



Mid-Infrared (MIR) Photodiode

3.7 - 4.6 μm

Lms43PD-03 series

Device parameters	Symbol	Value	Units
Sensitive area size	d	0.3	mm
Reverse voltage	V_r	0.1	V
Operating/ storage temperature	T_{opr}/ T_{stg}	-60..+90*	$^{\circ}\text{C}$
Soldering temperature (can be applied for not more than 5 secs)	T_{sol}	+180	$^{\circ}\text{C}$

*Temperature range may vary for different packaging types.

All parameters refer to photodiode operation at ambient temperature 25 $^{\circ}\text{C}$ unless otherwise stated.

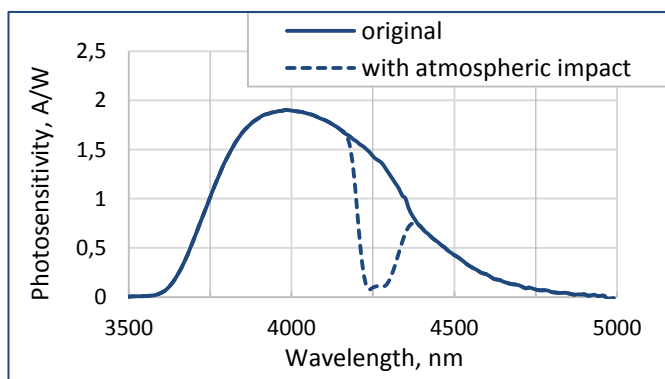


Photodiode parameters	Conditions	Symbol	Value	Units
Cut-off wavelength (at 10% level) ¹	-	λ_{cut}	4.6 - 4.7	μm
Max. sensitivity range (at 80% level) ¹	-	λ_p	3.8 - 4.2	μm
Dark current (typical/ maximal) ²	$V_r = 0.1 \text{ V}$	I_d	typ 4.0 / max 6.0	mA
Shunt resistance (minimal/ typical) ²	$V_r = 10 \text{ mV}$	R_{sh}	min 10 / typ 20	Ω
Capacitance (typical/ maximal) ¹	$V_r = 10 \text{ mV}$	C	-	pF
Photosensitivity (minimal/ typical) ²	$\lambda = 4.1 \mu\text{m}$	S	min 1.6 / typ 2.0	A/W
Noise equivalent power (typical/ maximal) ²	$\lambda = 4.1 \mu\text{m}$	NEP	typ $1.4 \cdot 10^{-11}$ / max $2.5 \cdot 10^{-11}$	$\text{W}/\text{Hz}^{1/2}$
Detectivity (minimal/ typical) ²	$\lambda = 4.1 \mu\text{m}$	D^*	min $1.2 \cdot 10^9$ / typ $2.1 \cdot 10^9$	$\text{cm}^2 \cdot \text{Hz}^{1/2} \cdot \text{W}^{-1}$

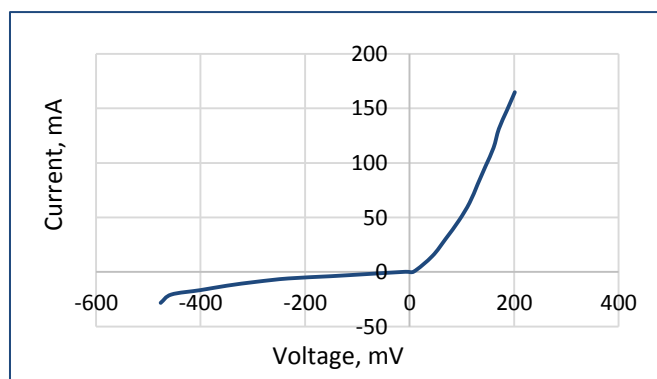
¹ Parameter tested for representative sampling.

² Parameter tested for each device.

