

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 Cooling		Active area	Replaces following	
		outline		[mm x mm]	Hamamatsu detector	
	PbS050040TO8-	Type 1	One-stage		P2532-01	
	1TEC	Type I	TE-cooled	4x5		
	PbS050040TO8-	Type 2	Two-stage	485	P2682-01	
PbS	2TEC	Type 2	TE-cooled		F2082-01	
F 103	PbS050050TO8-	Type 1	One-stage			
	1TEC	Type I	TE-cooled	5x5		
	PbS050050TO8-	Type 2	Two-stage			
	2TEC	Type 2	TE-cooled			
	PbSe020020TO8-	Type 1	One-stage	252	P9696-102	
	1TEC	Type I	TE-cooled		P2038-02	
	PbSe020020TO8-	Type 2	Two-stage	2x2	P9696-202	
PbSe	2TEC	Type 2	TE-cooled		P2680-02	
PDSe	PbSe030030TO8-	Type 1	One-stage		P9696-103	
	1TEC	Type 1	TE-cooled	3x3	P2038-03	
	PbSe030030TO8-	Type 2	Two-stage	383	P9696-203	
	2TEC	Type 2	TE-cooled		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

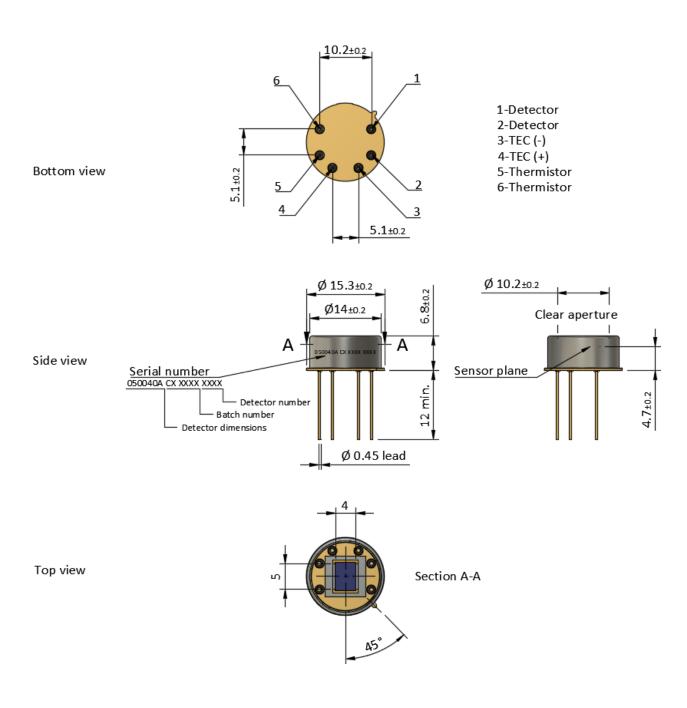


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Type 1 exemplary package outlines (mm)

PbS050040TO8-1TEC



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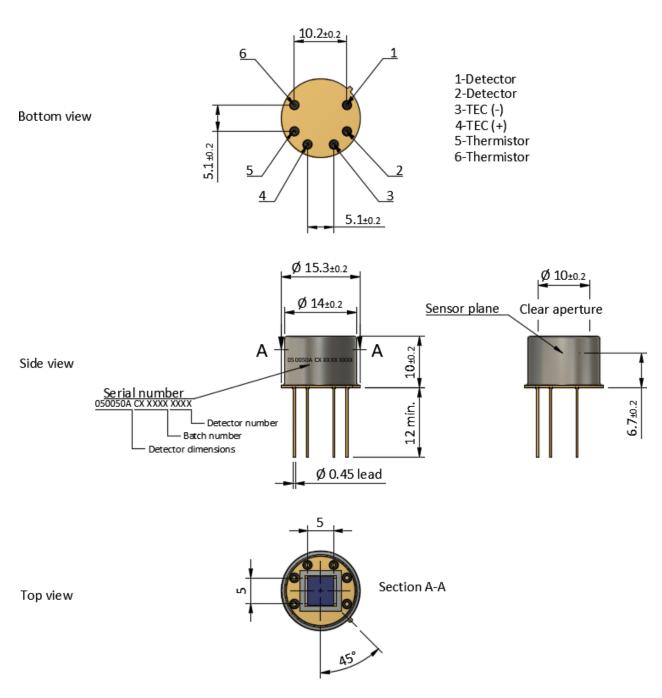


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Type 2 exemplary package outlines (mm)

PbS050050TO8-2TEC



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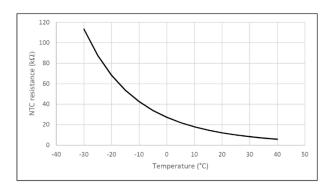
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Characteristics thermoelectric cooler (1TEC)

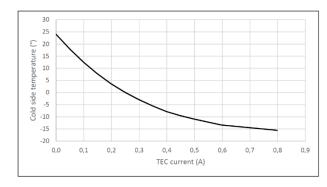
Single stage TEC U-I-curve

NTC resistance curve

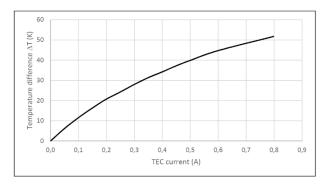


TEC cooling performance (absolute)

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



TEC cooling performance (relative)





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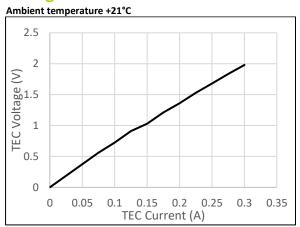
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Characteristics thermoelectric cooler (2TEC)

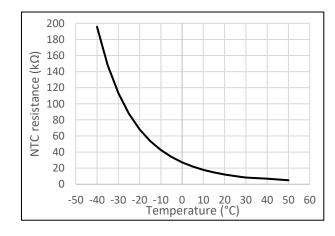
TEC cooling performance (absolute)

30 25 20 Cold side temperature (15 10 5 0 -5 -10 -15 -20 -25 -30 0.05 0.1 0.15 0.2 0.25 0.3 0.35 TEC Current (A)

2-stage TEC U-I-curve



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

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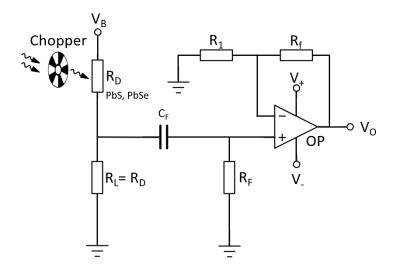
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Exemplary readout circuit



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

R₁: 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.