PbS near-infrared detector Single-Pixel thin-film encapsulated



Features

- Bondable electrode for COB mounting
- High durability for rugged operation
- Very high sensitivity
- Suitable for automated wire-bonding
- Room temperature operation

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.
PbS010010BC	1 x 1	8 · 10 ⁵	5.6 · 10 ⁵
PbS020020BC	2 x 2	4 · 10 ⁵	2.8 · 10 ⁵
PbS030030BC	3 x 3	3 · 10 ⁵	1.8 · 10 ⁵
PbS060060BC	6 x 6	1.4 · 10 ⁵	0.9 · 10 ⁵
PbS010050BC*	1 x 5	3.5 · 10 ⁵	2 · 10 ⁵

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



- 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 constant	Dark resistance R _D
temperature	length λ₽	wavelength λ _C	(620 Hz, 1 Hz)		[µs]	[MΩ]
[°C]	[µm]	[µm]	[cm·Hz½/W]			
	Тур.	Тур.	Тур.	Min.	Тур.	
22	2.7	2.9	1 · 10 ¹¹	$0.8 \cdot 10^{11}$	200	0.3 - 3

Die attach

- 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

Wire-bonding

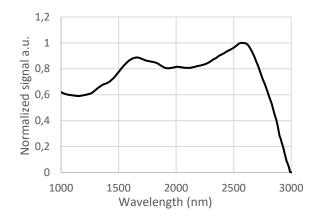
- Electrodes are optimized for room temperature Al wire wedge bonding
- Element temperature should never exceed +70°C

PbS near-infrared detector

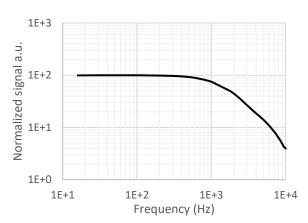
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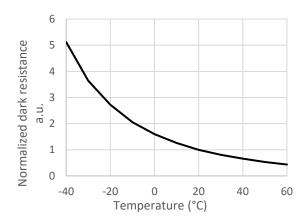
Typical spectral response



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

Options

- Custom windows and filters
- Custom packages upon request
- Evaluation Kit available

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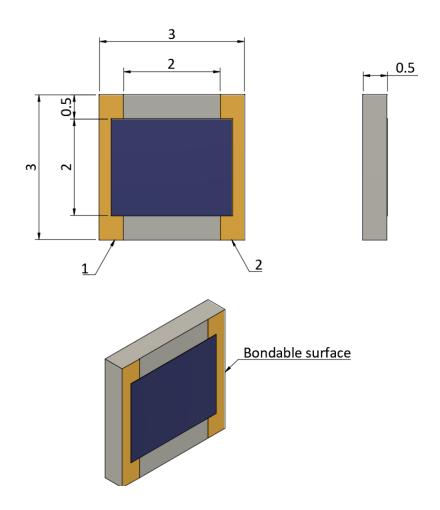
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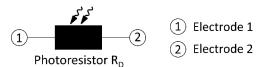


Exemplary mechanical outlines (dimensions in mm)

PbS020020BC



Schematic

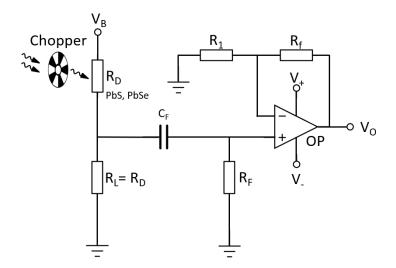


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Exemplary circuit



V_B: Bias voltage V_O: Output voltage

R_n: Dark resistance of the detector

R_L: Load resistor
C_F: Filter capacitor
R_F: Filter resistor
R_f: Feedback resistor

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.