



# Electro Optical Components, Inc.

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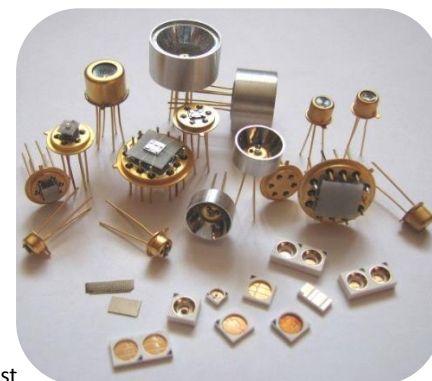
## Mid-Infrared (MIR) Photodiode

1.0 - 2.46  $\mu\text{m}$

### Lms24PD-05 series

| Device parameters       | Symbol           | Value     | Units |
|-------------------------|------------------|-----------|-------|
| Sensitive area diameter | d                | 0,5       | mm    |
| Storage temperature     | T <sub>stg</sub> | -50..+80* | °C    |
| Operating temperature   | T <sub>opr</sub> | -50..+60* | °C    |
| Reverse voltage         | V <sub>r</sub>   | 1         | V     |

\*PD design for higher storage/operating temperature is available under request

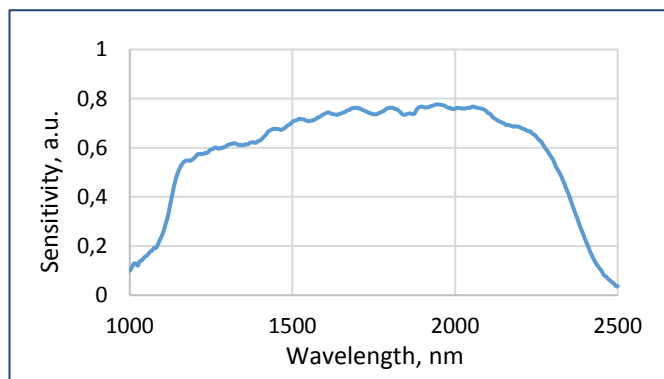


| Photodiode parameters         | Conditions                        | Symbol                 | Value                       | Units   |
|-------------------------------|-----------------------------------|------------------------|-----------------------------|---|
| Cut-off wavelength            | T = 25 °C                         | $\lambda_{\text{cut}}$ | 2.40 - 2.46                 | $\mu\text{m}$                                       |
| Max. sensitivity range (>80%) | T = 25 °C                         | $\lambda_p$            | 1.1 - 2.3                   | $\mu\text{m}$                                       |
| Dark current                  | T = 25 °C; V <sub>r</sub> = 1 V   | I <sub>d</sub>         | 10 - 100                    | $\mu\text{A}$                                       |
| Shunt resistance              | T = 25 °C; V <sub>r</sub> = 10 mV | R <sub>sh</sub>        | 4 - 18                      | k $\Omega$  |
| Capacitance                   | T = 25 °C; $\lambda = \lambda_p$  | C                      | 200 - 600                   | pF  |
| Sensitivity                   | T = 25 °C; $\lambda = \lambda_p$  | S                      | 0.9 - 1.1                   | A/W   |
| Noise equivalent power        | T = 25 °C; $\lambda = \lambda_p$  | NEP                    | (0.9-2.0)*10 <sup>-12</sup> | W/Hz <sup>1/2</sup>                                 |
| Detectivity                   | T = 25 °C; $\lambda = \lambda_p$  | D*                     | (2-5)*10 <sup>10</sup>      | cm <sup>2</sup> ·Hz <sup>1/2</sup> ·W <sup>-1</sup> |

