

# PbSe near-infrared detector

## Single-Pixel double encapsulated TO-package

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### 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

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	$4 \cdot 10^4$	$2 \cdot 10^4$
PbSe030030T05	3 x 3	$1.5 \cdot 10^4$	$8 \cdot 10^3$
PbSe060060T08	6 x 6	$8 \cdot 10^3$	$4 \cdot 10^3$



- 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

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

### 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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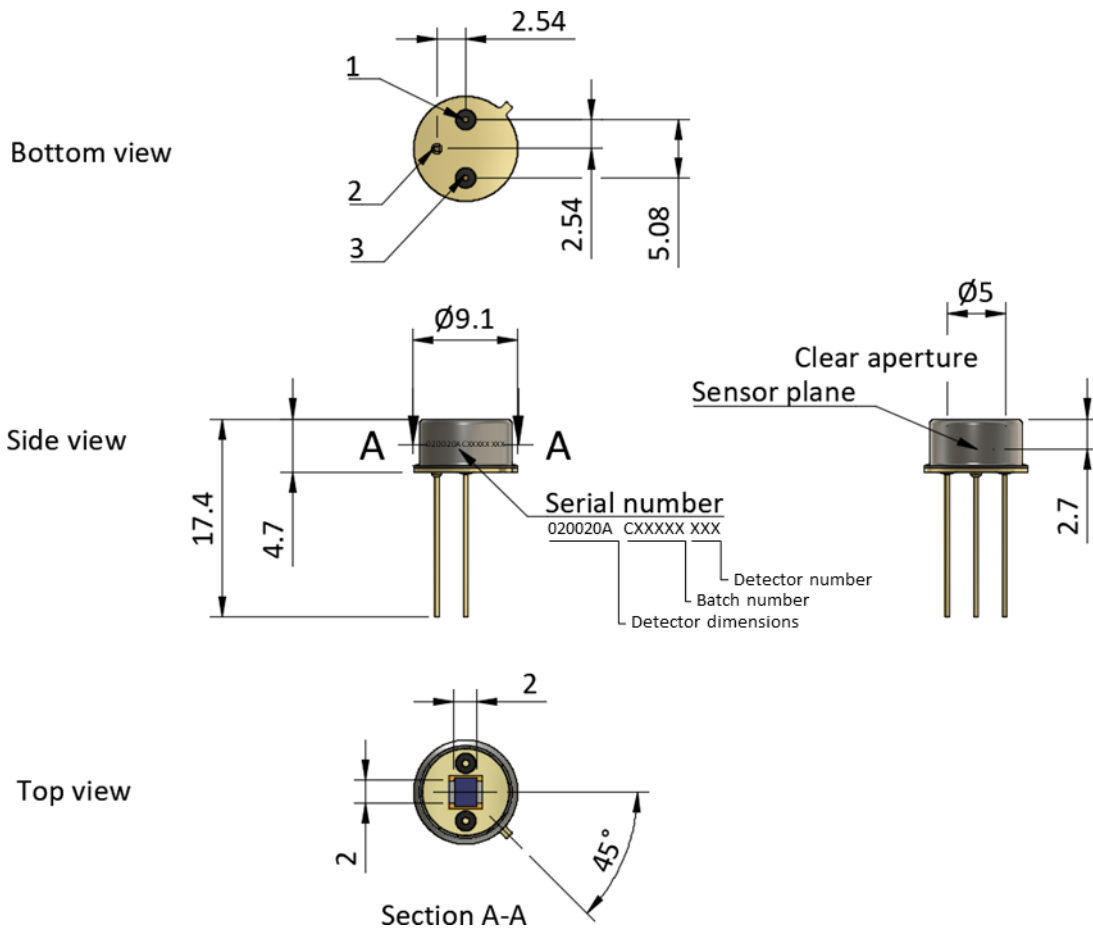
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### Options

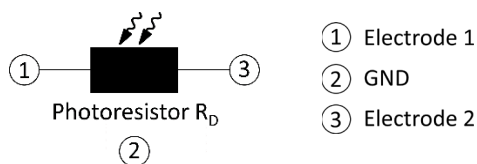
- Custom windows and filters
- 1-stage or 2-stage Thermoelectric cooler (TEC) including thermistor
- Built-in internal LED for illumination and detection
- Custom packages upon request
- Evaluation Kit available

