

# PbS, PbSe near-infrared detector

## TE-cooled Single-Pixel double encapsulated TO8-package



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### Features

- Double encapsulation (thin-film + TO8 package)
- One or Two-Stage thermoelectric cooler (TEC)
- High durability for rugged operation
- Very high sensitivity
- Sapphire window
- Custom windows and filters available

### Applications

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

### Overview PbS and PbSe detectors with TEC

	Type No.	Dimensional outline	Cooling	Active area [mm x mm]	Replaces following Hamamatsu detector
PbS	PbS050040TO8-1TEC	Type 1	One-stage TE-cooled	4x5	P2532-01
	PbS050040TO8-2TEC	Type 2	Two-stage TE-cooled		P2682-01
	PbS050050TO8-1TEC	Type 1	One-stage TE-cooled	5x5	
	PbS050050TO8-2TEC	Type 2	Two-stage TE-cooled		
PbSe	PbSe020020TO8-1TEC	Type 1	One-stage TE-cooled	2x2	P9696-102
	PbSe020020TO8-2TEC	Type 2	Two-stage TE-cooled		P2038-02
					P9696-202
	PbSe030030TO8-1TEC	Type 1	One-stage TE-cooled	3x3	P2680-02
					P9696-103
					P2038-03
	PbSe030030TO8-2TEC	Type 2	Two-stage TE-cooled	P9696-203	
				P2680-03	

### 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

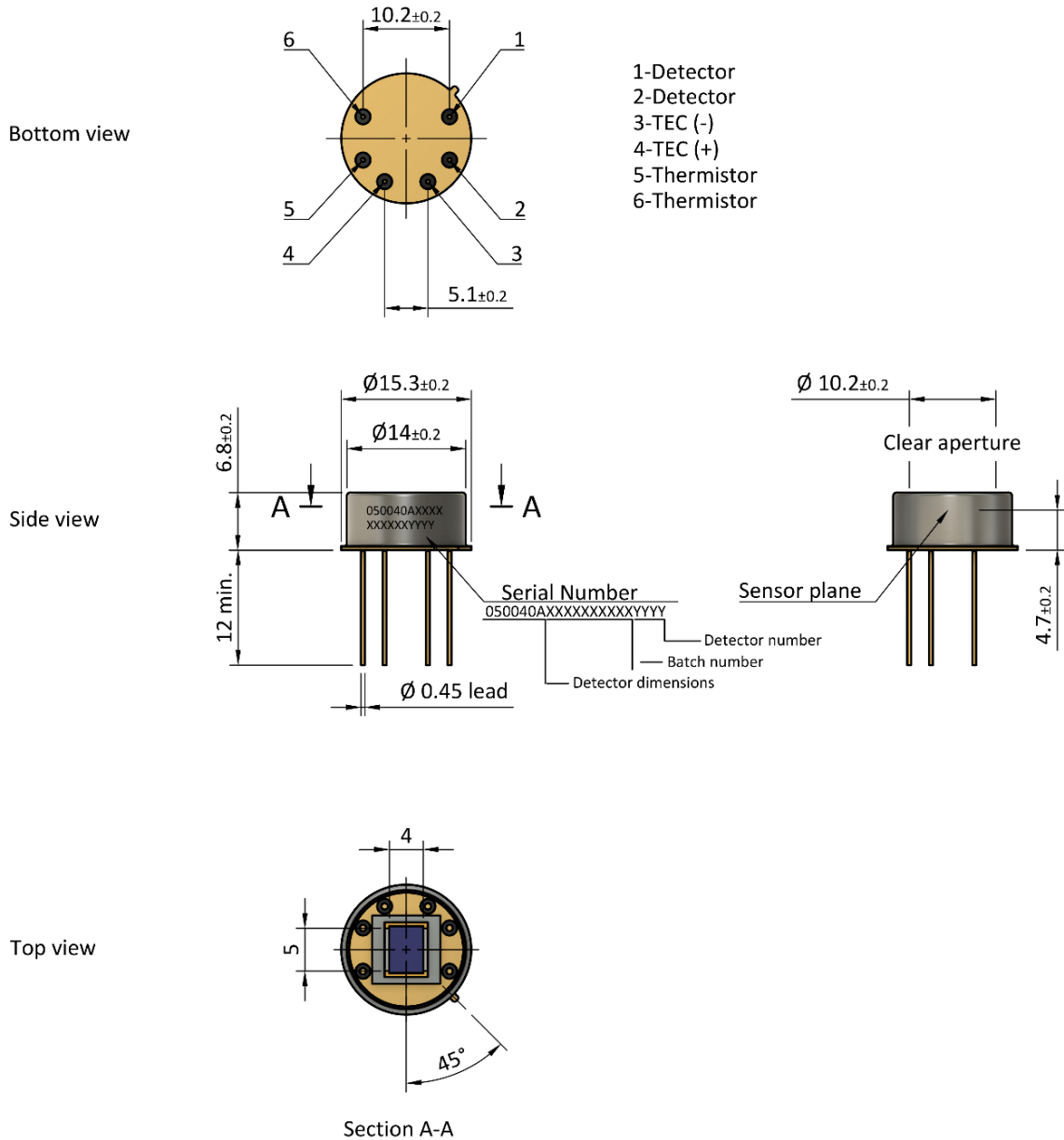
- Ensure dust-free environment for device handling
- Operating temperature: -30°C to +70°C

