

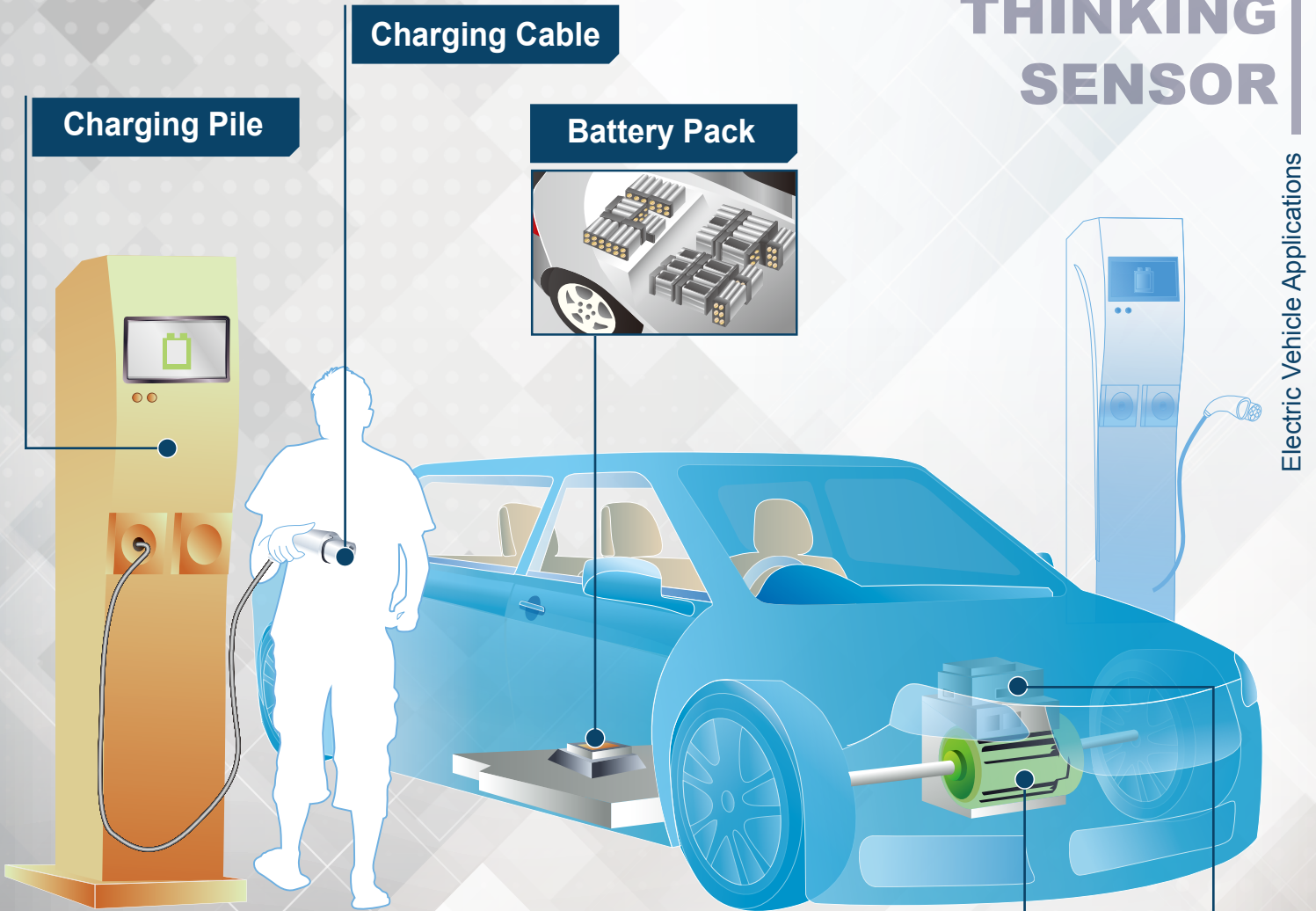
Temperature Sensor

Electric Vehicle Applications



THINKING SENSOR

Electric Vehicle Applications



Feature

- ◆ Tolerance of R value and B value is around $\pm 1\%$
- ◆ Higher durability and stability of product
- ◆ Customized temperature sensor is available in accordance with requirements of automobile's shocks and ambient temperature conditions.
- ◆ Specifications of $\Phi 2\text{mm} \sim \Phi 5\text{mm}$ are customizable in accordance with requirements of actual applications.
- ◆ Various electrical characteristics are available for your choice.

