Datasheet

ZXT0002C

Thermopile Temperature Sensor

TO-46 Package

Features

- TO metal housing with IR absorber coating inside
- Thermistor temperature reference included
- Low temperature coefficient of sensitivity
- Ideally suited for ear thermometers, miniature pyrometer

Applications

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

Descriptions

The ZXT0002C is a thermopile sensor in classic TO-46 housing. The sensor is composed of 116 elements of thermocouple in series on a floating micro-membrane having an active area of diameter 545 µm. The thermopile sensor provides nearly Johnson-noise-limited performance, which can be calculated by its ohmic series resistance. A thermistor with a lead connected to ground is also provided inside the TO package for ambient temperature reference.

Table 1 Thermopile Parameter

Parameter	Typ	Unit	Conditions
Sensitivity	128	V/W	323K, 5-14µm
TC of sensitivity	0.14±0.05	%/K	25°C
Thermopile Voltage	2.4±0.7	mV	Tb:50°C, Ta:25°C 5-14µm
Active area in diameter	545	µm	
Resistance of thermopile	115±35	KΩ	25°C
TC of resistance	0.1±0.05	%/K	25°C
Time constant	17	ms	
Noise voltage	42.9	$nV/Hz^{1/2}$	r.m.s 300K
NEP	0.34	$nW/Hz^{1/2}$	323K, 5-14µm
Normalized detectivity (D*)	$1.43*10^{8}$	$cm*Hz^{1/2}/W$	323K, 5-14µm
Thermistor resistance	100±5%	KΩ	25°C
β value	3964±0.5%	K	25°C/100°C
Field of view	90	°	@50% target signal
Cut on wavelength	5±0.3	µm	@25°C, 50% transmittance

