

# LabM-I-10.6

## DATASHEET

### Programmable IR detection module based on HgCdTe TE cooled optically immersed photovoltaic multi-junction detector



#### FEATURES

- Spectral range: 2.0 to 12.0  $\mu\text{m}$
- Frequency bandwidth: DC to 100 MHz
- High performance and reliability
- DC offset compensation
- Compatible with optical accessories
- Versatility and flexibility
- Quantity discounted price
- Fast delivery
- No minimum order quantity required

#### PROGRAMMABLE PARAMETERS

- Output voltage offset
- Gain: in the 40 dB range
- Bandwidth: 1.5 MHz/15 MHz/100 MHz
- Coupling: AC/DC
- Detector's parameters: temperature, reverse bias etc.

#### APPLICATIONS

- Gas detection, monitoring and analysis
- CO<sub>2</sub> laser (10.6  $\mu\text{m}$ ) measurements
- Laser power monitoring and control
- Laser beam profiling and positioning
- Laser calibration
- Semiconductor manufacturing
- Glucose monitoring
- Dentistry
- Research and prototyping

#### DETECTION MODULE CONFIGURATION

Detection module symbol	LabM-I-10.6
Detector symbol	<a href="#">PVMI-4TE-10.6-1x1-TO8-wZnSeAR-36</a>
Detector type	photovoltaic, multi-junction
Active element material	epitaxial HgCdTe heterostructure
Optical area, A <sub>0</sub>	1 mm × 1 mm
Immersion	hyperhemisphere
Cooling	4TE
Acceptance angle, $\Phi$	~36 deg.
Window	wZnSeAR (3 deg. wedged zinc selenide, anti-reflection coating)
Preamplifier symbol	PIP
Preamplifier type	transimpedance, programmable
Signal output socket	SMA
Power supply and TEC control socket	LEMO ECG.0B.309.CLN
Mounting hole	M4
Built-in fan	yes
Built-in TEC controller	no

#### INCLUDED ACCESSORIES

- SMA-BNC cable
- LEMO-DB9 cable

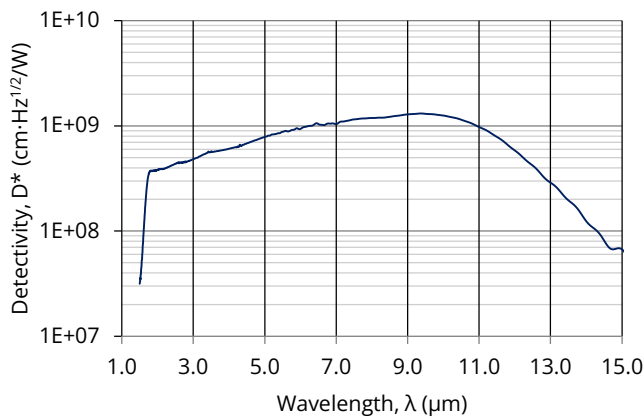
#### DEDICATED ACCESSORIES

- [PTCC-01 series](#) TEC controller (obligatory)
- [Smart Manager Software](#) (freeware)
- [OTA](#) optical threaded adapter
- [DRB-2](#) base mounting system

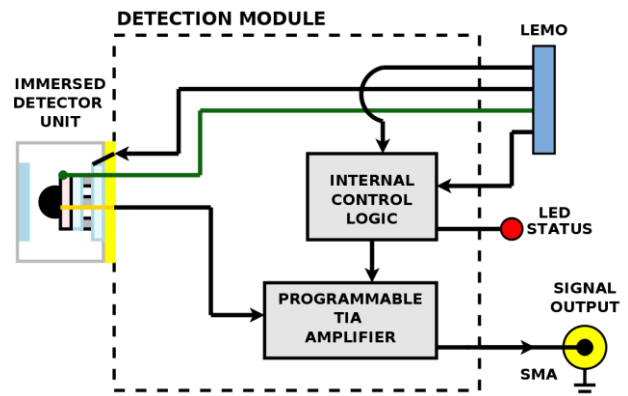
SPECIFICATION ( $T_{amb} = 293\text{ K}$ ,  $R_{load} = 50\ \Omega$ , unless otherwise noted; default module settings)

