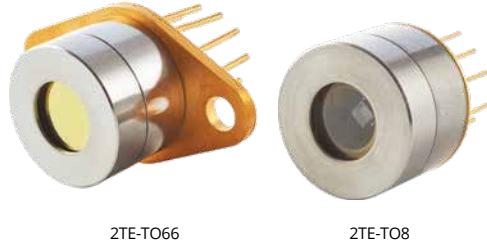
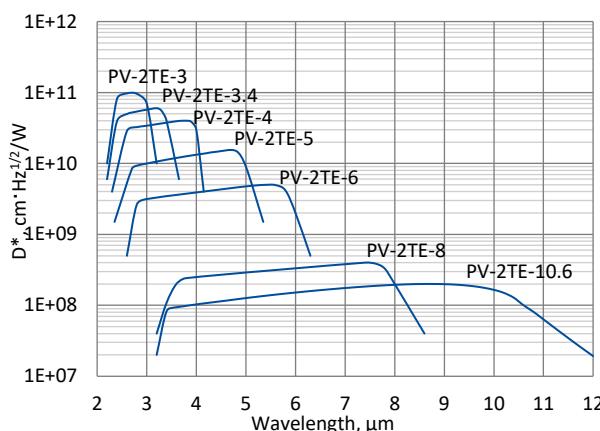


## 2.10 PV-2TE series

### 2.10.1 2.0 – 12.0 $\mu\text{m}$ 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  $\lambda_{\text{opt}}$ . 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 ( $\text{wAl}_2\text{O}_3$ ) or zinc selenide anti-reflection coated ( $\text{wZnSeAR}$ ) window prevents unwanted interference effects.

**Spectral response ( $T_a = 20^\circ\text{C}$ ,  $V_b = 0 \text{ mV}$ )**



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

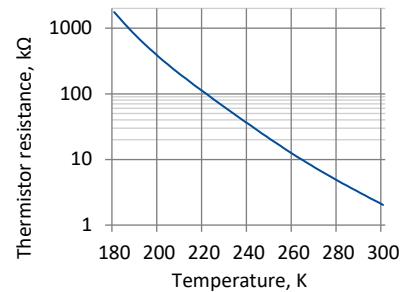
**Specification ( $T_a = 20^\circ\text{C}$ ,  $V_b = 0 \text{ V}$ )**

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 $\lambda_{\text{opt}}$ , $\mu\text{m}$	3.0	3.4	4.0	5.0	6.0	8.0	10.6
Detectivity $D^*(\lambda_{\text{peak}})$ , $\text{cm} \cdot \text{Hz}^{1/2} / \text{W}$	$\geq 1.0 \times 10^{11}$	$\geq 6.0 \times 10^{10}$	$\geq 4.0 \times 10^{10}$	$\geq 1.5 \times 10^{10}$	$\geq 5.0 \times 10^9$	$\geq 4.0 \times 10^8$	$\geq 2.0 \times 10^8$
Detectivity $D^*(\lambda_{\text{opt}})$ , $\text{cm} \cdot \text{Hz}^{1/2} / \text{W}$	$\geq 7.0 \times 10^{10}$	$\geq 4.0 \times 10^{10}$	$\geq 3.0 \times 10^{10}$	$\geq 9.0 \times 10^9$	$\geq 2.0 \times 10^9$	$\geq 2.0 \times 10^8$	$\geq 1.0 \times 10^8$
Current responsivity $R_i(\lambda_{\text{opt}})$ , $\text{A/W}$	$\geq 0.5$	$\geq 0.8$	$\geq 1.0$	$\geq 1.3$	$\geq 1.5$	$\geq 0.8$	$\geq 0.4$
Time constant $\tau$ , ns	$\leq 280$	$\leq 200$	$\leq 100$	$\leq 80$	$\leq 50$	$\leq 45$	$\leq 10$
Resistance-active area product $R \cdot A$ , $\Omega \cdot \text{cm}^2$	$\geq 150$	$\geq 3$	$\geq 2$	$\geq 0.1$	$\geq 0.02$	$\geq 0.0002$	$\geq 0.0001$
Active element temperature $T_{\text{det}}$ , K	$\sim 230$						
Active area A, mm $\times$ mm	$0.1 \times 0.1$					$0.05 \times 0.05$ , $0.1 \times 0.1$	$0.05 \times 0.05$
Package	TO8, TO66						
Acceptance angle $\Phi$	$\sim 70^\circ$						
Window	$\text{wAl}_2\text{O}_3$				$\text{wZnSeAR}$		

