



Hyper-Sense Tech.
www.hyper-sense.com.tw

Temperature Sensor Series

NTC SENSOR · NTC THERMISTOR · PT SENSOR (RTD SENSOR) · KTY SILICON TEMPERATURE SENSOR

**HIGH QUALITY
HIGH PERFORMANCE**



HIGH PERFORMANCE



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COMPANY PROFILE

ABOUT HST

HST was founded by a group of enthusiastic technicians and sales force who have abundant of experience in thermal products and highly motivated to service customers. Our goal in pursuing the best and perfect have made us in continues progress. And striving for professional thermal product supplier with customer-oriented and service-minded has made us become a staunch supplier.

In 2004 , we invested LED lighting company and mainly focus on high power LED Street Lights applications , our products have been qualified by PCT 138 members and SGS , we have provided so many products to lots of countries and some projects are under proceeding now.

In recent years the various countries competed to invest the massive resources positively to develop the regeneration energy , renewable energy and high efficiency energy industries. Taiwan's superiority will lie in the accumulation rich semiconductor industry technology base, the coordinate economy department subscribes next in 2010 to regenerate the energy electric power facility capacity allocated proportion to reach the total electric power facility capacity 10% goal, the solar cell prospects for development favors.

HST deeply feels "the regeneration energy elementary education" importance . Establishes the photoelectricity department in 2006 and is employed the most long solar energy photoelectricity application specialized company with Taiwan - SOLAR I Company signature contract Becomes south solar cell product Taiwan the area specialized business agent .Sell the whole world by the most new style solar energy and the wind power generation using the product.

We take making a contribution to promoting clean and sustainable environment as the one of our long term goals .

OUR PHILOSOPHY

Achievement comes from customers' satisfactions.

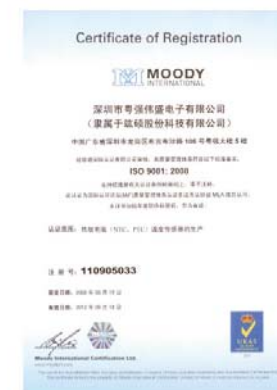


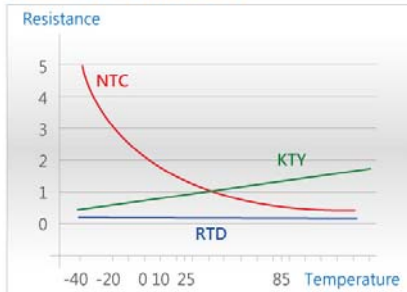
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SENSORS INDEX

NTC THERMISTOR



Thermistor is thermally sensitive resistor whose main function is to exhibit a change in electrical resistance with environmental temperature.

Especially, NTC (Negative Temperature Coefficient) thermistor shows the decrease of electric resistance with temperature increase. With high sensitivity and low price, NTC thermistor has variety of application fields such as home electronics, automobile, telecommunication, computer, medical field and other industrial usage.

Zero-power resistance (R_T)

The zero-power resistance is the value of a resistance when measured at a specified temperature, under conditions such that the change in resistance due to the internal generation of heat is negligible with respect to the total error of measurement.

B-value

An index of the thermal sensitivity expressed by the formula:

$$\beta_{T_a/T_0} = \frac{\ln(R_{T_a}/R_{T_0})}{\frac{1}{T_a} - \frac{1}{T_0}}$$

Where

B: constant in Kelvins (K)

R_0 : resistance in ohms (Ω) at temperature T_0

R_a : resistance in ohms (Ω) at temperature T_a

$$T(K) = 273.15 + T(^{\circ}C)$$

The value given above for T_0 and T_a are the preferred values. When the detail specification prescribes that the B-value shall be measured at other temperatures, the specified value (in Kelvins) shall be used for T_0 and T_a in place of the preferred values.

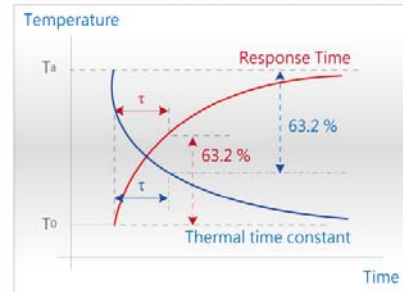
Dissipation constant (δ)

The dissipation constant is the quotient (in W/K), at a specified ambient temperature in specified medium of a change in power dissipation in a thermistor to the resultant body temperature change.

$$\delta = P / (T_2 - T_1)$$

where P, T_2 , and T_1 are the dissipated power, thermistor temperature, and ambient temperature respectively.

Response time / Thermal time constant (τ)



The time (in s) means the time necessary for an unloaded thermistor to vary its temperature by 63.2% of the difference between its temperature and the ambient temperature. The values of T , specified in this article, is determined in oil at an ambient temperature of 25°C.

Code	Rate of change (%) for $T=T_0$
τ	63.2
2τ	86.5
3τ	95.0
4τ	98.2
5τ	99.4
6τ	99.8
7τ	99.9

Maximum power rating

The power rating is the maximum power for a continuous load at the rated temperature. For parts in this catalog, the value is calculated from the following using T_a °C as the ambient temperature.

$$P_{max} = \delta (T_{max} - T_a)$$

HOW TO MEASURE NTC THERMISTORS

The published RT-values are measured at the temperature T .

The published B-value at 25°C is the result of the measurement at 25°C and that at 85°C. Hence, these values should be used when checking.

The following general precautions have to be taken when measuring NTC thermistors:

* Never measure thermistors in air; this is quite inaccurate and gives deviations of 1 or 2K. For measurements at room temperature or below, use petrol or some other non-conductive and non-aggressive fluid. For higher temperatures use oil, preferably silicon oil.

* Use a thermobath with an accuracy of better than 0.1°C. Even if the fluid is well stirred, there is still a temperature gradient in the fluid. Measure the temperature as close as possible to the NTC.

* After placing the NTC in the thermobath, wait until temperature equilibrium between the NTC and the fluid is obtained. For some types this may take more than 1 minute.

* Keep the measuring voltage as low as possible, otherwise the NTC will be heated by the measuring current.

Miniature NTC thermistors are especially sensitive in this respect. Measuring voltages of less than 0.5V are recommended.

* For high temperature measurements it is recommended that stem correction be applied to the thermometer reading.



HOUSEHOLD APPLICATION



NTC SENSORS

The Temperature sensor is assembled one with various parts and thermistor devices according to the required applications. Its electric characteristics are the same as those of thermistor devices. Variable type of sensor can be utilized for detecting or controlling temperature because its operating temperature range is wide from -50 to +300°C. Standard temperature sensor is available in accordance with the applications such as measurements of liquid, atmosphere and surface temperature.

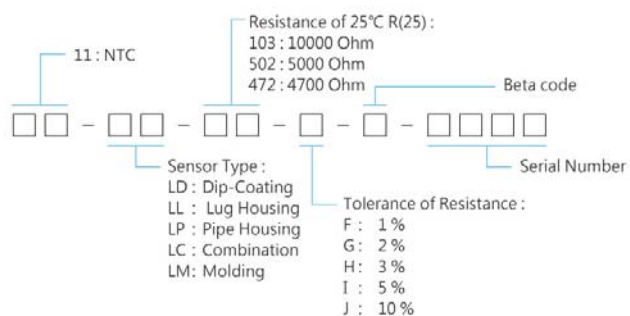


Product No. : 11L

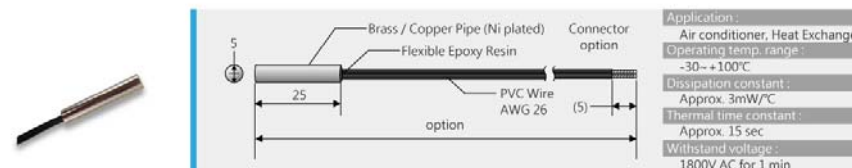
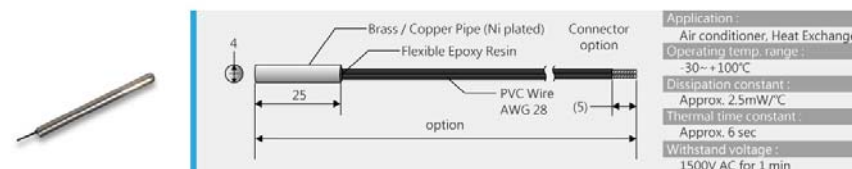
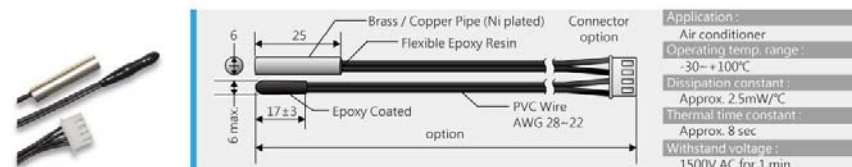
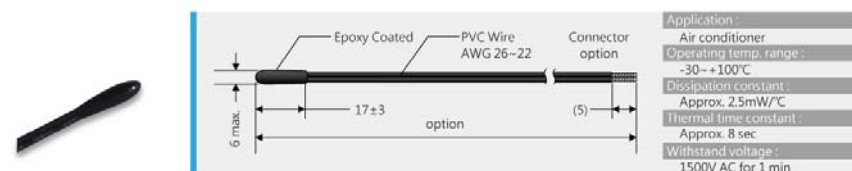
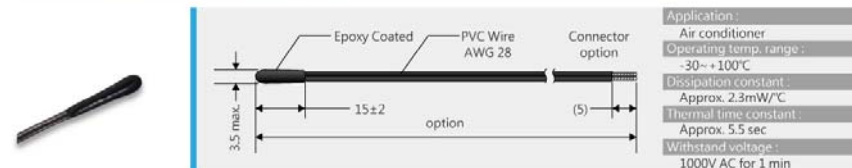
Description :

- High stability, high accuracy and high reliability.
- Provide a flexible design of any kind of sensor.
- Resistance at 25°C : 2K ~ 100K ohms
- Resistance tolerance : $\pm 1\%$, $\pm 2\%$, $\pm 3\%$, $\pm 5\%$

NTC Sensors Coding System

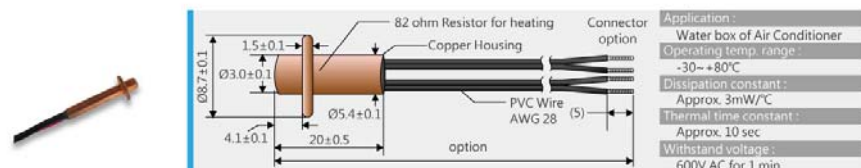
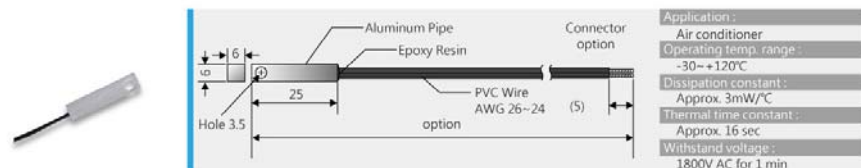
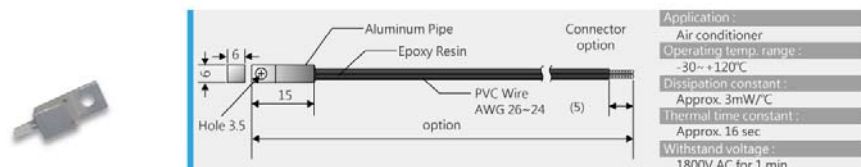
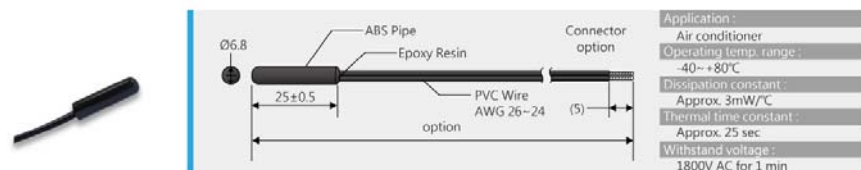
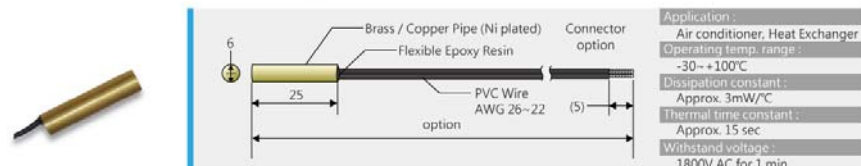


