PbS near-infrared detector

Single-Pixel thin-film encapsulated

trinamiX

A brand of
BASF – We create chemistry

Features

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

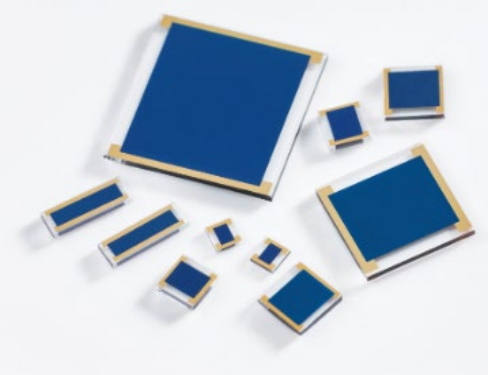
Applications

- 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.
PbS005005BC	0.5 x 0.5	$16 \cdot 10^5$	$10 \cdot 10^5$
PbS010010BC	1 x 1	$8 \cdot 10^5$	$5.6 \cdot 10^5$
PbS020020BC	2 x 2	$4 \cdot 10^5$	$2.8 \cdot 10^5$
PbS030030BC	3 x 3	$3 \cdot 10^5$	$1.8 \cdot 10^5$
PbS060060BC	6 x 6	$1.4 \cdot 10^5$	$0.9 \cdot 10^5$
PbS100100BC	10 x 10	$0.6 \cdot 10^5$	$0.4 \cdot 10^5$
PbS010050BC*	1 x 5	$3.5 \cdot 10^5$	$2 \cdot 10^5$

* Dark resistance R_D [MΩ] = 0.05 - 1



- 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 MΩ) 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) [cm·Hz½/W]		Time constant [µs]	Dark resistance R_D [MΩ]
	Typ.	Typ.	Typ.	Min.	Typ.	
22	2.7	2.9	$1 \cdot 10^{11}$	$0.8 \cdot 10^{11}$	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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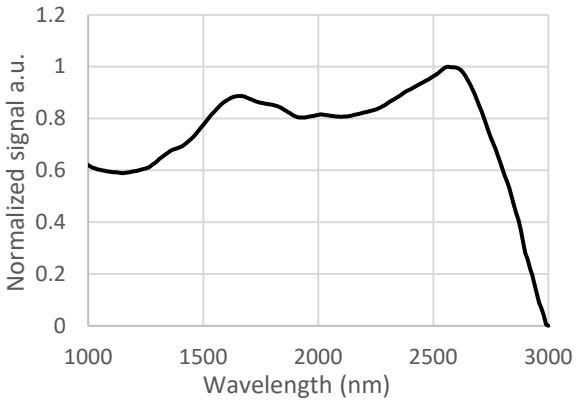
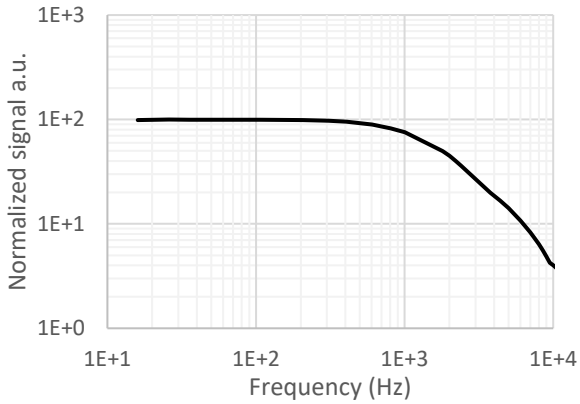
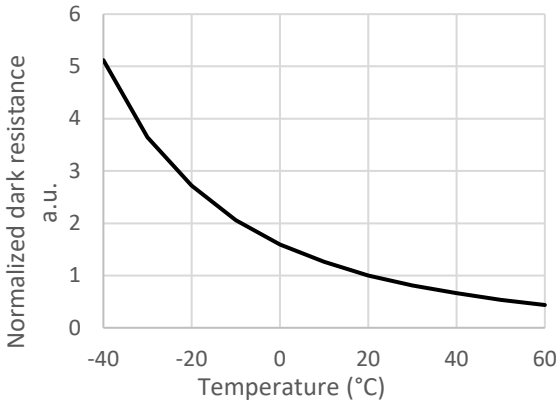
Typical spectral response



