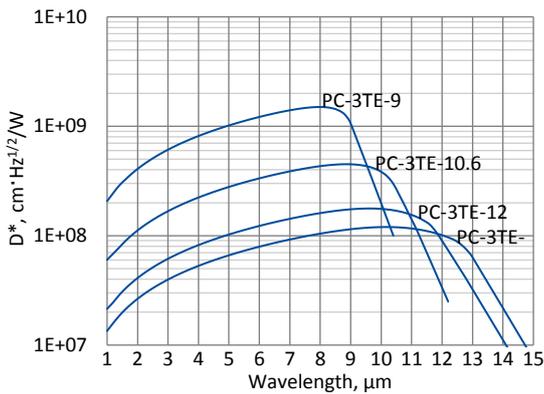


## 2.3 PC-3TE series

### 2.3.1 1.0 – 15.0 μm HgCdTe three-stage thermoelectrically cooled photoconductive detectors

**PC-3TE series** features three-stage thermoelectrically cooled IR photoconductive detectors based on sophisticated HgCdTe heterostructures for the best performance and stability. The devices are optimized for the maximum performance at  $\lambda_{opt}$ . The devices should operate in optimum bias voltage and current readout mode. Performance at low frequencies is reduced due to 1/f noise. The 1/f noise corner frequency increases with the cut-off wavelength. 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.

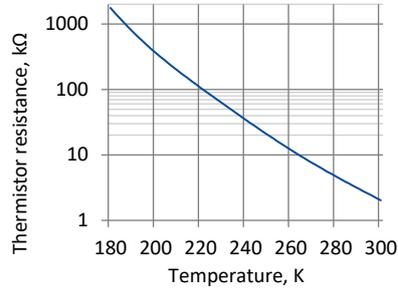
#### Specification ( $T_a = 20^\circ\text{C}$ )

Parameter	Detector type			
	PC-3TE-9	PC-3TE-10.6	PC-3TE-12	PC-3TE-13
Active element material	epitaxial HgCdTe heterostructure			
Optimal wavelength $\lambda_{opt}$ , μm	9.0	10.6	12.0	13.0
Detectivity $D^*(\lambda_{peak}, 20\text{kHz})$ , $\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$	$\geq 1.5 \times 10^9$	$\geq 4.5 \times 10^8$	$\geq 1.8 \times 10^8$	$\geq 1.2 \times 10^8$
Detectivity $D^*(\lambda_{opt}, 20\text{kHz})$ , $\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$	$\geq 1.0 \times 10^9$	$\geq 2.5 \times 10^8$	$\geq 9.0 \times 10^7$	$\geq 6.0 \times 10^7$
Current responsivity-active area length product $R_i(\lambda_{opt})L$ , A·mm/W	$\geq 0.075$	$\geq 0.02$	$\geq 0.01$	$\geq 0.007$
Time constant $\tau$ , ns	$\leq 60$	$\leq 20$	$\leq 5$	$\leq 4$
1/f noise corner frequency $f_c$ , Hz	$\leq 10\text{k}$	$\leq 20\text{k}$		
Bias voltage-active area length ratio $V_b/L$ , V/mm	$\leq 2.0$	$\leq 1.5$		
Resistance $R$ , Ω	$\leq 400$	$\leq 300$		
Active element temperature $T_{dev}$ , K	~210			
Active area $A$ , mm×mm	0.05×0.05, 0.1×0.1, 0.25×0.25, 0.5×0.5, 1×1, 2×2			
Package	TO8, TO66			
Acceptance angle $\Phi$	~70°			
Window	wZnSeAR			

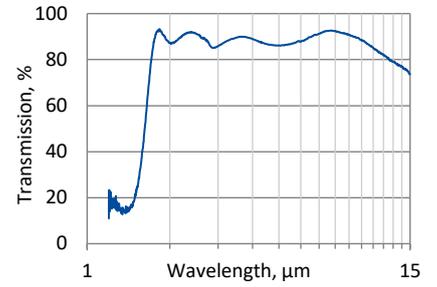
**Three-stage thermoelectric cooler parameters**

Parameter	Value
$T_{det}$ K	~210
$V_{max}$ V	3.6
$I_{max}$ A	0.45
$Q_{max}$ W	0.27

**Thermistor characteristics**

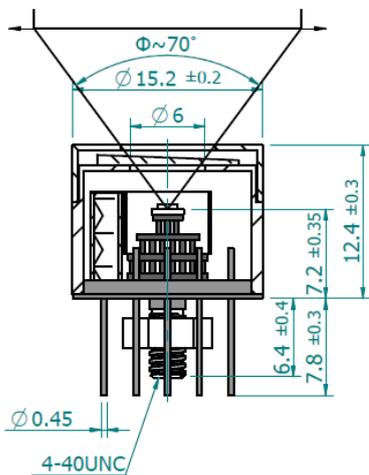


**Spectral transmission of wZnSeAR window (typical example)**



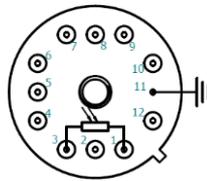
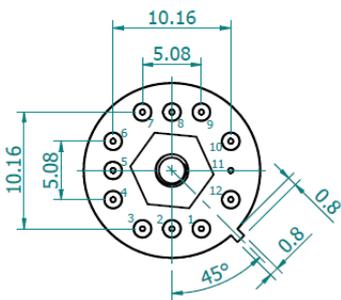
**Mechanical layout, mm**

TO8 package

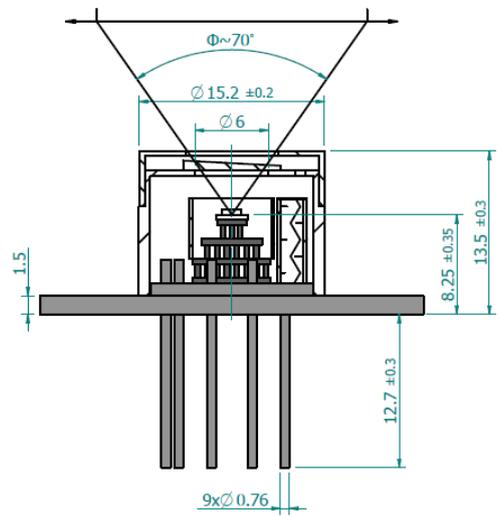


Φ - acceptance angle

Bottom view

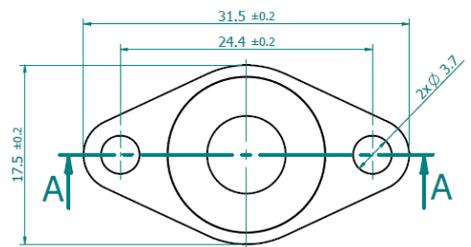


TO66 package

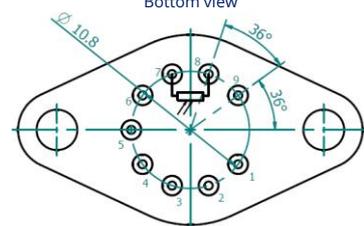


Φ - acceptance angle

Top view



Bottom view



TO8 package

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

TO66 package

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

**Dedicated preamplifier**



„all-in-one“ AIP



programmable PIP



standard MIP



small SIP-TO8