Function

- ◆ Temperature detection of electric motor
- ◆ Over-temperature protection of on-board charger
- ◆ Over-temperature protection of charging cable
- ◆ Over-temperature protection of charging pile
- ◆ Temperature detection of battery pack

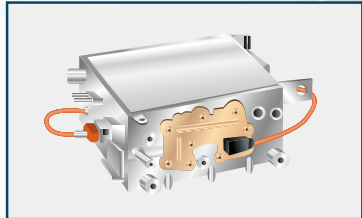
Application

Electric motor, on-board charger (OBC), battery management system (BMS), charging pile, and charging cable.

Electric Motor



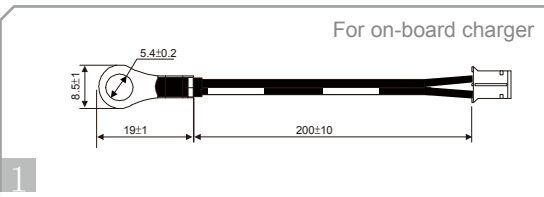
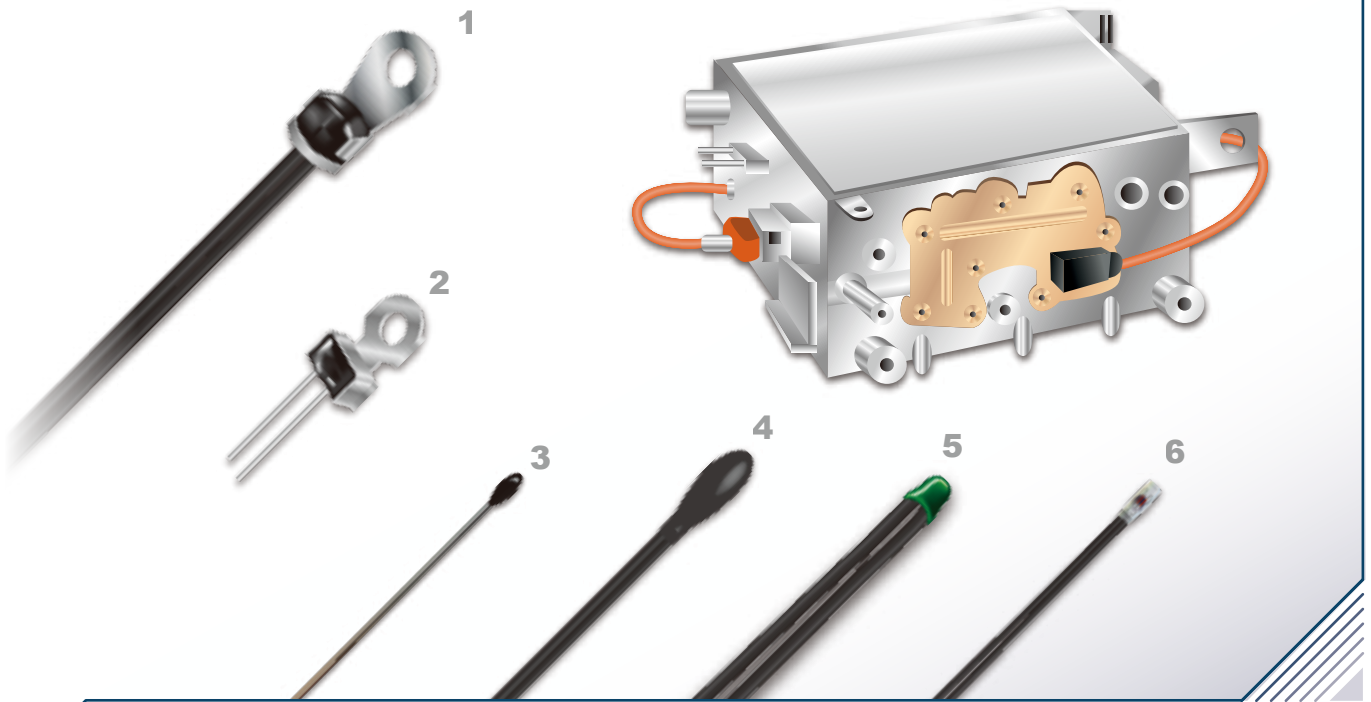
On-Board Charger



