13.20 | 8.3 | -6.02 |
| -20 | 9.804 | 7.3 | -5.82 |
| -15 | 7.352 | 6.3 | -5.63 |
| -10 | 5.565 | 5.4 | -5.45 |
| -5 | 4.251 | 4.5 | -5.28 |
| 0 | 3.275 | 3.7 | -5.11 |
| 5 | 2.544 | 2.9 | -4.95 |
| 10 | 1.992 | 2.1 | -4.80 |
| 15 | 1.572 | 1.4 | -4.65 |
| 20 | 1.249 | 0.7 | -4.51 |
| 25 | 1.0000 | 0.0 | -4.38 |
| 30 | 0.8057 | 0.7 | -4.25 |
| 35 | 0.6534 | 1.3 | -4.12 |
| 40 | 0.5331 | 1.9 | -4.00 |
| 45 | 0.4376 | 2.5 | -3.89 |
| 50 | 0.3612 | 3.1 | -3.77 |
| 55 | 0.2998 | 3.7 | -3.67 |
| 60 | 0.2501 | 4.3 | -3.57 |
| 65 | 0.2097 | 4.8 | -3.47 |
| 70 | 0.1767 | 5.3 | -3.37 |
| 75 | 0.1496 | 5.9 | -3.28 |
| 80 | 0.1272 | 6.4 | -3.19 |
| 85 | 0.1087 | 6.9 | -3.11 |
| 90 | 0.09320 | 7.4 | -3.03 |
| 95 | 0.08025 | 7.8 | -2.95 |
| 100 | 0.06937 | 8.3 | -2.87 |
| 105 | 0.06019 | 8.8 | -2.80 |
| 110 | 0.05242 | 9.2 | -2.73 |
| 115 | 0.04580 | 9.6 | -2.66 |
| 120 | 0.04016 | 10.1 | -2.60 |
| 125 | 0.03532 | 10.5 | -2.53 |
| 130 | 0.03117 | 10.9 | -2.47 |
| 135 | 0.02758 | 11.3 | -2.41 |
| 140 | 0.02448 | 11.7 | -2.36 |
| 145 | 0.02179 | 12.1 | -2.30 |
| 150 | 0.01945 | 12.4 | -2.25 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | MA 3965 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 101.09 | 2.47 | -7.49 |
| -50 | 69.81 | 2.26 | -7.22 |
| -45 | 48.87 | 2.06 | -6.96 |
| -40 | 34.65 | 1.87 | -6.71 |
| -35 | 24.87 | 1.69 | -6.48 |
| -30 | 18.06 | 1.52 | -6.26 |
| -25 | 13.259 | 1.35 | -6.05 |
| -20 | 9.837 | 1.19 | -5.84 |
| -15 | 7.372 | 1.04 | -5.65 |
| -10 | 5.578 | 0.89 | -5.47 |
| -5 | 4.259 | 0.75 | -5.29 |
| 0 | 3.280 | 0.61 | -5.12 |
| 5 | 2.548 | 0.48 | -4.96 |
| 10 | 1.994 | 0.35 | -4.81 |
| 15 | 1.573 | 0.23 | -4.66 |
| 20 | 1.250 | 0.11 | -4.52 |
| 25 | 1.0000 | 0.00 | -4.38 |
| 30 | 0.8054 | 0.11 | -4.25 |
| 35 | 0.6528 | 0.22 | -4.13 |
| 40 | 0.5324 | 0.32 | -4.01 |
| 45 | 0.4368 | 0.42 | -3.90 |
| 50 | 0.3603 | 0.52 | -3.79 |
| 55 | 0.2989 | 0.61 | -3.68 |
| 60 | 0.2492 | 0.70 | -3.58 |
| 65 | 0.2088 | 0.79 | -3.48 |
| 70 | 0.1758 | 0.88 | -3.39 |
| 75 | 0.1487 | 0.96 | -3.30 |
| 80 | 0.1263 | 1.04 | -3.21 |
| 85 | 0.1078 | 1.12 | -3.13 |
| 90 | 0.0923 | 1.20 | -3.05 |
| 95 | 0.0794 | 1.27 | -2.97 |
| 100 | 0.06857 | 1.35 | -2.90 |
| 105 | 0.05942 | 1.42 | -2.83 |
| 110 | 0.05167 | 1.49 | -2.76 |
| 115 | 0.04509 | 1.55 | -2.69 |
| 120 | 0.03948 | 1.62 | -2.62 |
| 125 | 0.03467 | 1.68 | -2.56 |
| 130 | 0.03055 | 1.75 | -2.50 |
| 135 | 0.02699 | 1.81 | -2.44 |
| 140 | 0.02392 | 1.87 | -2.39 |
| 145 | 0.02125 | 1.93 | -2.33 |
| 150 | 0.01894 | 1.98 | -2.28 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | MC 3910 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 100.6 | 23.0 | -7.56 |
| -50 | 69.29 | 19.9 | -7.27 |
| -45 | 48.40 | 17.1 | -7.00 |
| -40 | 34.27 | 14.6 | -6.75 |
| -35 | 24.57 | 12.4 | -6.50 |
| -30 | 17.83 | 10.5 | -6.27 |
| -25 | 13.09 | 8.7 | -6.05 |
| -20 | 9.71 | 7.2 | -5.84 |
| -15 | 7.282 | 5.9 | -5.64 |
| -10 | 5.514 | 4.7 | -5.45 |
| -5 | 4.215 | 3.7 | -5.27 |
| 0 | 3.250 | 2.8 | -5.10 |
| 5 | 2.528 | 2.0 | -4.93 |
| 10 | 1.982 | 1.4 | -4.77 |
| 15 | 1.567 | 0.8 | -4.62 |
| 20 | 1.247 | 0.4 | -4.48 |
| 25 | 1.0000 | 0.0 | -4.34 |
| 30 | 0.8072 | 0.4 | -4.21 |
| 35 | 0.6559 | 0.8 | -4.08 |
| 40 | 0.5362 | 1.2 | -3.96 |
| 45 | 0.4410 | 1.7 | -3.85 |
| 50 | 0.3647 | 2.2 | -3.74 |
| 55 | 0.3033 | 2.8 | -3.63 |
| 60 | 0.2535 | 3.4 | -3.53 |
| 65 | 0.2130 | 4.0 | -3.43 |
| 70 | 0.1798 | 4.6 | -3.34 |
| 75 | 0.1525 | 5.2 | -3.25 |
| 80 | 0.1300 | 5.9 | -3.16 |
| 85 | 0.1112 | 6.6 | -3.08 |
| 90 | 0.09552 | 7.3 | -2.99 |
| 95 | 0.08239 | 8.0 | -2.92 |
| 100 | 0.07133 | 8.7 | -2.84 |
| 105 | 0.06199 | 9.4 | -2.77 |
| 110 | 0.05406 | 10.1 | -2.70 |
| 115 | 0.04731 | 10.9 | -2.63 |
| 120 | 0.04153 | 11.6 | -2.57 |
| 125 | 0.03658 | 12.3 | -2.51 |
| 130 | 0.03231 | 13.1 | -2.45 |
| 135 | 0.02863 | 13.8 | -2.39 |
