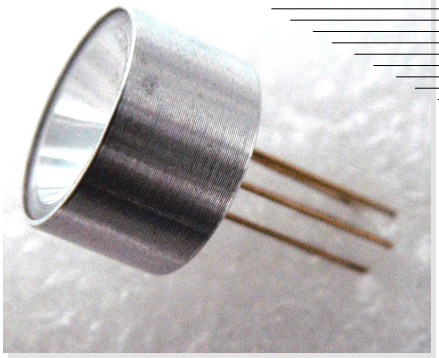
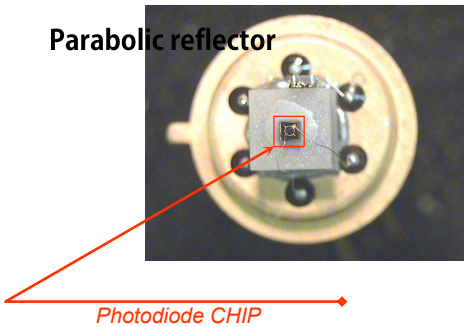
Mid infrared IBSG Optoelectronics



Features

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



Applications

- **Environment measurements**
- **Gas analysis (CH_4, CO, CO_2)**
- **Infrared spectrophotometry**
- **Analytical instruments**

Accessories (optional)

- **Amplifier with temperature controller AMT-07M**

Description

Photodiode **PD48-05-WS-TEC-PRW** 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 **PD48-05-WS-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-WS-TEC-PRW** is 0.45×0.45 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

WS - wide spectrum

Package	Parameter	Symbol	Value	Unit
TO-5 with TEC PR W	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	10.5	mm
		H	23.0	

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Electrical and optical characteristics

Parameter	Symbol	Condition	Element temperature			Unit
			−20°C	**0**°C	**+20**°C	
Spectral sensitivity range	λ	at level 10%	0.8 - 4.65	0.8 - 4.75	0.8 - 4.8	µm
Peak sensitivity wavelength	λ_p	at level 90%	3.15 - 3.9	3.2 - 4.0	3.25 - 4.15	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]·10^8	[6 - 9]·10^8	[5 - 9]·10^8	cm·$Hz^{½}$·W^{-1}
Dark current	I_d	V = −0.1 V	0.2 - 0.4	0.5 - 1.0	1.0 - 3.0	mA
Capacitance	C	V = 0 V f = 1 MHz	30 - 40	40 - 50	40 - 60	pF
Rise time	t_r	V = 0 V R_L = 50 Ω	≤ 20			ns
Fall time	t_f					
Shunt resistance	R_0	V ≈ −10 mV	200 - 300	100 - 220	50 - 150	Ω
Noise equivalent power	NEP	at D*	-	-	-	$W·Hz^{-½}$

