OTC-238

THERMOPILE INFRARED SENSOR

Date : Oct. 10, 2000

Features

The thermopile sensor consists of a series of 44 thermoelements, forming a sensitive area of 0.5*0.5 mm^2. The sensor is hermetically sealed into a TO-18 metal housing, with optical filter. This standard filter allows measurements to be made in the spectral range above 5μm wavelength. The thermosensor exhibits an almost white noise, comparable to an ohmic resistance. It has a constant signal versus frequency up to its frequency limit, and is directly proportional to incident radiation.

Applications

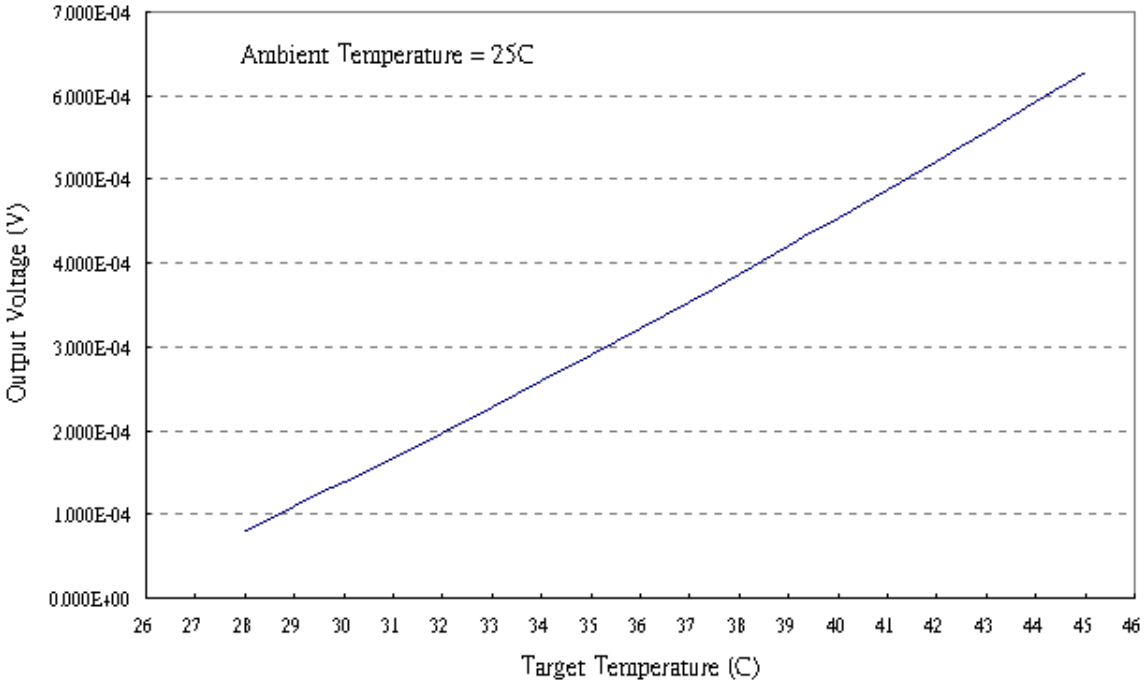
* Ear thermometers; clinic thermometers
* Infrared thermometers
* Consumer applications: hair dryer, micro-wave oven, air conditioner, refrigerator
* Continuous temperature control of manufacturing
* Security system
* Radiation monitor switch system
* Absorbing measurement for gas analysis
* Thermoelectric converter
* Heat flux flowmeter

Electrical Characteristics

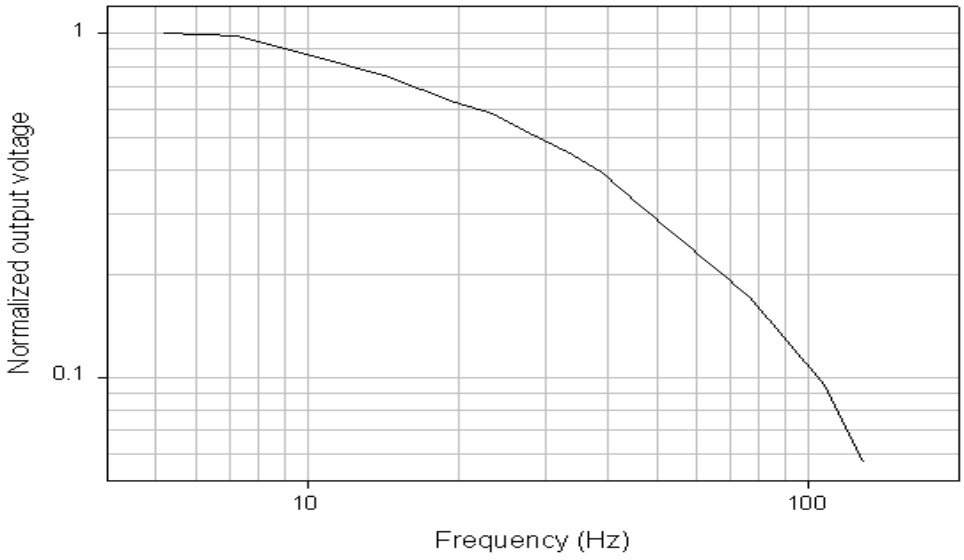
Parameter	Condition	Min.	Typ.	Max.	Unit
Thermopile					
Number of thermojunctions		---	44	---	
Chip size		---	1920*1725	---	μm^2
Active area	Interference layer	---	500*500	---	μm^2
Thickness of substrate	Silicon-substrate	600	625	650	μm
Resistance of thermopile	25□	60	70	80	KΩ
Sensitivity	With 5-14μm filter	40	55	70	V/W
Detecctivity		$4*10^7$	$7*10^7$	$9*10^7$	$cm*Hz^{1/2}/W$
Time Constant		---	30	---	ms
Noise voltage		---	34	---	$nV/Hz^{1/2}$
NEP		---	0.8	---	$nW/Hz^{1/2}$
Temperature range	Operation	-20	---	100	□