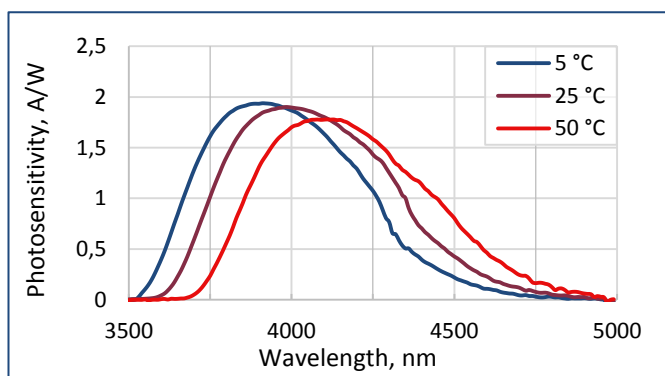
Typical spectral response



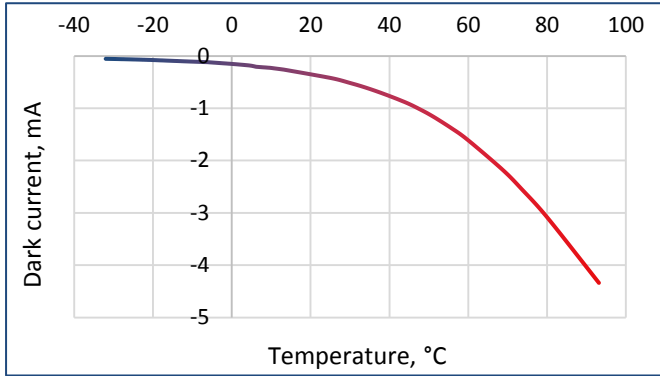
Typical current-voltage characteristic



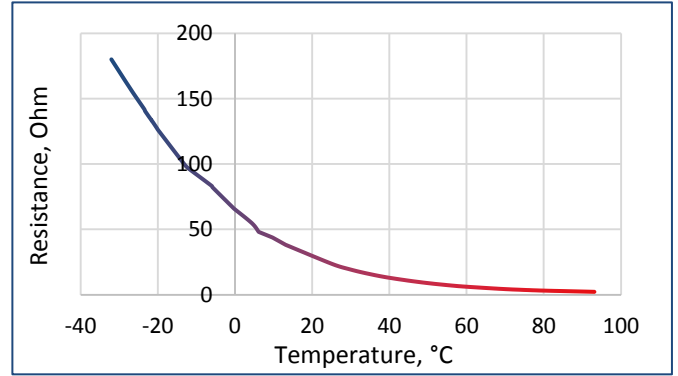
Temperature shift of spectral response



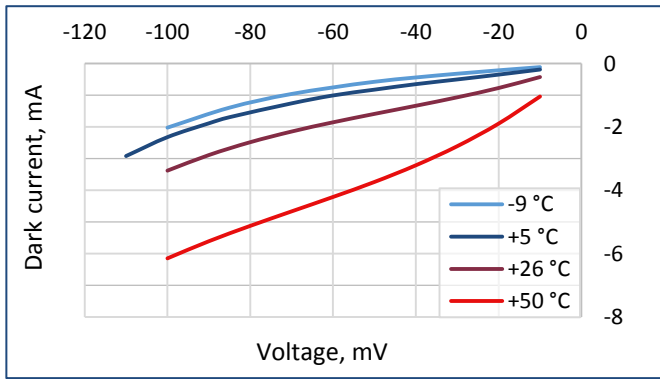
Dark current vs. temperature ($V_r = 0.1 \text{ V}$)



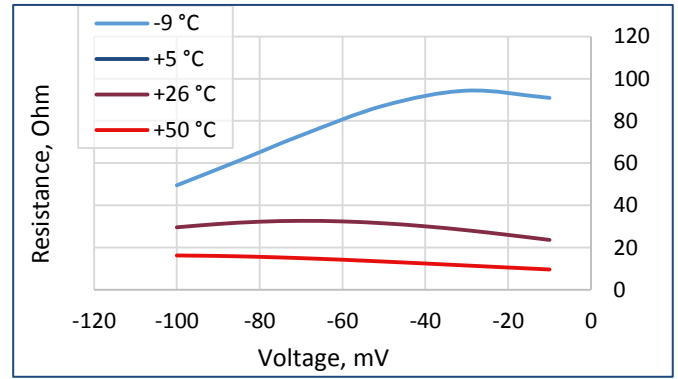
Shunt resistance vs. temperature ($V_r = 10 \text{ mV}$)



