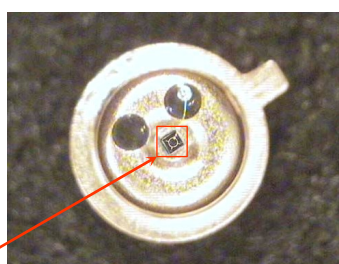


## Features

- High reliability
- Superior linearity
- Easy-to-use detector/amplifier modules are also available
- Parabolic reflector



Photodiode CHIP

## Description

Photodiode **PD48-05-WS-PR** is a model of photodetector with wide spectral range (**WS**) for detection of radiation in the Middle Infrared (Mid-IR) spectral range from 800 to 4800 nm operating at room temperature.

Photodiode is disposed inside the standard 5.5 mm TO-18 package with parabolic reflector (**PR**).

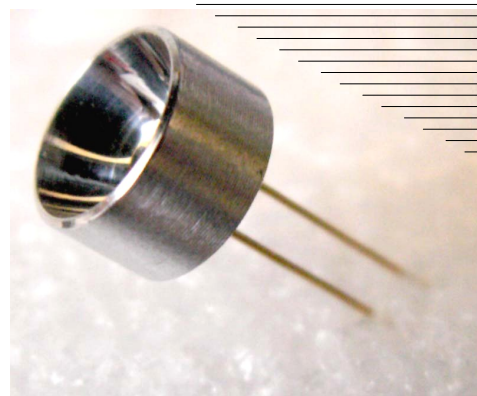
Photosensitive area of **PD48-05-WS-PR** is  $0.45 \times 0.45 \text{ mm}^2$ . High speed of response makes it possible for detection of modulated radiation of laser diodes (LDs) and light-emitting diodes (LEDs). **PR** allows to increase detectivity of the photodiode by a factor of 10 in the case of parallel beam of radiation.

Related products: **PD48-05-WS-PR** can be used in optical pair with our **LED36**, **LED37**, **LED38**, **LED39**, **LED41**, **LED43**, **LED46**.

## General characteristics

**WS** - wide spectrum

| Package                  | Parameter                       | Symbol           | Value                | Unit            |
|--------------------------|---------------------------------|------------------|----------------------|-----------------|
| <b>TO-18<br/>with PR</b> | Chip size (photosensitive area) | A                | 0.45×0.45            | mm <sup>2</sup> |
|                          | Weight                          | m                | 0.65                 | g               |
|                          | Operating temperature           | T <sub>opr</sub> | − 20...+ 40          | °C              |
|                          | Window material                 |                  | no or sapphire glass |                 |
|                          | Soldering temperature           | T <sub>s</sub>   | + 230                | °C              |
|                          | Storage temperature             | T <sub>stg</sub> | − 55...+ 60          | °C              |
|                          | Maximum reverse bias voltage    | V <sub>b</sub>   | − 0.5                | V               |
|                          | Size                            | D                | 9.0                  | mm              |
|                          |                                 | H                | 18.5                 |                 |



## Applications

- Environment measurements
- Gas analysis (CH<sub>4</sub>, CO, CO<sub>2</sub>)
- Infrared spectrophotometry
- Laser detection
- Analytical instruments

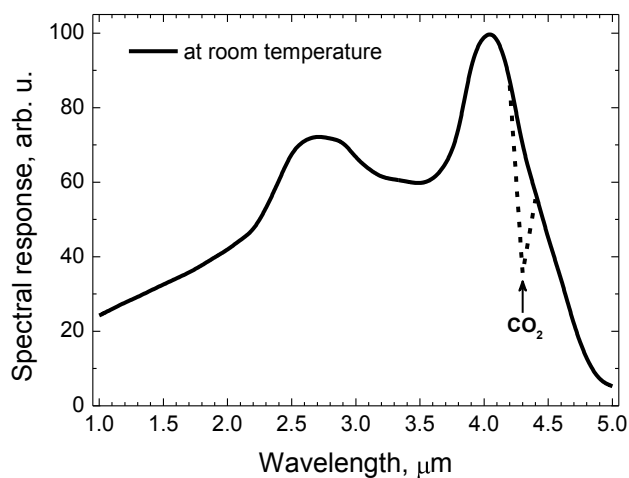
## Accessories (optional)

