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>PbS005005 BC_PCB</td>
<td>0.5 x 0.5</td>
<td>16 · 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·Hz²/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 · 10^{11}</td>
<td>0.8 · 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 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

- 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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**Exemplary circuit**

![Exemplary circuit diagram](image)

- $V_B$: Bias voltage
- $V_D$: Output voltage
- $R_D$: Dark resistance of the detector
- $R_L$: Load resistor
- $C_F$: Filter capacitor
- $R_F$: Filter resistor
- $R_I$: Feedback resistor
- $R_1$: 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.