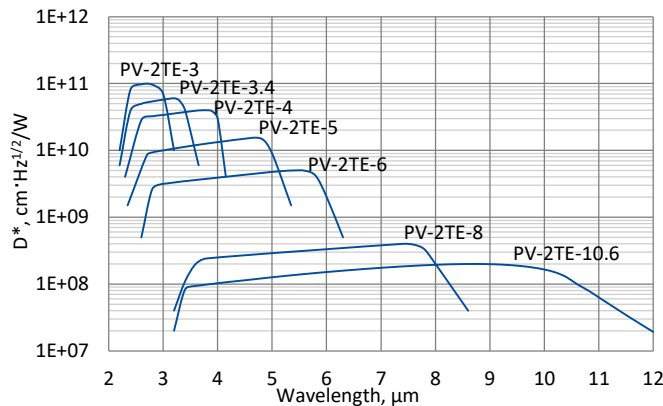


PV-2TE series

2.0 – 12.0 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 (wAl₂O₃) or zinc selenide anti-reflection coated (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.

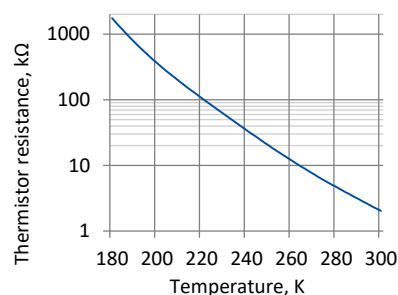
Specification ($T_a = 20^\circ\text{C}$, $V_b = 0\text{V}$)

| 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 λ_{opt} , μm | 3.0 | 3.4 | 4.0 | 5.0 | 6.0 | 8.0 | 10.6 |
| Detectivity $D^*(\lambda_{peak})$, $\text{cm}^2 \cdot \text{Hz}^{1/2} / \text{W}$ | $\geq 1.0 \times 10^{11}$ | $\geq 6.0 \times 10^{10}$ | $\geq 4.0 \times 10^{10}$ | $\geq 1.5 \times 10^{10}$ | $\geq 5.0 \times 10^9$ | $\geq 4.0 \times 10^8$ | $\geq 2.0 \times 10^8$ |
| Detectivity $D^*(\lambda_{opt})$, $\text{cm}^2 \cdot \text{Hz}^{1/2} / \text{W}$ | $\geq 7.0 \times 10^{10}$ | $\geq 4.0 \times 10^{10}$ | $\geq 3.0 \times 10^{10}$ | $\geq 9.0 \times 10^9$ | $\geq 2.0 \times 10^9$ | $\geq 2.0 \times 10^8$ | $\geq 1.0 \times 10^8$ |
| Current responsivity $R_i(\lambda_{opt})$, 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 $R \cdot A$, $\Omega \cdot \text{cm}^2$ | ≥ 150 | ≥ 3 | ≥ 2 | ≥ 0.1 | ≥ 0.02 | ≥ 0.0002 | ≥ 0.0001 |
| Active element temperature T_{det} , K | ~ 230 | | | | | | |
| Active area A , mm \times mm | 0.05×0.05 , 0.1×0.1 | | | 0.05×0.05 | | | |
| Package | TO8, TO66 | | | | | | |
| Acceptance angle Φ | $\sim 70^\circ$ | | | | | | |
| Window | wAl ₂ O ₃ | | | | wZnSeAR | | |

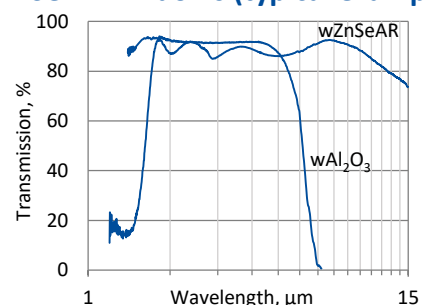
Two-stage thermoelectric cooler parameters

| Parameter | Value |
|---------------|------------|
| T_{det} , K | ~ 230 |
| V_{max} , V | 1.3 |
| I_{max} , A | 1.2 |
| Q_{max} , W | 0.36 |

Thermistor characteristics

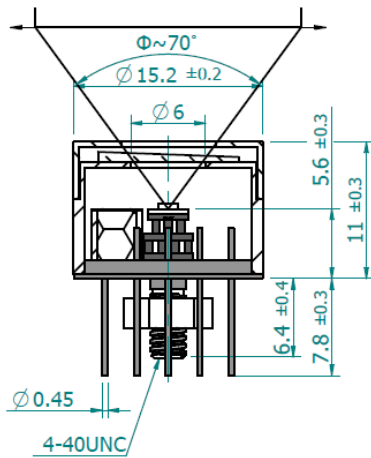


Spectral transmission of wAl₂O₃ and wZnSeAR windows (typical example)



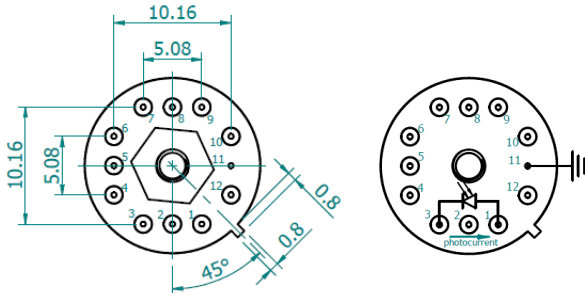
Mechanical layout, mm

2TE-T08 package



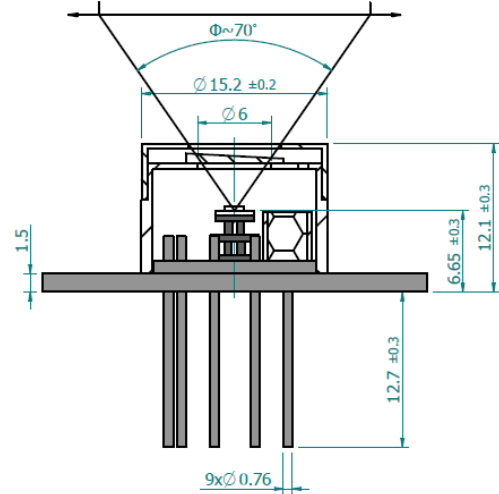
Φ – acceptance angle

Bottom view



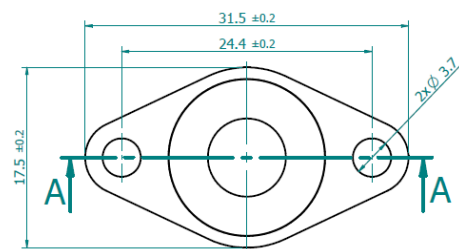
| Function | Pin number |
|-------------------------|-----------------|
| Detector | 1, 3 |
| Reverse bias (optional) | 1(-), 3(+) |
| Thermistor | 7, 9 |
| TE cooler supply | 2(+), 8(-) |
| Chassis ground | 11 |
| Not used | 4, 5, 6, 10, 12 |

2TE-T066 package

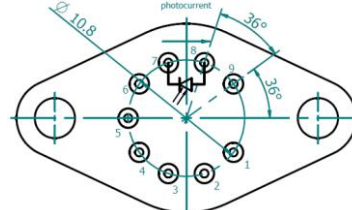


Φ – acceptance angle

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-T08



fast FIP