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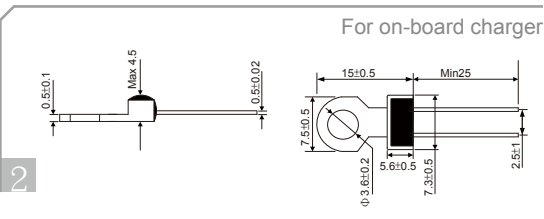
**On-Board
Charger
Application**

Application: For sensing top, screw-on type is for easy installation and can be installed on metallic surface for temperature detection. Epoxy coating type directly contacts detected object and responds faster. Tubing type offers better resistance of water, heat, and voltage.

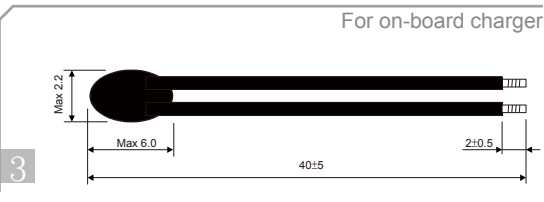


Component | Sensing top (terminal+NTC chip+epoxy)+tube +lead wire+terminal+housing

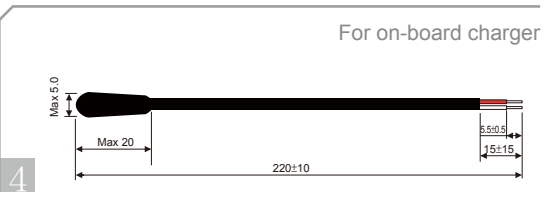
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+105°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/50=3950K±1%
Thermal Time Constant | Around 30 seconds (heating board)
Hi-Pot Test | AC 1500V 10mA (Max)



Component | Sensing top (terminal+NTC chip+epoxy)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+125°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/85=3435K±1%
Thermal Time Constant | Around 15 seconds (heating board)
Hi-Pot Test | AC 1500V 10mA (Max)

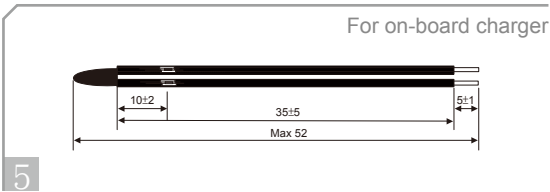


Component | Sensing top (NTC chip+epoxy)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -30~+105°C
Insulation Test | DC 100V 50MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/85=3435K±1%
Thermal Time Constant | Around 5 seconds (in water)

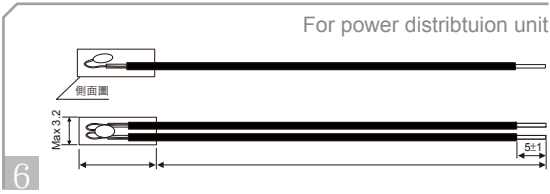


Component | Sensing top (NTC chip+epoxy)+cable wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+105°C
Insulation Test | DC 100V 50MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/85=3435K±1%
Thermal Time Constant | Around 10 seconds (in water)
Hi-Pot Test | AC 1000V 10mA (Max)

- 1. Temperature sensor is customizable in accordance with customer's needs, and THINKING provides consulting services for sensor design.
- 2. All specifications are subject to change.
- 3. Please contact your sales representative if you have any questions.