APPLICATION

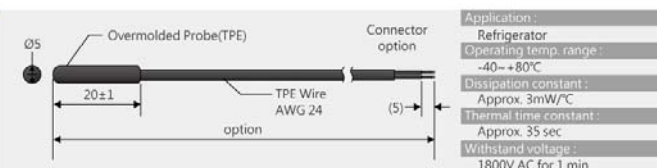
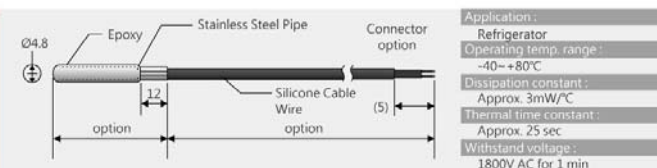
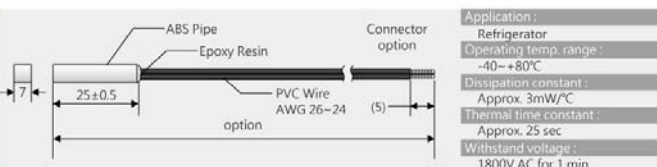
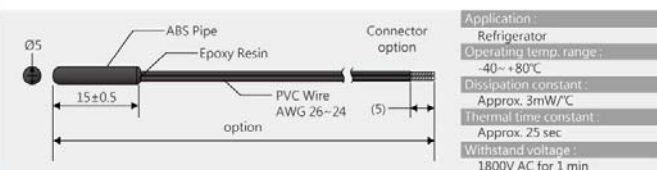
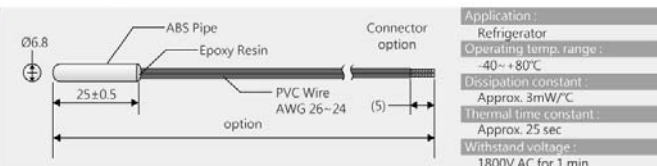




Air-Conditioner

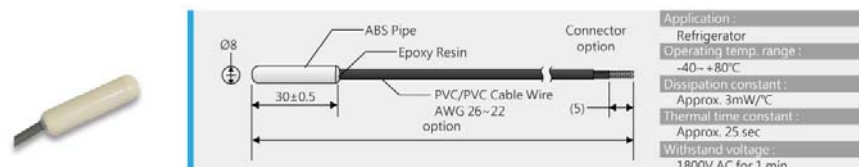
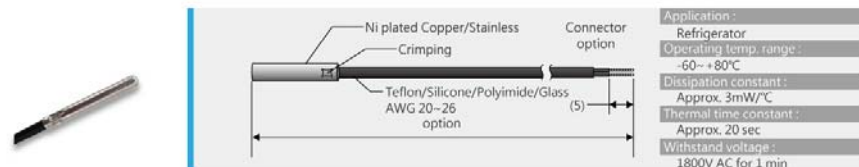
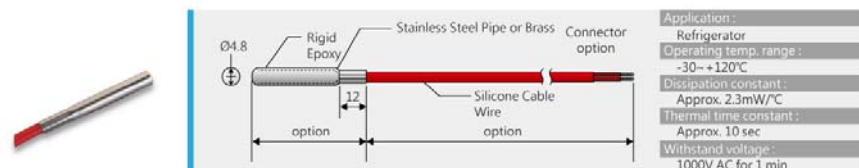
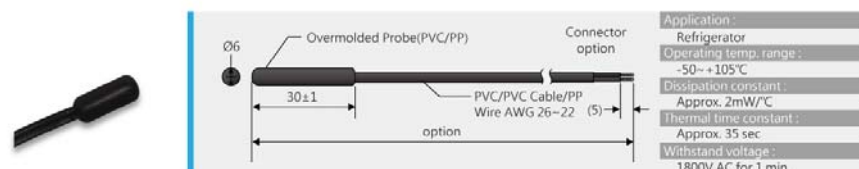
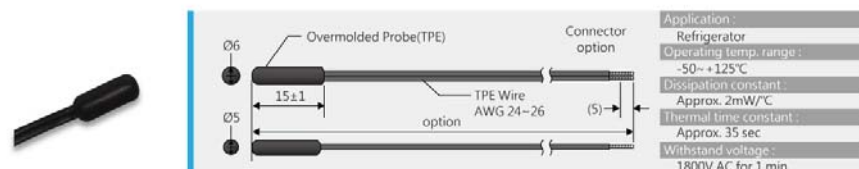


Refrigerator/Chiller

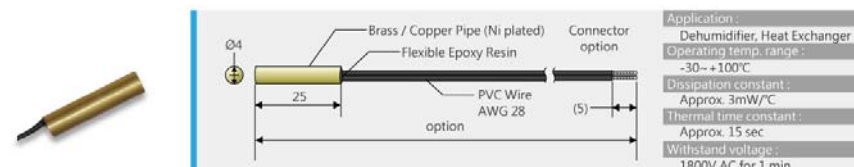
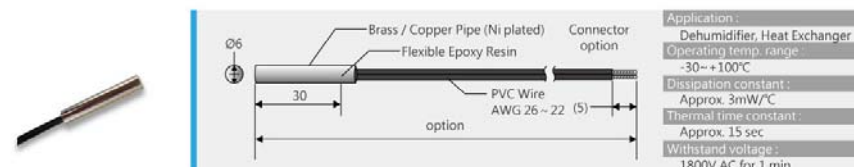
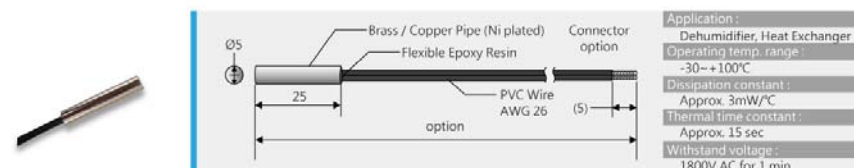
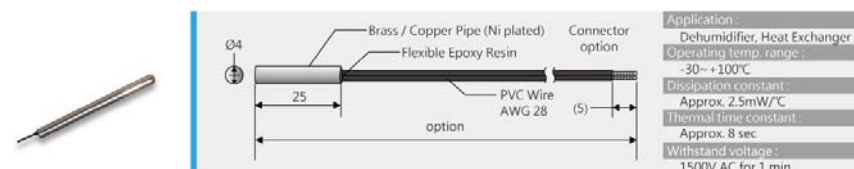
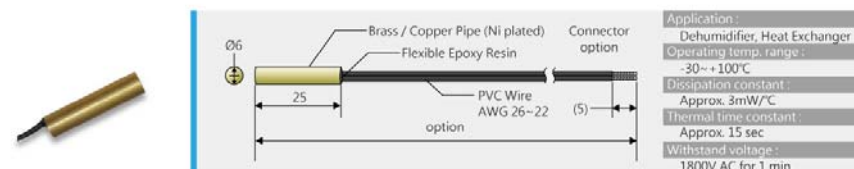




Refrigerator/Chiller

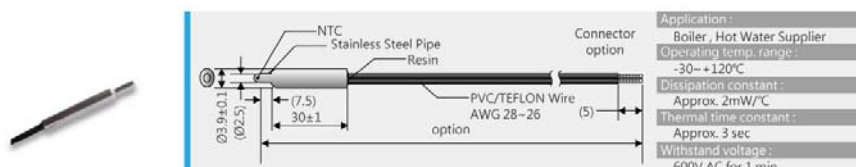
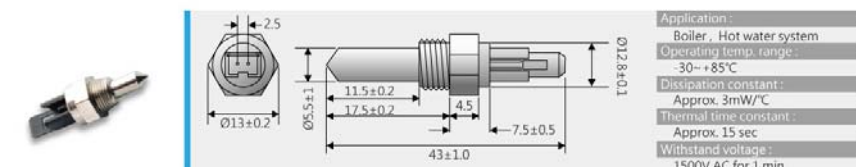
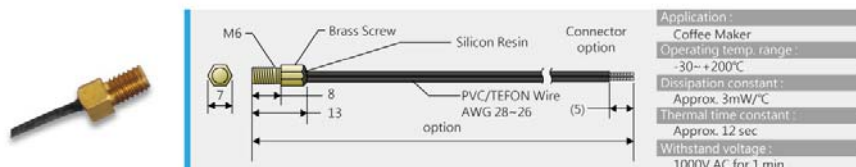
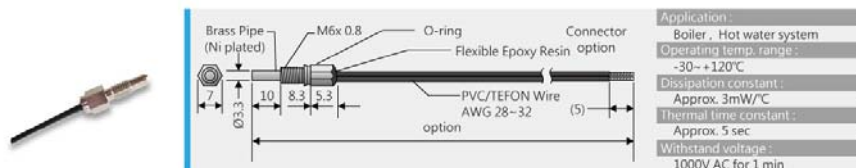
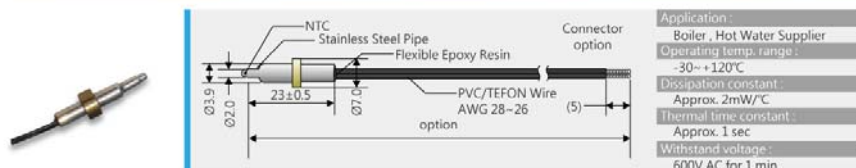


Dehumidifier

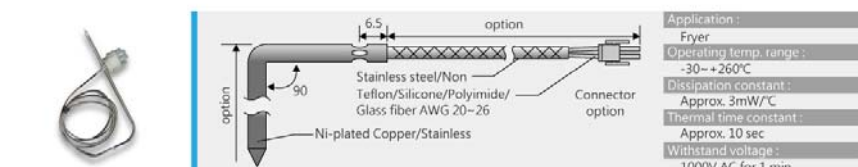
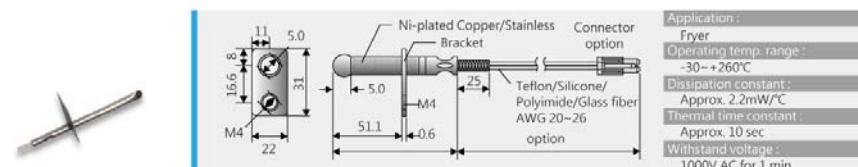
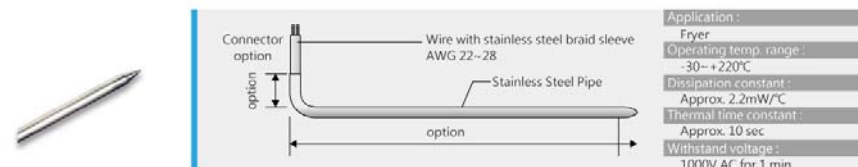
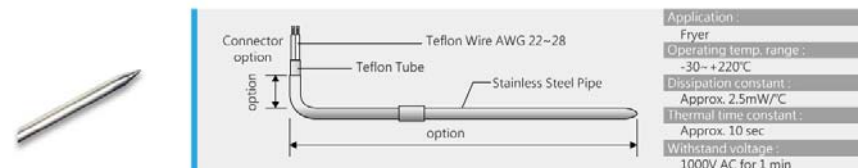
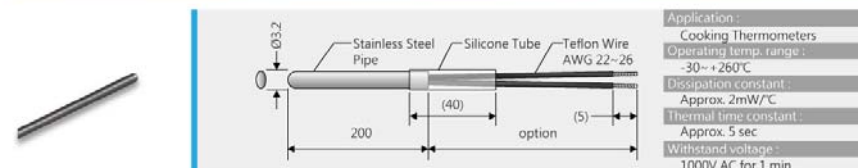


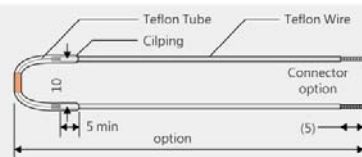


Coffee maker & Boiler

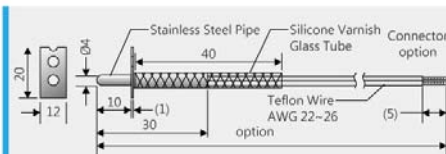


Fryer

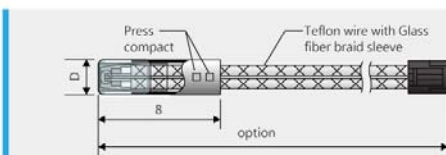




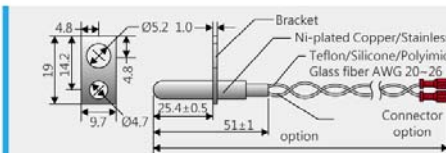
Application :
Home Baker, Rice Cooker
Operating temp. range :
-30~+260°C
Dissipation constant :
Approx. 2.5mW/°C
Thermal time constant :
Approx. 5 sec
Withstand voltage :
1000V AC for 1 min



