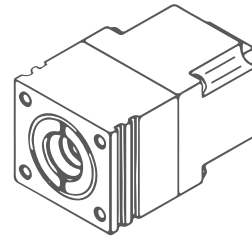


SM-I-12

Small-size IR detection module based on HgCdTe TE cooled optically immersed photoconductive detector



FEATURES

- Spectral range: up to 14.0 μm
- Frequency bandwidth: 10 Hz to 1 MHz
- Adjustable gain
- Small size
- Compatible with optical accessories
- External heatsink required
- External TEC controller required
- Quantity discounted price
- Fast delivery
- No minimum order quantity required

APPLICATIONS

- FTIR spectroscopy
- Gas detection, monitoring and analysis: C_2H_6 , NH_3
- Laser measurements: power monitoring and control, beam profiling and positioning, calibration

INCLUDED ACCESSORIES

- 1 pc of MMCX-SMA cable
- 1 pc of AMP2x4-DB9 cable

DEDICATED ACCESSORIES

- PTCC-01 series TEC controller (p. 145)
- Smart Manager software: freeware
- MHS-2 heatsink (p. 153)

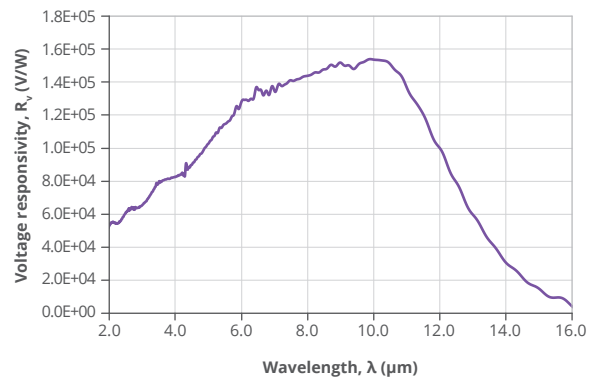
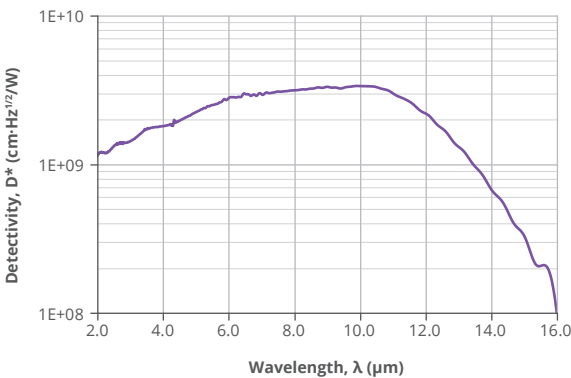
DETECTION MODULE CONFIGURATION

| Detection module symbol | SM-I-12 |
|---|--|
| Detector symbol | PCI-3TE-12-1x1-TO8-wZnSeAR-36 (p. 78) |
| Detector type | photoconductive |
| Active element material | epitaxial HgCdTe heterostructure |
| Optical area, A_o | 1 mm \times 1 mm |
| Immersion | hyperhemisphere |
| Cooling | 3TE |
| Acceptance angle, Φ | ~ 36 deg. |
| Window | wZnSeAR (3 deg. wedged zinc selenide, anti-reflection coating) |
| Preamplifier symbol | SIP-TO8 (p. 135) |
| Preamplifier type | transimpedance |
| Signal output socket | MMCX |
| Power supply, TE cooler and thermistor socket | AMP2x4 (part No. 280389-2) |

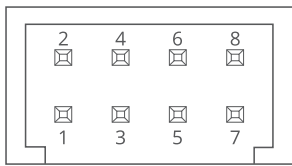
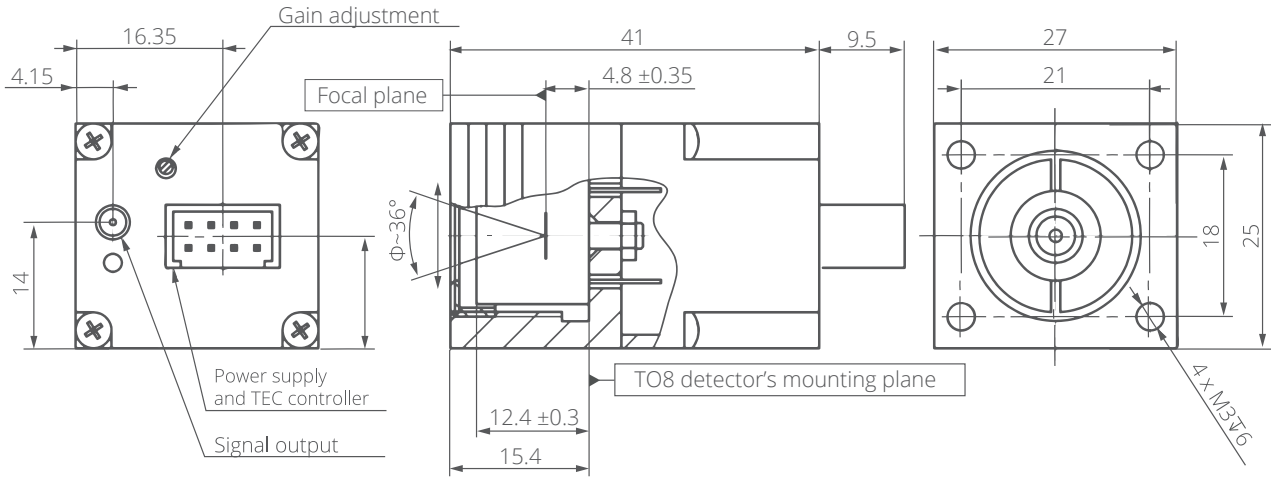
SPECIFICATION ($T_{amb} = 293\text{ K}$, $R_{load} = 1\text{ M}\Omega$, unless otherwise noted)

