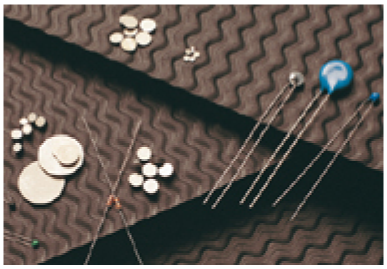
AMETHERM
Circuit Protection Thermistors

NTC Thermistors - Disc and Chip Style



Temperature Measurement and Control Thermistors

DISC and CHIP Style

RoHS

DISC & CHIP NTC
STYLE NTC THERMISTOR
Features

- **Wide Ohmic Value Range**
- **Accurate & Stable**
- **Fast Thermal Response Time**
- **Tight Tolerances**
- **High Sensitivity**

NTC Thermistors

Negative Temperature Coefficient (NTC) thermistors are thermally sensitive semiconductor resistors which exhibit a decrease in resistance as absolute temperature increases. Change in the resistance of NTC thermistor can be brought about either by a change in the ambient temperature or internally by self-heating resulting from **current flowing through the device**. Most of the practical applications of NTC thermistors are based on these material characteristics.

NTC Disc and Chip Style Devices

Ametherm manufactures Disc and Chip style thermistors in **resistance values ranging from 1.0 ohm to 500,000 ohms.** These devices are suitable for a range of resistance values and temperature coefficients from relatively low resistance and temperature coefficients to very high values. Precision resistance tolerances are available to 1%. **Standard resistance tolerances are from 5% to 20%.** All tolerances are **specified at 25°C** or may be specified at any temperature within the operating temperature range of the thermistor.

Thermistor Terminology for Temperature Measurement & Control Devices

- **The dissipation constant (D.C.)** is the ratio, normally expressed in milliwatts per degree C (mw/°C), at a specified ambient temperature, of a change in power dissipated in a thermistor to the resultant change in body temperature.
- **The thermal time constant (T.C.)** is the time required for a thermistor to change 63.2% of the total difference between its initial and final body temperature when subjected to a step function change in temperature under zero-power conditions and is normally expressed in seconds (S).
- **Alpha (α) or Temperature Coefficient or Resistance** is the temperature coefficient of resistance is the ratio at a specified temperature, T, of the rate of change of zero-power resistance with temperature to the zero-power resistance of the thermistor. The temperature coefficient is commonly expressed in percent per degree C (%/°C).

$$\alpha_T = \Delta R_T / \Delta T$$

NTC DISC & CHIP
Selection
Considerations

- Select Req'd. Resistance Value & Temperature Coefficient

- Determine Accuracy Req'd.
- Review Power Dissipation
- Determine Operating Temperature Range
- Review Thermal Time Constant

Thermistor Applications

Time and temperature are two of the most frequently measured variables. There are numerous ways of the measuring temperature electronically, most commonly by **thermocouples and negative temperature coefficient (NTC) thermistors**. For general purpose temperature measurement, NTC temperature sensors can operate over a wide temperature range (-55 to +300°C). They are stable throughout a long lifetime, and are small and comparatively inexpensive. Typically, they have negative temperature coefficients between **-3.3 and -4.9%/°C at 25°C**. This is more than ten (10) times the sensitivity of a platinum resistance thermometer of the same nominal resistance. Ametherm's Disc & Chip style thermistors are used in many applications that require a high degree of accuracy and reliability.

Some of the most popular applications of NTC thermistors include:

- Temperature Compensation
- Temperature Measurement & Control
- Fan Motor Control
- Fluid Level & Temperature Sensors

NTC DISC & CHIP - Selection Process

- Select R Value
- Determine R @ T
- Calculate DEV for R @ T
- Evaluate Power Rating (D.C.)
- Review T.C. Requirements

Selection considerations for NTC Disc and Chip Devices

Power dissipation is a common problem in the use of thermistors as they can only dissipate a certain amount of power.

- If the **power dissipated exceeds the dissipation constant** (D.C.) rating of the sensor it is likely that it will exhibit self heating.

- Most thermistors dissipate from 1 to 25 mW/°C nominal. This means that the resistance changes by an equivalent of 1°C for each D.C. rating (mW/°C) for the selected device.
- To maintain a higher degree of accuracy, temperature error caused by self-heating should be an order of magnitude less than the required sensor accuracy. For many applications, this degree of accuracy is not required and a less stringent de-rating may be adequate.
- Several options to reduce the thermistor power are to increase the thermistor resistance, lower the source voltage and/or increase the series resistor in the divider circuit.

