56 Sparta Avenue • Newton, New Jersey 07860
(973) 300-3000 Sales • (973) 300-3600 Fax
www.thorlabs.com

THORLABS

PDA30B - January 30, 2018

Item # PDA30B was discontinued on January 30, 2018. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

GE TRANSIMPEDANCE AMPLIFIED PHOTODETECTORS

Ge Detector Type
Switchable Amplified Detectors with Output up to 10 V
Wavelength Range from 800 - 1800 nm

Power Supply Included with Detector

PDA50B

PDA30B

Detector with Ø1" Lens Tube Attached to a 30 mm Cage System

Hide Overview

OVERVIEW

Features

- Detection Range: 800 - 1800 nm
- Low-Noise, Wide Band Amplifiers
- Bandwidth from DC to 460 kHz
- 0 to 10 V Output
- Compatible with SM1 (1.035"-40) Series and Some SM05 (0.535"-40) Series Products
- Linear Power Supply Included

Click to Enlarge
Each detector has an internal SM05 and external SM1 thread and comes with an attached SM1T1 Internal SM1 Adapter and SM1RR Retaining Ring.

Click to Enlarge
The power supply is included with all of the detectors on this page.

The Ge-based Transimpedance Amplified Photodetectors feature a switchable gain setting housed in a compact, low-profile package. These detectors are sensitive to light in the NIR spectral region from 800 nm to 1800 nm. The slim profile housing enables use in light paths with space constraints. All connections and controls are located perpendicular to the light path, providing increased accessibility. Amplification is provided by low noise transimpedance or voltage amplifiers that are capable of driving 50 Ω loads. Signal output is via a BNC connector. These photodetectors are ideal for use with Thorlabs' passive low-pass filters; these filters have a 50 Ω input and a high-impedance output that allows them to be directly attached to high-impedance measurement devices such as an oscilloscope. Thorlabs offers a wide variety of BNC, BNC-to-SMA, and SMC cables, as well as a variety of BNC, SMA, and SMC adapters.

Each housing provides two 8-32 tapped mounting holes (M4 for - EC) centered on the detector surface for vertical or horizontal post mounting. The housings also feature external SM1 threading and internal SM05 threading that are compatible with most Thorlabs SM1 (1.035"-40)- and SM05 (0.535"-40)-threaded accessories. Additionally, an internally threaded SM1 coupler is included with each detector. This allows convenient mounting of SM1-compatible accessories, optics, and cage assembly accessories. The internal SM05 threading is only suitable for mating to an externally threaded SM05 lens tube (components such as fiber adapters cannot be threaded onto the SM05 threading). Most SM1-threaded fiber adapters are compatible with these detectors. However, the S120-FCinternally SM1-threaded fiber adapter is not compatible with these detectors. Externally SM1-threaded adapters should be mated to the included internally SM1-threaded adapter, while internally SM1-threaded adapters can be mated directly to the housing.

A ±12 VDC power supply is included with each photodetector. The power supply features a switch, supporting either 115 or 230 VAC input voltage. Due to limitations in the IC, the high-speed amplifier used in these devices may become unstable, exhibiting oscillations or negative output if the linear power supply voltage is applied when the module is on. The unit should always be powered up using the power switch on the power supply or the unit itself. Hot plugging the unit is not recommended. Additionally, inhomogeneities at the edges of the active area of the detector can generate unwanted capacitance and resistance effects that distort the time-domain response of the photodetector output. Thorlabs therefore recommends that the incident light on the photodetector be well centered on the active area. The SM1 (1.035"-40) threading on the housing is ideally suited for mounting a Ø1" focusing lens or pinhole in front of the detector element.

[Hide Specs]

SPECS

Performance Specifications

Item #	Detector Element	Active Area	Wavelength	Peak Response	Bandwidth	NEP Range[a]	Rise Time[b]
PDA50B	Ge	19.6 mm^2 (Ø5.0 mm)	800 - 1800 nm	0.85 A/W @ 1550 nm	DC - 460 kHz	1.68×10^{-12} - 4.96×10^{-11} W/$Hz^{1/2}$	N/A
PDA30B		7.0 mm^2 (Ø3.0 mm)	800 - 1800 nm	0.88 A/W @ 1550 nm	DC - 460 kHz	1.95×10^{-12} - 4.44×10^{-11} W/$Hz^{1/2}$	N/A

a. A noise equivalent power (NEP) range is given for switchable gain detectors.
b. Rise times depend on the chosen gain level and wavelength. As one increases the gain of a given optical amplifier, the bandwidth is reduced, and hence, the rise time increases. Please refer to the photodiode tutorial for information on calculating the rise time. Bandwidth specifications for each photodetector may be found in the table below.