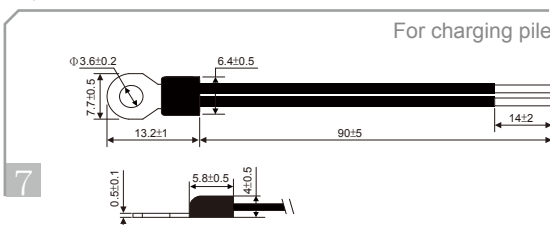
Component | Sensing top (NTC chip)+terminal+tube+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -20~+80°C
R Value | R25°C=10KΩ±5% **B Value** | B25/85= 3975K±1%
Thermal Time Constant | Around 11 seconds (in air)



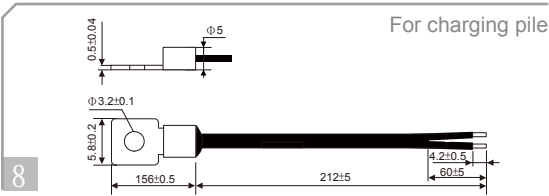
Component | Sensing top (NTC chip+tube)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+150°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/85=3435K±1%
Thermal Time Constant | Around 6 seconds (in water)
Hi-Pot Test | AC 3500V 10mA (Max)

Charging Pile Application

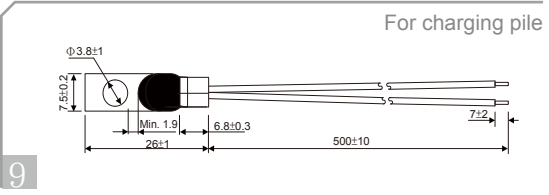
Feature: Maximum operation voltage is increased, and the increase ranges from 125°C to 200°C. For sensing top, screw-on type is for easy installation. Sensing top made of stainless steel is water and corrosion resistant, and it offers stable operation and faster response of the sensor. Φ3mm of the sensor is customizable. Furthermore, tubing type offers better resistance of water and heat. Pt sensor is more stable and accurate.



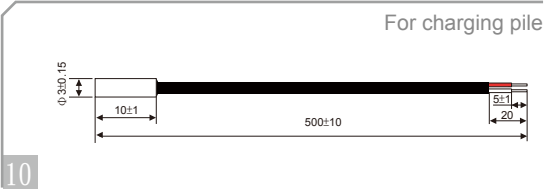
Component | Sensing top (terminal+plastic cap+NTC chip)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+125°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±5% **B Value** | B25/85=3975K±1%
Thermal Time Constant | Around 20 seconds (heating board)
Hi-Pot Test | AC 1500V 10mA (Max)



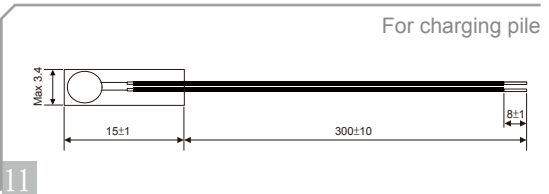
Component | Sensing top (terminal+NTC chip+epoxy)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+125°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/85=3435K±1%
Thermal Time Constant | Around 10 seconds (heating board)
Hi-Pot Test | AC 1500V 10mA (Max)



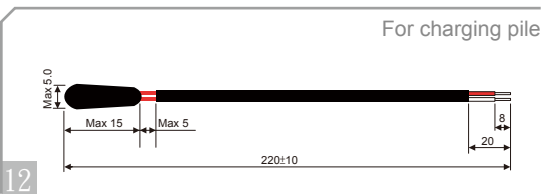
Component | Sensing top (terminal+NTC chip+epoxy)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -20~+125°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±5% **B Value** | B25/50=4050K±5%
Thermal Time Constant | Around 25 seconds (heating board)
Hi-Pot Test | AC 2000V 10mA (Max)



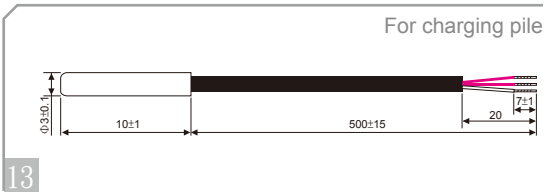
Component | Sensing top (NTC chip+stainless steel cap)+cable wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+125°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/85=3435K±1%
Thermal Time Constant | Around 10 seconds (in water)
Hi-Pot Test | AC 3500V 10mA (Max)