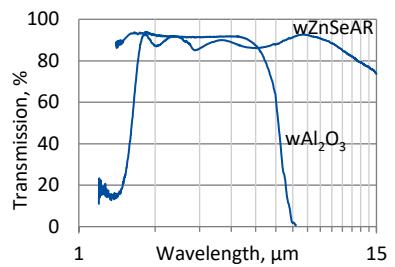
### Two-stage thermoelectric cooler parameters

Parameter	Value
T <sub>dev</sub> , Kt	~230
V <sub>max</sub> , V	1.3
I <sub>max</sub> , A	1.2
Q <sub>max</sub> , W	0.36

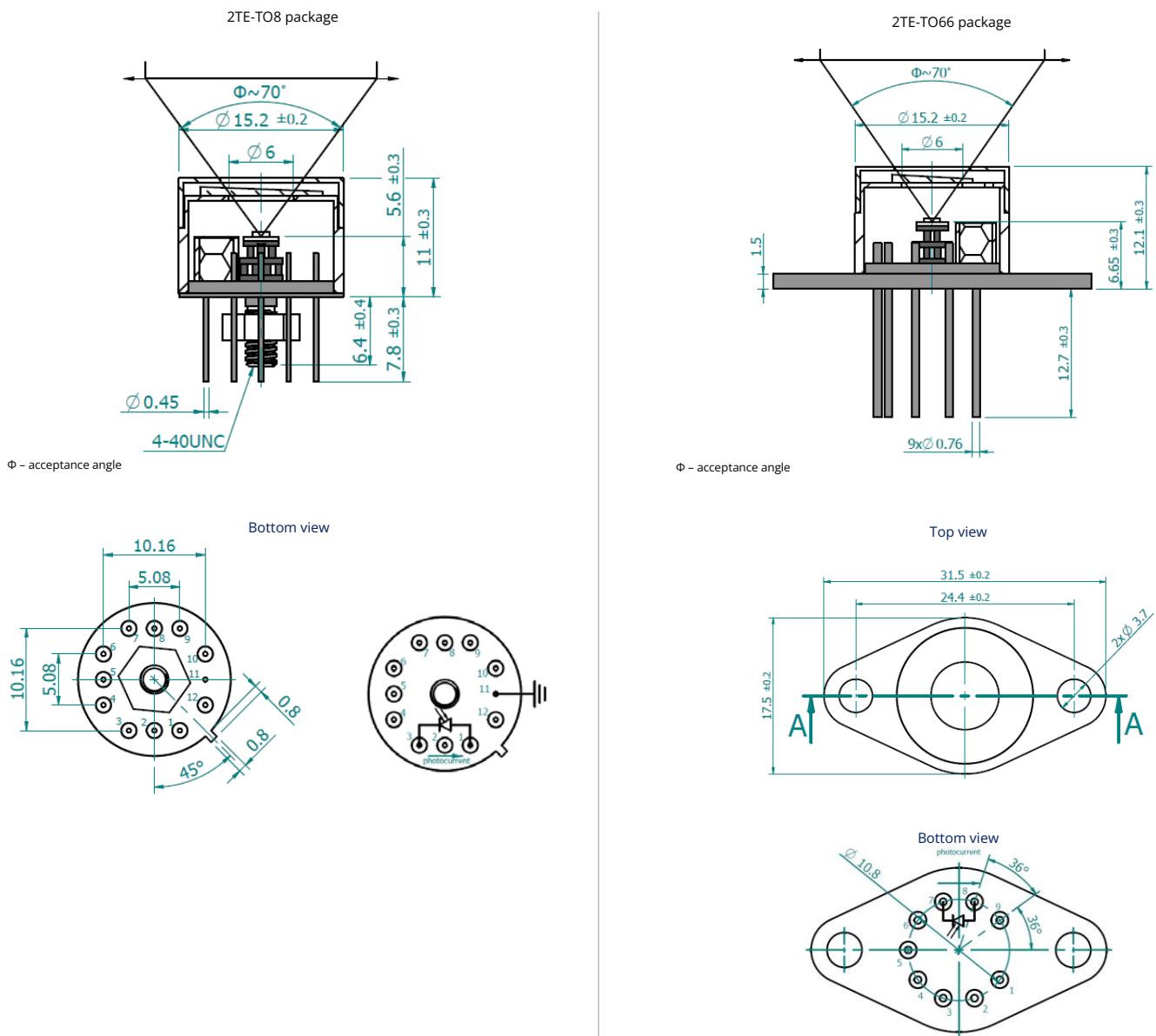
### Thermistor characteristics



### Spectral transmission of wAl<sub>2</sub>O<sub>3</sub> and wZnSeAR windows (typical example)



### Mechanical layout, mm



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

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 preamplifier



„all-in-one“ AIP



programmable PIP



standard MIP



small SIP-T08



fast FIP