

Fiber Coupled Avalanche Photodiode

2.5GHz, GaAs, 900-1650nm



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Features

- Dark Current ~ 0.8 nA
- High Quantum Efficiency
- 2.5 GHz Cutoff Frequency
- Ability to Choose Desired Optical Connector
- Ability to Choose Desired Fiber Type
- 50 Micron Active Area

Applications

- Communication
- RF over Fiber (RFoF)
- Optical Time-Domain Reflectometer (OTDR)



The FCAD is a GaAs-based avalanche photodiode with a 50 μm active area, optimized for low dark current and low spectral noise density. It provides high sensitivity with intrinsic detection gain, making it ideal for OTDR and optical sensing applications. The FCAV is available in single-mode (SM), polarization-maintaining (PM), and multimode (MM) fiber-coupled configurations.

Specifications

Electro-Optical Characteristics (T_{op} 23 $\pm$ 3°C, unless otherwise specified)

Parameter	Min	Typical	Max	Unit	Test Condition
Reverse Breakdown Voltage	40	45	55	V	ID = 100
Temperature Coefficient reverse breakdown voltage		0.1		%/°C	
Dark Current		5		nA	at 90% VBR
Multiplied Dark Current		0.8		nA	M = 10
Terminal Capacitance		0.7		Pf	at 90% VBR at f = 1 MHz
Cut-Off Frequency		2.5		GHz	M = 10
Quantum Efficiency	$\lambda = 1310 \text{ nm}$	76	90		M = 1
	$\lambda = 1550 \text{ nm}$	65	77		
Responsivity	$\lambda = 1310 \text{ nm}$	0.9		A/W	M = 1, Pin = 1 μW
	$\lambda = 1550 \text{ nm}$	0.7			
Multiplication Factor	$\lambda = 1550 \text{ nm}$	30			IPO = 1.0 μW , VBR-1.2V
Excess Noise Factor	$\lambda = 1310 \text{ nm}$	0.7			IPO = 1.0 μW , M = 10, f = 35 MHz
	$\lambda = 1550 \text{ nm}$	5			
Optical Return Loss	30			dB	SMF
Spectral Noise Density	0	0.5		pA/√Hz	at M = 30, with DC source

Photodiode Absolute Maximum Ratings

Parameter	Min	Typical	Max	Unit	Condition
Reverse Voltage			55	V	
Forward Current			8	mA	
Reverse Current			0.5	mA	
Input Optical Power			0.3	mW	
Storage Temperature	-25		90	°C	
Storage Humidity			85	% r.H.	
Operating Temperature	-10		80	°C	
Soldering Temperature			200	°C	60 sec
ESD Susceptibility	100			V	HBM

Note:

Operating at maximum ratings for a prolonged period will cause damage to the device.

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 [\[click this link\]](#):

Operating at maximum operating specs for prolonged periods of time will damage the device.

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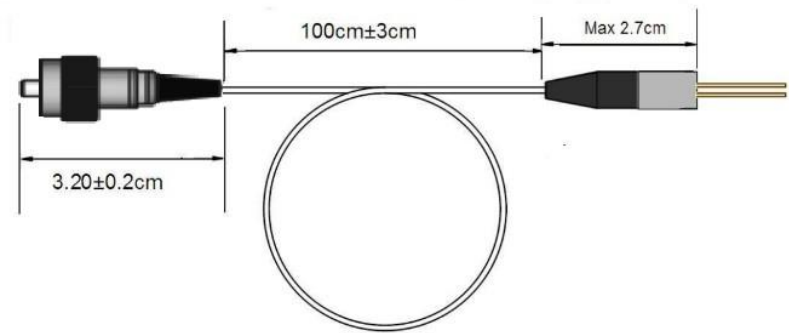
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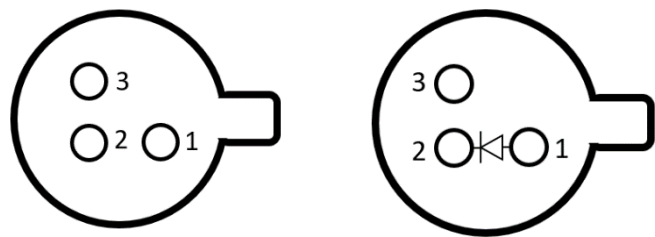
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Mechanical Dimensions (mm)



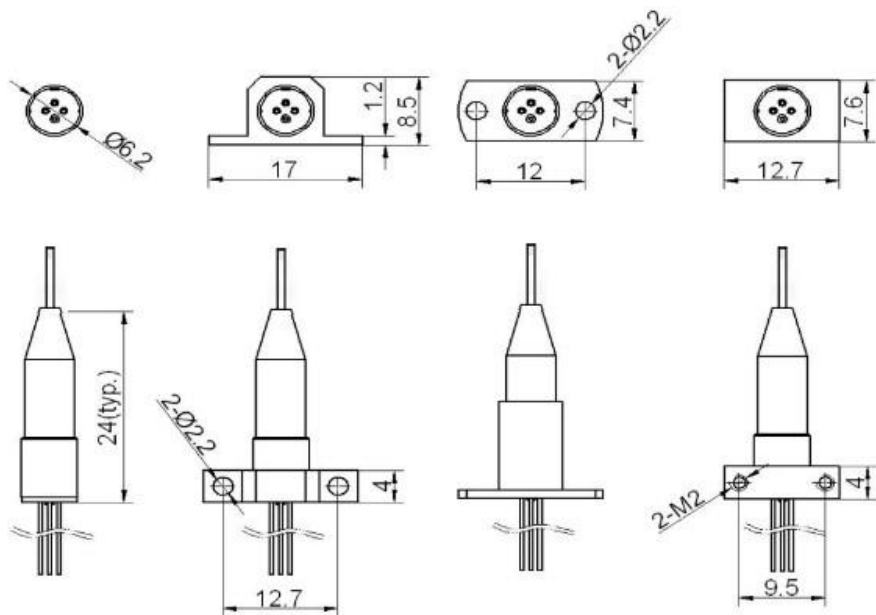
*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

PIN Configuration (Bottom View)



Pin #	Function
1	PD Anode (+)
2	PD Cathode (-)
3	Case Ground

Build Configurations – Mounting Support



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Ordering Information

	1	2	C	☐	☐	☐	☐	☐
Prefix	Wavelength	Speed		Package	Fiber Type	Fiber Cover	Fiber Length	Connector ^[1]
FCAD-	900 - 1620 = 1	2.5GHz = 2		Standard = 1 Special = 0	SM28 = 1 50/125 = 2 PM1550 = 5 Special = 0	0.9mm tube = 3 Bare fiber = 1 Special = 0	0.25m = 1 1.0 m = 3 1.5 m = 5 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0

[1]. Regular fiber connector has PER ~22dB. Connector with PER >27 dB is available using special process



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.

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Typical Performance Curves (Top 23°C ± 3°C)

