

## 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

<b>SCN</b>	<b>10</b>	<b>D - 20</b>
(1)	(2)	(3)

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

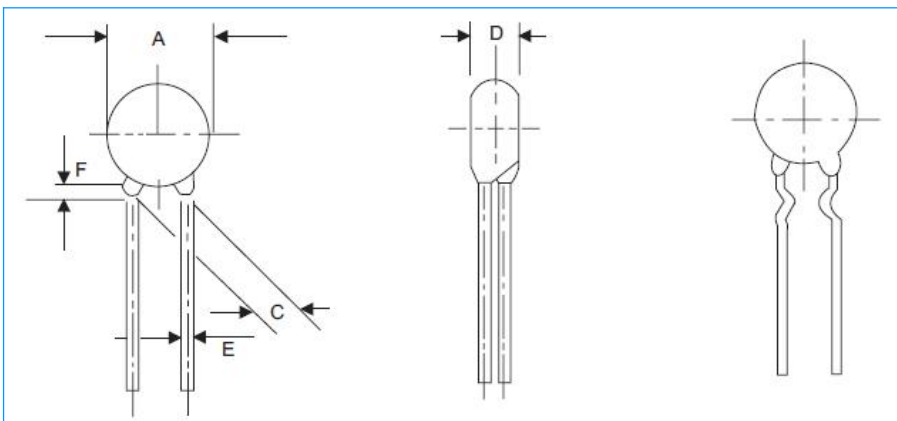
## Surge-Arrestor Negative Temperature Coefficient Thermistor

### SCNxxD-20 Series

#### 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
<b>A<sub>MAX</sub></b>	22
<b>C ± 1</b>	7.5/10
<b>D<sub>MAX</sub></b>	7
<b>E ± 0.05</b>	1.0
<b>F<sub>MAX</sub></b>	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<sub>t</sub>**---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.

◆ **R<sub>25</sub>**---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:

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

## Surge-Arrestor Negative Temperature Coefficient Thermistor

### SCNxxD-20 Series

#### 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, " $\alpha$ " 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  $\delta$

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:  $\delta = \Delta P / \Delta T$ .  $\delta$  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  $\delta$ , the dissipation constant. That is " $t = C / \delta$ ".