

## PbS near-infrared detector

### Single-Pixel double encapsulated in TO package

#### Features

- Double encapsulation (thin-film and TO package)
- High durability for rugged operation
- Very high sensitivity
- Room temperature operation
- Sapphire window

#### 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.
PbS005005TO5	0.5 x 0.5	$16 \cdot 10^5$	$10 \cdot 10^5$
PbS010010TO5	1 x 1	$8 \cdot 10^5$	$5.6 \cdot 10^5$
PbS020020TO5	2 x 2	$4 \cdot 10^5$	$2.8 \cdot 10^5$
PbS030030TO5	3 x 3	$3 \cdot 10^5$	$1.8 \cdot 10^5$
PbS060060TO8	6 x 6	$1.4 \cdot 10^5$	$0.9 \cdot 10^5$
PbS010050TO5*	1 x 5	$3.5 \cdot 10^5$	$2 \cdot 10^5$



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

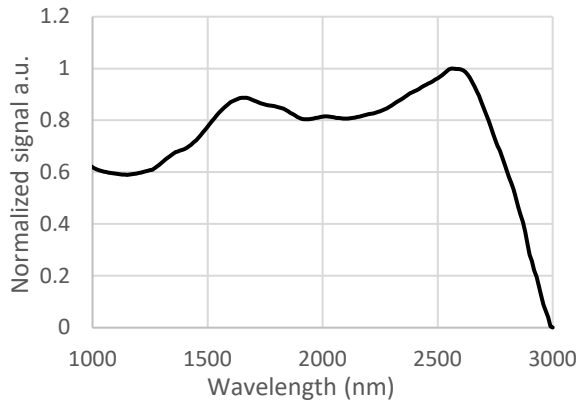
- Measured with 1550 nm LED, incident power 16  $\mu$ W/cm<sup>2</sup>
- Measured in a voltage divider circuit with 50 V/mm
- Photo responsivity and detectivity are measured with constant load resistance ( $R_L = 1$  M $\Omega$ ) and calculated for matched resistance

Element temperature [°C]	Peak wave-length $\lambda_p$ [ $\mu$ m]	20% cut-off wavelength $\lambda_c$ [ $\mu$ m]	Peak D* (620 Hz, 1 Hz) [cm $\cdot$ Hz <sup>1/2</sup> /W]		Time constant [ $\mu$ s]	Dark resistance $R_D$ [M $\Omega$ ]
	Typ.	Typ.	Typ.	Min.	Typ.	
22	2.7	2.9	$1.1 \cdot 10^{11}$	$0.8 \cdot 10^{11}$	200	0.3 - 3

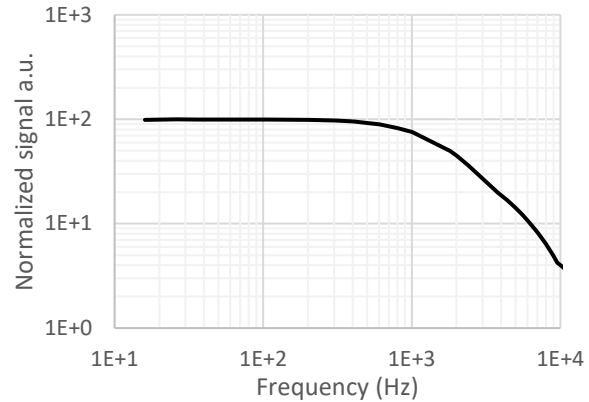
## PbS near-infrared detector

### Single-Pixel double encapsulated in TO package

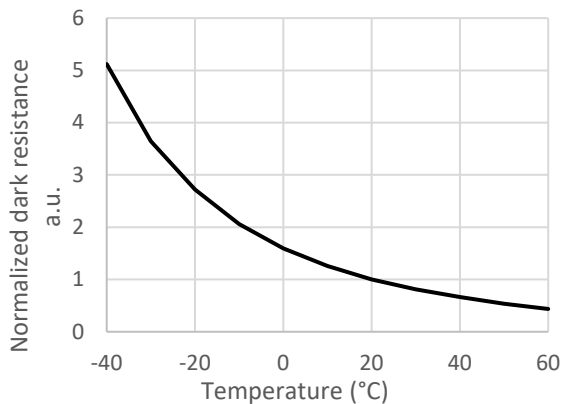
#### Typical spectral response



#### 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

#### Options

- Custom windows and filters
- 1-stage or 2-stage Thermoelectric cooler (TEC) including thermistor
- Built-in internal LED for illumination and detection

