**Overview**

KEMET’s Pyroelectric Infrared Sensors have a low profile design and can be used without a lens to enable miniaturized designs and are ideal to detect human proximity by IR presence.

KEMET’s proprietary piezoelectric ceramic material and structural development of the pyroelectric infrared sensor enables human presence detection through solid plastic materials or glass, which allows more mechanical and optical appearance design possibilities of the end product. The sensor can be used without a lens or, to extend the detection range, a proprietary KEMET lens can be used in 3 different colors.

**Benefits**

- Reflow capable SMD configuration
- Lens not required
- A lens can be attached to the sensor
- Wide view angle up to ±60 degrees (lensless)
- View angle up to ±37/±28 degrees (with lens)
- 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)

**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

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**Proximity Sensors**

**PL Pyroelectric Infrared Sensors**

**Sensor - Front**

**Sensor - Back**

**Natural Lens**

**White Lens**

**Black Lens**
Ordering Information

<table>
<thead>
<tr>
<th>PL-</th>
<th>N</th>
<th>823-</th>
<th>01</th>
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<tbody>
<tr>
<td></td>
<td>Lens Type</td>
<td>Sensor Type</td>
<td>Serial Number</td>
</tr>
<tr>
<td>PL</td>
<td>N = Lens not supported</td>
<td>823</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>Q = Lens supported</td>
<td>873</td>
<td>02</td>
</tr>
</tbody>
</table>

1 The Lens Type "Q = Lens supported" is not including the lens itself, to be selected and purchased separately, as per below table.

<table>
<thead>
<tr>
<th>PL-</th>
<th>001L-</th>
<th>N</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Lens Type</td>
<td>Color Type</td>
</tr>
<tr>
<td>PL</td>
<td>001L</td>
<td>BK = Black</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N = Natural</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W = White</td>
</tr>
</tbody>
</table>

Performance Characteristics

Measuring Method

Detected Distance (m)

$\Delta T (^{\circ}C) = $ Difference between room temperature and heat source temperature
Performance Characteristics cont.

PL-001L-N - Field of View (Unit: m)

±37°

±28°

Horizontal View

Vertical View

PL-001L-N - Projection View

Projection View at 5 m

Unit: m

Sensor Detection Area (P/N: PL-Q873-02)

Unit: mm

Detecting Performance with Different Materials

Measuring conditions:
- Transfer velocity - 1 m/s
- Heat source size - 170×70 mm (relative to hand)
- Temperature difference - Δ10°C
- Each material thickness - 1 mm (clear color)
Dimensions in mm

Sensor - Dimensions in mm

Sensor - Land Pattern in mm

Sensor - Pin Assignment

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Pin Name</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>V_{out} (Source)</td>
</tr>
<tr>
<td>3</td>
<td>V_{in} (Drain)</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
</tbody>
</table>
Dimensions in mm cont.

Lens - Dimensions in mm

Lens Area with Crack

Sensor and Lens Mounting Direction

Standard Position of Sensor

PCB Hole Dimension
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

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Part Number</th>
<th>Supply Voltage (VDC)</th>
<th>Output Voltage (^1) (mVp-p) Minimum</th>
<th>Source Voltage (^2) (V)</th>
<th>Noise (^3) (mVp-p) Maximum</th>
<th>Warm up Time (^4) (seconds) Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PL-N823-01</td>
<td>2.0 ~ 15.0</td>
<td>550</td>
<td>0.3 ~ 0.9</td>
<td>140</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>PL-Q873-02</td>
<td>2.0 ~ 15.0</td>
<td>550</td>
<td>0.3 ~ 0.9</td>
<td>140</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lens</th>
<th>Part Number</th>
<th>Lens Color</th>
<th>Detection Distance (^1) (m)</th>
<th>Field of View (°)</th>
<th>Operating Temperature (°C)</th>
<th>Storage Temperature (°C)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PL-001L-N</td>
<td>Natural</td>
<td>5.0</td>
<td>Horizontal: ±37° Vertical: ±28°</td>
<td>−20°C to +60°C</td>
<td>−25°C to +75°C</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>PL-001L-BK</td>
<td>Black</td>
<td>3.5</td>
<td>Horizontal: ±37° Vertical: ±28°</td>
<td>−20°C to +60°C</td>
<td>−25°C to +75°C</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>PL-001L-W</td>
<td>White</td>
<td>3.5</td>
<td>Horizontal: ±37° Vertical: ±28°</td>
<td>−20°C to +60°C</td>
<td>−25°C to +75°C</td>
<td>0.07</td>
</tr>
</tbody>
</table>

\(^1\) Difference of temperature with ambient temperature and heat source: 70°C, aperture diameter: Φ10, 1 Hz and AMP: 26 dB

\(^2\) Vd = 5 V and Rs = 47 kΩ

\(^3\) AMP = 72 dB and Rs = 47 kΩ

\(^4\) 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.

\(^1\) Reference data using SS-430L
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

Without Lens Type

With Lens Type
# Tape & Reel Packaging Information

## Sensor

<table>
<thead>
<tr>
<th>Series</th>
<th>Packaging Type</th>
<th>Pieces per Reel</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL</td>
<td>Tape &amp; Reel</td>
<td>2,000</td>
</tr>
</tbody>
</table>

## Lens

<table>
<thead>
<tr>
<th>Series</th>
<th>Packaging Type</th>
<th>Pieces per Tray</th>
<th>Pieces per Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL</td>
<td>Tray</td>
<td>100</td>
<td>2,000</td>
</tr>
</tbody>
</table>

## Taping Specifications

Dimensions of indented square hole plastic tape

![Taping Specifications Diagram](image-url)
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. Do not expose to high temperatures, high humidity, corrosive atmospheres, and avoid 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. The stock of sensors should be used promptly, preferably within six months of receipt.
KEMET Electronics Corporation Sales Offices

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

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

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