| 140 | 0.02544 | 14.6 | -2.33 |
| 145 | 0.02267 | 15.3 | -2.28 |
| 150 | 0.02025 | 16.1 | -2.23 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | ME 3975 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 103.9 | 2.47 | -7.56 |
| -50 | 71.53 | 2.26 | -7.28 |
| -45 | 49.94 | 2.06 | -7.01 |
| -40 | 35.32 | 1.87 | -6.76 |
| -35 | 25.29 | 1.69 | -6.53 |
| -30 | 18.32 | 1.52 | -6.30 |
| -25 | 13.43 | 1.35 | -6.08 |
| -20 | 9.945 | 1.19 | -5.88 |
| -15 | 7.440 | 1.04 | -5.68 |
| -10 | 5.621 | 0.89 | -5.50 |
| -5 | 4.286 | 0.75 | -5.32 |
| 0 | 3.297 | 0.61 | -5.15 |
| 5 | 2.557 | 0.48 | -4.98 |
| 10 | 2.000 | 0.35 | -4.83 |
| 15 | 1.576 | 0.23 | -4.68 |
| 20 | 1.251 | 0.11 | -4.54 |
| 25 | 1.0000 | 0.00 | -4.40 |
| 30 | 0.8048 | 0.11 | -4.27 |
| 35 | 0.6519 | 0.22 | -4.14 |
| 40 | 0.5313 | 0.32 | -4.02 |
| 45 | 0.4356 | 0.42 | -3.91 |
| 50 | 0.3591 | 0.52 | -3.80 |
| 55 | 0.2977 | 0.61 | -3.69 |
| 60 | 0.2481 | 0.70 | -3.59 |
| 65 | 0.2078 | 0.79 | -3.49 |
| 70 | 0.1749 | 0.88 | -3.40 |
| 75 | 0.1479 | 0.96 | -3.31 |
| 80 | 0.1256 | 1.04 | -3.22 |
| 85 | 0.1071 | 1.12 | -3.14 |
| 90 | 0.09175 | 1.20 | -3.06 |
| 95 | 0.07890 | 1.27 | -2.98 |
| 100 | 0.06810 | 1.35 | -2.90 |
| 105 | 0.05900 | 1.42 | -2.83 |
| 110 | 0.05130 | 1.49 | -2.76 |
| 115 | 0.04476 | 1.55 | -2.69 |
| 120 | 0.03918 | 1.62 | -2.63 |
| 125 | 0.03441 | 1.68 | -2.57 |
| 130 | 0.03031 | 1.75 | -2.50 |
| 135 | 0.02678 | 1.81 | -2.45 |
| 140 | 0.02373 | 1.87 | -2.39 |
| 145 | 0.02108 | 1.93 | -2.34 |
| 150 | 0.01878 | 1.98 | -2.28 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | M4 4400 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 98.22 | 23.5 | -7.38 |
| -50 | 68.17 | 20.3 | -7.12 |
| -45 | 47.92 | 17.5 | -6.88 |
| -40 | 34.11 | 14.9 | -6.64 |
| -35 | 24.57 | 12.7 | -6.42 |
| -30 | 17.89 | 10.7 | -6.20 |
| -25 | 13.17 | 8.9 | -6.00 |
| -20 | 9.790 | 7.4 | -5.80 |
| -15 | 7.349 | 6.0 | -5.62 |
| -10 | 5.568 | 4.8 | -5.44 |
| -5 | 4.256 | 3.8 | -5.27 |
| 0 | 3.280 | 2.8 | -5.11 |
| 5 | 2.549 | 2.1 | -4.95 |
| 10 | 1.996 | 1.4 | -4.80 |
| 15 | 1.574 | 0.8 | -4.66 |
| 20 | 1.250 | 0.4 | -4.52 |
| 25 | 1.0000 | 0.0 | -4.39 |
| 30 | 0.8049 | 0.4 | -4.27 |
| 35 | 0.6519 | 0.8 | -4.15 |
| 40 | 0.5311 | 1.2 | -4.03 |
| 45 | 0.4352 | 1.7 | -3.92 |
| 50 | 0.3586 | 2.3 | -3.81 |
| 55 | 0.2970 | 2.8 | -3.71 |
| 60 | 0.2472 | 3.4 | -3.61 |
| 65 | 0.2068 | 4.1 | -3.52 |
| 70 | 0.1738 | 4.7 | -3.42 |
| 75 | 0.1468 | 5.4 | -3.34 |
| 80 | 0.1245 | 6.0 | -3.25 |
| 85 | 0.1060 | 6.7 | -3.17 |
| 90 | 0.09060 | 7.4 | -3.09 |
| 95 | 0.07776 | 8.2 | -3.01 |
| 100 | 0.06700 | 8.9 | -2.94 |
| 105 | 0.05793 | 9.6 | -2.87 |
| 110 | 0.05026 | 10.4 | -2.80 |
| 115 | 0.04376 | 11.1 | -2.74 |
| 120 | 0.03822 | 11.9 | -2.67 |
| 125 | 0.03349 | 12.6 | -2.61 |
| 130 | 0.02944 | 13.4 | -2.55 |
| 135 | 0.02595 | 14.1 | -2.49 |
| 140 | 0.02294 | 14.9 | -2.44 |
| 145 | 0.02033 | 15.6 | -2.38 |
| 150 | 0.01807 | 16.4 | -2.33 |

Tables of Resistance vs Temperature



| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | MN 4077 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 103.56 | 2.54 | -7.39 |
| -50 | 71.79 | 2.32 | -7.14 |
| -45 | 50.39 | 2.12 | -6.90 |
| -40 | 35.79 | 1.92 | -6.68 |
| -35 | 25.71 | 1.74 | -6.46 |
| -30 | 18.67 | 1.56 | -6.25 |
| -25 | 13.70 | 1.39 | -6.06 |
| -20 | 10.15 | 1.22 | -5.87 |
| -15 | 7.59 | 1.06 | -5.68 |
| -10 | 5.73 | 0.91 | -5.51 |
| -5 | 4.36 | 0.77 | -5.34 |
| 0 | 3.35 | 0.63 | -5.18 |
| 5 | 2.59 | 0.49 | -5.03 |
| 10 | 2.02 | 0.36 | -4.88 |
| 15 | 1.59 | 0.24 | -4.74 |
| 20 | 1.26 | 0.12 | -4.60 |
| 25 | 1.00 | 0.00 | -4.47 |
| 30 | 0.80 | 0.11 | -4.35 |
| 35 | 0.65 | 0.22 | -4.23 |
| 40 | 0.52 | 0.33 | -4.11 |
| 45 | 0.43 | 0.43 | -4.00 |
| 50 | 0.35 | 0.53 | -3.89 |
| 55 | 0.29 | 0.63 | -3.79 |
| 60 | 0.24 | 0.72 | -3.69 |
| 65 | 0.20 | 0.81 | -3.59 |
| 70 | 0.17 | 0.90 | -3.50 |