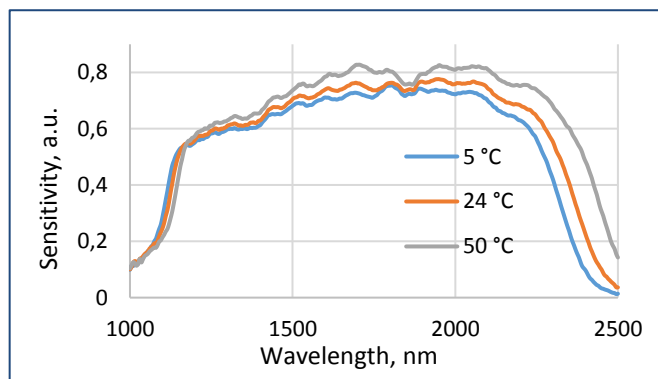
Photodiodes Lms24PD-05 series are fabricated from narrow band-gap GaInAsSb/AlGaAsSb-based heterostructures lattice matched to GaSb substrate.

All specifications are for photodiode operation at 25°C unless otherwise stated

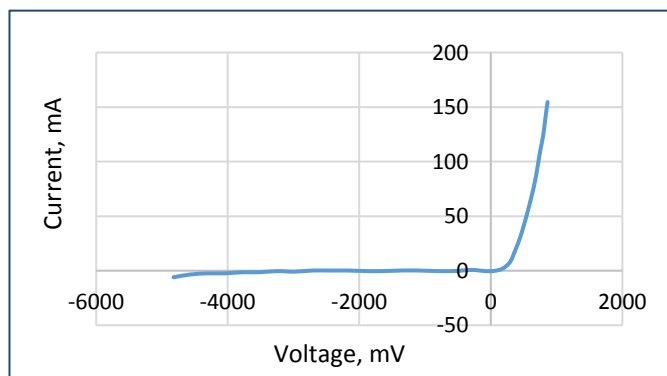
Typical spectral response



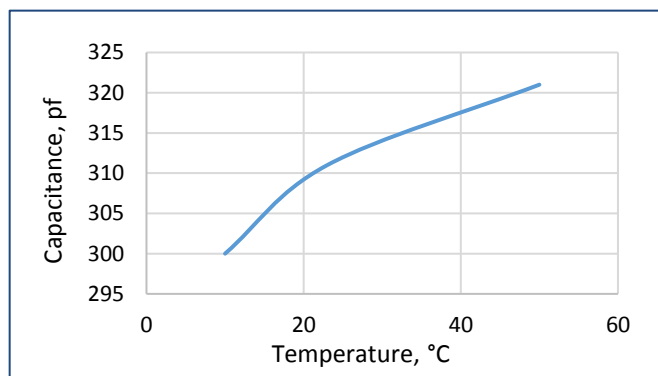
Temperature shift of spectral response



Typical current-voltage characteristic



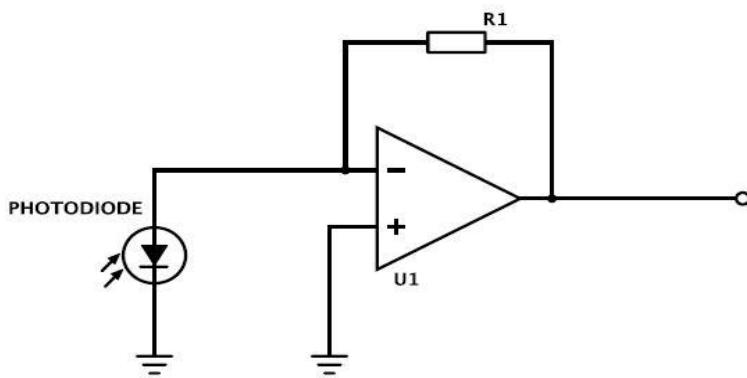
Capacitance vs. temperature



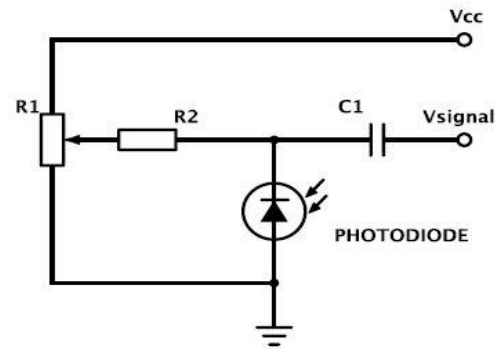
| Packages   | Model               |
|--|---------------------|
| TO-18 with a cap without a glass window  | Lms MIR PD-05       |
| TO-18 with a parabolic reflector without a window  | Lms MIR PD-05-R     |
| TO-18 with a parabolic reflector with a glass window   | Lms MIR PD-05-RW    |