Gain Specifications

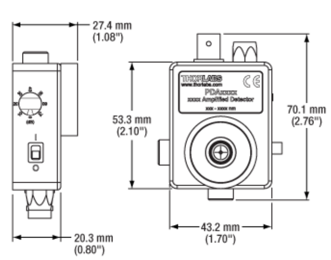
Item #	Gain Type	Gain Step (dB)	Gain w/ Hi-Z Load	Gain w/ 50 Ω Load	Bandwidth	Noise (RMS)	NEP at Peak Wavelength	Offset (±)	Output Voltage w/ Hi-Z Load	Output Voltage w/ 50 Ω Load
PDA50B[a]	Switchable	0	1.51 kV/A	0.75 kV/A	460 kHz	315 µV	3.41×10^{-11}W/$Hz^{1/2}$	15 mV (Typ.) 20 mV (Max)	0 - 10 V	0 - 5 V
		10	4.75 kV/A	2.38 kV/A	235 kHz	338 µV	1.75×10^{-11}W/$Hz^{1/2}$			
		20	15 kV/A	7.5 kV/A	97 kHz	320 µV	4.96×10^{-11}W/$Hz^{1/2}$			
		30	47.5 kV/A	23.8 kV/A	26 kHz	312 µV	1.49×10^{-11}W/$Hz^{1/2}$			
		40	151 kV/A	75 kV/A	7.3 kHz	323 µV	2.53×10^{-12}W/$Hz^{1/2}$			
		50	475 kV/A	238 kV/A	2.1 kHz	332 µV	1.68×10^{-12}W/$Hz^{1/2}$			
		60	1.5 MV/A	750 kV/A	705 Hz	376 µV	2.13×10^{-12}W/$Hz^{1/2}$			
		70	4.75 MV/A	2.38 MV/A	210 Hz	700 µV	4.63×10^{-12}W/$Hz^{1/2}$			
PDA30B[a]	Switchable	0	1.51 kV/A	0.75 kV/A	460 kHz	223 µV	4.44×10^{-11}W/$Hz^{1/2}$			
		10	4.75 kV/A	2.38 kV/A	230 kHz	240 µV	2.08×10^{-11}W/$Hz^{1/2}$			
		20	15 kV/A	7.5 kV/A	80 kHz	223 µV	9.87×10^{-12}W/$Hz^{1/2}$			
		30	47.5 kV/A	23.8 kV/A	20 kHz	220 µV	4.36×10^{-12}W/$Hz^{1/2}$			
		40	151 kV/A	75 kV/A	6.50 kHz	220 µV	3.10×10^{-12}W/$Hz^{1/2}$			
		50	475 kV/A	238 kV/A	2 kHz	220 µV	1.95×10^{-12}W/$Hz^{1/2}$			
		60	1.5 MV/A	750 kV/A	630 Hz	250 µV	4.79×10^{-12}W/$Hz^{1/2}$			
		70	4.75 MV/A	2.38 MV/A	200 Hz	500 µV	3.38×10^{-12}W/$Hz^{1/2}$			

a. This detector has a 50 Ω series terminator resistor (i.e., in series with the amplifier output). This forms a voltage divider with any load impedance (e.g., a 50 Ω load divides the signal in half).

Note: Gain figures can also be expressed in units of Ω.

[Hide Compact Design]

COMPACT DESIGN



PDA Series Design, scale in inches [mm].

Compact PDA Series Design

Thorlabs' Amplified Photodiode series features a slim design, which allows the detector access to the light path even between closely spaced optical elements.

The power supply input and the BNC output are located on the same outer edge of the package, further reducing the device thickness and allowing easier integration into tight optic arrangements. The Ge PDA detectors can fit into spaces as thin as 0.83" (21.1 mm) when the SM1 coupler is removed. With the SM1 coupler attached, the smallest width the detector can fit into is 1.03" (26.2 mm).

Additionally, the detectors have two tapped mounting holes perpendicular to each other so that the unit can be mounted in a horizontal or vertical orientation. This dual mounting feature offsets the fact that the cables protrude out the side of the package, thus requiring more free space above or alongside your beam path.

The switchable gain detectors feature an eight-position rotary gain switch (pictured below right) mounted on an outside edge perpendicular to the power supply and BNC output connections. The location of the gain switch allows for easy adjustments while the detector is mounted.

Hide Mounting Options

MOUNTING OPTIONS

GE PDA Amplified Photodetectors Mounting Options

The GE PDA amplified photodetectors are compatible with our entire line of lens tubes, TR series posts, and cage mounting systems. Because of the wide range of mounting options, the best method for mounting the housing in a given optical setup is not always obvious. The pictures and text in this tab will discuss some of the common mounting solutions. As always, our technical support staff is available for individual consultation.

		
Picture of a PDA series photodetector as it will look when unpackaged.	Picture of a DET series photodetector with the included SM1T1 and its retaining ring removed from the front of the housing. Thorlabs' PDA series photodetectors feature the same mounting options.	A close up picture of the front of the PDA10A photodetector. The internal SM1 threading on the SM1T1 adapter and internal SM05 threading on the photodetector housing can be seen in this image.

TR Series Post (Ø1/2" Posts) System

The PDA housing can be mounted vertically or horizontally on a TR Series Post using the 8-32 (M4) threaded holes.

DET series photodetector mounted vertically on a TR series post. In this configuration, the output and power cables (PDA series) are oriented vertically and away from the optic table, facilitating a neater optical setup.

PDA series photodetector mounted horizontally on a TR series post. In this configuration, the on/off switch is conveniently oriented on the top of the detector.

Lens Tube System

Each PDA housing includes a detachable Ø1" Optic Mount (SM1T1) that allows for Ø1" (Ø25.4 mm) optical components, such as optical filters and lenses, to be mounted along the axis perpendicular to the center of the photosensitive region. The maximum thickness of an optic that can be mounted in the SM1T1 is 0.1" (2.8 mm). For thicker Ø1" (Ø25.4 mm) optics or for any thickness of Ø0.5" (Ø12.7 mm) optics, remove the SM1T1 from the front of the detector and place (must be purchased separately) an SM1 or SM05 series lens tube, respectively, on the front of the detector.

The SM1 and SM05 threadings on the PDA photodetector housing make it compatible with our SM lens tube system and accessories. Two particularly useful accessories include the SM-threaded irises and the SM-compatible IR and visible alignment tools. Also available are fiber optic adapters for use with connectorized fibers.

DET series photodetector mounted onto an SM1L30C Ø1" Slotted Lens Tube, which is housing a focusing optic. The lens tube is attached to a 30 mm cage system via a CP02 SM1-Threaded 30 mm Cage Plate. This arrangement allows easy access for optic adjustment and signal alignment.