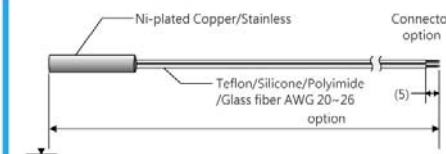
Application :
Home Baker, Microwave oven
Operating temp. range :
-30~+260°C
Dissipation constant :
Approx. 3mW/°C
Thermal time constant :
Approx. 10 sec
Withstand voltage :
1000V AC for 1 min



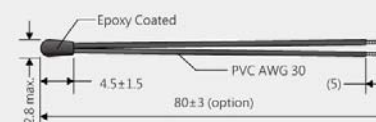
Application :
Home Baker, Microwave oven
Operating temp. range :
-30~+260°C
Dissipation constant :
Approx. 3mW/°C
Thermal time constant :
Approx. 10 sec
Withstand voltage :
1000V AC for 1 min



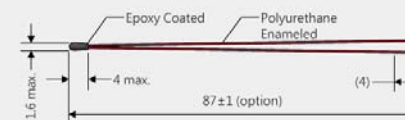
Application :
Home Baker, Microwave oven
Operating temp. range :
-30~+260°C
Dissipation constant :
Approx. 3mW/°C
Thermal time constant :
Approx. 10 sec
Withstand voltage :
1000V AC for 1 min



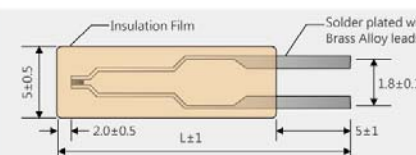
Application :
Home Baker, Microwave oven
Operating temp. range :
-30~+260°C
Dissipation constant :
Approx. 3mW/°C
Thermal time constant :
Approx. 10 sec
Withstand voltage :
1000V AC for 1 min



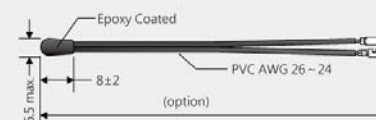
Application :
Battery Pack
Operating temp. range :
-30~+80°C
Dissipation constant :
Approx. 1.3mW/°C
Thermal time constant :
Approx. 2.5 sec
Withstand voltage :
500V AC for 1 min



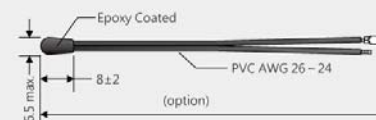
Application :
Battery Pack, Thermometers
Operating temp. range :
-30~+120°C
Dissipation constant :
Approx. 0.7mW/°C
Thermal time constant :
Approx. 0.8 sec
Withstand voltage :
> 50MWQ / 500V DC



Application :
Battery Pack
Operating temp. range :
-30~+120°C
Dissipation constant :
Approx. 0.7mW/°C
Thermal time constant :
Approx. 10 sec
Withstand voltage :
> 50MWQ / 500V DC



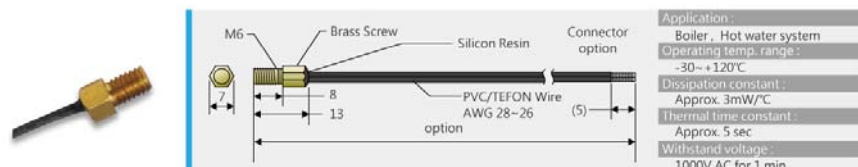
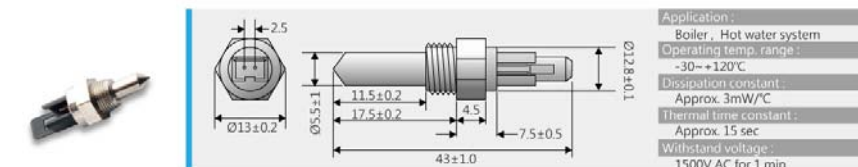
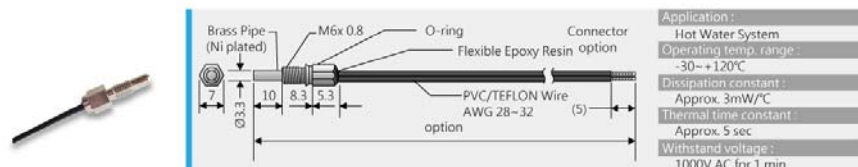
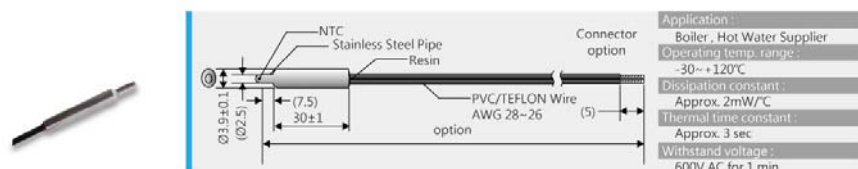
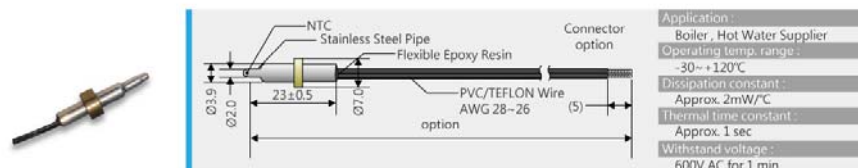
Application :
Battery Pack
Operating temp. range :
-30~+80°C
Dissipation constant :
Approx. 1.3mW/°C
Thermal time constant :
Approx. 2.5 sec
Withstand voltage :
500V AC for 1 min



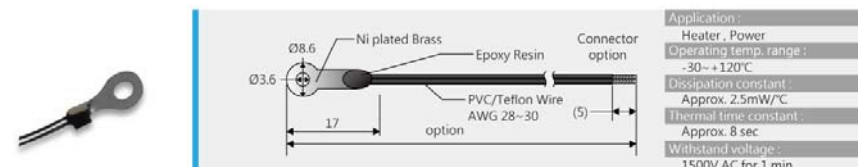
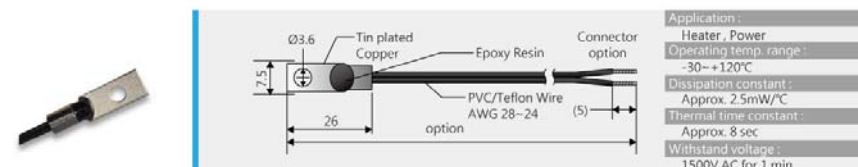
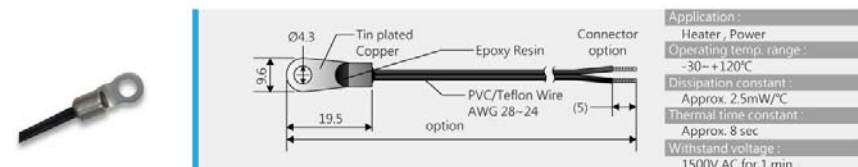
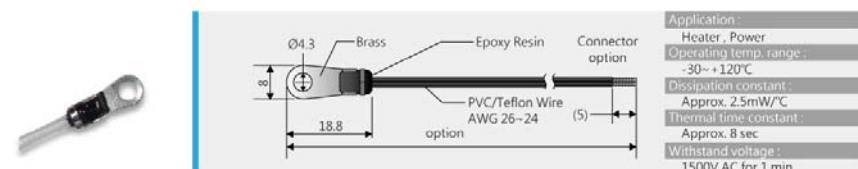
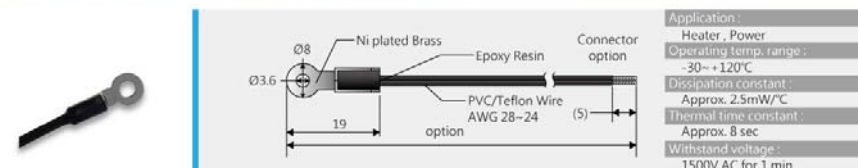
Application :
Battery Pack
Operating temp. range :
-30~+80°C
Dissipation constant :
Approx. 1.3mW/°C
Thermal time constant :
Approx. 2.5 sec
Withstand voltage :
500V AC for 1 min



Hot water supplier/Boiler

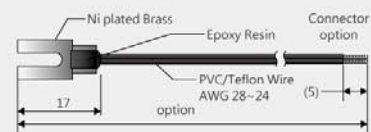


Power supply/Heater

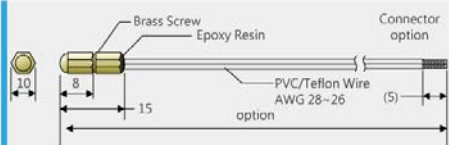




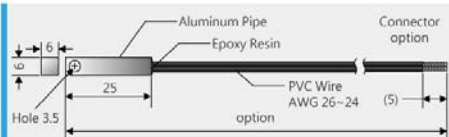
Power supply/Heater



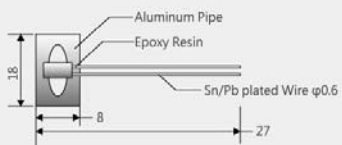
Application :
Heater, Power
Operating temp. range :
-30~+120°C
Dissipation constant :
Approx. 2.5mW/°C
Thermal time constant :
Approx. 8 sec
Withstand voltage :
1500V AC for 1 min



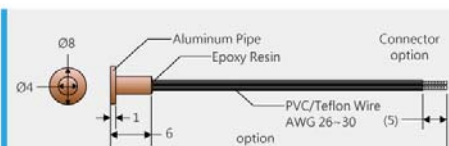
Application :
Heater, Power
Operating temp. range :
-30~+120°C
Dissipation constant :
Approx. 2.5mW/°C
Thermal time constant :
Approx. 12 sec
Withstand voltage :
1500V AC for 1 min



Application :
Heater, Power
Operating temp. range :
-30~+120°C
Dissipation constant :
Approx. 2.5mW/°C
Thermal time constant :
Approx. 18 sec
Withstand voltage :
1800V AC for 1 min



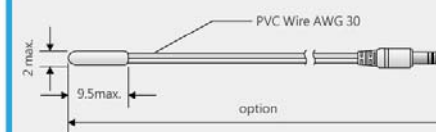
Application :
Surface Temperature Detector
Operating temp. range :
-30~+120°C
Dissipation constant :
Approx. 2mW/°C
Thermal time constant :
Approx. 8 sec
Withstand voltage :
1500V AC for 1 min



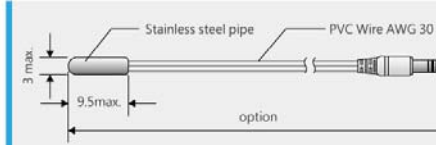
Application :
Heater
Operating temp. range :
-30~+120°C
Dissipation constant :
Approx. 2mW/°C
Thermal time constant :
Approx. 8 sec
Withstand voltage :
1500V AC for 1 min



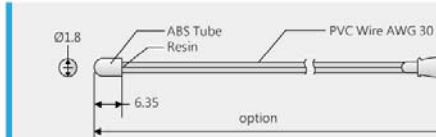
Medicine



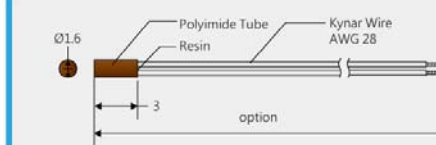
Application :
Medicine
Operating temp. range :
-30~+80°C
Dissipation constant :
Approx. 1.5mW/°C
Thermal time constant :
Approx. 2 sec
Withstand voltage :
1000V AC for 1 min



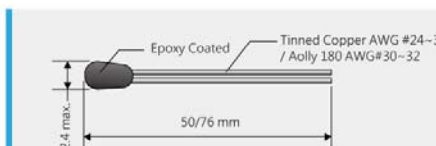
Application :
Medicine
Operating temp. range :
-30~+80°C
Dissipation constant :
Approx. 1.5mW/°C
Thermal time constant :
Approx. 2 sec
Withstand voltage :
1000V AC for 1 min



Application :
Medicine
Operating temp. range :
-50~+150°C
Dissipation constant :
Approx. 2.5mW/°C
Thermal time constant :
Approx. 1.25 sec
Withstand voltage :
> 50MWQ / 500V DC



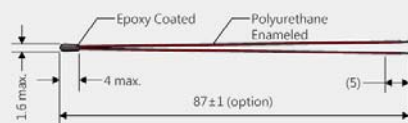
Application :
Medicine
Operating temp. range :
-50~+150°C
Dissipation constant :
Approx. 1.5mW/°C
Thermal time constant :
Approx. 0.4 sec
Withstand voltage :
> 50MWQ / 500V DC



