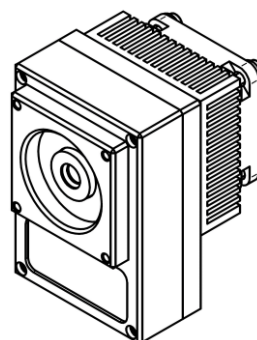


4EM-5

PRELIMINARY DATASHEET

“All-in-one” four-channel IR detection module based on four-element linear HgCdTe thermoelectrically cooled photovoltaic detector



FEATURES

- Spectral range: 3.5 to 6.0 μm
- Frequency bandwidth: DC to 1.0 MHz (typ.)
- Low crosstalk
- Integrated TEC controller and fan
- M4 mounting hole
- Single power supply
- Compatible with optical accessories
- Detector and detector chip options available for custom integration

APPLICATIONS

- Laser measurements: power monitoring and control, beam profiling and positioning, calibration
- Contactless temperature measurement: railway transport, industrial and laboratory processes monitoring
- Flame and explosion detection
- Threat warning systems
- Heat-seeking, thermal signature detection
- 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
- Breath analysis: C_2H_6 , CH_2O , NH_3 , NO , OCS
- Gas leak detection
- Combustion process control
- Non-destructive material testing

INCLUDED ACCESSORIES

- 4 pcs MCX-BNC cable
- 1 pc AC adaptor

DEDICATED ACCESSORIES

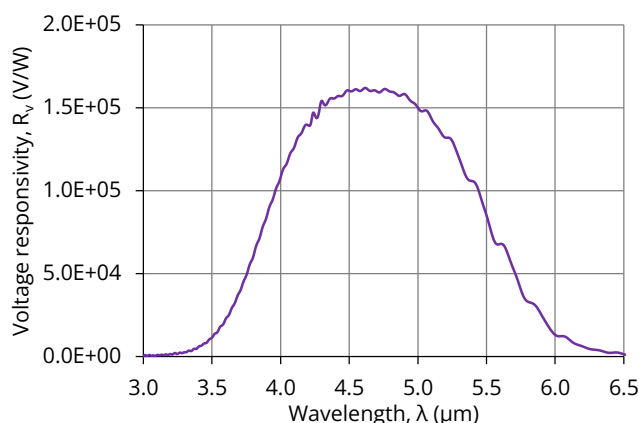
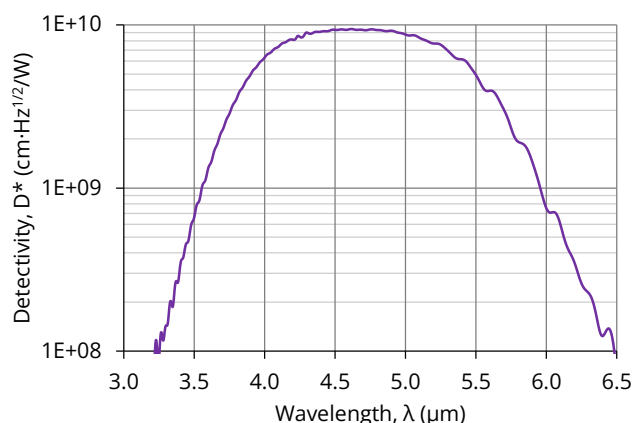
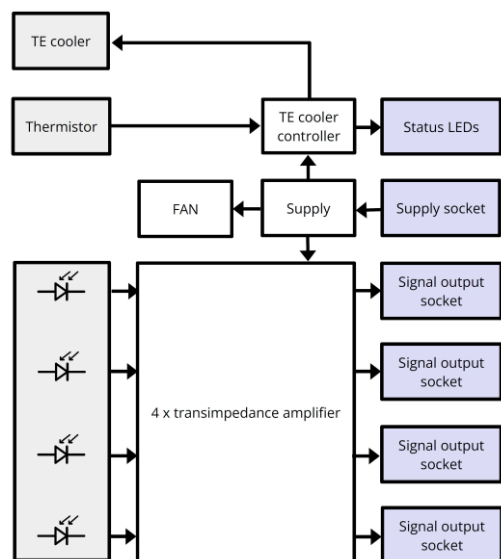
- [OTA optical threaded adapter](#)
- [DRB-2 base mounting system](#)