Cage System

The simplest method for attaching the PDA photodetector housing to a cage plate is to remove the SM1T1 that is attached to the front of the PDA when it is shipped. This will expose external SM1 threading that is deep enough to thread the photodetector directly to a CP02 30 mm cage plate. When the CP02 cage plate is tightened down onto the PDA photodetector housing, the cage plate will not necessarily be square with the detector. To fix this, back off the cage plate until it is square with the photodetector and then use the retaining ring included with the SM1T1 to lock the PDA photodetector into the desired location.

This method for attaching the PDA photodetector housing to a cage plate does not allow much freedom in determining the orientation of the photodetector; however, it has the benefit of not needing an adapter piece, and it allows the diode to be as close as possible to the cage plate, which can be important in setups where the light is divergent. As a side note, Thorlabs sells the SM05PD and SM1PD series of photodiodes that can be threaded into a cage plate so that the diode is flush with the front surface of the cage plate; however, the photodiode is unbiased.

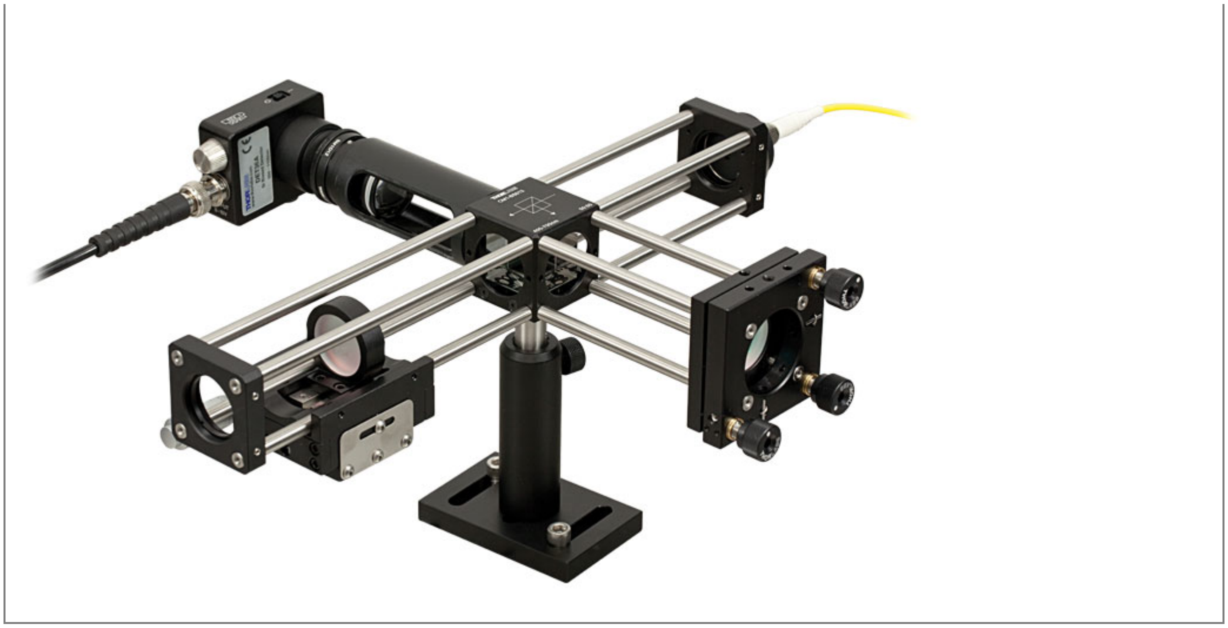
For more freedom in choosing the orientation of the PDA photodetector housing when attaching it, a SM1T2 lens tube coupler can be purchased. In this configuration the SM1T1 is left on the detector and the SM1T2 is threaded into it. The exposed external SM1 threading is now deep enough to secure the detector to a CP02 cage plate in any orientation and lock it into place using one of the two locking rings on the ST1T2.

	 
This picture shows a DET series photodetector attached to a CP02 cage plate after removing the SM1T1. The retaining ring from the SM1T1 was used to make the orientation of the detector square with the cage plate.	These two pictures show a DET series photodetector in a horizontal configuration. The top picture shows the detector directely coupled to a CP02cage plate. The bottom picture shows a DET series photodetector attached to a CP02 cage plate using an SM1T2 adapter in addition to the SM1T1 that comes with the PDA series detector.

Although not pictured here, the PDA photodetector housing can be connected to a 16 mm cage system by purchasing an SM05T2. It can be used to connect the PDA photodetector housing to an SP02 cage plate.

Application

The image below shows a Michelson Interferometer built entirely from parts available from Thorlabs. This application demonstrates the ease with which an optical system can be constructed using our lens tube, TR series post, and cage systems. A PDA series photodetector is interchangable with the DET series photodetector shown in the picture.



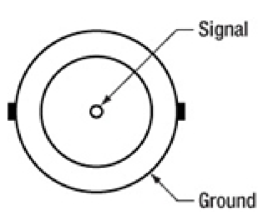
The table below contains a part list for the Michelson Interferometer for use in the visible range. Follow the links to the pages for more information about the individual parts.