Sensor Package

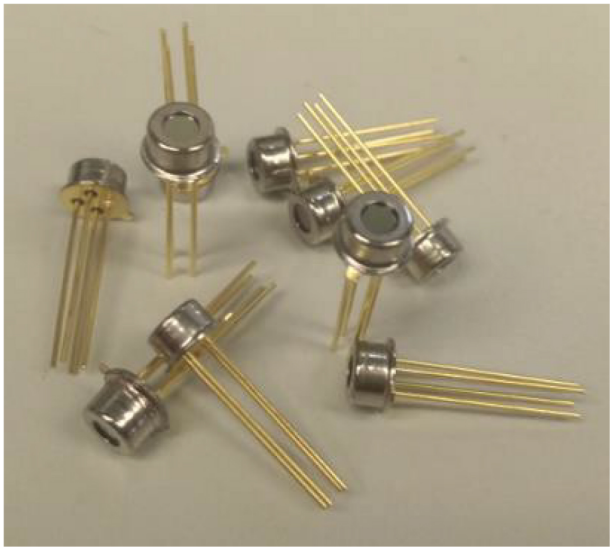


Figure 1 Thermopile ZXT0002C

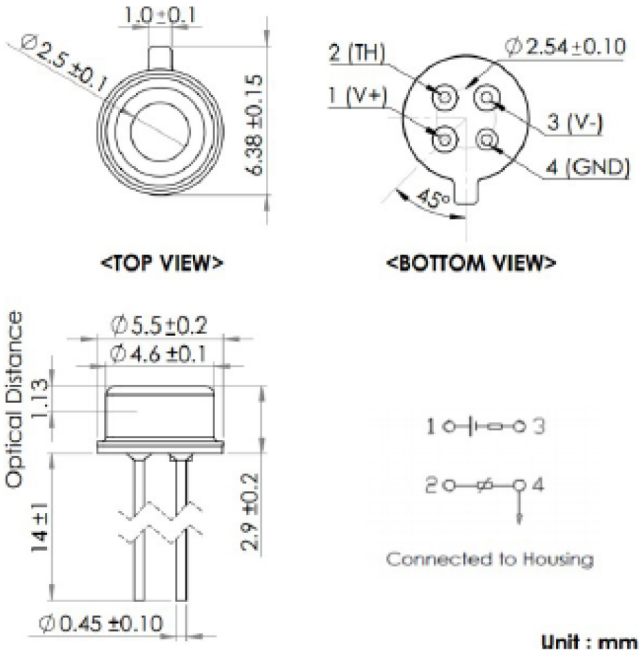


Figure 2 Outline of Sensor Package

Filter Transmission Curve

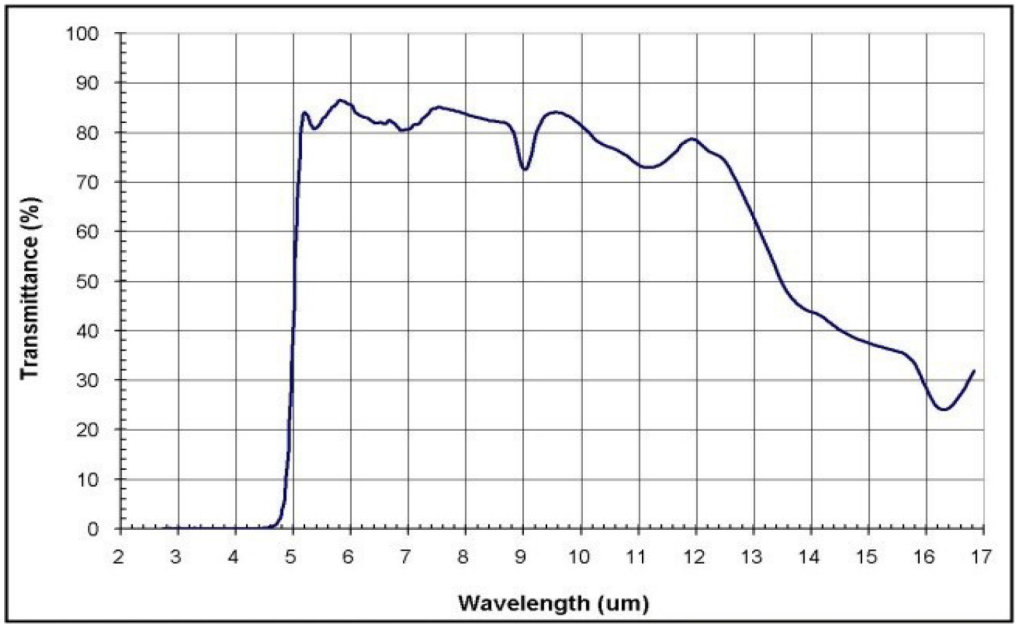


Figure 3 Filter Transmission Curve

Sensitivity Output Curve

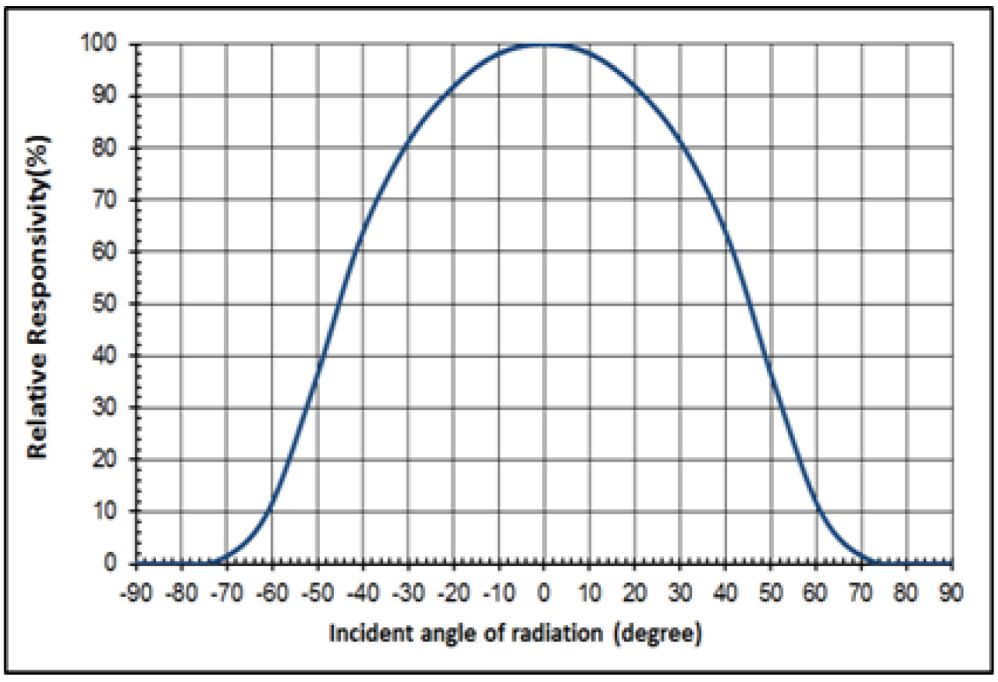
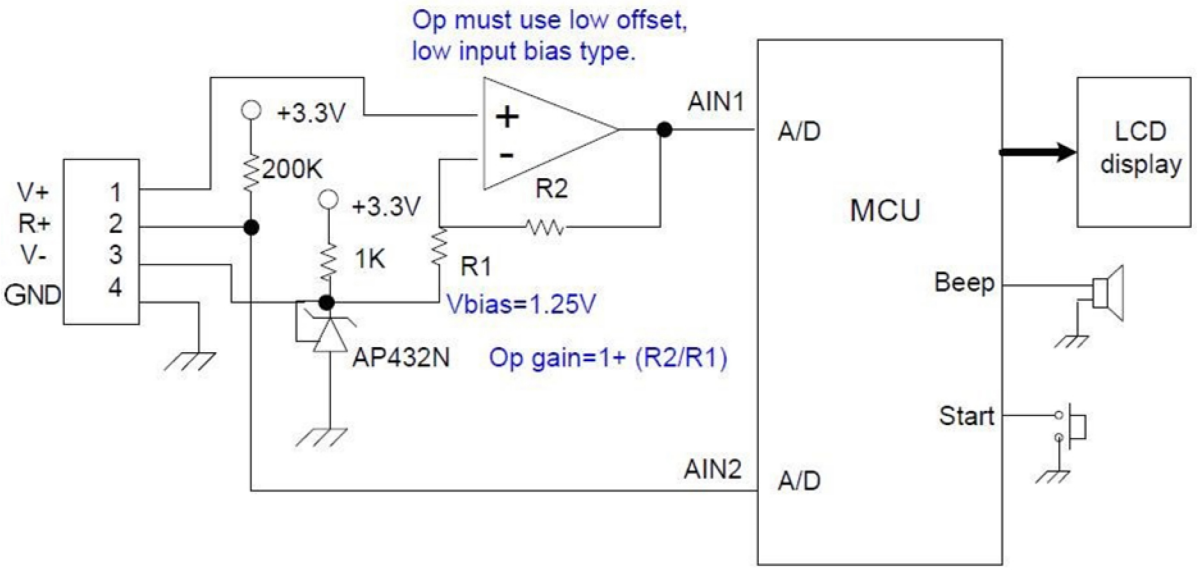
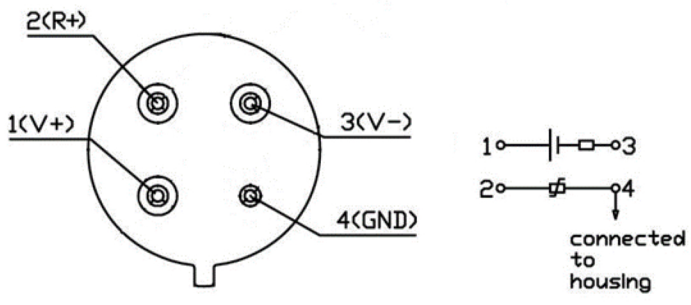


