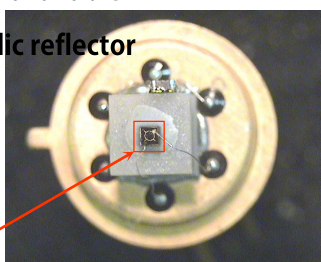


Features

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



Photodiode CHIP

Description

Photodiode **PD48-05-NS-TEC-PRW** is a model of [photodetector](#) with narrow spectral range (**NS**) for detection of radiation in the Middle Infrared (Mid-IR) spectral range from 3700 to 4800 nm operating at room temperature.

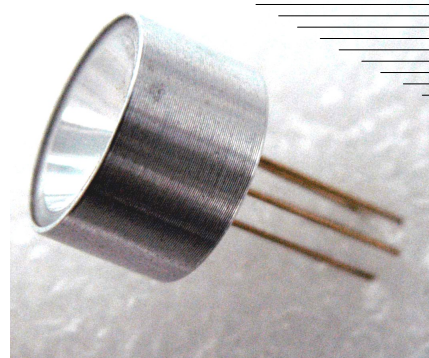
Photodiode **PD48-05-NS-TEC-PRW** has thermo electric cooler (**TEC**) and thermistor for a control of temperature. Components are integrated inside the standard 9.2 mm TO-5 package with **TEC**, parabolic reflector (**PR**) and window (**W**).

Photosensitive area of **PD48-05-NS-TEC-PRW** 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.

General characteristics

NS - narrow spectrum

Package	Parameter	Symbol	Value	Unit
TO-5 with TEC	Chip size (photosensitive area)	A	0.45×0.45	mm ²
	Weight	m	3.65	g
	Operating temperature	T _{opr}	−20...+40	°C
	Window material	sapphire glass		
	Cooling	one-stage TE-cooled		
	Soldering temperature	T _s	+230	°C
	Storage temperature	T _{stg}	−20...+50	°C
	Maximum reverse bias voltage	V	−0.5	V
	Size	D	9.2	mm
		H	20.2	



Applications

- Environment measurements
- Gas analysis (CH₄, CO, CO₂)
- Infrared spectrophotometry
- Analytical instruments

Accessories (optional)

- [Amplifier with temperature controller](#)
AMT-07M

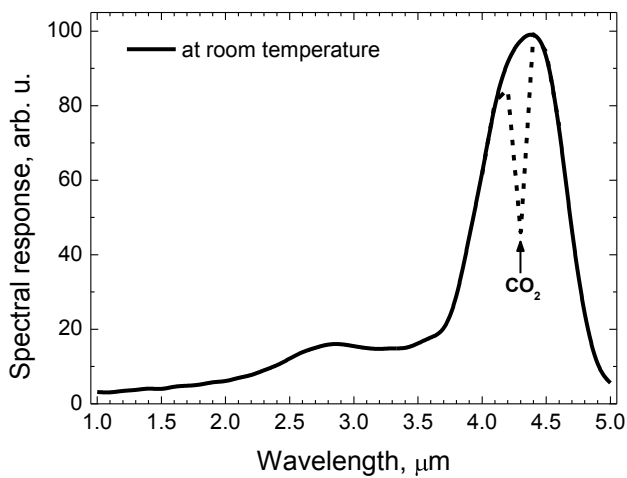
▼ Electrical and optical characteristics

Parameter	Symbol	Condition	Element temperature			Unit
			-20°C	0°C	+20°C	
Spectral sensitivity range	λ	at level 10%	-	-	2.5 - 4.9	μm
Peak sensitivity wavelength	λ_p	at level 90%	-	-	4.3 - 4.6	μm
Photo sensitivity	S	at λ_p	0.7 - 0.9	0.6 - 0.8	0.6 - 0.8	A/W
Detectivity	D^*	at λ_p	$[8 - 10] \cdot 10^8$	$[6 - 9] \cdot 10^8$	$[5 - 9] \cdot 10^8$	$\text{cm} \cdot \text{Hz}^{1/2} \cdot \text{W}^{-1}$
Dark current	I_d	$V = -0.1 \text{ V}$	0.2 - 0.4	0.4 - 1.0	1.0 - 3.0	mA
Capacitance	C	$V = 0 \text{ V}$ $f = 1 \text{ MHz}$	18 - 35	20 - 40	30 - 60	pF
Rise time	t_r	$V = 0 \text{ V}$ $R_L = 50 \Omega$	≤ 20			ns
Fall time	t_f					
Shunt resistance	R_0	$V \approx -10 \text{ mV}$	150 - 300	120 - 250	80 - 150	Ω
Noise equivalent power	NEP	at D^*	-	-	-	$\text{W} \cdot \text{Hz}^{-1/2}$