Item #	Quantity	Description	Item #	Quantity	Description
KC1	1	Mirror Mount	CT1	1	1/2" Travel Translator
BB1-E02	2	Broadband Dielectric Laser Mirrors	SM1D12	1	SM1 Threaded Lens Tube Iris
ER4	8	4" Cage Rods	SM1L30C	1	SM1 3" Slotted Lens Tube
ER6	4	6" Cage Rods	SM1V05	1	Ø1" Adjustable Length Lens Tube
CCM1-BS013	1	Cube-Mounted Beamsplitter	CP08FP	1	30 mm Cage Plate for FiberPorts
BA2	1	Post Base (not shown in picture)	PAF-X-5-A	1	FiberPort
TR2	1	Ø1/2" Post, 2" in Length	P1-460B-FC-2	1	Single Mode Fiber Patch Cable
PH2	1	Ø1/2" Post Holder	DET36A / PDA36A	1	Biased / Amplified Photodiode Detector

Hide Pin Diagram

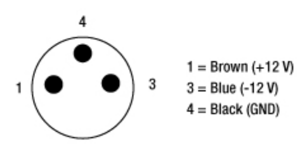
PIN DIAGRAM

BNC Female Output (Photodetector)

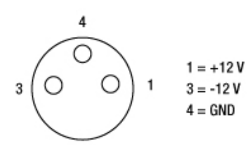


0 - 10 V Output

PDA Male (Power Cables)



PDA Female (Photodetector)



Hide Photodiode Tutorial

PHOTODIODE TUTORIAL

Photodiode Tutorial

Theory of Operation

A junction photodiode is an intrinsic device that behaves similarly to an ordinary signal diode, but it generates a photocurrent when light is absorbed in the depleted region of the junction semiconductor. A photodiode is a fast, highly linear device that exhibits high quantum efficiency based upon the application and may be used in a variety of different applications.

It is necessary to be able to correctly determine the level of the output current to expect and the responsivity based upon the incident light. Depicted in Figure 1 is a junction photodiode model with basic discrete components to help visualize the main characteristics and gain a better understanding of the operation of Thorlabs' photodiodes.

$$I_{OUT} = I_{DARK} + I_{PD}$$

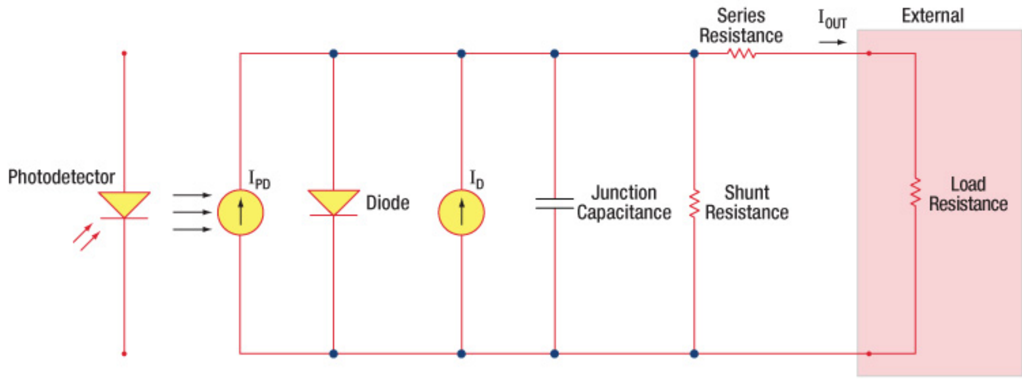


Figure 1: Photodiode Model

Photodiode Terminology

Responsivity
The responsivity of a photodiode can be defined as a ratio of generated photocurrent (I_{PD}) to the incident light power (P) at a given wavelength:

$$R(\lambda) = \frac{I_{PD}}{P}$$

Modes of Operation (Photoconductive vs. Photovoltaic)
A photodiode can be operated in one of two modes: photoconductive (reverse bias) or photovoltaic (zero-bias). Mode selection depends upon the application's speed requirements and the amount of tolerable dark current (leakage current).

Photoconductive
In photoconductive mode, an external reverse bias is applied, which is the basis for our DET series detectors. The current measured through the circuit indicates illumination of the device; the measured output current is linearly proportional to the input optical power. Applying a reverse bias increases the width of the depletion junction producing an increased responsivity with a decrease in junction capacitance and produces a very linear response. Operating under these conditions does tend to produce a larger dark current, but this can be limited based upon the photodiode material. (Note: Our DET detectors are reverse biased and cannot be operated under a forward bias.)

Photovoltaic
In photovoltaic mode the photodiode is zero biased. The flow of current out of the device is restricted and a voltage builds up. This mode of operation exploits the photovoltaic effect, which is the basis for solar cells. The amount of dark current is kept at a minimum when operating in photovoltaic mode.

Dark Current
Dark current is leakage current that flows when a bias voltage is applied to a photodiode. When operating in a photoconductive mode, there tends to be a higher dark current that varies directly with temperature. Dark current approximately doubles for every 10 °C increase in temperature, and shunt resistance tends to double for every 6 °C rise. Of course, applying a higher bias will decrease the junction capacitance but will increase the amount of dark current present.

The dark current present is also affected by the photodiode material and the size of the active area. Silicon devices generally produce low dark current compared to germanium devices which have high dark currents. The table below lists several photodiode materials and their relative dark currents, speeds, sensitivity, and costs.

Material	Dark Current	Speed	Spectral Range	Cost
Silicon (Si)	Low	High Speed	Visible to NIR	Low
Germanium (Ge)	High	Low Speed	NIR	Low
Gallium Phosphide (GaP)	Low	High Speed	UV to Visible	Moderate
Indium Gallium Arsenide (InGaAs)	Low	High Speed	NIR	Moderate
Indium Arsenide Antimonide (InAsSb)	High	Low Speed	NIR to MIR	High
Extended Range Indium Gallium Arsenide (InGaAs)	High	High Speed	NIR	High

Material	Dark Current	Speed	Spectral Range	Cost
Mercury Cadmium Telluride (MCT, HgCdTe)	High	Low Speed	NIR to MIR	High

Junction Capacitance

Junction capacitance (C_j) is an important property of a photodiode as this can have a profound impact on the photodiode's bandwidth and response. It should be noted that larger diode areas encompass a greater junction volume with increased charge capacity. In a reverse bias application, the depletion width of the junction is increased, thus effectively reducing the junction capacitance and increasing the response speed.

