

Overview

KEMET's Pyroelectric Infrared Sensors use the pyroelectric effect of ceramic by absorbing infrared rays emitted from the human body. This detects the natural infrared signature produced by humans. Also, it can detect infrared rays without using lenses.

Due to the absence of a lens, KEMET's Pyro Sensor is low profile, as it does not protrude, which makes it ideal for gathering visual requirements. With KEMET's proprietary piezoelectric ceramic material and element structure of the Pyroelectric Infrared Sensor, humans can be detected through glass or resin. This allows more freedom in the design of the outer appearance of the end product.

Applications

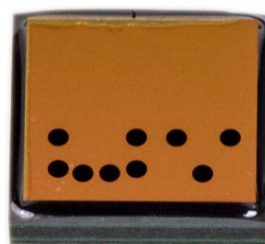
Typical applications include human presence detection sensing for energy saving functions in:

- Contact less switching
- Office automation equipment
- Home appliances
- Lighting
- Display products
- Air-conditioners
- TV
- PC monitors
- Rice cookers
- Smart toilets

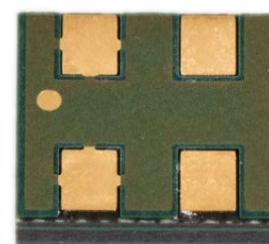
Benefits

- Reflow capable SMD configuration
- Lens not required
- Wide view angle up to ± 60 degrees
- Detection possible through glass or resin
- Low power consumption, down in the μA range
- Excellent radio wave performance in high-frequency band
- Compact and low profile (5.0 x 4.8 x 1.7 mm)

Front



Back



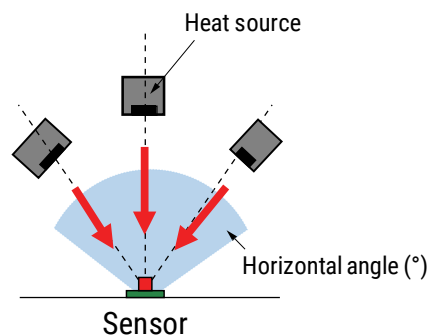
Ordering Information

PL-	N	823-	01
Series	Lens Type	Sensor Type	Serial Number
PL	N = No lens	823	01

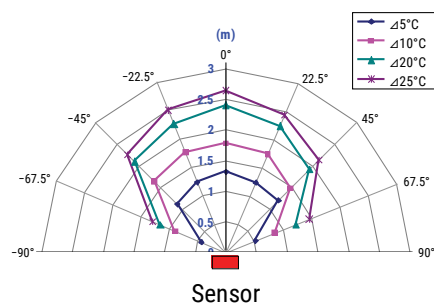
Performance Characteristics

Item	Performance Characteristics
Operating temperature	-40°C to +70°C
Storage temperature	-40°C to +85°C

Measuring Method



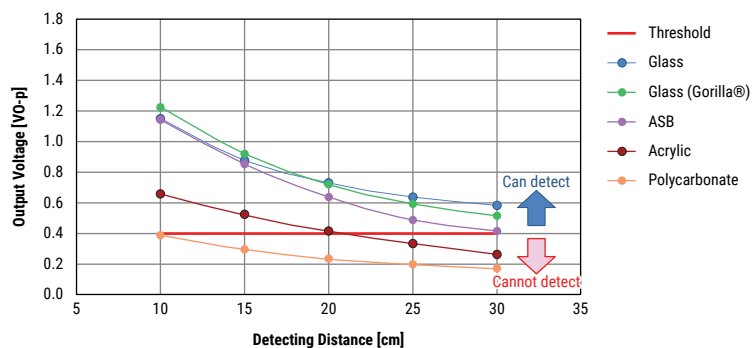
Detected Distance (m)