| Parameter | Test conditions/remarks | Value | | | Unit |
|---|---|--------------------|-------------------|----------|--|
| | | Min. | Typ. | Max. | |
| Active element temperature, T_{chip} | | - | 210 | - | K |
| Peak wavelength, λ_{peak} | | 9.5 | 10.0 | 10.5 | μm |
| Specific wavelength, λ_{spec} | | - | 12.0 | - | μm |
| Cut-off wavelength, $\lambda_{cut-off}$ (10%) | At 10% of peak responsivity | - | 14.0 | - | μm |
| Detectivity, D^* | At $\lambda = \lambda_{peak}$, $f = 100\text{ kHz}$ | - | 3.4×10^9 | - | $\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$ |
| | At $\lambda = \lambda_{spec}$, $f = 100\text{ kHz}$ | 1.2×10^9 | 2.2×10^9 | - | $\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$ |
| Output noise voltage density, v_n | At $f = 100\text{ kHz}$ | - | - | 8 | $\mu\text{V}/\text{Hz}^{1/2}$ |
| Voltage responsivity, R_v | At $\lambda = \lambda_{peak}$, $K_i = 100\text{ kV/A}$ | - | 1.5×10^5 | - | V/W |
| | At $\lambda = \lambda_{spec}$, $K_i = 100\text{ kV/A}$ | 5.0×10^4 | 1.0×10^5 | - | V/W |
| | At $\lambda = \lambda_{peak}$, $K_i = 55\text{ kV/A}$ | - | 8.3×10^4 | - | V/W |
| | At $\lambda = \lambda_{spec}$, $K_i = 55\text{ kV/A}$ | 2.75×10^4 | 5.5×10^4 | - | V/W |
| Low cut-off frequency, f_{lo} | AC coupling | - | 10 | - | Hz |
| High cut-off frequency, f_{hi} | | 1 | - | - | MHz |
| Output impedance, R_{out} | | - | 50 | - | Ω |
| Output voltage swing, V_{out} | | - | - | ± 10 | V |
| Output voltage offset, V_{off} | | - | - | ± 20 | mV |
| Power supply voltage (positive), $+V_{sup}$ | | - | +15 | - | V |
| Power supply voltage (negative), $-V_{sup}$ | | - | -15 | - | V |
| Power supply current consumption (positive), $+I_{sup}$ | | - | - | +50 | mA |
| Power supply current consumption (negative), $-I_{sup}$ | | - | - | -50 | mA |
| TEC voltage, V_{TEC} | | - | - | 3.6 | V |
| TEC current, I_{TEC} | | - | - | 0.45 | A |
| Weight | | - | 52 | - | g |

SPECTRAL RESPONSE (Typ., $T_{amb} = 293\text{ K}$, $T_{chip} = 210\text{ K}$, $K_i = 100\text{ kV/A}$)



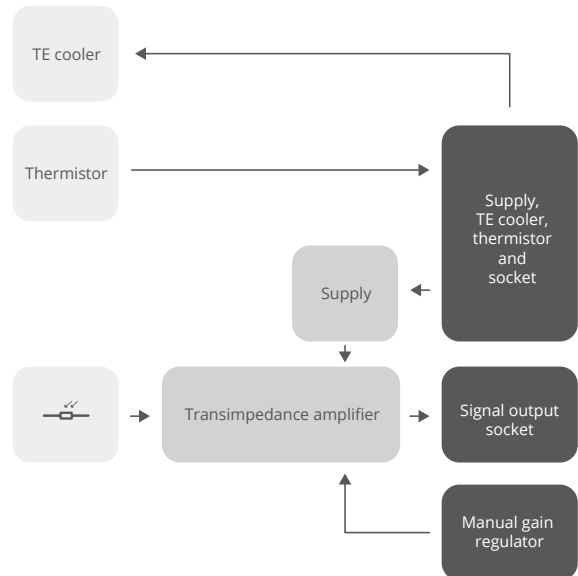
MECHANICAL LAYOUT (Unit: mm)



Power supply TEC and thermistor socket AMP2x4 (part No. 280389-2)

| Pin number | Symbol | Function |
|------------|--------|------------------------|
| 1 | -Vsup | Power supply input (-) |
| 2 | TH2 | Thermistor output (2) |
| 3 | DATA | DATA pin |
| 4 | TEC- | TEC supply input (-) |
| 5 | GND | Ground |
| 6 | TH1 | Thermistor output (1) |
| 7 | +Vsup | Power supply input (+) |
| 8 | TEC+ | TEC supply input (+) |

SCHEMATIC DIAGRAM



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.