| TO-5 with a built-in thermocooler and thermoresistor, covered by a cap with a glass window                 | Lms MIR PD-05-TEM   |
| TO-5 with a built-in thermocooler and thermoresistor, covered by a parabolic reflector with a glass window | Lms MIR PD-05-TEM-R |
| PD with a built-in preamplifier; TO-18 with a parabolic reflector without a window in an aluminium tube    | Lms MIR PD-05-R-PA  |
| PD with a built-in preamplifier; TO-18 with a parabolic reflector with a window in an aluminium tube       | Lms MIR PD-05-RW-PA |

### Recommended modes of PD operation

#### PD used as a current source (photovoltaic mode)



#### PD used in a photoconductive mode (under reverse bias)



We recommend using **photovoltaic mode**, when PD is used under no reverse bias.

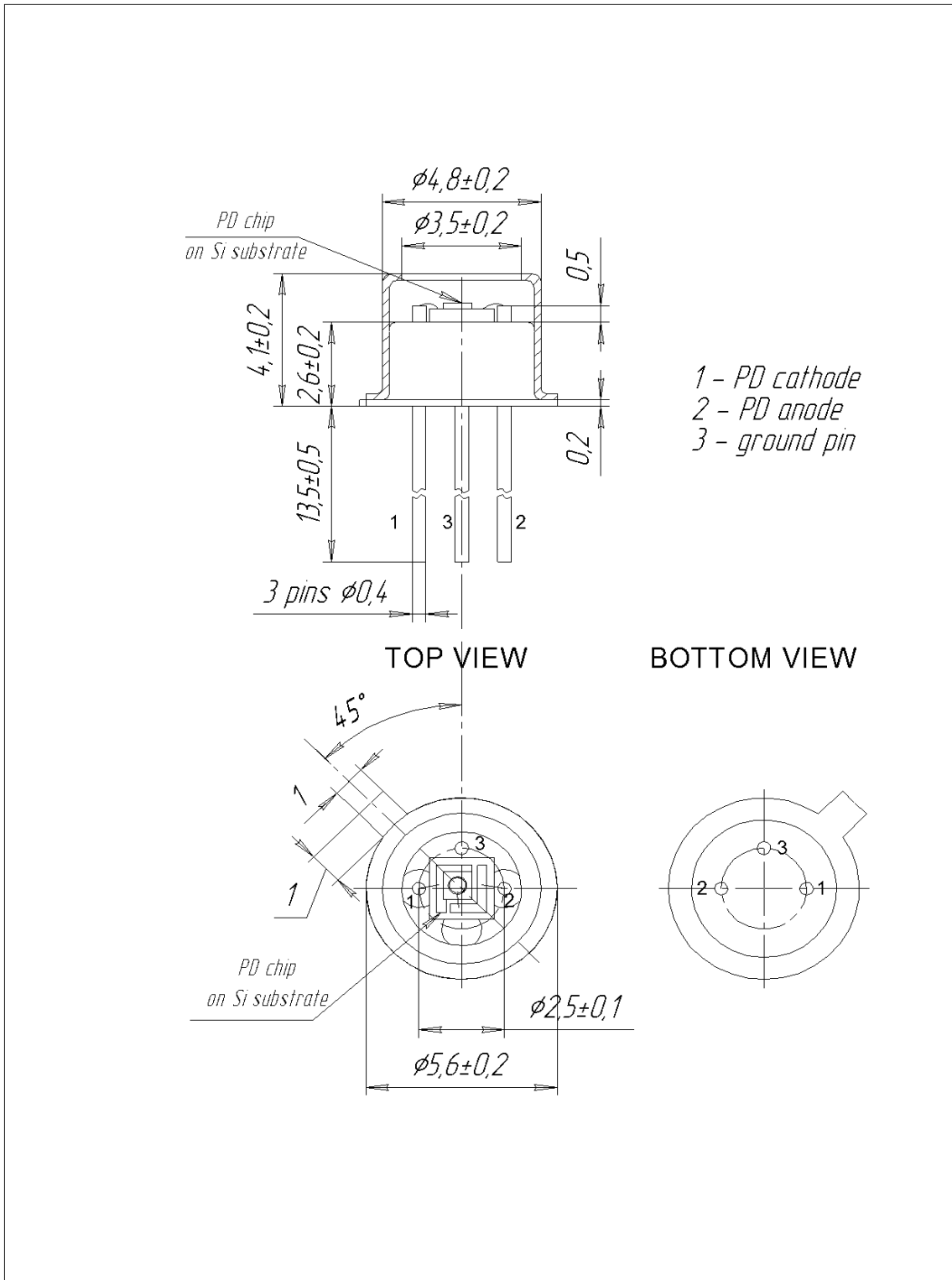
Use photoconductive mode (mode with reverse bias) with caution.

