INFRARED DETECTORS AND MODULES – CONFIGURABLE LINE

VIGO offers various types of infrared detectors based on Mercury Cadmium Telluride, Indum Arsenide and Indium Arsenide Antimonide featuring different parameters.

Main features

- Optimized at any wavelength from 2 – 14 μm spectral range
- With or without immersion technology
- Uncooled or thermoelectrically cooled
- Different sizes of active/optical area
- Different packages
- Different infrared windows
- Different acceptance angle
- Wide range of dedicated preamplifiers and accessories

How to choose an infrared detector?

For making a detector selection, following points should be taken into consideration:

- wavelength or wavelength range,
- detectivity,
- speed of response.

VIGO detectors are optimized for various wavelengths. Depending on the required parameters a proper detector type should be selected.

Detector series	Spectral response range, µm	Features
HgCdTe (MCT) photoconductive detectors	MWIR: PC/PCI LWIR: PC/PCI, PCQ	› Broad 1 – 16 µm spectral range › Active area from 25×25 μm^2 to 4×4 mm^2 › High detectivity › Low speed › Long lifetime and MTBF › Stability and reliability › 1/f noise › Uncooled and TE cooled › Immersion microlens technology available

HgCdTe (MCT) photovoltaic detectors	MWIR: PV/PVI
	LWIR: PV/PVI
		› Near BLIP detection in 3 – 6 µm range
		› < 10x gap to BLIP for > 7 µm
		› No bias required
		› No 1/f noise
		› Bandwidth:
		  › tens of MHz (without reverse bias)
		  › ≥ 1GHz (with reverse bias)
		› LWIR devices limited to small areas
		› Uncooled and TE cooled
		› Immersion microlens technology available

HgCdTe (MCT) photovoltaic multiple junction detectors	LWIR: PVM/PVMI, PVMQ	› Wide 2 – 12 µm spectral range › Large active areas up to 4×4 mm^2 › No bias required › No 1/f noise › Short time constant ≤ 1.5 ns › Operation from DC to high frequency › Sensitive to IR radiation polarisation › Uncooled and TE cooled › Immersion microlens technology available
HgCdTe (MCT) photoelectromagnetic detectors	LWIR: PEM/PEMI	› Wide 2 – 12 µm spectral range › Room temperature operation › No bias required › No 1/f noise › Large active area up to 2×2 mm^2 › Short time constant ≤1.2 ns › Sensitive to IR radiation polarisation › Immersion microlens technology available
InAs and InAsSb photovoltaic detectors	MWIR: PVA/PVIA	› Spectral range 2 – 5.5 µm › Temperature stable up to 300°C › Mechanically durable › Complying with the RoHS Directive › No bias required › No 1/f noise › Sensitive to IR radiation polarisation › Uncooled and TE cooled › Immersion microlens technology available

Detector code

Different information such as detector type, optical immersion, number of stages thermoelectric cooler, the wavelength a detector is optimized for, size of active/optical area, package type, window type and acceptance angle combine to create VIGO System's detector code.

Detector type	Immersion	–	Cooling	–	Optimal wavelength	–	Active/optical area	–	Package	–	Window	–	Acceptance angle

Please see particular detector series datasheets to get available options of each detector type.

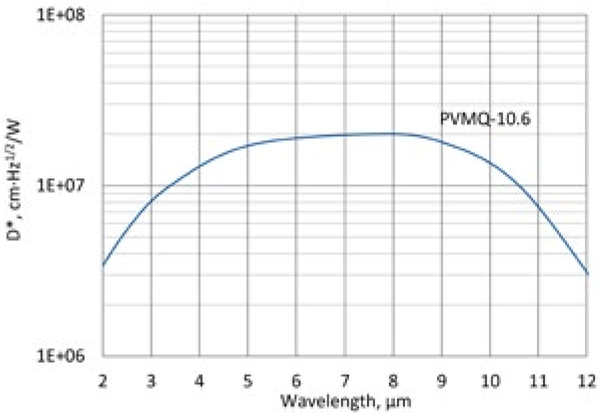
VIGO SYSTEM

PVMQ

2 – 11 µm HgCdTe ambient temperature photovoltaic multiple junction quadrant detector

PVMQ is uncooled IR phtovoltaic multiple junction quadrant detector based on sophisticated HgCdTe heterostructures for the best performance and stability. Quadrant detector consists of four separate active elements arranged in a quadrant geometry. The device is optimized for the maximum performance at 10.6 µm. The main application of PVMQ detector is laser beam profiling and positioning.

