Fiber Coupled High-Speed InGaAs APD Photodiode

(900 to 1600nm, up to 10 GHz)

DATASHEET

BUY NOW

The Fiber Coupled High-Speed InGaAs APD Photodiode is based on an InGaAs Avalanche photodiode and provides fast pulse response up to 10Gb/s NRZ rates. In an APD, the absorbed photons create electron-hole pairs, which are then accelerated by a strong electric field in the multiplication region under a higher bias voltage. This acceleration causes secondary ionizations, leading to an avalanche effect, which amplifies the signal. Compared with PIN, APD photodetectors have higher sensitivity and gain with a much higher output current for the same incident light power. However, APD has higher noise than PIN photodetectors. APD photodetectors are suited to applications requiring high sensitivity and detection of weak signals, such as LIDAR and certain types of spectroscopy. Our design minimizes component assembly costs and module footprint while increasing stability over wide temperature and wavelength ranges.

Applications

- Lidar
- RF over Fiber
- Sensor
- Instruments

Features

- High Gain
- Large Bandwidth
- Fast Response
- High Reliability

Specifications

Parameter	Min	Typical	Max	Unit
Wavelength	1000		1630	nm
Responsivity (1550nm)	0.75	0.85		A/W
Input Power	-26		-5	dBm
Conversion Gain (Small Signal)	12000			V/W
Dark Current (3V Bias)		50	500	nA
Detector Capacitance		0.2	0.8	pF
Optical Back Reflection	40			dB
Operation Voltage	20	40	50	V
Operation Bandwidth (NRZ Rate)		10		GHz
Bandwidth (3dB S21)		8		GHz
Character (S22)		-7		dB
Group Delay		50		ps
RF Connector (50 om)		SMA		
Operating Temperature	-5		+75	°C
Storage Temperature	-40		+85	°C
Reliability		Telcordia 1209 and 1221		

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link]:

Warning: **The device is extremely ESD-sensitive. Its dark current increases by unprotected handling. It is recommended to be handled under a certified ion fan once the package is removed.**

Rev 07/31/24

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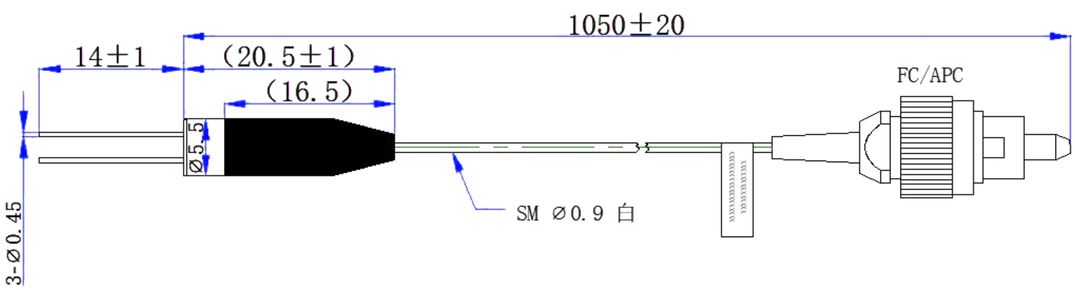
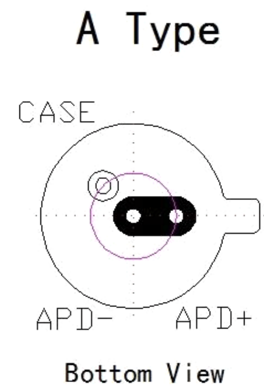
Mechanical Dimensions (mm)

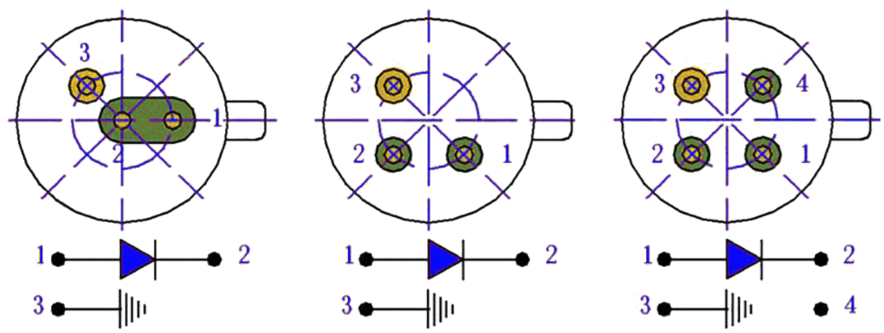




Standard Package for Infrared Band. For other wavelength band, size may vary due to special detector configurations.