Bandwidth and Response

A load resistor will react with the photodetector junction capacitance to limit the bandwidth. For best frequency response, a 50 Ω terminator should be used in conjunction with a 50 Ω coaxial cable. The bandwidth (f_{BW}) and the rise time response (t_r) can be approximated using the junction capacitance (C_j) and the load resistance (R_{LOAD}):

$$f_{BW} = 1 / (2 * \pi * R_{LOAD} * C_j)$$
$$t_r = 0.35 / f_{BW}$$

Noise Equivalent Power

The noise equivalent power (NEP) is the generated RMS signal voltage generated when the signal to noise ratio is equal to one. This is useful, as the NEP determines the ability of the detector to detect low level light. In general, the NEP increases with the active area of the detector and is given by the following equation:

$$NEP = \frac{Incident\ Energy * Area}{\frac{S}{N} * \sqrt{\Delta f}}$$

Here, S/N is the Signal to Noise Ratio, Δf is the Noise Bandwidth, and Incident Energy has units of W/cm^2. For more information on NEP, please see Thorlabs' Noise Equivalent Power White Paper.

Terminating Resistance

A load resistance is used to convert the generated photocurrent into a voltage (V_{OUT}) for viewing on an oscilloscope:

$$V_{OUT} = I_{OUT} * R_{LOAD}$$

Depending on the type of the photodiode, load resistance can affect the response speed. For maximum bandwidth, we recommend using a 50 Ω coaxial cable with a 50 Ω terminating resistor at the opposite end of the cable. This will minimize ringing by matching the cable with its characteristic impedance. If bandwidth is not important, you may increase the amount of voltage for a given light level by increasing R_{LOAD}. In an unmatched termination, the length of the coaxial cable can have a profound impact on the response, so it is recommended to keep the cable as short as possible.

Shunt Resistance

Shunt resistance represents the resistance of the zero-biased photodiode junction. An ideal photodiode will have an infinite shunt resistance, but actual values may range from the order of ten Ω to thousands of MΩ and is dependent on the photodiode material. For example, and InGaAs detector has a shunt resistance on the order of 10 MΩ while a Ge detector is in the kΩ range. This can significantly impact the noise current on the photodiode. For most applications, however, the high resistance produces little effect and can be ignored.

Series Resistance

Series resistance is the resistance of the semiconductor material, and this low resistance can generally be ignored. The series resistance arises from the contacts and the wire bonds of the photodiode and is used to mainly determine the linearity of the photodiode under zero bias conditions.

Common Operating Circuits

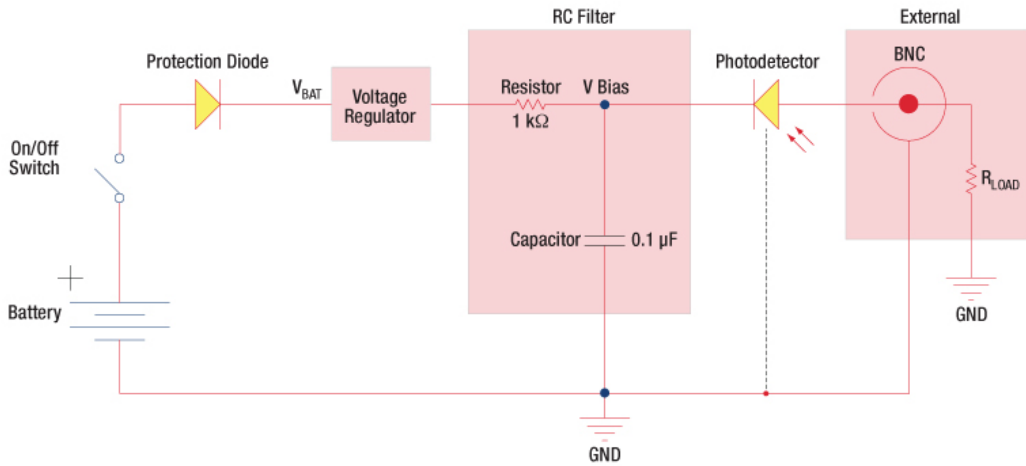


Figure 2: Reverse-Biased Circuit (DET Series Detectors)

The DET series detectors are modeled with the circuit depicted above. The detector is reverse biased to produce a linear response to the applied input light. The amount of photocurrent generated is based upon the incident light and wavelength and can be viewed on an oscilloscope by attaching a load resistance on the output. The function of the RC filter is to filter any high-frequency noise from the input supply that may contribute to a noisy output.

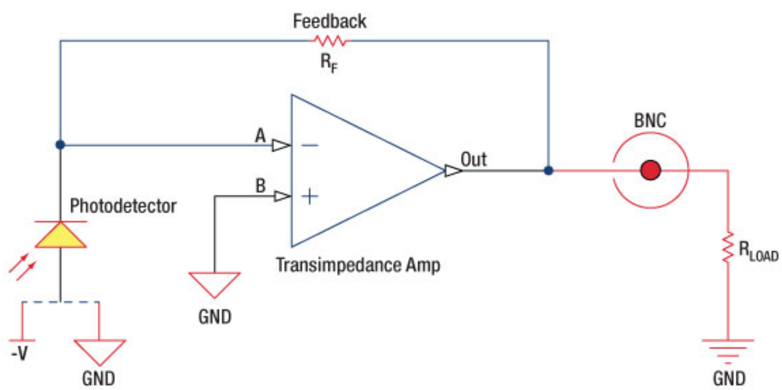


Figure 3: Amplified Detector Circuit

One can also use a photodetector with an amplifier for the purpose of achieving high gain. The user can choose whether to operate in Photovoltaic of Photoconductive modes. There are a few benefits of choosing this active circuit:

