

Infrared Thermopile Sensor ISB-TS45H Product Instruction V2.0

Infrared Thermopile Sensor can measure the temperature without contact by detecting the infrared energy of an object. And the higher the temperature, the more infrared energy is produced. Thermopile sensing elements consist of small thermocouples on silicon chips that absorb energy and produce output signals.

ISB-TS45H Infrared Thermopile Sensor can be widely used in non-contact temperature measurement. This product consists of infrared filters, thermistors and other components, and packaged by TO-46. Made of metal, it has high reliability and high sensitivity.

Features:

- TO-46 package
- High sensitivity
- NTC thermistor compensation
- Fast response
- 5 μ m Long-wave pass filter

Uses:

- Non-contact temperature measurement
- Ear thermometer, forehead thermometer
- Industrial continuous temperature control



Performance parameters

Parameter	Min.	Typ.	Max.	Unit	Conditions
Chip size		1.1×1.1		mm ²	
Sensitive area		0.35×0.35		mm ²	
Detection angle		90		°	
Thermopile resistance	80	98	115	k Ω	Temp=25 $^{\circ}$ C
Noise voltage		38		nV/Hz ^{1/2}	Temp=25 $^{\circ}$ C
NEP		0.23		nW/Hz ^{1/2}	Blackbody=500K,1Hz@25 $^{\circ}$ C
Voltage Response		20.11		Vmm ² /w	Blackbody=500K,1Hz@25 $^{\circ}$ C
Responsivity	134	164	194	V/w	Blackbody=500K,1Hz@25 $^{\circ}$ C
Temp. coefficient of resistance		0.06		%/ $^{\circ}$ C	Temp=25 $^{\circ}$ C ~ 75 $^{\circ}$ C
Time constant		\leq 13		ms	
Specific detectivity		1.51 E08		cmHz ^{1/2} /w	Blackbody=500K,1Hz@25 $^{\circ}$ C
NTC Resistance		100 \pm 3%		k Ω	25 $^{\circ}$ C
NTC β		3950 \pm 1%		K	25/50 $^{\circ}$ C

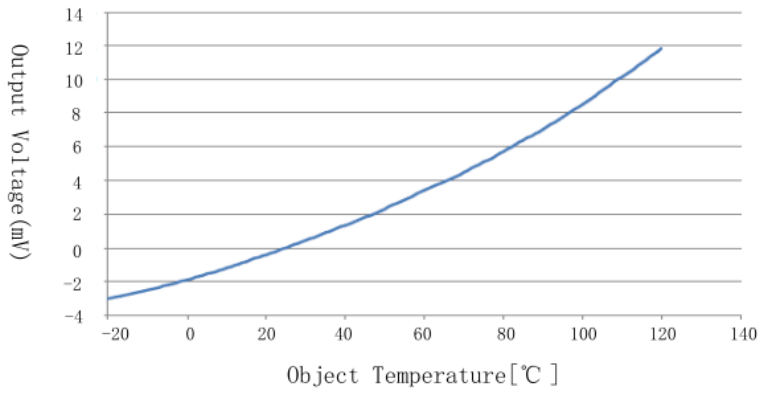
Environmental requirements

- Working temperature: -30 $^{\circ}$ C ~ +85 $^{\circ}$ C
- Storage temperature: -30 $^{\circ}$ C ~ +100 $^{\circ}$ C

Output Sensitivity

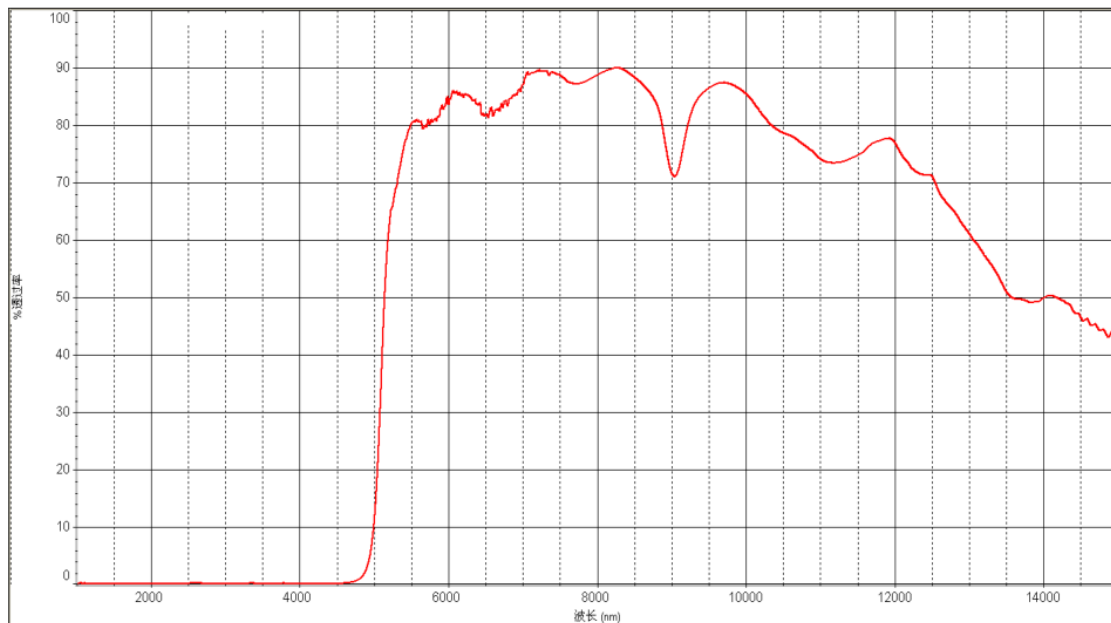
Test conditions: under 25 °C, the measured object temperature vs the typical output voltage of thermopile

* Note: This parameter is tested with TO-46 package and LWP 5.0 filter.

