

## Features and Benefits

Solid state sensor  
High reliability  
Low cost, small size  
On chip temperature sensor

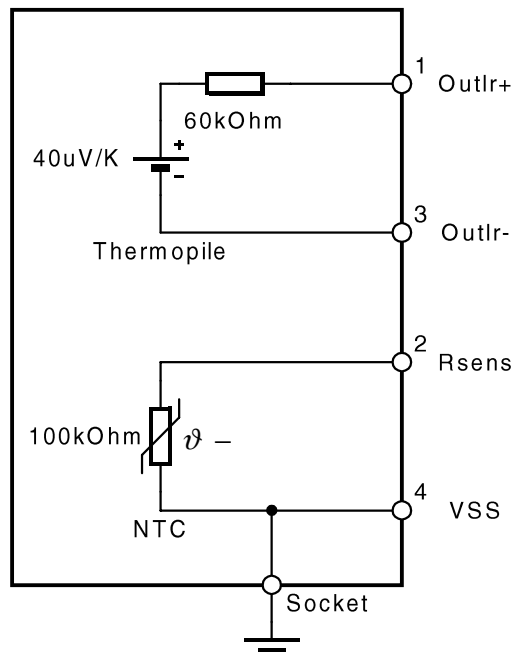
## Applications

Non-Contact Temperature Sensing  
Differential Temperature Sensing  
Climate Control  
Ear, Temple Thermometers  
Household and Commercial Appliances

## Ordering Information

Part No.	Description
MLX90247C	Thermopile with 100K NTC Thermistor

## Functional Diagram



## Description

The MLX90247C is a thermopile sensor IC which detects very small amounts of heat radiation. The sensor consists of a membrane with a thermopile on top of it.

The hot junctions of the thermopile are positioned near the center of the membrane, the cold junctions above the bulk silicon edge.

Due to the low thermal conductivity of the membrane, absorbed heat will cause the temperature to increase more at the center of the membrane than at the edge above the bulk. This temperature difference is converted to an electric potential by the thermo-electric effect in the thermopile junctions. No supply voltage is needed.

The sensor IC is packaged together with a NTC chip thermistor for cold junction reference. The thermopile and thermistor are separate components, mounted in close proximity. The NTC thermistors have higher sensitivity at low temperatures than the standard PTC thermistors in the B and D models.

The sensor and thermistor can be used independent of each other if desired, as the thermopile potential is floating.

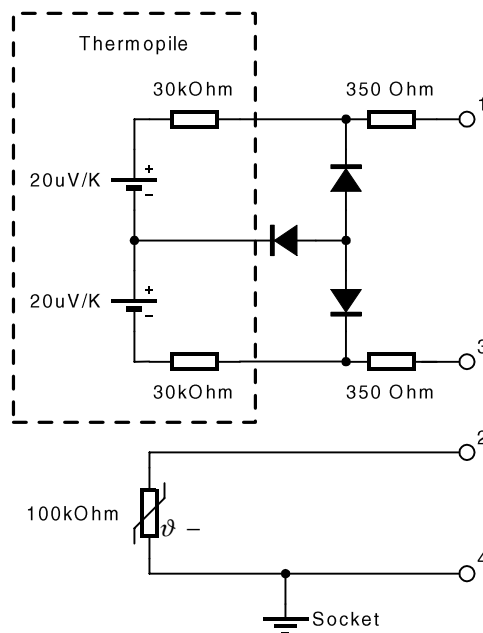
## MLX90247C Electrical Specifications

DC Operating Parameters  $T_A = -40^{\circ}\text{C}$  to  $150^{\circ}\text{C}$ , (unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Thermopile Resistance	Rtp	@298K	44	59.5	75	$k\Omega$
Sensitivity	S	sensor @298K black body @299K	29	42	55	$\mu\text{V}/\text{K}$
TC of Sensitivity	TCs	@298K		0.1		$\%/K$
Time constant	T				30	ms
Thermistor Value	Rntc	@298K	95	100	105	$k\Omega$
Thermal Coefficient NTC <sup>(1)</sup>	$\beta_{ntc}$	0-50°C <sup>(1)</sup>	4120	4140	4161	K

(1) Tolerance given between  $15^{\circ}\text{C}$  and  $35^{\circ}\text{C}$ . Typical value corresponds to a relative resistance change of  $-4.68\%/^{\circ}\text{C}$ . Definition of  $\beta$  is  $\Delta \ln R / \Delta (1/T)$  with T in K. (Naperian logarithm).