Component | Sensing top (NTC chip+tube)+lead wire
Moisture Resistance | 50°C 95% RH X 1000 hours
Operation Temperature | -40~+200°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/85=3435 K±1%
Thermal Time Constant | Around 6 seconds (in water)
Hi-Pot Test | AC 3000V 10mA (Max)



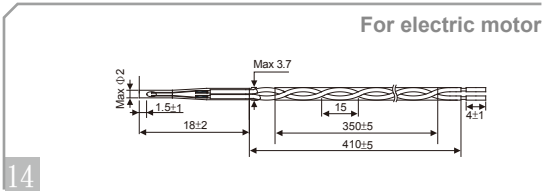
Component | Sensing top (Pt chip+epoxy)+tube+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+150°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R0°C=1000Ω (Class 2B)
Temperature Coefficient of Resistance | 3850 ppm
Hi-Pot Test | AC 3500V 10mA (Max)



Component | Sensing top (Pt chip+stainless steel cap)+cable wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+150°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R0°C=100Ω (Class B)
Temperature Coefficient of Resistance | 3850 ppm
Hi-Pot Test | AC 2500V 10mA (Max)

Electric Motor Application

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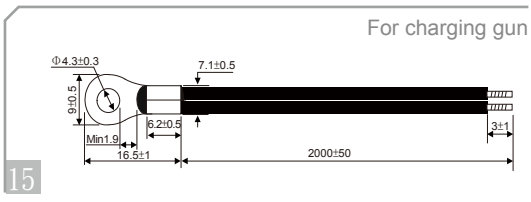


Component | Sensing top (NTC chip+tube)+lead wire+tube
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+200°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R185°C=0.1345KΩ±1% **B Value** | B25/100=3767K±1%
Thermal Time Constant | Less than 4 seconds (in water)
Hi-Pot Test | AC 2000V 1sec 5mA(Max)

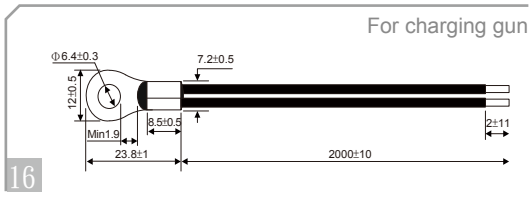
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Charging Cable Application

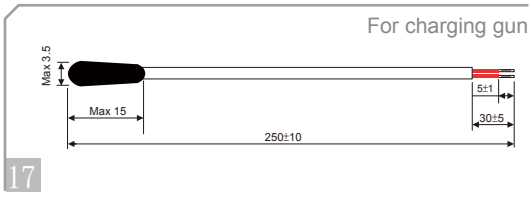
Application: For sensing top, screw-on type is for easy installation. Epoxy coating type directly detects temperature and responds faster. Tubing type is with better water and heat resistances. Pt sensor offers more accurate temperature detection and better product stability.



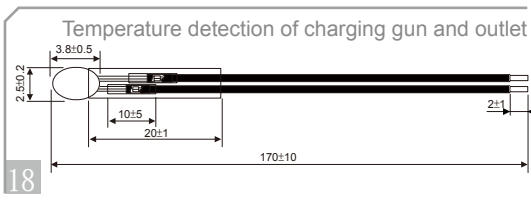
Component | Sensing top (terminal+NTC chip+epoxy)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+125°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/85=3435K±1%
Thermal Time Constant | Around 30 seconds (heating board)
Hi-Pot Test | AC 1500V 10mA (Max)



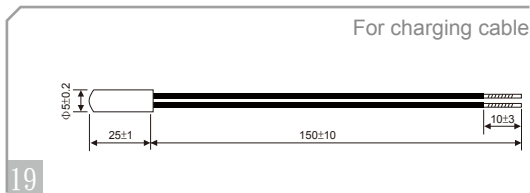
Component | Sensing top (terminal+NTC chip+epoxy)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+150°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/50°C=3950K±1%
Thermal Time Constant | Around 30 seconds (heating board)
Hi-Pot Test | AC 1500V 10mA (Max)