- Photovoltaic mode: The circuit is held at zero volts across the photodiode, since point A is held at the same potential as point B by the operational amplifier. This eliminates the possibility of dark current.
- Photoconductive mode: The photodiode is reversed biased, thus improving the bandwidth while lowering the junction capacitance. The gain of the detector is dependent on the feedback element (R_f). The bandwidth of the detector can be calculated using the following:

$$f(-3dB) = \sqrt{\frac{GBP}{4\pi * R_f * C_D}}$$

where GBP is the amplifier gain bandwidth product and C_D is the sum of the junction capacitance and amplifier capacitance.

Effects of Chopping Frequency

The photoconductor signal will remain constant up to the time constant response limit. Many detectors, including PbS, PbSe, HgCdTe (MCT), and InAsSb, have a typical 1/f noise spectrum (i.e., the noise decreases as chopping frequency increases), which has a profound impact on the time constant at lower frequencies.

The detector will exhibit lower responsivity at lower chopping frequencies. Frequency response and detectivity are maximized for

$$f_c = \frac{1}{2\pi\tau_r}$$

Hide Cross Reference

CROSS REFERENCE

The following table lists Thorlabs' selection of photodiodes and photoconductive detectors. Item numbers in the same row contain the same detector element.

Photodetector Cross Reference						
Wavelength	**Material**	**Unmounted Photodiode**	**Unmounted Photoconductor**	**Mounted Photodiode**	**Biased Detector**	**Amplified Detector**
150 - 550 nm	GaP	FGAP71	-	SM05PD7A	DET25K(/M)	PDA25K(-EC)
200 - 1100 nm	Si	FDS010	-	SM05PD2A SM05PD2B	DET10A(/M)	PDA10A(-EC)
	Si	-	-	SM1PD2A	-	-
320 - 1100 nm	Si	-	-	-	-	PDA8A(/M)
	Si	FD11A	-	SM05PD3A	-	PDF10A(/M)
340 - 1100 nm	Si	-	-	-	-	PDA100A(-EC)
	Si	FDS10X10	-	-	-	-
350 - 1100 nm	Si	FDS100 FDS100-CAL [a]	-	SM05PD1A SM05PD1B	DET36A(/M)	PDA36A(-EC)
	Si	FDS1010 FDS1010-CAL [a]	-	SM1PD1A SM1PD1B	DET100A(/M)	
400 - 1000 nm	Si	-	-	-	-	PDA015A(/M) FPD510-FV FPD310-FV FPD310-FC-VIS FPD510-FC-VIS FPD610-FC-VIS FPD610-FS-VIS
400 - 1100 nm	Si	FDS015 [b]	-	-	-	-
	Si	FDS025 [b] FDS02 [c]	-	-	DET02AFC(/M) DET025AFC(/M) DET025A(/M) DET025AL(/M)	-
400 - 1700 nm	Si & InGaAs	DSD2	-	-	-	-
500 - 1700 nm	InGaAs	-	-	-	DET10N(/M)	-
750 - 1650 nm	InGaAs	-	-	-	-	PDA8GS
800 - 1700 nm	InGaAs	FGA015	-	-	-	PDA015C(/M)
	InGaAs	FGA21 FGA21-CAL [a]	-	SM05PD5A	DET20C(/M)	PDA20C(/M) PDA20CS(-EC)
	InGaAs	FGA01 [b] FGA01FC [c]	-	-	DET01CFC(/M)	-
	InGaAs	FDGA05 [b]	-	-	-	PDA10CF(-EC)
	InGaAs	-	-	-	DET08CFC(/M) DET08C(/M) DET08CL(/M)	PDF10C(/M)
800 - 1800 nm	Ge	FDG03 FDG03-CAL [a]	-	SM05PD6A	DET30B(/M)	PDA30B(-EC)
	Ge	FDG50	-	-	DET50B(/M)	PDA50B(-EC)
	Ge	FDG05	-	-	-	-
800 - 2600 nm	InGaAs	-	-	-	DET05D(/M)	-
		-	-	-	DET10D(/M)	-
850 - 1650 nm	InGaAs	-	-	-	-	FPD510-F
900 - 1700 nm	InGaAs	FGA10	-	SM05PD4A	DET10C(/M)	PDA10CS(-EC)
900 - 2600 nm	InGaAs	FD05D	-	-	-	-
		FD10D	-	-	-	-

Photodetector Cross Reference						
Wavelength	Material	Unmounted Photodiode	Unmounted Photoconductor	Mounted Photodiode	Biased Detector	Amplified Detector
950 - 1650 nm	InGaAs	-	-	-	-	FPD310-FC-NIR FPD310-FS-NIR FPD510-FC-NIR FPD610-FC-NIR FPD610-FS-NIR
1.0 - 2.9 µm	PbS	-	FDPS3X3	-	-	PDA30G(-EC)
1.0 - 5.8 µm	InAsSb	-	-	-	-	PDA10PT(-EC)
1.2 - 2.6 µm	InGaAs	-	-	-	-	PDA10D(-EC)
1.5 - 4.8 µm	PbSe	-	FDPSE2X2	-	-	PDA20H(-EC)
2.0 - 5.4 µm	HgCdTe (MCT)	-	-	-	-	PDA10JT(-EC)
2.0 - 8.0 µm	HgCdTe (MCT)	VML8T0 VML8T4 [d]	-	-	-	PDAVJ8
2.0 - 10.6 µm	HgCdTe (MCT)	VML10T0 VML10T4 [d]	-	-	-	PDAVJ10
2.7 - 5.0 µm	HgCdTe (MCT)	VL5T0	-	-	-	-

a. Calibrated Unmounted Photodiode
b. Unmounted TO-46 Can Photodiode
c. Unmounted TO-46 Can Photodiode with FC/PC Bulkhead
d. Photovoltaic Detector with Thermoelectric Cooler