*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

PD PIN Assignments



Type A   Type B   Type C

Optical and Electrical Characteristics (Tc=25°C)

Parameter	Symbol	Min	Typical	Max	Unit	Test condition
Operating Wavelength	λ	1100	-	1650	nm	
Reverser Breakdown Voltage	Vbr	40	-	50	V	Id =10μA, φe=0μW
Responsivity	R	0.70	0.75	-	A/W	λ=1310nm, φe=1μw, M=1
Multiplication factor	M	10	-	-	-	Vr=Vbr-3V, λ=1310nm, φe=1uW
Dark Current	Id	-	-	10	nA	VR=Vbr-3, φe=0μW
Capacitance	C	-	-	0.5	pF	Vr=Vbr-3, f=1MHz
Bandwidth	BW	2.0	-	-	GHz	VR=Vbr-3, RL=50Ω, λ=1550nm
Optical Return Loss	RL	40			dB	λ=1310nm

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Typical Response @ 1550nm

Ordering Information

	G	☐☐	☐	☐☐	☐	☐	☐
Prefix	**Wavelength**	**Frequency**	**Amplifier**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector**
FCAD-	900 - 1620 = G Special = 0	2.5G = 02 5G = 05 10G = 10	No = 1 Yes = 2	SMF-28 = 01 Special - Choose Below	900µm Tube = 3 Bare fiber = 1 Special = 0	1m = 3 0.5m = 2 0.25m = 1 1.5 m = 5 Special = 0	FC/APC = 3 FC/PC = 2 Non = N SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0

Fiber Type Selection Table:

01	SMF-28	34	PM1550	71	MM 50/125µm
02		35	PM1950	72	MM 62.5µm
03		36	PM1310	73	
04		37		74	
05	SM1950	38		75	
06		39		76	
07		40			
08		41	PM980		
09	SM980	42			
10	Hi1060	43			
11		44			
12		45			
13		46			

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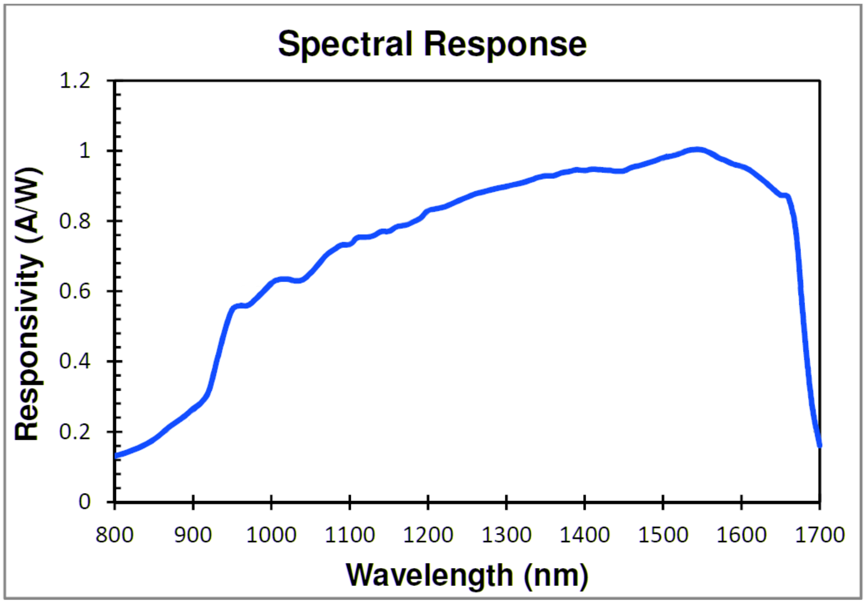
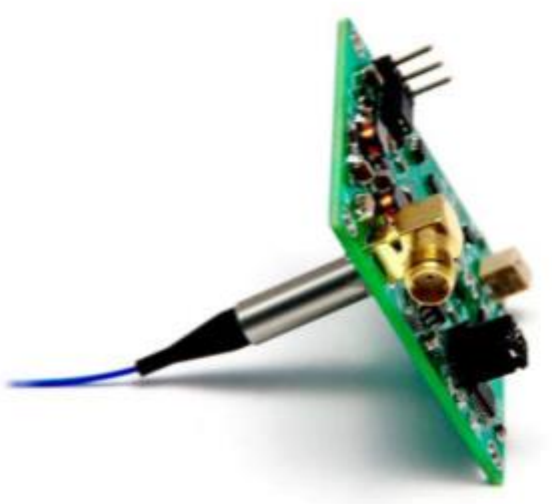
Spectral Response



Amplifier Mounted Option



Low-Noise Optical Detector Amplifier

DETA-11A221111
$165

https://agiltron.com/product/precision-optical-detector-amplifier/

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Application Notes

Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness

Fibers with smaller core diameters (<5 μm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.