Dark current vs. voltage



Shunt resistance vs. voltage

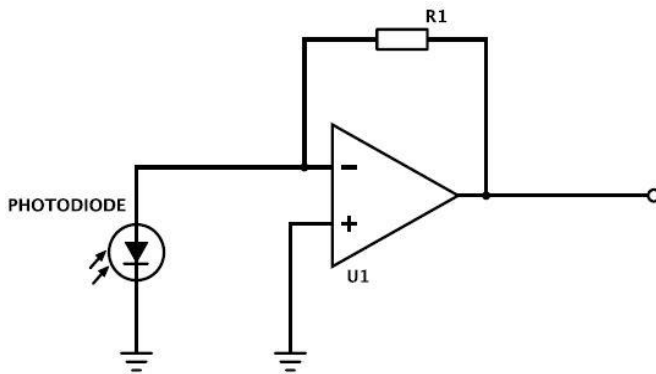


Packages*	Model
TO-18 with a cap without a glass window	Lms43PD-03
TO-18 with a parabolic reflector without a glass window	Lms43PD-03-R
TO-18 with a parabolic reflector with a glass window	Lms43PD-03-RW
TO-5 with a built-in thermocooler and thermoresistor, covered by a cap with a glass window	Lms43PD-03-TEM
TO-5 with a built-in thermocooler and thermoresistor, covered by a parabolic reflector with a glass window	Lms43PD-03-TEM-R
PD with a built-in preamplifier; TO-18 with a parabolic reflector without a window in an aluminum tube	Lms43PD-03-R-PA
PD with a built-in preamplifier; TO-18 with a parabolic reflector with a window in an aluminum tube	Lms43PD-03-RW-PA

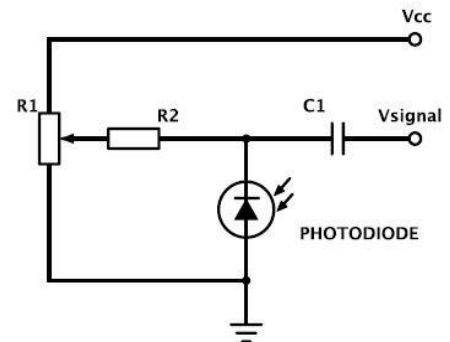
*Standard photodiode packaging is non-hermetical, so that condensation during device operation and storage must be prevented.

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:

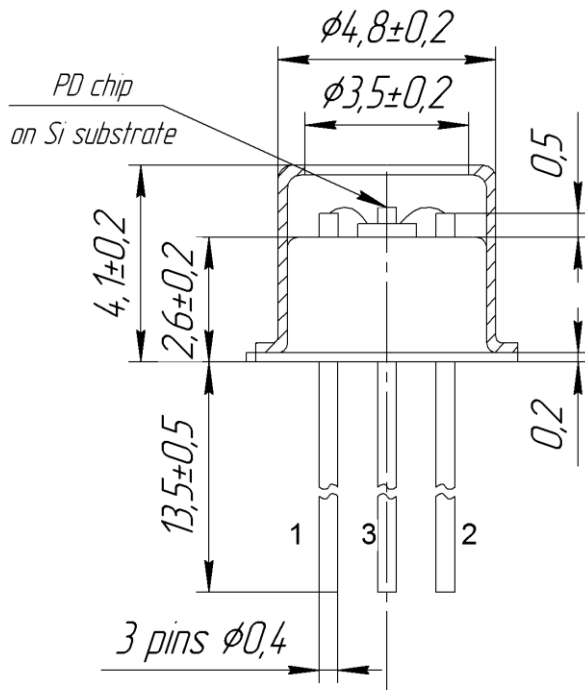
- please check your connection circuit before turning on the PD;
- please mind the PD polarity: PD anode is marked with a RED dot;
- please do not connect the PD to the multimeter.