ΔT (°C) = Difference between room temperature and heat source temperature

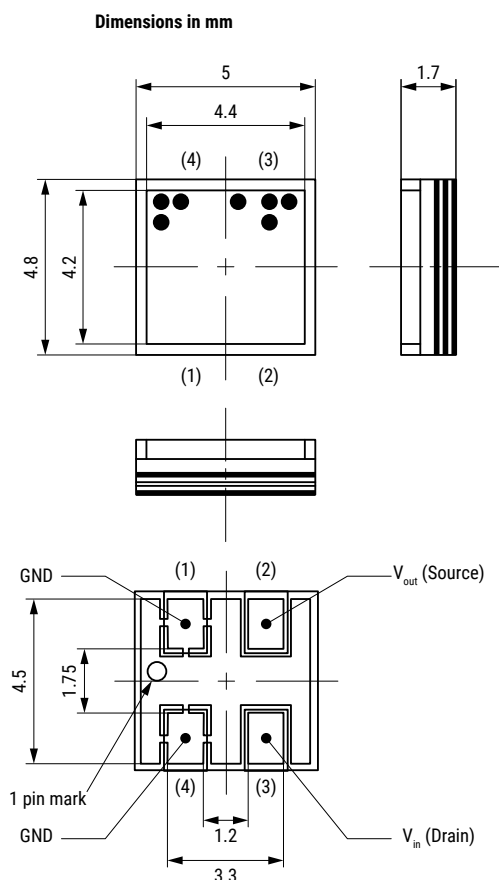
Performance Characteristics (cont.)

Detecting Performance with Different Materials



Measuring conditions: Transfer velocity - 1 m/s
Heat source size - 170×70 mm (relative to hand)
Temperature difference - $\Delta 10^{\circ}\text{C}$
Each material thickness - 1 mm (clear color)

Dimensions in mm



Pin Number	Pin Name
1	GND
2	V_{out} (Source)
3	V_{in} (Drain)
4	GND

Environmental Compliance

All KEMET Pyroelectric Infrared Sensors are RoHS and REACH Compliant.



Article 33(1) of the REACH Regulation states that manufacturers and importers of articles (products) are required to notify their customers of the presence of any Substances of Very High Concern (SVHC) in their products exceeding 0.1% by weight and provide instructions on safe use of the product.

KEMET Corporation reports regarding the Article 33(1) of REACH Regulation as follows:

1. Applicable Product: Pyroelectric Infrared Sensors (PL series)

2. Report for the content of REACH SVHC list:

The product(s) above contains a substance by more than 0.1wt% per product weight that was published in the 8th update of the REACH SVHC substances (December 19, 2012).

3. Regarding the safety of the pyroelectric infrared sensors (Piezoceramic products):

The Piezoceramic that is used in this product becomes ceramic by sintering powder containing PZT as the main ingredient. It is chemically stable, with minimum risks toward the human body or environment within the intended use of the product. Please note that risks could occur in the case of inhalation or accidental oral uptake of powder ceramics.

4. Technical product information on the multilayer piezoelectric actuators (Piezoceramic products):

The manufacturing technique of the "piezoceramic products" whose main ingredient is Lead Titanium Zirconium Oxide (PZT) has been established, and there is no alternative material that can exhibit superior performance than PZT at this moment. Please note that the piezoceramic is listed as an exempt on RoHS (2011/65/EU) AnnexIII (7c.1).

5. The responsibility of piezoceramic manufacturers:

Piezoceramic manufacturers report information regarding PZT containment in their products to the customers to obey the article 33 of the REACH regulation

Table 1 – Ratings & Part Number Reference

Part Number	Supply Voltage (VDC)	Minimum Output Voltage ¹ (mVp-p)	Source Voltage ² (V)	Maximum Noise ³ (mVp-p)	Maximum Warm up Time ⁴ (seconds) Maximum	Field of View (°)	MSL Reflow Temp ≤ 240°C	Weight (g)
PL-N823-01	2.0 ~ 15.0	550	0.3 ~ 0.9	140	30	Horizontal: ±60° Vertical : ±60°	3	0.1

