PbS near-infrared detector
Single-Pixel thin-film encapsulated on PCB

Features

- COB for direct PCB mounting
- Castellated holes for easy soldering
- High durability for rugged operation
- Very high sensitivity
- Room temperature operation

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>PbS030030 BC_PCB</td>
<td>3 x 3</td>
<td>3 \cdot 10^5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.8 \cdot 10^5</td>
</tr>
</tbody>
</table>

- Measured with 1550 nm LED, incident power 16 µW/cm²
- Measured in a voltage divider circuit with 50 V/mm
- Photo responsivity and detectivity are measured with constant load resistance (R_L = 1 MΩ) and calculated for matched resistance

<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]</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 \cdot 10^{11}</td>
<td>0.8 \cdot 10^{11}</td>
<td>200</td>
</tr>
</tbody>
</table>

COB on PCB attachment

- Use clean, soft rubber tip for pick and place handling
- UV-curing is not suitable due to permanent damage by UV light exposure
- Element temperature should never exceed +70°C

Soldering

- Product is not compatible with reflow soldering
- Element temperature should never exceed +70°C
- Detector should not be exposed to prolonged heat
- Exposing detector to flux damages thin-film encapsulation
- Recommendation: Careful hand soldering with low flux solder and short soldering time
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Typical spectral response

![Typical spectral response graph](image)

Typical frequency response

![Typical frequency response graph](image)

Typical resistance change over temperature

![Typical resistance change over temperature graph](image)

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

- Active area is scratch sensitive, protect top surface from any mechanical contact
- Ensure dust-free environment for device handling
- Operating temperature: -30°C to +70°C
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Mechanical outlines and land pattern (mm)

Sensor plane

0.5
0.55

7.4
3
3
3.7
4
4

Pad 1; 2: Electrode 1
Pad 3; 4: Electrode 2

3.7
4
8

R0.35
2
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Exemplary circuit

![Exemplary circuit diagram](image)

\[V_B: \text{Bias voltage} \]
\[V_O: \text{Output voltage} \]
\[R_D: \text{Dark resistance of the detector} \]
\[R_L: \text{Load resistor} \]
\[C_F: \text{Filter capacitor} \]
\[R_F: \text{Filter resistor} \]
\[R_I: \text{Feedback resistor} \]
\[R_1: \text{Gain resistor} \]

Regulatory

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

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