Hide Amplified Ge Photodetectors: NIR Wavelengths

Amplified Ge Photodetectors: NIR Wavelengths

Item #	PDA50B	PDA30B
Click Image to Enlarge[a]		
Detector Element (Click for Image)	Ge	Ge
Wavelength Range	800 - 1800 nm	800 - 1800 nm
Responsivity Curve	 Raw Data	 Raw Data
Active Area	19.6 mm^2 (Ø5.0 mm)	7.0 mm^2 Ø3.0 mm
Gain	8 x 10 dB Steps	8 x 10 dB Steps
Bandwidth Range	DC - 460 kHz	DC - 460 kHz
Noise Equivalent Power (NEP)	$1.68 \times 10^{-12} - 4.96 \times 10^{-11}$ W/Hz$^{1/2}$	$1.95 \times 10^{-12} - 4.44 \times 10^{-11}$ W/Hz$^{1/2}$

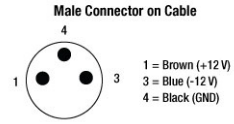
a. Both photodetectors are shown with the included SM1T1 Internal SM1 Adapter attached.

Part Number	Description	Price	Availability
PDA50B-EC	Ge Switchable Gain Detector, 800-1800 nm, 460 kHz BW, 19.6 mm^2, M4 Taps	$535.50	Today
PDA30B-EC	Ge Switchable Gain Detector, 800-1800 nm, 460 kHz BW, 7.0 mm^2, M4 Taps	$492.66	Lead Time
PDA50B	Ge Switchable Gain Detector, 800-1800 nm, 460 kHz BW, 19.6 mm^2, 8-32 Taps	$535.50	Today
PDA30B	Ge Switchable Gain Detector, 800-1800 nm, 460 kHz BW, 7.0 mm^2, 8-32 Taps	$492.66	Today

Hide PDA Power Supply Cable

PDA Power Supply Cable

The PDA-C-72 power cord is offered for the PDA line of amplified photodetectors when using with a power supply other than the one included with the detector. The cord has tinned leads on one end and a PDA-compatible 3-pin connector on the other end. It can be used to power the PDA series of amplified photodetectors with any power supply that provides a DC voltage. The pin descriptions are shown to the right.

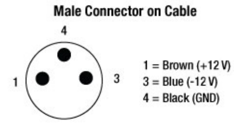


Part Number	Description	Price	Availability
PDA-C-72	72" PDA Power Supply Cable, 3-Pin Connector	$19.89	Today

Hide 12 VDC Regulated Power Supply

12 VDC Regulated Power Supply

- Replacement Power Supply for the PDA and PDF Amplified Photodetectors Sold Above
- ±12 VDC Power Output
- Current Limit Enabling Short Circuit and Overload Protection
- On/Off Switch with LED Indicator
- Switchable AC Input Voltage (115 or 230 VAC)
- 6.6 ft (2 m) Cable with LUMBERG RSMV3-657/2M Male Connector
- UL and CE Compliant



The LDS1212 ±12 VDC Regulated Linear Power Supply is intended as a replacement for the supply that comes with our PDA and PDF line of amplified photodetectors sold on this page. The cord has three pins: one for ground, one for +12 V, and one for -12 V (see diagram above). This power supply ships with a location-specific power cord and the voltage switch is set to the proper setting for your location before it is shipped. This power supply can also be used with our PDB series of balanced photodetectors, our PMM series of photomultiplier modules, our APD series of avalanche photodetectors, and our dichroic atomic vapor spectroscopy systems.

Part Number	Description	Price	Availability
LDS1212	±12 VDC Regulated Linear Power Supply, 6 W, 115/230 VAC	$80.33	Lead Time

Hide Internally SM1-Threaded Fiber Adapters

Internally SM1-Threaded Fiber Adapters

These internally SM1-threaded (1.035"-40) adapters mate connectorized fiber to any of our externally SM1-threaded components, including our photodiode power sensors, our thermal power sensors, and our photodetectors. These adapters are compatible with the housing of the photodetectors on this page.

Item #	S120-SMA	S120-ST	S120-SC	S120-LC
Click Image to Enlarge				
Fiber Connector Type[a]	SMA	ST	SC	LC
Thread	Internal SM1 (1.035"-40)			

a. Other Connector Types Available upon Request

Part Number	Description	Price	Availability
S120-SMA	SMA Fiber Adapter Cap with Internal SM1 (1.035"-40) Thread	$39.78	Today
S120-ST	ST/PC Fiber Adapter Cap with Internal SM1 (1.035"-40) Thread	$39.78	3-5 Days
S120-SC	SC/PC Fiber Adapter Cap with Internal SM1 (1.035"-40) Thread	$49.98	Today
S120-LC	LC/PC Fiber Adapter Cap with Internal SM1 (1.035"-40) Thread	$49.98	Today

Hide Externally SM1-Threaded Fiber Adapters

Externally SM1-Threaded Fiber Adapters

- Externally SM1-Threaded (1.035"-40) Disks with FC/PC, FC/APC, SMA, or ST/PC Receptacle
- Light-Tight When Used with SM1 Lens Tubes
- Compatible with Many of Our 30 mm Cage Plates and Photodetectors