| 75 | 0.14 | 0.99 | -3.41 |
| 80 | 0.12 | 1.07 | -3.32 |
| 85 | 0.10 | 1.15 | -3.24 |
| 90 | 0.09 | 1.23 | -3.16 |
| 95 | 0.07 | 1.31 | -3.08 |
| 100 | 0.06 | 1.38 | -3.00 |
| 105 | 0.05 | 1.46 | -2.93 |
| 110 | 0.05 | 1.53 | -2.86 |
| 115 | 0.04 | 1.60 | -2.79 |
| 120 | 0.04 | 1.67 | -2.73 |
| 125 | 0.03 | 1.73 | -2.66 |
| 130 | 0.03 | 1.80 | -2.60 |
| 135 | 0.02 | 1.86 | -2.54 |
| 140 | 0.02 | 1.92 | -2.49 |
| 145 | 0.02 | 1.98 | -2.43 |
| 150 | 0.02 | 2.04 | -2.38 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | N 4080 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 110.1 | 24.0 | -7.50 |
| -50 | 75.89 | 20.7 | -7.25 |
| -45 | 52.97 | 17.8 | -7.01 |
| -40 | 37.42 | 15.2 | -6.78 |
| -35 | 26.75 | 12.9 | -6.56 |
| -30 | 19.33 | 10.9 | -6.35 |
| -25 | 14.11 | 9.1 | -6.14 |
| -20 | 10.41 | 7.5 | -5.95 |
| -15 | 7.758 | 6.1 | -5.76 |
| -10 | 5.834 | 4.9 | -5.58 |
| -5 | 4.426 | 3.8 | -5.41 |
| 0 | 3.387 | 2.9 | -5.24 |
| 5 | 2.614 | 2.1 | -5.08 |
| 10 | 2.033 | 1.4 | -4.93 |
| 15 | 1.593 | 0.9 | -4.78 |
| 20 | 1.258 | 0.4 | -4.64 |
| 25 | 1.0000 | 0.0 | -4.51 |
| 30 | 0.8004 | 0.4 | -4.37 |
| 35 | 0.6449 | 0.8 | -4.25 |
| 40 | 0.5228 | 1.3 | -4.13 |
| 45 | 0.4264 | 1.8 | -4.01 |
| 50 | 0.3497 | 2.3 | -3.90 |
| 55 | 0.2885 | 2.9 | -3.79 |
| 60 | 0.2392 | 3.5 | -3.68 |
| 65 | 0.1994 | 4.1 | -3.58 |
| 70 | 0.1671 | 4.8 | -3.49 |
| 75 | 0.1406 | 5.5 | -3.39 |
| 80 | 0.1189 | 6.2 | -3.30 |
| 85 | 0.1010 | 6.9 | -3.22 |
| 90 | 0.08616 | 7.6 | -3.13 |
| 95 | 0.07381 | 8.3 | -3.05 |
| 100 | 0.06347 | 9.1 | -2.97 |
| 105 | 0.05480 | 9.8 | -2.90 |
| 110 | 0.04748 | 10.6 | -2.83 |
| 115 | 0.04129 | 11.3 | -2.76 |
| 120 | 0.03603 | 12.1 | -2.69 |
| 125 | 0.03155 | 12.9 | -2.62 |
| 130 | 0.02771 | 13.7 | -2.56 |
| 135 | 0.02442 | 14.4 | -2.50 |
| 140 | 0.02158 | 15.2 | -2.44 |
| 145 | 0.01913 | 16.0 | -2.38 |
| 150 | 0.01700 | 16.8 | -2.33 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | NA 4100 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 109.5 | 8.0 | -7.53 |
| -50 | 75.44 | 6.9 | -7.27 |
| -45 | 52.64 | 6.0 | -7.02 |
| -40 | 37.19 | 5.1 | -6.78 |
| -35 | 26.59 | 4.3 | -6.56 |
| -30 | 19.22 | 3.7 | -6.34 |
| -25 | 14.05 | 3.1 | -6.14 |
| -20 | 10.37 | 2.5 | -5.94 |
| -15 | 7.730 | 2.1 | -5.75 |
| -10 | 5.817 | 1.6 | -5.57 |
| -5 | 4.417 | 1.3 | -5.40 |
| 0 | 3.382 | 1.0 | -5.23 |
| 5 | 2.611 | 0.7 | -5.08 |
| 10 | 2.032 | 0.5 | -4.92 |
| 15 | 1.593 | 0.3 | -4.78 |
| 20 | 1.258 | 0.1 | -4.64 |
| 25 | 1.0000 | 0.0 | -4.51 |
| 30 | 0.8003 | 0.1 | -4.38 |
| 35 | 0.6446 | 0.3 | -4.25 |
| 40 | 0.5224 | 0.4 | -4.14 |
| 45 | 0.4258 | 0.6 | -4.02 |
| 50 | 0.3490 | 0.8 | -3.91 |
| 55 | 0.2877 | 1.0 | -3.81 |
| 60 | 0.2383 | 1.2 | -3.71 |
| 65 | 0.1984 | 1.4 | -3.61 |
| 70 | 0.1660 | 1.6 | -3.51 |
| 75 | 0.1395 | 1.8 | -3.42 |
| 80 | 0.1178 | 2.1 | -3.34 |
| 85 | 0.09989 | 2.3 | -3.25 |
| 90 | 0.08506 | 2.5 | -3.17 |
| 95 | 0.07271 | 2.8 | -3.09 |
| 100 | 0.06240 | 3.0 | -3.02 |
| 105 | 0.05375 | 3.3 | -2.94 |
| 110 | 0.04647 | 3.5 | -2.87 |
| 115 | 0.04032 | 3.8 | -2.81 |
| 120 | 0.03509 | 4.1 | -2.74 |
| 125 | 0.03065 | 4.3 | -2.68 |
| 130 | 0.02685 | 4.6 | -2.61 |
| 135 | 0.02359 | 4.8 | -2.55 |
| 140 | 0.02079 | 5.1 | -2.50 |
| 145 | 0.01837 | 5.4 | -2.44 |
| 150 | 0.01628 | 5.6 | -2.39 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | NC 4080 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 105.4 | 24.0 | -7.45 |
| -50 | 72.89 | 20.7 | -7.20 |
| -45 | 51.04 | 17.8 | -6.95 |
| -40 | 36.18 | 15.2 | -6.72 |
| -35 | 25.94 | 12.9 | -6.50 |
| -30 | 18.81 | 10.9 | -6.29 |
| -25 | 13.78 | 9.1 | -6.08 |
| -20 | 10.20 | 7.5 | -5.89 |
| -15 | 7.621 | 6.1 | -5.71 |
| -10 | 5.748 | 4.9 | -5.53 |
| -5 | 4.373 | 3.8 | -5.36 |
| 0 | 3.355 | 2.9 | -5.20 |
| 5 | 2.595 | 2.1 | -5.04 |
| 10 | 2.023 | 1.4 | -4.89 |
| 15 | 1.588 | 0.9 | -4.75 |
| 20 | 1.256 | 0.4 | -4.61 |
