

Datasheet

TSD15

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 TSD15 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	1.08X1.08			mm ²	
Active Area	0.7X0.7			mm ²	
Responsivity	40			V/W	Black body=500K,1HZ @temp=25°C
Detectivity	7.72E07			cm · Hz ^{1/2} /W	Black body=500K,1HZ @temp=25°C
NEP	0.91			nW · Hz ^{1/2}	Black body=500K,1HZ @temp=25°C
Voltage Response	20			V · mm ² /W	Black body=500K,1HZ @temp=25°C
Thermopile Res	70	80	90	kΩ	@temp=25°C
TC of Thermopile	-0.11			%/°C	
Noise Voltage	33	35	37	nV/Hz ^{1/2}	@temp=25°C
Time Constant	10			ms	
Field of View(FOV)	90			°	Degree at 50% signal level
Operating Temp	-40~125			°C	

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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.

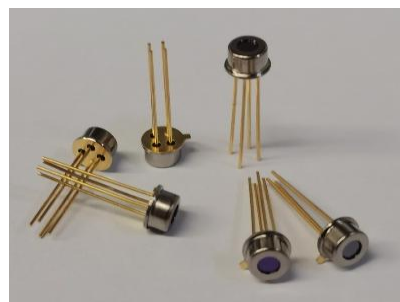


Figure 1 Thermopile TSD15

Outline of Sensor Package

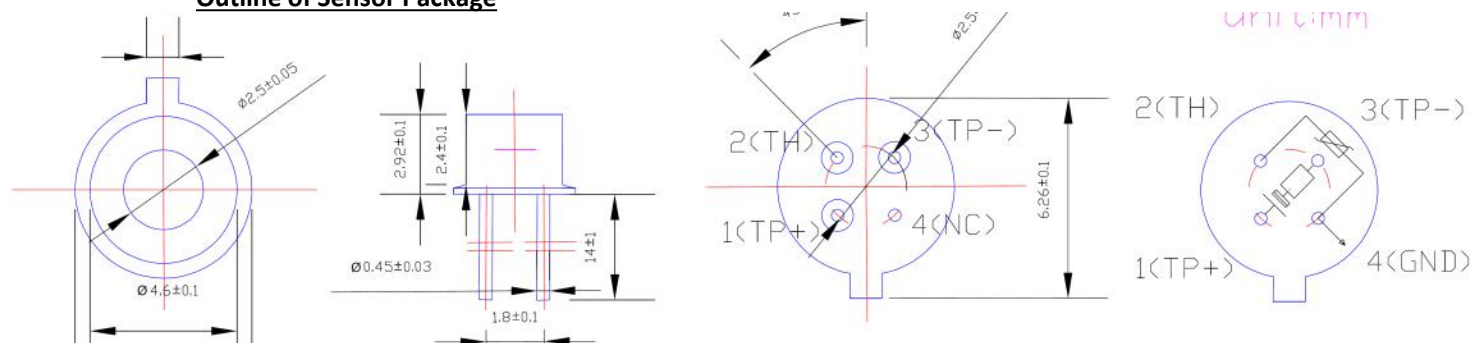


Figure 2 Outline of Sensor Package

Filter Transmission Curve

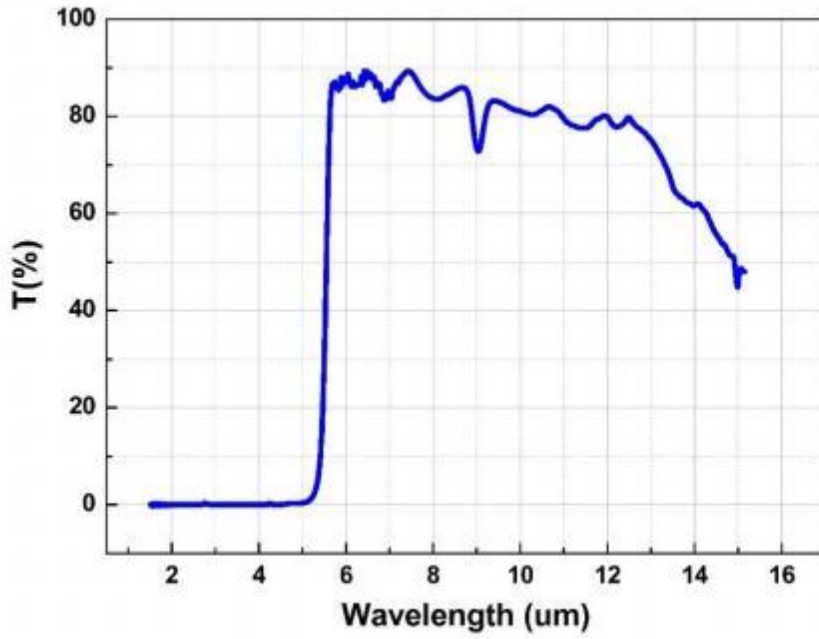


Figure 3 Filter Transmission Curve

Sensitivity Output Curve

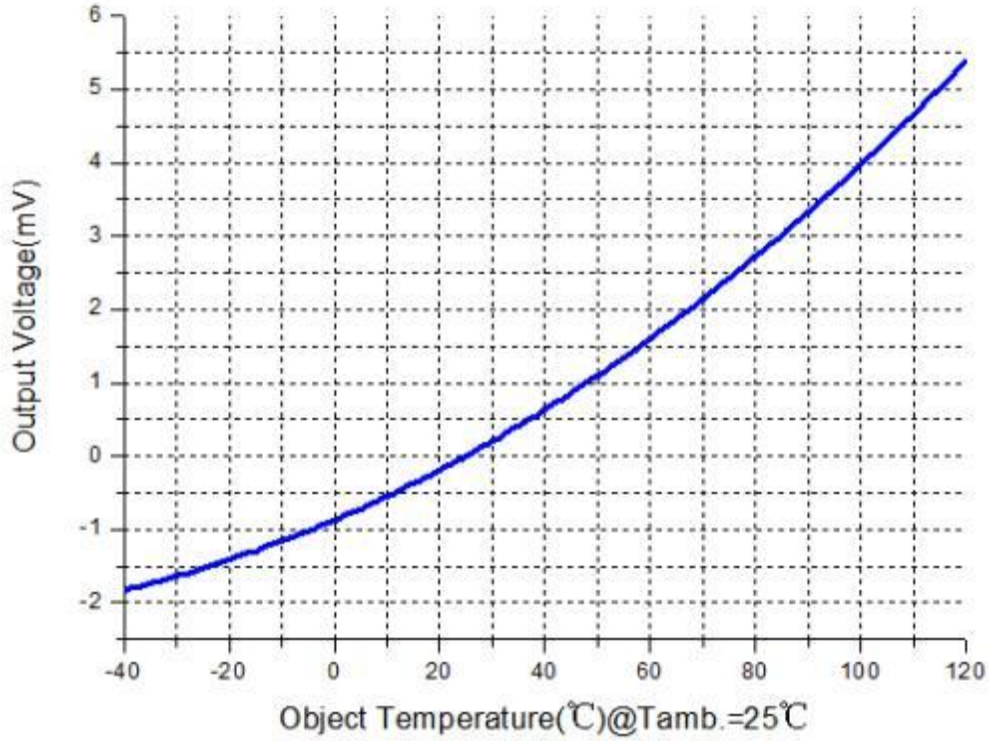


Figure 4 Sensitivity Output Curve