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PDA255 Operating Manual - High Speed Amplified InGaAs Detector

Description:

The PDA255 is a high speed amplified, InGaAs detector designed for detection of light signals from DC to 50 MHz. A buffered output drives 50Ω input impedances up to 5 volts. The PDA255 housing includes a removable threaded coupler that is compatible with any number of Thorlabs 1" 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 PDA255 has an 8-32 tapped mounting hole with a 0.25" mounting depth and includes a 120VAC AC/DC power supply. The PDA255-EC has a M4 tapped mounting hole and includes a 230VAC AC/DC power supply.

Specifications:

Electrical:	
Detector	InGaAs
Active Area	0.8mm^2 (∅1.0 mm)
Response	700 to 1800 nm
Peak Response	0.95 A/W @ 1500 nm
Small Signal Bandwidth[1]	50MHz (min.)
NEP (1650 nm)	3 x 10^{-11} W/√Hz (max.)
Noise (RMS)	2.0mV (max.)
Dark Offset	20mV (max.)
Output Voltage(50Ω)	0 to 5V
Output voltage	0 to 10V
Transimpedance Gain	1 x 10^4 V/A (5 x 10^3 V/A with a 50Ω terminator)

General:	
On / Off Switch	Toggle
Output	BNC
Damage Threshold	100mW CW
	0.5J/cm^2 10ns PW
Optical Head Size[2]	ϕ1.425" x 1.45"
Weight	60 grams
Accessories	SM1T1 Coupler
Storage Temp	-25 to 70°C
Operating Temp	10 to 50°C
AC Power Supply	AC - DC Converter
Input Power	100-120VAC, (220-240VAC -EC version) 50-60Hz, 5W

1: The small signal bandwidth was measured with an output amplitude of 200mV and a dc offset of 200mV, driving a 50Ω load termination.
2: Newer PDA's have a smaller package diameter to easily fit into Thorlabs cage plate assemblies. Also note that the length includes the SM1T1 mounting adapter and the BNC / power switch.

Setup:

- Unpack the optical head, install a Thorlabs TR-series ½" diameter post into the 8-32 (M4 on -EC version) tapped hole on the bottom of the head, and mount into a PH-series post holder.
- Connect the power supply 5-pin DIN plug into the mating receptacle on the PDA255.
- Plug the power supply into a 50-60Hz, 100-120VAC outlet (220-240VAC for -EC version).
- Attach a 50Ω 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 50Ω resistor (Thorlabs p/n T4119) for maximum performance.

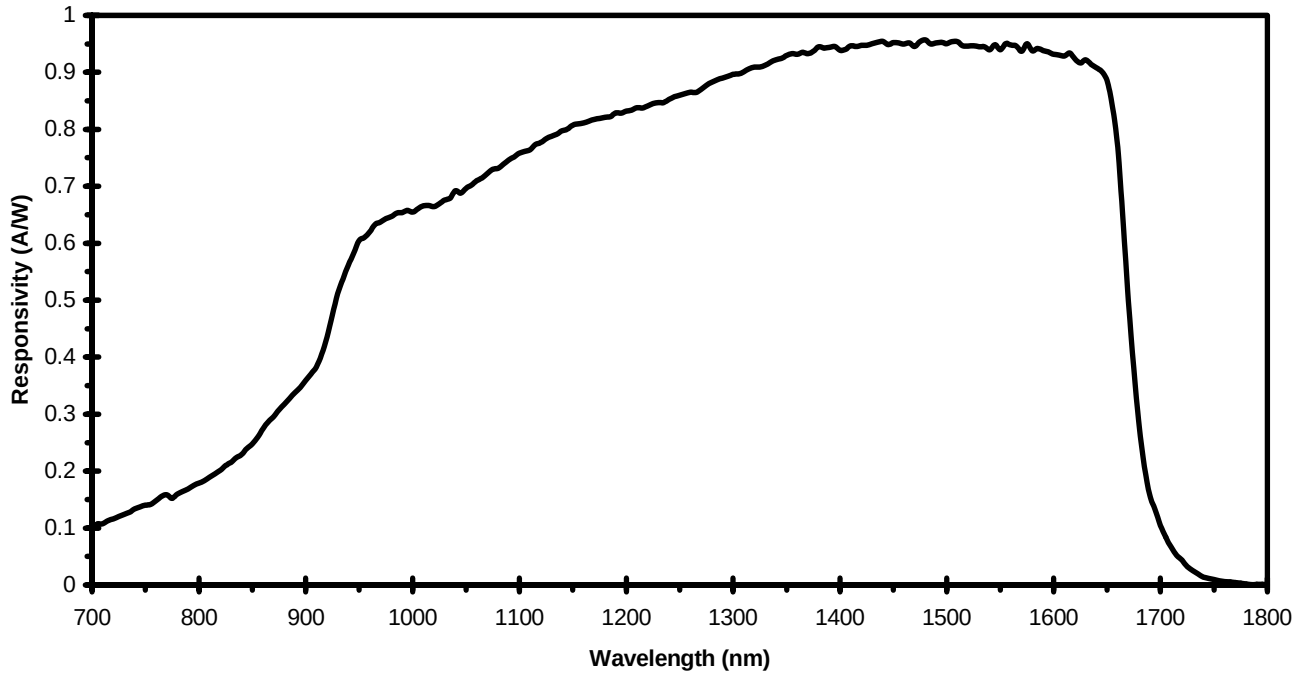
Operation:

- The PDA255 is switched on by the POWER toggle switch on the rear of the head.
- The light to voltage conversion can be estimated by factoring the wavelength-dependent responsivity of the InGaAs detector with the transimpedance gain:

  (E.g. output in volts / watt = transimpedance gain (V/A) x responsivity (A/W))

- The maximum output of the PDA255 is 10 volts for high impedance loads (5V 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/cm^2.
- Because of the finite gain-bandwidth performance common to all amplifier circuits, the bandwidth of the PDA255 goes down with increased output signal levels.

