

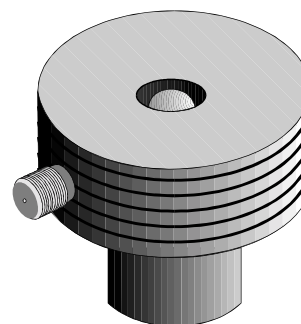


PEMI-L Series Photovoltaic CO₂ Laser Detectors

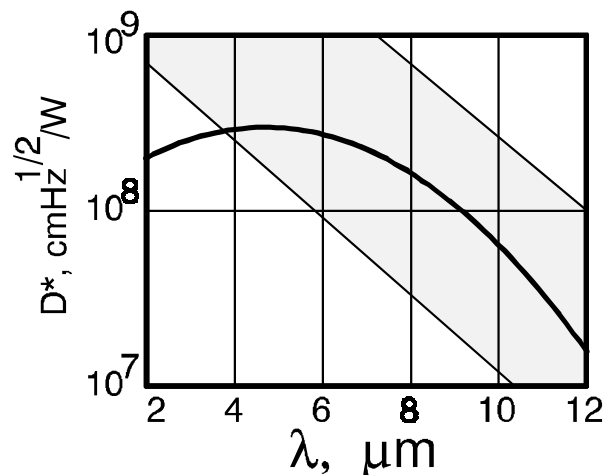
2-12 μm PHOTOVOLTAIC CO₂ LASER DETECTORS ROOM TEMPERATURE, OPTICALLY IMMERSED

FEATURES

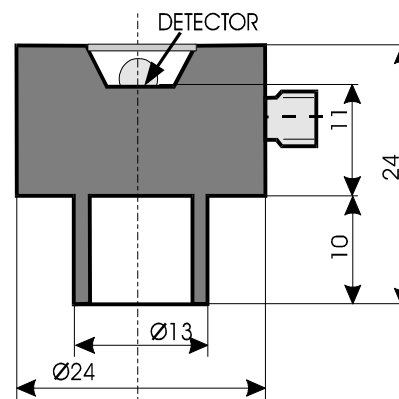
- Ambient temperature operation
- No bias required
- Wide spectral range (2-12 μm)
- $D^*(10.6 \mu\text{m})$ to $>3 \cdot 10^7 \text{ cmHz}^{1/2}/\text{W}$
- Response time $<0.5 \text{ nsec}$
- No $1/f$ (flicker) noise
- Operation from DC to $>320 \text{ MHz}$
- Lightweight, rugged and reliable
- Very convenient to use



SPECTRAL RESPONSE



Typical spectral detectivity of PEMI-L detectors as a function of wavelength. Spectral detectivities can be tailored upon request within the shaded region.



These devices are mounted in specialized packages with SMA connectors designed for wide band applications. A permanent magnet bias circuit is incorporated into the package.



DESCRIPTION

PEMI-L series detectors operate on the photoelectromagnetic effect and produce a photocurrent in response to incoming photons. The devices are optimized for the best performance at 10.6 μm but are useful at other wavelengths as well. Recent improvements include the newly developed quaternary semiconductor (HgCdZnTe) with selected composition and doping profiles, optical immersion of the detector on a high refractive index lens and inclusion of miniature permanent magnets to produce very strong magnetic bias fields. They are housed in rugged packages of small size and weight. Measured performance data are provided with each detector.

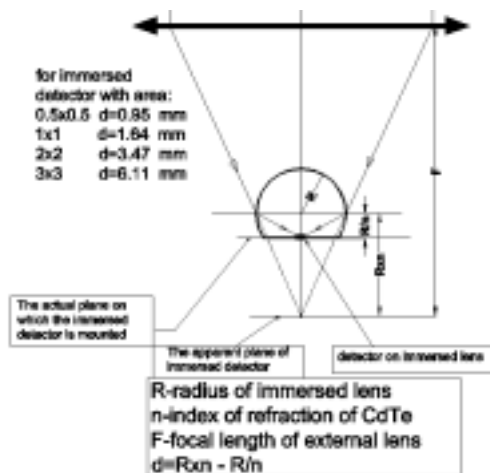
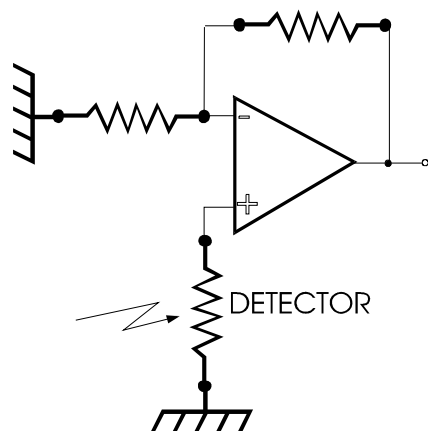
The PEMI-series are well suited for heterodyne detection of 10.6 μm radiation due to a very short response time and to the perfect match to fast electronics. Exhibiting no flicker noise, they can also be used for detection of CW and low frequency modulated radiation in the whole 2-12 μm spectral range.

SPECIFICATION

Specifications are subject to change without notice. Specifications measured @20°C, 1x1 active area.

Characteristics	Units	PEMI-L-1	PEMI-L-2	PEMI-L-3
Spectral range	μm	2 - 12		
Time Constant	nsec	<0.5		
Detectivity (peak)	$\text{cmHz}^{1/2}/\text{W}$	$>3 \times 10^7$	$>6 \times 10^7$	$>1 \times 10^8$
Detectivity (10.6 μm)	$\text{cmHz}^{1/2}/\text{W}$	$>1 \times 10^7$	$>2 \times 10^7$	$>3 \times 10^7$
Responsivity-Width Product (10.6 μm)	Vxmm/W	>0.1	>0.2	>0.3
Area (optical)	mm^2	0.1x0.1; 0.2x0.2; 0.5x0.5; 1x1; 2x2		
Field of View	deg	>40		
Resistivity	Ω	40 - 80		

TYPICAL OPERATING CIRCUIT



CAUTION

- CW optical power must not exceed 20W/cm²!
- Pulses shorter than 1 μs must not exceed 10kW/cm²!
- Avoid electrical biasing!

We supply compatible low-noise preamplifiers with bandwidths from DC to 100 MHz or, AC-coupled, to 500+ MHz. These detectors require no bias voltage and exhibit no $1/f$ (flicker) noise and thus have optimum performance from DC to very high frequencies.

