

# PbS near-infrared detector

## Multi-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

- Spectroscopy
- Gas detection and analysis
- Flame monitoring
- Flame and spark detection
- Temperature measurement
- Moisture measurement

### Electrical and optical characteristics per pixel

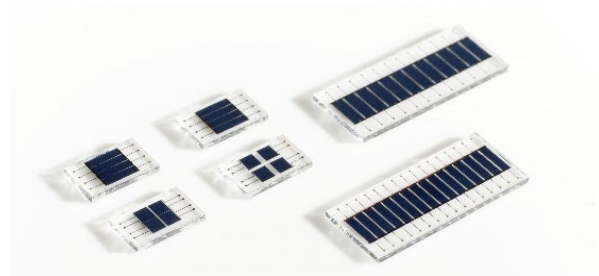
Element temperature [°C]	Peak wavelength $\lambda_p$ [ $\mu\text{m}$ ]	20% cut-off wavelength $\lambda_c$ [ $\mu\text{m}$ ]	Peak $D^*$ (620 Hz, 1 Hz) [ $\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$ ]		Time constant [ $\mu\text{s}$ ]	Dark resistance $R_D$ [ $\text{M}\Omega$ ]
	Typ.	Typ.	Typ.	Min.	Typ.	
22	2.7	2.9	$1 \cdot 10^{11}$	$0.5 \cdot 10^{11}$	200	0.3 - 15*

\*depends on pixel geometry

- Measured with 1550 nm LED, incident power  $16 \mu\text{W}/\text{cm}^2$
- 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

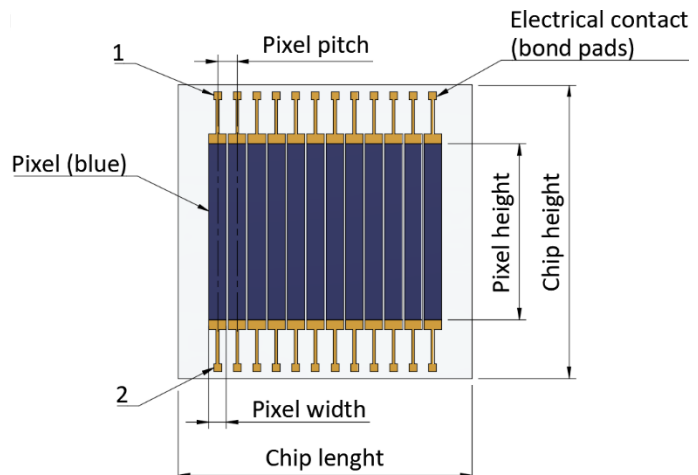
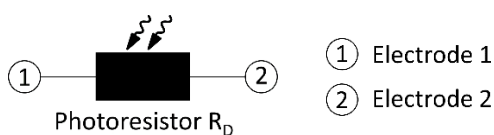
### Possible mechanical characteristics

- Number of lines 1 - 4
- Number of pixels 2 - 16
- Minimum pixel width 20  $\mu\text{m}$
- Minimum pixel height 20  $\mu\text{m}$
- Minimum pixel pitch 50  $\mu\text{m}$
- Minimal chip length 3000  $\mu\text{m}$
- Minimal chip height 3000  $\mu\text{m}$



Please contact us for an individual design:  
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### Schematic



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Release Date: April 14<sup>th</sup>, 2020  
ver. 1.8

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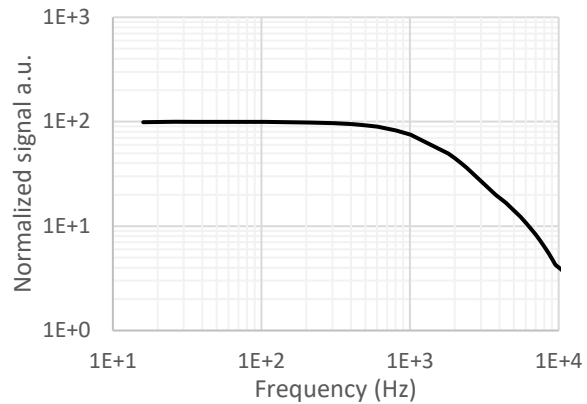
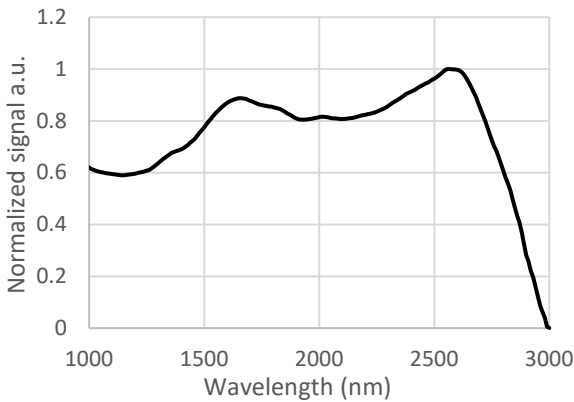
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### Exemplary mechanical characteristics

Type No.	Number of lines	Number of pixels	Pixel pitch [μm]	Pixel width [μm]	Pixel height [μm]	Operating temperature [°C]
PbS_MP_01x12_0200_0180x1800	1	12	200	180	x 1800	-30 to +70

### Typical spectral response per pixel    Typical frequency response per pixel



### 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

### 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

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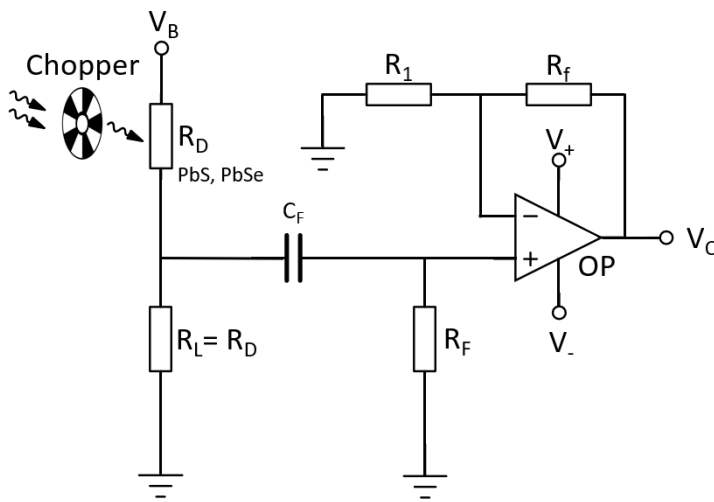
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### Options

- Individual housing
- Bonding onto PCB
- Integrated optics
- Evaluation-Kit available

### 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.