

PDA8A Operating Manual - Silicon Amplified Detector

Description:

The PDA8A is a wideband amplified, silicon detector designed for detection of light signals from DC to 50 MHz. A buffered output drives a 50 Ω input impedance up to 1.8 volts. The ultra-low noise design includes an active low-pass filter to prevent aliasing effects and to suppress out of band noise effectively.

The PDA8A housing includes a removable threaded coupler that is compatible with any number of Thorlabs 1" and ½" threaded accessories. This allows convenient mounting of external optics, light filters and apertures, as well as providing an easy mounting mechanism using the Thorlabs cage assembly accessories. The PDA8A has three 8-32 (M4 for /M-version) tapped mounting hole with a 0.25" mounting depth and includes a power supply.

Specifications:

Electrical	
Detector	Silicon
Active Area	Ø0.8mm (0.5 mm ²)
Response	320 – 1000 nm
Peak Response	0.56 A/W @ 820 nm
Small Signal Bandwidth	DC – 50 MHz
NEP	6.5 pW/√Hz
Noise (RMS)	1.8 mV
Dark Offset	±10 mV (max.)
Output Voltage	
Hi-Z	0 to 3.6V
50 Ω	0 to 1.8V
Transimpedance Gain	
Hi-Z	100 kV/A

	50 Ω	50 kV/A
General		
On / Off Switch	Slide	
Output	BNC	
Optical Head Size	2.8" x 1.9" x 0.83" 70mm x 48 mm x 21mm	
Weight	60 grams	
Storage Temp	-25 to 70°C	
Operating Temp	10 to 50	
AC Power Supply	AC – DC Converter	
Input Power	100 VAC, 120VAC; 230 VAC 50-60 Hz, 6W	

1. The small signal bandwidth was measured with output amplitude of 200mV and a dc offset of 200mV, driving a 50 Ω load termination.
2. All measurements performed with 50 Ω load unless stated otherwise.

Setup

- Unpack the optical head, install a Thorlabs TR-series ½" diameter post into one of the 8-32 (M4 on - Metric version) tapped holes, located on the bottom and side of the sensor, and mount into a PH-series post holder.
- Switch the power supply to your local main voltage (100 VAC, 120 VAC, or 230 VAC)



Figure 1: Switchable power supply for 100 V, 120 VAC, or 230 V

- Connect the power supply 3-pin plug into the mating receptacle on the PDA8A.
- Plug the power supply into a outlet
- Attach a 50 Ω coax cable (i.e. RG-58U) to the output of the PDA. When running cable lengths longer than 12" we recommend terminating the opposite end of the coax with a 50 Ω resistor (Thorlabs p/n T4119) for maximum performance.

Operation

- The PDA8A is switched on by the 'POWER' Slide switch, located on the side wall of the optical sensor.
- The light to voltage conversion can be estimated by factoring the wavelength-dependent responsivity of the Silicon detector with the transimpedance gain as shown below:

$$\text{output (V/W)} = \text{transimpedance gain (V/A)} \times \text{responsivity (A/W)}$$

- The maximum output of the PDA8A is 3.6V for high impedance loads (1.8V for 50Ω loads). The output signal should be below the maximum output voltage to avoid saturation. If necessary, use external neutral density filters to reduce the input light level.
- For maximum linearity performance when measuring focused beams, fiber outputs, or small diameter beams, do not exceed a maximum intensity of 10mW/cm².
- Because of the finite gain-bandwidth performance common to all amplifier circuits, the bandwidth of the PDA8A decreases with increased output signal levels.

