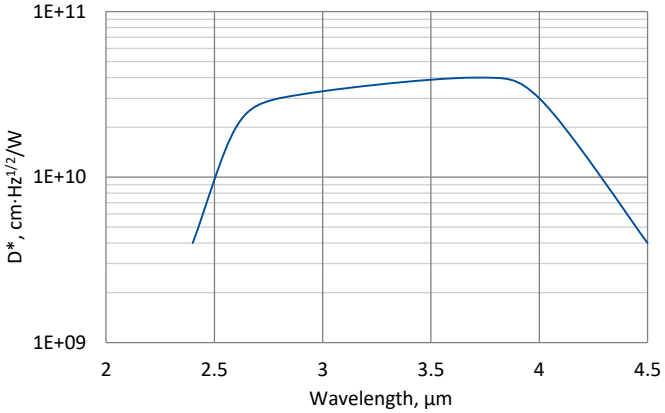
PVI-4-1×1-TO39-NW-36

2.4 – 4.5 µm HgCdTe ambient temperature, optically immersed photovoltaic detector

PVI-4-1×1-TO39-NW-36 is uncooled IR photovoltaic detector based on sophisticated HgCdTe heterostructure for the best performance and stability. The device is optimized for the maximum performance at 4 µm. Detector element is monolithically integrated with hyperhemispherical GaAs microlens in order to improve performance of the device. 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.

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



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

Specification (T_a = 20°C, V_b = 0 mV)

Parameter	Detector type PVI-4-1×1-TO39-NW-36
Active element material	epitaxial HgCdTe heterostructure
Cut-on wavelength $\lambda_{cut\text{-}on}$ (10%), µm	2.4±0.5
Peak wavelength λ_{peak}, µm	3.4±0.5
Optimum wavelength λ_{opt}, µm	4.0
Cut-off wavelength $\lambda_{cut\text{-}off}$ (10%), µm	4.5±0.3
Detectivity D*(λ_{peak}), cm·Hz$^{1/2}$/W	≥4.0×10^{10}
Detectivity D*(λ_{opt}), cm·Hz$^{1/2}$/W	≥3.0×10^{10}
Current responsivity R_i(λ_{peak}), A/W	≥2.0
Current responsivity R_i(λ_{opt}), A/W	≥1.0
Time constant τ, ns	≤150
Resistance R, Ω	≥600
Optical area A_O, mm×mm	1×1
Package	TO39
Acceptance angle Φ	~36°
Window	none

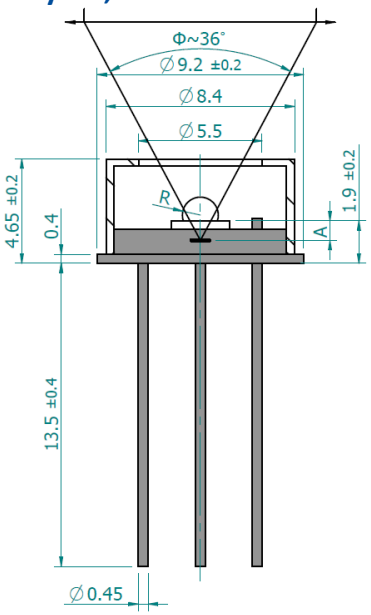
Features

- Wide dynamic range
- Convenient to use
- Very small size
- Cost-effective solution
- Quantity discounted price
- Fast delivery

Applications

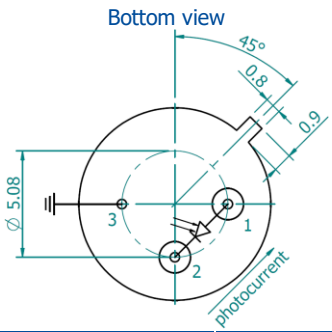
- Gas detection, monitoring and analysis (CH_4, C_2H_2, CH_2O, HCl, NH_3, SO_2, C_2H_6)
- Breath analysis
- Explosion prevention
- Flue gas denitrification
- Emission control (exhaust fumes, greenhouse gases)

Mechanical layout, mm



Parameter	Value
Immersion microlens shape	hyperhemisphere
Optical area A_O, mm×mm	1×1
R, mm	0.8
A, mm	2.4±0.2

Φ – acceptance angle
R – hyperhemisphere microlens radius
A – distance from the bottom of hyperhemisphere microlens to the focal plane



Function	Pin number
Detector	1, 2
Reverse bias (optional)	1(–), 2(+)
Chassis ground	3

Precautions for use and storage

- Standard ohmmeter may overbias and damage the detector. Bias of 10 mV can be used for resistance measurements.
- 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/cm².
- Storage in dark place with 10% to 90% humidity and -20°C to 50°C ambient temperature.

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