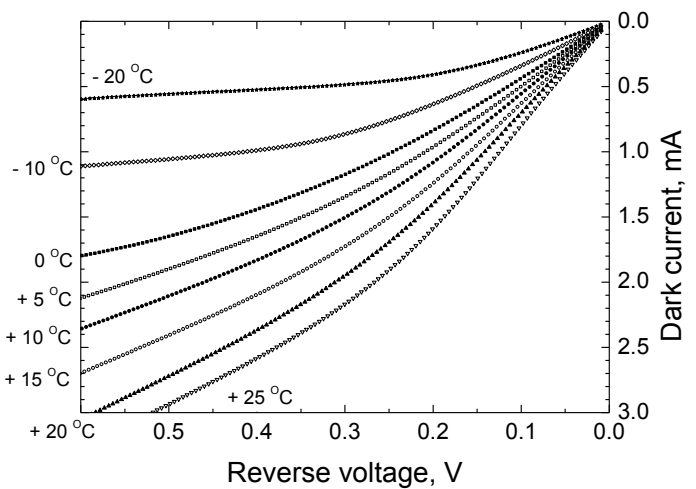
▼ TEC *TO506.1MC0400710.TB103* parameters (without load)

Parameter	Symbol	Condition	Value	Unit
Current	I_{max}	ΔT_{max}	1.50	A
Voltage	U_{max}	ΔT_{max}	0.80	V
Cooling energy	Q_{max}	-	1.30	W
Temperature range	ΔT_{max}	vacuum	70	K
Thermistor resistance	R_t	at +20°C	10.00	k Ω