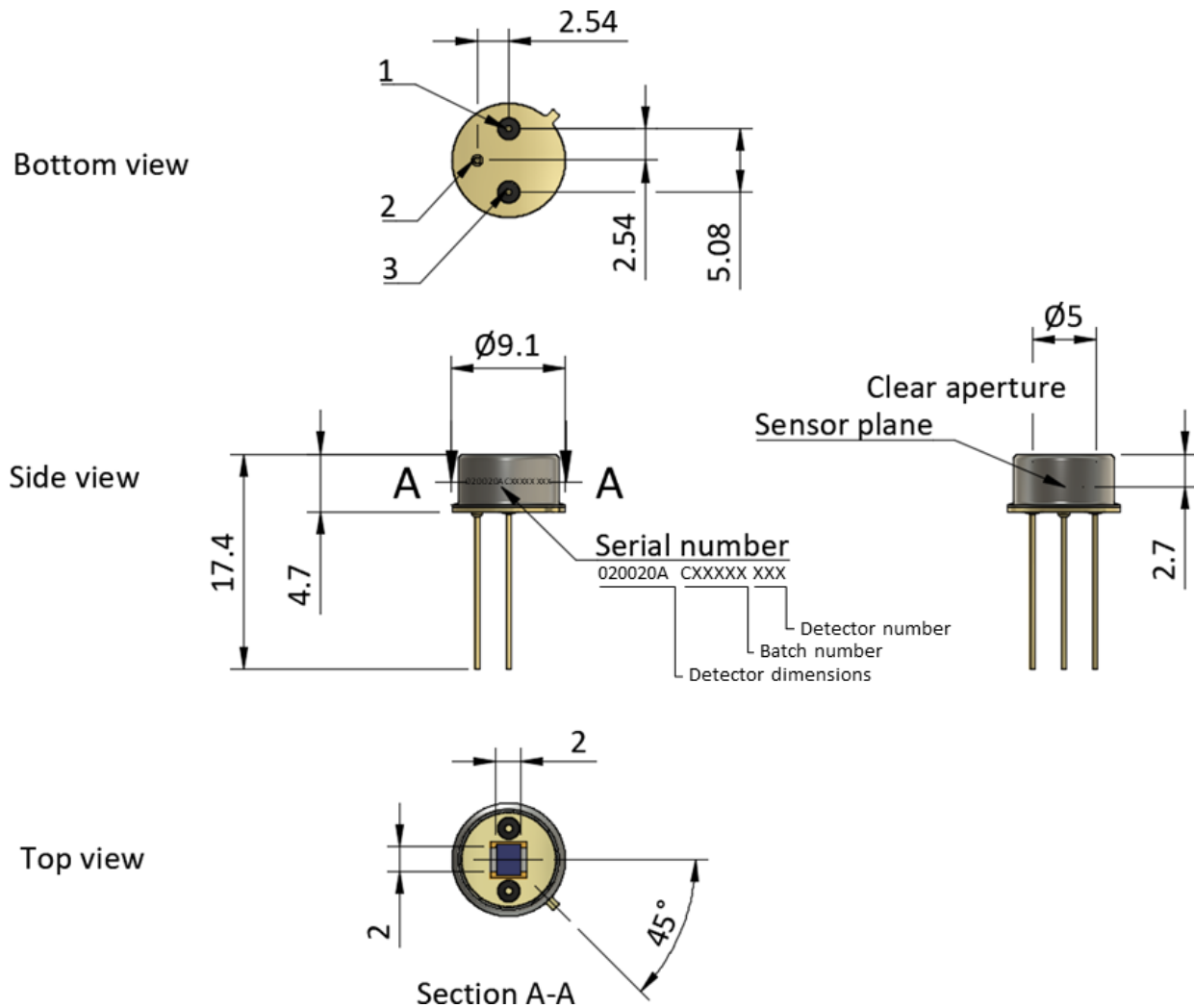
#### Handling

- Ensure dust-free environment for device handling
- Operating temperature: -30°C to +70°C

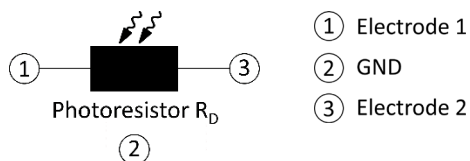
## PbS near-infrared detector Single-Pixel double encapsulated in TO package

