PbS near-infrared detector
Single-Pixel double encapsulated in TO package

Features
- Double encapsulation (thin-film and TO package)
- High durability for rugged operation
- Very high sensitivity
- 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></td>
<td></td>
<td>Typ.</td>
</tr>
<tr>
<td>PbS010010TO5</td>
<td>1 x 1</td>
<td>8 \cdot 10^5</td>
</tr>
<tr>
<td>PbS020020TO5</td>
<td>2 x 2</td>
<td>4 \cdot 10^5</td>
</tr>
<tr>
<td>PbS030030TO5</td>
<td>3 x 3</td>
<td>3 \cdot 10^5</td>
</tr>
<tr>
<td>PbS060060TO8</td>
<td>6 x 6</td>
<td>1.4 \cdot 10^5</td>
</tr>
<tr>
<td>PbS010050TO5*</td>
<td>1 x 5</td>
<td>3.5 \cdot 10^5</td>
</tr>
</tbody>
</table>

* Dark resistance R_D [MΩ] = 0.05 - 1

- Measured with 1550 nm LED, incident power 16 µW/cm²
- 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 (\lambda_p) [µm]</th>
<th>20% cut-off wavelength (\lambda_c) [µm]</th>
<th>Peak D* (620 Hz, 1 Hz) [cm·Hz½/W]</th>
<th>Time constant [µs]</th>
<th>Dark resistance R_D [MΩ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>2.7</td>
<td>2.9</td>
<td>1.1 \cdot 10^{11}</td>
<td>0.8 \cdot 10^{11}</td>
<td>200</td>
</tr>
</tbody>
</table>
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Typical spectral response

Typical frequency response

Typical resistance change over temperature

Storage
- Storage temperature: -55°C to +70°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 +70°C

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

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TO5 exemplary package outlines (dimensions in mm)

PbS020020TO5

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)

PbSO6060TO8

Schematic

1. Electrode 1
2. Electrode 2

1. Photoresistor R₀

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Exemplary circuit

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.