DETECTION MODULE CONFIGURATION

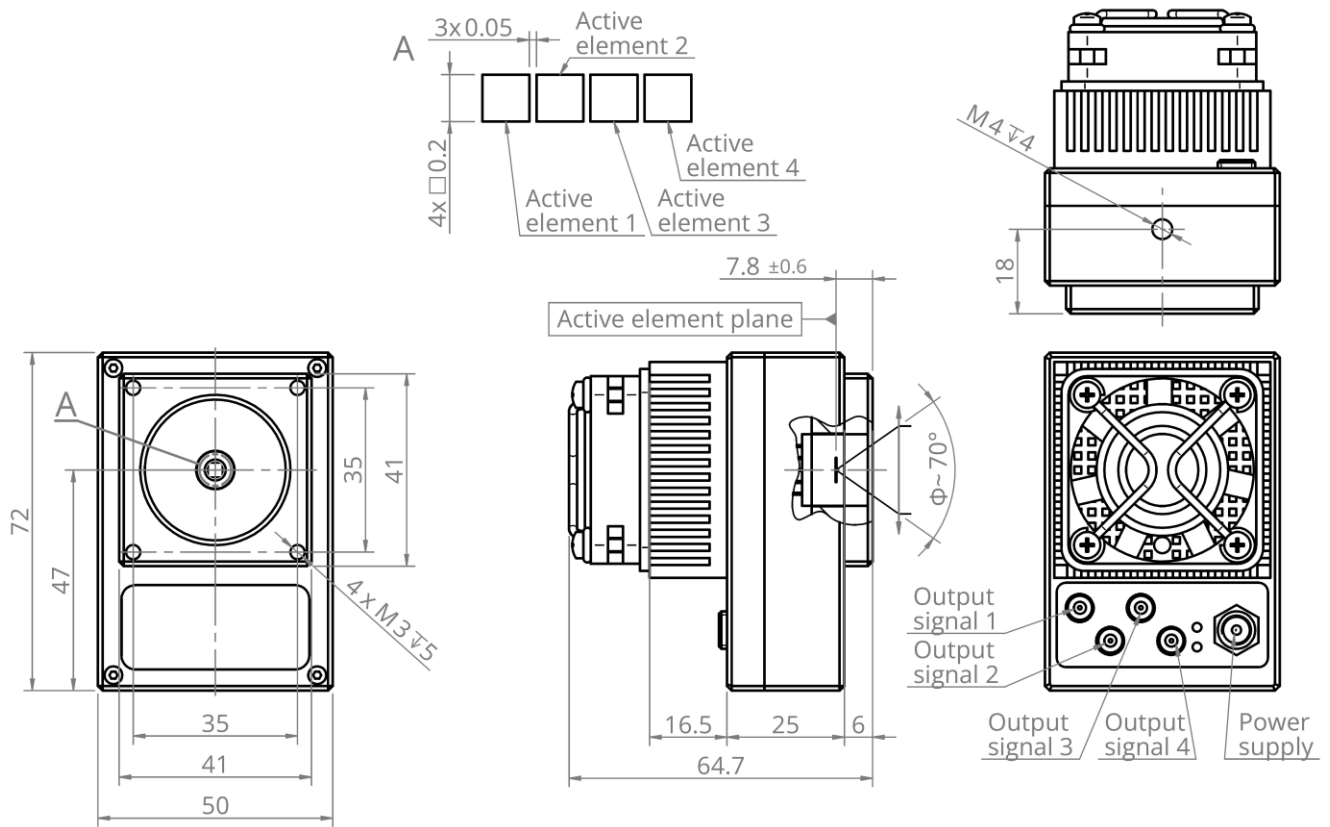
Detection module symbol	4EM-5
Detector type	photovoltaic
Active element material	epitaxial HgCdTe heterostructure
Active area of a single element, A	0.2 mm $\times$ 0.2 mm
Number of elements	4 (1 row)
Active area pitch, mm	0.25
Optical immersion	no
Cooling	3TE ($T_{\text{chip}} \cong 230\text{K}$)
Temperature sensor	thermistor
Acceptance angle, Φ	$\sim 70^\circ$
Window	pSiAR (planar silicon, anti-reflection coating)
Amplifier type	four-channel, transimpedance
Signal output socket	4x MCX
Power supply socket	DC 2.1/5.5

SPECIFICATION ($T_{\text{amb}} = 293 \text{ K}$, $T_{\text{chip}} = 230 \text{ K}$, $R_{\text{load}} = 1 \text{ M}\Omega$, each channel)

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	-	3.5	-	μm
Peak wavelength, λ_{peak}		-	4.7	-	μm
Specific wavelength, λ_{spec}		-	5.0	-	μm
Cut-off wavelength, $\lambda_{\text{cut-off}} (10\%)$	At 10% of the peak responsivity	-	6.0	-	μm
Detectivity, D^*	At $\lambda = \lambda_{\text{peak}}$, $f = 100 \text{ kHz}$	-	9.0×10^9	-	$\text{cm} \cdot \text{Hz}^{1/2} / \text{W}$
	At $\lambda = \lambda_{\text{spec}}$, $f = 100 \text{ kHz}$	-	8.8×10^9	-	
Output noise voltage density, v_n	At $f = 100 \text{ kHz}$	-	-	0.5	$\mu\text{V} / \text{Hz}^{1/2}$
Voltage responsivity, R_v	At $\lambda = \lambda_{\text{peak}}$	-	1.6×10^5	-	V / W
	At $\lambda = \lambda_{\text{spec}}$	-	1.5×10^5	-	
Low cut-off frequency, f_{lo}	DC coupling	-	0	-	Hz
High cut-off frequency, f_{hi}		-	1.0	-	MHz
Output impedance, R_{out}		-	50	-	Ω
Output voltage swing, V_{out}		-	0-4	-	V
Output voltage offset, V_{off}		-	-	± 20	mV
Power supply voltage, V_{sup}		-	+7.5	-	V_{DC}

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

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	100	W/cm ²
	Single pulses <1 μ s duration	1	MW/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.