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### Type 1 exemplary package outlines (dimensions in mm)

PbS050040TO8-1TEC



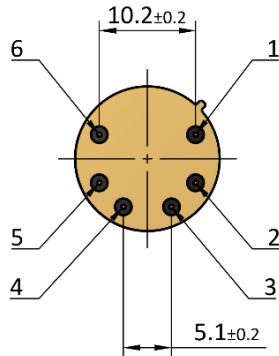
## PbS, PbSe near-infrared detector

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#### Type 2 exemplary package outlines (dimensions in mm)

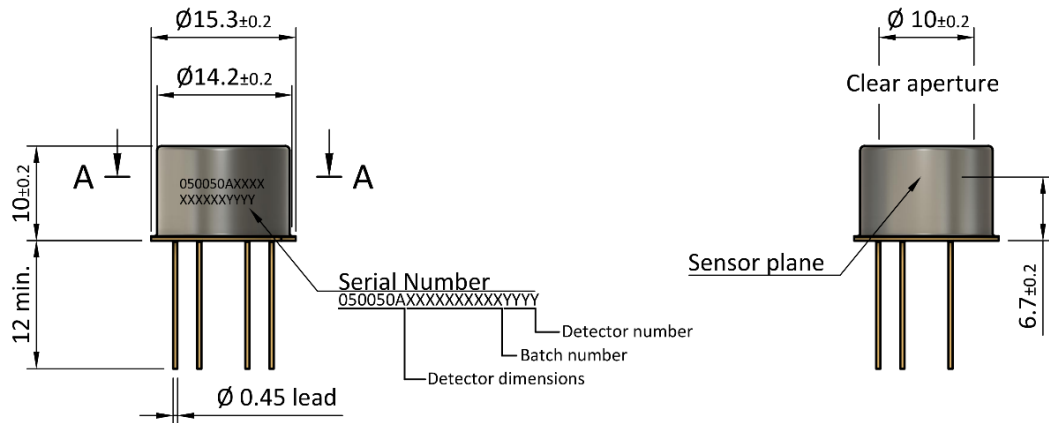
##### PbS050050TO8-2TEC

Bottom view

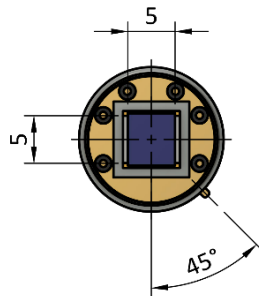


- 1-Detector
- 2-Detector
- 3-TEC (-)
- 4-TEC (+)
- 5-Thermistor
- 6-Thermistor

Side view



Top view



Section A-A

# PbS, PbSe near-infrared detector

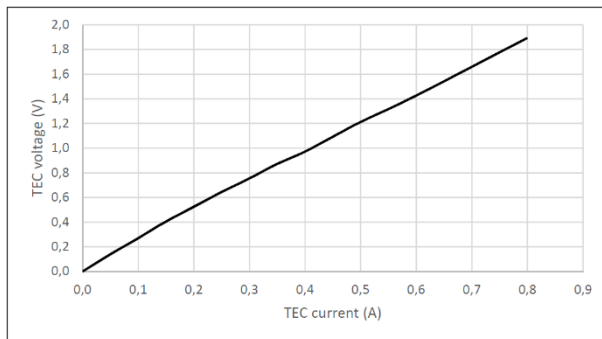
## TE-cooled Single-Pixel double encapsulated TO8-package



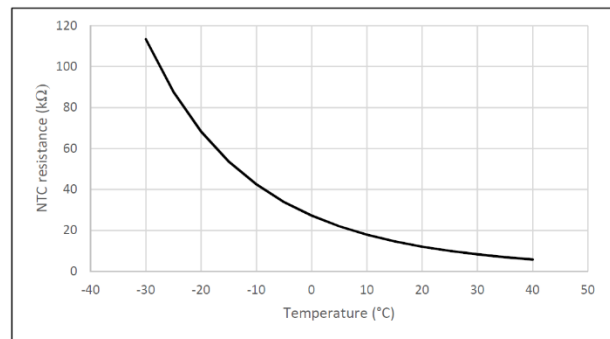
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### Characteristics thermoelectric cooler (1TEC)

