PbS near-infrared detector

Single-Pixel thin-film encapsulated



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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]	
		Тур.	Min.
PbS005005BC	0.5 x 0.5	16 · 10 ⁵	10 · 10 ⁵
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	$0.9 \cdot 10^{5}$
PbS100100BC	10 x 10	0.6 · 10 ⁵	$0.4 \cdot 10^{5}$
PbS010050BC*	1 x 5	3.5 · 10 ⁵	2 · 10 ⁵

- Measured with 1550 nm LED, incident power 16 μW/cm²
- 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	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-bonding
- Element temperature should never exceed +70°C

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

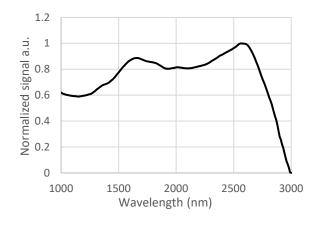
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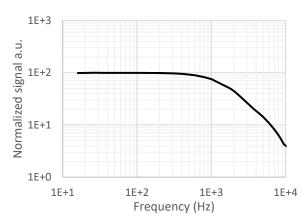


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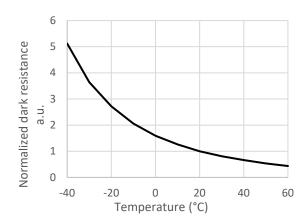
Typical spectral response



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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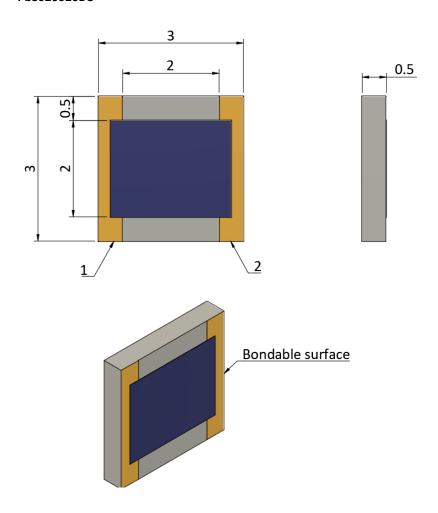
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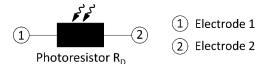


Exemplary mechanical outlines (mm)

PbS020020BC



Schematic

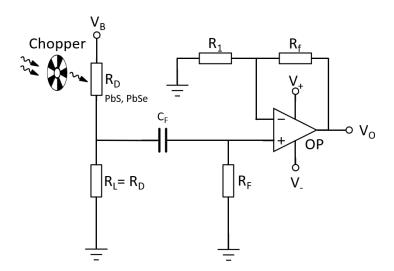


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Exemplary circuit



V_B: Bias voltage V_O: Output voltage

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 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.