As an example,

- If the D.C. of the thermistor selected is **5 mW/°C** and the power dissipated by the device is 20 mW/°C, then a 4°C error is induced due to the effect of self-heating.
- To minimize this effect, a factor can be derived simply by taking the DC rating times 10-1(one order of magnitude lower) and use it in the power equation to produce a good approximation of the maximum allowable power.
- For instance, if the **desired accuracy is 1°C**, and the rated D.C. of the device selected is 5 mW/°C, adjusting the specified D.C. rating in the power equation to 0.5 mW/°C compensates for self-heating error and effectively predicts the maximum power the device can dissipate without significantly affecting the desired accuracy.
- The resulting maximum power that should be applied would be calculated as **1°C*0.5mW/°C = 0.5mW**.

NTC Standard Disc Thermistor Specifications

Part Number	Resistance @25°C (Ohms) ±10%	R-T Curve	D (in.)	THK (in.)	D.C.	T.C.	Leads AWG#	S (in)	
1DA101J	100	A	0.1	0.06	3	10	28	0.07	
1DA101J-EC	100	A	0.1	0.06	3	10	28	0.07	
1DA101K	100	A	0.1	0.06	3	10	28	0.07	

1DA101K-EC	100	A	0.1	0.06	3	10	28	0.07
1DA131J	130	A	0.1	0.06	3	10	28	0.07
1DA131K	130	A	0.1	0.06	3	10	28	0.07
1DA500J	50	A	0.1	0.03	3	6	28	0.07
1DA500K	50	A	0.1	0.03	3	6	28	0.07
1DB102J	1,000	B	0.1	0.06	3	10	28	0.07
1DB102K	1,000	B	0.1	0.06	3	10	28	0.07
1DB102K-EC	1,000	B	0.1	0.06	3	10	28	0.07
1DB501K	500	B	0.1	0.03	3	6	28	0.07
1DC103J	10,000	C	0.1	0.03	3	6	28	0.07
1DC103J-EC	10,000	C	0.1	0.08	4	12	28	0.07
1DC302J	3,000	C	0.1	0.08	4	12	28	0.07
1DC502J	5,000	C	0.1	0.08	4	12	28	0.07
1DC502J-EC	5,000	C	0.1	0.08	4	12	28	0.07
1DE104J	100,000	E	0.1	0.95	3	9	28	0.07
1DE104K	100,000	E	0.1	0.95	3	9	28	0.07
1DE104K-EC	10,000	E	0.1	0.95	3	9	28	0.07
2DA200J	20	A	0.2	0.05	7	20	24	0.1
2DA200K	20	A	0.2	0.05	7	20	24	0.1
2DA503J	50,000	A	0.2	0.05	7	20	24	0.1

2DB101K	100	B	0.2	0.025	7	18	24	0.1
2DB102J	1,000	B	0.2	0.025	7	18	24	0.1
2DB102J-EC	1,000	B	0.2	0.025	7	18	24	0.1
2DB102K	1,000	B	0.2	0.025	7	18	24	0.1
2DB151J	150	B	0.2	0.025	7	18	24	0.1
2DB151K	150	B	0.2	0.035	7	19	24	0.1
2DC102K	1,000	C	0.2	0.035	7	18	24	0.1
2DC302J	3,000	C	0.2	0.1	7	30	24	0.1
2DC302K	3,000	C	0.2	0.1	7	30	24	0.1
2DE103J	1,0000	E	0.2	0.04	7	17	24	0.1
2DE103K	1,0000	E	0.2	0.04	7	17	24	0.1
2DE503K	5,0000	E	0.2	0.04	7	17	24	0.1
3DA100J	10	A	0.3	0.06	8	48	24	0.1
3DA100K	10	A	0.3	0.06	8	48	24	0.1
3DB500J	50	B	0.3	0.025	8	35	24	0.1
3DB500K	50	B	0.3	0.025	8	35	24	0.1
3DE502J	5,000	E	0.3	0.025	8	35	24	0.1
3DE502K	5,000	E	0.3	0.025	8	35	24	0.1

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http://moschip.ru/get-element

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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

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