Note: when measuring resistances with an ohm meter, please take care that the internal protection diodes, as indicated in the functional diagram below, are always reverse biased.



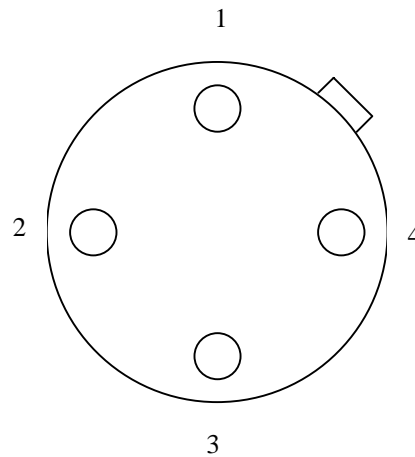
## MLX90247C Absolute Maximum Ratings

Parameter	Value	Unit	Comment
Operating temperature	-40 ~ 150	$^{\circ}\text{C}$	Keep diode leakage in mind at high temperatures
Storage temperature	-40 ~ 150	$^{\circ}\text{C}$	
Soldering temperature	<220	$^{\circ}\text{C}$	t<5sec

## MLX90247C Pinout

Pin	Symbol	Description
1	Outlr+	Infrared Thermopile positive output
2	Rsens	Thermistor for sensor ambient temperature measurement
3	Outlr-	Infrared Thermopile negative output
4	Vss	Thermistor ground / case potential

TO-39 package - connections



Top view = pins down

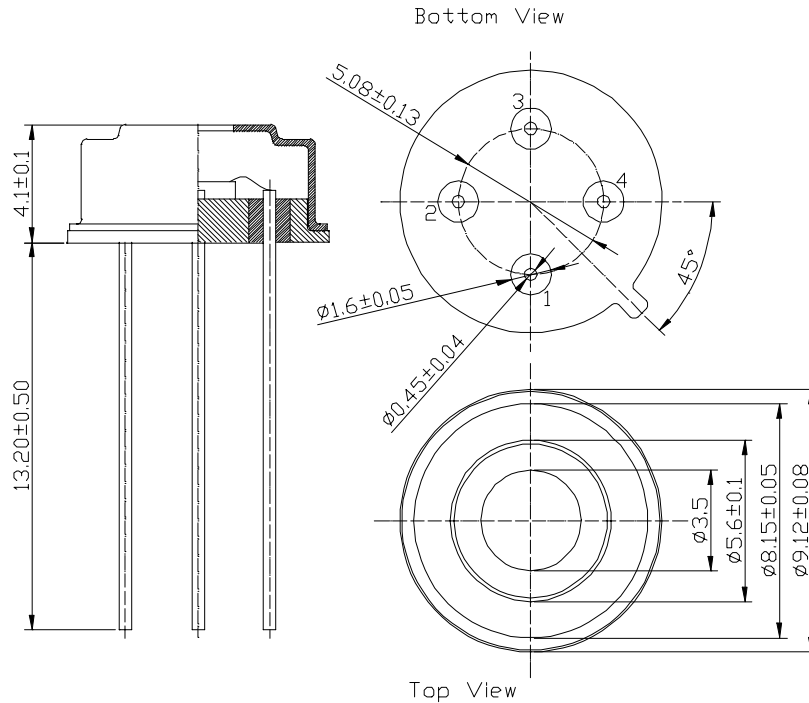
## ML90247C Mechanical Specifications

Parameter	Value	Unit	Comment
TO-39 specifications			
Metal cap			Welded
Filling gas			Nitrogen
Filter specifications			
Transmission	>75	%	$7.5\mu < \lambda < 13.5\mu$
Transmission	<0.5	%	$0 < \lambda < 5\mu$
Sensor window			
FOV	100	°	Full opening angle: Determined by aperture
Aperture diameter	3.5	mm	Default

**ESD Precautions** Electronic semiconductor products are sensitive to Electro Static Discharge (ESD). Always observe ESD control procedures whenever handling semiconductor devices.

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**RA (TO-39) Package Outline**



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