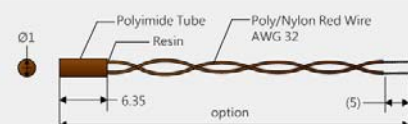
Application :
Medicine
Operating temp. range :
-50~+150°C
Dissipation constant :
Approx. 2.0mW/°C
Thermal time constant :
Approx. 0.75 sec
Withstand voltage :
> 50MWQ / 500V DC



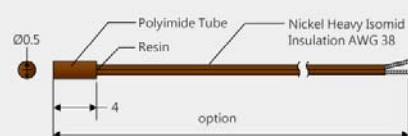
Medicine



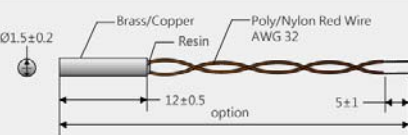
Application:
Medical Equipment, Thermometers
Operating temp. range:
-30~+120°C
Dissipation constant:
Approx. 0.7mW/°C
Thermal time constant:
Approx. 0.8 sec
Withstand voltage:
> 50MWQ. / 500V DC



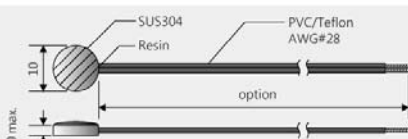
Application:
Medicine
Operating temp. range:
-50~+150°C
Dissipation constant:
Approx. 1.5mW/°C
Thermal time constant:
Approx. 0.4 sec
Withstand voltage:
> 50MWQ. / 500V DC



Application:
Medicine
Operating temp. range:
-50~+150°C
Dissipation constant:
Approx. 1.5mW/°C
Thermal time constant:
Approx. 0.4 sec
Withstand voltage:
> 50MWQ. / 500V DC



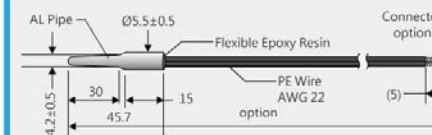
Application:
Medicine
Operating temp. range:
-50~+150°C
Dissipation constant:
Approx. 1.5mW/°C
Thermal time constant:
Approx. 0.2 sec
Withstand voltage:
> 50MWQ. / 500V DC



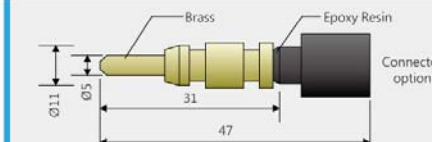
Application:
Medicine
Operating temp. range:
-50~+150°C
Dissipation constant:
Approx. 1.5mW/°C
Thermal time constant:
Approx. 0.2 sec
Withstand voltage:
> 50MWQ. / 500V DC



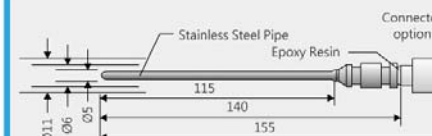
Automobile



Application:
Intake air
Operating temp. range:
-30~+120°C
Dissipation constant:
Approx. 2mW/°C
Thermal time constant:
Approx. 5 sec
Withstand voltage:
1500V AC for 1 min



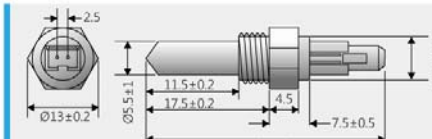
Application:
Water temp.
Operating temp. range:
-30~+120°C
Dissipation constant:
Approx. 2.5mW/°C
Thermal time constant:
Approx. 9 sec
Withstand voltage:
1500V AC for 1 min



Application:
Water temp.
Operating temp. range:
-30~+120°C
Dissipation constant:
Approx. 3mW/°C
Thermal time constant:
Approx. 15 sec
Withstand voltage:
1500V AC for 1 min



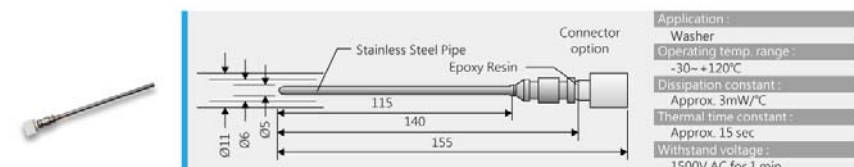
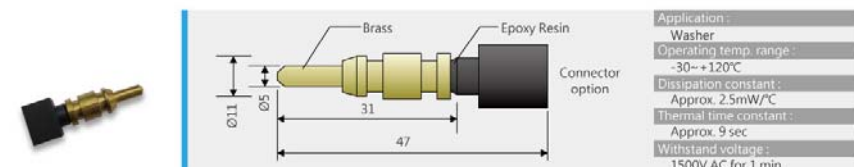
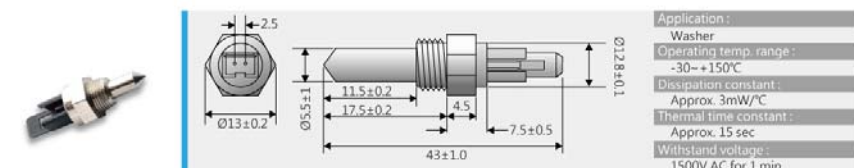
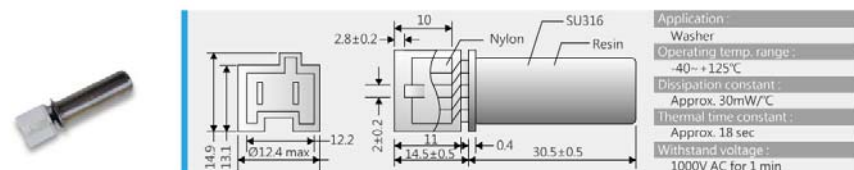
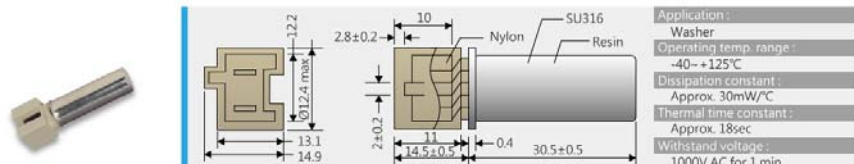
Application:
Water temp.
Operating temp. range:
-30~+150°C
Dissipation constant:
Approx. 3mW/°C
Thermal time constant:
Approx. 15 sec
Withstand voltage:
1500V AC for 1 min



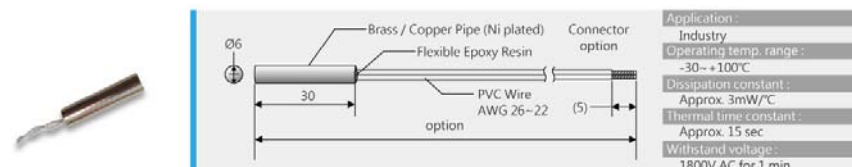
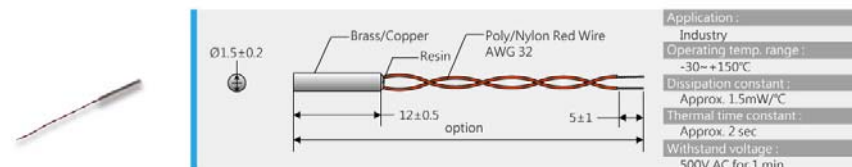
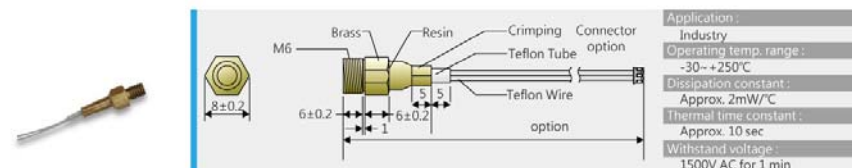
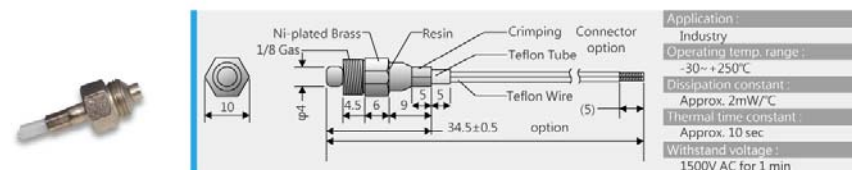
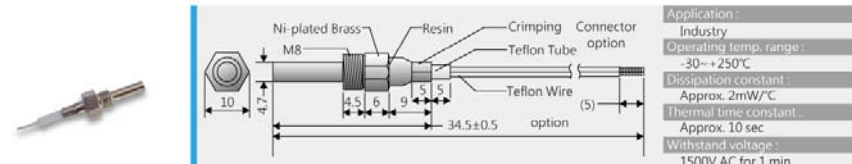
Application:
Water temp.
Operating temp. range:
-30~+150°C
Dissipation constant:
Approx. 3mW/°C
Thermal time constant:
Approx. 15 sec
Withstand voltage:
1500V AC for 1 min



Washer

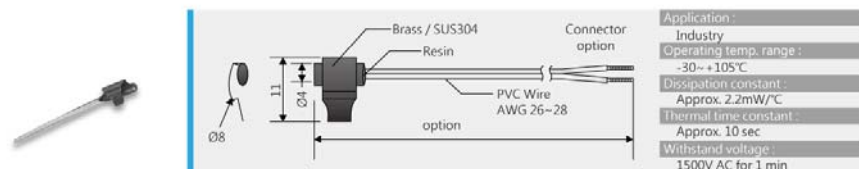
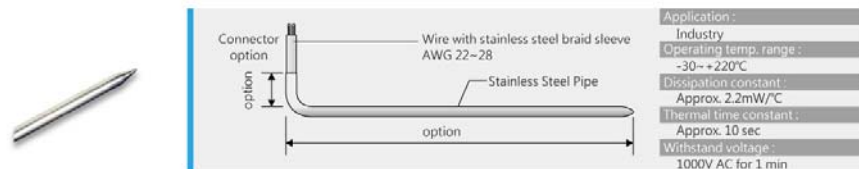
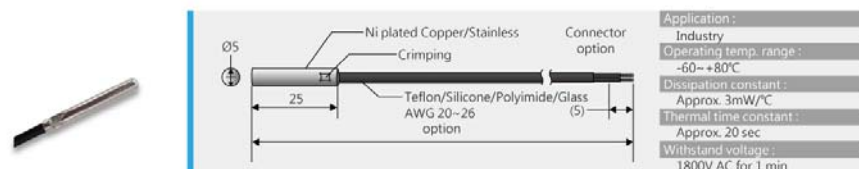
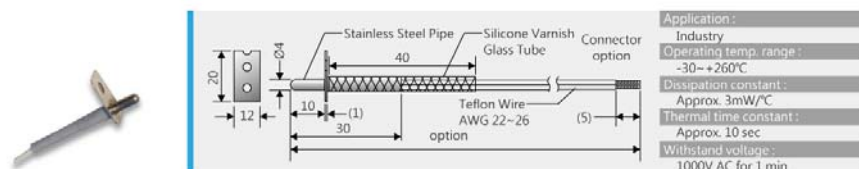
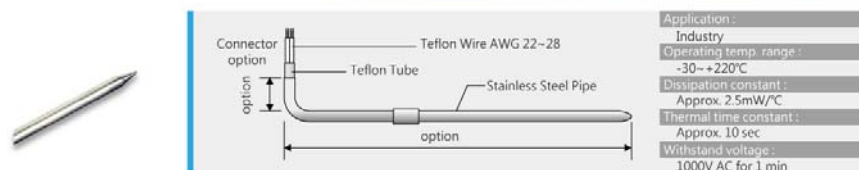