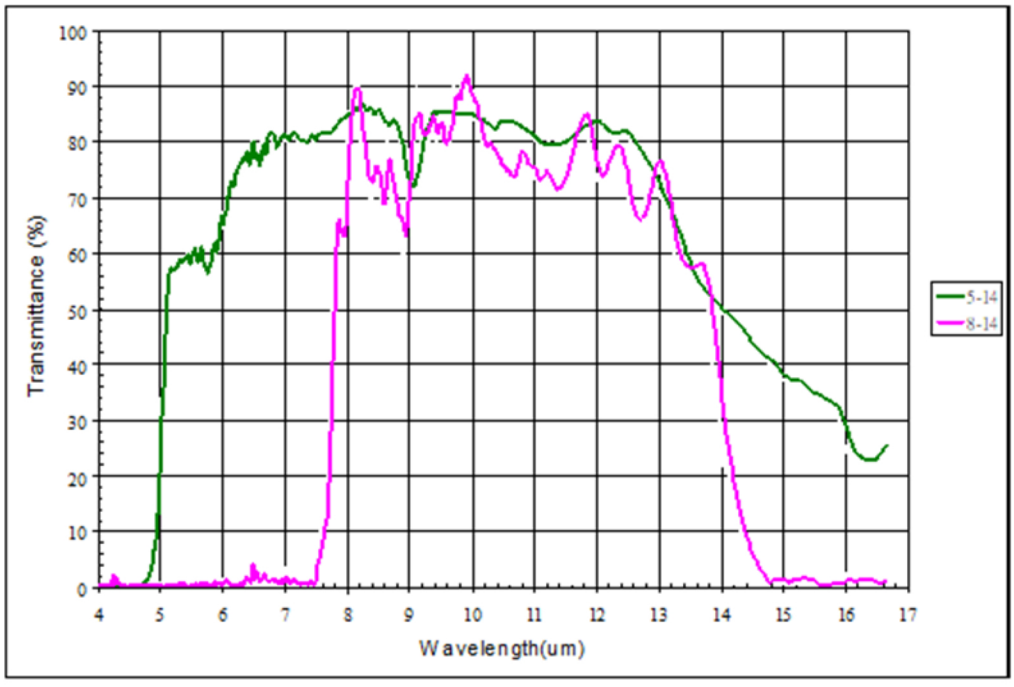
Figure 4 Sensitivity Output Curve

Circuit


Op must use low offset,
low input bias type.
+3.3V
200K
+3.3V
1K
R1
R2
V+
R+
V-
GND
1
2
3
4
Vbias=1.25V
AP432N
Op gain=1+ (R2/R1)
AIN1
AIN2
A/D
A/D
MCU
LCD
display
Beep
Start


2(R+)
1(V+)
3(V-)
4(GND)
1
3
2
4
connected
to
housing

Structure of Thermopile IR Sensor



Transmission	Filter Material	Applications
5 -14 µm	Silicon	Ear thermometer, Automotive (Air conditioning), Human body detection, HVAC, Occupancy detection, Industry (Object detection), Medical (Skin temperature), Monitoring Systems, Home appliances (Microwave oven), Security (Presence detection)
8-14 µm	Silicon	