PbSe near-infrared detector
Single-Pixel double encapsulated TO-package

Features

- Double encapsulation (thin-film + TO package)
- High durability for rugged operation
- Room temperature operation
- Sapphire window

Applications

- Flame monitoring
- Flame and spark detection
- Gas detection and analysis
- Spectroscopy
- Temperature measurement
- Moisture measurement

Electrical and optical characteristics

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Active area [mm x mm]</th>
<th>Peak responsivity S [V/W]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PbSe010010T05</td>
<td>1 x 1</td>
<td>4.5 \times 10^4 \quad 2.3 \times 10^4</td>
</tr>
<tr>
<td>PbSe020020T05</td>
<td>2 x 2</td>
<td>4 \times 10^4 \quad 2 \times 10^4</td>
</tr>
<tr>
<td>PbSe030030T05</td>
<td>3 x 3</td>
<td>1.5 \times 10^4 \quad 8 \times 10^3</td>
</tr>
<tr>
<td>PbSe060060T08</td>
<td>6 x 6</td>
<td>8 \times 10^3 \quad 4 \times 10^3</td>
</tr>
</tbody>
</table>

- Measured with 500K blackbody
- Measured in a voltage divider circuit with 1 MΩ load resistor
- Photo responsivity and detectivity calculated for a voltage divider circuit with matched resistance and 50 V/mm

<table>
<thead>
<tr>
<th>Element temperature [°C]</th>
<th>Peak wavelength λ_P [µm]</th>
<th>20% cut-off wavelength λ_C [µm]</th>
<th>Peak D* (620 Hz, 1 Hz) [cm·Hz^{1/2}/W]</th>
<th>Time constant [µs]^a</th>
<th>Dark resistance R_0 [MΩ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>3.8</td>
<td>4.5</td>
<td>1.8 \times 10^{10}</td>
<td>1.2 \times 10^{10}</td>
<td>4</td>
</tr>
</tbody>
</table>

^a literature value

Storage

- Storage temperature: -55°C to +90°C
- Exposure to UV light results in permanent damage
- Prolonged exposure to visible light results in temporary low dark resistance

Handling

- Ensure dust-free environment for device handling
- Operating temperature: -30°C to +90°C
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Options

- Custom windows and filters
- 1-stage or 2-stage Thermoelectric cooler (TEC) including thermistor
- Built-in internal LED for illumination and detection
- Custom packages upon request
- Evaluation Kit available

TO5 exemplary package outlines (dimensions in mm)

PbSe020020TO5

Bottom view

Side view

Top view

Schematic

1. Electrode 1
2. GND
3. Electrode 2

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TO8 exemplary package outlines (dimensions in mm)
PbSe060060TO8

Bottom view

Pin no.  
5 - Detector 11 - Detector

Side view

Sensor plane

Clear aperture

Top view

Section A-A

Schematic

1. Electrode 1
2. Electrode 2

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Exemplary circuit

$$\begin{align*}
V_B &: \text{Bias voltage} \\
V_O &: \text{Output voltage} \\
R_D &: \text{Dark resistance of the detector} \\
R_L &: \text{Load resistor} \\
C_F &: \text{Filter capacitor} \\
R_F &: \text{Filter resistor} \\
R_I &: \text{Feedback resistor} \\
R_1 &: \text{Gain resistor}
\end{align*}$$

Regulatory

For the use of trinamiX PbS and PbSe infrared photodetectors in medical devices, monitoring and control instruments and consumer applications RoHS exemptions apply.

For automotive applications trinamiX PbS and PbSe infrared photodetectors fall under ELV exemption.