

Surge-Arrestor Negative Temperature Coefficient Thermistor

SCNxxD-20 Series

Outline

This is a Negative Temperature Coefficient Resistor whose resistance changes with ambient temperature changes. Thermistor comprises 2 or 4 kinds of metal oxides of iron, nickel, cobalt, manganese and copper, being shaped and sintered at high temperature (1200 °C to 1500 °C).



Features

- ◆ Small in size, high-powered, and very capable of bringing down the surge current;
- ◆ Quick in reaction;
- ◆ High in B value and low in residual current; Long service life and high reliability; High coefficient of safety and wide range of application.

Applications

Conversion power supply, switch power, UPS power, Kinds of electric heater, electronic energy-saving lamps, electronic ballast etc all kinds of power circuit protection of electronic equipments, filament protection of CRT, bulb and other lighting lamps.

Part Number Code

| | | |
|------------|-----------|---------------|
| SCN | 10 | D - 20 |
| (1) | (2) | (3) |

- (1) SCN: Socay Negative Temperature Coefficient Resistor.
(2) 10: Resistance Value: 10Ω.
(3) D-20: Diameter of Chip: Φ20.

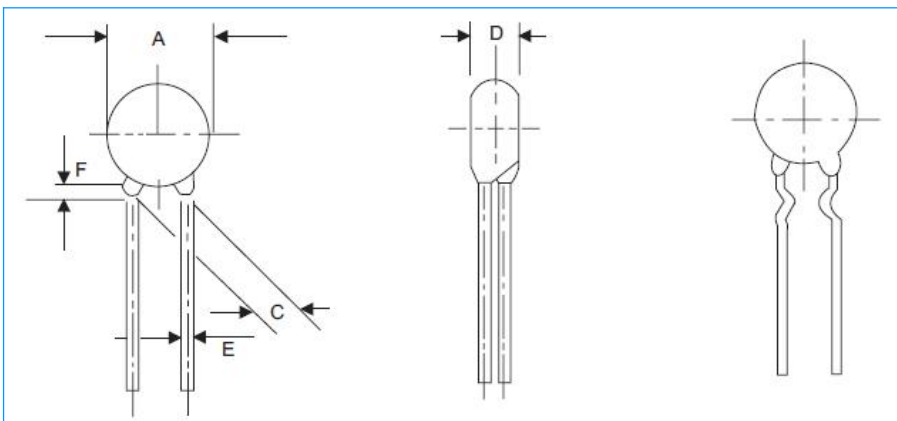
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Electrical Characteristics

| Part Number | R25°C ±20% | Max Steady Current | Approx R Of Max Current | Power Dissipation Coefficient | Time Constant |
|-------------|---------------|--------------------------|-------------------------------|-------------------------------------|------------------|
| | (Ω) | (A) | (Ω) | (mW/°C) | (s) |
| SCN3D-20 | 3 | 8 | 0.079 | 24 | 100 |
| SCN5D-20 | 5 | 7 | 0.106 | 23 | 87 |
| SCN8D-20 | 8 | 6 | 0.157 | 23 | 105 |
| SCN10D-20 | 10 | 6 | 0.194 | 23 | 118 |
| SCN16D-20 | 16 | 5 | 0.236 | 25 | 113 |

Dimensions (Unit: mm)



| Type | D-20 |
|------------------------|--------|
| A_{MAX} | 22 |
| C ± 1 | 7.5/10 |
| D_{MAX} | 7 |
| E ± 0.05 | 1.0 |
| F_{MAX} | 3 |

Note: "E" value may be 0.6 for resistors for which the chip's diameter is ≤ 13 and the working current is ≤ 2A.

Critical Technical Parameters of NTC Thermistor

◆ **R_t**---Resistance Value at Zero-power

It's a resistance which is got at a fixed temperature on a basis of a testing power which causes resistance to Vary in a range which can be ignored in relation to the total testing error.

◆ **R₂₅**---Resistance Value at Rated Zero-power

The design resistance of the thermistor usually refers to the resistance value got at Zero-power at 25 °C , which is usually indicated on the thermistor.

◆ **B Value**

B value stands for the thermal exponent at a negative temperature coefficient. It's defined as a ratio of the balance between the natural logarithms of resistance values at zero-power to the balance between the reciprocals of the two temperatures. The formula is as below:

$$B = \ln \frac{R_{T1}}{R_{T2}} / \left(\frac{1}{T_1} - \frac{1}{T_2} \right) \approx \frac{T_1 T_2}{T_2 - T_1} \ln \frac{R_{T1}}{R_{T2}}$$

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Critical Technical Parameters of NTC Thermistor (Continue)

In this formula: R_{T_1} is the resistance at Zero-power when the temperature is T_1 , R_{T_2} is the resistance at Zero-power when the temperature is T_2 . Unless otherwise specified, B value is got by calculating the Zero-power resistances at 25°C (298.15K) and 50 °C (323.15K). It's not a firm constant within the range of working temperature.

Resistance-to-Temperature Coefficient at Zero-power. It refers to the ratio of changes of a thermistor. Resistance value at Zero-power when The temperature, to the resistance value at Zero-power. The formula is as below:

$$\alpha_T = \frac{1}{R_T} \frac{DR_T}{DT} = - \frac{B}{T^2}$$

In this formula, " α " stands for the resistance-temperature coefficient at Zero-power when the temperature is T:

R_T stands for the resistance value at Zero-power when the temperature is T.

T stands for the temperature (in K).

B stands for B value.

◆ Max steady state current.

The maximum allowable continuous current passing through thermistor at 25°C.

◆ Dissipation Coefficient δ

It's the ratio of the changes with a thermistor dissipation power, in a pre-set ambient temperature, to the changes with the temperature. The formula is as below: $\delta = \Delta P / \Delta T$. δ changes in response when the ambient temperature changes, within the ranges of the working temperature.

◆ Thermal Time Constant

At Zero-power and when a mutation occurs with the temperature, the time " t ", which is spent for finishing 63.2% of the gap between the beginning temperature and the ending temperature in the thermistor, is directly proportional to " C ", the heat capacity of the thermistor, and is inversely proportional to δ , the dissipation constant. That is " $t = C / \delta$ ".