#### Single stage TEC U-I-curve

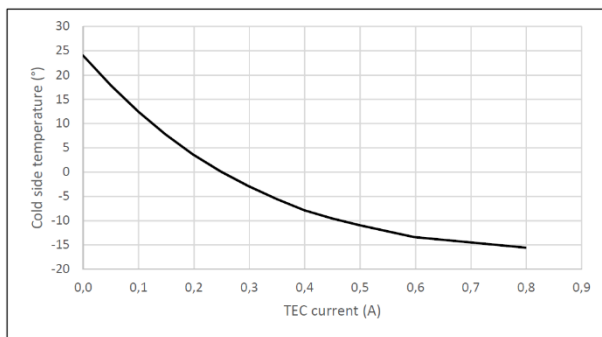


#### NTC resistance curve

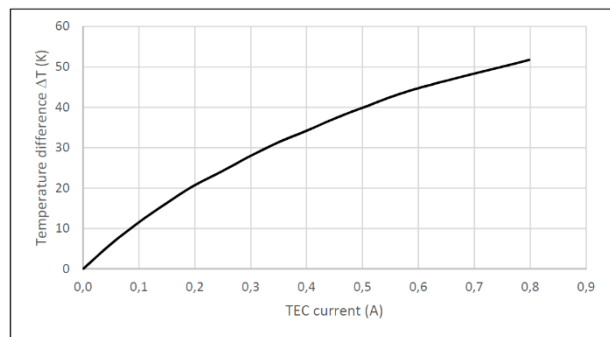


#### TEC cooling performance (absolute)

Ambient temperature +24°C, heat sink <7 K/W



#### TEC cooling performance (relative)



# PbS, PbSe near-infrared detector

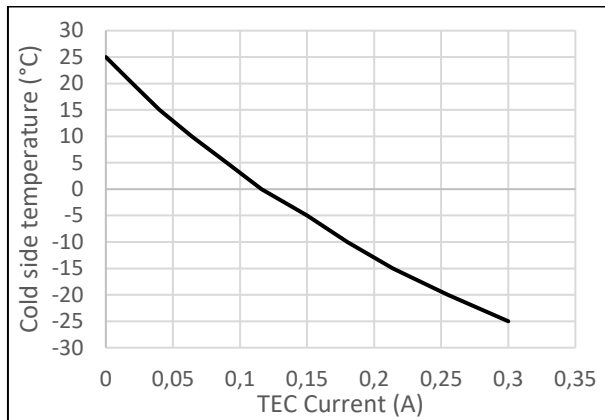
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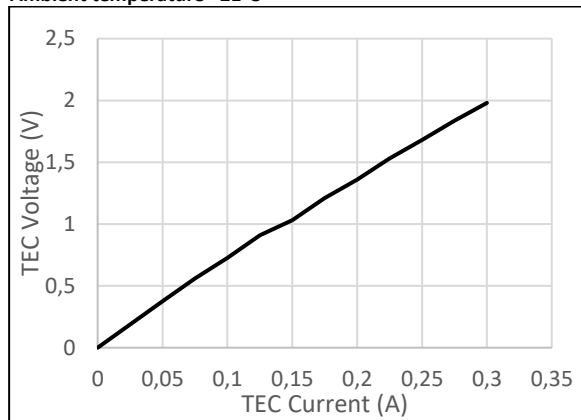
### Characteristics thermoelectric cooler (2TEC)

#### TEC cooling performance (absolute)

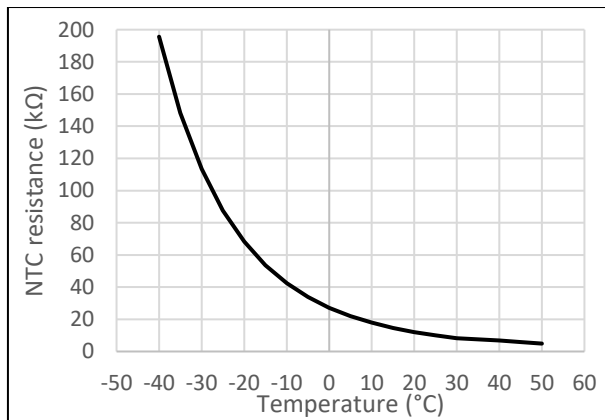


#### 2-stage TEC U-I-curve

Ambient temperature +21°C