Industry

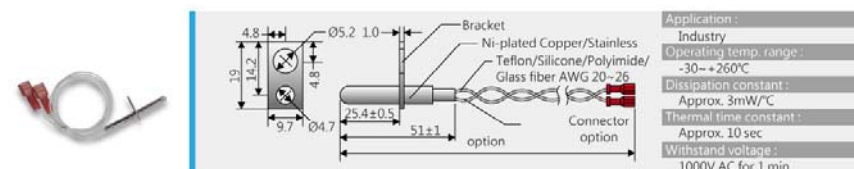
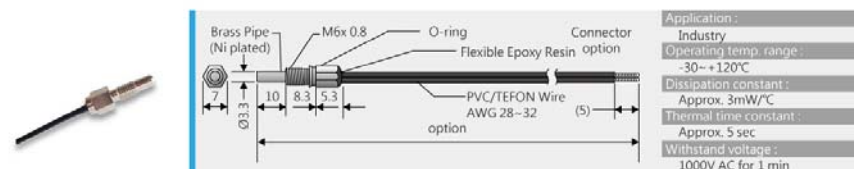
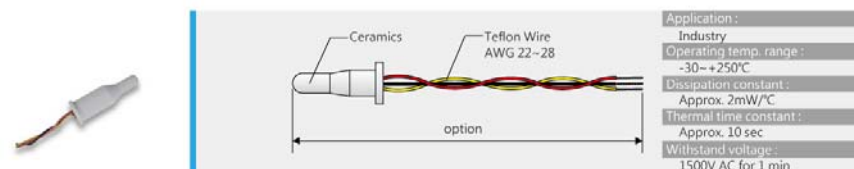
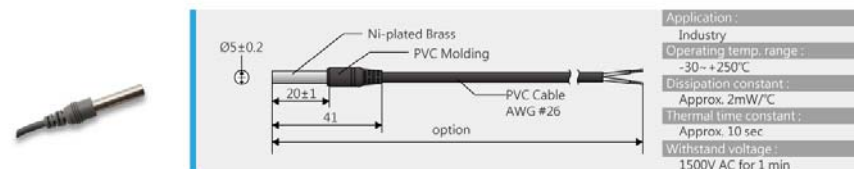
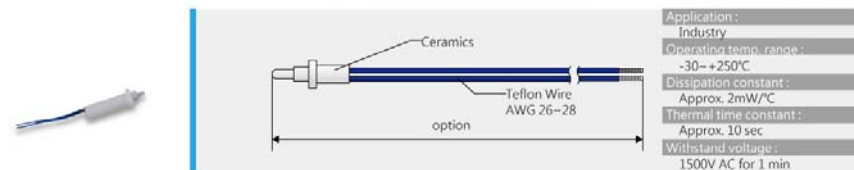




Industry



Industry



NTC THERMISTORS

Radial series

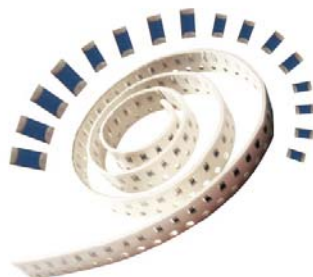


Product No. : 11R

Description :

- Small precision type
- Excellent thermal cycle endurance
- Rapid time response quality
- Resistance Tolerance : $\pm 1 \sim \pm 3 \%$
- Operation Temperature Range : $-30 \sim +120 \text{ }^{\circ}\text{C}$

SMD series



Product No. : 11S

Description :

- Thermistor with glass coated ceramic for long-term reliability and good solderability.
- Resistance at 25°C : $3300 \sim 330\text{K ohms}$
- Resistance tolerance : $\pm 1\%, \pm 3\%, \pm 5\%, \pm 10\%$
- Operating temperature: $-40 \sim 125^{\circ}\text{C}$

Thin-Film series



Product No. : 11F

Description :

- Operating temperature : $-50 \sim 125^{\circ}\text{C}$
- Suitable for narrow space
- Rapid response time
- Elastic and solder easily
- RoHS Compliance
- UL1434 Certification

Interchangeable series

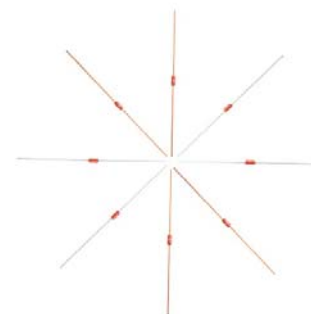


Product No. : 11LDIN

Description :

- High accuracy tolerances from $\pm 1^{\circ}\text{C}$ to $\pm 0.1^{\circ}\text{C}$
- Operating ranges from -50°C to 150°C
- Small size
- Proprietary processes provide top of the line with high quality and stability
- RoHS Compliance

Glass Encapsulated series



Product No. : 11G

The 11G0200 series thermistor is a thermal sensor in a DO35 package. It is highly reliable and offers a wide operating range of -50°C to 250°C . They can be employed for home electric appliances and high temperature applications.

Product No. : 11GP

The 11GP series thermistor (Shibaura NTC thermistors) provides high stability thanks to the fine ceramic chip. The automated production process refined through Shibaura's years of experience provide uniform shape and characteristics--as well as high cost performance. The glass seal provides high heat resistance and moisture tightness, while the small size provides fast response times.



RADIAL SERIES

Characteristics

- Thermal Time Constant ≈ 12 sec.
- Thermal Dissipation Constant ≈ 3 mW/°C
- Operation Temperature Range -30 ~ +120 °C

Part Number System

11-R-0100-103-H-H-J001

- Product Name: NTC Thermistor
- Product Identifier: Radial Type
- Dimensions:
0100 : Chip Size, 0300 : 3mm Disc Size
0500 : 5mm Disc Size
- Resistance at 25°C : $103 = 10 \times 10^3 \Omega$
- Resistance Tolerance:
F: $\pm 1\%$, G: $\pm 2\%$, H: $\pm 3\%$, J: 5%, K: 10%
- Beta Code
- Special Code

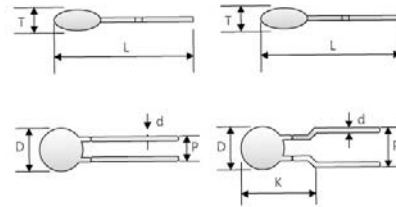
Features

- Small precision type
- Excellent thermal cycle endurance
- Rapid time response quality

Applications

- Temperature detection for mother boards
- Temperature-humidity clock
- Notebook computer's battery chargers

Outline Drawing and Dimension



Symbol	0100	0300	0500
D	3.0 Max.	4.0 Max.	6.0 Max.
T	2.5 Max.	3.0 Max.	3.5 Max.
L		8~30	
P	2.54/2.54	2.54/5.0	2.54/5.0
d		0.5	
K	(6.0)	(7.0)	(8.0)

Part No.	Resistance at 25°C B 25/85 Constant	
	(Ω)	(°K)
11R0100152*H*	1,500	3900
11R0100202*D*	2,000	3520
11R0100222*H*	2,200	3970
11R0100252*H*	2,500	3925
11R0100272*H*	2,700	3970
11R0100302*H*	3,000	3970
11R0100402*H*	4,000	3520
11R0100472*H*	4,700	3970
11R0100502*B*	5,000	3324
11R0100502*D*	5,000	3520
11R0100502*H*	5,000	3970
11R0100103*C*	10,000	3435
11R0100103*D*	10,000	3520
11R0100103*H*	10,000	3970
11R0100203*H*	20,000	3970
11R0100203*K*	20,000	4200
11R0100303*K*	30,000	4200
11R0100403*K*	40,000	3990
11R0100473*K*	47,000	3990
11R0100503*K*	50,000	3990
11R0100104*H*	100,000	3970
11R0100104*M*	100,000	4390
11R0100154*M*	150,000	4390

Besides The Above Standard Characteristic Product, We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well.

Part No.	Resistance at 25°C B 25/85 Constant	
	(Ω)	(°K)
11R0300101*A	100	3180
11R0300121*A	120	3180
11R0300151*A	150	3180
11R0300201*A	200	3200
11R0300501*C	500	3430
11R0300102*E	1,000	3600
11R0300152*E	1,500	3650
11R0300152*K	1,500	4150
11R0300202*E	2,000	3750
11R0300202*K	2,000	4200
11R0300222*E	2,200	3750
11R0300252*E	2,500	3750
11R0300272*F	2,700	3800
11R0300302*F	3,000	3850
11R0300332*F	3,300	3850
11R0300402*F	4,000	3850
11R0300472*F	4,700	3900
11R0300502*F	5,000	3450
11R0300502*F	5,000	3900
11R0300682*F	6,800	3900
11R0300103*C	10,000	3450
11R0300103*H	10,000	3970
11R0300103*J	10,000	4040
11R0300123*H	12,000	3970
11R0300153*J	15,000	4050
11R0300153*K	15,000	4150
11R0300203*J	20,000	4100
11R0300223*J	22,000	4100
11R0300253*K	25,000	4150
11R0300303*K	30,000	4150
11R0300333*K	33,000	4150
11R0300403*K	40,000	4200
11R0300473*L	47,000	4250
11R0300503*L	50,000	4280
11R0300683*L	68,000	4350
11R0300104*L	100,000	4350
11R0300104*N	100,000	4500
11R0300154*M	150,000	4600
11R0300204*P	200,000	4700
11R0300224*P	220,000	4720
11R0300244*N	240,000	4450
11R0300304*P	300,000	4800
11R0300334*P	330,000	4800
11R0300404*P	400,000	4900
11R0300474*P	470,000	4750
11R0300504*Q	500,000	5050
11R0300105*Q	1,000,000	5300

Besides The Above Standard Characteristic Product, We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well.

SMD SERIES

Characteristics

- Resistance Tolerance $\pm 1 \sim \pm 10 \%$
- B Constant Tolerance $\pm 3 \%$
- Thermal Time Constant $\approx 8 \text{ sec.}$
- Operation Temperature Range $-40 \sim +125 \text{ }^{\circ}\text{C}$
- Thermal Dissipation Constant $\approx 1.0 \text{ mW/}^{\circ}\text{C}$
- Max. Rated Power at $25^{\circ}\text{C} \approx 5 \text{ mW}$

Part Number System

11-S-0805-103-K-C

1. Product Name: NTC Thermistor
2. Product Identifier: Surface Mount
3. Dimensions:
4. Resistance at 25°C : $103 = 10 \times 10^3 \Omega$
5. Resistance Tolerance:
6. F: $\pm 1\%$, H: $\pm 3\%$, J: $\pm 5\%$, K: $\pm 10\%$
Beta Code

Features

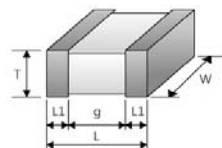
- Ultra small size, low capacitor
- Glass coated ceramics for long term reliability
- Good solderability
- Non polarized for mounting

Applications

- Communication products-Cellular phone (TCXO, Battery Pack)
- Computer-PC/PDA (LCD panel, Battery pack)
- Video/Audio electronic products-Car stereo, Camcorder, CD-ROM driver

Besides The Above Standard Characteristic Product, We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well.

Outline Drawing and Dimension



Size	L(mm)	W(mm)	T(mm)	L1(mm)
0402	1.00 $\pm$ 0.10	0.50 $\pm$ 0.10	0.60 Max.	0.15~0.30
0603	1.60 $\pm$ 0.15	0.80 $\pm$ 0.15	0.95 Max.	0.20~0.50
0805	2.00 $\pm$ 0.20	1.25 $\pm$ 0.20	1.20 Max.	0.20~0.50

Part No.	Resistance at 25°C	B 25/85 Constant
	(Ω)	($^{\circ}\text{K}$)
11S0402103*C	10,000	3435
11S0402103*F	10,000	3900
11S0402333*G	33,000	3950
11S0402473*J	47,000	4100
11S0402683*H	68,000	3970
11S0402104*G	100,000	3950
11S0402104*H	100,000	4000

Part No.	Resistance at 25°C	B 25/85 Constant
	(Ω)	($^{\circ}\text{K}$)
11S0603202*A	2,000	3100
11S0603302*A	3,000	3200
11S0603472*B	4,700	3340
11S0603103*C	10,000	3435
11S0603103*D	10,000	3550
11S0603103*H	10,000	3970
11S0603123*D	12,000	3550
11S0603303*F	30,000	3900
11S0603333*F	33,000	3900
11S0603403*G	40,000	3950
11S0603473*G	47,000	3950
11S0603493*G	49,000	3950
11S0603503*G	50,000	3950
11S0603513*G	51,000	3950
11S0603683*G	68,000	3950
11S0603104*G	100,000	3950
11S0603104*M	100,000	4400
11S0603154*H	150,000	4000
11S0603204*G	200,000	3950
11S0603224*G	220,000	3950
11S0603334*J	330,000	4100
11S0603374*H	370,000	4000
11S0603404*J	400,000	4100
11S0603474*J	470,000	4055
11S0603504*J	500,000	4100

Part No.	Resistance at 25°C	B 25/85 Constant
	(Ω)	($^{\circ}\text{K}$)
11S0805202*A	2,000	3200
11S0805222*A	2,200	3200
11S0805332*K	3,300	4145
11S0805472*C	4,700	3435
11S0805502*C	5,000	3435
11S0805103*C	10,000	3435
11S0805103*D	10,000	3550
11S0805103*H	10,000	3970
11S0805153*E	15,000	3630
11S0805223*F	22,000	3900
11S0805223*J	22,000	4050
11S0805303*F	30,000	3900
11S0805333*J	33,000	4055
11S0805473*H	47,000	4000
11S0805503*H	50,000	4000
11S0805563*H	56,000	4000
11S0805683*G	60,000	3950
11S0805104*H	100,000	4000
11S0805154*J	150,000	4055
11S0805204*G	200,000	3950
11S0805224*J	220,000	4055
11S0805334*J	330,000	4100

Besides The Above Standard Characteristic Product, We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well.

