

PbS near-infrared detector

Single-Pixel double encapsulated in TO package

trinamiX

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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

Type No.	Active area [mm x mm]	Peak responsivity S [V/W]	
		Typ.	Min.
PbS005005TO5	0.5 x 0.5	$16 \cdot 10^5$	$10 \cdot 10^5$
PbS010010TO5	1 x 1	$8 \cdot 10^5$	$5.6 \cdot 10^5$
PbS020020TO5	2 x 2	$4 \cdot 10^5$	$2.8 \cdot 10^5$
PbS030030TO5	3 x 3	$3 \cdot 10^5$	$1.8 \cdot 10^5$
PbS060060TO8	6 x 6	$1.4 \cdot 10^5$	$0.9 \cdot 10^5$
PbS010050TO5*	1 x 5	$3.5 \cdot 10^5$	$2 \cdot 10^5$

* Dark resistance R_D [M Ω] = 0.05 - 1



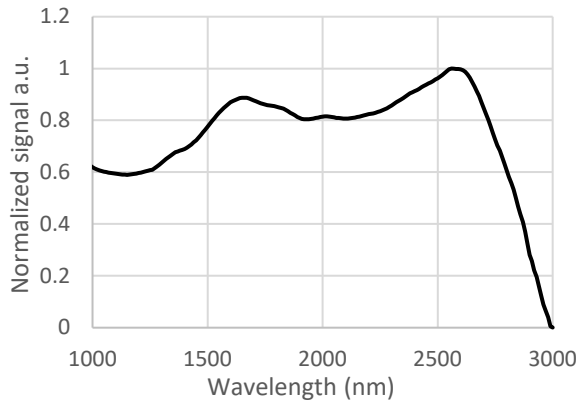
- Measured with 1550 nm LED, incident power 16 $\mu\text{W}/\text{cm}^2$
- Measured in a voltage divider circuit with 50 V/mm
- Photo responsivity and detectivity are measured with constant load resistance ($R_L = 1 \text{ M}\Omega$) and calculated for matched resistance

Element temperature [°C]	Peak wave-length 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 [M Ω]
	Typ.	Typ.	Typ.	Min.	Typ.	
22	2.7	2.9	$1.1 \cdot 10^{11}$	$0.8 \cdot 10^{11}$	200	0.3 - 3

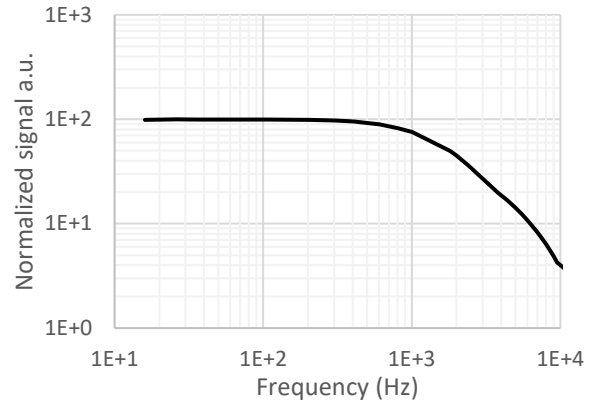
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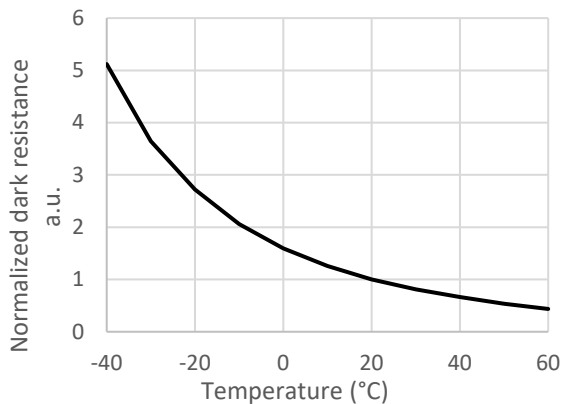
Typical spectral response



