# FPD510

## High Sensitivity Fast PIN Photodetector

MenloSystems


The high sensitivity ultrafast PIN photodetector FPD510 product family is optimized for highest signal-to-noise-ratio for detection of low level optical beat signals and pulse shape at frequencies up to 250 MHz.
These photodetectors are easy-to-use Si- or InGaAs-PIN photodiode packages with an integrated high-gain, low-noise transimpedance amplifier.
The 3 dB bandwidth of the DC-coupled device is 200 MHz.
Models for both visible and near infrared range are available, both with either free space or fiber coupled optical input. The compact design of these detectors allows for easy OEM integration. Included with each amplified photodetector is a low noise power supply, which features a universal AC input.
The units are especially recommended for applications e.g. in metrology and optical lock techniques when homodyne or heterodyne optical beat signals of weak power have to be detected and amplified in a highly efficient way.

### KEY SPECIFICATIONS

- Frequency Range DC-250 MHz
- Spectral Sensitivity from 400-1000 nm or 950-1650 nm
- 3 dB Bandwidth DC-200 MHz
- Rise Time below 2 ns

### APPLICATIONS

- Efficient Homodyne and Heterodyne Extraction of Optical Beat Signals at Frequencies up to 250 MHz
- Detection of Low Light Level Signals
- Characterization of Pulsed or Modulated Light Sources Features
- Detection of Chopped Light Sources

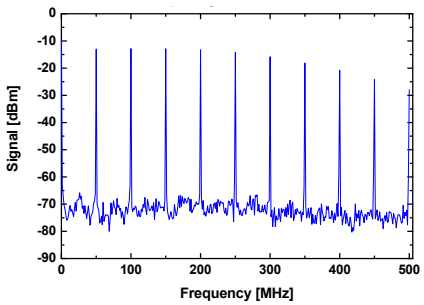
### FEATURES

- Highest Signal-to-Noise Ratio with true DC
- Flat Spectral Response (less than 3 dB up to 200 MHz)
- OEM Integration
- Fiber Coupled or Free Space Optical Input
- Integrated Low Noise Transimpedance Amplifier
- Easy-to-use Package
- Low Noise Power Supply included

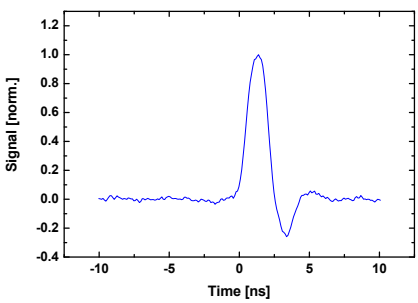
## FPD510

Response to a pulse train with sub 250 fs pulses at 1560 nm and 5 µW optical average power:

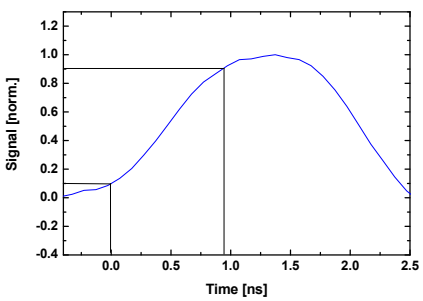
**Frequency Characteristics**




**Time Characteristics**




**Rise Time**



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## High Sensitivity Fast PIN Photodetector

### SPECIFICATIONS

| FPD510 | -FC-VIS | -FS-VIS | -FC-NIR | -FS-NIR |
|---|---|---|---|---|
| Detector Type | Si | Si | InGaAs | InGaAs |
| Optical Input | fiber coupled: FC/PC connector | free space | fiber coupled: SMF28 pigtail with FC/APC | free space |
| Spectral Range | 400-1000 nm | 400-1000 nm | 950-1650 nm | 950-1650 nm |
| Saturation Limit | <100 µW | <100 µW | <100 µW | <100 µW |
| Damage Threshold | 3 mW | 3 mW | 3 mW | 3 mW |
| Detector Diameter | 0.25 mm | 0.4 mm | - | 0.3 mm |
| Frequency Range | DC-250 MHz | DC-250 MHz | DC-250 MHz | DC-250 MHz |
| 3 dB Bandwidth | DC-200 MHz | DC-200 MHz | DC-200 MHz | DC-200 MHz |
| Rise Time | 2 ns | 2 ns | 2 ns | 2 ns |
| Max. Gain | $1.5 \times 10^5$ $V_{Peak\text{-}Peak}/W_{Input}$ | $1.5 \times 10^5$ $V_{Peak\text{-}Peak}/W_{Input}$ | $1.5 \times 10^5$ $V_{Peak\text{-}Peak}/W_{Input}$ | $1.5 \times 10^5$ $V_{Peak\text{-}Peak}/W_{Input}$ |
| Dark State Noise Level not integrated (up to 5 MHz / 5-250 MHz) | -110 dBm /√Hz/ -135 dBm /√Hz | -110 dBm /√Hz/ -135 dBm /√Hz | -110 dBm /√Hz/ -135 dBm /√Hz | -110 dBm /√Hz/ -135 dBm /√Hz |
| NEP (calculated) | 6.4 pW/√Hz | 6.0 pW/√Hz | 3.0 pW/√Hz | 3.2 pW/√Hz |
| Output Impedance | 50 Ω | 50 Ω | 50 Ω | 50 Ω |
| Output Coupling | DC | DC | DC | DC |
| Output Signal | 0-1 V | 0-1 V | 0-1 V | 0-1 V |
| Output Connector | SMA female | SMA female | SMA female | SMA female |
| Supply Voltage | +12 V / -12 V | +12 V / -12 V | +12 V / -12 V | +12 V / -12 V |
| Max. Current Consumption | 50 mA / 20 mA | 50 mA / 20 mA | 50 mA / 20 mA | 50 mA / 20 mA |
| Operating Temperature | 10-40 °C | 10-40 °C | 10-40 °C | 10-40 °C |
| Storage Temperature | -20 to +85 °C | -20 to +85 °C | -20 to +85 °C | -20 to +85 °C |
| Storage Humidity (RH= relativ humidity) | 10-90 % RH | 10-90 % RH | 10-90 % RH | 10-90 % RH |
| Device Dimensions | 60 x 50 x 20 mm³ | 60 x 50 x 20 mm³ | 60 x 50 x 20 mm³ | 60 x 50 x 20 mm³ |

### ORDERING INFORMATION

| | | | | |
|---|---|---|---|---|
| **Product Code** | FPD510-FC-VIS | FPD510-FS-VIS | FPD510-FC-NIR | FPD510-FS-NIR |
| **Price** | 1600 EUR | 1600 EUR | 1600 EUR | 1600 EUR |

Prices and specifications are subject to change without notice. Custom modifications are available, please inquire.


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