THIN-FILM SERIES

The TF thermistor feature ultra thinness of 500 μ m and superior electrical insulation. This thermistor can be used to provide safety in applications where mounting could contact electrodes.

Characteristics

- Resistance Tolerance $\pm 1 \sim \pm 5 \%$
- B Constant Tolerance $\pm 1 \%$
- Thermal Dissipation Constant $\approx 0.7 \text{ mW/}^\circ\text{C}$ in still air
- Thermal Time Constant $\approx 2.0 \text{ sec.}$ in air
- Operation Temperature Range $-50 \sim +90^\circ\text{C}$

Part Number System

11-F-0525-103-F-C-15

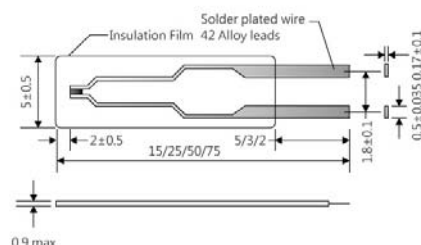
① ② ③ ④ ⑤ ⑥ ⑦

- Product Name: NTC Thermistor
- Product Identifier: Thin-Film
- Dimensions:
0515 : 5*15 mm, 0525: 5*25 mm
0550 : 5*50 mm, 0575: 5*75 mm
- Resistance at 25 $^\circ\text{C}$: $103 = 10 \times 10^3 \Omega$
- Resistance Tolerance:
F: $\pm 1\%$, H: $\pm 3\%$, J: $\pm 5\%$
- Beta Code:
C: 3435
L: 4262
- Others:
X: 5: 5mm, 3: 2.5mm, 2: 2mm
Y: 0: Halogen-Free, 1: Normal

Features

- Suitable for narrow space
- Rapid response time
- Elastic and solder easily
- RoHS Compliance
- UL1434 Certification

Outline Drawing and Dimension



Part No.	Resistance at 25 $^\circ\text{C}$ (Ω)	B 25/85 Constant ($^\circ\text{K}$)
11F0515103*C3*	10K	3435
11F0525103*C5*	10K	3435
11F0525103*C2*	10K	3435
11F0550103*C5*	10K	3435
11F0575103*C5*	10K	3435
11F0525104*L5*	100K	4262
11F0550104*L5*	100K	4262

Besides The Above Standard Characteristic Product, We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well.

INTERCHANGEABLE SERIES

Interchangeable refers to how accurately thermistors guarantee (R/T) curve over a range of temperatures. This allows every thermistor to be interchangeable with every other thermistor of the same series specifications without re-calibration of instrumentation.

Characteristics

- Resistance Tolerance $\pm 0.1 \sim \pm 1.0^\circ\text{C}$
- Thermal Dissipation Constant $\approx 2.0 \text{ mW/}^\circ\text{C}$ in still air
 $\approx 13 \text{ mW/}^\circ\text{C}$ in stirred oil
- Thermal Time Constant $\approx 0.75 \text{ sec.}$ in stirred oil
- Operation Temperature Range $-50 \sim +150^\circ\text{C}$

Part Number System

11-LD-IN-A-103-A-3-13

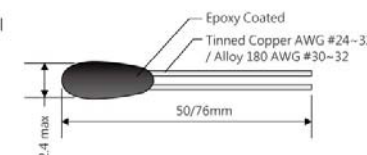
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- Product Name: NTC Thermistor
- Product Identifier: Leaded Dip-coating
- Series: Interchangeable
- Curve Code
- Resistance at 25 $^\circ\text{C}$: $103 = 10 \times 10^3 \Omega$
- Resistance Tolerance:
A: $\pm 1.0^\circ\text{C}$, B: $\pm 0.5^\circ\text{C}$, C: $\pm 0.2^\circ\text{C}$,
D: $\pm 0.1^\circ\text{C}$, X: Specials
- Temperature Range:
1: 20 ~ 45 $^\circ\text{C}$, 2: -20 ~ 50 $^\circ\text{C}$, 3: 0 ~ 70 $^\circ\text{C}$
4: 0 ~ 100 $^\circ\text{C}$
- Others:
X: 1: Tinned copper, 2: Tinned alloy 180
Y: 1: 32 AWG, 2: 30 AWG, 3: 28 AWG

Features

- High accuracy tolerances from $\pm 1^\circ\text{C}$ to $\pm 0.1^\circ\text{C}$
- Operating ranges from -50°C to 150°C
- Small size
- Proprietary processes provide top of the line with high quality and stability.
- RoHS Compliance

Outline Drawing and Dimension



Part No.	Resistance at 25 $^\circ\text{C}$ (Ω)	B 25/85 Constant ($^\circ\text{K}$)
11LDIN-A****	1K~100K	3977
11LDIN-B****	10K~100K	3942
11LDIN-C****	5K~20K	3695
11LDIN-D****	20K~100K	4262
11LDIN-E****	1K~200K	4434
11LDIN-F****	10K	3435
11LDIN-G****	50K~200K	4390
11LDIN-H****	1M	4847
11LDIN-I****	2K~20K	3535
11LDIN-K****	5K~20K	3485
11LDIN-P****	100K	4144

Besides The Above Standard Characteristic Product, We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well.

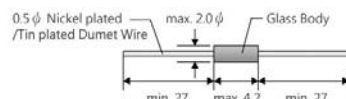
GLASS ENCAPSULATED SERIES

The glass encapsulated thermistors are manufactured using super stable NTC chips which are hermetically sealed in a glass (DO-35 diode or bead type) package. The result is a device which exhibits excellent long term reliability and stability even when subjected to severe environmental or thermal condition.

Characteristics

- Resistance Tolerance $\pm 2 \sim \pm 10 \%$
- B Constant Tolerance $\pm 2 \sim \pm 3 \%$
- Thermal Dissipation Constant $\approx 2.3 \text{ mW}/^\circ\text{C}$
- Thermal Time Constant $\approx 5 \text{ sec.}$
- Operation Temperature Range $-50 \sim +250 \text{ }^\circ\text{C}$

Outline Drawing and Dimension



Part Number System

11-G-0200-103-K-H

1. Product Name: NTC Thermistor
2. Product Identifier: Glass Encapsulated
3. Dimensions
4. Resistance at 25°C: 103 = $10 \times 10^3 \Omega$
5. Resistance Tolerance: G: $\pm 2\%$, H: $\pm 3\%$, J: $\pm 5\%$, K: $\pm 10\%$
6. Beta Code

Features

- Suitable for high temperature applications
- Hermetically sealed glass package
- Low cost
- High stability

Part No.	Resistance at 25°C (Ω)	B 25/50 Constant ($^\circ\text{K}$)
11G0200202°C	2,000	3380
11G0200502*B	5,000	3270
11G0200502°C	5,000	3380
11G0200502*D	5,000	3450
11G0200103*B	10,000	3270
11G0200103°C	10,000	3380
11G0200103*D	10,000	3435
11G0200103*D	10,000	3450
11G0200103*E	10,000	3550
11G0200103*H	10,000	3950
11G0200123°F	12,000	3730
11G0200153*D	15,000	3480
11G0200153*E	15,000	3550
11G0200203*E	20,000	3700
11G0200473*H	47,000	3950
11G0200473*J	47,000	3990
11G0200503*G	50,000	3900
11G0200503*H	50,000	3950
11G0200503*J	50,000	3990
11G0200104*H	100,000	3950
11G0200104*J	100,000	3990
11G0200104*J	100,000	4050
11G0200204*G	200,000	3900
11G0200204*K	200,000	4100
11G0200204*L	200,000	4200
11G0200474*N	470,000	4400
11G0200504*L	500,000	4310

Besides The Above Standard Characteristic Product, We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well.

GLASS ENCAPSULATED SERIES

NTC Diode for Special Temperature Range (With Special Part Number)

Characteristics

- Resistance Tolerance $\pm 2 \sim \pm 10 \%$
- B Constant Tolerance $\pm 2 \sim \pm 3 \%$
- Thermal Dissipation Constant $\approx 2.3 \text{ mW}/^\circ\text{C}$
- Operation Temperature Range $-40 \sim +125 \text{ }^\circ\text{C}$
- Thermal Time Constant $\approx 5 \text{ sec.}$
- Operation Temperature Range $-50 \sim +300 \text{ }^\circ\text{C}$

Outline Drawing and Dimension

11GP SERIES



Unit: mm

	D	T	L	d
S1	2.3 $\pm$ 0.2	4.1 $\pm$ 0.5	67 $\pm$ 5	0.3
S3	1.3 $\pm$ 0.2	2.2 $\pm$ 0.4	71 $\pm$ 5	0.2
S5	0.8 $\pm$ 0.1	0.1 $\pm$ 0.4	65 $\pm$ 3	0.15
S7	0.55 $\pm$ 0.1	1.1 $\pm$ 0.3	50 $\pm$ 3	0.1

Part No.	Resistance (Ω)	B Constant ($^\circ\text{K}$)
11GPB-36-S1	R0: 6 K	3390 (0~100°C)
11GPB-41E-S1	R0: 15 K	3450 (0~100°C)
11GPB-43-S1	R0: 30 K	3450 (0~100°C)
11GPT-51F-S1	R100: 3.3 K	3970 (0~100°C)
11GPT-25E2-S1	R200: 5.5 K	4300 (100~200°C)
11GPT-312-S1	R200: 1 K	4537 (100~200°C)
11GPM-342-S1	R200: 4 K	5133 (200~300°C)
11GPB3-36-S3	R0: 6 K	3390 (0~100°C)
11GPB3-41E-S3	R0: 15 K	3450 (0~100°C)
11GPB3-43-S3	R0: 30 K	3450 (0~100°C)
11GPT3-51F-S3	R100: 3.3 K	3970 (0~100°C)
11GPT3-25E2-S3	R200: 5.5 K	4300 (100~200°C)
11GPT3-312-S3	R200: 1 K	4537 (100~200°C)
11GPM3-342-S3	R200: 4 K	5133 (200~300°C)
11GPBN-36-N	R0: 6 K	3390 (0~100°C)
11GPBN-41E-N	R0: 15 K	3450 (0~100°C)
11GPBN-43-N	R0: 30 K	3450 (0~100°C)
11GPTN-51F-N	R100: 3.3 K	3970 (0~100°C)
11GPTN-25E2-N	R200: 5.5 K	4300 (100~200°C)
11GPTN-312-N	R200: 1 K	4537 (100~200°C)
11GPMN-342-N	R200: 4 K	5133 (200~300°C)
11GP*00502°C	R25: 5K	3270 B25/50
11GP*00502°C	R25: 5K	3470 B25/50
11GP*00502*H	R25: 5K	3950 B25/50
11GP*00103*H	R25: 10K	3470 B25/50
11GP*00103*H	R25: 10K	3380 B25/50
11GP*00103*H	R25: 10K	3950 B25/50
11GP*00203*H	R25: 20K	3950 B25/50
11GP*00503*H	R25: 50K	3950 B25/50
11GP*00503*H	R25: 50K	3900 B25/50
11GP*00104*H	R25: 100K	3950 B25/50
11GP*00104*K	R25: 100K	4100 B25/50

Besides The Above Standard Characteristic Product, We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well.

