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# THORLABS

## FPD510 - Nov 15, 2017

Item # FPD510 was discontinued on Nov 15, 2017. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### INGAAS FAST PIN AMPLIFIED PHOTODETECTORS

- ▶ High Signal-to-Noise Ratio
- ▶ Ultrafast up to 9.5 GHz
- ▶ Free-Space or Fiber-Coupled InGaAs Photodetectors
- ▶ Wavelength Ranges Between 750 - 1650 nm



FPD510-F



PDA8GS

[Hide Overview](#)

#### OVERVIEW

##### Features

- Built-in Amplifier
- OEM Package with FC/APC Connector, FC Bulkhead, or Free Space Module
- Small Package Allows Easy Mounting
- Minimum Recommended Load Resistor: 50  $\Omega$

Thorlabs' fast PIN amplified photodetectors offer a fast response with high signal-to-noise ratios. These fast response detectors are ideal for detection of fast laser pulses, low-light level signals, or chopped light sources. The FPD510 series photodetectors offer either fiber or free space coupling. They require a user-supplied external power supply (see below for more details). The PDA8GS has an FC bulkhead connector, which is compatible with both FC/PC and FC/APC connectors and is available fiber coupled, the power supply is included.

##### PDA8GS

The PDA8GS is a versatile, high-speed, amplified photodetector designed to perform in a wide range of test and measurement applications involving fast optical signals. The unit incorporates a high-performance InGaAs PIN photodiode coupled with a transimpedance amplifier that has a gain of 460 V/A into 50  $\Omega$  with data rates up to 12.5 Gb/s. The wide bandwidth makes it ideal for evaluating pulsed laser and high-frequency modulation applications. Communication applications include 10 Gb Ethernet, OC192, and analog satellite microwave systems. This model exhibits linear performance across the input range, yielding low analog distortion. A 12 VDC, 750 mA power adapter is included with the PDA8GS.



Click to Enlarge  
 Application idea for the PDA8GS 9.5 GHz amplified

**FPD510 & FPD510-F**

Menlo Systems' FPD510 series of high sensitivity PIN photodetectors are optimized for the highest signal-to-noise ratio when detecting low-level optical beat signals at frequencies up to 250 MHz. The unit is recommended, in particular, for applications in metrology when beat signals of weak power have to be detected in a highly efficient way. The FPD510 photodetectors feature ultrafast fiber-coupled (FPD510) or free-space (FPD510-F) photoreceivers with an integrated low-noise transimpedance amplifier. The 3 dB bandwidth of the DC-coupled device is 200 MHz. The compact design of these detectors allows for easy OEM integration.

**Power Supply for FPD Series Detectors**

The FPD510 series detectors do not come with a power supply. For best performance, we recommend using a linear regulated power supply or a battery. Thorlabs' LDS9 is a suitable power supply that can be wired by the customer to operate these detectors. As can be seen in the drawings for these detectors, a pin and ground are provided for soldering a power supply to the detector. When connecting a power supply, please note the polarity of the supply. A switched power supply is not recommended as it may introduce switching noise in the output signal.

[Hide Specs](#)
**S P E C S**

Item #	PDA8GS
Material	InGaAs
Bandwidth	DC - 9.5 GHz
Wavelength Range	750 - 1650 nm
Fiber Input	62.5 $\mu$ m Core Multimode Fiber
Input Connector <sup>a</sup>	FC Bulkhead
Output, 700 mV (Max) <sup>b</sup>	SMA - 50 $\Omega$
Peak Response, SM (Typ.)	0.95 A/W @ 1550 nm
Peak Response, MM (Typ.)	0.525 A/W @ 850 nm
Transimpedance Gain	460 V/A into 50 $\Omega$
Max Optical Power (CW) <sup>b</sup>	1.0 mW
Max Peak Power (Pulsed) <sup>b</sup>	20 mW <sup>c</sup>
Rise Time	<50 ps
Fall Time	<50 ps
Dark Current	-
NEP (Max)	N/A
Junction Capacitance	N/A
Housing Dimensions	3.0" x 2.38" x 1.1" (76.2 mm x 60.45 mm x 27.94 mm)

- Compatible with both FC/PC and FC/APC connectors.
- Damage to the photodiode may occur if these maximum ratings are exceeded.
- Do not hold peak optical power for longer than a 60 ms burst.