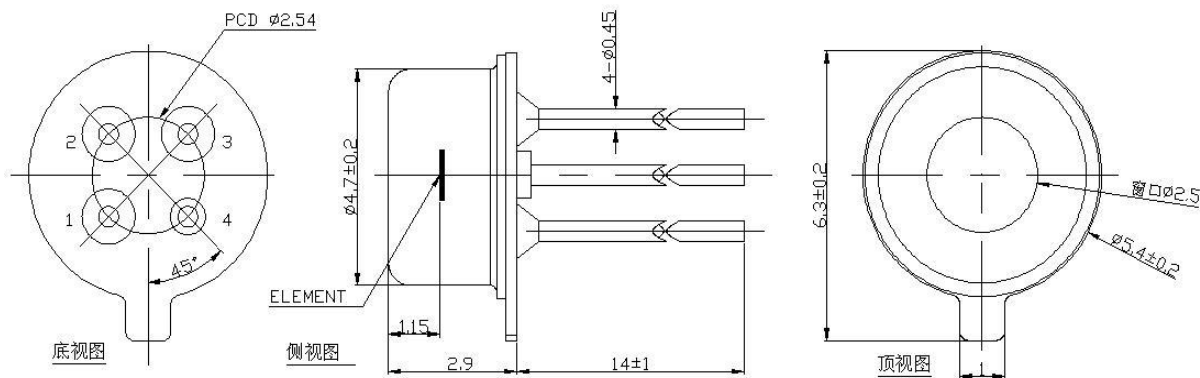


Temp (°C)	V out (mv)	Temp (°C)	V out (mv)	Temp (°C)	V out (mv)	Temp (°C)	V out (mv)	Temp (°C)	V out (mv)
-20	-3.046	10	-1.196	40	1.334	70	4.477	100	8.508
-19	-2.983	11	-1.131	41	1.426	71	4.606	101	8.667
-18	-2.929	12	-1.051	42	1.526	72	4.73	102	8.839
-17	-2.879	13	-0.973	43	1.624	73	4.845	103	9.001
-16	-2.829	14	-0.888	44	1.725	74	4.962	104	9.172
-15	-2.777	15	-0.806	45	1.81	75	5.081	105	9.335
-14	-2.724	16	-0.723	46	1.892	76	5.205	106	9.499
-13	-2.673	17	-0.646	47	1.995	77	5.321	107	9.664
-12	-2.619	18	-0.572	48	2.094	78	5.455	108	9.83
-11	-2.569	19	-0.494	49	2.199	79	5.587	109	9.991
-10	-2.514	20	-0.417	50	2.306	80	5.724	110	10.15
-9	-2.461	21	-0.33	51	2.42	81	5.848	111	10.32
-8	-2.399	22	-0.248	52	2.53	82	5.981	112	10.48
-7	-2.338	23	-0.164	53	2.635	83	6.116	113	10.64
-6	-2.275	24	-0.083	54	2.753	84	6.251	114	10.81
-5	-2.214	25	0	55	2.865	85	6.376	115	10.98
-4	-2.144	26	0.086	56	2.969	86	6.514	116	11.15
-3	-2.084	27	0.174	57	3.08	87	6.641	117	11.33
-2	-2.022	28	0.258	58	3.185	88	6.767	118	11.5
-1	-1.964	29	0.346	59	3.299	89	6.907	119	11.66
0	-1.899	30	0.446	60	3.401	90	7.043	120	11.84
1	-1.829	31	0.544	61	3.508	91	7.19		
2	-1.754	32	0.623	62	3.608	92	7.33		
3	-1.689	33	0.709	63	3.715	93	7.468		
4	-1.629	34	0.798	64	3.808	94	7.604		
5	-1.555	35	0.892	65	3.91	95	7.751		
6	-1.479	36	0.974	66	4.019	96	7.9		
7	-1.416	37	1.062	67	4.123	97	8.051		
8	-1.349	38	1.149	68	4.239	98	8.191		
9	-1.275	39	1.246	69	4.354	99	8.344		

Spectral curve



Dimensions



Unit: mm

- 1.THERMOPILE(+)
- 2.THERMISTOR
- 3.THERMOPILE(-)
- 4.GROUND

Caution

1. Design restrictions

The sensor is designed for indoor use.

Make sure to use the suitable optical filters and moisture-proof structures in outdoor applications using.

In order to prevent the secondary failures caused by operational failures or malfunctions, the fail-safe features can be added in advance.

2. Use restrictions

In order to prevent sensor failure, operational failure or any other malfunction, do not use this sensor under the conditions below.

- A. Severe changes in ambient temperature.
- B. Strong vibration or vibration.
- C. The detecting area is full with barrier material (glass, fog, etc.)
- D. In liquids, corrosive gases and seawater.
- E. Continuous use in a high-humidity atmosphere.
- F. Static electric field or strong electromagnetic radiation.
- G. Corrosive gas or sea breeze.
- H. Dirty and dusty environment that may contaminate the optical window.

3. Welding restrictions

A. Soldering with soldering iron. The welding temperature should be under 260 °C in 10 seconds. Long time overheating of the sensor pins should be avoided.

B. All flux must be washed off after soldering and rinsed with a brush. Using an ultrasonic cleaner may cause performance problems.

4. Usage restrictions

Use and sell should be under any applicable law or regulation.

The sensor failure caused by incorrect handling or storage is not the responsibility of manufacturer.