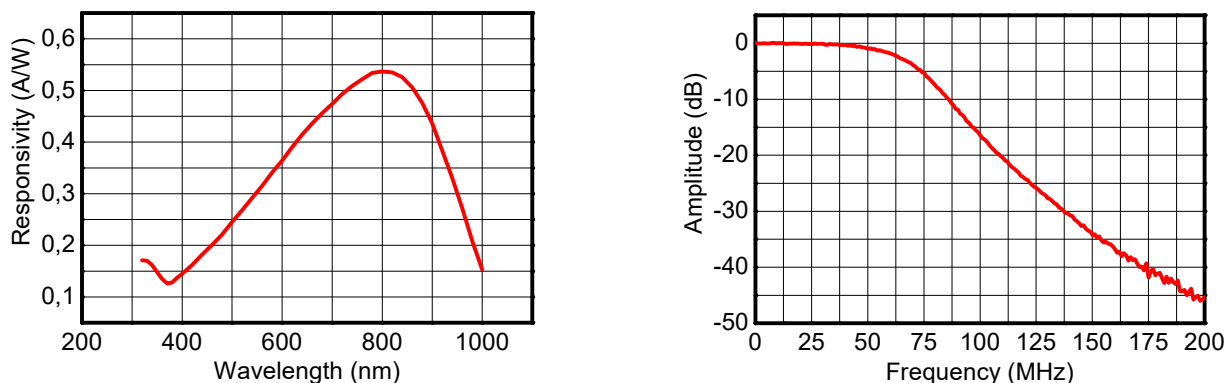


Figure 2: PDA8A Spectral Responsivity and Frequency Response

Fiber Adapters and Other Accessories

Thorlabs sells a number of accessories that are compatible with the 1" and ½" threads on the PDA housing including FC, SMA, and ST fiber adapters, stackable lens tubes for mounting optics, and cage assemblies that allow the PDA to be incorporated into elaborate 3-D optical assemblies.

Maintaining the PDA8A

There are no serviceable parts in the PDA8A optical head or power supply. The housing may be cleaned by wiping with a soft damp cloth. The window of the detector should only be cleaned using optical grade wipes. If you suspect a problem with your PDA8A please call Thorlabs and an engineer will be happy to assist you.

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Certifications and compliances

Certifications and compliances

Category	Standards or description	
EC Declaration of Conformity – EMC	Meets intent of Directive 2004/108/EC ¹ for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:	
	EN 61326-1:2006	Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements – Part 1: General Requirements: Immunity: complies with basic immunity test requirements ² . Emission: complies with EN 55011 Class B Limits ^{2,3} IEC 61000-3-2 and IEC 61000-3-3.
	IEC 61000-4-2	Electrostatic Discharge Immunity (Performance Criterion A)
	IEC 61000-4-3	Radiated RF Electromagnetic Field Immunity (Performance Criterion A)
	IEC 61000-4-4	Electrical Fast Transient / Burst Immunity (Performance Criterion A)
FCC EMC Compliance	Emissions comply with the Class B Limits of FCC Code of Federal Regulations 47, Part 15, Subpart B ^{2,3} .	
EC Declaration of Conformity - Low Voltage	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Communities: Low Voltage Directive 2006/95/EC ⁴	
	EN 61010-1:2001	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements
U.S. Nationally Recognized Testing Laboratory Listing	UL 61010-1 2 nd ed.	
	ISA-82.02.01 2 nd ed.	
Canadian Certification	CAN/CSA C22.2 No. 61010-1 2 nd ed.	
Additional Compliance	IEC 61010-1:2001	
Equipment Type	Test and measuring	
Safety Class	Class I equipment (as defined in IEC 60950-1:2001)	

¹ Replaces 89/336/EEC.

² Compliance demonstrated using high-quality shielded interface cables shorter than or equal to 3 meters.

³ Emissions, which exceed the levels required by these standards, may occur when this equipment is connected to a test object.

⁴ Replaces 73/23/EEC, amended by 93/68/EEC.

WEEE

As required by the WEEE (Waste Electrical and Electronic Equipment Directive) of the European Community and the corresponding national laws, Thorlabs offers all end users in the EC the possibility to return “end of life” units without incurring disposal charges.

This offer is valid for Thorlabs electrical and electronic equipment

- sold after August 13th 2005
- marked correspondingly with the crossed out “wheelie bin” logo (see fig. 2)
- sold to a company or institute within the EC
- currently owned by a company or institute within the EC
- still complete, not disassembled and not contaminated

As the WEEE directive applies to self contained operational electrical and electronic products, this “end of life” take back service does not refer to other Thorlabs products, such as

- pure OEM products, that means assemblies to be built into a unit by the user (e. g. OEM laser driver cards)
- components
- mechanics and optics
- left over parts of units disassembled by the user (PCB's, housings etc.).

If you wish to return a Thorlabs unit for waste recovery, please contact Thorlabs or your nearest dealer for further information.

Waste treatment on your own responsibility

If you do not return an “end of life” unit to Thorlabs, you must hand it to a company specialized in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.

Ecological background

It is well known that WEEE pollutes the environment by releasing toxic products during decomposition. The aim of the European RoHS directive is to reduce the content of toxic substances in electronic products in the future. The intent of the WEEE directive is to enforce the recycling of WEEE. A controlled recycling of end of live products will thereby avoid negative impacts on the environment.