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	kΩ

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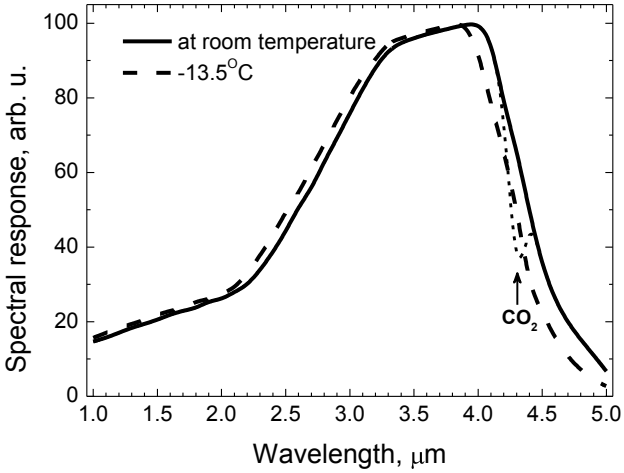
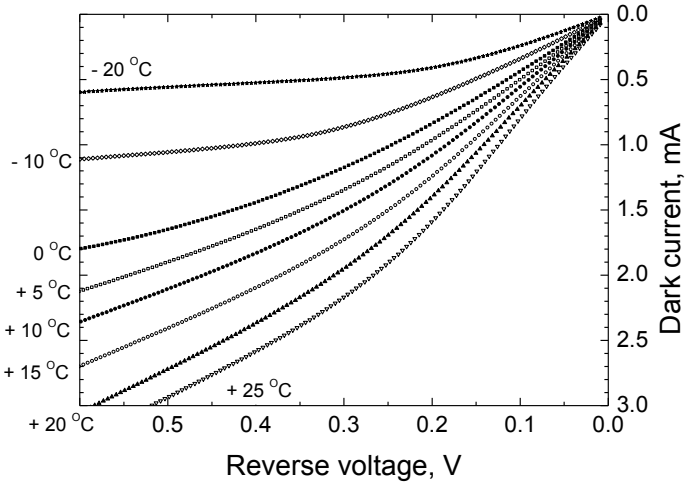
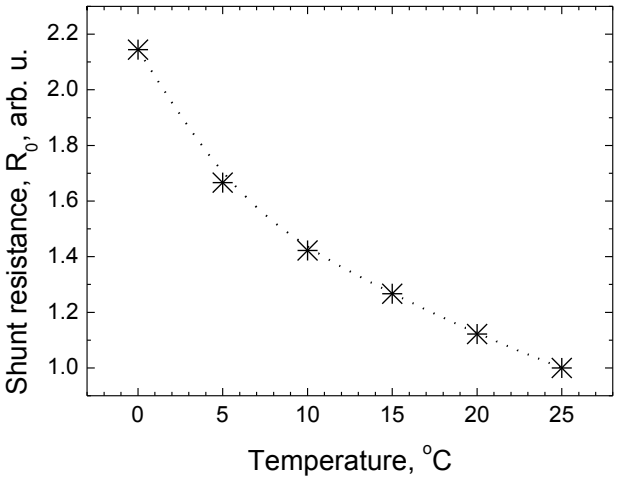
Spectral response



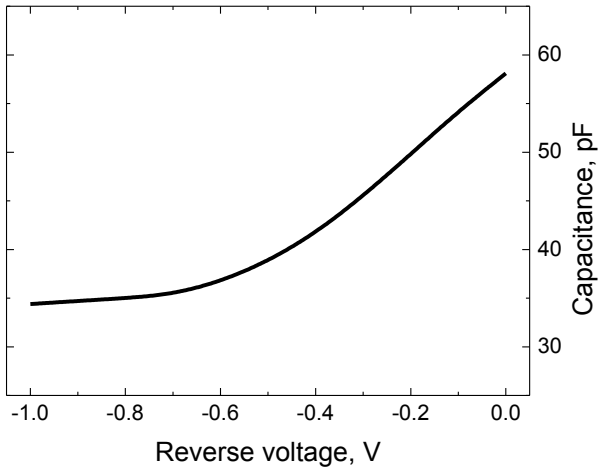
Dark current vs. reverse voltage



Shunt resistance vs. temperature



Capacitance vs. reverse voltage



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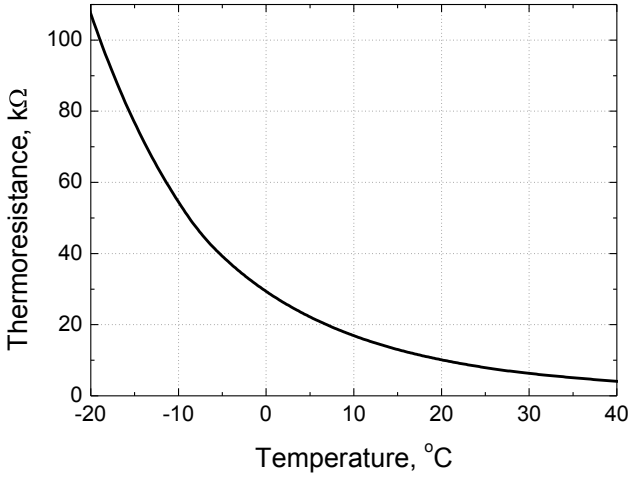
Thermoresistance vs. temperature