Related products:

- **Light emitting diodes (LEDs)** - sources of IR radiation;
- **PAb preamplifier** - amplifies photocurrent generated by a PD and converts it into a voltage signal;
- **SDM synchronous detector** - enables synchronous operation of a PD coupled with a preamplifier and an LED coupled with a driver; performs conversion of an output PD preamplifier signal into DC voltage signal.

Technical Drawings

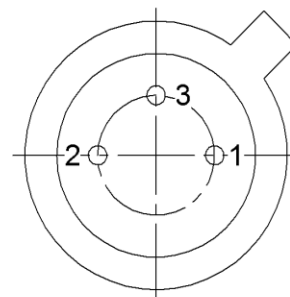
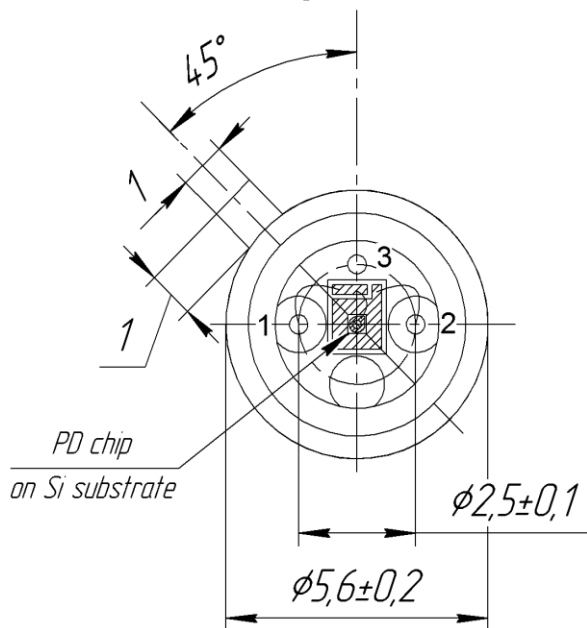
Lms43PD-03



