

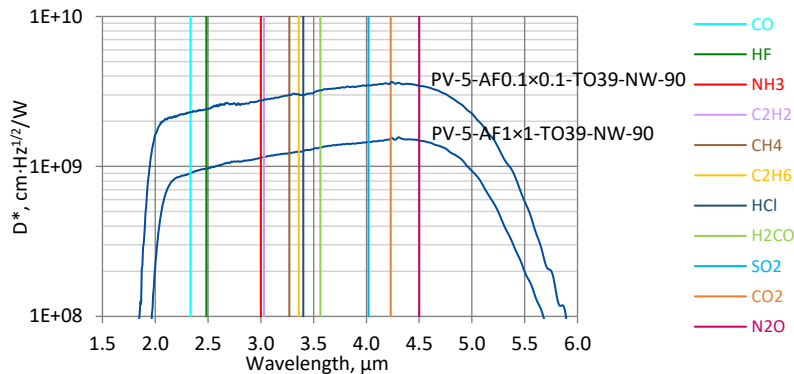
## PV-5-AF series – ENGINEERING SAMPLE

### HgCdTe ambient temperature photovoltaic detectors with anti-fringing technology

**PV-5-AF series** features uncooled IR photovoltaic detector based on sophisticated HgCdTe heterostructure for the best performance and stability.

In order to make this detectors immune to unwanted optical fringing effects, VIGO developed anti-fringing technology (internal modification of substrate's surface) and successfully applied it. This results in the fringing 10 – 40 times smaller compared to the standard IR detector. In order to minimize fringing it is recommended to work with detectors optimized for longer wavelengths and operate below  $\lambda_{peak}$ .

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



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

#### Specification (Typ., $T_a = 20^\circ\text{C}$ , $V_b = 0\text{ mV}$ )

Parameter	Detector type	
	PV-5-AF1x1-TO39-NW-90	PV-5-AF0.1x0.1-TO39-NW-90
Active element material	epitaxial HgCdTe heterostructure	
Cut-on wavelength $\lambda_{cut-on}$ (10%), $\mu\text{m}$	2.1±0.2	2.0±0.2
Peak wavelength $\lambda_{peak}$ , $\mu\text{m}$	4.4±0.2	4.4±0.2
Cut-off wavelength $\lambda_{cut-off}$ (10%), $\mu\text{m}$	≥5.3	≥5.3
Detectivity $D^*(\lambda_{peak})$ , $\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$	~1.45×10 <sup>9</sup>	~3.55×10 <sup>9</sup>
Current responsivity $R_i(\lambda_{peak})$ , A/W	~0.36	~2.80
Time constant $\tau$ , ns	~570	~177
Resistance R, $\Omega$	~8	~265
Active area A, mm×mm	AF1×1	AF0.1×0.1
Package		TO39
Acceptance angle $\Phi$		~90°
Window		none

#### Features

- Anti-fringing technology applied
- Significant fringing reduction for 2.1 – 4.4  $\mu\text{m}$  spectral range
- No bias required
- No 1/f noise

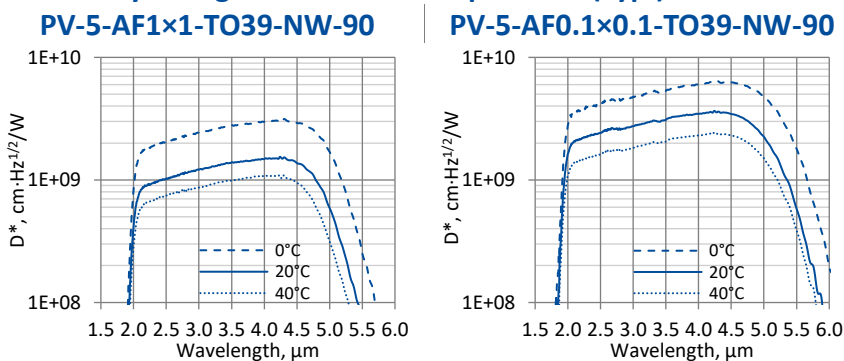
#### Applications

- Gas detection, monitoring and analysis (CO, HF, NH<sub>3</sub>, C<sub>2</sub>H<sub>2</sub>, CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, HCl, H<sub>2</sub>CO, SO<sub>2</sub>, CO<sub>2</sub>, N<sub>2</sub>O, NO<sub>x</sub>)

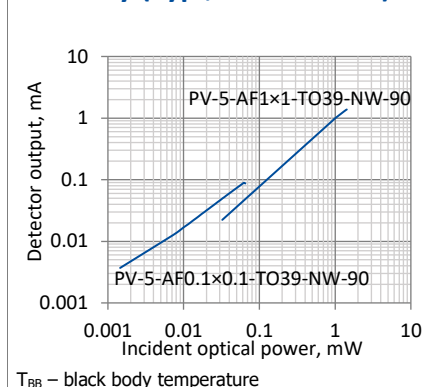
#### Related document

- Anti-fringing technology

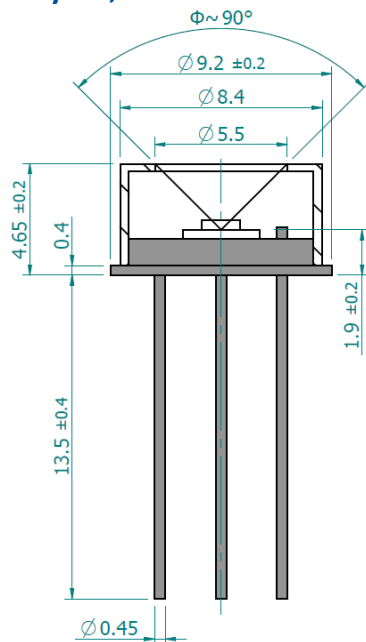
#### Detectivity change vs. ambient temperature (Typ.)



#### Linearity (Typ., $T_{BB} = 1273\text{ K}$ )



### Mechanical layout, mm



$\Phi$  – acceptance angle

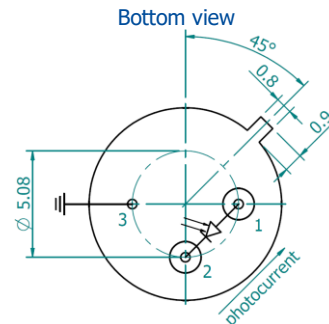
### Dedicated preamplifier



small SIP-T039

### Precautions for use and storage

- Operation in 10% to 80% humidity and -20°C to 30°C ambient temperature.
- Beam power limitations:
  - irradiance with CW or single pulse longer than 1  $\mu$ s irradiance on the apparent optical active area must not exceed 100 W/cm<sup>2</sup>,
  - irradiance of the pulse shorter than 1  $\mu$ s must not exceed 1 MW/cm<sup>2</sup>.
- Storage in dark place with 10% to 90% humidity and -20°C to 50°C ambient temperature.



Function	Pin number
Detector	1, 2
Chassis ground	3