¹ Difference of temperature with ambient temperature and heat source: 70°C, aperture diameter: $\Phi 10$, 1 Hz and AMP: 26 dB

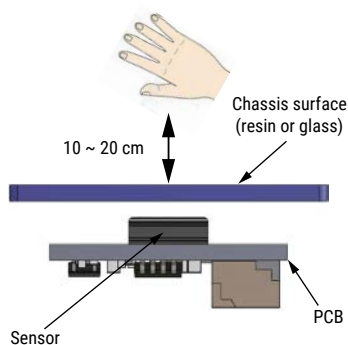
² $V_d = 5\text{ V}$ and $R_s = 47\text{ k}\Omega$

³ AMP = 72 dB and $R_s = 47\text{ k}\Omega$

⁴ The warm up time is defined by the time needed for the source voltage to reach a rated value after the sensor's power supply has been turned on.

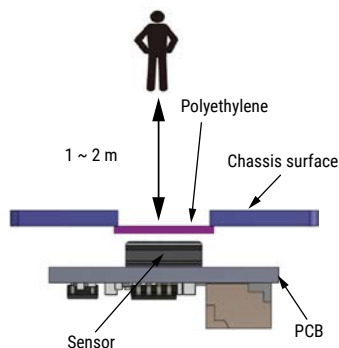
Applications

Non-contact Switch



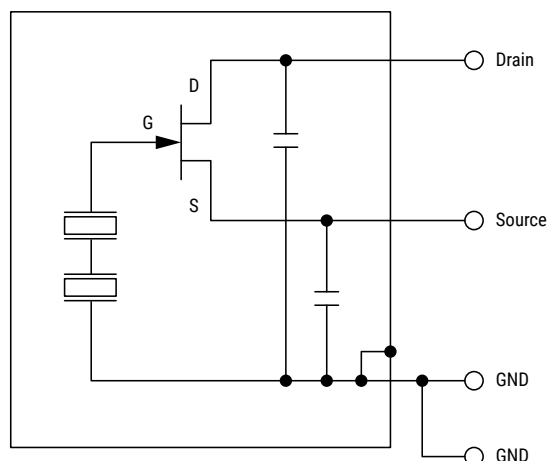
Detecting distance will vary by the chassis material used.

Common Application



Detecting distance increased to a few meters by using a polyethylene plate.