- Sapphire glass window
- Amplifier AM-07M

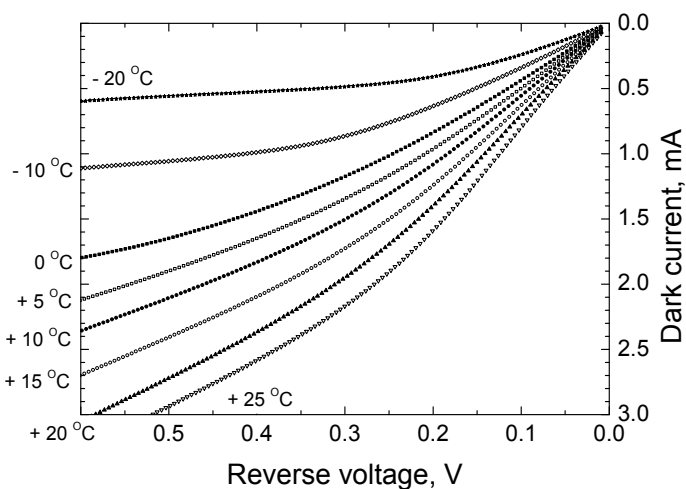
## Electrical and optical characteristics

| Parameter                   | Symbol      | Condition<br>$T \approx + 20^\circ\text{C}$ | Min.           | Typ.           | Max.           | Unit                                                  |
|-----------------------------|-------------|---------------------------------------------|----------------|----------------|----------------|-------------------------------------------------------|
| Spectral sensitivity range  | $\lambda$   | at level 10%                                | 0.8 - 4.8      |                |                | $\mu\text{m}$                                         |
| Peak sensitivity wavelength | $\lambda_p$ | at level 90%                                | 3.9 - 4.2      |                |                | $\mu\text{m}$                                         |
| Photo sensitivity           | S           | at $\lambda_p$                              | 0.6            | 0.7            | 0.8            | A/W                                                   |
| Detectivity                 | $D^*$       | at $\lambda_p$                              | $5 \cdot 10^8$ | $7 \cdot 10^8$ | $9 \cdot 10^8$ | $\text{cm} \cdot \text{Hz}^{1/2} \cdot \text{W}^{-1}$ |
| Dark current                | $I_d$       | $V_b = - 0.1 \text{ V}$                     | 1.0            | 1.5            | 3.0            | mA                                                    |
| Rise time                   | $t_r$       | $V_b = 0 \text{ V}, R_L = 50 \Omega$        | $\leq 20$      |                |                | ns                                                    |
| Fall time                   | $t_f$       |                                             |                |                |                |                                                       |
| Capacitance                 | C           | $V_b = 0 \text{ V}, f = 1 \text{ MHz}$      | 40             | 55             | 60             | pF                                                    |
| Shunt resistance            | $R_0$       | $V_b \approx \pm [5 - 10] \text{ mV}$       | 50             | 80             | 150            | $\Omega$                                              |
| Noise equivalent power      | NEP         | at $\lambda_p$                              | -              | -              | -              | $\text{W} \cdot \text{Hz}^{-1/2}$                     |