#### NTC resistance curve



#### NTC resistance at key temperatures

Temperature (°C)	NTC resistance (Ω)
20	12.081k ±1%
0	27.219k ±1%
-10	42.506k ±1%
-15	53.65k ±1%
-20	68.237k ±1%

Resistance (25°C) (ohm)	B-Constant (25-50°C) (K)	B-Constant (25-80°C) (Reference Value) (K)	B-Constant (25-85°C) (Reference Value) (K)	B-Constant (25-100°C) (Reference Value) (K)	Maximum Operating Current (25°C) (mA)	Maximum Voltage (V)	Typical Dissipation Constant (25°C) (mW/°C)
10k ±1%	3380 ±1%	3428	3434	3455	0.100	5	1

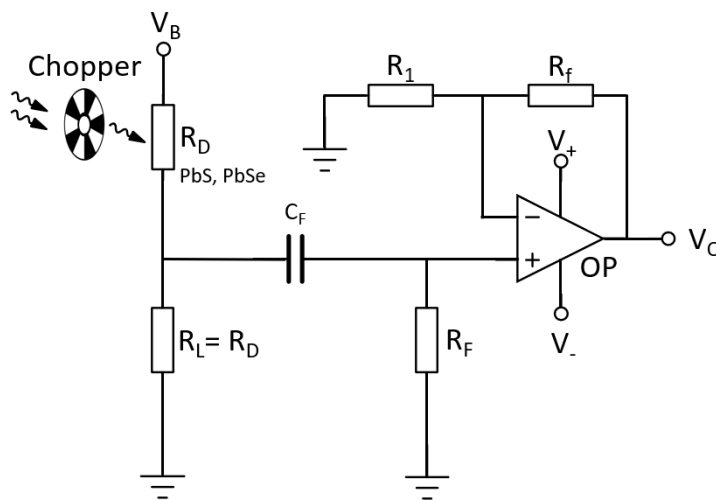
## PbS, PbSe near-infrared detector

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### Exemplary readout 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.