

## 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 <sup>2</sup>	
Active Area	1.4X1.4			mm <sup>2</sup>	
Responsivity	60			V/W	Black body=500K,1HZ @temp=25°C
Detectivity	1.21E08			cm · Hz <sup>1/2</sup> /W	Black body=500K,1HZ @temp=25°C
NEP	0.59			nW · Hz <sup>1/2</sup>	Black body=500K,1HZ @temp=25°C
Voltage Response	29			V · mm <sup>2</sup> /W	Black body=500K,1HZ @temp=25°C
Thermopile Res	65	75	85	kΩ	@temp=25°C
TC of Thermopile	0.1			%/°C	
Noise Voltage	33	35	37	nV/Hz <sup>1/2</sup>	@temp=25°C
Time Constant	25			ms	
Field of View(FOV)	104			°	Degree at 50% signal level

### TSD14 Thermopile Temperature Sensor

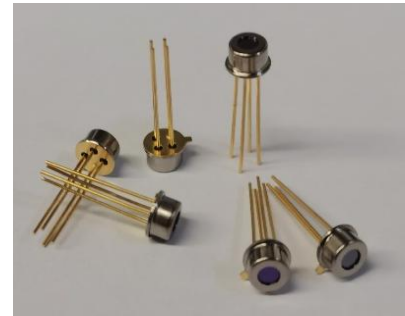
Operating Temp	-40~125	°C	
Storage Temp	-40~125	°C	
<b>Thermistor for Temperature Compensation</b>			
Thermistor Resistance	100	kΩ	±1% tolerance, @temp=25°C
TC of Thermistor(B)	3950	K	±0.6% tolerance, Defined at 25/50°C