Spectral response (T_a = 20°C)

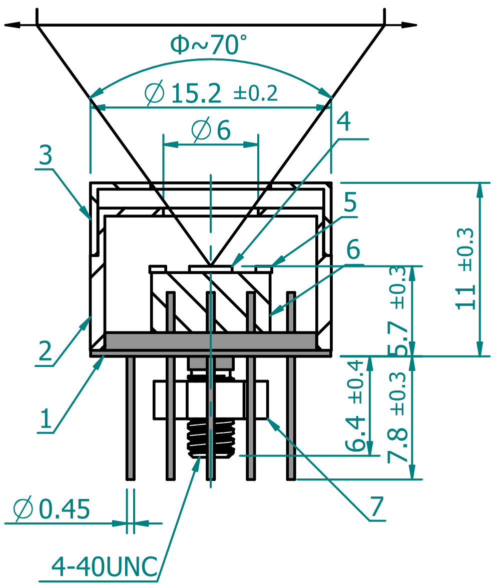


Exemplary spectral detectivity, the spectral response of delivered devices may differ.

Specification (T_a = 20°C)

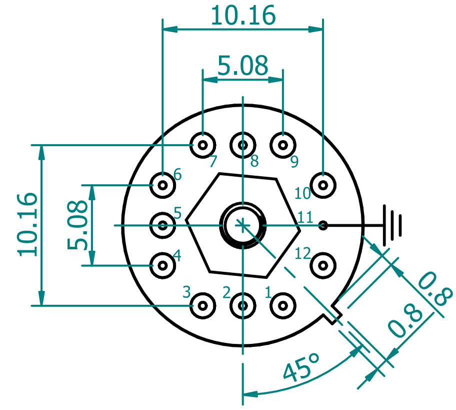
Parameter	Detector type
	PVMQ-10.6
Active elements material	epitaxial HgCdTe heterostructure
Optimal wavelength λ_{opt}, µm	10.6
Detectivity D*(λ_{peak}), cm·Hz$^{1/2}$/W	≥2.0×10^{7}
Detectivity D*(λ_{opt}), cm·Hz$^{1/2}$/W	≥1.0×10^{7}
Current responsivity $R_i(\lambda_{opt})$, A/W	≥0.002
Time constant τ, ns	≤1.5
Resistance R, Ω	30 to 150
Active area of single element A, mm×mm	1×1
Distance between elements, µm	200
Package	TO8
Acceptance angle Φ	~70°
Window	none

Mechanical layout, mm

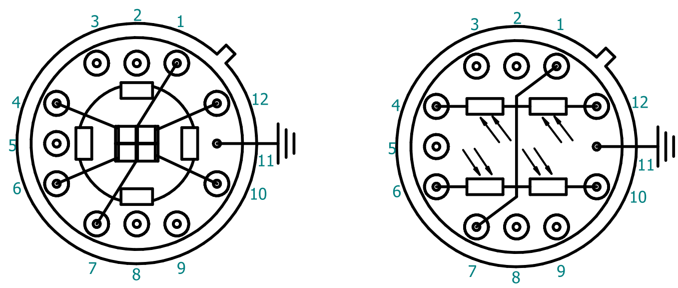


Φ – *acceptance angle*

Bottom view



Top view



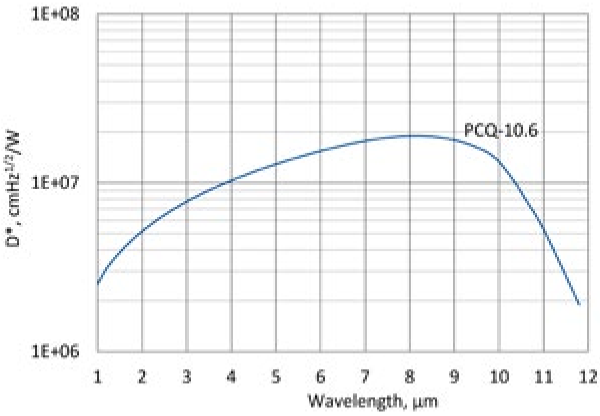
Function	Pin number
Detector 1	12
Detector 2	10
Detector 3	6
Detector 4	4
Common	1, 7
Chassis ground	11
Not used	2, 3, 5, 8, 9

