# PV-2TE series

2 – 12 μm HgCdTe two-stage thermoelectrically cooled photovoltaic detectors

PV-2TE series features two-stage thermoelectrically cooled IR photovoltaic detectors based on sophisticated HgCdTe heterostructures for the best performance and stability. The devices are optimized for the maximum performance at λ_{opt}. Cut-on wavelength can be optimized upon request. Reverse bias may significantly increase response speed and dynamic range. It also results in improved performance at high frequencies, but 1/f noise that appears in biased devices may reduce performance at low frequencies. 3° wedged sapphire (wAl$_2$O$_3$) or zinc selenide anti-reflection coated (wZnSeAR) window prevents unwanted interference effects.

Spectral response (T_a = 20°C, V_b = 0 mV)

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

2TE-TO66   2TE-TO8
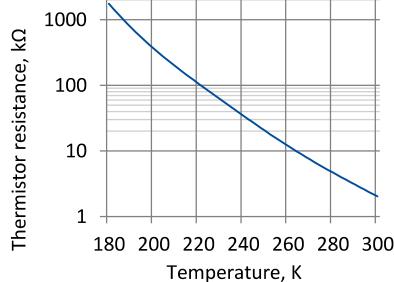
Specification (T_a = 20°C, V_b = 0V)

Parameter	Detector type						
	PV-2TE-3	PV-2TE-3.4	PV-2TE-4	PV-2TE-5	PV-2TE-6	PV-2TE-8	PV-2TE-10.6
Active element material	epitaxial HgCdTe heterostructure						
Optimum wavelength λ_{opt}, μm	3.0	3.4	4.0	5.0	6.0	8.0	10.6
Detectivity D*(λ_{peak}), cm·Hz$^{1/2}$/W	≥1.0×10^{11}	≥6.0×10^{10}	≥4.0×10^{10}	≥1.5×10^{10}	≥5.0×10^{9}	≥4.0×10^{8}	≥2.0×10^{8}
Detectivity D*(λ_{opt}), cm·Hz$^{1/2}$/W	≥7.0×10^{10}	≥4.0×10^{10}	≥3.0×10^{10}	≥9.0×10^{9}	≥2.0×10^{9}	≥2.0×10^{8}	≥1.0×10^{8}
Current responsivity R$_i$(λ_{opt}), A/W	≥0.5	≥0.8	≥1.0	≥1.3	≥1.5	≥0.8	≥0.4
Time constant τ, ns	≤280	≤200	≤100	≤80	≤50	≤45	≤10
Resistance-active area product R·A, Ω·cm^2	≥150	≥3	≥2	≥0.1	≥0.02	≥0.0002	≥0.0001
Active element temperature T$_{det}$, K	~230						
Active area A, mm×mm	0.05×0.05, 0.1×0.1						0.05×0.05
Package	TO8, TO66						
Acceptance angle Φ	~70°						
Window	wAl$_2$O$_3$				wZnSeAR		
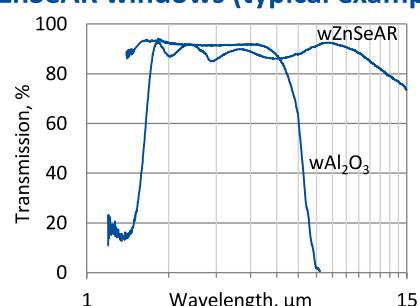
Two-stage thermoelectric cooler parameters

Parameter	Value
T$_{det}$, K	~230
V$_{max}$, V	1.3
I$_{max}$, A	1.2
Q$_{max}$, W	0.36

### Thermistor characteristics
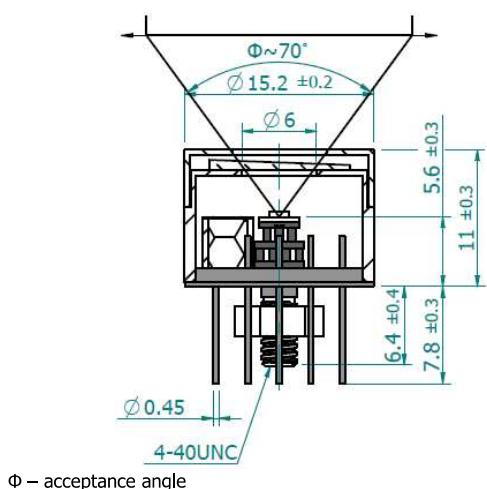
Spectral transmission of wAl$_2$O$_3$ and wZnSeAR windows (typical example)
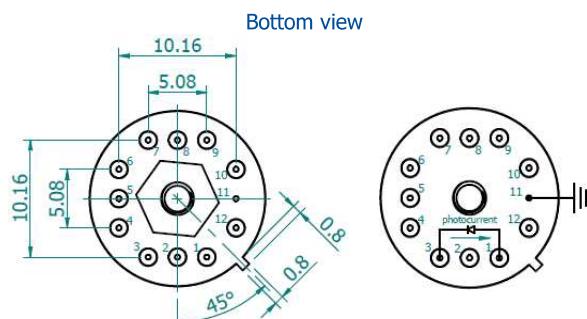
Mechanical layout, mm

2TE-TO8 package

Φ – acceptance angle

2TE-TO66 package

Φ – acceptance angle

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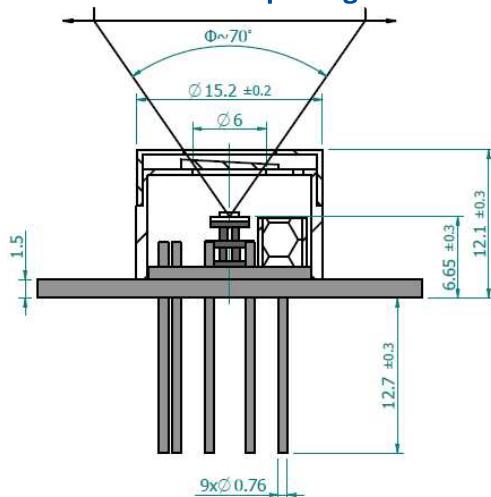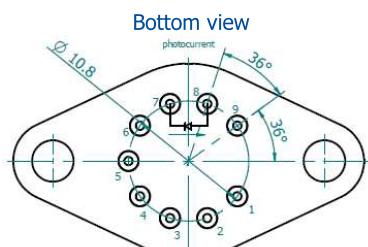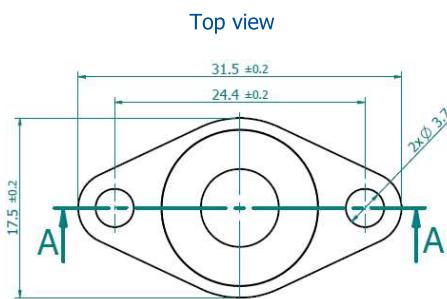
Function	Pin number
Detector	1, 3
Reverse bias (optional)	1(−), 3(+)
Thermistor	7, 9
TE cooler supply	2(+), 8(−)
Chassis ground	11
Not used	4, 5, 6, 10, 12

Top view

Bottom view

Function	Pin number
Detector	7, 8
Reverse bias (optional)	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 | fast FIP |