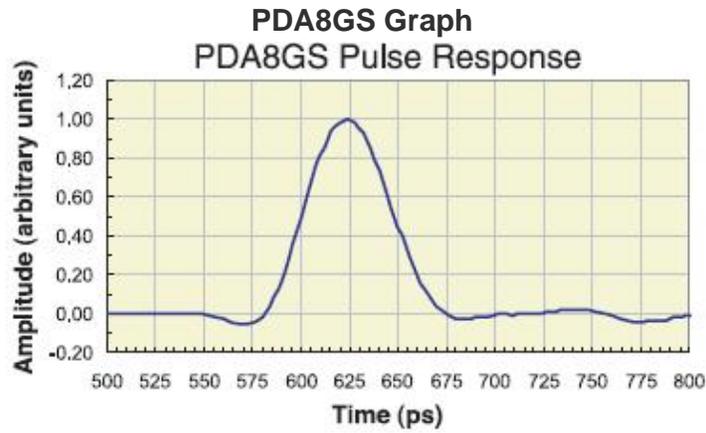
Item #	FPD510	FPD510-F
Optical Input	Fiber <sup>a</sup>	Free-Space
Supply Voltage (Power Supply Not Included)	+8 to +20 V	
Current Consumption	50 mA	
Max. Incident Power	10 mW	
Operating Temperature	10 to 40 °C	
Wavelength Range <sup>b</sup>	850 - 1650 nm	

Detector Diameter	-	0.3 mm
Frequency Range	0 to 250 MHz	
3 dB Bandwidth	0 to 200 MHz	
Rise Time	2 ns	
Gain Setting 1 <sup>c</sup>	4 x 10 <sup>4</sup> V/W	
Gain Setting 2 <sup>c</sup>		
Dark State Noise Level <sup>d</sup>	-120 dBm	
NEP (Calculated)	3.0 pW/(Hz <sup>1/2</sup> )	3.2 pW/(Hz <sup>1/2</sup> )
Output Connector	SMA	
Output Impedance	50 Ω	
Device Dimensions	60 mm x 50 mm x 26.5 mm (2.36" x 1.97" x 1.04")	
Output Coupling	DC	

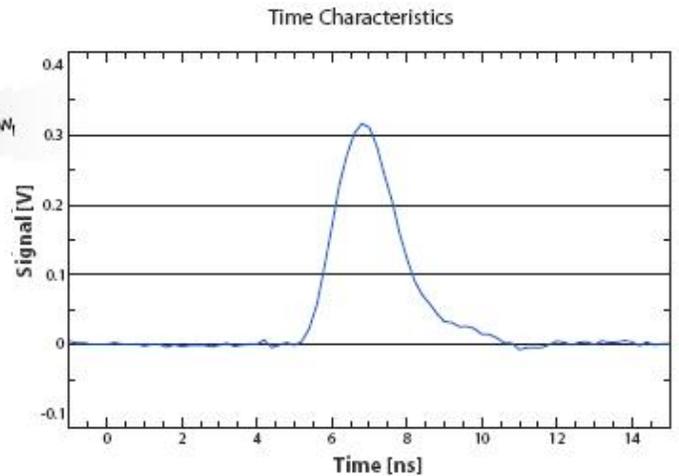
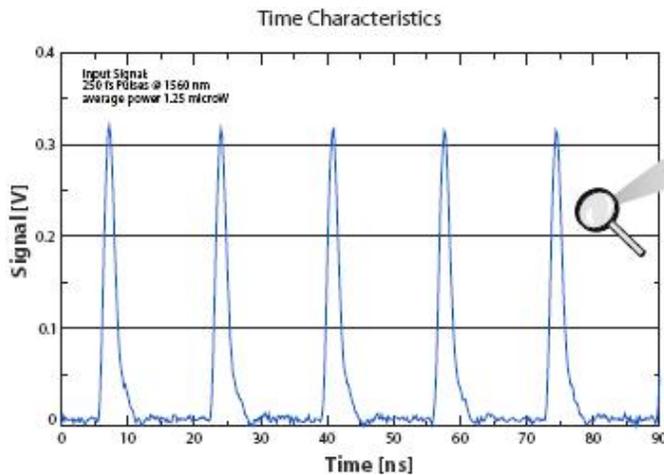
- SMF-28e Pigtail with FC/APC
- Other Spectral Ranges Available on Request
- At 1 GHz, 1500 nm/750 nm
- Span: 5 MHz, Resolution Bandwidth 3 kHz