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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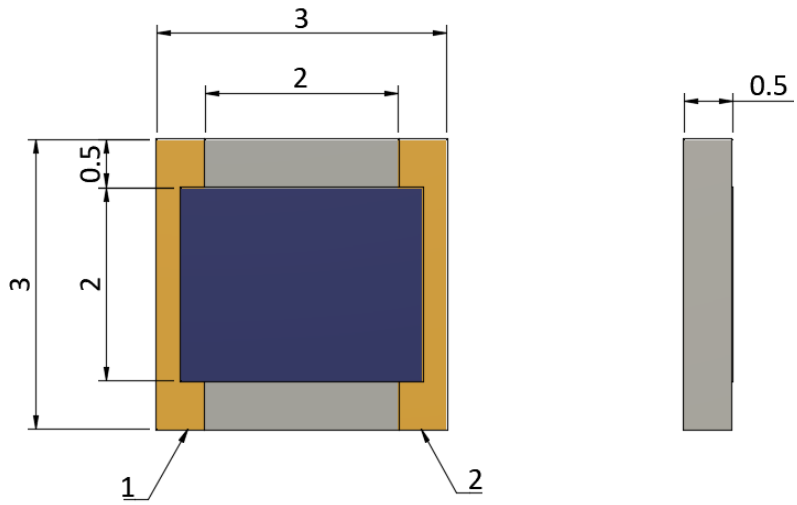
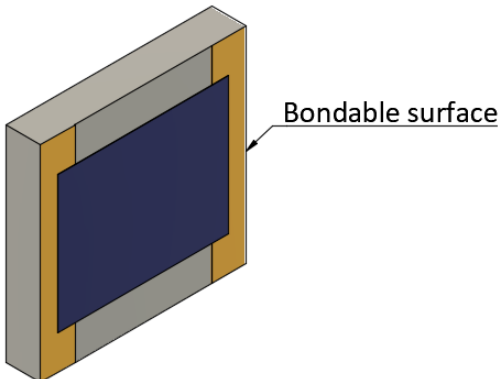
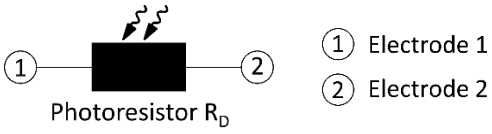
Exemplary mechanical outlines (mm)

PbS020020BC





Schematic



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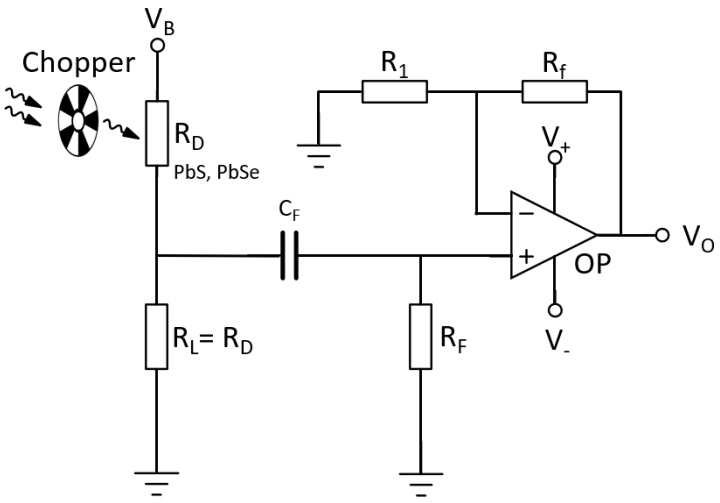
Exemplary circuit



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.