

Datasheet

TSD14

Thermopile Temperature Sensor

TO-46 Package

Features

- Non-contact surface temperature measuring
- TO housing with an F5.5 infrared filter
- Using NTC thermistor for ambient temperature compensation
- Suitable for human body temperature detecting and Industrial temperature measurement
- Fast response time
- High sensitivity

Applications

- Non-contact infrared thermometer
- Microwave oven
- Automatic induction equipment
- Heating, Ventilation and Air Conditioning(HVAC)
- Appliance

Descriptions

The TSD14 is a thermopile temperature sensor based on MEMS (Micro-ElectroMechanical Systems) technology. This thermopile detector consists of a thermopile MEMS chip, an F5.5 infrared band pass filter, a NTC thermistor for temperature compensation and a small size TO-46 package.

Table 1 Thermopile Parameter

| Parameter | Specification | | | Unit | Condition |
|--------------------|---------------|------|------|---------------------------|--------------------------------|
| | Min. | Typ. | Max. | | |
| Chip Size | 1.85X1.85 | | | mm ² | |
| Active Area | 0.7X0.7 | | | mm ² | |
| Responsivity | 60 | | | V/W | Black body=500K,1HZ @temp=25°C |
| Detectivity | 1.21E08 | | | cm · Hz ^{1/2} /W | Black body=500K,1HZ @temp=25°C |
| NEP | 0.59 | | | nW · Hz ^{1/2} | Black body=500K,1HZ @temp=25°C |
| Voltage Response | 29 | | | V · mm ² /W | Black body=500K,1HZ @temp=25°C |
| Thermopile Res | 65 | 75 | 85 | kΩ | @temp=25°C |
| TC of Thermopile | -0.11 | | | %/°C | |
| Noise Voltage | 33 | 35 | 37 | nV/Hz ^{1/2} | @temp=25°C |
| Time Constant | 16 | | | ms | |
| Field of View(FOV) | 102 | | | ° | Degree at 50% signal level |

TSD14 Thermopile Temperature Sensor

| | | | |
|--|---------|----|-------------------------------------|
| Operating Temp | -40~125 | °C | |
| Storage Temp | -40~125 | °C | |
| Thermistor for Temperature Compensation | | | |
| Thermistor Resistance | 100 | kΩ | ±1% tolerance, @temp=25°C |
| TC of Thermistor(B) | 3950 | K | ±0.6% tolerance, Defined at 25/50°C |

Table 2 NTC Temperature VS Resistance Table

| Temp.(°C) | R _{min} (kΩ) | R _{nor} (kΩ) | R _{max} (kΩ) | Temp.(°C) | R _{min} (kΩ) | R _{nor} (kΩ) | R _{max} (kΩ) |
|------------|-----------------------|-----------------------|-----------------------|------------|-----------------------|-----------------------|-----------------------|
| -40 | 3178 | 3279 | 3381 | 40 | 52.47 | 53.20 | 53.93 |
| -30 | 1694 | 1740 | 1788 | 50 | 35.31 | 35.88 | 36.46 |
| -20 | 940.2 | 962.7 | 985.7 | 60 | 24.29 | 24.74 | 25.20 |
| -10 | 538.7 | 549.8 | 561.0 | 70 | 17.03 | 17.38 | 17.74 |
| 0 | 319.8 | 325.3 | 330.9 | 80 | 12.15 | 12.43 | 12.71 |
| 10 | 195.9 | 198.7 | 201.5 | 90 | 8.812 | 9.030 | 9.253 |
| 20 | 123.5 | 124.9 | 126.3 | 100 | 6.487 | 6.660 | 6.837 |
| 25 | 99.00 | 100.0 | 101.0 | 110 | 4.841 | 4.979 | 5.120 |
| 30 | 79.65 | 80.56 | 81.47 | 120 | 3.658 | 3.769 | 3.882 |

