

Features and Benefits

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

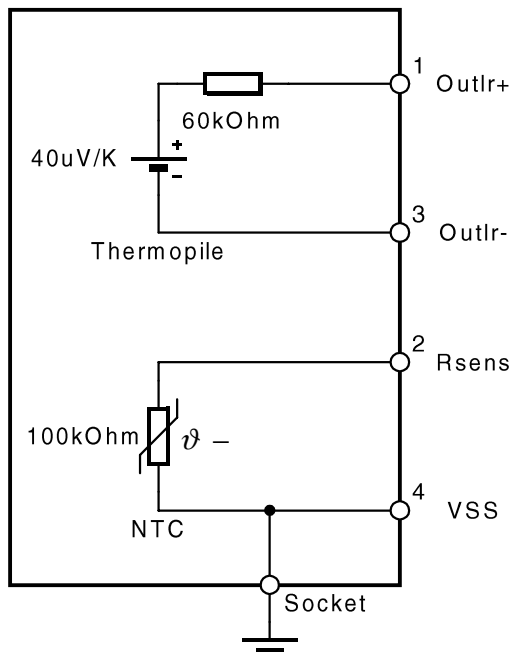
Applications

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.

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

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

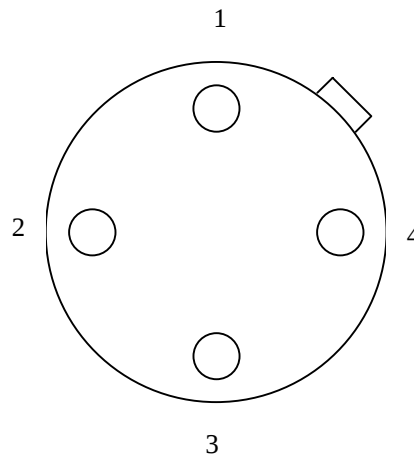
The diagram shows a thermopile circuit. Inside a dashed box labeled "Thermopile", two 20 uV/K sensors are connected in series. Each sensor has a $30\text{ k}\Omega$ resistor in series with its output. The output of the thermopile is connected to a bridge circuit. The bridge consists of two $350\text{ }\Omega$ resistors in series with two diodes. The bridge is connected to a $100\text{ k}\Omega$ resistor and a socket.

Parameter	Value	Unit	Comment
Operating temperature	-40 ~ 150	°C	Keep diode leakage in mind at high temperatures
Storage temperature	-40 ~ 150	°C	
Soldering temperature	<220	°C	t<5sec

MLX90247C Pinout

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

TO-39 package - connections



Top view = pins down

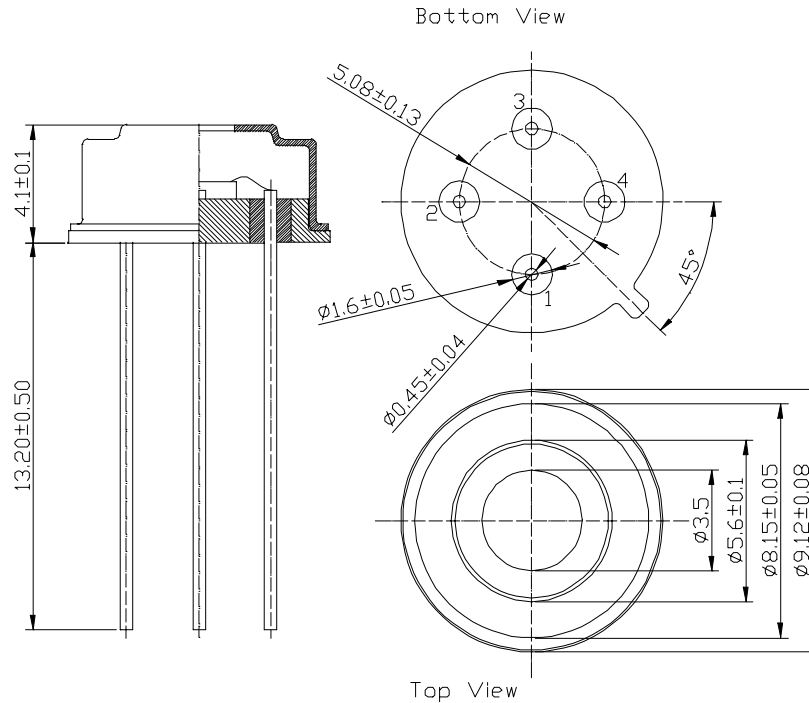
ML90247C Mechanical Specifications

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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