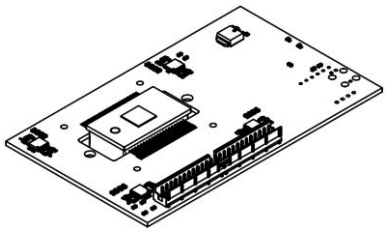
# 32MM-5

**PRELIMINARY DATASHEET**

## 32-channel IR detection module based on a 32-element InAsSb superlattice thermoelectrically cooled photovoltaic detector array



## FEATURES

- Spectral range: 1.7 to 5.7 µm (typ.)
- Frequency bandwidth: 1 Hz to 1 MHz (typ.)
- RoHS-compliant III-V material
- High ambient operating and storage temperature
- Back-side illuminated
- Low crosstalk
- Convenient cryogenic-free operation
- Integrated TEC controller
- An external heatsink is necessary

## APPLICATIONS

- Contactless temperature measurements: railway transport, industrial and laboratory processes monitoring
- Flame and explosion detection
- Threat warning systems
- Heat-seeking, thermal signature detection
- Simultaneous multi-point 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 and imaging

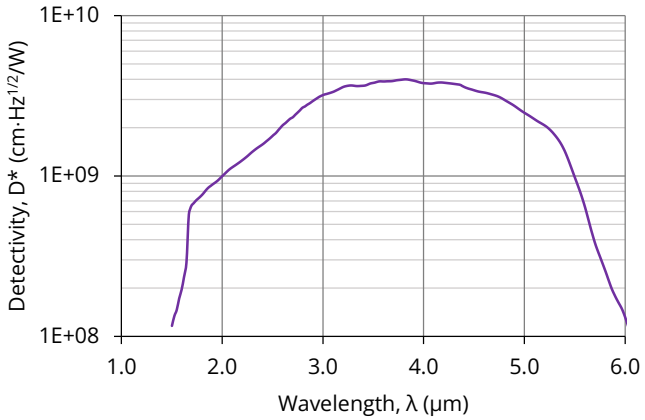
## DETECTION MODULE CONFIGURATION

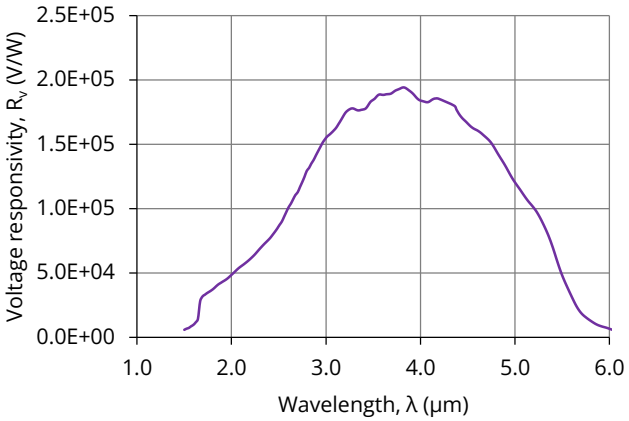
| Detection module symbol | 32MM-5 |
|---|---|
| Detector type | photovoltaic |
| Active elements material | epitaxial InAsSb superlattice heterostructure |
| Active area of a single element, A | 0.1 mm × 0.1 mm |
| Number of active elements | 32 (6 rows, 6 columns, without active elements in the corners) |
| Active area pitch | 0.15 mm (horizontally and vertically) |
| Optical immersion | no |
| Cooling | 3TE ($T_{chip}$≅230K) |
| Acceptance angle, Φ | ≥40 deg. |
| Window | p$Al_2O_3$AR (planar sapphire, anti-reflection coating) |
| Amplifier type | 32-channel, transimpedance |
| Power supply and signal output socket | Molex 87831-5019 (matching plug PN: 87568-5044) |

## SPECIFICATION ($T_{amb}$ ≅ 293 K, $R_{load}$ = 1 MΩ, each channel)

| Parameter | Test conditions, remarks | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| Active element temperature, $T_{chip}$ | | - | ~230 | - | K |
| Cut-on wavelength, $\lambda_{cut\text{-}on}$ (10%) | At 10% of the peak responsivity | - | 1.7 | - | µm |
| Peak wavelength, $\lambda_{peak}$ | | - | 3.8 | - | µm |
| Cut-off wavelength, $\lambda_{cut\text{-}off}$ (10%) | At 10% of the peak responsivity | - | 5.7 | - | µm |
| Detectivity, D* | At λ = $\lambda_{peak}$, f = 500 kHz | - | $4.0\times10^9$ | - | cm·$Hz^{1/2}$/W |
| Output noise voltage density, $v_n$ | At f = 500 kHz | - | 0.5 | - | µV/$Hz^{1/2}$ |
| Voltage responsivity, $R_v$ | At λ = $\lambda_{peak}$ | - | $1.94\times10^5$ | - | V/W |
| Low cut-off frequency, $f_{lo}$ | AC coupling | - | 1 | - | Hz |
| High cut-off frequency, $f_{hi}$ | | - | 1 | - | MHz |
| Output impedance, $R_{out}$ | | - | 50 | - | Ω |
| Output voltage swing, $V_{out}$ | | - | ±5 | - | V |
| Output voltage offset, $V_{off}$ | | - | 0 | - | mV |
| Power supply voltage (positive), $+V_{sup}$ | | - | +5.0 | - | V |
| Power supply voltage (negative), $-V_{sup}$ | | - | -5.0 | - | V |
| Power supply current consumption (positive), $+I_{sup}$ | | - | +1.0 | - | A |
| Power supply current consumption (negative), $-I_{sup}$ | | - | -0.1 | - | A |

## SPECTRAL RESPONSE (Typ., $T_{amb}$ ≅ 293 K, $T_{chip}$ ≅ 230 K, each channel)




## MECHANICAL LAYOUT, ACTIVE ELEMENTS ARRANGEMENT AND PINOUT

- 32MM-5 detection module technical drawing

## ABSOLUTE MAXIMUM RATINGS

| Parameter | Test conditions, remarks | Value | Unit |
|---|---|---|---|
| Ambient operating temperature, $T_{amb}$ | Operation at $T_{amb}$ > 30°C may increase the active element temperature and reduce the performance of the detection module below specified parameters | -40 to 70 | °C |
| Storage temperature, $T_{stg}$ | | -40 to 85 | °C |
| Humidity | No dew condensation | 10 to 90 | % |
| Maximum incident optical power density | Continuous wave (CW) or single pulses >1 μs duration | 100 | W/cm$^2$ |
| | Single pulses <1 μs duration | 1 | MW/cm$^2$ |
| Maximum power supply voltage positive, $+V_{sup\ max}$ | | +5.5 | V |
| Maximum power supply voltage negative, $-V_{sup\ max}$ | | -5.5 | V |

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.