# 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

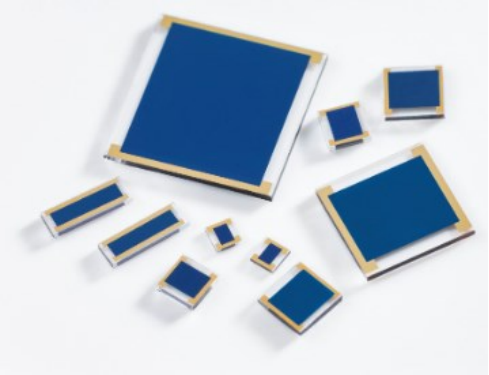
## Applications

- 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. |
| 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 | $1.4 \cdot 10^5$ | $0.9 \cdot 10^5$ |
| | | | |
| 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 1 MΩ load resistor
- Photo responsivity and detectivity calculated for a voltage divider circuit with matched resistance and 50 V/mm

| Element temperature [°C] | Peak wave-length $\lambda_P$ [µm] | 20% cut-off wavelength $\lambda_C$ [µm] | Peak D* (620 Hz, 1 Hz) [cm·Hz$^{½}$/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 wedge bonding
- Element temperature should never exceed +70°C

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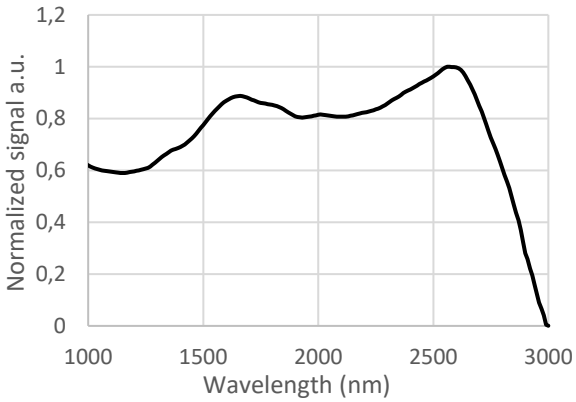
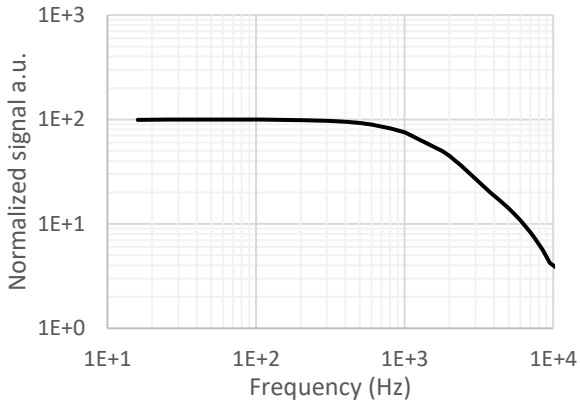
ver. 1.5

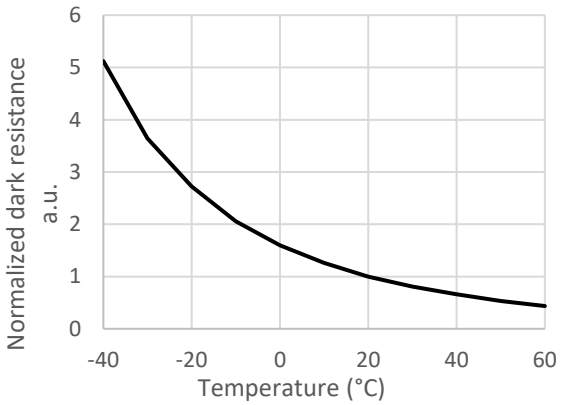
## Typical spectral response




## 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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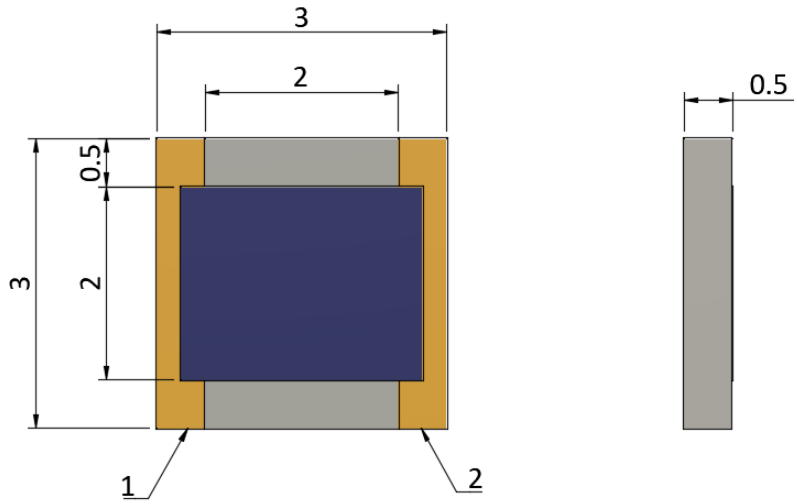
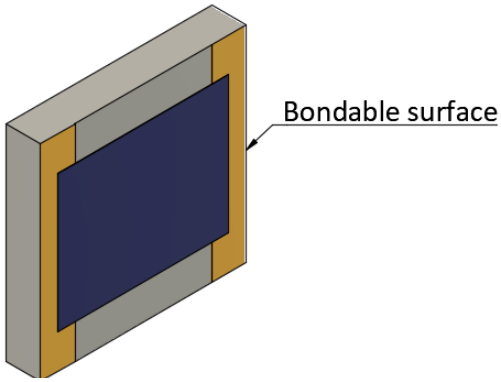
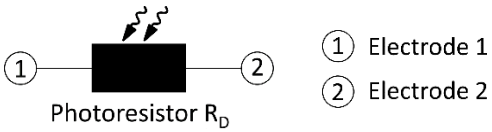
## Exemplary mechanical outlines (dimensions in mm)

**PbS020020BC**




**Schematic**

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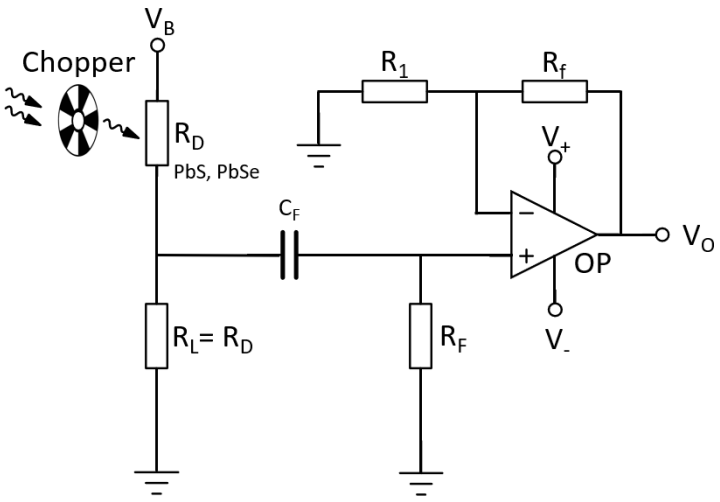
## Exemplary circuit




$V_B$: 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 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.

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