**Table 2 NTC Temperature VS Resistance Table**

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

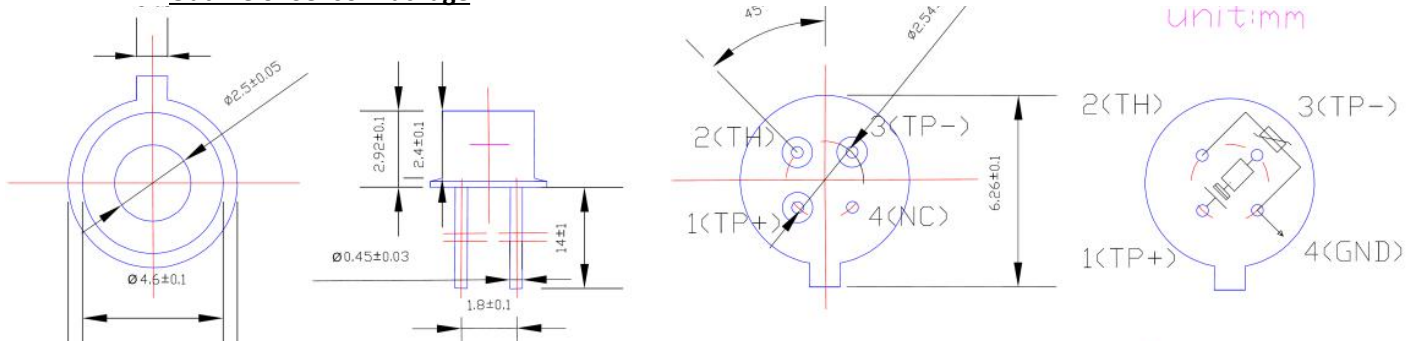
**Table 3 Pin Names and Description**

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**

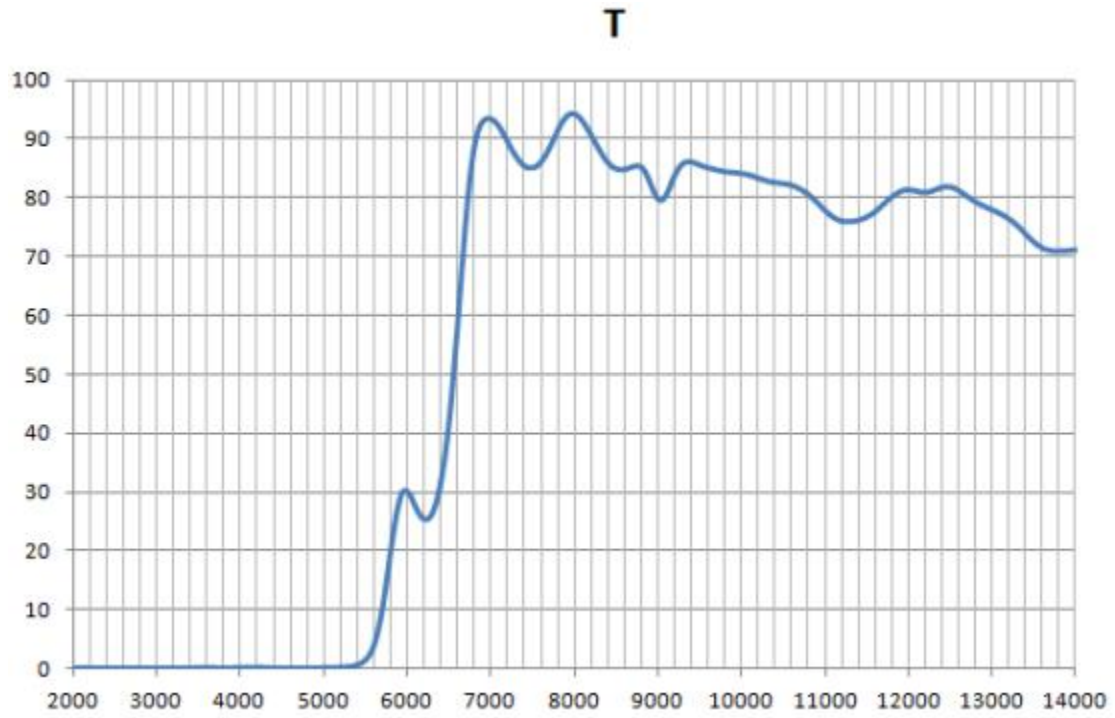


Figure 3 Filter Transmission Curve

**Sensitivity Output Curve**

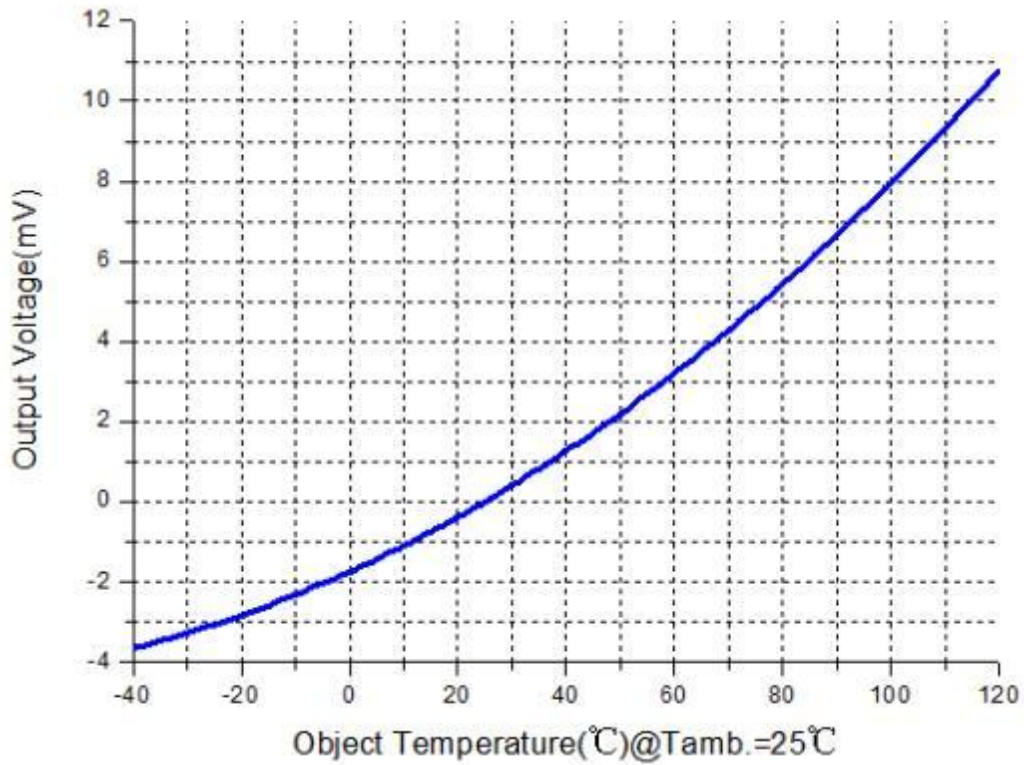


Figure 4 Sensitivity Output Curve