| 25 | 1.0000 | 0.0 | -4.48 |
| 30 | 0.8014 | 0.4 | -4.35 |
| 35 | 0.6463 | 0.8 | -4.23 |
| 40 | 0.5243 | 1.3 | -4.11 |
| 45 | 0.4278 | 1.8 | -4.00 |
| 50 | 0.3510 | 2.3 | -3.89 |
| 55 | 0.2896 | 2.9 | -3.79 |
| 60 | 0.2401 | 3.5 | -3.69 |
| 65 | 0.2001 | 4.1 | -3.59 |
| 70 | 0.1675 | 4.8 | -3.50 |
| 75 | 0.1409 | 5.5 | -3.41 |
| 80 | 0.1190 | 6.2 | -3.32 |
| 85 | 0.1010 | 6.9 | -3.24 |
| 90 | 0.08605 | 7.6 | -3.16 |
| 95 | 0.07360 | 8.3 | -3.08 |
| 100 | 0.06319 | 9.1 | -3.01 |
| 105 | 0.05446 | 9.8 | -2.94 |
| 110 | 0.04710 | 10.6 | -2.87 |
| 115 | 0.04087 | 11.3 | -2.80 |
| 120 | 0.03559 | 12.1 | -2.73 |
| 125 | 0.03109 | 12.9 | -2.67 |
| 130 | 0.02724 | 13.7 | -2.61 |
| 135 | 0.02394 | 14.4 | -2.55 |
| 140 | 0.02111 | 15.2 | -2.49 |
| 145 | 0.01866 | 16.0 | -2.44 |
| 150 | 0.01654 | 16.8 | -2.38 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | NE 4100 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 97.27 | 24.1 | -7.2 |
| -50 | 67.99 | 20.8 | -7.0 |
| -45 | 48.08 | 17.9 | -6.8 |
| -40 | 34.39 | 15.3 | -6.5 |
| -35 | 24.85 | 13.0 | -6.3 |
| -30 | 18.15 | 11.0 | -6.1 |
| -25 | 13.38 | 9.2 | -6.0 |
| -20 | 9.960 | 7.6 | -5.8 |
| -15 | 7.479 | 6.2 | -5.6 |
| -10 | 5.664 | 4.9 | -5.4 |
| -5 | 4.325 | 3.8 | -5.3 |
| 0 | 3.328 | 2.9 | -5.1 |
| 5 | 2.581 | 2.1 | -5.0 |
| 10 | 2.016 | 1.4 | -4.9 |
| 15 | 1.585 | 0.9 | -4.7 |
| 20 | 1.255 | 0.4 | -4.6 |
| 25 | 1.0000 | 0.0 | -4.5 |
| 30 | 0.8017 | 0.4 | -4.3 |
| 35 | 0.6466 | 0.8 | -4.2 |
| 40 | 0.5245 | 1.3 | -4.1 |
| 45 | 0.4278 | 1.8 | -4.0 |
| 50 | 0.3508 | 2.3 | -3.9 |
| 55 | 0.2891 | 2.9 | -3.8 |
| 60 | 0.2394 | 3.5 | -3.7 |
| 65 | 0.1992 | 4.2 | -3.6 |
| 70 | 0.1666 | 4.8 | -3.5 |
| 75 | 0.1399 | 5.5 | -3.4 |
| 80 | 0.11794 | 6.2 | -3.4 |
| 85 | 0.09987 | 6.9 | -3.3 |
| 90 | 0.08491 | 7.6 | -3.2 |
| 95 | 0.07246 | 8.4 | -3.1 |
| 100 | 0.06207 | 9.1 | -3.1 |
| 105 | 0.05336 | 9.9 | -3.0 |
| 110 | 0.04604 | 10.6 | -2.9 |
| 115 | 0.03985 | 11.4 | -2.8 |
| 120 | 0.03461 | 12.2 | -2.8 |
| 125 | 0.03015 | 12.9 | -2.7 |
| 130 | 0.02635 | 13.7 | -2.7 |
| 135 | 0.02309 | 14.5 | -2.6 |
| 140 | 0.0203 | 15.3 | -2.5 |
| 145 | 0.01789 | 16.1 | -2.5 |
| 150 | 0.01581 | 16.8 | -2.4 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | N5 4160 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 115.8 | 16.3 | -7.52 |
| -50 | 79.72 | 14.1 | -7.28 |
| -45 | 55.54 | 12.1 | -7.04 |
| -40 | 39.15 | 10.4 | -6.82 |
| -35 | 27.91 | 8.8 | -6.61 |
| -30 | 20.11 | 7.4 | -6.40 |
| -25 | 14.64 | 6.2 | -6.20 |
| -20 | 10.77 | 5.1 | -6.01 |
| -15 | 7.996 | 4.2 | -5.83 |
| -10 | 5.991 | 3.3 | -5.65 |
| -5 | 4.529 | 2.6 | -5.48 |
| 0 | 3.454 | 2.0 | -5.31 |
| 5 | 2.655 | 1.4 | -5.16 |
| 10 | 2.057 | 1.0 | -5.00 |
| 15 | 1.606 | 0.6 | -4.86 |
| 20 | 1.263 | 0.3 | -4.72 |
| 25 | 1.0000 | 0.0 | -4.58 |
| 30 | 0.7973 | 0.3 | -4.45 |
| 35 | 0.6398 | 0.5 | -4.32 |
| 40 | 0.5167 | 0.9 | -4.20 |
| 45 | 0.4198 | 1.2 | -4.09 |
| 50 | 0.3430 | 1.6 | -3.97 |
| 55 | 0.2819 | 2.0 | -3.86 |
| 60 | 0.2329 | 2.4 | -3.76 |
| 65 | 0.1934 | 2.8 | -3.66 |
| 70 | 0.1614 | 3.3 | -3.56 |
| 75 | 0.1354 | 3.7 | -3.46 |
| 80 | 0.1141 | 4.2 | -3.37 |
| 85 | 0.09658 | 4.7 | -3.29 |
| 90 | 0.08211 | 5.2 | -3.20 |
| 95 | 0.07010 | 5.7 | -3.12 |
| 100 | 0.06009 | 6.2 | -3.04 |
| 105 | 0.05171 | 6.7 | -2.96 |
| 110 | 0.04467 | 7.2 | -2.89 |
| 115 | 0.03872 | 7.7 | -2.82 |
| 120 | 0.03369 | 8.2 | -2.75 |
| 125 | 0.02941 | 8.8 | -2.68 |
| 130 | 0.02576 | 9.3 | -2.62 |
| 135 | 0.02263 | 9.8 | -2.55 |
| 140 | 0.01995 | 10.3 | -2.49 |
| 145 | 0.01763 | 10.9 | -2.44 |
| 150 | 0.01563 | 11.4 | -2.38 |

Tables of Resistance vs Temperature



| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | P 4220 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 121.4 | 24.8 | -7.56 |
| -50 | 83.35 | 21.5 | -7.32 |
| -45 | 57.92 | 18.4 | -7.09 |
| -40 | 40.72 | 15.8 | -6.87 |