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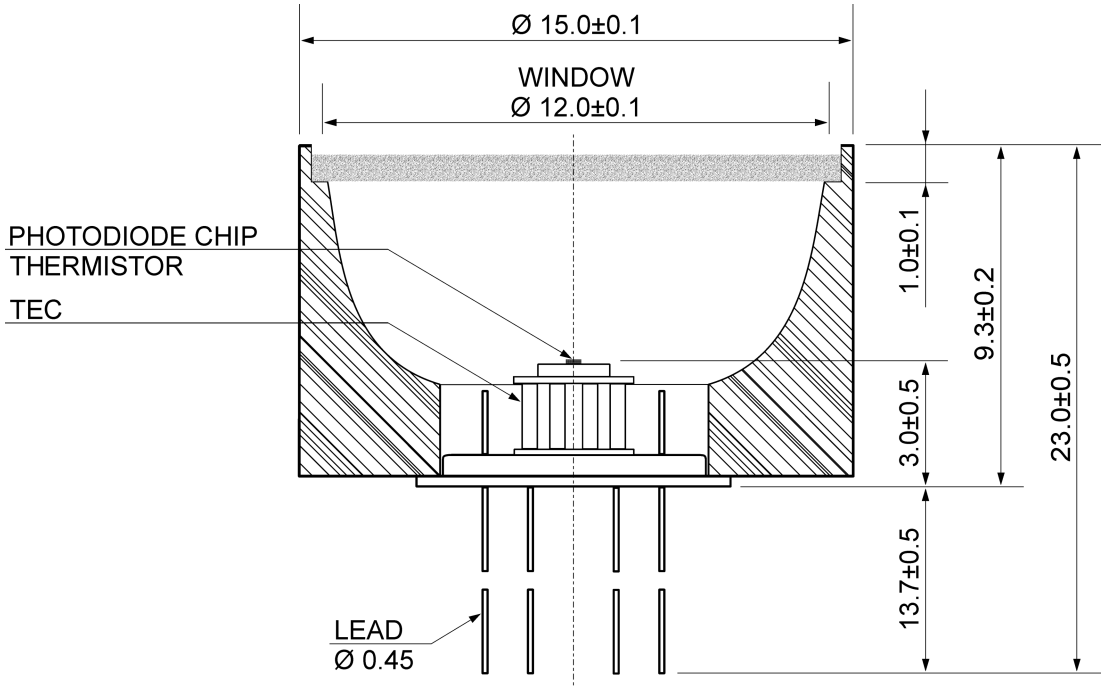
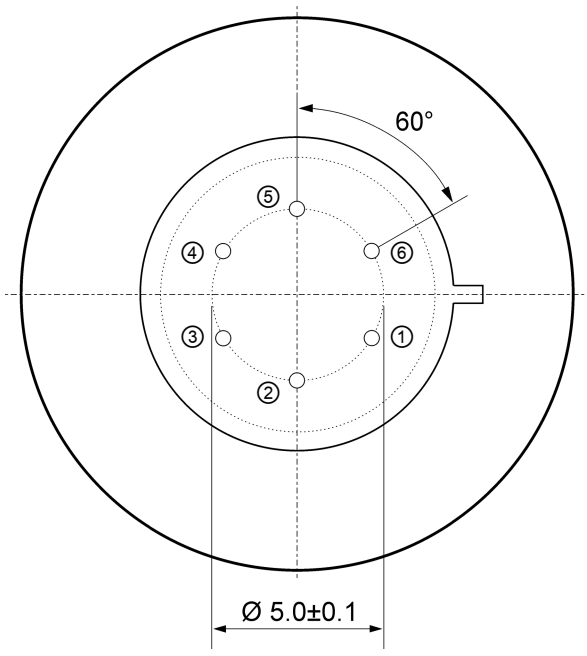
TO-5 package with TEC & PR dimensions (unit: mm)





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.

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