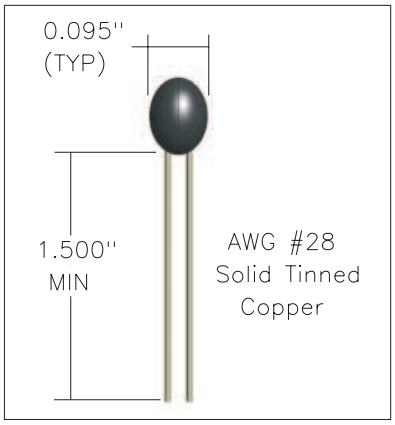
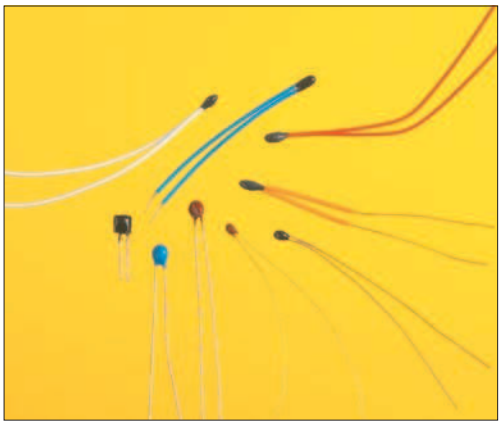
Coated Chip Style

SPECTRUM SENSORS & CONTROLS INC
A Spectrum Control Business

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.)





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SS&C Standard Values

R_{25} (Ω)	Part Number	Material*	TYPES OF THERMISTOR TOLERANCES	STANDARDS Code	STANDARDS 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			
5,000	A5003	Z	**Curve Matched:****	**Code**	**Accuracy**
10,000	A1004	Z	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.	-A3	± 1.0°C
10,000	A1004	C			
20,000	A2004	C		-B3	± 0.5°C
30,000	A3004	D			
50,000	A5004	D		-C3	± 0.2°C
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

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SS&C 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)	(˚C)	$\frac{R_t}{R_{25}}$	α (%/˚C)	Curve Dev.	$\frac{R_t}{R_{25}}$	α (%/˚C)	Curve Dev.	$\frac{R_t}{R_{25}}$	α (%/˚C)	Curve Dev.	$\frac{R_t}{R_{25}}$	α (%/˚C)	Curve Dev.	$\frac{R_t}{R_{25}}$	α (%/˚C)	Curve 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. SS&C uses the Steinhart-Hart equation to calculate the nominal Rt/R_{25} value. 1°C tables are available upon request.

- **Rt/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 x .06787 = 678.7Ω.

- **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 ± 2.0°C at 50°C, the thermistor must have a resistance tolerance of ± 2.0°C x 3.5%/°C= ± 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 ± 5% tolerance at 25°C, it will have a total tolerance at 80°C of (± 5%) +(±2.3%)= ±7.3%.