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

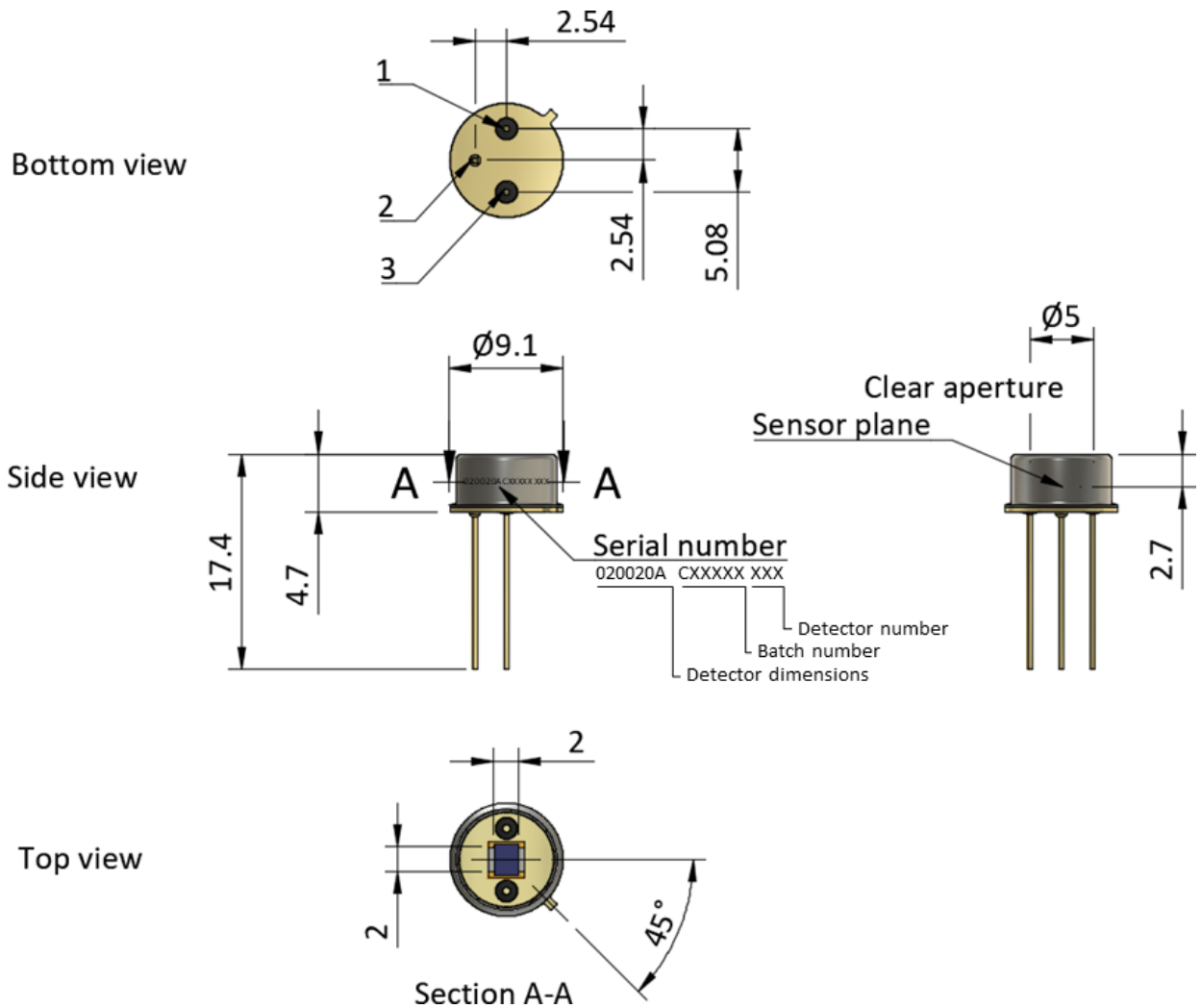
Options

- 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 (mm)

