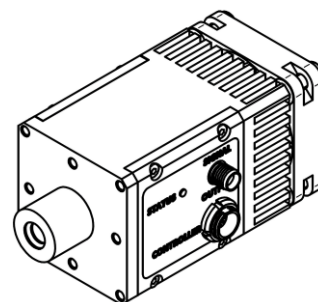


LabM-I-13

PRELIMINARY DATASHEET

Programmable IR detection module based on InAsSb thermoelectrically cooled optically immersed photovoltaic detector



FEATURES

- Spectral range: 1.8 to 13.8 μm
- RoHS-compliant III-V material
- Frequency bandwidth: DC to 75 MHz (typ.)
- High performance and reliability
- DC offset compensation
- Integrated fan
- M4 mounting hole
- VIGO PTCC-01 TEC controller obligatory
- Compatible with optical accessories
- Versatile and flexible
- Quantity discounted price
- No minimum order quantity required

PROGRAMMABLE PARAMETERS

- Gain: in the 40 dB range
- Bandwidth: 1.5 MHz/15 MHz/75 MHz (typ.)
- Coupling: AC/DC
- Detector temperature
- Output voltage offset

APPLICATIONS

- FTIR spectroscopy
- Gas detection, monitoring and analysis: C_2H_6
- Toxic gas detection
- Gas leak detection

DETECTION MODULE CONFIGURATION

Detection module symbol	LabM-I-13
Detector symbol	PVIA-4TE-13-1x1-TO8-wZnSeAR-36
Detector type	photovoltaic
Active element material	epitaxial InAsSb superlattice heterostructure
Optical area, A_o	1 mm $\times$ 1 mm
Optical immersion	hyperhemisphere
Cooling	4TE ($T_{\text{chip}} \cong 200\text{K}$)
Temperature sensor	thermistor
Acceptance angle, Φ	~ 36 deg.
Window	wZnSeAR (3 deg. wedged zinc selenide, anti-reflection coating)
Amplifier symbol	PIP
Amplifier type	programmable, transimpedance
Signal output socket	SMA
Power supply, TE cooler, thermistor and fan socket	LEMO ECG.0B.309.CLN (female)

INCLUDED ACCESSORIES

- 1 pc SMA-BNC cable
- 1 pc LEMO-DB9 or LEMO-DUBOX2x5 cable

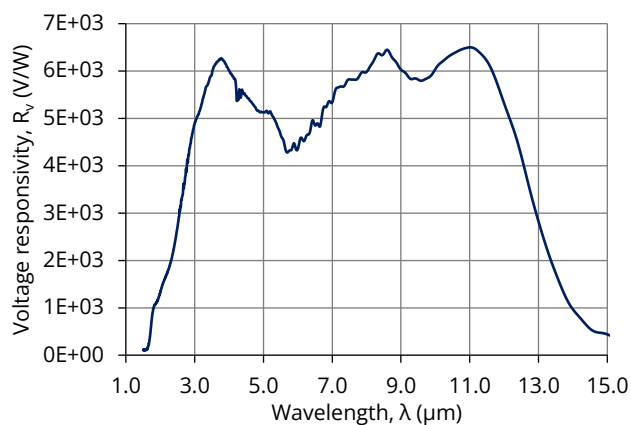
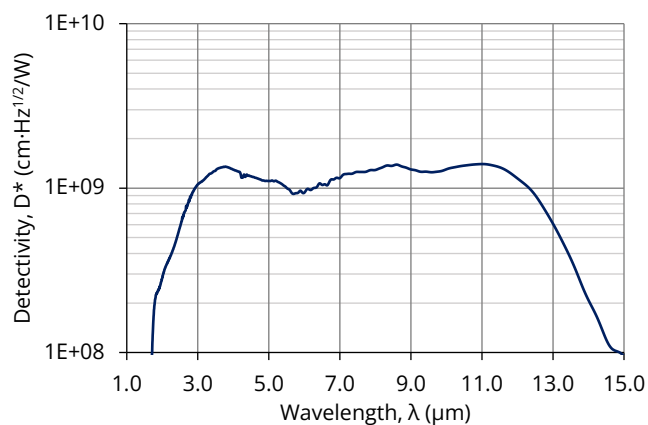
DEDICATED ACCESSORIES

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

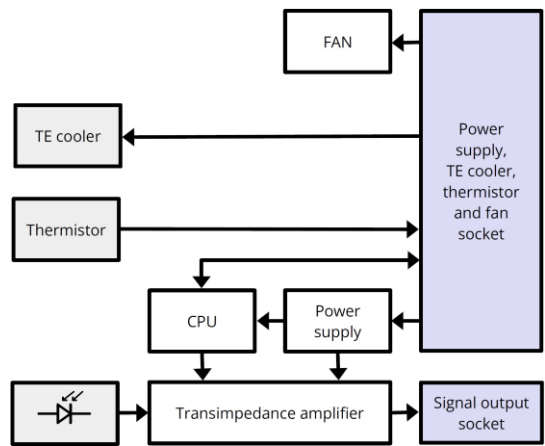
SPECIFICATION ($T_{\text{amb}} = 293 \text{ K}$, $T_{\text{chip}} = 200 \text{ K}$, $R_{\text{load}} = 50 \Omega$, unless otherwise noted; default module settings)