### IMPORTANT CAUTIONS:

- please check your connection circuit before turning on the PD;
- please mind the PD polarity: PD anode is marked with a RED dot;
- please do not connect the PD to the multimeter.

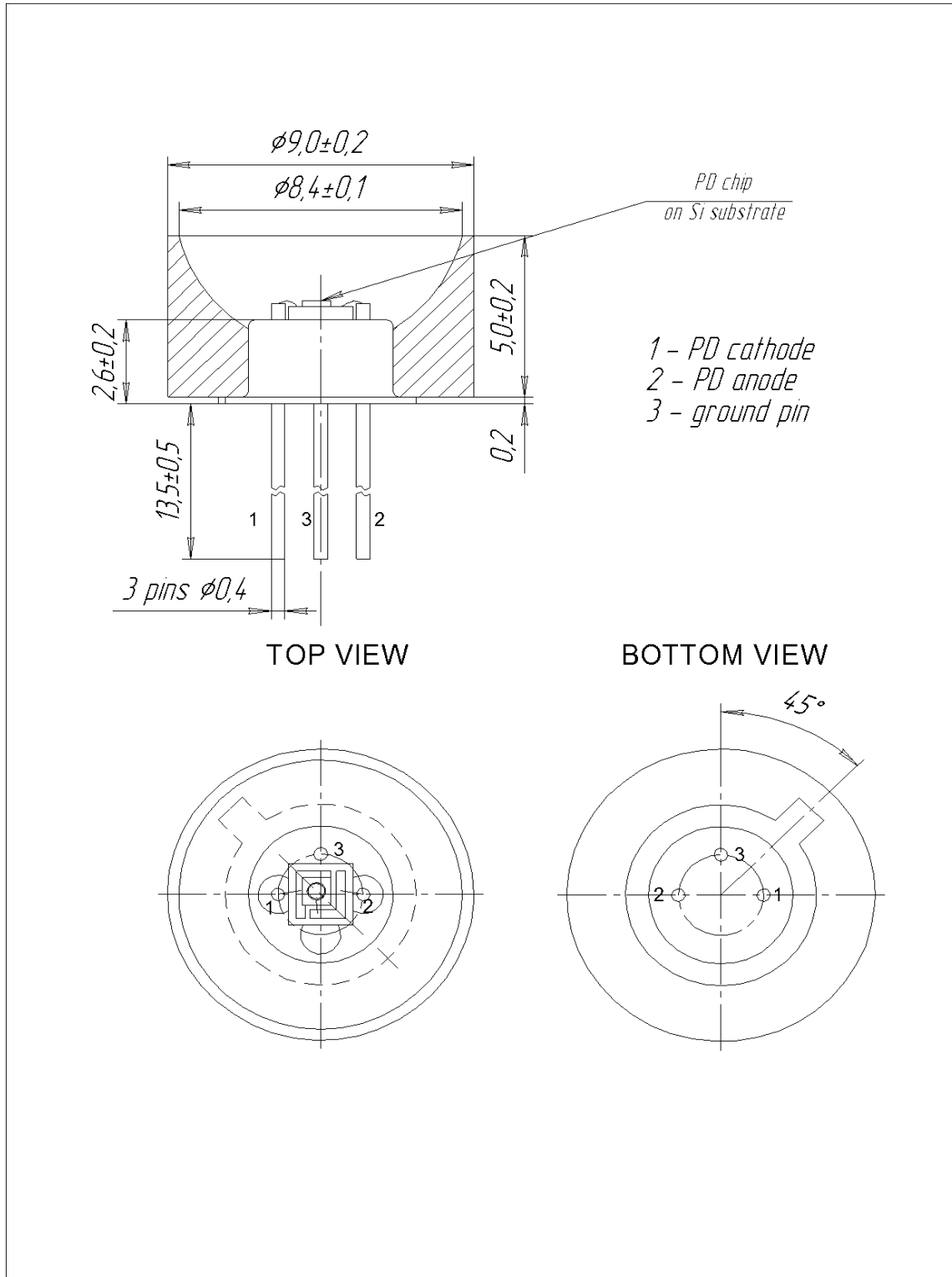
Technical Drawings

Lms24PD-05



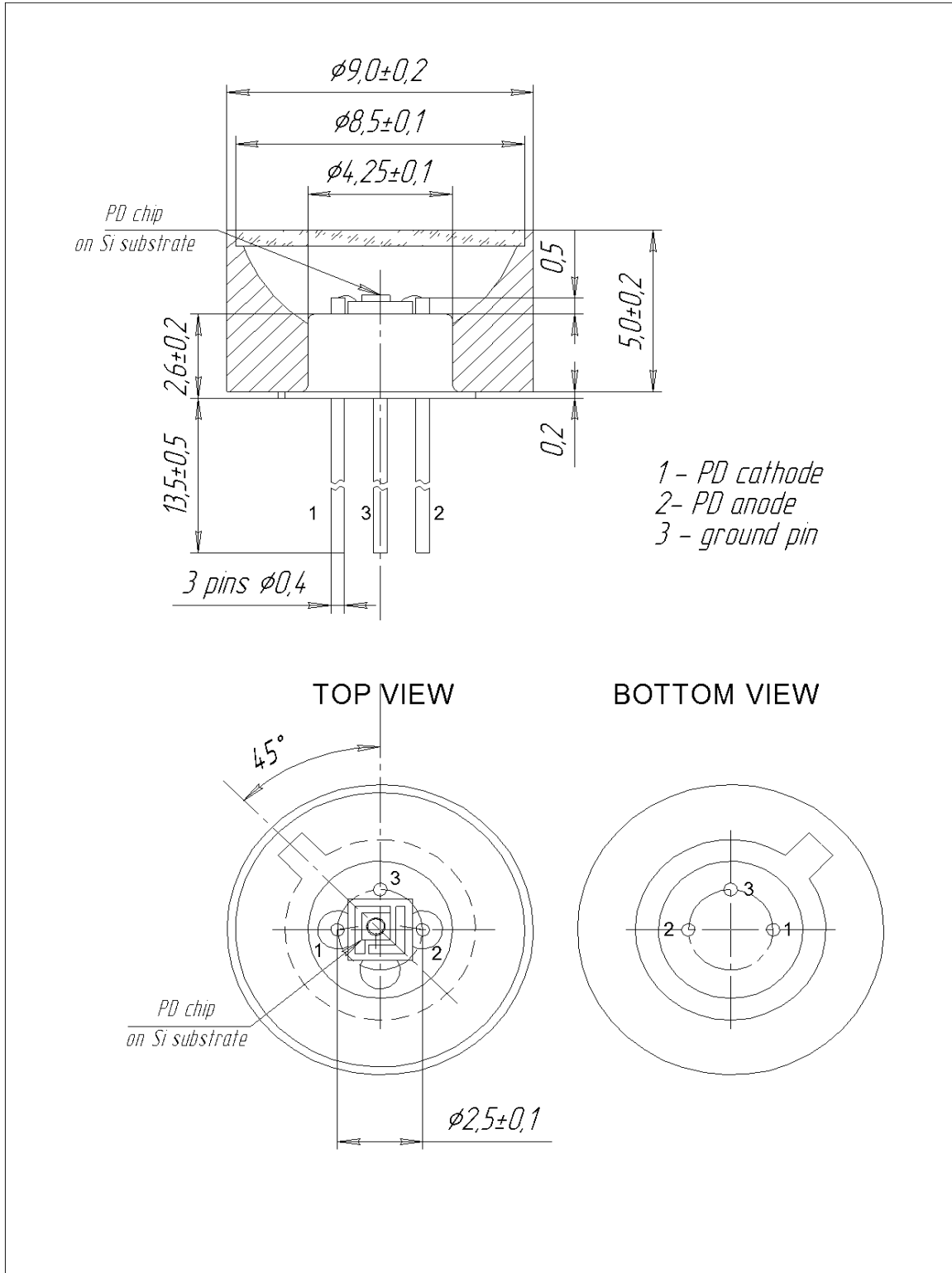
Technical Drawings

Lms24PD-05-R



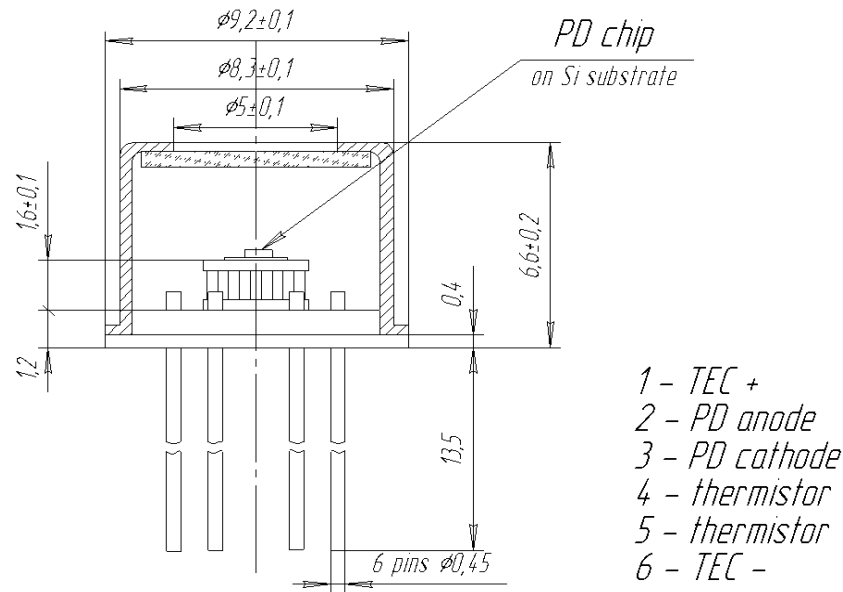