Measured at 1 Hz chopper frequency, within spectral range 5-14μm, using a blackbody radiator of 500K temperature.

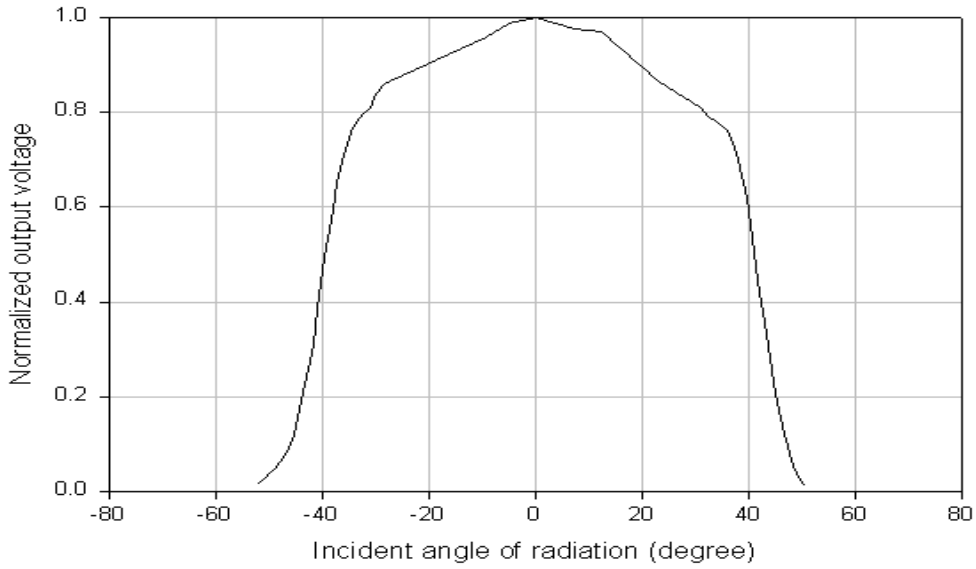
Thermopile voltage vs. blackbody temperature



Frequency response



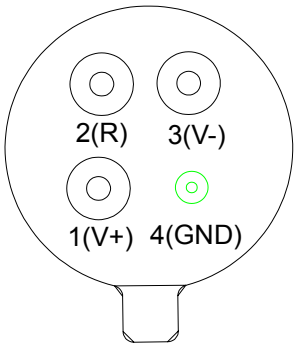
Field of view



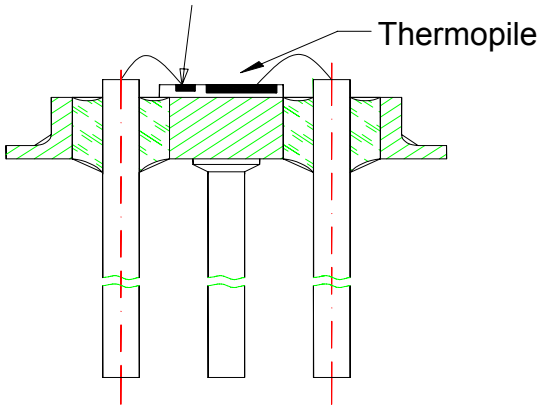
Pin assignment & description

1 thermopile output pin (+)

3 thermopile output pin (-)