NTC R/T TABLE

Temp(°C)	RT1	RT2	RT3	RT4	RT5	RT6	RT7
-40	34.702	37.512	19.608	17.529	40.268	38.643	34.516
-35	24.908	26.864	14.799	13.494	28.702	27.058	24.893
-30	18.086	19.442	11.296	10.470	20.670	19.262	18.143
-25	13.278	14.214	8.713	8.185	15.034	13.921	13.357
-20	9.850	10.493	6.786	6.445	11.041	10.201	9.929
-15	7.381	7.819	5.332	5.111	8.183	7.571	7.449
-10	5.584	5.880	4.224	4.081	6.119	5.686	5.638
-5	4.263	4.460	3.372	3.279	4.615	4.317	4.304
0	3.283	3.411	2.711	2.652	3.510	3.311	3.312
5	2.549	2.629	2.195	2.158	2.691	2.563	2.569
10	1.995	2.043	1.788	1.766	2.078	2.002	2.007
15	1.574	1.599	1.465	1.453	1.617	1.577	1.580
20	1.250	1.260	1.207	1.202	1.267	1.251	1.252
25	1.000	1.000	1.000	1.000	1.000	1.000	1.000
30	0.8053	0.7988	0.8325	0.8359	0.7942	0.8048	0.8015
35	0.6526	0.6421	0.6964	0.7021	0.6348	0.6519	0.6473
40	0.5321	0.5193	0.5852	0.5925	0.5104	0.5312	0.5258
45	0.4364	0.4224	0.4938	0.5023	0.4129	0.4354	0.4296
50	0.3599	0.3455	0.4184	0.4276	0.3358	0.3588	0.3528
55	0.2985	0.2841	0.3560	0.3655	0.2747	0.2972	0.2913
60	0.2488	0.2349	0.3039	0.3138	0.2258	0.2474	0.2417
65	0.2084	0.1952	0.2605	0.2704	0.1866	0.2069	0.2015
70	0.1754	0.1629	0.2240	0.2338	0.1549	0.1739	0.1688
75	0.1483	0.1366	0.1932	0.2030	0.1292	0.1467	0.1420
80	0.1259	0.1151	0.1672	0.1768	0.1083	0.1243	0.1200
85	0.1074	0.0974	0.1452	0.1545	0.0912	0.1057	0.1018
90	0.0920	0.0828	0.1264	0.1355	0.0770	0.0902	0.0867
95	0.0791	0.0706	0.1104	0.1191	0.0654	0.0773	0.0742
100	0.0682	0.0604	0.0967	0.1051	0.0557	0.0665	0.0637
105	0.0591	0.0520	0.0849	0.0930	0.0476	0.0573	0.0548
110	0.0514	0.0448	0.0747	0.0825	0.0409	0.0496	0.0474
115	0.0448	0.0388	0.0659	0.0734	0.0352	0.0431	0.0411
120	0.0392	0.0337	0.0583	0.0655	0.0305	0.0375	0.0358
B(25/85)	3970	4145	3435	3324	4262	4000	4066
B(25/50)	3938	4096	3358	3274	4205	3950	4015
B(0/50)	3903	4042	3299	3222	4143	3923	3953

Please contact us for available of special spec.

RELIABILITY

No.	Item	Condition	Equipment	Sampling Size	Performance
1	High Temperature Storage	125°C x 1000Hrs.	Drying Oven	10	$\Delta R/R25 \leq \pm 3\%$ $\Delta B/B \leq \pm 3\%$
2	Low Temperature Storage	-40°C x 1000Hrs.	Drying Oven	10	
3	Humidity	40°C, 95%R.H. x 1000Hrs.	Temperature & Humidity Tester	10	$I_R \geq 100M\Omega$ at 500VDC Hi-Pot: $I_L < 2\text{ mA}$ @ Related specific voltage
4	Thermal Shock	125 ordinary temp. 30 min -40 30 min This cycle is repeated 100 times.	Thermal Shock Tester	10	
5	Boiling Test	Immerse the specimens in boiling water for 72 hrs.	Voltage / Insulation Tester	10	$I_R \geq 100M\Omega$ at 500VDC Hi-Pot: $I_L < 2\text{ mA}$ @ Related specific voltage
6	Water Pressure Test	Immerse the specimens in a water pressure chamber @ 6 kg/cm ² H ₂ O Pressure for 1000 Hrs	Voltage / Insulation Tester	10	
7	Specified by customer	Specified by customer	Specified by customer	10	Specified by customer

After completion of the test, allow sample to stand under room temperature for 24 hrs.

PT SENSOR (RTD SENSOR)

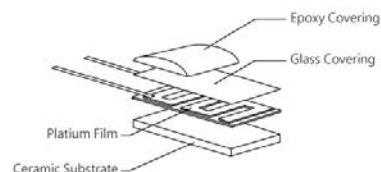
Resistance Temperature Detectors (RTD), as the name implies, are sensors used to measure temperature by correlating the resistance of the RTD element with temperature. Most RTD elements consist of a length of fine coiled wire wrapped around a ceramic or glass core. The element is usually quite fragile, so it is often placed inside a sheathed probe to protect it. The RTD element is made from a pure material whose resistance at various temperatures has been documented. The material has a predictable change in resistance as the temperature changes; it is this predictable change that is used to determine temperature.

The RTD is one of the most accurate temperature sensors. Not only does it provide good accuracy, it also provides excellent stability and repeatability.

RTDs are also relatively immune to electrical noise and therefore well suited for temperature measurement in industrial environments, especially around motors, generators and other high voltage equipment.

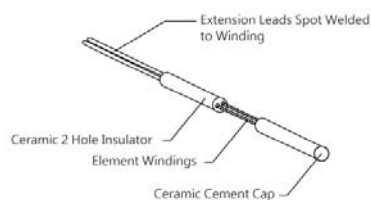
RTD's are manufactured in 3 basic types of construction. Each of these different types has advantages and disadvantages.

Platinum Thin Film Element



The thin film style of RTD is probably the most popular design because of their rugged design and low cost. The thin film element is manufactured by coating a small ceramic chip with a very thin (.0001") film of platinum and then laser cutting or chemical etching a resistance path in the platinum film. The element is then coated with a thin layer of glass to protect it from harmful chemicals and gases. Larger extension lead wires are spot welded to the chip and this junction is then covered with a drop of epoxy to help hold the wires to the element.

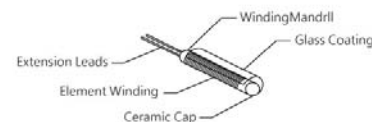
Inner Coil Wire Wound Element



This type of element is normally manufactured using platinum wire. Very small platinum wire (.0002") is coiled and then slid into a small 2 hole ceramic insulator. Larger extension leads are then spot welded to the ends of the platinum wire and cemented in place. Some manufacturers backfill the bores of the insulator with ceramic powder once the coils have been inserted.

This keeps the coils from moving and shorting against each other. The end opposite the extension leads is capped with ceramic cement also.

Outer Wire Wound Element



The outer wound RTD element is made by winding the sensing element wire around a center mandrill, which is usually made of ceramic. This winding is then coated with glass or some other insulating material to protect and secure the windings. The winding wires are then spot welded to extension leads and secured to the body with ceramic cement or epoxy.

Characteristic

The characteristic temperature curve determines the dependence of the electrical resistivity on the temperature. The following definition of the temperature curve according to the IEC 60751/ DIN EN 60751 standard applies: for the temperature range of -55°C up to 0°C :

$$R_T = R_0 \times [1 + A T + B T^2 + C (T - 100) T^3]$$

$$R_T = R_0 \times (1 + A T + B T^2)$$

R_T : Resistance as a function of temperature

R_0 : Resistance at 0°C

T : Temperature in °C

$A = 3.9083 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$

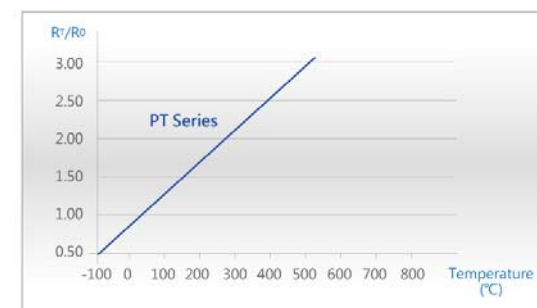
$B = -5.775 \times 10^{-7} \text{ } ^\circ\text{C}^{-2}$

$C = -4.183 \times 10^{-12} \text{ } ^\circ\text{C}^{-4}$

Tolerance Classes:

The temperature sensors are divided into classes according to their limit deviations:

Class A:	$\Delta T \pm (0.15 + 0.002 \times T)$
Class B:	$\Delta T \pm (0.30 + 0.005 \times T)$



PT SENSOR (RTD SENSOR)

Description :

Resistance Temperature Detectors (RTDs) are temperature sensors that contain a resistor that changes resistance value as its temperature changes. They have been used for many years to measure temperature in laboratory and industrial processes, and have developed a reputation for accuracy, repeatability, and stability.

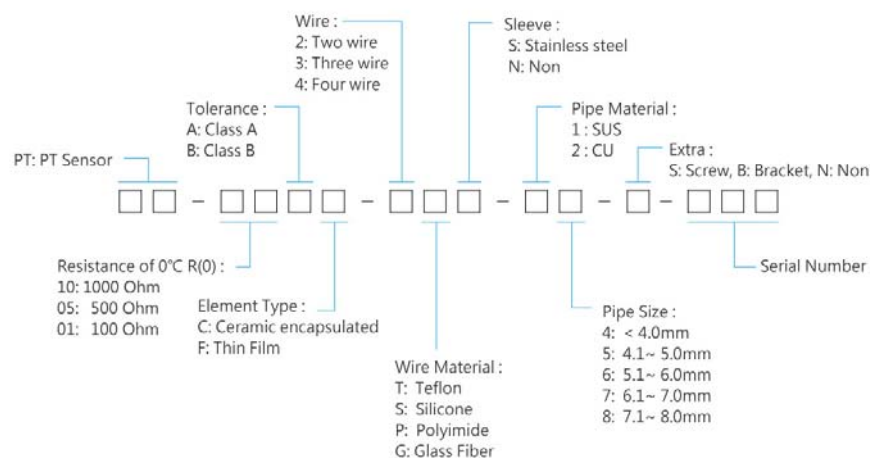
Feature :

- A wide temperature range (approximately -200 to 850°C)
- Good accuracy (better than thermocouples)
- Good interchangeability
- Long-term stability

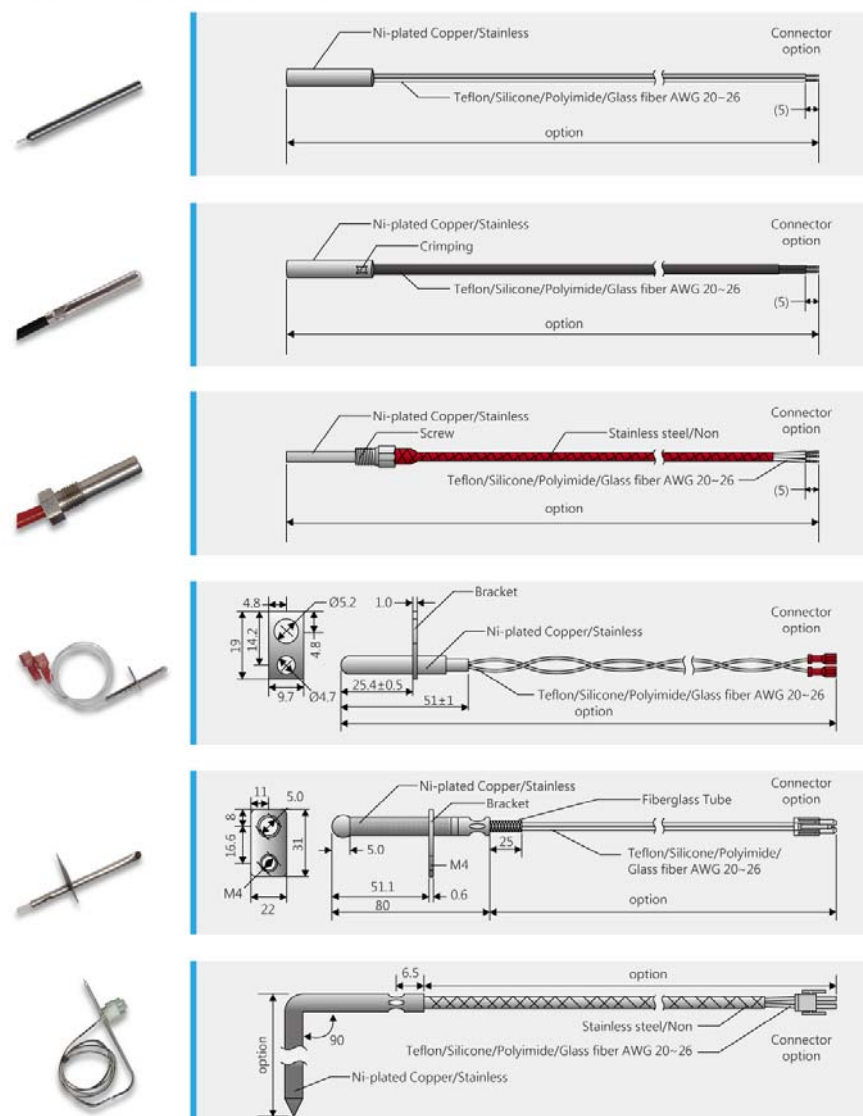
With a temperature range up to 850°C, RTDs can be used in all but the highest-temperature industrial processes. When made using metals such as platinum, they are very stable and are not affected by corrosion or oxidation.