| -35 | 28.95 | 13.4 | -6.66 |
| -30 | 20.80 | 11.3 | -6.45 |
| -25 | 15.10 | 9.4 | -6.26 |
| -20 | 11.07 | 7.8 | -6.07 |
| -15 | 8.197 | 6.3 | -5.89 |
| -10 | 6.123 | 5.1 | -5.71 |
| -5 | 4.615 | 4.0 | -5.54 |
| 0 | 3.508 | 3.0 | -5.38 |
| 5 | 2.688 | 2.2 | -5.22 |
| 10 | 2.076 | 1.5 | -5.07 |
| 15 | 1.616 | 0.9 | -4.92 |
| 20 | 1.267 | 0.4 | -4.78 |
| 25 | 1.0000 | 0.0 | -4.64 |
| 30 | 0.7949 | 0.4 | -4.51 |
| 35 | 0.6359 | 0.8 | -4.38 |
| 40 | 0.5120 | 1.3 | -4.26 |
| 45 | 0.4148 | 1.8 | -4.14 |
| 50 | 0.3379 | 2.4 | -4.03 |
| 55 | 0.2769 | 3.0 | -3.92 |
| 60 | 0.2281 | 3.6 | -3.81 |
| 65 | 0.1890 | 4.3 | -3.71 |
| 70 | 0.1573 | 5.0 | -3.61 |
| 75 | 0.1316 | 5.7 | -3.52 |
| 80 | 0.1106 | 6.4 | -3.42 |
| 85 | 0.09337 | 7.1 | -3.34 |
| 90 | 0.07918 | 7.9 | -3.25 |
| 95 | 0.06743 | 8.6 | -3.17 |
| 100 | 0.05766 | 9.4 | -3.09 |
| 105 | 0.04950 | 10.2 | -3.01 |
| 110 | 0.04266 | 10.9 | -2.93 |
| 115 | 0.03691 | 11.7 | -2.86 |
| 120 | 0.03204 | 12.5 | -2.79 |
| 125 | 0.02791 | 13.3 | -2.72 |
| 130 | 0.02439 | 14.1 | -2.66 |
| 135 | 0.02139 | 14.9 | -2.59 |
| 140 | 0.01881 | 15.7 | -2.53 |
| 145 | 0.01660 | 16.5 | -2.47 |
| 150 | 0.01469 | 17.3 | -2.42 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | PA 4235 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 123.40 | 8.3 | -7.68 |
| -50 | 84.33 | 7.2 | -7.42 |
| -45 | 58.39 | 6.2 | -7.17 |
| -40 | 40.93 | 5.3 | -6.93 |
| -35 | 29.04 | 4.5 | -6.71 |
| -30 | 20.83 | 3.8 | -6.49 |
| -25 | 15.11 | 3.2 | -6.29 |
| -20 | 11.07 | 2.6 | -6.09 |
| -15 | 8.190 | 2.1 | -5.90 |
| -10 | 6.117 | 1.7 | -5.72 |
| -5 | 4.610 | 1.3 | -5.54 |
| 0 | 3.505 | 1.0 | -5.38 |
| 5 | 2.686 | 0.7 | -5.22 |
| 10 | 2.075 | 0.5 | -5.07 |
| 15 | 1.615 | 0.3 | -4.92 |
| 20 | 1.267 | 0.1 | -4.78 |
| 25 | 1.0000 | 0.0 | -4.64 |
| 30 | 0.7949 | 0.1 | -4.51 |
| 35 | 0.6359 | 0.3 | -4.39 |
| 40 | 0.5119 | 0.4 | -4.27 |
| 45 | 0.4145 | 0.6 | -4.15 |
| 50 | 0.3376 | 2.4 | -4.04 |
| 55 | 0.2764 | 1.0 | -3.93 |
| 60 | 0.2276 | 1.2 | -3.83 |
| 65 | 0.1883 | 1.4 | -3.73 |
| 70 | 0.1566 | 1.7 | -3.63 |
| 75 | 0.1308 | 1.9 | -3.54 |
| 80 | 0.1098 | 2.1 | -3.45 |
| 85 | 0.09257 | 2.4 | -3.37 |
| 90 | 0.07836 | 2.6 | -3.28 |
| 95 | 0.06661 | 2.9 | -3.20 |
| 100 | 0.05685 | 3.1 | -3.13 |
| 105 | 0.04870 | 3.4 | -3.05 |
| 110 | 0.04188 | 3.7 | -2.98 |
| 115 | 0.03614 | 3.9 | -2.91 |
| 120 | 0.03129 | 4.2 | -2.84 |
| 125 | 0.02719 | 4.5 | -2.78 |
| 130 | 0.02370 | 4.7 | -2.71 |
| 135 | 0.02072 | 5.0 | -2.65 |
| 140 | 0.01817 | 5.3 | -2.59 |
| 145 | 0.01598 | 5.5 | -2.54 |
| 150 | 0.01409 | 5.8 | -2.48 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | Q 4300 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 98.04 | 25.3 | -6.87 |
| -50 | 69.53 | 21.9 | -6.70 |
| -45 | 49.73 | 18.8 | -6.53 |
| -40 | 35.87 | 16.1 | -6.37 |
| -35 | 26.08 | 13.6 | -6.22 |
| -30 | 19.12 | 11.5 | -6.07 |
| -25 | 14.12 | 9.6 | -5.92 |
| -20 | 10.51 | 7.9 | -5.78 |
| -15 | 7.877 | 6.5 | -5.64 |
| -10 | 5.947 | 5.2 | -5.50 |
| -5 | 4.521 | 4.0 | -5.37 |
| 0 | 3.460 | 3.1 | -5.24 |
| 5 | 2.666 | 2.2 | -5.11 |
| 10 | 2.067 | 1.5 | -4.99 |
| 15 | 1.613 | 0.9 | -4.87 |
| 20 | 1.266 | 0.4 | -4.75 |
| 25 | 1.0000 | 0.0 | -4.63 |
| 30 | 0.7944 | 0.4 | -4.52 |
| 35 | 0.6347 | 0.8 | -4.41 |
| 40 | 0.5099 | 1.3 | -4.30 |
| 45 | 0.4119 | 1.9 | -4.20 |
| 50 | 0.3344 | 2.4 | -4.09 |
| 55 | 0.2730 | 3.1 | -3.99 |
| 60 | 0.2239 | 3.7 | -3.90 |
| 65 | 0.1846 | 4.4 | -3.80 |
| 70 | 0.1529 | 5.1 | -3.71 |
| 75 | 0.1272 | 5.8 | -3.62 |
| 80 | 0.1063 | 6.5 | -3.53 |
| 85 | 0.08927 | 7.2 | -3.44 |
| 90 | 0.07526 | 8.0 | -3.36 |
| 95 | 0.06372 | 8.8 | -3.28 |
| 100 | 0.05417 | 9.6 | -3.20 |
| 105 | 0.04622 | 10.4 | -3.13 |
| 110 | 0.03960 | 11.2 | -3.05 |
| 115 | 0.03405 | 12.0 | -2.98 |
| 120 | 0.02938 | 12.8 | -2.91 |
| 125 | 0.02545 | 13.6 | -2.84 |
| 130 | 0.02211 | 14.4 | -2.77 |
