PbS near-infrared detector Single-Pixel double encapsulated in TO package



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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]	
		Тур.	Min.
PbS010010TO5	1 x 1	8 · 10 ⁵	5.6 · 10 ⁵
PbS020020TO5	2 x 2	4 · 10 ⁵	2.8 · 10 ⁵
PbS030030TO5	3 x 3	3 · 10 ⁵	1.8 · 10 ⁵
PbS060060TO8	6 x 6	1.4 · 10 ⁵	0.9 · 10 ⁵
PbS010050TO5*	1 x 5	$3.5 \cdot 10^{5}$	2 · 10 ⁵



- Measured with 1550 nm LED, incident power 16 μW/cm²
- Measured in a voltage divider circuit with 1 $M\Omega$ load resistor
- Photo responsivity and detectivity calculated for a voltage divider circuit with matched resistance and 50 V/mm

Element	Peak wave-	20% cut-off	Peak D*		Time	Dark resistance R _D
temperature	length λ _P	wavelength	(620 Hz, 1 Hz)		constant	[MΩ]
[°C]	[µm]	λ _C [μm]	[cm·Hz½/W]		[µs]	
	Тур.	Тур.	Тур.	Min.	Тур.	
22	2.7	2.9	$1.1 \cdot 10^{11}$	$0.8 \cdot 10^{11}$	200	0.3 - 3

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^{*} Dark resistance $R_D[M\Omega] = 0.05 - 1$

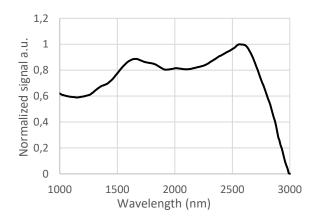
PbS near-infrared detector

Single-Pixel double encapsulated in TO package

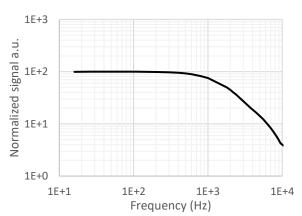


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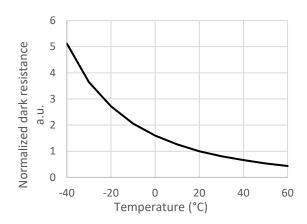
Typical spectral response



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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PbS near-infrared detector

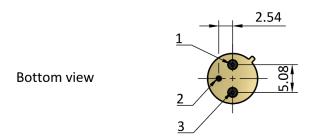


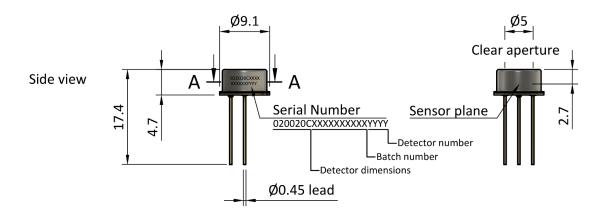


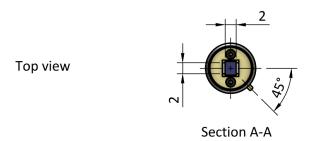
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TO5 exemplary package outlines (dimensions in mm)

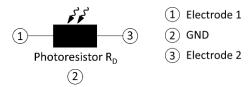
PbS020020TO5







Schematic



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PbS near-infrared detector

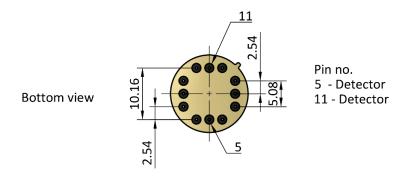


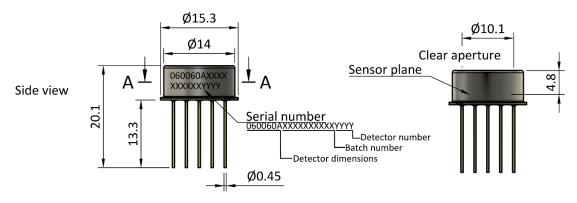


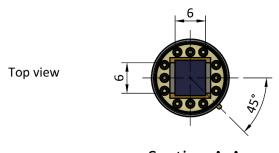
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TO8 exemplary package outlines (dimensions in mm)

PbS060060TO8

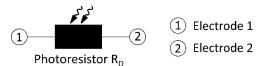






Section A-A

Schematic



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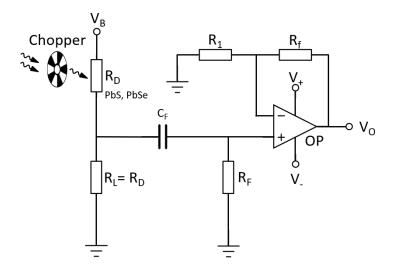
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Exemplary circuit



Bias voltage Output voltage

Dark resistance of the detector

Load resistor Filter capacitor Filter resistor Feedback resistor R_f : R₁: Gain resistor

Regulatory

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

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