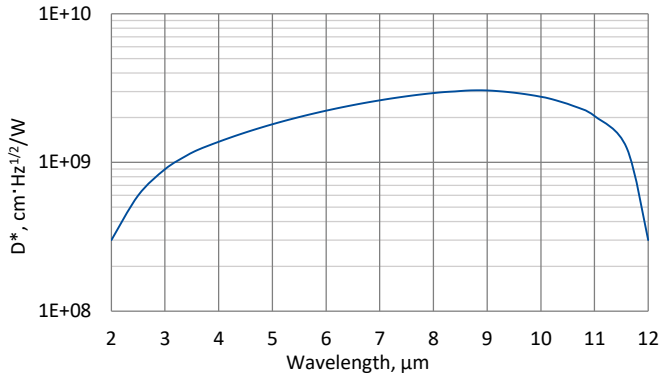
PVMI-4TE-10.6-1×1-TO8-wZnSeAR-36

2.0 – 12.0 µm HgCdTe four-stage thermoelectrically cooled, optically immersed photovoltaic multiple junction detector

PVMI-4TE-10.6-1×1-TO8-wZnSeAR-36 is four-stage thermoelectrically cooled IR photovoltaic multiple junction detector based on sophisticated HgCdTe heterostructure for the best performance and stability. The device is designed for the maximum performance at 10.6 µm. Detector element is monolithically integrated with hyperhemispherical GaAs microlens in order to improve performance of the device. 3° wedged zinc selenide anti-reflection coated (wZnSeAR) window prevents unwanted interference effects.

Spectral response (T_a = 20°C)



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

Specification (T_a = 20°C)

Parameter	Detector type PVMI-4TE-10.6-1×1-TO8-wZnSeAR-36
Active element material	epitaxial HgCdTe heterostructure
Cut-on wavelength $\lambda_{cut\text{-}on}$ (10%), µm	≤2.0
Peak wavelength λ_{peak}, µm	8.5±2.0
Optimum wavelength λ_{opt}, µm	10.6
Cut-off wavelength $\lambda_{cut\text{-}off}$ (10%), µm	≥12.0
Detectivity D*(λ_{peak}), cm·Hz$^{1/2}$/W	≥3.0×10^9
Detectivity D*(λ_{opt}), cm·Hz$^{1/2}$/W	≥2.5×10^9
Current responsivity R_i(λ_{peak}), A/W	≥0.25
Current responsivity R_i(λ_{opt}), A/W	≥0.18
Time constant τ, ns	≤3
Resistance R, Ω	≥120
Active element temperature T_{det}, K	~195
Optical area A_O, mm×mm	1×1
Package	TO8
Acceptance angle Φ	~36°
Window	wZnSeAR

Features

- High performance
- Wide spectral range from 2.0 to 12.0 µm
- No bias required
- No flicker noise
- Operation from DC to high frequency
- Sensitive to IR radiation polarisation
- Versatility
- Quantity discounted price
- Fast delivery

Applications

- CO_2 laser (10.6 µm) measurements
- Laser power monitoring and control
- Laser beam profiling and positioning
- Laser calibration
- Semiconductor manufacturing
- Glucose monitoring
- Detection of hazardous chemicals (i.e. ammonia) in the air

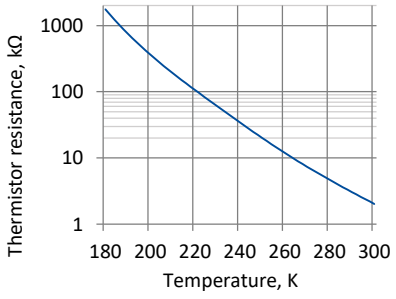
Related product

- LabM-I-10.6 detection module

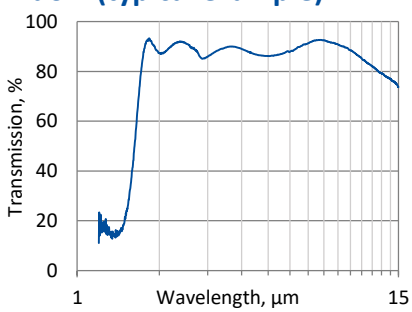
Four-stage thermoelectric cooler parameters

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

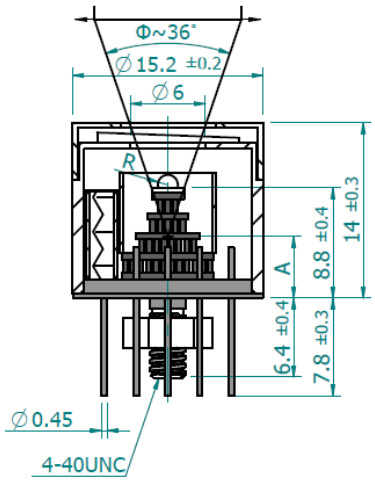
Thermistor characteristics



Spectral transmission of wZnSeAR window (typical example)



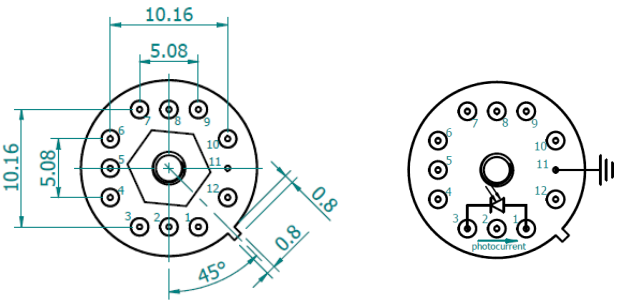
Mechanical layout, mm



Parameter	Value
Immersion microlens shape	hyperhemisphere
Optical area A_O, mm×mm	1×1
R, mm	0.8
A, mm	6.4±0.4

Φ – acceptance angle
A – distance from the bottom of the 4TE-TO8 header to the focal plane
R – hyperhemisphere microlens radius

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

Precautions for use and storage

- Heatsink with thermal resistance of ~1 K/W is necessary to dissipate heat generated by 4TE cooler.
- Operation in 10% to 80% humidity and -20°C to 30°C ambient temperature.
- Beam power limitations for optically immersed detector:
  - irradiance with CW or single pulse longer than 1 µs irradiance on the apparent optical active area must not exceed 2.5 W/cm^2,
  - irradiance of the pulse shorter than 1 µs must not exceed 10 kW/cm^2.
- Storage in dark place with 10% to 90% humidity and -20°C to 50°C ambient temperature.