Infrared Thermopile Sensor Specifications

WOK-S-006

CATALOG

1.Features

1）Non-ontact surface temperature measurement

2）High precision thermistor with ambient temperature compensation

3）Quick response

4）TO-46 metal shell package

5）With a 5.5um long pass infrared filter window

2.Application

1）Non- contact thermometry；

2）Air conditioning system

3）Intelligent temperature sensing and control of household appliances

3.Performance

Table 1 Performance Parameters of Sensor

Chip size	1120*1120	um^2
Sensitive area	700*700	um^2
Field angle	87	°
Resistance	300±30	kΩ
Response rate	50	V/W
Time constant	20	ms
NEP	0.6	$nW/Hz^{1/2}$
Detection rate	0.94E08	$cmHz^{1/2}/W$
Thermistor resistance	100±2%	kΩ (25℃)
Beta value of thermistor	3950±1%	K(25℃/50℃)
Working temperature	-30~120	℃

Test conditions: 1. Temperature = 25 ℃; 2. 500K, 5.5um long pass; 3. 500K, 1Hz

Table 2 voltage response of sensor to 35-42 degree target

V-T From 35°C-42°C													
T AMB 22.58°C													
T_OBJ	Vout	T_OBJ	Vout	T_OBJ	Vout	T_OBJ	Vout	T_OBJ	Vout	T_OBJ	Vout	T_OBJ	Vout
35	0.7312												
35.1	0.7367	36.1	0.8079	37.1	0.8742	38.1	0.9155	39.1	0.9867	40.1	1.0525	41.1	1.1209
35.2	0.7479	36.2	0.8126	37.2	0.8857	38.2	0.9229	39.2	0.9884	40.2	1.0556	41.2	1.1234
35.3	0.7614	36.3	0.8194	37.3	0.8868	38.3	0.9269	39.3	1.006	40.3	1.0595	41.3	1.1286
35.4	0.7661	36.4	0.8259	37.4	0.8821	38.4	0.9396	39.4	1.0084	40.4	1.0693	41.4	1.1347
35.5	0.7782	36.5	0.8304	37.5	0.8878	38.5	0.9434	39.5	1.0091	40.5	1.0729	41.5	1.1408
35.6	0.7798	36.6	0.8367	37.6	0.8934	38.6	0.9552	39.6	1.0252	40.6	1.0821	41.6	1.1421
35.7	0.7809	36.7	0.8496	37.7	0.8976	38.7	0.9599	39.7	1.0275	40.7	1.0864	41.7	1.1499
35.8	0.7901	36.8	0.853	37.8	0.8987	38.8	0.9691	39.8	1.0343	40.8	1.0963	41.8	1.152
35.9	0.7958	36.9	0.8553	37.9	0.9037	38.9	0.9731	39.9	1.0398	40.9	1.1035	41.9	1.1624
36	0.8056	37	0.872	38	0.9147	39	0.9812	40	1.0501	41	1.112	42	1.1632