Table 3 Pin Names and Description

| Pin | Function | Description |
|-----|------------------|---|
| 1 | Thermopile+(TP+) | Thermopile Output DC Voltage+ pin. |
| 2 | Thermistor(TH) | Ambient Temperature Compensation Resistance+ pin. |
| 3 | Thermopile-(TP-) | Thermopile Output DC Voltage- pin. |
| 4 | GND | Ambient Temperature Compensation Resistance- pin and GND. |

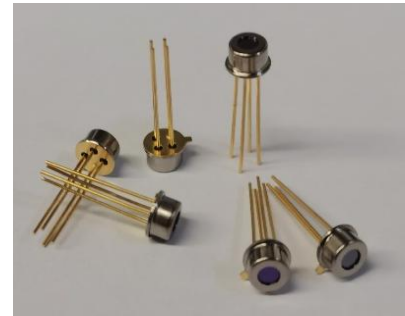


Figure 1 Thermopile TSD14

Outline of Sensor Package

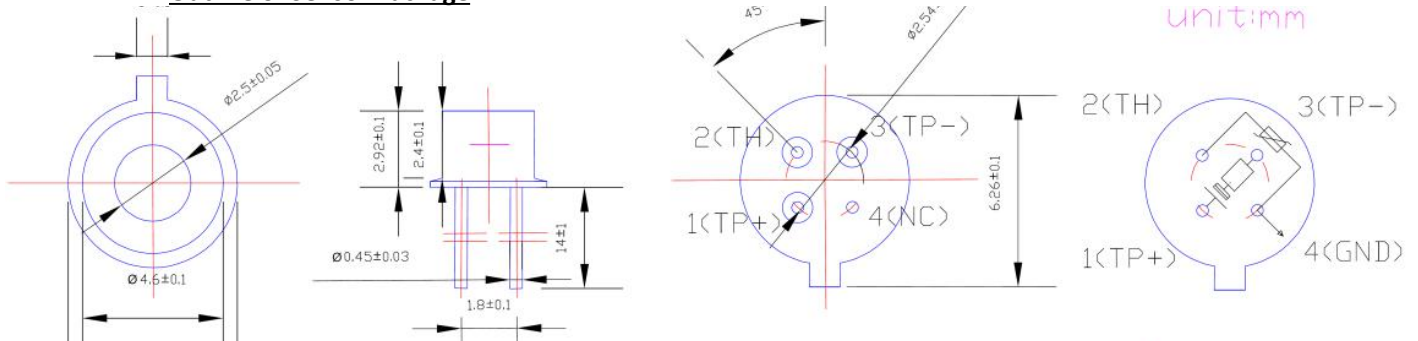


Figure 2 Outline of Sensor Package

Filter Transmission Curve

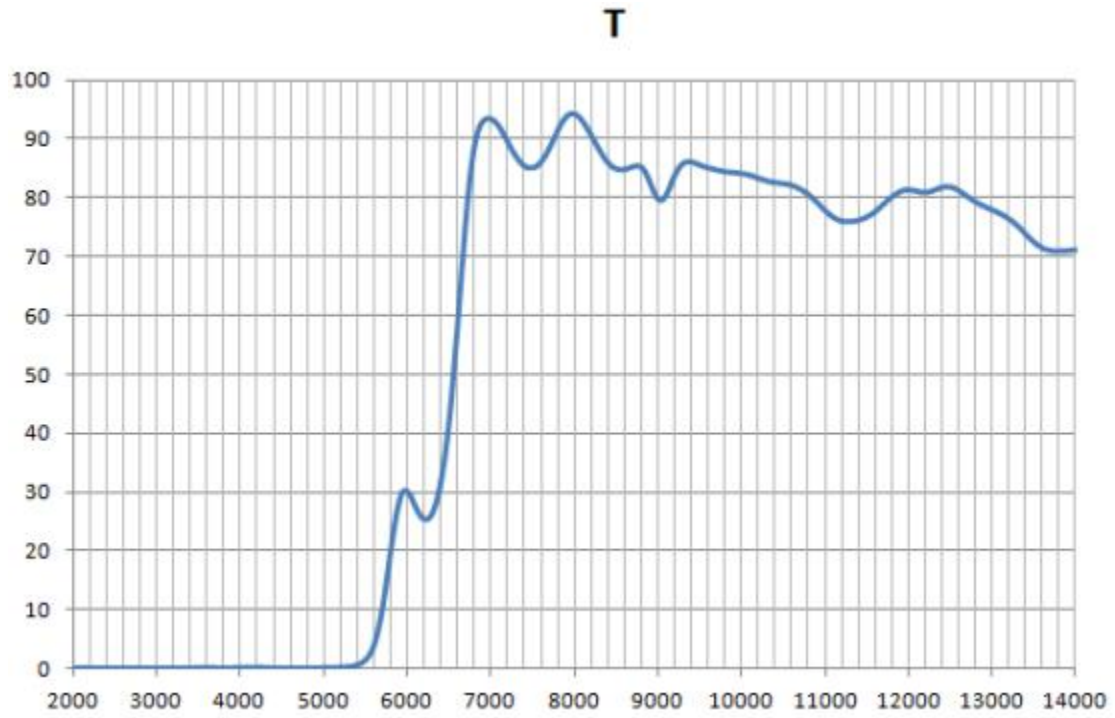


Figure 3 Filter Transmission Curve

Sensitivity Output Curve

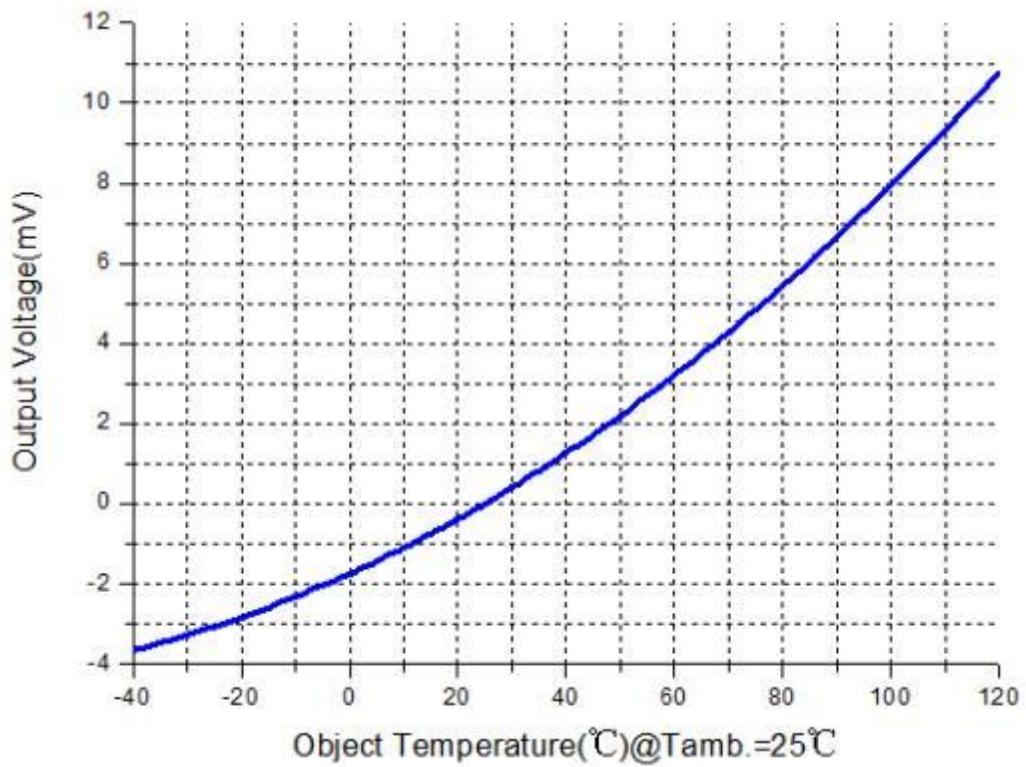


Figure 4 Sensitivity Output Curve