# PEM series

2 – 12 µm HgCdTe ambient temperature photoelectromagnetic detectors

PEM series features uncooled HgCdTe photovoltaic 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 a large active 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 coated (wZnSeAR) window prevents unwanted interference effects and protects against pollution.
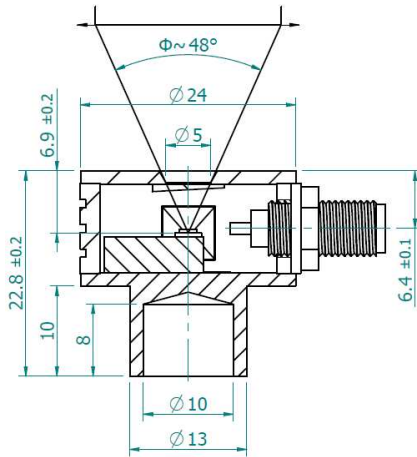
Spectral response (T_a = 20°C)
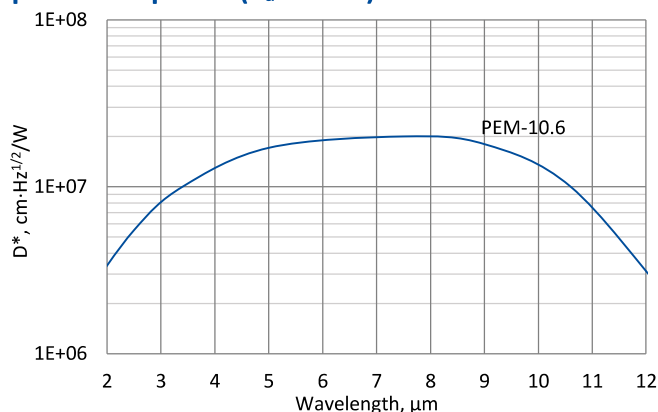
Exemplary spectral detectivity, the spectral response of delivered devices may differ.

PEM-TO8   PEM-SMA

Specification (T_a = 20°C)

Parameter	Detector type	
	PEM-10.6	
Active element material	epitaxial HgCdTe heterostructure	
Optimal wavelength λ_{opt}, µm	10.6	
Detectivity $D^*(\lambda_{peak})$, cm·Hz$^{1/2}$/W	≥2.0×10^7	
Detectivity $D^*(\lambda_{opt})$, cm·Hz$^{1/2}$/W	≥1.0×10^7	
Current responsivity-active area length product $R_i(\lambda_{opt})$·L, A·mm/W	≥0.002	
Time constant τ, ns	≤1.2	
Resistance R, Ω	≥40	
Active area A, mm×mm	1×1, 2×2	
Package	PEM-SMA	PEM-TO8
Acceptance angle Φ	~48°	~52°
Window	wZnSeAR	

Mechanical layout, mm

PEM-SMA

Φ~48°
Ø 24
Ø 5
6.9 ±0.2
22.8 ±0.2
10
8
6.4 ±0.1
Ø 10
Ø 13

Φ – acceptance angle

PEM-TO8

Φ~52°
Ø 24 ±0.2
Ø 5
13.45 ±0.2
7.15 ±0.3
6.4 ±0.4
7.8 ±0.3
0.08 min
B
B
4-40UNC

Φ – acceptance angle

Top view

21.9 ±0.3
A A
inner pin
photocurrent
outer shield

Bottom view

10.16
5.08
10.16
5.08
45°
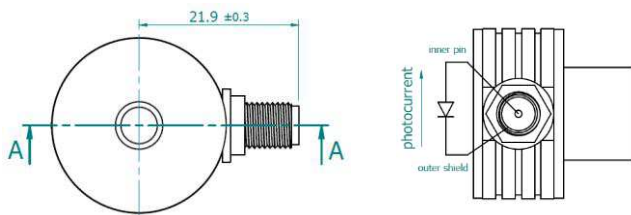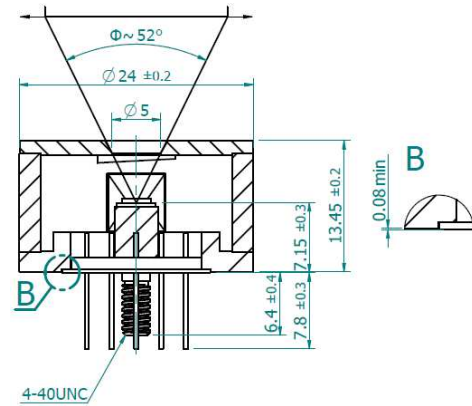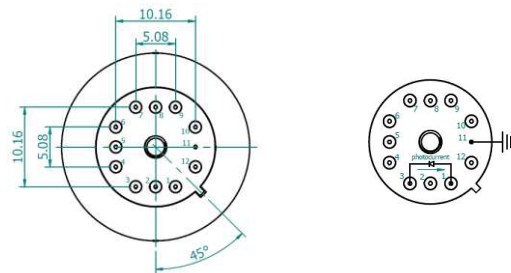
Function	Pin number
Detector	1, 3
Chassis ground	11
Not used	2, 4, 5, 6, 7, 8, 9, 10, 12

Spectral transmission of wZnSeAR window (typical example)

Transmission, %

100
80
60
40
20
0

1   Wavelength, µm   15
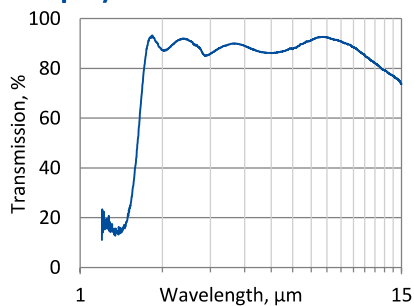
Dedicated preamplifier

standard MIP