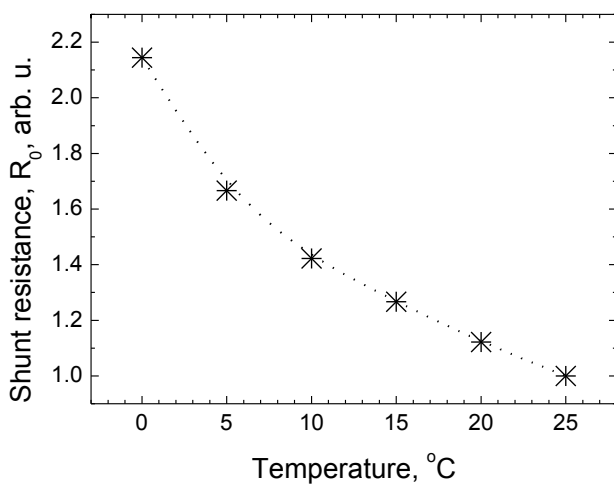
▼ Spectral response



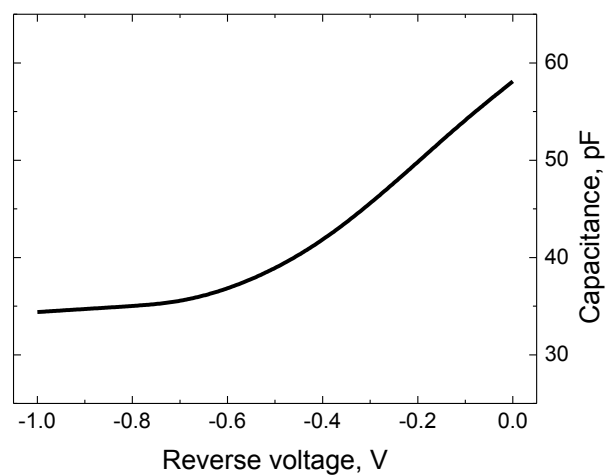
▼ Dark current vs. reverse voltage



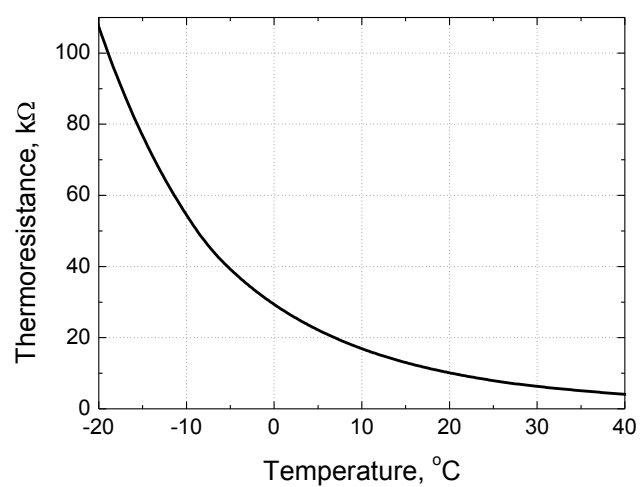
▼ Shunt resistance vs. temperature



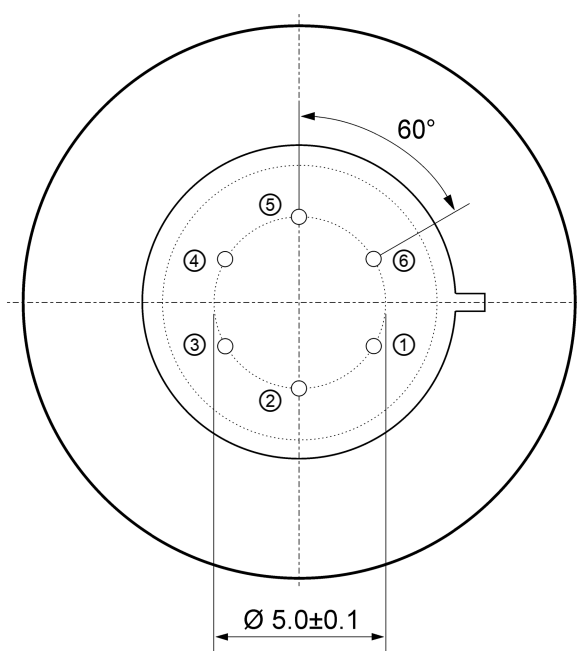
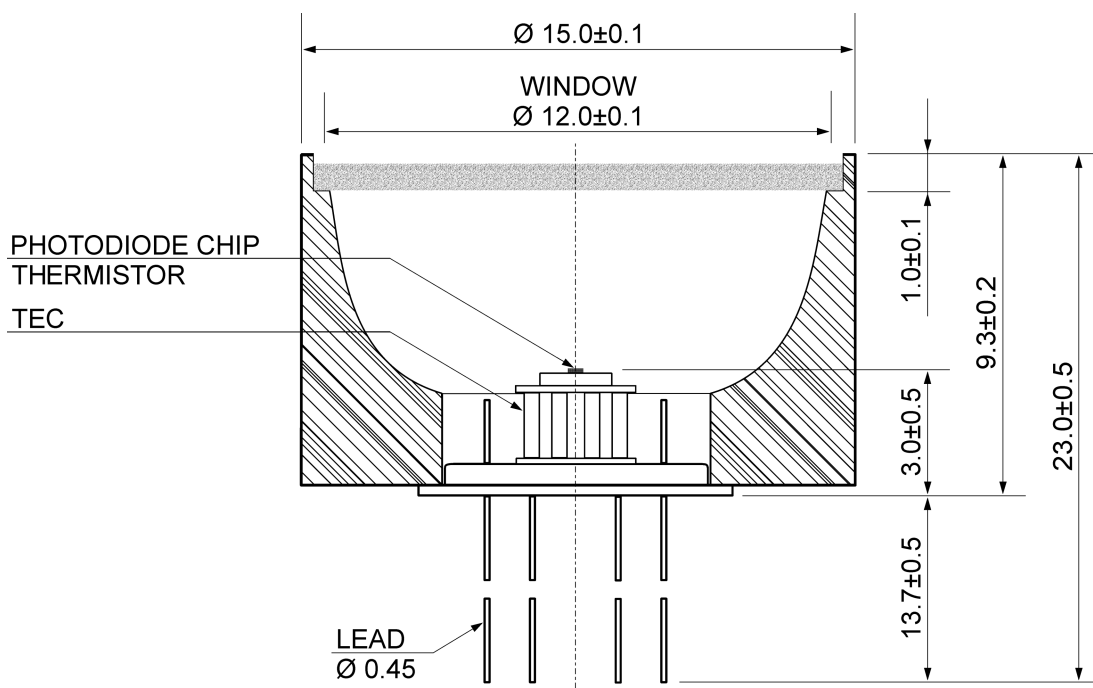
▼ Capacitance vs. reverse voltage



▼ Thermoresistance vs. temperature



▼ TO-5 package with TEC & PR dimensions (unit: mm)



Pin	Description
①	TEC (anode)
②	Detector (anode)*
③	Detector (cathode)*
④	Thermistor TC103
⑤	
⑥	TEC (catnode)

*Special order: the pin polarity can be changed.