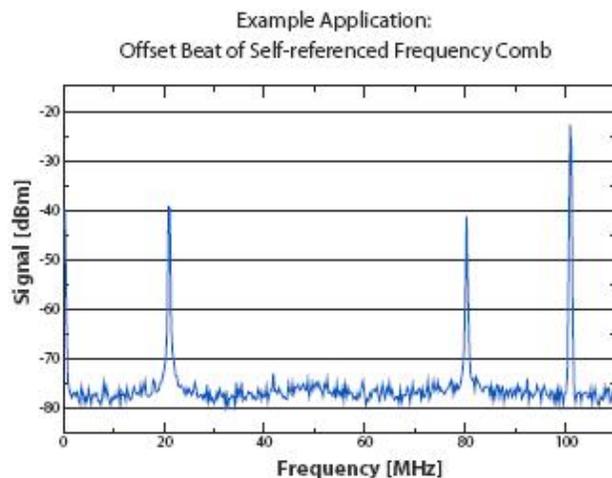
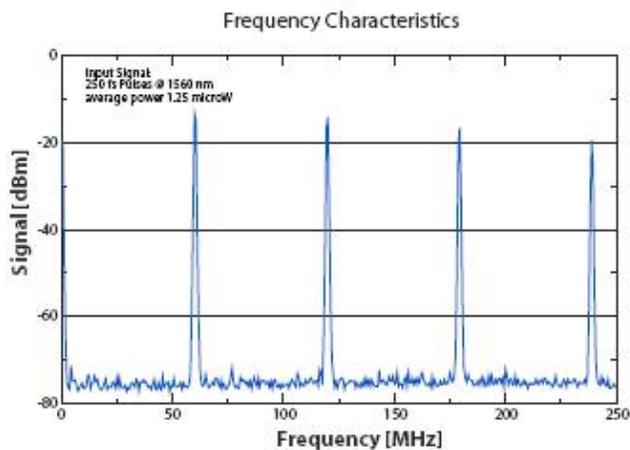
[Hide Graphs](#)

GRAPHS



**FPD510 & FPD510-F Graphs**

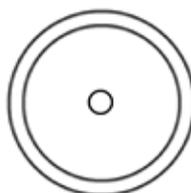




[Hide Pin Diagram](#)

PIN DIAGRAM

Signal Out - SMA Female



For connection to a suitable monitoring device, e.g. oscilloscope or RF-spectrum-analyzer, with 50 Ω impedance.

[Hide InGaAs Amplified Photodetectors](#)

**InGaAs Amplified Photodetectors**

Part Number	Description	Price	Availability
PDA8GS	High-Sensitivity PIN Detector, 750 - 1650 nm, Fiber Coupled, 9.5 GHz (Power Supply Included)	\$4,170.00	Today
FPD510	High-Sensitivity PIN Detector, 850 - 1650 nm, Fiber Coupled, DC - 250 MHz	\$1,399.00	Lead Time
FPD510-F	High-Sensitivity PIN Detector, 850 - 1650 nm, Free Space, DC - 250 MHz	\$1,399.00	Today

Visit the *InGaAs Fast PIN Amplified Photodetectors* page for pricing and availability information:

[https://www.thorlabs.com/newgroupage9\\_pf.cfm?guide=10&category\\_id=77&objectgroup\\_id=6687](https://www.thorlabs.com/newgroupage9_pf.cfm?guide=10&category_id=77&objectgroup_id=6687)