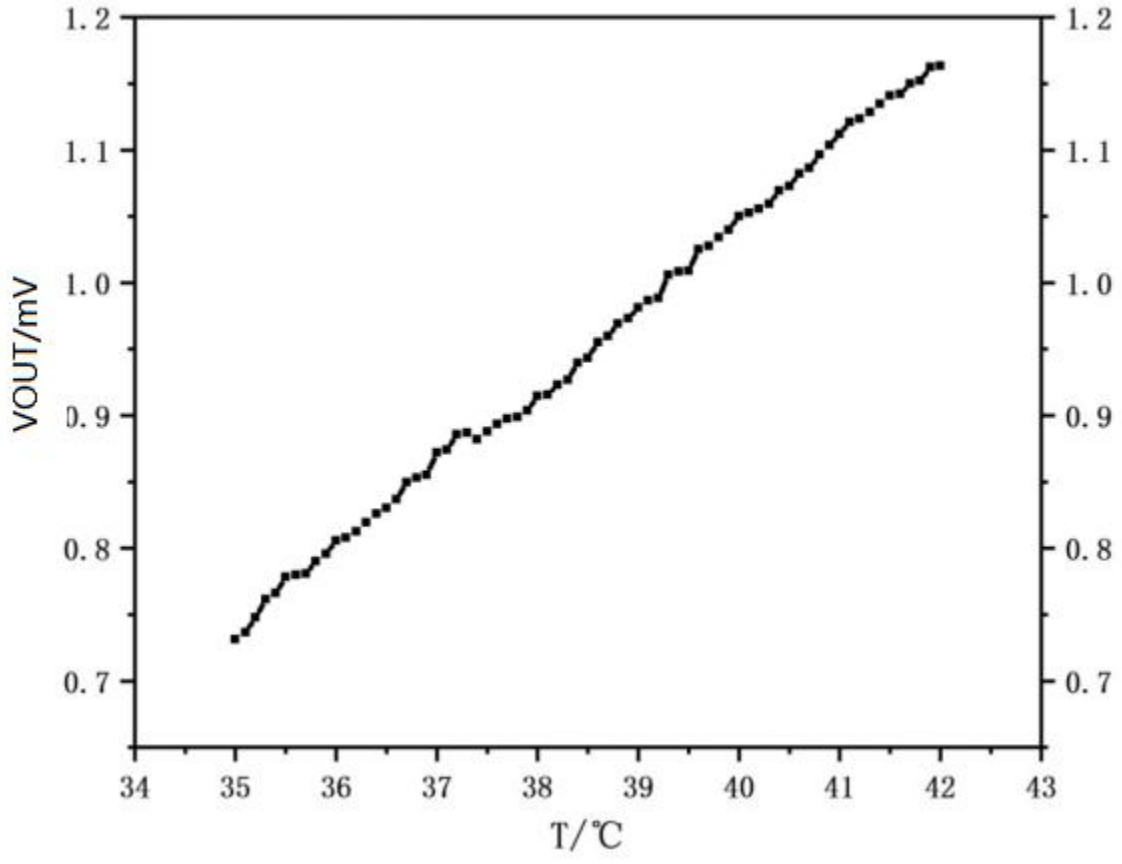


Fig. 1 VT curve of sensor between 35-42 degrees

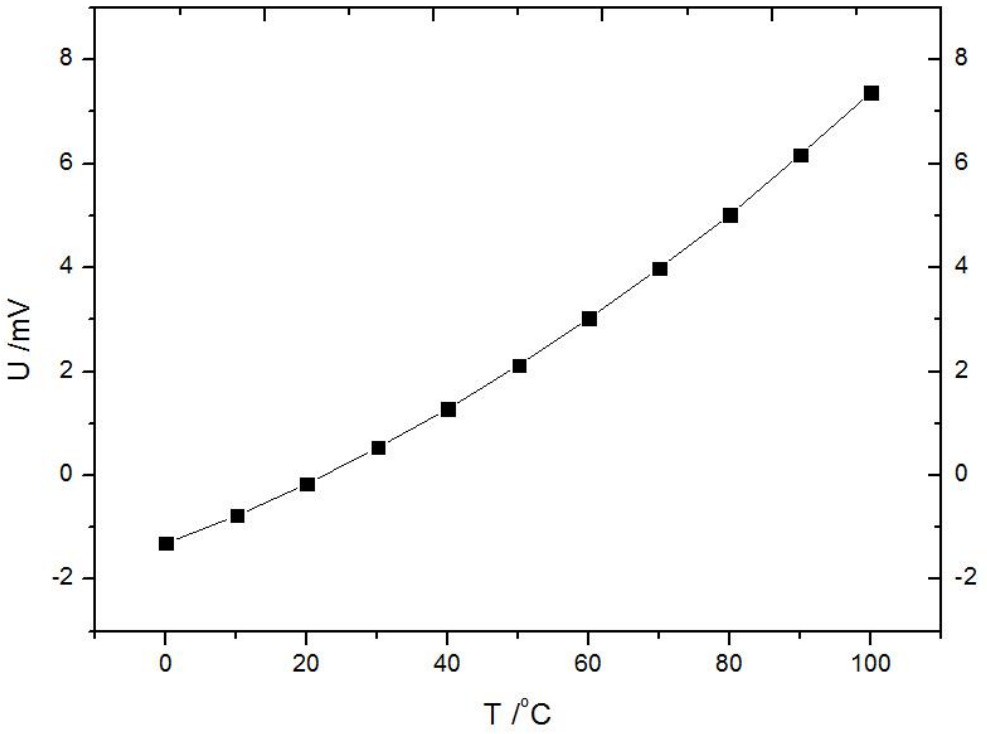


Fig. 2 VT curve (measured at ambient temperature of 22oC and test distance of 2.5cm)

Table 3 sensor voltage temperature curve

Thermopile Output Voltage[mV]		Thermistor Temperature[° C]							
		10	15	20	25	30	35	40	45
Object Temperature [° C]	0	-0.4298	-0.6712	-0.9324	-1.1851	-1.4649	-1.7623		
	2	-0.3451	-0.587	-0.8477	-1.101	-1.378	-1.6792	-1.9492(3°)	
	4	-0.2601	-0.5013	-0.7613	-1.0159	-1.295	-1.5927	-1.911	
	6	-0.1722	-0.4137	-0.6721	-0.9298	-1.2077	-1.5069	-1.8228	
	8	-0.0837	-0.3243	-0.582	-0.8407	-1.1198	-1.418	-1.7319	-2.0651
	10	0.0073	-0.2316	-0.4906	-0.7492	-1.0278	-1.3273	-1.6422	-1.9747
	12	0.1006	-0.139	-0.3969	-0.6568	-0.9357	-1.2358	-1.5511	-1.8819
	14	0.1958	-0.0429	-0.2994	-0.5611	-0.8409	-1.1394	-1.4538	-1.7856
	16	0.2942	0.0544	-0.2006	-0.4638	-0.7436	-1.0426	-1.3577	-1.6865
	18	0.3944	0.1548	-0.1009	-0.3657	-0.6461	-0.943	-1.2591	-1.5878
	20	0.4959	0.257	0.0018	-0.2637	-0.5435	-0.8423	-1.1558	-1.4881
	22	0.599	0.3609	0.1063	-0.1602	-0.4421	-0.7395	-1.0515	-1.3828
	24	0.706	0.4672	0.2131	-0.0556	-0.335	-0.6329	-0.9476	-1.2785
