

PbSe near-infrared detector

Single-Pixel double encapsulated TO-package

trinamiX

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Features

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

Applications

- Gas detection and analysis
- Spectroscopy
- Process control
- Temperature control
- Flame detection and monitoring

Electrical and optical characteristics

| Type No. | Active area [mm x mm] | Peak responsivity S [V/W] | |
|---------------|--------------------------|------------------------------|------------------|
| | | Typ. | Min. |
| PbSe010010T05 | 1 x 1 | $4.5 \cdot 10^4$ | $2.3 \cdot 10^4$ |
| PbSe020020T05 | 2 x 2 | $4.0 \cdot 10^4$ | $2.0 \cdot 10^4$ |
| PbSe030030T05 | 3 x 3 | $1.5 \cdot 10^4$ | $8 \cdot 10^3$ |
| PbSe060060T08 | 6 x 6 | $8 \cdot 10^3$ | $4 \cdot 10^3$ |

| Element temperature [°C] | Peak wave-length λ_p [μm] | 20% cut-off wavelength λ_c [μm] | Peak D* (620 Hz, 1 Hz) [$\text{cm} \cdot \text{Hz}^{1/2} / \text{W}$] | | Time constant [μs] | Dark resistance R_D [$\text{M}\Omega$] |
|-----------------------------|---|---|---|---------------------|------------------------------------|---|
| | Typ. | Typ. | Typ. | Min. | | |
| 22 | 3.8 | 4.5 | $1.8 \cdot 10^{10}$ | $1.2 \cdot 10^{10}$ | 4 | 0.1 - 3 |

- Measured with 500K blackbody
- Measured in a voltage divider circuit with 50 V/mm
- Photo responsivity and detectivity are measured with constant load resistance ($R_L = 1 \text{ M}\Omega$) and calculated for matched resistance

Storage

- Storage temperature: -55°C to +90°C
- 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

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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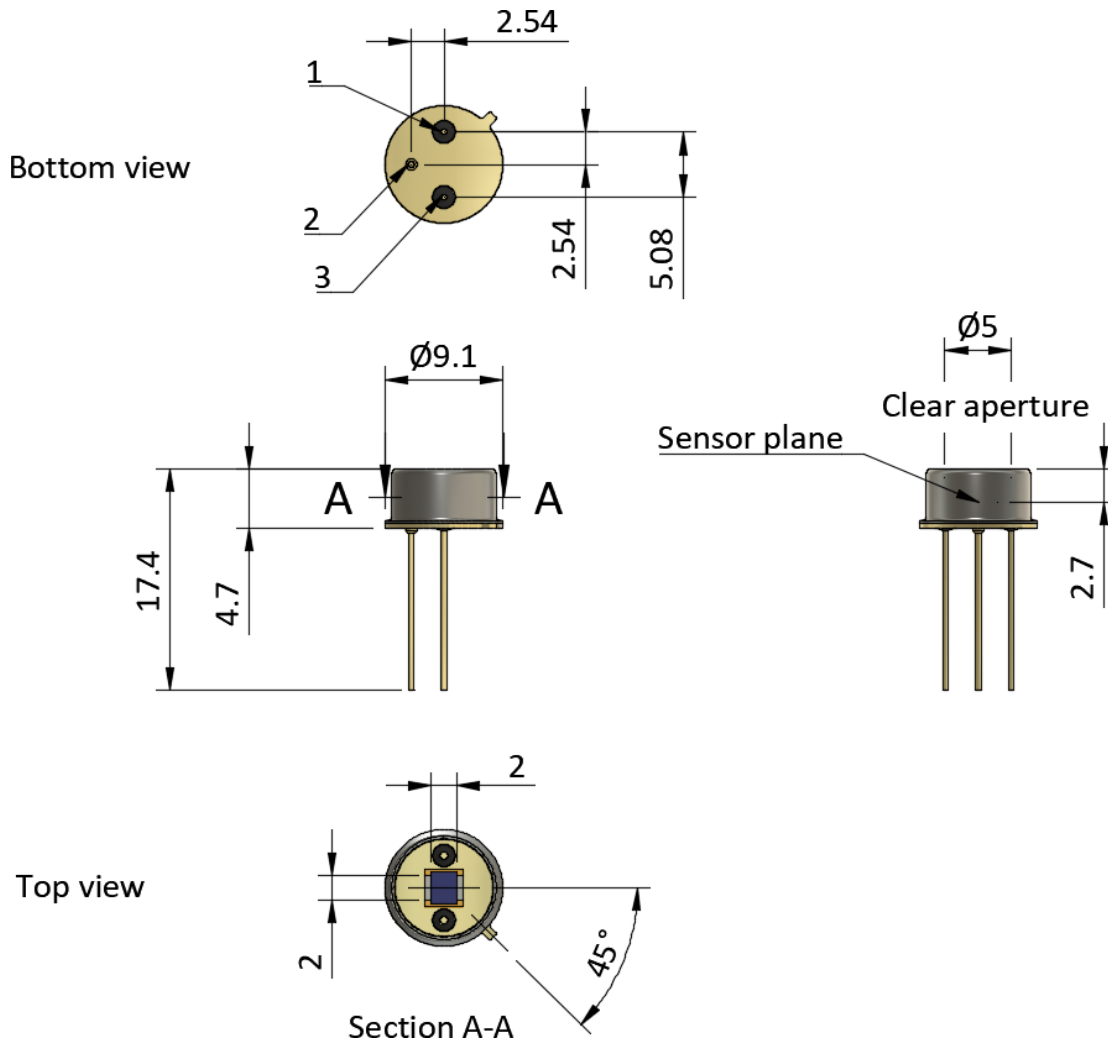
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Release Date: March 20th, 2020
ver. 1.5

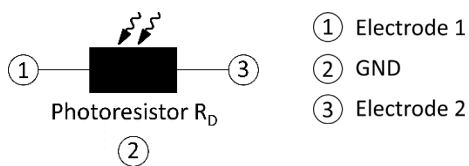
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TO5 exemplary package outlines (mm)

PbSe020020TO5



Schematic



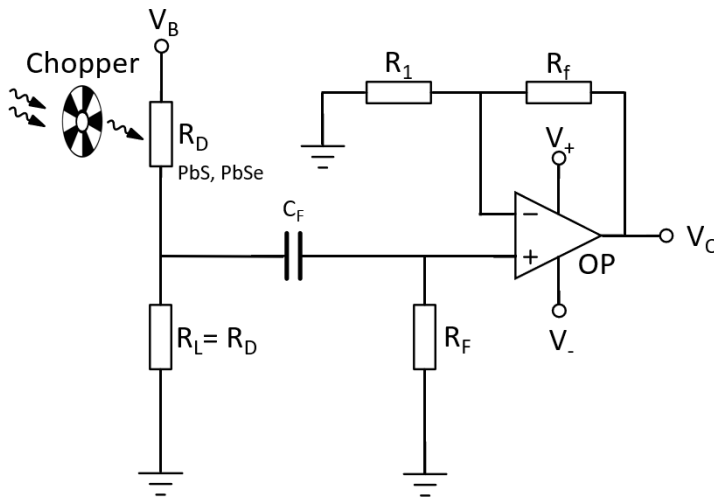
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Exemplary circuit



- V_B : Bias voltage
- V_O : Output voltage
- R_D : Dark resistance of the detector
- R_L : Load resistor
- C_F : Filter capacitor
- R_F : Filter resistor
- R_f : 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.