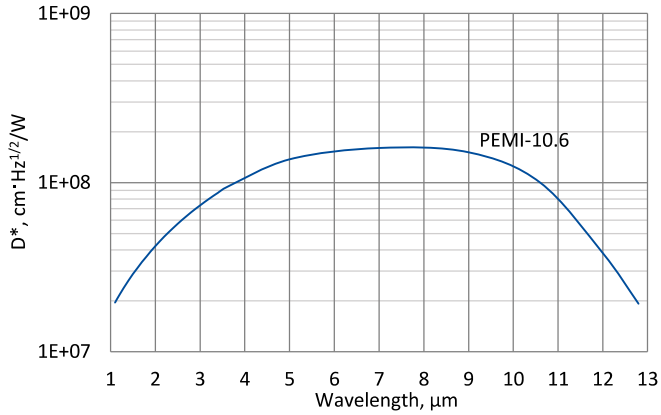
PEMI series

2 – 12 µm HgCdTe ambient temperature, optically immersed photoelectromagnetic detectors

PEMI series features uncooled HgCdTe photovoltaic optically immersed IR detectors based on photelectromagnetic effect in the semiconductor – spatial separation of optically generated electrons and holes in the magnetic field. The devices are designed for the maximum performance at 10.6 µm and especially useful as large optical area detectors to detect CW and low frequency modulated radiation. These devices are mounted in specialized packages with incorporated magnetic circuit inside. 3° wedged zinc selenide anti-reflection coating (wZnSeAR) window prevents unwanted interference effects and protects against pollution.

Spectral response (T_a = 20°C)



PEM-TO8 PEM-SMA

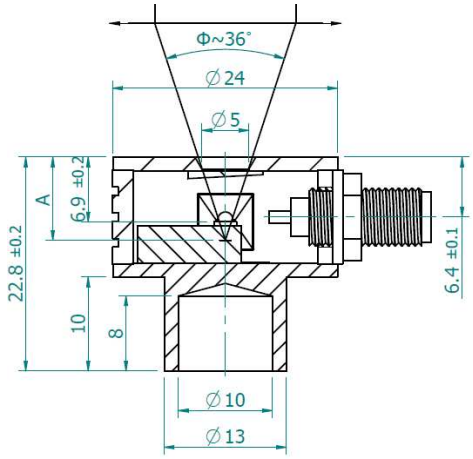
Exemplary spectral detectivity, the spectral response of delivered devices may differ.

Specification (T_a = 20°C)

Parameter	Detector type
	PEMI-10.6
Active element material	epitaxial HgCdTe heterostructure
Optimal wavelength λ_{opt}, µm	10.6
Detectivity D*(λ_{peak}), cm·Hz$^{1/2}$/W	≥1.6×10^8
Detectivity D*(λ_{opt}), cm·Hz$^{1/2}$/W	≥1.0×10^8
Current responsivity-optical area length product $R_i(\lambda_{opt})$·L, A·mm/W	≥0.01
Time constant τ, ns	≤1.2
Resistance R, Ω	40 to 100
Optical area A_O, mm×mm	1×1, 2×2
Package	PEM-SMA, PEM-TO8
Acceptance angle Φ	~36°
Window	wZnSeAR

Mechanical layout, mm

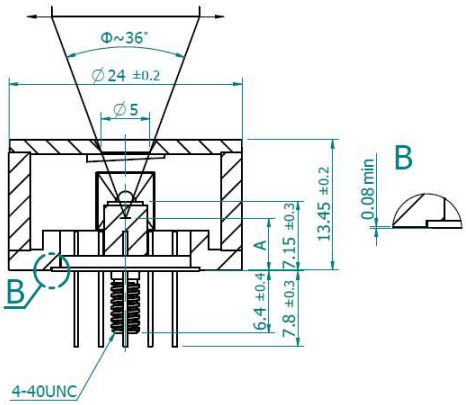
PEM-SMA



Parameter	Value	
Immersion microlens shape	hyperhemisphere	
Optical area A_O, mm×mm	1×1	2×2
R, mm	0.8	1.25
A, mm	9.3±0.4	10.65±0.40

Φ – acceptance angle
R – hyperhemisphere microlens radius
A – distance from the top of PEM-SMA lid to the focal plane

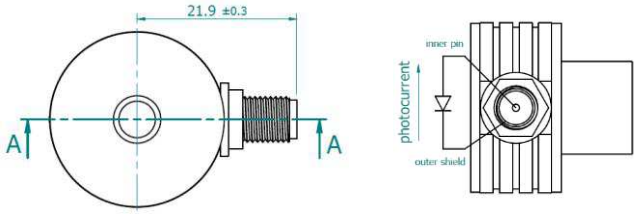
PEM-TO8



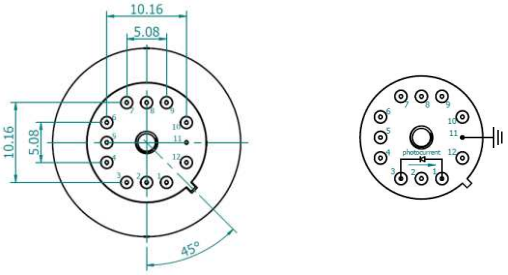
Parameter	Value	
Immersion microlens shape	hyperhemisphere	
Optical area A_O, mm×mm	1×1	2×2
R, mm	0.8	1.25
A, mm	4.75±0.30	3.4±0.4

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

Top view

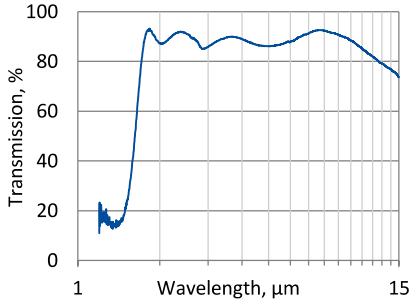


Bottom view



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

Spectral transmission of wZnSeAR window (typical example)



Dedicated preamplifier

standard MIP