| 135 | 0.01928 | 15.2 | -2.71 |
| 140 | 0.01686 | 16.0 | -2.64 |
| 145 | 0.01479 | 16.8 | -2.58 |
| 150 | 0.01302 | 17.7 | -2.52 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | QA 4250 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 99.06 | 8.3 | -7.09 |
| -50 | 69.60 | 7.2 | -6.88 |
| -45 | 49.42 | 6.2 | -6.68 |
| -40 | 35.45 | 5.3 | -6.49 |
| -35 | 25.67 | 4.5 | -6.30 |
| -30 | 18.77 | 3.8 | -6.13 |
| -25 | 13.84 | 3.2 | -5.96 |
| -20 | 10.29 | 2.6 | -5.79 |
| -15 | 7.719 | 2.1 | -5.64 |
| -10 | 5.834 | 1.7 | -5.49 |
| -5 | 4.442 | 1.3 | -5.34 |
| 0 | 3.407 | 1.0 | -5.20 |
| 5 | 2.632 | 0.7 | -5.07 |
| 10 | 2.047 | 0.5 | -4.94 |
| 15 | 1.602 | 0.3 | -4.81 |
| 20 | 1.262 | 0.1 | -4.69 |
| 25 | 1.0000 | 0.0 | -4.57 |
| 30 | 0.7971 | 0.1 | -4.46 |
| 35 | 0.6389 | 0.3 | -4.35 |
| 40 | 0.5149 | 0.4 | -4.24 |
| 45 | 0.4172 | 0.6 | -4.14 |
| 50 | 0.3397 | 0.8 | -4.04 |
| 55 | 0.2780 | 1.0 | -3.95 |
| 60 | 0.2286 | 1.2 | -3.85 |
| 65 | 0.1888 | 1.4 | -3.76 |
| 70 | 0.1567 | 1.7 | -3.68 |
| 75 | 0.1306 | 1.9 | -3.59 |
| 80 | 0.1093 | 2.1 | -3.51 |
| 85 | 0.09179 | 2.4 | -3.43 |
| 90 | 0.07743 | 2.6 | -3.36 |
| 95 | 0.06556 | 2.9 | -3.28 |
| 100 | 0.05571 | 3.2 | -3.21 |
| 105 | 0.04752 | 3.4 | -3.14 |
| 110 | 0.04067 | 3.7 | -3.07 |
| 115 | 0.03492 | 3.9 | -3.01 |
| 120 | 0.03008 | 4.2 | -2.94 |
| 125 | 0.02600 | 4.5 | -2.88 |
| 130 | 0.02254 | 4.7 | -2.82 |
| 135 | 0.01960 | 5.0 | -2.76 |
| 140 | 0.01709 | 5.3 | -2.71 |
| 145 | 0.01495 | 5.5 | -2.65 |
| 150 | 0.01311 | 5.8 | -2.60 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | R 4400 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 113.90 | 25.9 | -7.13 |
| -50 | 79.71 | 22.4 | -6.95 |
| -45 | 56.30 | 19.2 | -6.77 |
| -40 | 40.13 | 16.4 | -6.60 |
| -35 | 28.85 | 14.0 | -6.44 |
| -30 | 20.92 | 11.8 | -6.28 |
| -25 | 15.29 | 9.8 | -6.12 |
| -20 | 11.27 | 8.1 | -5.97 |
| -15 | 8.368 | 6.6 | -5.82 |
| -10 | 6.261 | 5.3 | -5.68 |
| -5 | 4.719 | 4.1 | -5.53 |
| 0 | 3.583 | 3.1 | -5.40 |
| 5 | 2.739 | 2.3 | -5.26 |
| 10 | 2.108 | 1.5 | -5.13 |
| 15 | 1.634 | 0.9 | -5.00 |
| 20 | 1.274 | 0.4 | -4.88 |
| 25 | 1.0000 | 0.0 | -4.75 |
| 30 | 0.7897 | 0.4 | -4.64 |
| 35 | 0.6273 | 0.9 | -4.52 |
| 40 | 0.5012 | 1.4 | -4.41 |
| 45 | 0.4028 | 1.9 | -4.30 |
| 50 | 0.3255 | 2.5 | -4.19 |
| 55 | 0.2644 | 3.1 | -4.09 |
| 60 | 0.2159 | 3.8 | -3.98 |
| 65 | 0.1772 | 4.5 | -3.89 |
| 70 | 0.1462 | 5.2 | -3.79 |
| 75 | 0.1212 | 5.9 | -3.70 |
| 80 | 0.1009 | 6.7 | -3.60 |
| 85 | 0.08440 | 7.4 | -3.52 |
| 90 | 0.07092 | 8.2 | -3.43 |
| 95 | 0.05984 | 9.0 | -3.35 |
| 100 | 0.05071 | 9.8 | -3.26 |
| 105 | 0.04314 | 10.6 | -3.19 |
| 110 | 0.03685 | 11.4 | -3.11 |
| 115 | 0.03160 | 12.2 | -3.03 |
| 120 | 0.02719 | 13.1 | -2.96 |
| 125 | 0.02349 | 13.9 | -2.89 |
| 130 | 0.02036 | 14.7 | -2.82 |
| 135 | 0.01770 | 15.6 | -2.76 |
| 140 | 0.01545 | 16.4 | -2.69 |
| 145 | 0.01352 | 17.2 | -2.63 |
| 150 | 0.01187 | 18.1 | -2.57 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | RA 4380 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 110.80 | 8.6 | -7.24 |
| -50 | 77.24 | 7.4 | -7.03 |
| -45 | 54.44 | 6.4 | -6.83 |
| -40 | 38.76 | 5.5 | -6.63 |
| -35 | 27.87 | 4.6 | -6.45 |
| -30 | 20.22 | 3.9 | -6.27 |
| -25 | 14.81 | 3.3 | -6.10 |
| -20 | 10.94 | 2.7 | -5.93 |
| -15 | 8.144 | 2.2 | -5.78 |
| -10 | 6.112 | 1.8 | -5.62 |
| -5 | 4.623 | 1.4 | -5.48 |
| 0 | 3.522 | 1.0 | -5.34 |
| 5 | 2.702 | 0.8 | -5.20 |
| 10 | 2.087 | 0.5 | -5.07 |
| 15 | 1.623 | 0.3 | -4.94 |
| 20 | 1.270 | 0.1 | -4.82 |
| 25 | 1.0000 | 0.0 | -4.70 |
| 30 | 0.7920 | 0.1 | -4.59 |
| 35 | 0.6308 | 0.3 | -4.47 |
| 40 | 0.5052 | 0.5 | -4.37 |
| 45 | 0.4068 | 0.6 | -4.26 |
| 50 | 0.3292 | 0.8 | -4.16 |
| 55 | 0.2678 | 1.0 | -4.07 |
| 60 | 0.2189 | 1.3 | -3.97 |
| 65 | 0.1797 | 1.5 | -3.88 |
| 70 | 0.1482 | 1.7 | -3.79 |
| 75 | 0.1228 | 2.0 | -3.71 |