Part Schematic

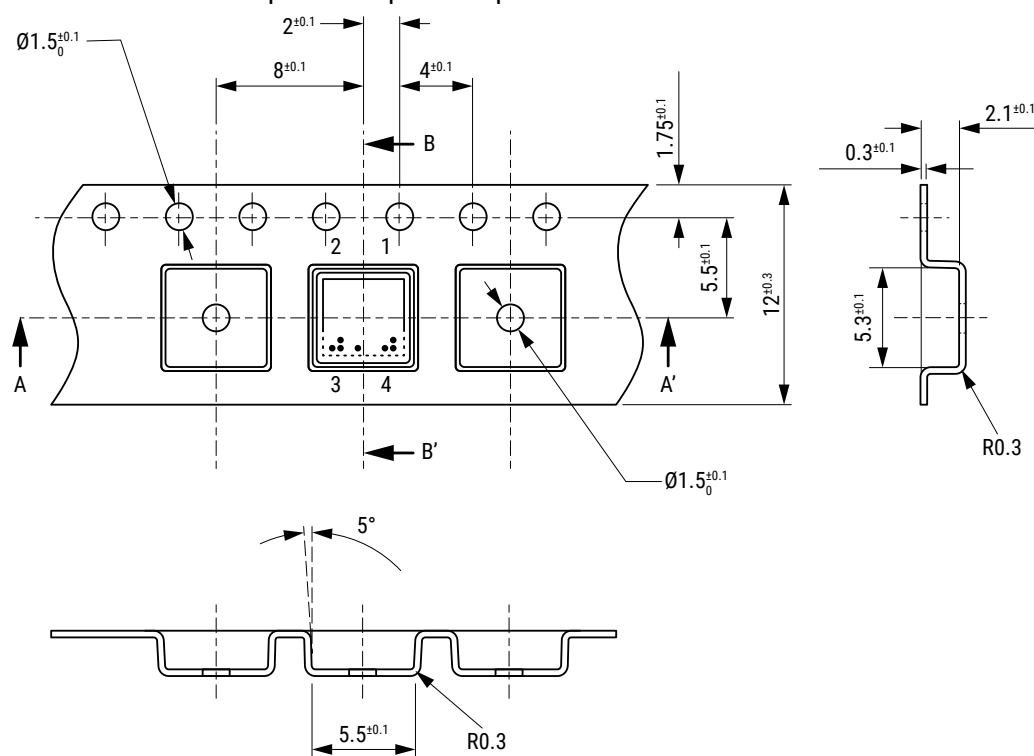


Tape & Reel Packaging Information

Series	Packaging Type	Pieces per Reel
PL	Tape & Reel	2,000

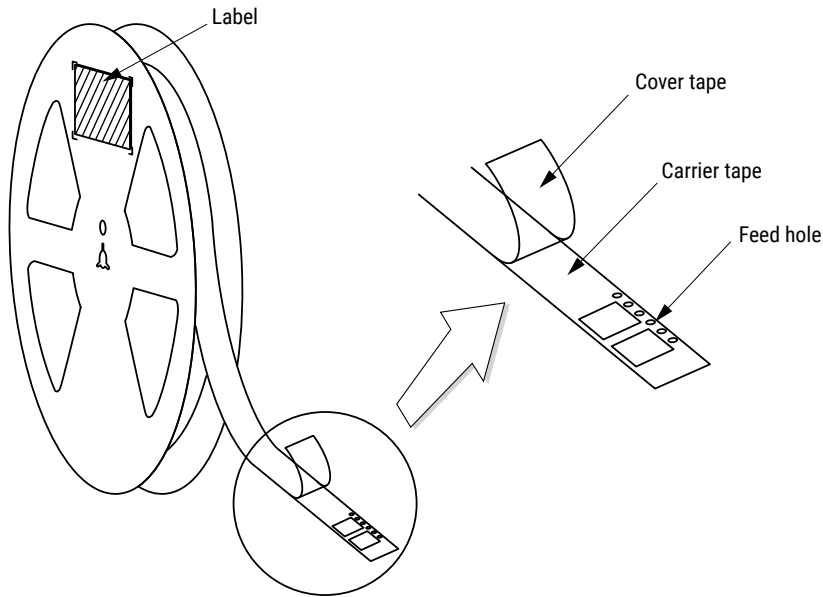
Taping Specifications

Dimensions of indented square hole plastic tape



Tape & Reel Packaging Information cont.

Reel Specifications



Handling Precautions

Pyroelectric Infrared Sensors should be kept away from indirect and direct sunlight, the headlights of cars, wind, and exposure to strong vibration and strong shock. Do not use in water, alcohol ETA, corrosive gas or undersea breeze. Do not drop or apply any mechanical stress.

Pyroelectric Infrared Sensors should be stored in normal working environments. Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long-term storage. KEMET recommends that maximum storage temperature not exceed 25°C and maximum storage humidity not exceed 50% relative humidity. Atmospheres should be free of chlorine and sulfur-bearing compounds.

Temperature fluctuations should be minimized to avoid condensation on the parts. For optimized solderability sensors stock should be used promptly, preferably within six months of receipt.

Export Control

For customers in Japan

For products which are controlled items subject to the “Foreign Exchange and Foreign Trade Law” of Japan, the export license specified by the law is required for export.

For customers outside Japan

Sensors should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles), or any other weapons.

KEMET Electronics Corporation Sales Offices

For a complete list of our global sales offices, please visit www.kemet.com/sales.

Disclaimer

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Although KEMET designs and manufactures its products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.

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