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High-Sensitivity Avalanche Photodetectors

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Features

- High-Speed Response up to 1 GHz
- 100 Step Adjustable Gain
- 400 - 1000 nm and 850 - 1650 nm Wavelength Ranges Available
- Internal SM05 Threads for Lens Tube and Cage Assembly Integration

Applications

- Detection of Fast Laser Pulses
- For Beat Signals of Low-Level Inputs
- LIDAR (Light Detection and Ranging)
- Testing of Optical Components



Menlo Systems' Avalanche Photodetector (APD) series provides an extremely light-sensitive alternative to traditional PIN photodiodes. The APDs are sensitive and fast enough for the characterization of pulsed lasers on the order of nanoseconds. The silicon avalanche photodiode of the APD210 provides exceptional performance for low-light applications in the 400 - 1000 nm range, while the APD310 covers the InGaAs range of 850 - 1650 nm. The APD maintains high-gain stability over the operating temperature range by utilizing a temperature-compensation circuit, which adjusts the ~150 VDC bias to ensure operation near the breakdown voltage.

A 40 dB gain amplifier is integrated into the package and is AC-coupled to band the output BNC. The output is matched to 50 Ω impedance. The detector has an electronic width of 1 MHz to 1 GHz and offers a user-accessible potentiometer providing 100 step gain adjustment. The APD series has SM05 threads for easy integration into Thorlabs' entire family of lens tubes and cage assemblies. The bottom of the detector has a metric (M4) mounting hole and an M4 to 8-32 adapter for post mounting. The compact packaging allows the APD to be substituted directly into an existing setup while maintaining a small footprint on the benchtop. A location-specific power adapter is included with the detector; contact tech support for more information.

These photodetectors are not suitable for pulses longer than 30 ns or continuous light levels. Please see the [FPD510 series](#) for alternatives.

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<input type="text" value="0"/>	 APD210 - High-Speed Avalanche Detector, 3 dB BW: 5 - 1000 MHz, 400 - 1000 nm	\$2,079.00	✓ 3-5 Days
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	APD210	APD310
Optical Input	Free Space*	
Supply Voltage	12 - 15 V**	
Current Consumption	200 mA	
Incident Power (Max)	10 mW	
Operating Temperature	10 - 40 °C	
Spectral Range	400 - 1000 nm	850 - 1650 nm
Detector Diameter	0.5 mm	0.03 mm
Frequency Range (Max)	1 - 1600 MHz	1 - 1800 MHz
3 dB Bandwidth	5 - 1000 MHz	
Rise Time	500 ps	
Gain (Max)***	2.5 x 10 ⁵ V/W @ 1 GHz, 800 nm	2.5 x 10 ⁴ V/W @ 1 GHz, 1500 nm
Gain Step Size	2500 V/W @ 1 GHz, 800 nm	250 V/W @ 1 GHz, 1500 nm
Dark State Noise Level†	-80 dBm	
NEP (calculated)‡	0.4 pW/ (Hz ^{1/2})	2 pW/ (Hz ^{1/2})
Output Impedance	50 Ω	
Output Connector	BNC	BNC
Output Coupling	AC	
Device Dimensions	60 mm x 56 mm x 47.5 mm	

* With adapter for Thorlabs' SM05 Mount
 ** Power supply included with adapters for EU/USA. Please contact us to request a different adapter.
 *** Gain Adjustable via Push Buttons
 † This is a measure of the noise when no light is incident on the detector's photosensitive area. Span: 5 MHz, Resolution Bandwidth: 3 kHz
 ‡ The noise-equivalent power is a measure of the detector's minimum detectable power per square root of bandwidth. Since this value only depends on the detector itself, it can be used to compare two detectors that do not have the same integration time. The smaller the NEP value, the better the detector.

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- Feedback
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Click the Documents Icon () or Part Number below to view the available support documentation

Part Number	Product Description	Part Number	Product Description
LDS12B	: ±12 VDC Regulated Linear Power Supply, 6 W, 100/120/230 VAC	SM1FC	: FC/PC Fiber Adapter Plate with External SM1 (1.035"-40) Threads, Wide Key (2.2 mm)
PDA30B2	: Ge Switchable Gain Amplified Detector, 800 - 1800 nm, 590 kHz BW, 7.1 mm ² , Universal 8-32 / M4 Mounting Holes	SM1FC2	: FC/PC Fiber Adapter Plate with External SM1 (1.035"-40) Threads, Narrow Key (2.0 mm)
PDA50B2	: Ge Switchable Gain Amplified Detector, 800 - 1800 nm, 510 kHz BW, 19.6 mm ² , Universal 8-32 / M4 Mounting Holes	SM1FCA	: FC/APC Fiber Adapter Plate with External SM1 (1.035"-40) Threads, Wide Key (2.2 mm)
PDA-C-72	: 72" PDA Power Supply Cable, 3-Pin Connector	SM1FCA2	: FC/APC Fiber Adapter Plate with External SM1 (1.035"-40) Threads, Narrow Key (2.0 mm)
S120-APC	: FC/APC Fiber Adapter Cap with Internal SM1 (1.035"-40) Threads, Wide Key (2.2 mm)	SM1FCV	: Vacuum-Compatible FC/PC Fiber Adapter Plate with External SM1 (1.035"-40) Threads, Wide Key (2.2 mm)
S120-APC2	: FC/APC Fiber Adapter Cap with Internal SM1 (1.035"-40) Threads, Narrow Key (2.0 mm)	SM1LC	: LC/PC Fiber Adapter Plate with External SM1 (1.035"-40) Threads
S120-LC	: LC/PC Fiber Adapter Cap with Internal SM1 (1.035"-40) Threads	SM1SC1	: SC/PC Fiber Adapter Plate with External SM1 (1.035"-40) Threads
S120-SC	: SC/PC Fiber Adapter Cap with Internal SM1 (1.035"-40) Threads	SM1SMA	: SMA Fiber Adapter Plate with External SM1 (1.035"-40) Threads
S120-SMA	: SMA Fiber Adapter Cap with Internal SM1 (1.035"-40) Threads	SM1SMAV	: Vacuum-Compatible SMA Fiber Adapter Plate with External SM1 (1.035"-40) Threads
S120-ST	: ST/PC Fiber Adapter Cap with Internal SM1 (1.035"-40) Threads	SM1ST	: ST/PC Fiber Adapter Plate with External SM1 (1.035"-40) Threads

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