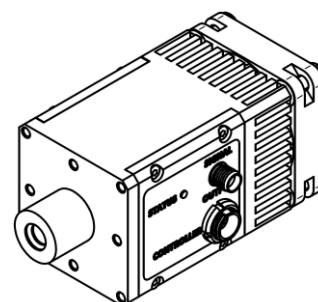


LabM-I-6-01

DATASHEET

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



FEATURES

- Spectral range: 2.6 to 7.0 μm
- Frequency bandwidth: DC to 4 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
- Fast delivery
- No minimum order quantity required

PROGRAMMABLE PARAMETERS

- Gain: in the 40 dB range
- Bandwidth: 0.15 MHz/1.5 MHz/4 MHz (typ.)
- Coupling: AC/DC
- Detector temperature
- Output voltage offset

APPLICATIONS

- Gas detection, monitoring and analysis: CH_4 , C_2H_2 , CH_2O , HCl , NH_3 , SO_2 , C_2H_6 , CO , CO_2 , NO_x , SO_x , HNO_3
- Exhaust gas denitrification
- Combustion process control
- Contactless temperature measurement: railway transport, industrial and laboratory processes monitoring
- Heat-seeking, thermal signature detection
- Non-destructive material testing
- Biochemical analysis
- Laser calibration
- Research and prototyping

DETECTION MODULE CONFIGURATION

Detection module symbol	LabM-I-6-01
Detector symbol	PVI-2TE-6-1x1-TO8-wZnSeAR-36
Detector type	photovoltaic
Active element material	epitaxial HgCdTe heterostructure
Optical area, A_o	1 mm $\times$ 1 mm
<u>Optical immersion</u>	hyperhemisphere
Cooling	2TE ($T_{\text{chip}} \approx 230\text{K}$)
<u>Temperature sensor</u>	thermistor
Acceptance angle, Φ	~ 36 deg.
<u>Window</u>	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 of SMA-BNC cable
- 1 pc of LEMO-DB9 or LEMO-DUBOX2x5 cable

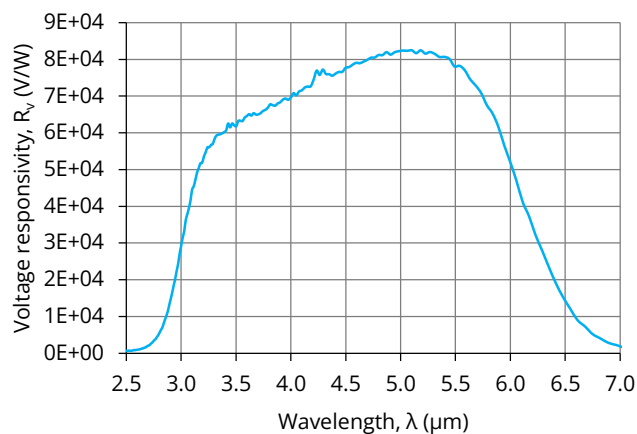
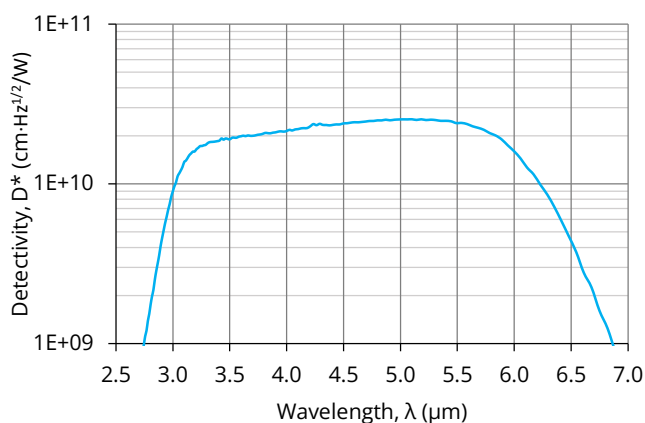
DEDICATED ACCESSORIES

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

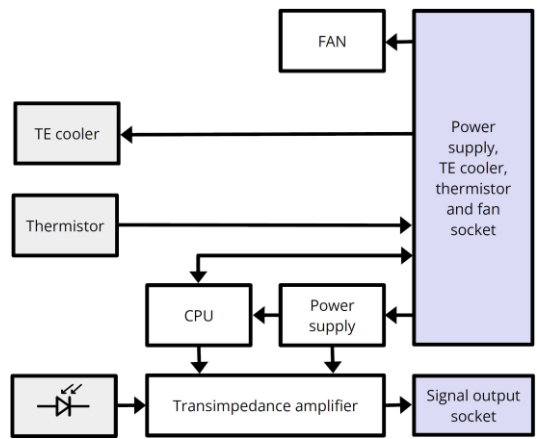
SPECIFICATION ($T_{\text{amb}} = 293 \text{ K}$, $T_{\text{chip}} = 230 \text{ K}$, $R_{\text{load}} = 50 \Omega$, unless otherwise noted; default module settings)