- 1 - PD cathode
- 2 - PD anode
- 3 - ground pin

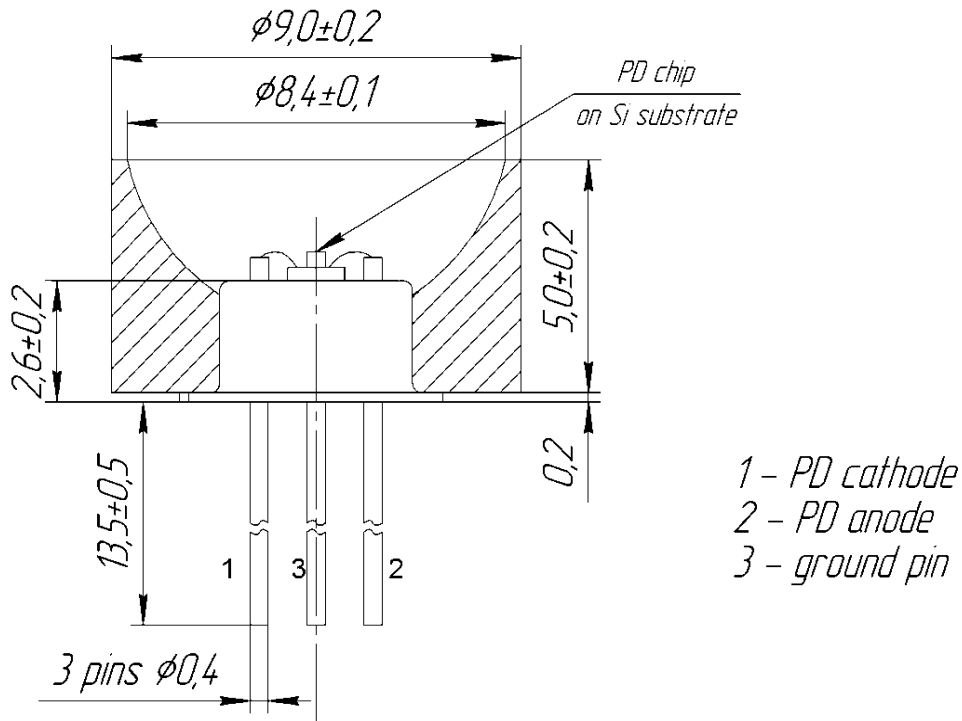
TOP VIEW

BOTTOM VIEW



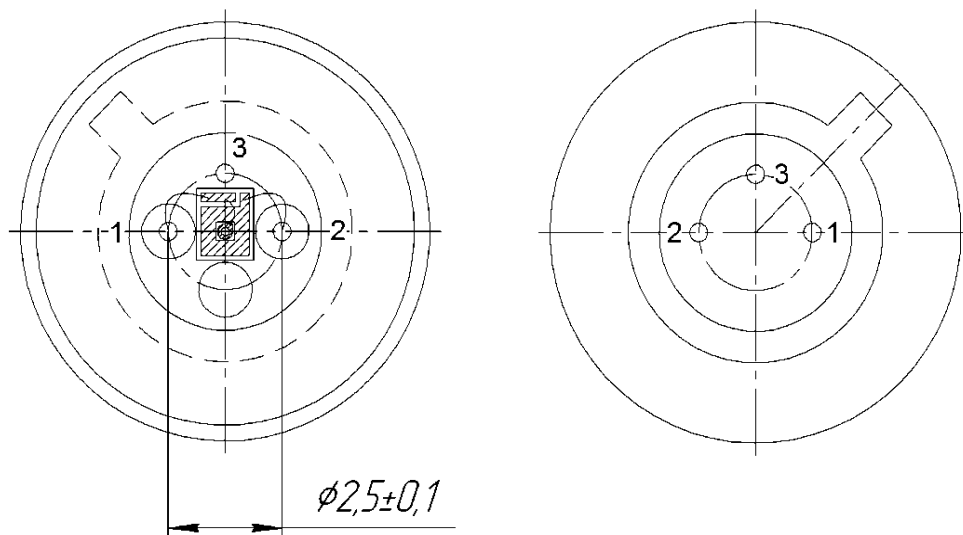
Technical Drawings

Lms43PD-03-R



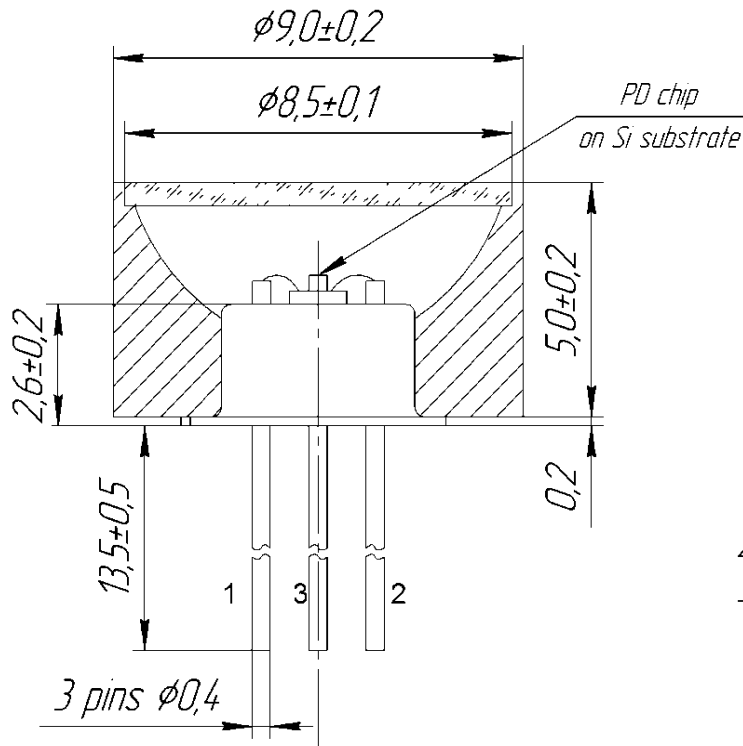
