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NEW

# InAsSb photovoltaic detector with preamp

P16702-011MN

## Infrared detector with preamp offering high sensitivity in the mid-infrared region (up to 11 µm)

It is a compact infrared detector that integrates an InAsSb photovoltaic detector (up to 11 µm) and a preamp. It is approximately 1/200 th the size of previous module products, and achieves a response speed of 100 MHz, which is twice as fast. This product is an environmentally friendly infrared detector and do not use lead, mercury, or cadmium, which are substances restricted by the RoHS directive.

### Features

- **Compact (TO-5)**
- **High-speed response (DC to 100 MHz)**
- **RoHS compliant (lead, mercury, cadmium free)**

### Applications

- **Gas analysis (combined with QCL)**
- **$CO_2$ laser monitor**
- **Non-invasive blood analysis**

### Structure

| Parameter | Specification | Unit |
|---|---|---|
| Photosensitive area | 0.7 × 0.7 | mm |
| Package | TO-5 | - |
| Window material | No | - |
| Field of view (FOV) | 97 | degrees |

### Absolute maximum ratings (Ta=25 °C)

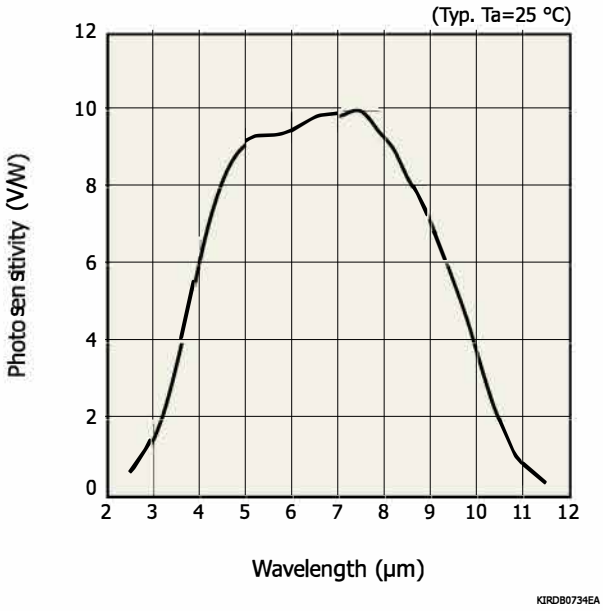
| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Supply voltage (for preamp) | Vcc | +4 | V |
| Reverse voltage (for element) | $V_R$ | +1 | V |
| Operating temperature*1 | Topr | -30 to +60 | °C |
| Storage temperature*1 | Tstg | -30 to +60 | °C |
| Incident light level | Pin | 1 | W/mm² |

*1: No dew condensation
When there is a temperature difference between a product and the surrounding area in high humidity environments, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

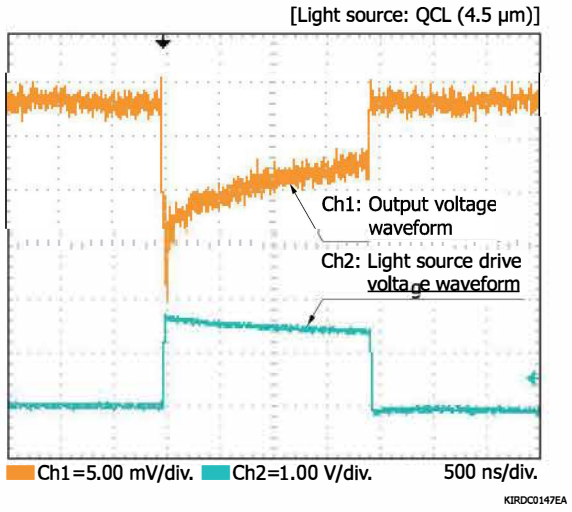
### Electrical and optical characteristics (Typ. Ta=25 °C, Vcc=+3.3 V, 50 Ω system, unless otherwise noted)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Peak sensitivity wavelength | λp | | - | 7.4 | - | µm |
| Cutoff wavelength | λc | | 9.7 | 11 | - | µm |
| Photosensitivity | S | λ=λp | - | 10 | - | V/W |
| Reverse voltage (for element) | $V_R$ | | - | 0.7 | - | V |
| Noise equivalent power | NEP | λ=λp, f=50 kHz | - | $8.0 \times 10^{-9}$ | $5.0 \times 10^{-8}$ | W/Hz$^{1/2}$ |
| Frequency characteristics | $f_{CL}$ | -3 dB | - | DC | - | - |
| | $f_{CH}$ | -3 dB | 80 | 100 | - | MHz |
| Output voltage level | - | | 0.6 | 0.9 | 1.2 | V |
| Maximum output voltage amplitude | Vp-p max | | - | -0.5 | - | V |
| Supply voltage (for preamp) | Vcc | | 3.2 | 3.3 | 3.4 | V |
| Current consumption | Ic | | 20 | 26 | 35 | mA |