	26	0.8139	0.575	0.3209	0.0528	-0.2275	-0.526	-0.8395	-1.1718
	28	0.9218	0.6847	0.4318	0.1621	-0.1194	-0.4141	-0.7299	-1.0616
	30	1.0345	0.7974	0.5439	0.2743	-0.007	-0.3037	-0.6166	-0.9516
	32	1.1491	0.9123	0.6563	0.3871	0.1071	-0.1887	-0.5026	-0.8332
	34	1.265	1.0289	0.7734	0.5032	0.2234	-0.0737	-0.3853	-0.7184
	36	1.3836	1.1487	0.893	0.6211	0.3412	0.0437	-0.2666	-0.6002
	38	1.5043	1.2697	1.0137	0.7407	0.4629	0.1658	-0.1459	-0.478
	40	1.629	1.3933	1.136	0.8623	0.5837	0.2903	-0.0228	-0.353
	42	1.7528	1.5196	1.2615	0.9865	0.7075	0.4138	0.1028	-0.2265
	44	1.88	1.6466	1.3888	1.1145	0.8363	0.5436	0.2305	-0.0995
	46	2.0105	1.7773	1.5196	1.2432	0.9648	0.6703	0.363	0.0298
	48	2.1432	1.9092	1.65	1.3737	1.0961	0.8007	0.4953	0.1655
	50	2.2763	2.0448	1.7821	1.5055	1.2308	0.9376	0.6282	0.3012
	52	2.4122	2.1815	1.9181	1.6418	1.3667	1.0738	0.7683	0.4372
	54	2.5521	2.3221	2.0551	1.7797	1.5054	1.2115	0.9076	0.5764
	56	2.692	2.4634	2.1955	1.9207	1.6454	1.3535	1.046	0.7207
	58	2.8361	2.6072	2.3362	2.0628	1.7897	1.4968	1.1892	0.8644
	60	2.9818	2.7526	2.4749	2.2064	1.9344	1.6461	1.3357	1.0066
			0.0047 (15° C)		0.0022 (25° C)		-0.0139 (35° C)		-0.0327 (45° C)