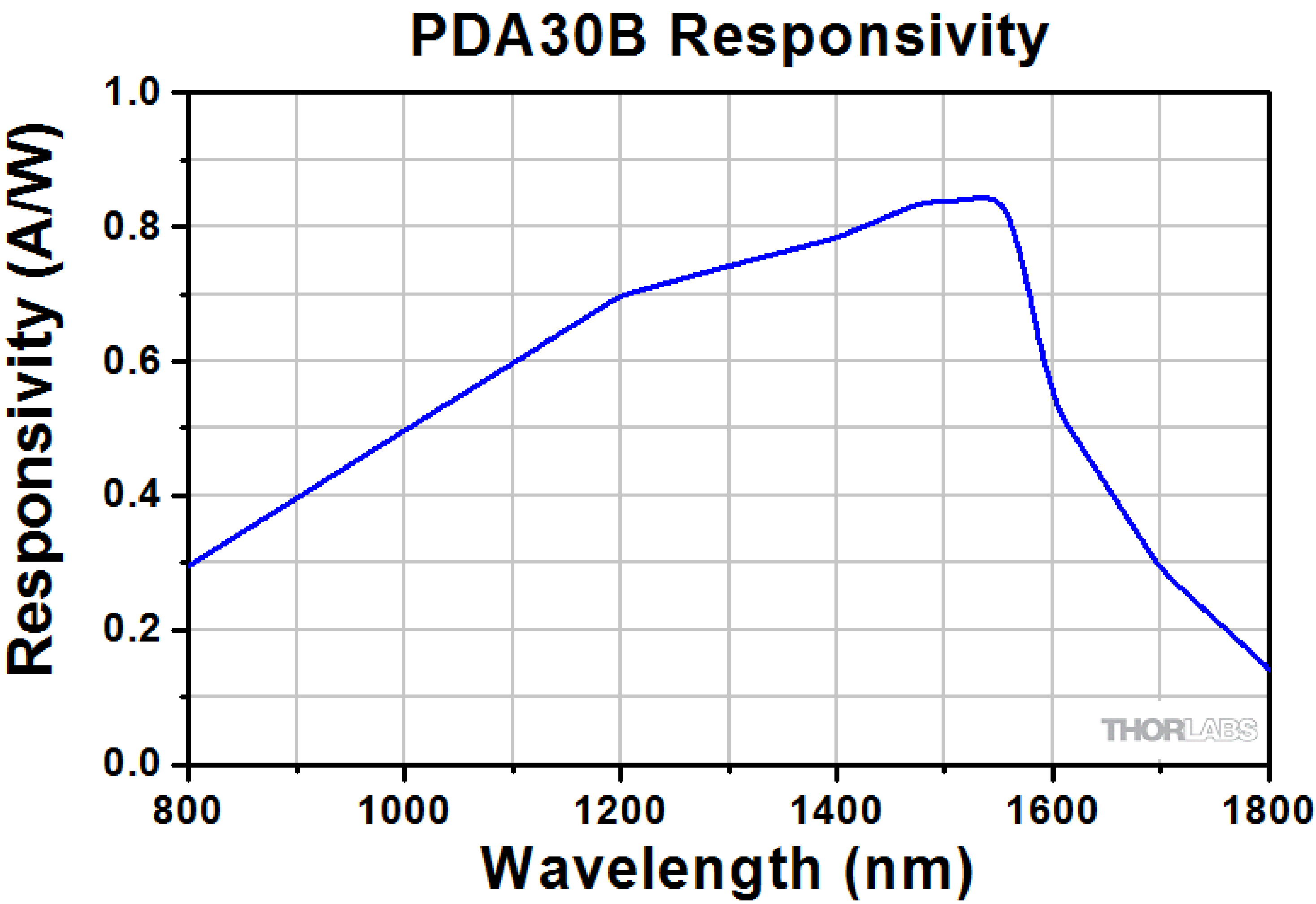
Each disk has four dimples, two in the front surface and two in the back surface, that allow it to be tightened from either side with the SPW909 or SPW801 spanner wrench. The dimples do not go all the way through the disk so that the adapters can be used in light-tight applications when paired with SM1 lens tubes. Once the adapter is at the desired position, use an SM1RR retaining ring to secure it in place.

Item #	SM1FC	SM1FCA[a]	SM1SMA	SM1ST
Adapter Image (Click the Image to Enlarge)				

				
Connector Type	FC/PC	FC/APC	SMA	ST/PC
Threading	External SM1 (1.035"-40)			

a. Please note that the SM1FCA has a mechanical angle of only 4°, even though the standard angle for these connectors is 8°. There is a 4° angle of deflection caused by the glass-air interface; when combined with the 4° mechanical angle, the output beam is aligned perpendicular to the adapter face.

Part Number	Description	Price	Availability
SM1FC	**FC/PC Fiber Adapter Plate with External SM1 (1.035"-40) Thread**	**$29.58**	**3-5 Days**
SM1FCA	**FC/APC Fiber Adapter Plate with External SM1 (1.035"-40) Thread**	**$31.37**	**Lead Time**
SM1SMA	**SMA Fiber Adapter Plate with External SM1 (1.035"-40) Thread**	**$29.58**	**Today**
SM1ST	**ST/PC Fiber Adapter Plate with External SM1 (1.035"-40) Thread**	**$28.42**	**Today**


PDA30B Responsivity
Responsivity (A/W)
1.0
0.8
0.6
0.4
0.2
0.0
800
1000
1200
1400
1600
1800
Wavelength (nm)
THORLABS


OUTPUT
0-10V
THORLABS
www.thorlabs.com
PDA30B
Ge Amplified Detector
800 - 1800nm