PCQ

2 – 11 µm HgCdTe ambient temperature photoconductive quadrant detector

PCQ is uncooled IR photoconductive quadrant detector based on sophisticated HgCdTe heterostructures for the best performance and stability. Quadrant detector consists of four separate active elements arranged in a quadrant geometry. The device is optimized for the maximum performance at 10.6 µm. The detector should operate in optimum bias voltage and current readout mode. Performance at low frequencies is reduced due to 1/f noise. The main application of PCQ detectors is laser beam profiling and positioning.

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 PCQ-10.6
Active elements material	epitaxial HgCdTe heterostructure
Optimal wavelength λ_{opt}, µm	10.6
Detectivity D*(λ_{peak}, 20kHz), cm·Hz$^{1/2}$/W	≥1.9×10^7
Detectivity D*(λ_{opt}, 20kHz), cm·Hz$^{1/2}$/W	≥9.0×10^6
Current responsivity-active area length product $R_i(\lambda_{opt})$·L, A·mm/W	≥0.001
Time constant τ, ns	≤5
1/f noise corner frequency f_c, Hz	≤20k
Bias voltage-active area length ratio V_b/L, V/mm	≤6.0
Resistance R, Ω	≤240
Active area of single element A, mm×mm	1×1
Distance between elements, µm	20
Package	TO8
Acceptance angle Φ	~70°
Window	none

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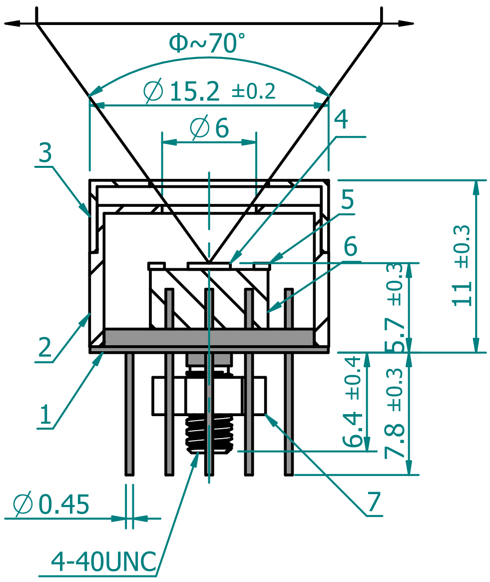
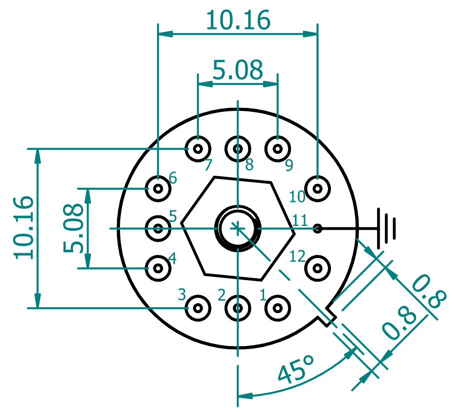
Mechanical layout, mm

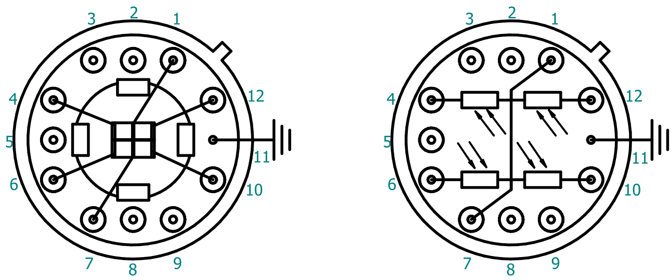


Φ – *acceptance angle*

Bottom view



Top view



Function	Pin number
Detector 1	12
Detector 2	10
Detector 3	6
Detector 4	4
Common	1, 7
Chassis ground	11
Not used	2, 3, 5, 8, 9