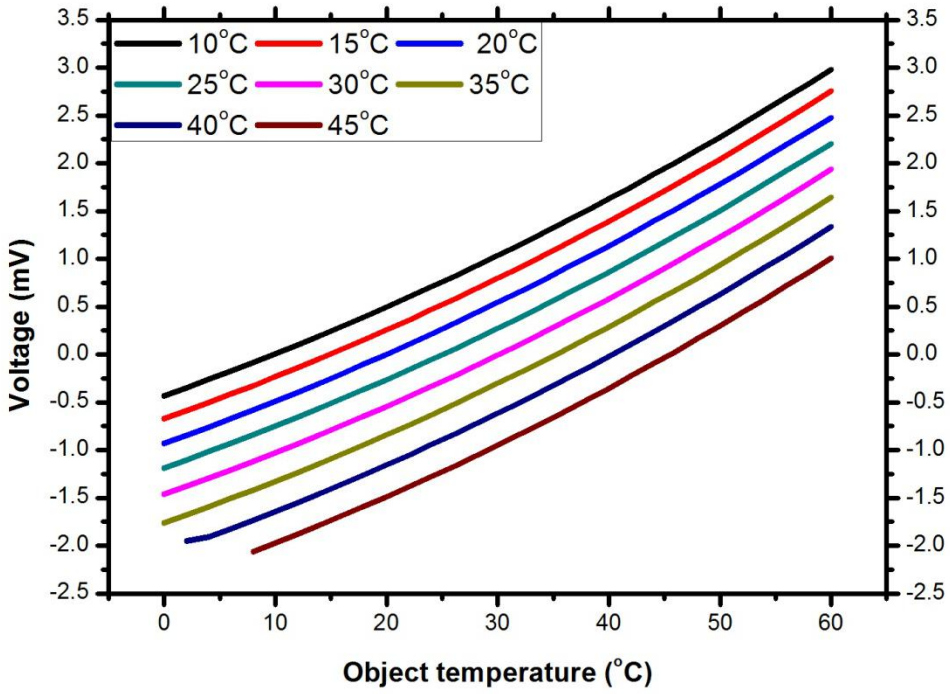


Fig. 3 VT curve of sensor at different ambient temperature

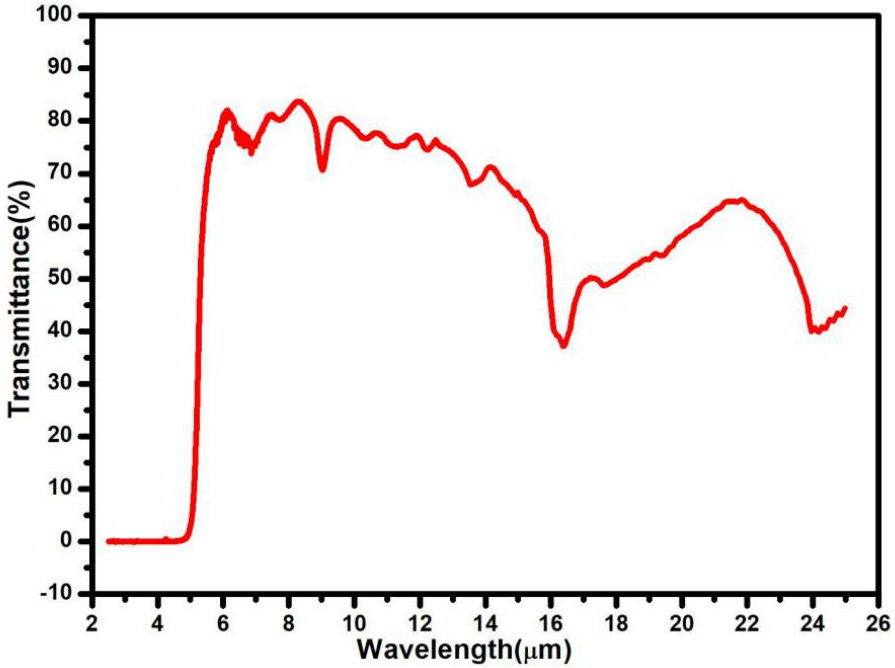


Figure 4 transmission spectrum of filter

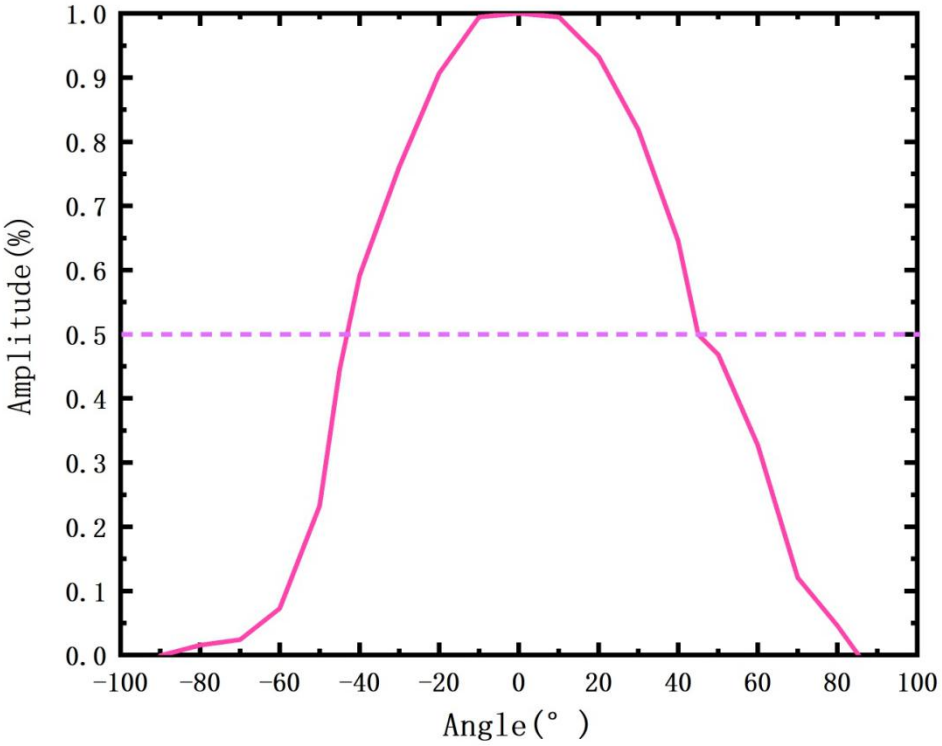


Fig. 5 field angle of sensor

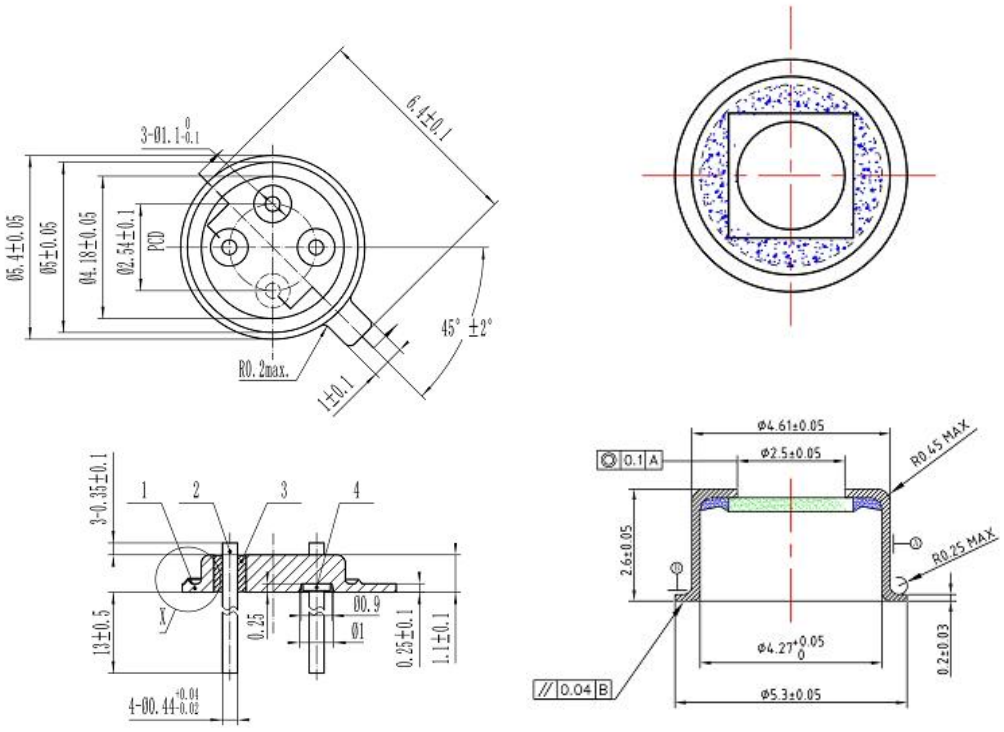


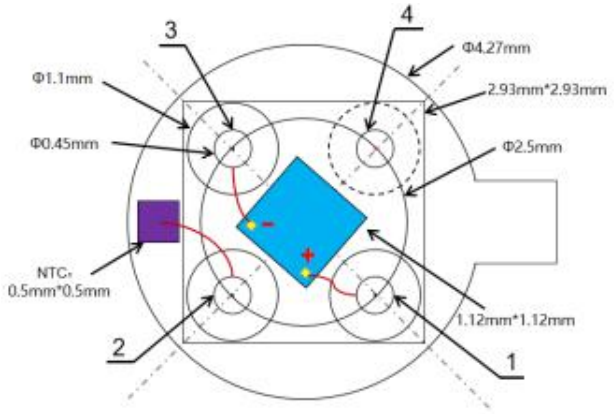
Figure 6 device shell pin information

4.Pin definition