Parameter	Test conditions, remarks	Value			Unit
		Min.	Typ.	Max.	
Active element temperature, T_{chip}		-	230	-	K
Cut-on wavelength, $\lambda_{\text{cut-on}}$ (10%)	At 10% of the peak responsivity	-	2.6	-	μm
Peak wavelength, λ_{peak}		-	5.2 $\pm$ 0.2	-	μm
Specific wavelength, λ_{spec}		-	6.0	-	μm
Cut-off wavelength, $\lambda_{\text{cut-off}}$ (10%)	At 10% of the peak responsivity	-	7.0	-	μm
Detectivity, D^*	At $\lambda = \lambda_{\text{peak}}$, $f = 1 \text{ MHz}$	-	2.5 $\times 10^{10}$	-	$\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$
	At $\lambda = \lambda_{\text{spec}}$, $f = 1 \text{ MHz}$	7.0 $\times 10^9$	1.6 $\times 10^{10}$	-	
Output noise voltage density, v_n	At $f = 1 \text{ MHz}$	-	-	500	$\text{nV}/\text{Hz}^{1/2}$
Voltage responsivity, R_v	At $\lambda = \lambda_{\text{peak}}$	-	8.2 $\times 10^4$	-	V/W
	At $\lambda = \lambda_{\text{spec}}$	3.5 $\times 10^4$	5.2 $\times 10^4$	-	
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	2.5	4	-	MHz
High cut-off frequency, $f_{\text{hi-M}}$	Mid bandwidth selected	-	1.5	-	MHz
High cut-off frequency, $f_{\text{hi-L}}$	Low bandwidth selected	-	0.15	-	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_{TEC}		-	-	1.0	V
TEC current, I_{TEC}		-	-	1.2	A
Weight		-	180	-	g

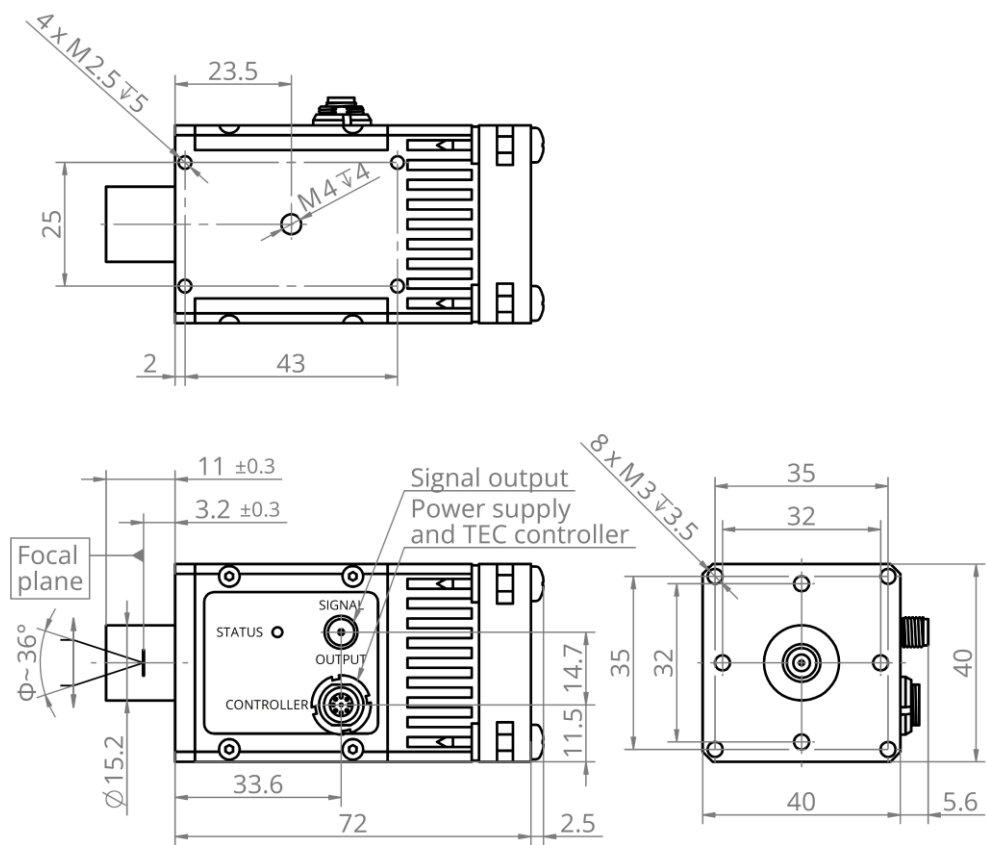
SPECTRAL RESPONSE (Typ., $T_{\text{amb}} = 293 \text{ K}$, $T_{\text{chip}} = 230 \text{ K}$)



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 85	°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.