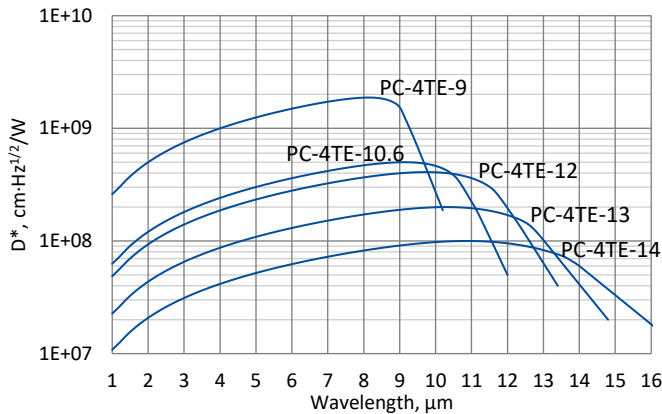


PC-4TE series

1.0 – 16.0 μm HgCdTe four-stage thermoelectrically cooled photoconductive detectors

PC-4TE series features four-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 λ_{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.

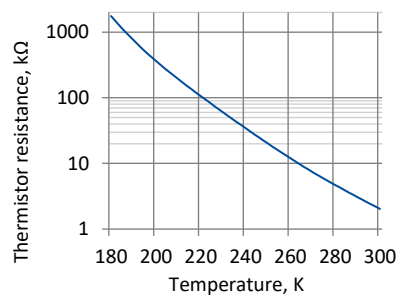
Specification ($T_a = 20^\circ\text{C}$)

Parameter	Detector type				
	PC-4TE-9	PC-4TE-10.6	PC-4TE-12	PC-4TE-13	PC-4TE-14
Active element material	epitaxial HgCdTe heterostructure				
Optimal wavelength λ_{opt} , μm	9.0	10.6	12.0	13.0	14.0
Detectivity $D^*(\lambda_{peak}, 20\text{kHz})$, $\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$	$\geq 1.9 \times 10^9$	$\geq 5.0 \times 10^8$	$\geq 4.0 \times 10^8$	$\geq 2.0 \times 10^8$	$\geq 1.0 \times 10^8$
Detectivity $D^*(\lambda_{opt}, 20\text{kHz})$, $\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$	$\geq 1.5 \times 10^9$	$\geq 3.5 \times 10^8$	$\geq 2.0 \times 10^8$	$\geq 1.0 \times 10^8$	$\geq 6.0 \times 10^7$
Current responsivity-active area length product $R_i(\lambda_{opt}) \cdot L$, $\text{A}\cdot\text{mm}/\text{W}$	≥ 0.1	≥ 0.03	≥ 0.015	≥ 0.01	≥ 0.007
Time constant τ , ns	≤ 80	≤ 30	≤ 7	≤ 6	≤ 5
$1/f$ 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	≤ 3.8	≤ 3.0		≤ 2.25	
Resistance R, Ω	≤ 500	≤ 400		≤ 300	
Active element temperature T_{det} , K	~ 195				
Active area A, mm \times mm	0.05 \times 0.05, 0.1 \times 0.1, 0.25 \times 0.25, 0.5 \times 0.5, 1 \times 1, 2 \times 2				
Package	TO8, TO66				
Acceptance angle Φ	$\sim 70^\circ$				
Window	wZnSeAR				

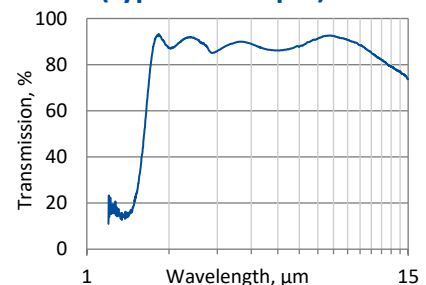
Four-stage thermoelectric cooler parameters

Parameter	Value
T_{det} , K	~ 195
V_{max} , V	8.3
I_{max} , A	0.4
Q_{max} , W	0.28

Thermistor characteristics

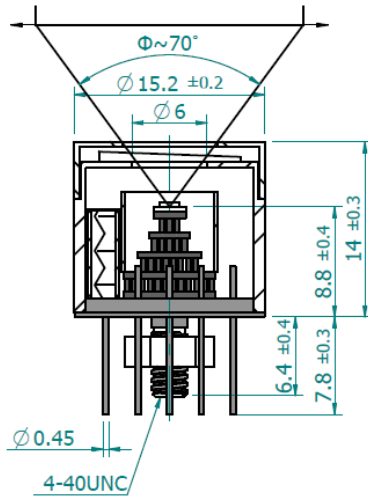


Spectral transmission of wZnSeAR window (typical example)



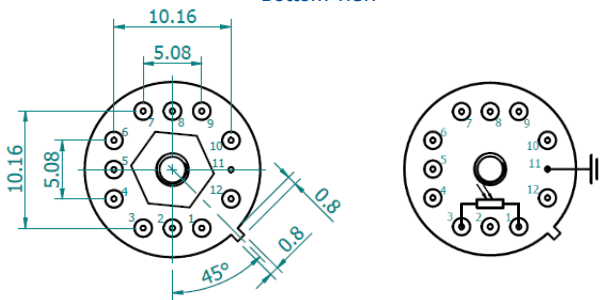
Mechanical layout, mm

4TE-TO8 package



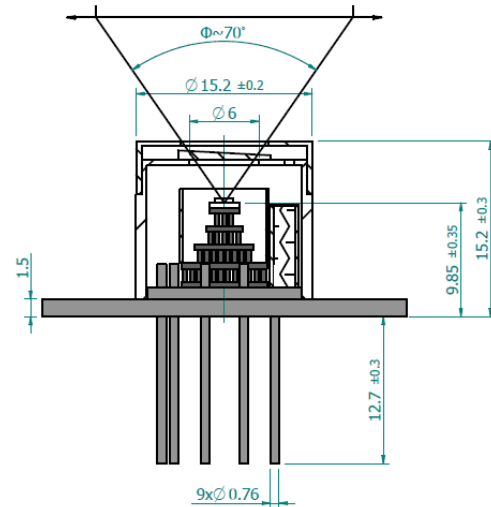
Φ – acceptance angle

Bottom view



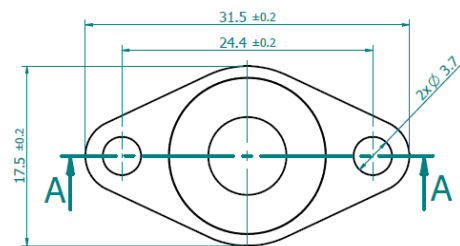
Function	Pin number
Detector	1, 3
Thermistor	7, 9
TE cooler supply	2(+), 8(-)
Chassis ground	11
Not used	4, 5, 6, 10, 12

4TE-TO66 package

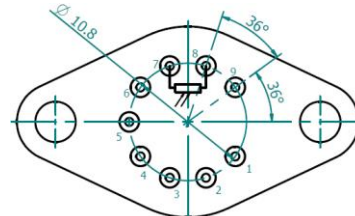


Φ – acceptance angle

Top view



Bottom view



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

Dedicated preamplifiers



„all-in-one“ AIP



programmable PIP



standard MIP



small SIP-TO8