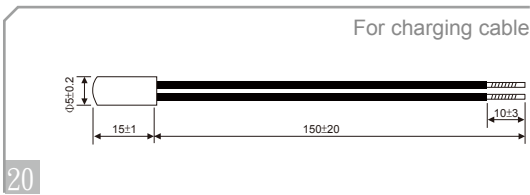
Component | Sensing top (NTC chip+epoxy)+cable wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+105°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10KΩ±1% **B Value** | B25/85=3435K±1%
Thermal Time Constant | Around 10 seconds (in water)
Hi-Pot Test | AC 3500V 10mA (Max)



Component | Sensing top (NTC chip)+tube+terminal+tube+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+180°C
R Value | R25°C=10KΩ ±1% **B Value** | B25/85=3435K±1%
Thermal Time Constant | Around 10 seconds (in air)



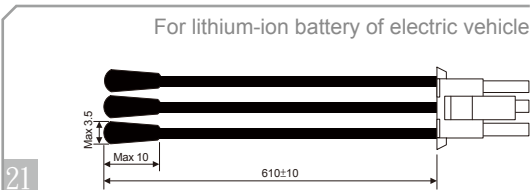
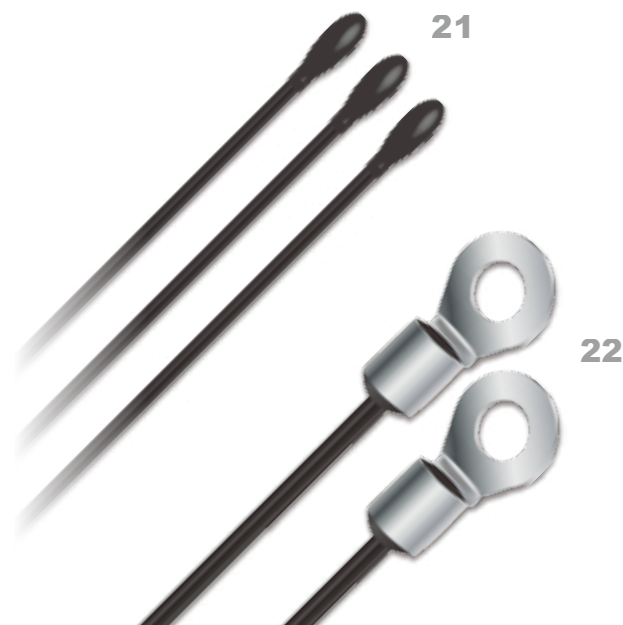
Component | Sensing top (Pt chip+stainless steel cap)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+150°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R0°C=1000Ω (Class 2B)
Temperature Coefficient of Resistance | 3750 ppm
Hi-Pot Test | AC 1500V 10mA (Max)



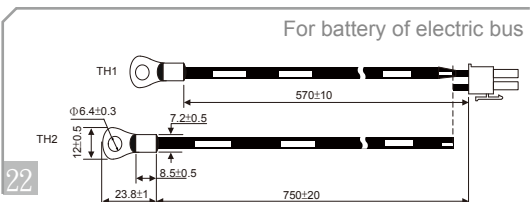
Component | Sensing top (Pt chip+stainless steel cap)+lead wire
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+150°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R0°C=1000±4Ω (Class B)
Temperature Coefficient of Resistance | 3850 ppm
Hi-Pot Test | AC 3500V 10mA (Max)

Battery Pack Application

Feature: Multiple-sensor structure offers better PCB layout, and structure or electrical characteristics is customizable in accordance with requirement of temperature detection.



Component | Sensing top (NTC chip+epoxy)+lead wire+terminal+housing
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -40~+105°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=10 KΩ±1% **B Value** | B25/85°C=3435 K±1%
Thermal Time Constant | Around 10 seconds (in water)
Hi-Pot Test | AC 1000V 10mA (Max)



Component | Sensing top (terminal+NTC chip+epoxy)+lead wire+terminal+housing
Moisture Resistance | 40°C 95% RH X 1000 hours
Operation Temperature | -20~+80°C
Insulation Test | DC 500V 100MΩ(Min)
R Value | R25°C=2KΩ±5% **B Value** | B25/50°C=3500K±2%
Thermal Time Constant | Around 30 seconds (heating board)
Hi-Pot Test | AC 1500V 10mA (Max)

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