Other materials such as nickel, copper, and nickel-iron alloy have also been used for RTDs. However, these materials are not commonly used since they have lower temperature capabilities and are not as stable or repeatable as platinum.

RTD Sensors Coding System



APPLICATION



Besides The Above Standard Characteristic Product , We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well .

PT R/T TABLE

Temp(°C)	Resistance at 0°C			Tolerance	
	(Ω)			(°C)	
	100	500	1000	Class A	Class B
-55	78.32	391.60	783.20	± 0.30	± 0.68
-50	80.31	401.55	803.10	± 0.25	± 0.55
-25	90.19	450.95	901.90	± 0.20	± 0.43
0	100.00	500.00	1000.00	± 0.15	± 0.30
25	109.74	548.70	1097.40	± 0.20	± 0.43
50	119.40	597.00	1194.00	± 0.25	± 0.55
75	128.99	644.95	1289.90	± 0.30	± 0.68
100	138.51	692.55	1385.10	± 0.35	± 0.80
125	147.95	739.75	1479.50	± 0.40	± 0.93
150	157.33	786.65	1573.30	± 0.45	± 1.05
175	166.63	833.15	1666.30	± 0.50	± 1.18
200	175.86	879.30	1758.60	± 0.55	± 1.30
225	185.01	925.05	1850.10	± 0.60	± 1.43
250	194.10	970.50	1941.00	± 0.65	± 1.55
275	203.11	1015.55	2031.10	± 0.70	± 1.68
300	212.05	1060.25	2120.50	± 0.75	± 1.80
325	220.92	1104.60	2209.20	± 0.80	± 1.93
350	229.72	1148.60	2297.20	± 0.85	± 2.05
375	238.44	1192.20	2384.40	± 0.90	± 2.18
400	247.09	1235.45	2470.90	± 0.95	± 2.30
425	255.67	1278.35	2556.70	± 1.00	± 2.43
450	264.18	1320.90	2641.80	± 1.05	± 2.55
475	272.61	1363.05	2726.10	± 1.10	± 2.68
500	280.98	1404.90	2809.80	± 1.15	± 2.80
525	289.27	1446.35	2892.70	± 1.20	± 2.93
550	297.49	1487.45	2974.90	± 1.25	± 3.05

SILICON TEMPERATURE SENSORS

The silicon temperature sensors have a positive temperature coefficient of resistance and are suitable for use in measurement and control systems.

Silicon sensors have a positive temperature coefficient and in opposite to the PTC's an approximate linear temperature characteristic. The resistance behaviour is comparable with this of a measurement resistor with a very big temperature coefficient. The main area of application of the silicon sensors is the temperature measurement and the monitoring of limit values in the field of

*industrial measuring technique / motor protection

*automobile technique

*medicine electronic

KTY sensors display a virtually linear temperature coefficient over their entire temperature range, ensuring highly accurate measurements. A linearization resistor can be easily added where further linearization is required. As the temperature coefficient is positive, the sensors exhibit fail-safe operation when a system overheats. Furthermore silicon is inherently stable, so KTY sensors are extremely reliable and have very long operational lifetimes.

$$R_T = R_{25} \times (1 + \alpha \times \Delta T_A + \beta \times \Delta T_A^2) = f(T_A)$$

$$\text{with: } \alpha = 7.88 \times 10^{-3} \text{K}^{-1}; \beta = 1.937 \times 10^{-5} \text{K}^{-2}$$

he temperature factor kT can be derived from this :

$$k_T = \frac{R_T}{R_{25}} = (1 + \alpha \times \Delta T_A + \beta \times \Delta T_A^2) = f(T_A)$$

The temperature at the sensor can be calculated from the change in the sensors resistance from the following equation, which approximates the characteristic curve

$$T = \left(25 + \frac{\sqrt{\alpha^2 - 4 \times \beta + 4 \times \beta \times k_T - \alpha}}{2 \times \beta} \right) ^\circ\text{C}$$

KTY SENSOR



Description :

Silicon Temperature Sensors are designed for the measurement, control and regulation of air, gases and liquids within the temperature range of -50°C to +150°C.

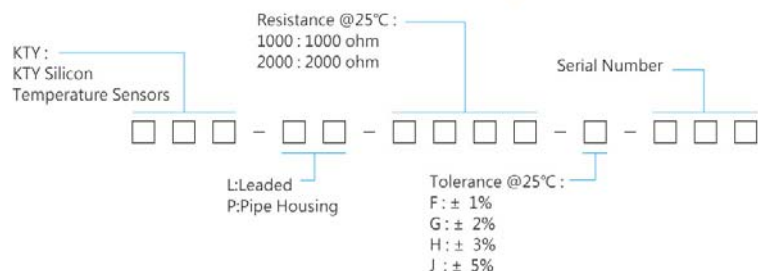
The temperature sensing element is an n-conducting (N type) silicon crystal in planar technology.

The resistance of the sensor can be calculated for various temperatures from the following second order equation, valid over the temperature range -30°C to +130°C

Feature :

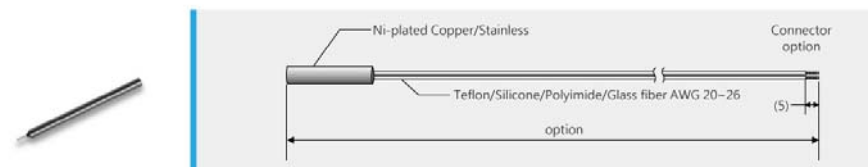
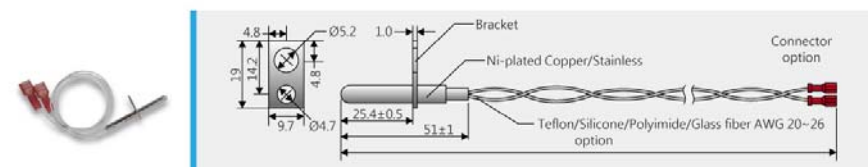
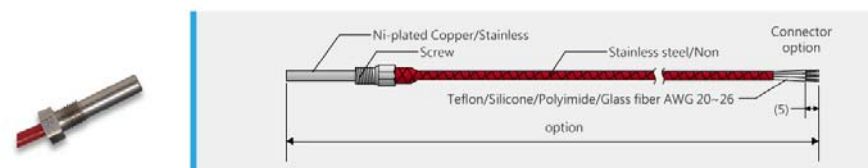
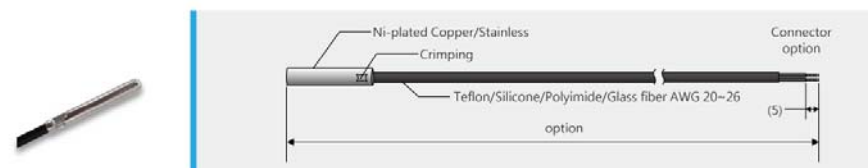
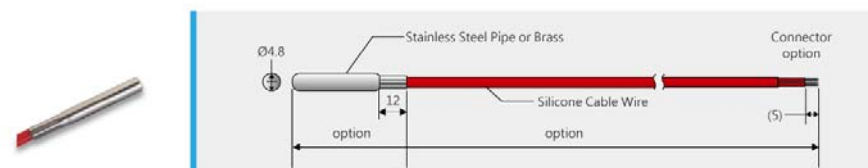
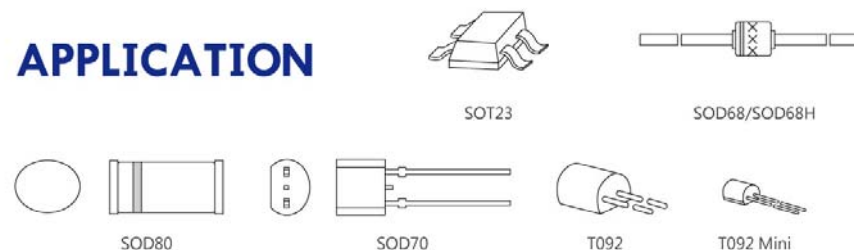
- Temperature dependent resistor with positive temperature coefficient
- Temperature range : -50°C to +150°C
- Available in SMD or leaded or customized packages
- Linear output
- Excellent long term stability
- Polarity independent due to symmetrical construction
- Fast response time
- Resistance tolerances (R25) of +/-3% or +/-1%

KTY Silicon Temperature Sensors Coding System



Family	Package	R (Ohms)	Available Tolerances	Operator Temp. Range
KTY-1	SOD70	1000/2000	±5%~±1%	-55~150°C
KTY-2	SOT23	1000/2000	±5%~±1%	-55~150°C
KTY-3	SOD68	1000	±5%~±1%	-55~175°C
KTY-4	SOD68H	1000(R ₁₀₀)	±5%~±3%	-40~300°C
KTY-5	SOD80	1000	±5%~±1%	-40~125°C
KTY-6	TO92	1000/2000	±5%~±1%	-50~150°C
KTY-7	TO92 Mini	1000/2000	±5%~±1%	-50~150°C

APPLICATION



Besides The Above Standard Characteristic Product, We Have Some Special Types And Can Provide The Flexible Design According To Your Needs As Well.

KTY R/T TABLE

Temp(°C)	Resistance at 25°C		Temperature Deviation (°C)
	(Ω)		
	2000	1000	
-50	1012	506	± 3.43
-45	1064	532	±3.29
-40	1117	558	±3.15
-35	1173	586	±3.00
-30	1230	615	±2.86
-25	1281	640	±2.71
-20	1351	676	±2.57
-15	1415	708	±2.43
-10	1481	740	±2.28
-5	1549	774	±2.14
0	1619	809	±1.99
5	1691	845	±1.85
10	1765	882	±1.71
15	1841	921	±1.56
20	1920	960	±1.42
25	2000	1000	±1.27
30	2078	1039	±1.41
35	2157	1079	±1.56
40	2239	1119	±1.71
45	2322	1161	±1.85
50	2407	1203	±1.99
55	2494	1247	±2.14
60	2583	1291	±2.28
65	2673	1337	±2.43
70	2766	1383	±2.57
75	2860	1430	±2.71
80	2956	1478	±2.86
85	3054	1527	±3.00
90	3154	1577	±3.15
95	3256	1628	±3.29
100	3360	1680	±3.43
105	3465	1733	±3.58
110	3572	1786	±3.72
115	3681	1841	±3.87
120	3792	1896	±4.01
125	3905	1953	±4.15
130	4020	2010	±4.30
135	4084	2042	±4.44
140	4186	2093	±4.59
145	4289	2145	±4.73
150	4392	2196	±4.87

OTHER PRODUCT

Inrush Current Limiting Thermistor Series

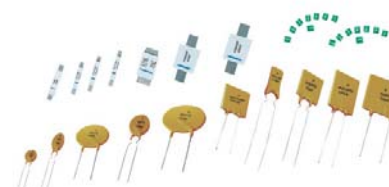


Product No. : 11P

Description :

- High inrush current restriction effect
- High thermal and electrical stability
- Operating temperature range from -40°C to +180°C
- Resistance tolerances : ±10%, ±15% and ±20% on R25 values
- Body size : 5φ, 8φ, 10φ, 13φ, 15φ, 20φ, 25φ, 30φ

PPTC Series



Product No. : 12

Description :

- Resettable fuses are made of patented novel polymeric PTC material
- Suitable for wide variety of electronic equipment
- Available with a wide operating voltage and excellent stability

Zinc Oxide Varistor Series



Product No. : 13R

Description :

- Varistor with fast response to the rapidly rising surge voltage
- Element dia. : 5φ, 7φ, 10φ, 14φ, 20φ, 25φ, 32φ, 40φ, 53φ
- Varistor voltage: 18V-1800V
- Max. peak current : 100A ~ 70KA

OTHER PRODUCT

Gas Discharge Tube Series



Product No. : 13GACPA

Description :

- Temperature Rating: Storage : -40°C to + 115°C
Operate : -30°C to + 85°C
- Series: 2 elements / 3 elements / SMD / Chip SMD
- Reliable, approved by UL

Thermal Cutoffs & Joiner Series



Product No. : 14

Description :

- Extremely sensitive to ambient temperature
- Precise and stable functioning characteristic
- Compact, epoxy-sealed construction
- Reliable, approved by various international standards (UL/CSA/VDE/TUE/TUV/CCC/PSE/MITI)

Thermostats Series



Product No. : 15

Description :

- Snap-action , automatic reset bimetal
- Operating temperature : 65~185°C
- Temperature tolerance : $\pm 5^\circ\text{C}$
- Electrical rating : 22A/115VAC , 8A/277VAC , 20A/16VDC



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