TOP VIEW

BOTTOM VIEW



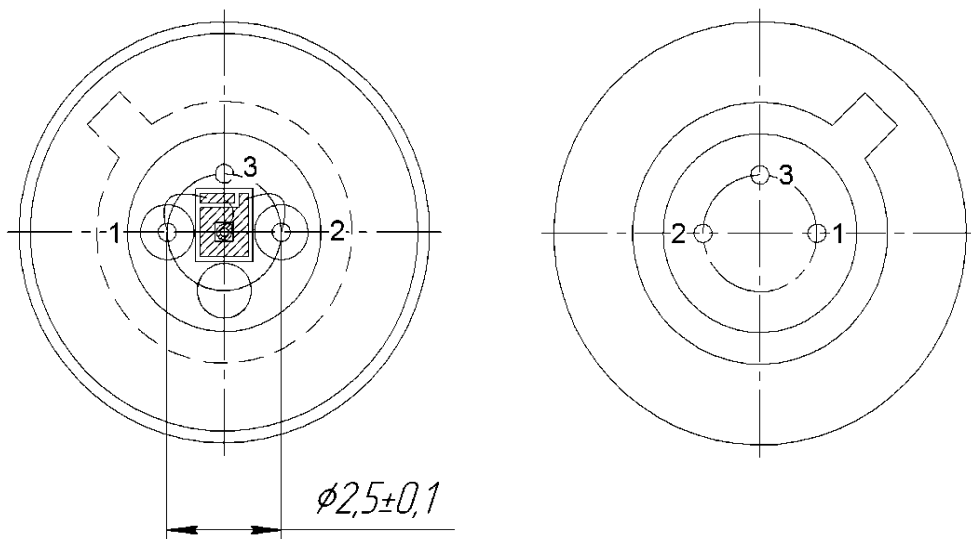
Technical Drawings

Lms43PD-03-RW



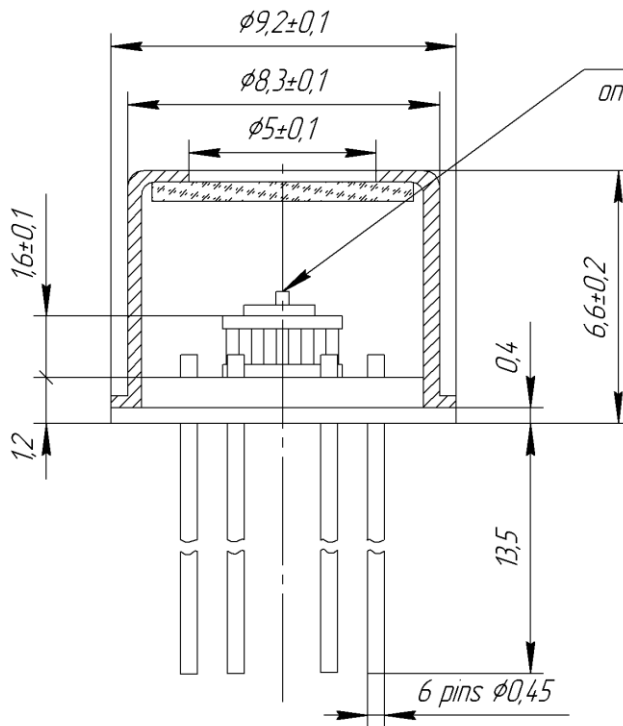
TOP VIEW

BOTTOM VIEW



Technical Drawings