### TO5 exemplary package outlines (mm)

PbS020020TO5



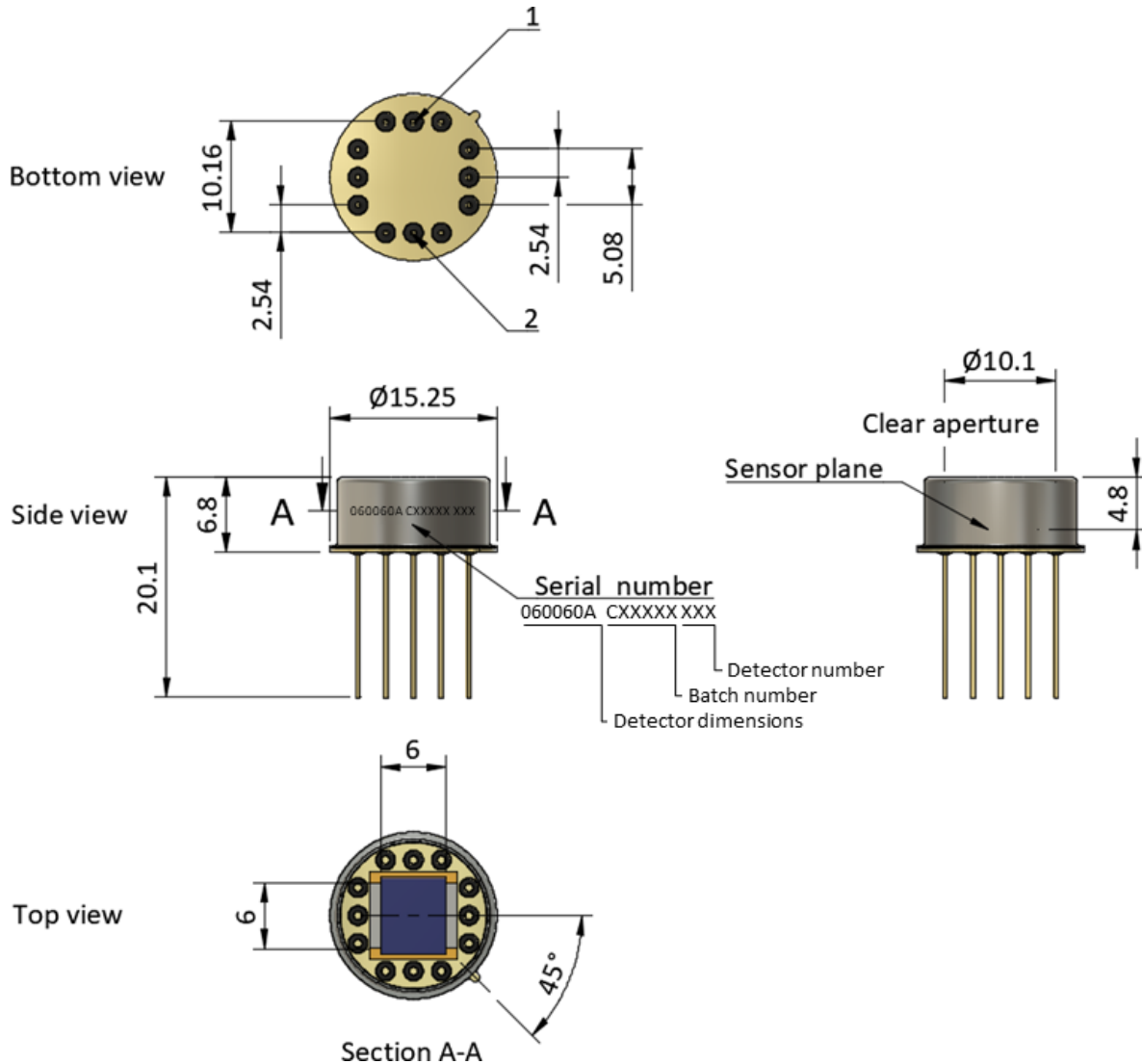
### Schematic



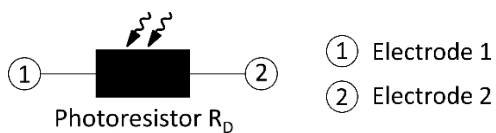
PbS near-infrared detector  
 Single-Pixel double encapsulated in TO package

TO8 exemplary package outlines (mm)

PbS060060TO8



Schematic



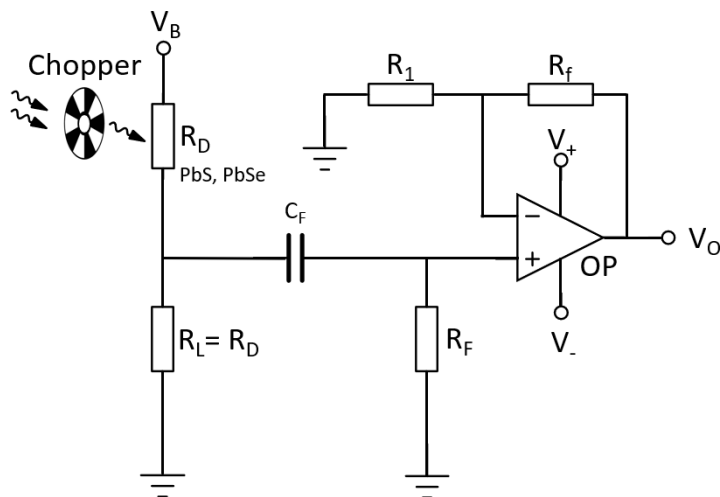
# PbS near-infrared detector

## Single-Pixel double encapsulated in TO package

**trinamiX**

A brand of  
BASF – We create chemistry

### 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.