Technical Drawings

Lms24PD-05-RW

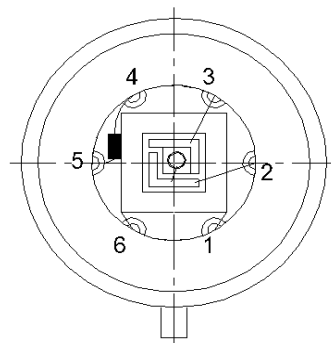


Technical Drawings

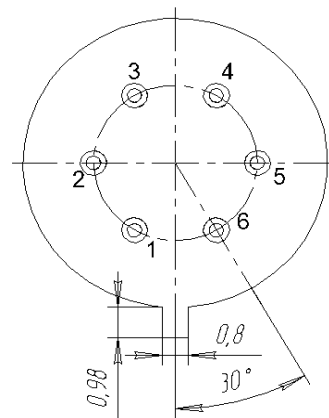
Lms24PD-05-TEM



TOP VIEW

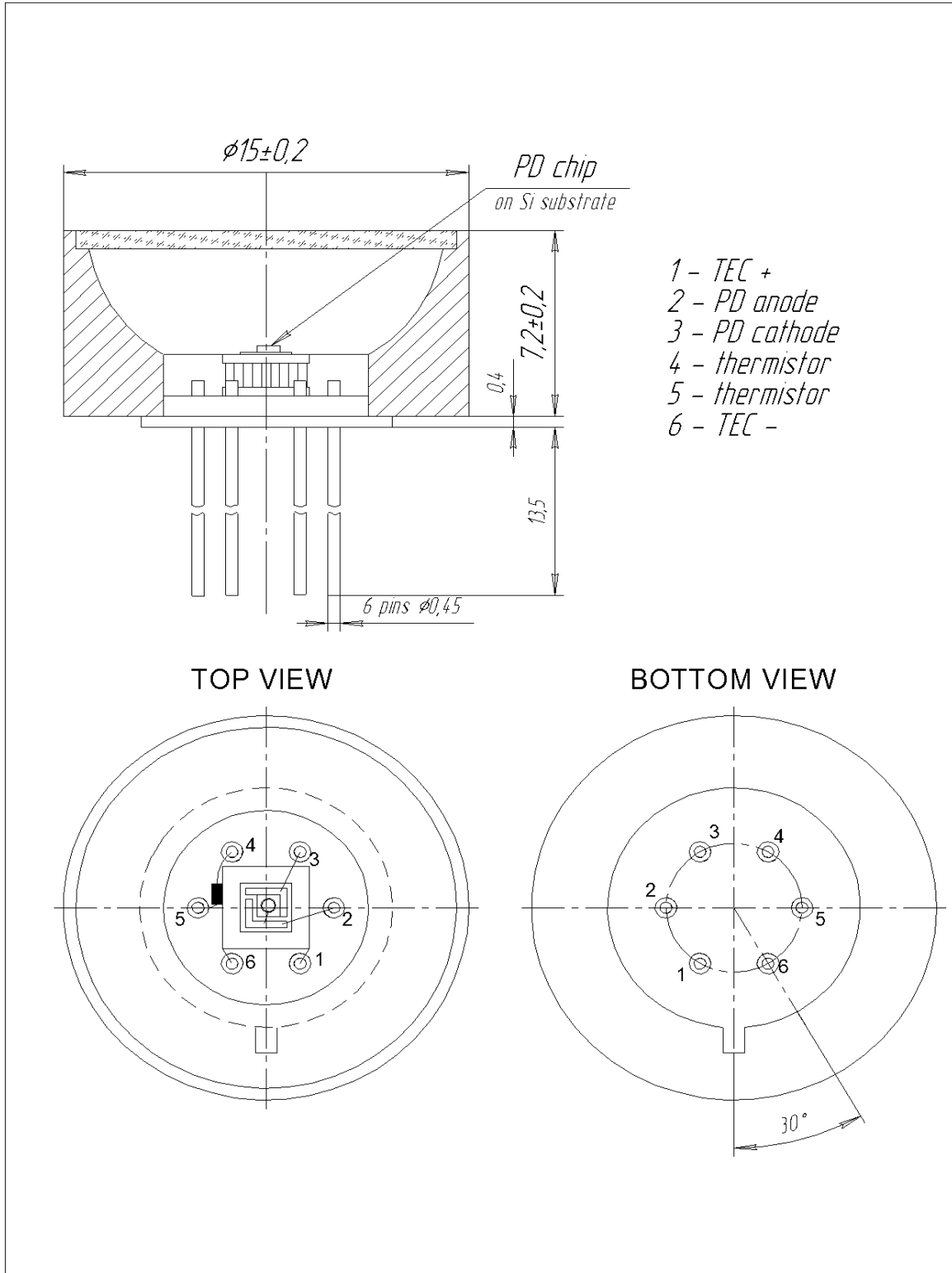


BOTTOM VIEW



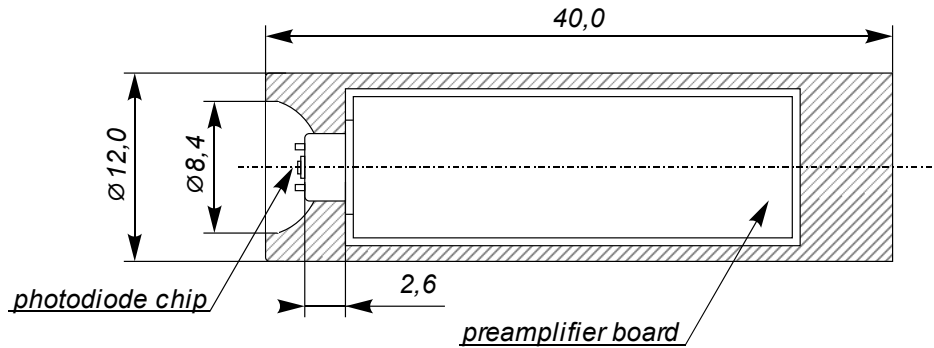
Technical Drawings

Lms24PD-05-TEM-R

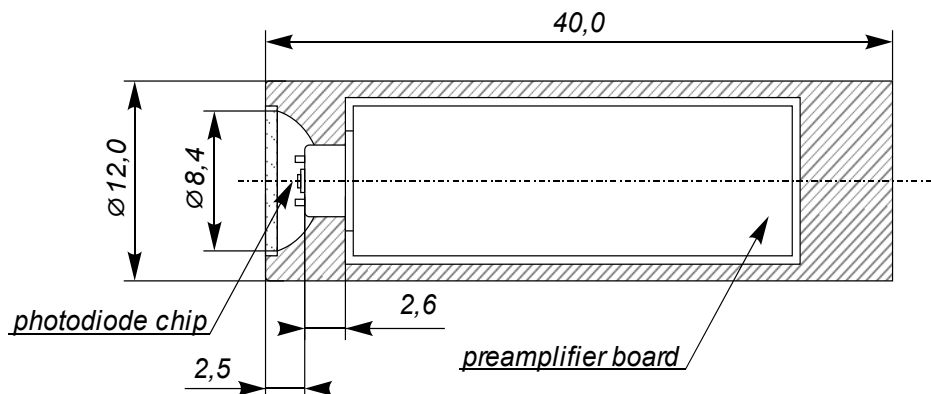


Technical Drawings

Lms24PD-05-R-PA



Lms24PD-05-RW-PA



**Connections:**

The output of PD with a built-in preamplifier has four wires:

- "+" power input (to the "+" of the power output terminal block of the SDM synchronous detector);
- "-" power input (to the "-" of the power output terminal block of the SDM synchronous detector);
- output photodiode signal (to the "-" of the signal input terminal block of the SDM synchronous detector);
- output photodiode signal (to the "+" of the signal input terminal block of the SDM synchronous detector).

For the proper connection mind colours of the wires pointed in the technical data provided with the photodiode.

Related products:

- **LEDs** - sources of mid-infrared radiation;
- **SDM** - synchronous detector for PD models with preamplifiers - Lms MIR PD-XX-R-PA and Lms MIR PD-XX-RW-PA. SDM synchronous detector measures the voltage signal from the output of photodiode preamplifier and converts it to the DC voltage signal proportional to amplitude of voltage from input.
- **TCM** - thermocontroller for PD models with built-in thermoelectric modules (thermocooler and thermistor) - Lms MIR PD-XX-TEM and Lms MIR PD-XX-TEM-R models. TCM enables control and adjustment of PD temperature.