Lms43PD-03-TEM

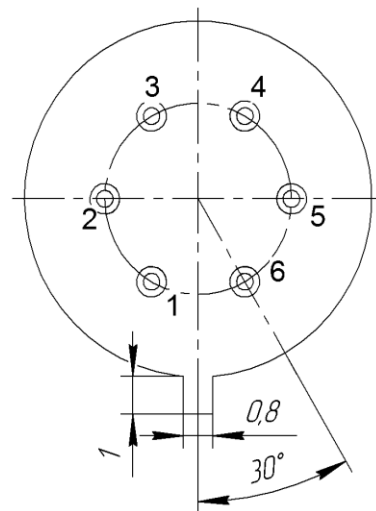
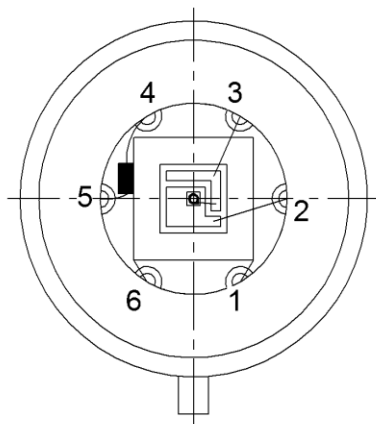


*PD chip
on Si substrate*

- 1 - TEC +
- 2 - PD anode
- 3 - PD cathode
- 4 - thermistor
- 5 - thermistor
- 6 - TEC -