Parameter	Test conditions, remarks	Value			Unit
		Min.	Typ.	Max.	
Active element temperature, T_{chip}		-	200	-	K
Cut-on wavelength, $\lambda_{\text{cut-on}} (10\%)$	At 10% of peak responsivity	-	1.8	-	μm
Peak wavelength, λ_{peak}		-	10.5	-	μm
Cut-off wavelength, $\lambda_{\text{cut-off}} (10\%)$	At 10% of peak responsivity	-	13.8	-	μm
Detectivity, D^*	At $\lambda = \lambda_{\text{peak}}$, $f = 10 \text{ MHz}$	-	1.4×10^9	-	$\text{cm} \cdot \text{Hz}^{1/2} / \text{W}$
Output noise voltage density, v_n	At $f = 10 \text{ MHz}$	-	450	-	$\text{nV} / \text{Hz}^{1/2}$
Voltage responsivity, R_v	At $\lambda = \lambda_{\text{peak}}$	-	6.5×10^3	-	V / W
Low cut-off frequency, $f_{\text{lo-DC}}$	DC coupling selected	-	0	-	Hz
Low cut-off frequency, $f_{\text{lo-AC}}$	AC coupling selected	-	10	-	Hz
High cut-off frequency, $f_{\text{hi-H}}$	High bandwidth selected	-	75	-	MHz
High cut-off frequency, $f_{\text{hi-M}}$	Mid bandwidth selected	-	15	-	MHz
High cut-off frequency, $f_{\text{hi-L}}$	Low bandwidth selected	-	1.5	-	MHz
Output impedance, R_{out}		-	50	-	Ω
Output voltage swing, V_{out}		-	-	± 1	V
Output voltage offset, V_{off}		-	-	± 20	mV
Power supply voltage (positive), $+V_{\text{sup}}$		-	+9	-	V
Power supply voltage (negative), $-V_{\text{sup}}$		-	-9	-	V
Power supply current consumption (positive), $+I_{\text{sup}}$		-	-	+100	mA
Power supply current consumption (negative), $-I_{\text{sup}}$		-	-	-100	mA
Fan power consumption, P_{fan}		-	-	900	mW
TEC voltage, $V_{\text{TEC max}}$		-	-	8.3	V
TEC current, $I_{\text{TEC max}}$		-	-	0.4	A
Weight		-	180	-	g

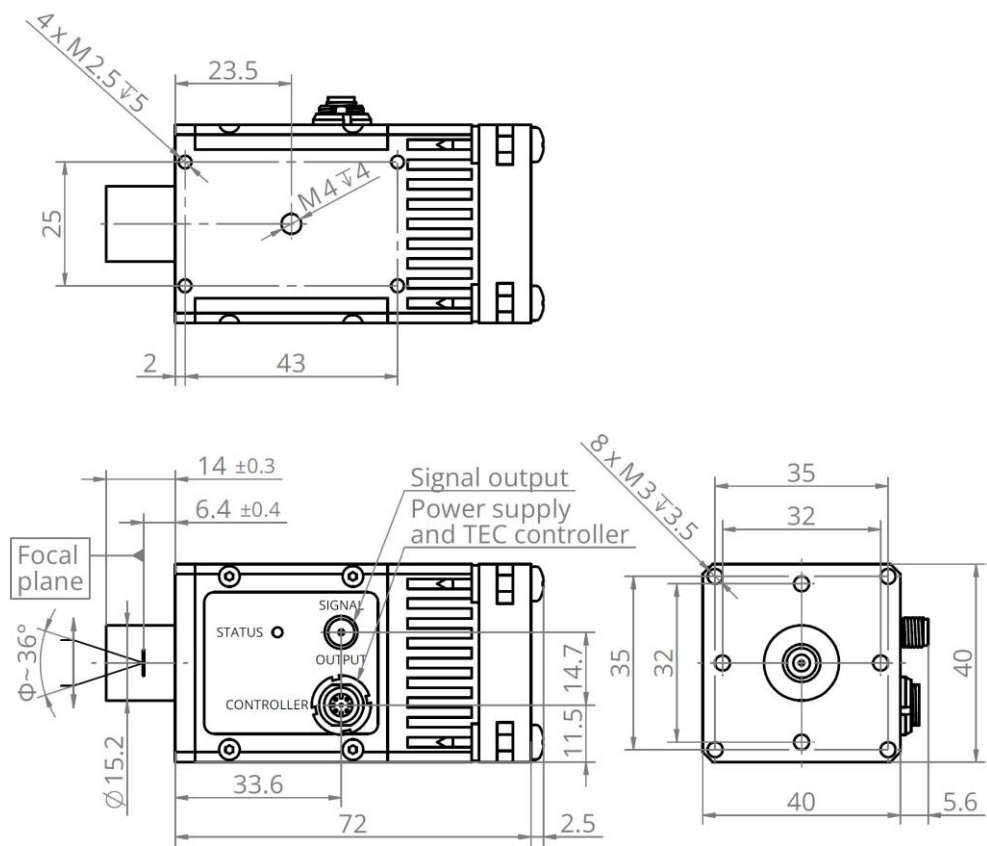
SPECTRAL RESPONSE (Typ., $T_{\text{amb}} = 293 \text{ K}$, $T_{\text{chip}} = 200 \text{ K}$)



SCHEMATIC DIAGRAM



MECHANICAL LAYOUT (Unit: mm)



ABSOLUTE MAXIMUM RATINGS

Parameter	Test conditions, remarks	Value	Unit
Ambient operating temperature, T_{amb}		10 to 30	°C
Storage temperature, T_{stg}		-20 to 50	°C
Humidity	No dew condensation	10 to 90	%
Maximum incident optical power density	Continuous wave (CW) or single pulses >1 μ s duration	2.5	W/cm ²
	Single pulses <1 μ s duration	10	kW/cm ²

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