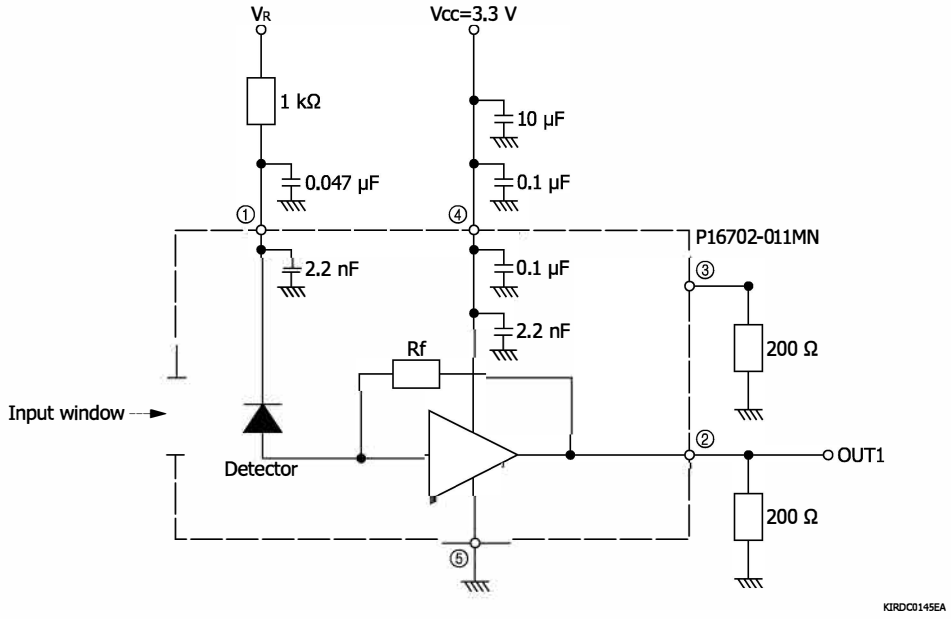
## Spectral response




## Output waveform example

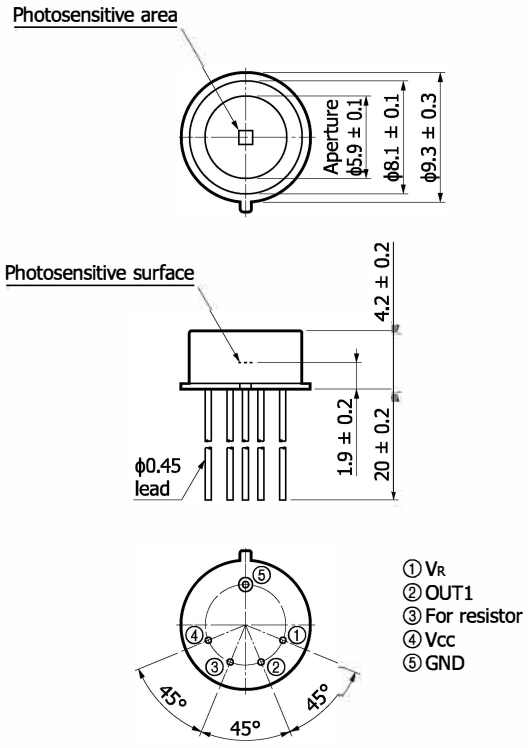



## Connection example




Note: Please connect the same resistance to the terminal ②③.
Make sure to connect a bypass capacitor (0.1 to 10 µF) to the supply voltage ④ to prevent oscillation.

## Dimensional outline (unit: mm)




Note: Please connect the same resistance to the terminal ②③.
Make sure to connect a bypass capacitor (0.1 to 10 μF)
to the supply voltage ④ to prevent oscillation.

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## Precautions

■ Electrostatic breakdown

The P16702-011MN may be damaged or deteriorated by static electricity. Please refer to precautions of "compound opto-semiconductors (photosensors, light emitters)" for use.

■ Wiring

Applying voltage or current with the wrong polarity to electronic parts such as a preamp may degrade the characteristics or destroy the elements. Please refer to the dimensional outline to do wiring correctly.

## Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions
· Disclaimer
· Safety consideration
· Unsealed products
· Compound opto-semiconductors (photosensors, light emitters)

■ Technical note
· Compound semiconductor photosensors





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