### TO5 exemplary package outlines (mm)

PbSe020020TO5



### Schematic



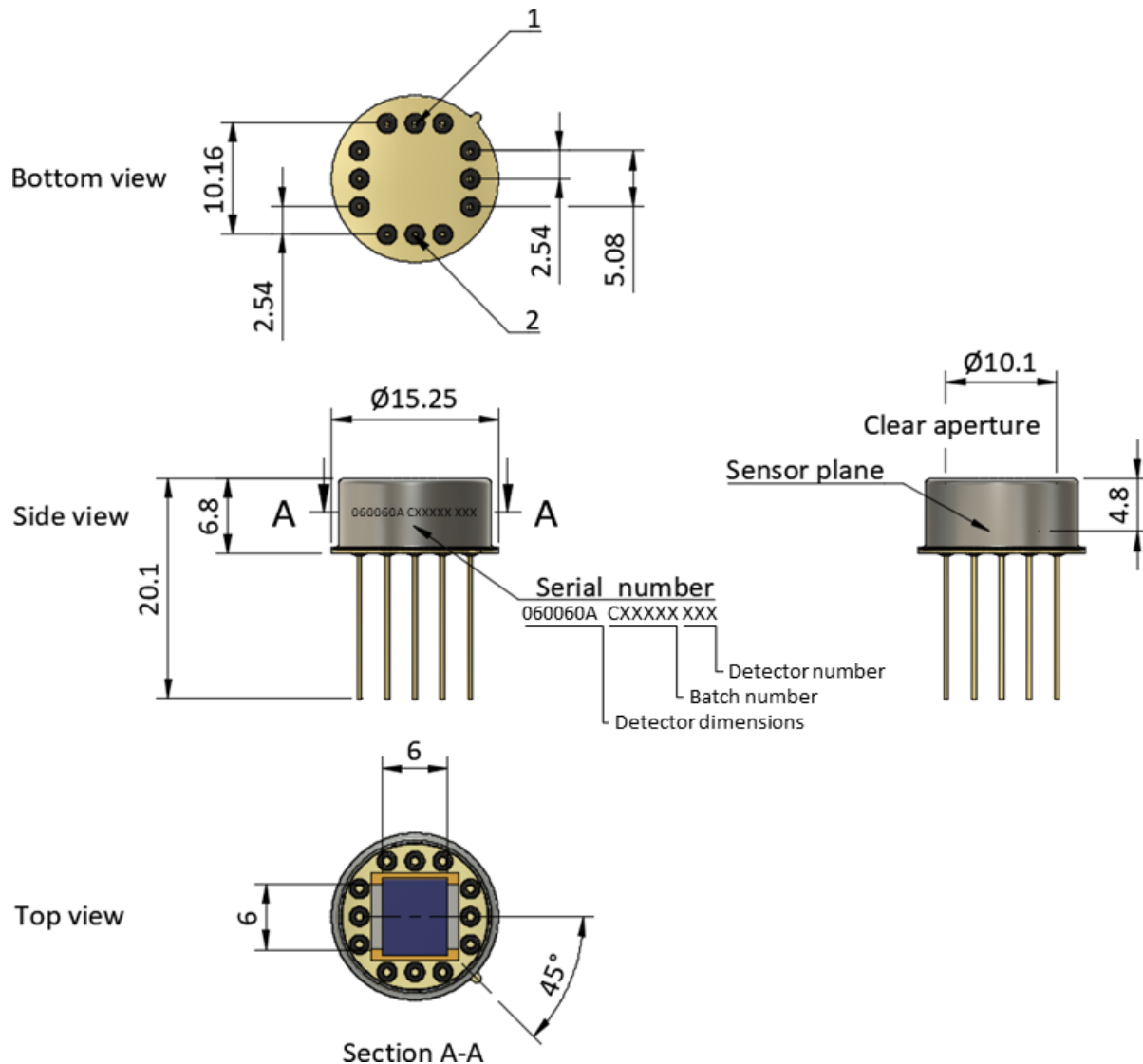
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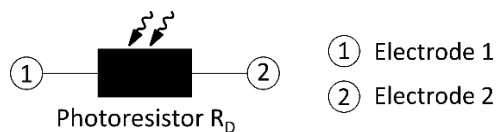
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**TO8 exemplary package outlines (mm)**

**PbSe060060TO8**



**Schematic**

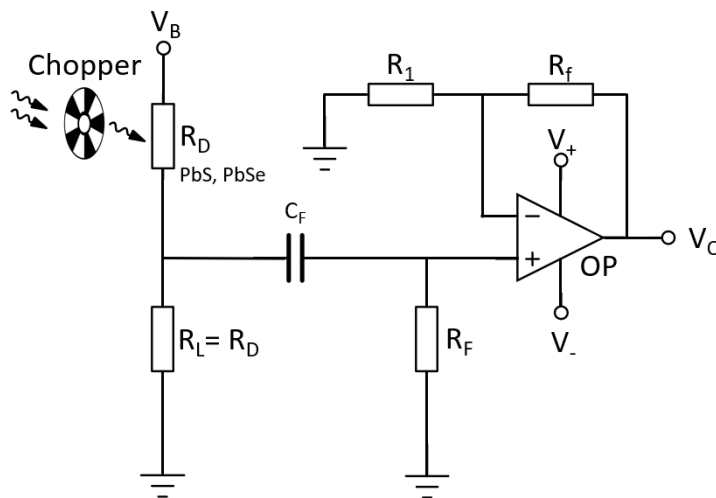


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### Exemplary circuit



- $V_B$ : 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.