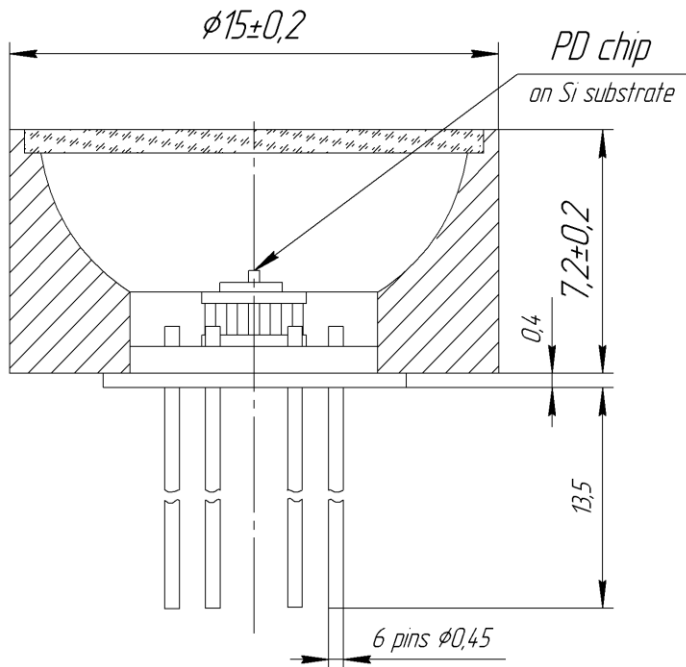
TOP VIEW

BOTTOM VIEW



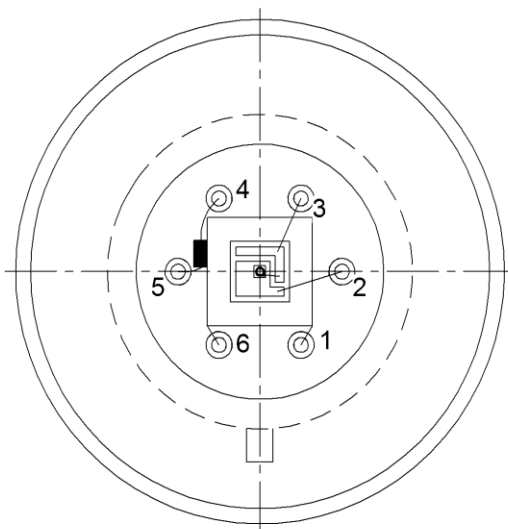
Technical Drawings

Lms43PD-03-TEM-R

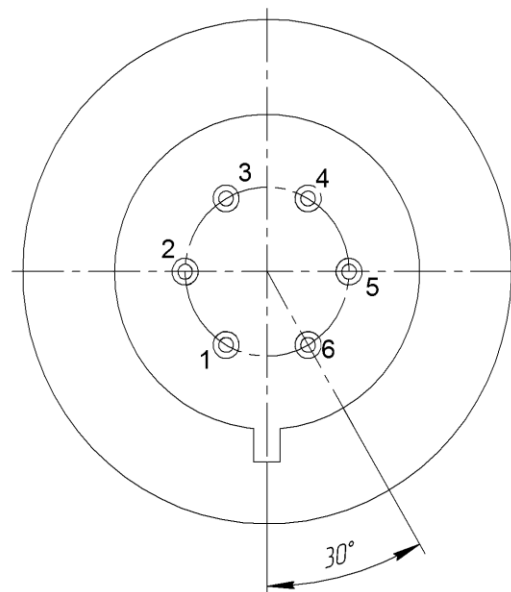


- 1 - TEC +
- 2 - PD anode
- 3 - PD cathode
- 4 - thermistor
- 5 - thermistor
- 6 - TEC -

TOP VIEW

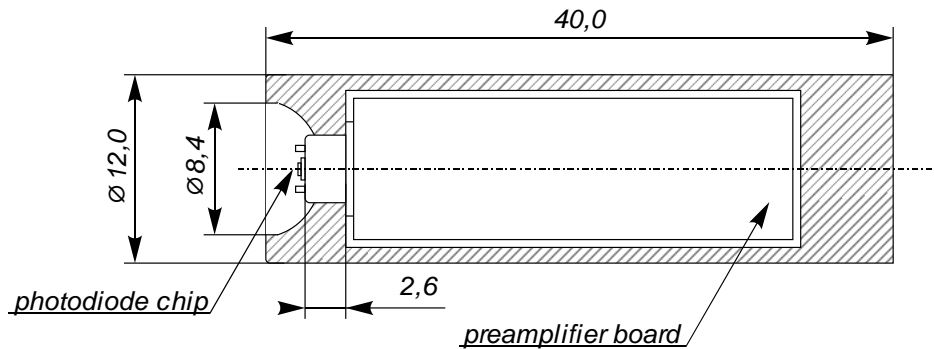


BOTTOM VIEW

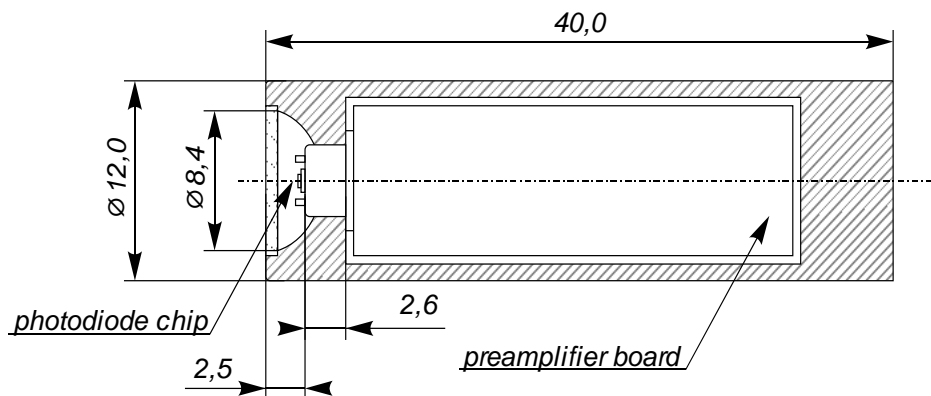


Technical Drawings

Lms43PD-03-R-PA



Lms43PD-03-RW-PA



Power input voltage: +5 V, stabilized;

Connections:

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

- "+" power input (to the "+5V" of the power output terminal block of the SDM synchronous detector);
- "ground" power input (to the "0V" of the power output terminal block of the SDM synchronous detector);
- "ground" output photodiode signal (to the "0V" of the signal input terminal block of the SDM synchronous detector);
- "+" output photodiode signal (to the "IN" of the signal input terminal block of the SDM synchronous detector).

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