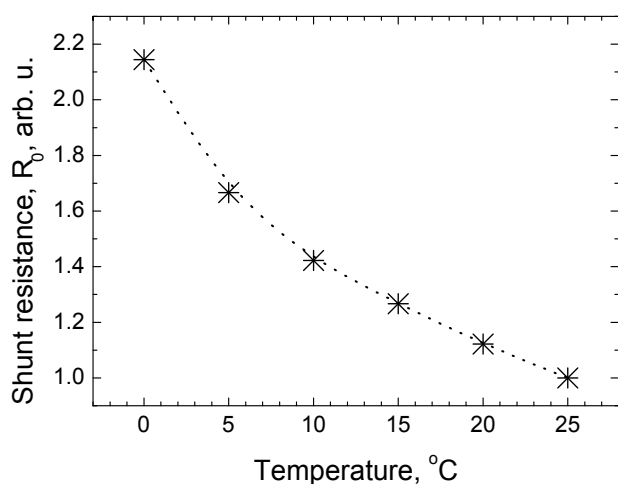
### ▼ Spectral response



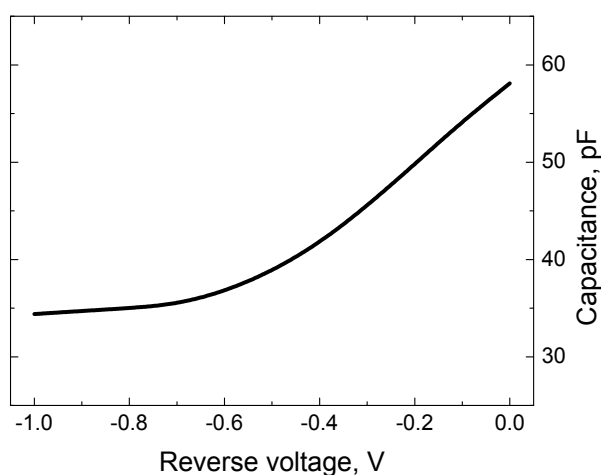
### ▼ Dark current vs. reverse voltage



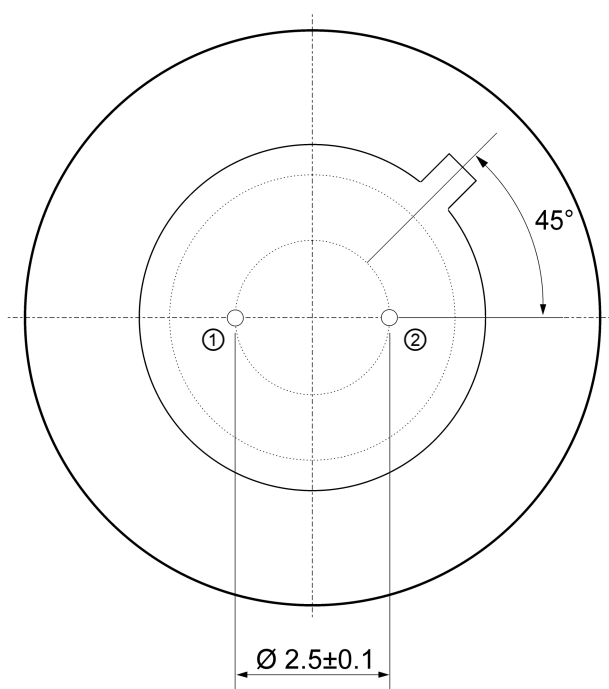
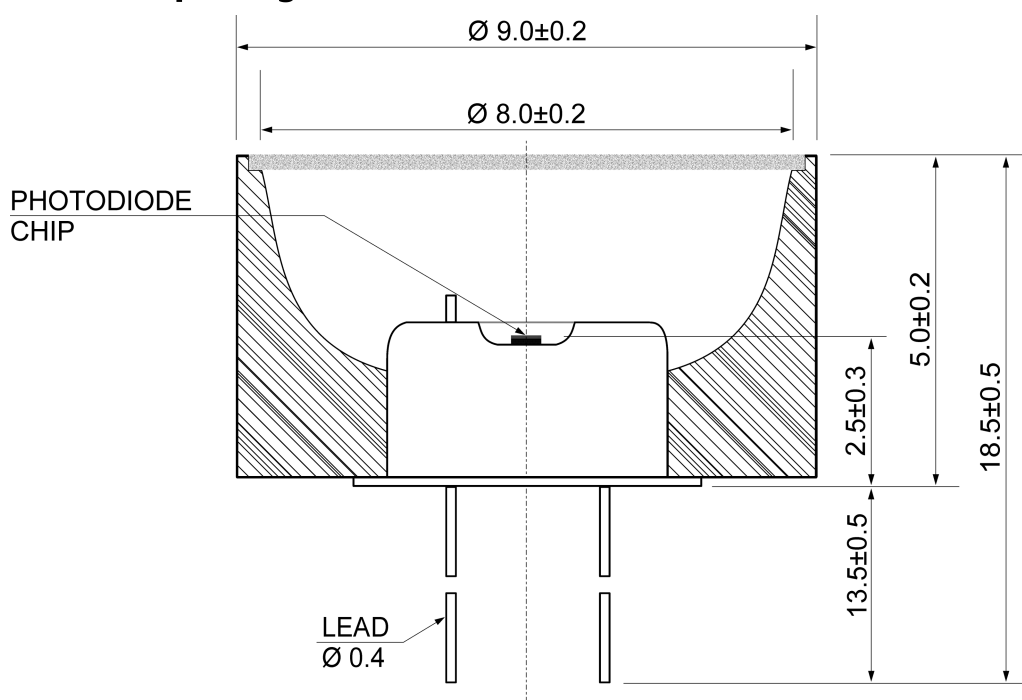
### ▼ Shunt resistance vs. temperature



### ▼ Capacitance vs. reverse voltage



▼ **TO-18 package with PR dimensions (unit: mm)**



| Pin | Description         |
|-----|---------------------|
| ①   | Detector (cathode)* |
| ②   | Detector (anode)*   |

\*Special order: the pin polarity can be changed.