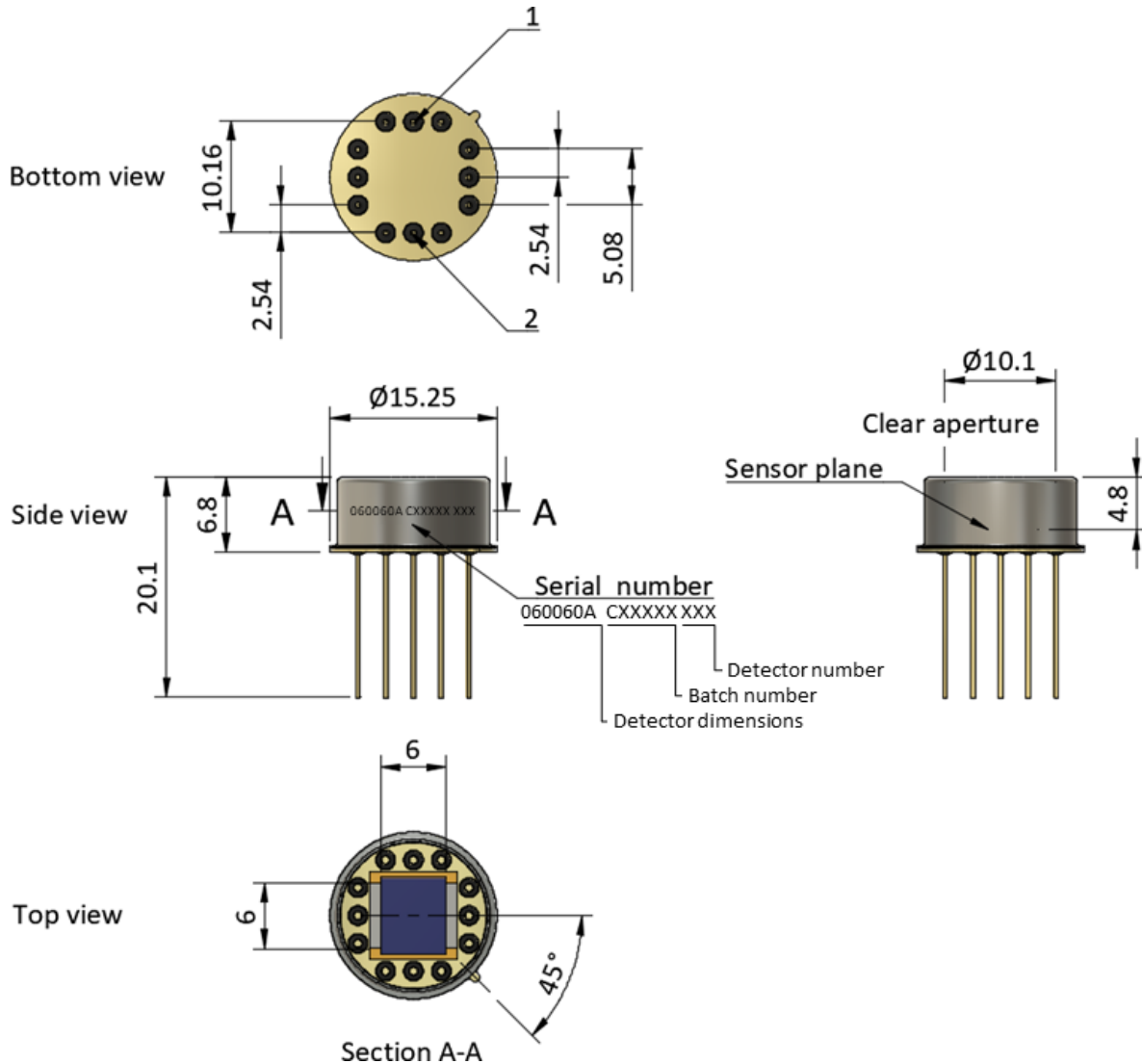
PbS020020TO5



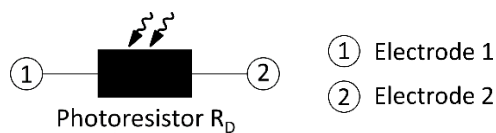
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TO8 exemplary package outlines (mm)

PbS060060TO8



Schematic



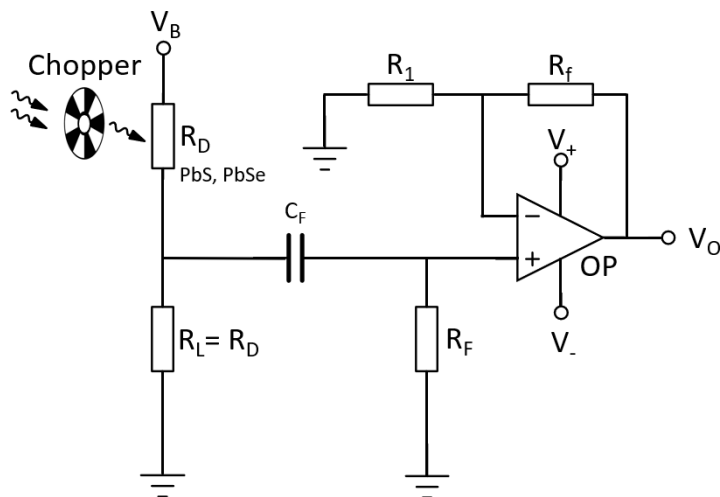
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Exemplary circuit



- 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.