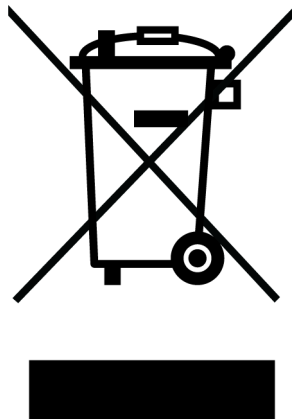
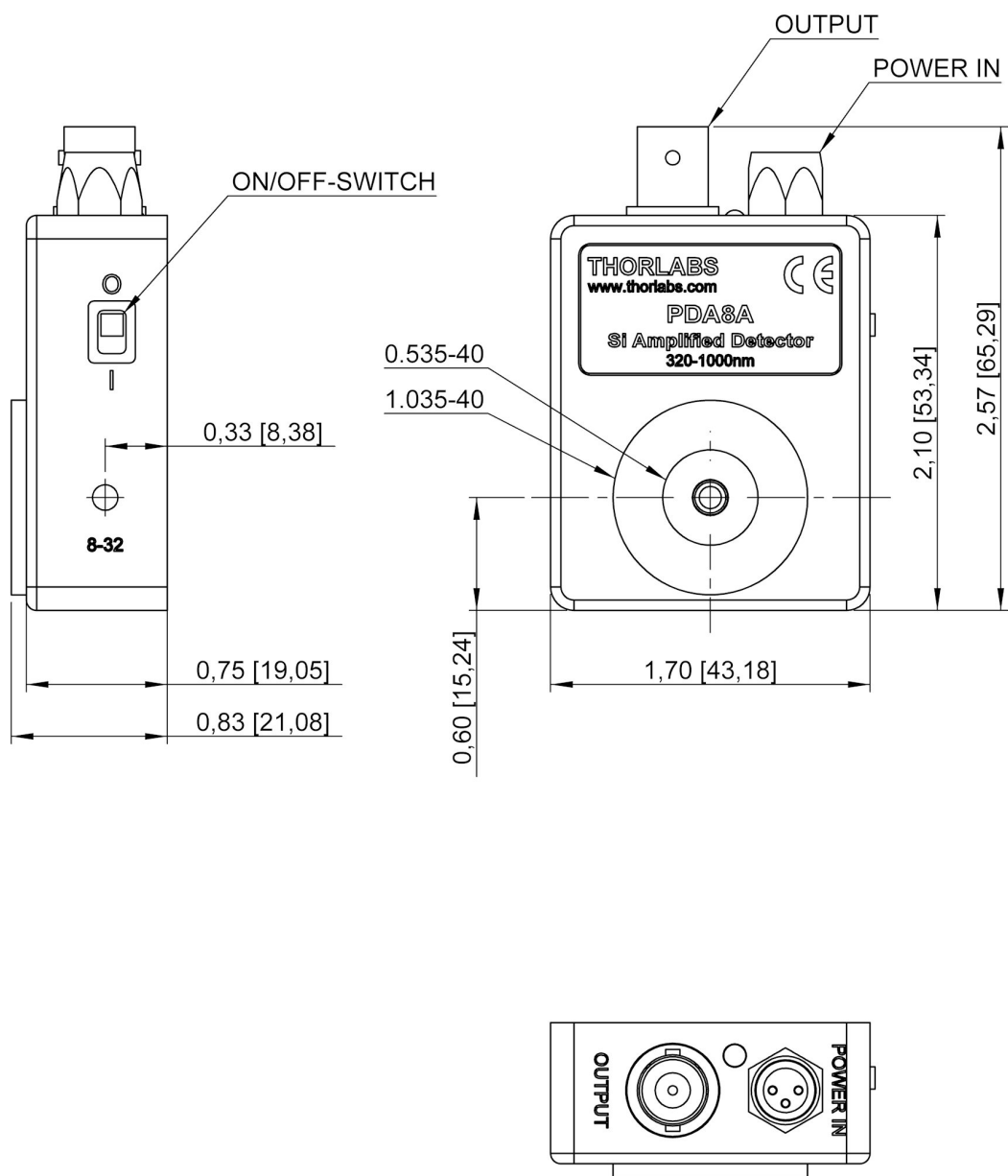


Figure 3: Crossed out “wheelie bin” symbol



Mechanical drawing
Unit inch [mm]
PDA8A
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