Figure 1 - PDA255 Spectral Responsivity Curve



Fiber Adapters and Other Accessories

Thorlabs sells a number of accessories that are compatible with the 1" thread 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.

Caution: The PDA255 was designed to allow maximum accessibility to the photodetector by having the front surface of the diode extend outside of the PDA housing. When using fiber adapters, make sure that the fiber ferrule does not crash into the detector. Failure to do so may cause damage to the diode and / or the fiber. An easy way to accomplish this is to install a SM1RR retaining ring (included with the PDA255) inside the 1" threaded coupler *before* installing the fiber adapter.

Also available in the PDA series are Silicon, switchable gain InGaAs and switchable gain silicon models.

Maintaining the PDA255

There are no serviceable parts in the PDA255 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 PDA255 please call Thorlabs and an engineer will be happy to assist you.

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. 1)
- 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.

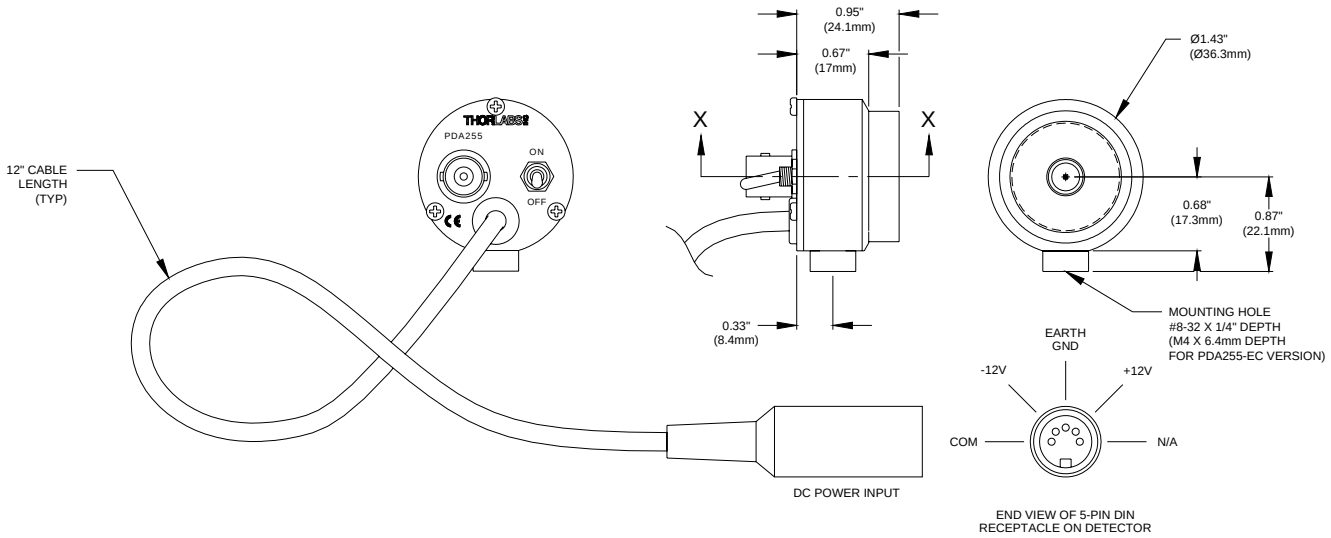
Waste treatment on your own responsibility
If you do not return an “end of life” unit to Thorlabs, you must hand it to a company specialized in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.

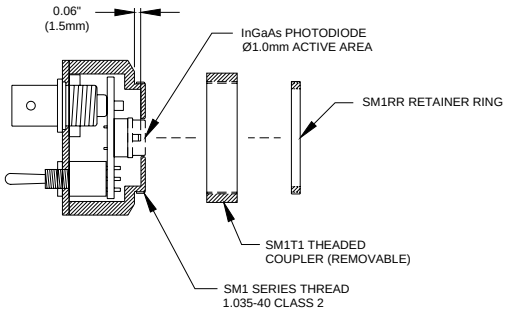
Ecological background
It is well known that WEEE pollutes the environment by releasing toxic products during decomposition. The aim of the European RoHS directive is to reduce the content of toxic substances in electronic products in the future.
The intent of the WEEE directive is to enforce the recycling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



Crossed out “wheelie bin” symbol

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CROSS SECTION VIEW X-X

INFORMATION ONLY, NOT FOR MANUFACTURING

THORLABS INC			PO BOX 366 NEWTON NJ
TITLE: FIXED GAIN AMPLIFIED InGaAs SENSOR			
TOL: X.XXX=+/-0.005 X.XX=+/-0.010 ANGULAR +/-30'			
SURF. FINISH: 32 MICROINCHES UNLESS OTHERWISE NOTED			
DRAWN: EC	ENGINEER: EC	APPROVED: EC	
MATERIAL: PDA255			
DATE: 3/31/98	REV: B	SIZE: B	SHEET: 1 OF 1
DRAWING SCALE: 1" = 1"			
DWG NO.: 2240-E01	PART NO.: PDA255		

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