| 80 | 0.1022 | 2.2 | -3.63 |
| 85 | 0.08536 | 2.5 | -3.55 |
| 90 | 0.07159 | 2.7 | -3.47 |
| 95 | 0.06028 | 3.0 | -3.39 |
| 100 | 0.05095 | 3.2 | -3.32 |
| 105 | 0.04322 | 3.5 | -3.25 |
| 110 | 0.03679 | 3.8 | -3.18 |
| 115 | 0.03142 | 4.1 | -3.11 |
| 120 | 0.02693 | 4.3 | -3.05 |
| 125 | 0.02315 | 4.6 | -2.98 |
| 130 | 0.01997 | 4.9 | -2.92 |
| 135 | 0.01728 | 5.2 | -2.86 |
| 140 | 0.01499 | 5.4 | -2.80 |
| 145 | 0.01304 | 5.7 | -2.75 |
| 150 | 0.01138 | 6.0 | -2.69 |

Tables of Resistance vs Temperature



| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | RC 4340 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 105.70 | 25.5 | -7.15 |
| -50 | 74.01 | 22.1 | -6.95 |
| -45 | 52.37 | 19.0 | -6.75 |
| -40 | 37.43 | 16.2 | -6.56 |
| -35 | 27.01 | 13.8 | -6.38 |
| -30 | 19.66 | 11.6 | -6.20 |
| -25 | 14.44 | 9.7 | -6.04 |
| -20 | 10.70 | 8.0 | -5.87 |
| -15 | 7.990 | 6.5 | -5.72 |
| -10 | 6.013 | 5.2 | -5.57 |
| -5 | 4.559 | 4.1 | -5.42 |
| 0 | 3.482 | 3.1 | -5.29 |
| 5 | 2.678 | 2.2 | -5.15 |
| 10 | 2.074 | 1.5 | -5.02 |
| 15 | 1.616 | 0.9 | -4.90 |
| 20 | 1.267 | 0.4 | -4.77 |
| 25 | 1.0000 | 0.0 | -4.66 |
| 30 | 0.7936 | 0.4 | -4.54 |
| 35 | 0.6334 | 0.8 | -4.43 |
| 40 | 0.5083 | 1.3 | -4.33 |
| 45 | 0.4100 | 1.9 | -4.23 |
| 50 | 0.3325 | 2.5 | -4.13 |
| 55 | 0.2709 | 3.1 | -4.03 |
| 60 | 0.2218 | 3.7 | -3.94 |
| 65 | 0.1825 | 4.4 | -3.85 |
| 70 | 0.1508 | 5.1 | -3.76 |
| 75 | 0.1251 | 5.8 | -3.67 |
| 80 | 0.1043 | 6.6 | -3.59 |
| 85 | 0.08727 | 7.3 | -3.51 |
| 90 | 0.07332 | 8.1 | -3.43 |
| 95 | 0.06184 | 8.9 | -3.36 |
| 100 | 0.05235 | 9.7 | -3.29 |
| 105 | 0.04448 | 10.5 | -3.22 |
| 110 | 0.03793 | 11.3 | -3.15 |
| 115 | 0.03245 | 12.1 | -3.08 |
| 120 | 0.02785 | 12.9 | -3.01 |
| 125 | 0.02399 | 13.7 | -2.95 |
| 130 | 0.02072 | 14.5 | -2.89 |
| 135 | 0.01796 | 15.4 | -2.83 |
| 140 | 0.01561 | 16.2 | -2.77 |
| 145 | 0.01360 | 17.0 | -2.72 |
| 150 | 0.01189 | 17.8 | -2.66 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | T 4630 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 137.10 | 27.2 | -7.33 |
| -50 | 94.94 | 23.5 | -7.15 |
| -45 | 66.35 | 20.2 | -6.98 |
| -40 | 46.78 | 17.3 | -6.82 |
| -35 | 33.25 | 14.7 | -6.66 |
| -30 | 23.84 | 12.4 | -6.50 |
| -25 | 17.23 | 10.3 | -6.35 |
| -20 | 12.54 | 8.5 | -6.20 |
| -15 | 9.206 | 6.9 | -6.05 |
| -10 | 6.807 | 5.6 | -5.91 |
| -5 | 5.070 | 4.3 | -5.77 |
| 0 | 3.803 | 3.3 | -5.63 |
| 5 | 2.873 | 2.4 | -5.50 |
| 10 | 2.185 | 1.6 | -5.36 |
| 15 | 1.673 | 1.0 | -5.23 |
| 20 | 1.289 | 0.4 | -5.11 |
| 25 | 1.0000 | 0.0 | -4.99 |
| 30 | 0.7805 | 0.4 | -4.86 |
| 35 | 0.6129 | 0.9 | -4.75 |
| 40 | 0.4841 | 1.4 | -4.63 |
| 45 | 0.3847 | 2.0 | -4.52 |
| 50 | 0.3074 | 2.6 | -4.41 |
| 55 | 0.2470 | 3.3 | -4.30 |
| 60 | 0.1996 | 4.0 | -4.19 |
| 65 | 0.1621 | 4.7 | -4.09 |
| 70 | 0.1323 | 5.4 | -3.99 |
| 75 | 0.1086 | 6.2 | -3.89 |
| 80 | 0.08951 | 7.0 | -3.80 |
| 85 | 0.07416 | 7.8 | -3.71 |
| 90 | 0.06172 | 8.6 | -3.62 |
| 95 | 0.05160 | 9.5 | -3.53 |
| 100 | 0.04333 | 10.3 | -3.44 |
| 105 | 0.03655 | 11.2 | -3.36 |
| 110 | 0.03095 | 12.0 | -3.28 |
| 115 | 0.02632 | 12.9 | -3.20 |
| 120 | 0.02246 | 13.7 | -3.12 |
| 125 | 0.01925 | 14.6 | -3.05 |
| 130 | 0.01656 | 15.5 | -2.97 |
| 135 | 0.01429 | 16.4 | -2.90 |
| 140 | 0.01238 | 17.3 | -2.83 |
| 145 | 0.01076 | 18.1 | -2.77 |
| 150 | 0.009383 | 19.0 | -2.70 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | U 4840 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 173.70 | 28.5 | -7.69 |
| -50 | 118.20 | 24.6 | -7.50 |
| -45 | 81.18 | 21.2 | -7.32 |
| -40 | 56.26 | 18.1 | -7.15 |
| -35 | 39.34 | 15.4 | -6.98 |
| -30 | 27.75 | 12.9 | -6.82 |
| -25 | 19.74 | 10.8 | -6.66 |
| -20 | 14.15 | 8.9 | -6.50 |
| -15 | 10.23 | 7.3 | -6.34 |
| -10 | 7.457 | 5.8 | -6.19 |
| -5 | 5.476 | 4.5 | -6.04 |
| 0 | 4.051 | 3.4 | -5.90 |
| 5 | 3.020 | 2.5 | -5.76 |
| 10 | 2.267 | 1.7 | -5.62 |