Parameter	Test conditions/remarks	Value			Unit
		Min.	Typ.	Max.	
Active element temperature, $T_{chip}$		-	195	-	K
Cut-on wavelength, $\lambda_{cut-on}$ (10%)	At 10% of peak responsivity	-	-	2.0	$\mu\text{m}$
Peak wavelength, $\lambda_{peak}$		8.0	9.0	10.0	$\mu\text{m}$
Optimum wavelength, $\lambda_{opt}$		-	10.6	-	$\mu\text{m}$
Cut-off wavelength, $\lambda_{cut-off}$ (10%)	At 10% of peak responsivity	12.0	-	-	$\mu\text{m}$
Detectivity, $D^*$	At $\lambda = \lambda_{peak}$ , $f = 20\text{ kHz}$	$7.2 \times 10^8$	-	-	$\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$
	At $\lambda = \lambda_{opt}$ , $f = 20\text{ kHz}$	$6.0 \times 10^8$	-	-	$\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$
Output noise voltage density, $v_n$	At $f = 10\text{ MHz}$	-	-	400	$\text{nV}/\text{Hz}^{1/2}$
Voltage responsivity, $R_v$	At $\lambda = \lambda_{peak}$	$2.4 \times 10^3$	-	-	$\text{V}/\text{W}$
	At $\lambda = \lambda_{opt}$	$2.0 \times 10^3$	-	-	$\text{V}/\text{W}$
Low cut-off frequency, $f_{lo-DC}$	DC coupling selected	-	0	-	Hz
Low cut-off frequency, $f_{lo-AC}$	AC coupling selected	-	10	-	Hz
High cut-off frequency, $f_{hi-H}$	High bandwidth selected	100	-	-	MHz
High cut-off frequency, $f_{hi-M}$	Mid bandwidth selected	-	15	-	MHz
High cut-off frequency, $f_{hi-L}$	Low bandwidth selected	-	1.5	-	MHz
Output impedance, $R_{out}$		-	50	-	$\Omega$
Output voltage swing, $V_{out}$		-1	-	+1	V
Output voltage offset, $V_{off}$		-	-	$\pm 20$	mV

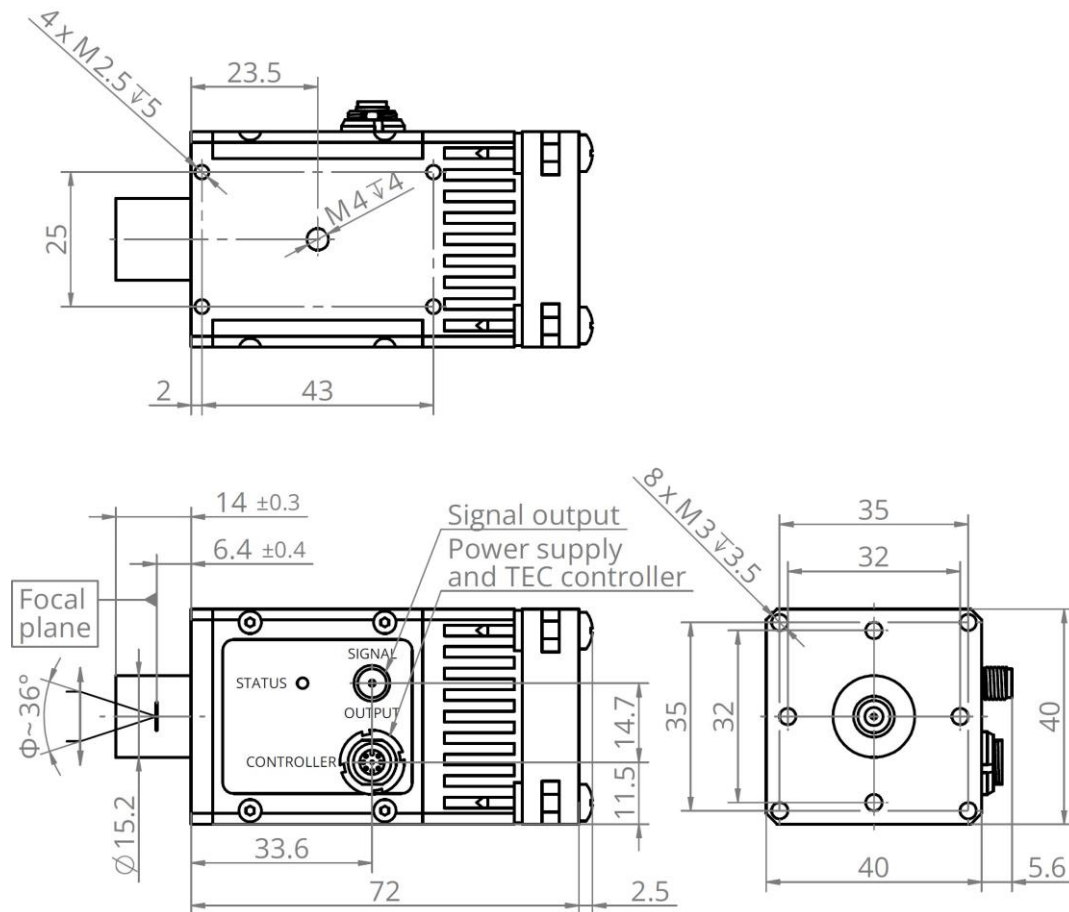
SPECTRAL RESPONSE (Typ.,  $T_{chip} = 195\text{ K}$ )



SCHEMATIC DIAGRAM



## MECHANICAL LAYOUT (Unit: mm)



## ABSOLUTE MAXIMUM RATINGS

Parameter	Test conditions/remarks	Value	Unit
Maximum incident optical power density	Continuous wave (CW) or single pulses $>1 \mu\text{s}$ duration	2.5	$\text{W}/\text{cm}^2$
	Single pulses $<1 \mu\text{s}$ duration	10	$\text{kW}/\text{cm}^2$
Ambient operating temperature, $T_{\text{amb}}$		10 to 30	$^\circ\text{C}$
Storage temperature, $T_{\text{stg}}$		-20 to 85	$^\circ\text{C}$
Humidity	No dew condensation	10 to 90	%

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device.

Constant or repeated exposure to absolute maximum rating conditions may affect the quality and reliability of the device.