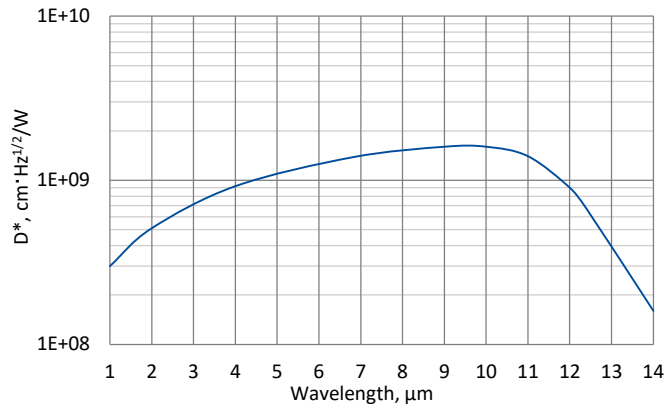


## PCI-3TE-12-1x1-TO8-wZnSeAR-36

### 2 – 14 μm HgCdTe three-stage thermoelectrically cooled, optically immersed photoconductive detector

**PCI-3TE-12-1x1-TO8-wZnSeAR-36** is a three-stage thermoelectrically cooled IR photoconductor, based on sophisticated HgCdTe heterostructure for the best performance and stability. The device is optimized for the maximum performance at 12 μm. Detector element is monolithically integrated with hyperhemispherical GaAs microlens in order to improve performance of the device. Photoconductive detector should operate in optimum bias voltage and current readout mode. Performance at low frequencies is reduced due to 1/f noise. 3° wedged zinc selenide anti-reflection coated (wZnSeAR) window prevents unwanted interference effects.

#### Spectral response ( $T_a = 20^\circ\text{C}$ )



Exemplary spectral detectivity, the spectral response of delivered devices may differ.



#### Specification ( $T_a = 20^\circ\text{C}$ )

Parameter	Detector type
	PCI-3TE-12-1x1-TO8-wZnSeAR-36
Active element material	epitaxial HgCdTe heterostructure
Cut-on wavelength $\lambda_{\text{cut-on}}$ (10%), μm	$\leq 2.0$
Peak wavelength $\lambda_{\text{peak}}$ , μm	$10.0 \pm 0.2$
Optimum wavelength $\lambda_{\text{opt}}$ , μm	12.0
Cut-off wavelength $\lambda_{\text{cut-off}}$ (10%), μm	$14.0 \pm 0.2$
Detectivity $D^*(\lambda_{\text{peak}})$ , $\text{cm} \cdot \text{Hz}^{1/2} / \text{W}$	$\geq 1.6 \times 10^9$
Detectivity $D^*(\lambda_{\text{opt}})$ , $\text{cm} \cdot \text{Hz}^{1/2} / \text{W}$	$\geq 9.0 \times 10^8$
Current responsivity $R_i(\lambda_{\text{peak}})$ , A/W	$\geq 0.11$
Current responsivity $R_i(\lambda_{\text{opt}})$ , A/W	$\geq 0.07$
Time constant $\tau$ , ns	$\leq 5$
Resistance $R$ , $\Omega$	$\leq 300$
Bias voltage $V_b$ , V	$\leq 1.8$
1/f noise corner frequency $f_c$ , kHz	$\leq 20$
Active element temperature $T_{\text{det}}$ , K	$\sim 210$
Optical area $A_o$ , mm $\times$ mm	1 $\times$ 1
Package	TO8
Acceptance angle $\Phi$	$\sim 36^\circ$
Window	wZnSeAR

#### Features

- Wide spectral range from 1 to 14 μm
- High responsivity
- Large dynamic range
- Excellent long term stability and reliability
- Quantity discounted price
- Fast delivery

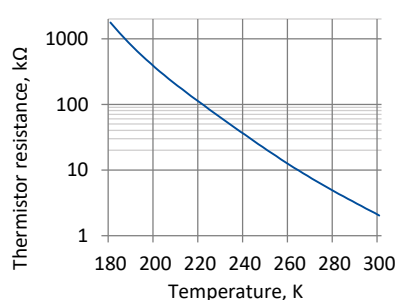
#### Applications

- FTIR spectroscopy and spectrometry

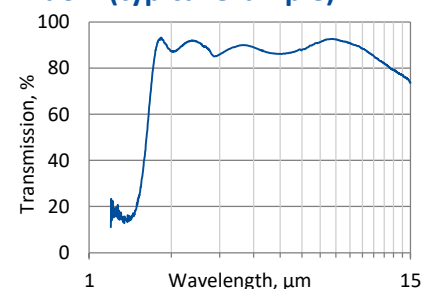
#### Three-stage thermoelectric cooler parameters

Parameter	Value
$T_{\text{det}}$ , K	$\sim 210$
$V_{\text{max}}$ , V	3.6
$I_{\text{max}}$ , A	0.45
$Q_{\text{max}}$ , W	0.27

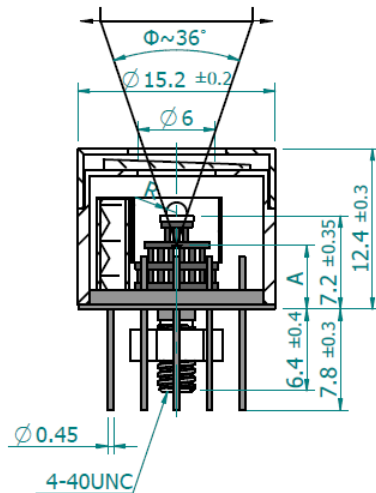
#### Thermistor characteristics



#### Spectral transmission of wZnSeAR window (typical example)

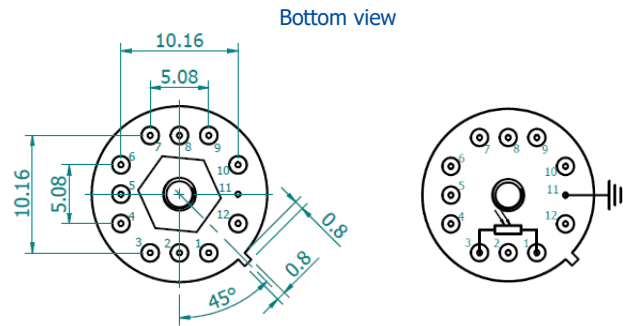


### Mechanical layout, mm



Parameter	Value
Immersion microlens shape	hyperhemisphere
Optical area $A_o$ , mm×mm	1×1
R, mm	0.8
A, mm	4.8±0.35

$\Phi$  – acceptance angle  
 R – hyperhemisphere microlens radius  
 A – distance from the bottom of the 3TE-TO8 header to the focal plane



Function	Pin number
Detector	1, 3
Thermistor	7, 9
TE cooler supply	2(+), 8(-)
Chassis ground	11
Not used	4, 5, 6, 10, 12

### Precautions for use and storage

- Heatsink with thermal resistance of  $\sim 2$  K/W is necessary to dissipate heat generated by 3TE cooler.
- Operation in 10% to 80% humidity and -20°C to 30°C ambient temperature.
- Beam power limitations for optically immersed detector:
  - irradiance with CW or single pulse longer than 1  $\mu$ s irradiance on the apparent optical active area must not exceed 2.5 W/cm<sup>2</sup>,
  - irradiance of the pulse shorter than 1  $\mu$ s must not exceed 10 kW/cm<sup>2</sup>.
- Storage in dark place with 10% to 90% humidity and -20°C to 50°C ambient temperature.

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