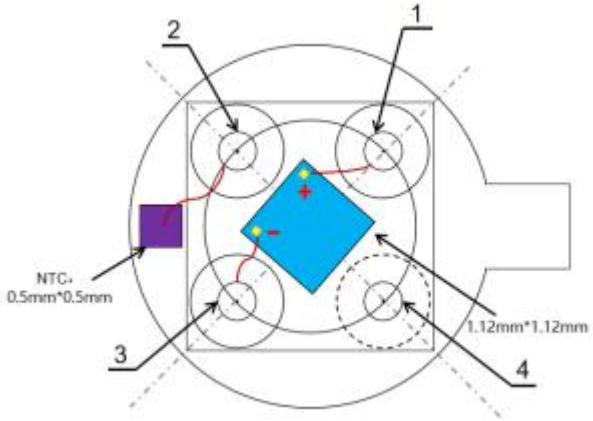
1）Pins 1 and 3 are the output pins of thermopile sensor voltage, and the output voltage is of the order of UV, which changes with the temperature of the measured object;

2）Pins 2 and 4 are thermistor pins, and the resistance value is between pins 2 and 4. The resistance value changes with the change of ambient temperature, and the resistance value is 100k Ω at 25 ℃.

Bottom view:



top view ：



5.Other suggestions

1）In order to reduce the thermal interference between sensor pins, thermal isolation should be carried out between sensor pins when making PCB.

2）Because the output voltage signal of the sensor is of the magnitude of UV, the noise of the circuit (operational amplifier, ADC, etc.) is required to be high, so it is recommended to use a professional MCU for temperature measurement.