| 15 | 1.714 | 1.0 | -5.48 |
| 20 | 1.305 | 0.5 | -5.35 |
| 25 | 1.0000 | 0.0 | -5.22 |
| 30 | 0.7715 | 0.4 | -5.09 |
| 35 | 0.5991 | 0.9 | -4.97 |
| 40 | 0.4681 | 1.5 | -4.84 |
| 45 | 0.3680 | 2.1 | -4.72 |
| 50 | 0.2911 | 2.8 | -4.61 |
| 55 | 0.2316 | 3.4 | -4.49 |
| 60 | 0.1853 | 4.2 | -4.38 |
| 65 | 0.1491 | 4.9 | -4.28 |
| 70 | 0.1206 | 5.7 | -4.17 |
| 75 | 0.09812 | 6.5 | -4.07 |
| 80 | 0.08022 | 7.3 | -3.97 |
| 85 | 0.06591 | 8.2 | -3.87 |
| 90 | 0.05442 | 9.0 | -3.77 |
| 95 | 0.04515 | 9.9 | -3.68 |
| 100 | 0.03763 | 10.8 | -3.59 |
| 105 | 0.03150 | 11.7 | -3.50 |
| 110 | 0.02649 | 12.6 | -3.42 |
| 115 | 0.02237 | 13.5 | -3.33 |
| 120 | 0.01897 | 14.4 | -3.25 |
| 125 | 0.01615 | 15.3 | -3.17 |
| 130 | 0.01380 | 16.2 | -3.10 |
| 135 | 0.01184 | 17.1 | -3.02 |
| 140 | 0.01020 | 18.0 | -2.95 |
| 145 | 0.008814 | 19.0 | -2.88 |
| 150 | 0.007643 | 19.9 | -2.81 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | S 4520 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 126.10 | 26.6 | -7.25 |
| -50 | 87.75 | 23.0 | -7.07 |
| -45 | 61.60 | 19.8 | -6.90 |
| -40 | 43.63 | 16.9 | -6.73 |
| -35 | 31.17 | 14.3 | -6.56 |
| -30 | 22.46 | 12.1 | -6.40 |
| -25 | 16.31 | 10.1 | -6.25 |
| -20 | 11.94 | 8.3 | -6.10 |
| -15 | 8.809 | 6.8 | -5.95 |
| -10 | 6.549 | 5.4 | -5.80 |
| -5 | 4.904 | 4.2 | -5.66 |
| 0 | 3.699 | 3.2 | -5.52 |
| 5 | 2.810 | 2.3 | -5.39 |
| 10 | 2.149 | 1.6 | -5.26 |
| 15 | 1.654 | 1.0 | -5.13 |
| 20 | 1.282 | 0.4 | -5.00 |
| 25 | 1.0000 | 0.0 | -4.88 |
| 30 | 0.7848 | 0.4 | -4.76 |
| 35 | 0.6196 | 0.9 | -4.64 |
| 40 | 0.4921 | 1.4 | -4.52 |
| 45 | 0.3931 | 2.0 | -4.41 |
| 50 | 0.3158 | 2.6 | -4.30 |
| 55 | 0.2551 | 3.2 | -4.20 |
| 60 | 0.2072 | 3.9 | -4.09 |
| 65 | 0.1691 | 4.6 | -3.99 |
| 70 | 0.1387 | 5.3 | -3.89 |
| 75 | 0.1144 | 6.1 | -3.80 |
| 80 | 0.0948 | 6.8 | -3.71 |
| 85 | 0.0789 | 7.6 | -3.61 |
| 90 | 0.06594 | 8.4 | -3.53 |
| 95 | 0.05538 | 9.2 | -3.44 |
| 100 | 0.04671 | 10.1 | -3.36 |
| 105 | 0.03956 | 10.9 | -3.28 |
| 110 | 0.03364 | 11.7 | -3.20 |
| 115 | 0.02872 | 12.6 | -3.12 |
| 120 | 0.02461 | 13.4 | -3.04 |
| 125 | 0.02117 | 14.3 | -2.97 |
| 130 | 0.01827 | 15.1 | -2.90 |
| 135 | 0.01583 | 16.0 | -2.83 |
| 140 | 0.01376 | 16.8 | -2.77 |
| 145 | 0.01200 | 17.7 | -2.70 |
| 150 | 0.01050 | 18.6 | -2.64 |

| T (°C) | Material B(K) | | |
|-----------|---------------|--------|----------|
| | SC 4500 | | |
| | R(T) / R25 | TF (%) | α (%/°C) |
| -55 | 129.80 | 26.5 | -7.51 |
| -50 | 89.31 | 22.9 | -7.29 |
| -45 | 62.15 | 19.7 | -7.07 |
| -40 | 43.72 | 16.8 | -6.87 |
| -35 | 31.07 | 14.3 | -6.68 |
| -30 | 22.29 | 12.0 | -6.49 |
| -25 | 16.15 | 10.0 | -6.31 |
| -20 | 11.80 | 8.3 | -6.14 |
| -15 | 8.703 | 6.8 | -5.97 |
| -10 | 6.470 | 5.4 | -5.81 |
| -5 | 4.849 | 4.2 | -5.66 |
| 0 | 3.662 | 3.2 | -5.51 |
| 5 | 2.786 | 2.3 | -5.36 |
| 10 | 2.135 | 1.6 | -5.23 |
| 15 | 1.647 | 0.9 | -5.09 |
| 20 | 1.279 | 0.4 | -4.96 |
| 25 | 1.0000 | 0.0 | -4.84 |
| 30 | 0.7865 | 0.4 | -4.72 |
| 35 | 0.6223 | 0.9 | -4.60 |
| 40 | 0.4953 | 1.4 | -4.49 |
| 45 | 0.3963 | 2.0 | -4.38 |
| 50 | 0.3189 | 2.6 | -4.28 |
| 55 | 0.2579 | 3.2 | -4.18 |
| 60 | 0.2096 | 3.9 | -4.08 |
| 65 | 0.1712 | 4.6 | -3.99 |
| 70 | 0.1405 | 5.3 | -3.89 |
| 75 | 0.1159 | 6.0 | -3.80 |
| 80 | 0.09595 | 6.8 | -3.72 |
| 85 | 0.07980 | 7.6 | -3.63 |
| 90 | 0.06664 | 8.4 | -3.55 |
| 95 | 0.05588 | 9.2 | -3.47 |
| 100 | 0.04704 | 10.0 | -3.40 |
| 105 | 0.03975 | 10.8 | -3.32 |
| 110 | 0.03371 | 11.7 | -3.25 |
| 115 | 0.02869 | 12.5 | -3.18 |
| 120 | 0.02450 | 13.4 | -3.12 |
| 125 | 0.02100 | 14.2 | -3.05 |
| 130 | 0.01805 | 15.1 | -2.99 |
| 135 | 0.01557 | 15.9 | -2.92 |
| 140 | 0.01347 | 16.8 | -2.86 |
| 145 | 0.01169 | 17.6 | -2.80 |
| 150 | 0.01017 | 18.5 | -2.75 |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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