BACKSIDE VIEW



SIDE VIEW

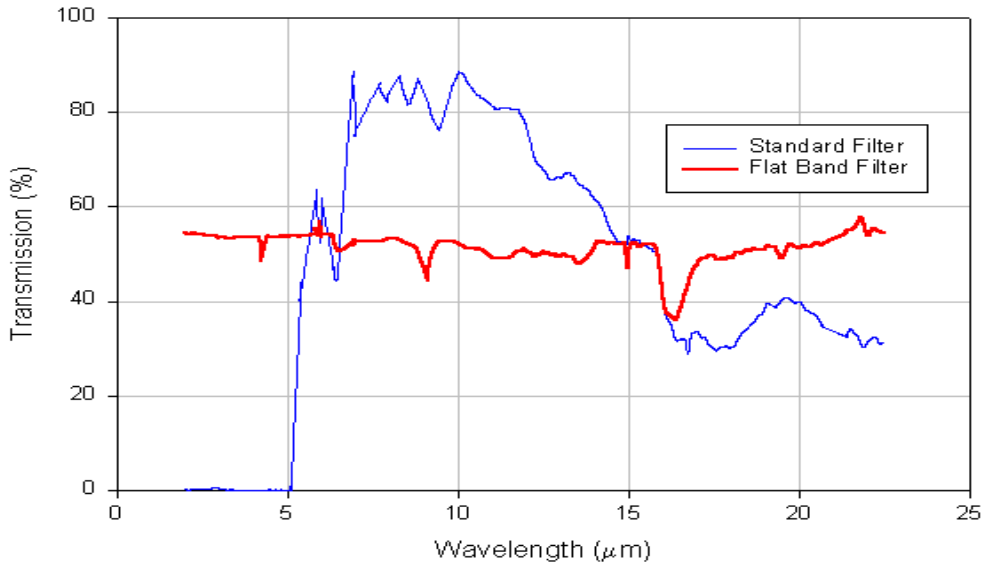
Order information : OTC-238-A

A : 1 : standard filter (5-14μm)

2 : silicon filter with flat band transmission

Transmission of filter

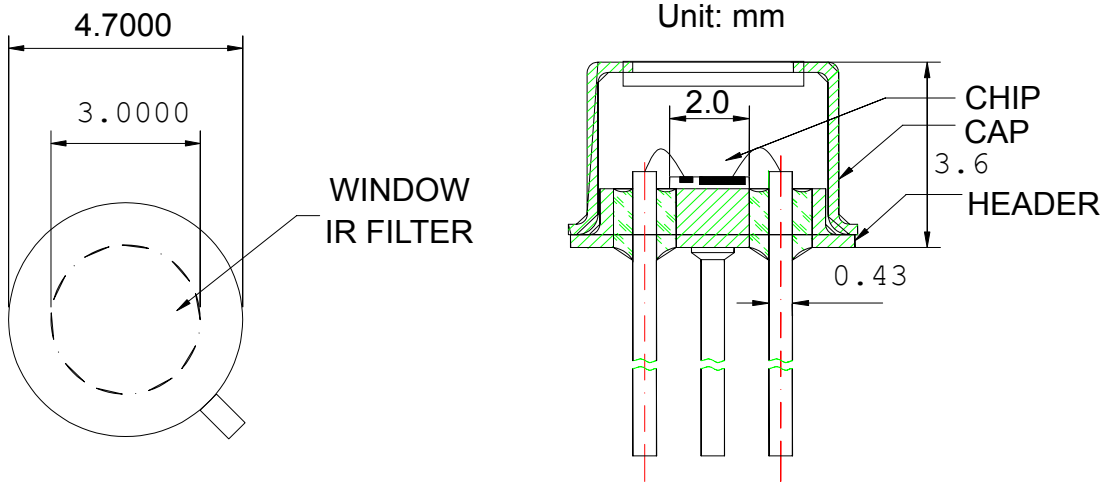
Transmission of optical filter is measured by FTIR from 2μm



Package

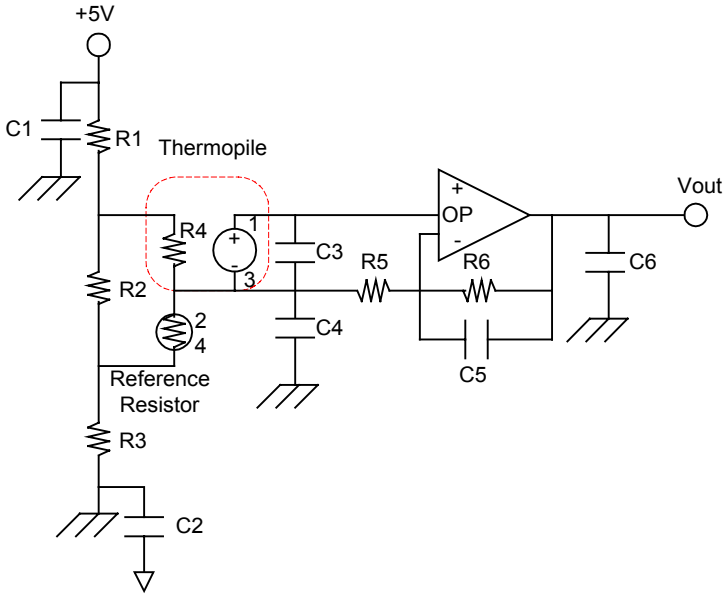
The sensor is hermetically sealed into a TO-18 metal housing, with optical filter. This standard filter allows measurements to be made in the spectral range above 5μm wavelength. The dimensions of header and cap are shown below.

Unit: mm



Application circuit

Circuit 1 :



Circuit 2 :