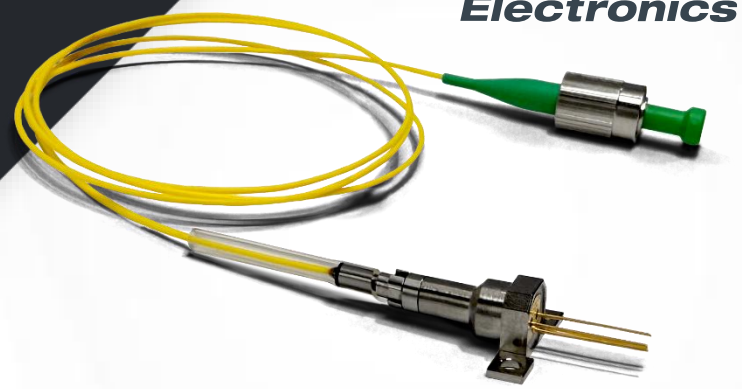
Pigtailed High-Gain Low-Noise InGaAs APD



CMC Electronics' 276-339767-VAR is a pigtailed InGaAs APD Series available in 30 µm (single mode fiber, SMF) and 80 µm (multimode fiber, MMF) active area variants, both with very high operating gain above M = 100, very low k-factor (k), and Excess Noise Figure (F).

Based on an industry-proven design, the 276-339767 Series InGaAs APDs have a high Quantum Efficiency (QE) over the wavelength range of 950 to 1600 nm.

A high dynamic range is maintained even at high operating temperatures, reducing the need for cooling.

Customizations such as optical return loss tuning or responsivity screening are available upon request.

Features

- Active area from 30 – 80 µm
- Low k-factor InGaAs APD
- Low Excess Noise Factor (F)
- Low Noise Equivalent Power (NEP)
- High dynamic range
  - ΔV ≈ 8 V (M = 10)
  - ΔV ≈ 4 V (M = 45)
  - ΔV ≈ 1 V (M = 100)
- Wide Operating Temp Range
- Typical coupling efficiency: > 90 %
- Low Optical Return Loss (ORL)
- FC/APC and other connectors available upon request

Applications

- Optical Time-Domain Reflectometry (OTDR)
- LiDAR and Laser Range Finding (LRF)
- Distributed Fiber Optic Sensing (DFOS)
- Distributed Temperature Sensing (DTS)
- Distributed Acoustic Sensing (DAS)
- Structural Health Monitoring (SHM)

Table 1. Electro-Optical Common Characteristics

Conditions: T_{case} = 25°C, M = 10 unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Units
Breakdown Voltage	V_{BR}	45	60	80	V
Operating point from Breakdown Voltage (V_{BR} - V_{OP})	ΔV	7	8	9	V
Temperature Coefficient of V_{OP}	ΔV/ΔT		0.06		V/°C
Quantum Efficiency (1064-1550 nm)	QE	75	83		%
Responsivity at 1550 nm	R	8.5	9.0		A/W
Excess Noise Factor	F		3.2		
Recommended Operating Gain (Note 1)	M	10	65	100	
Operating Temperature	T_A	-45		+85	°C
Storage Temperature	T_{stg}	-55		+85	°C

Note: 1. Noise increases with gain and depends on bulk and surface currents.

Table 2. Electro-Optical Specific Characteristics

Conditions: T_{case} = 25°C, M = 10 unless otherwise specified

		80 µm		30 µm		
Parameter	**Symbol**	**Typ.**	**Max.**	**Typ.**	**Max.**	**Units**
Dark current	I_d	2	10	0.25	0.5	nA
Capacitance	C_d	0.55	0.6	0.45		pF
Spectral Noise Current	i_n	0.18		0.045		pA/√Hz
Bandwidth	f_{-3dB}	5.8		6.5		GHz
Optical Return Loss	ORL	-25		-35		dB

Figure 1. Typical Quantum Efficiency

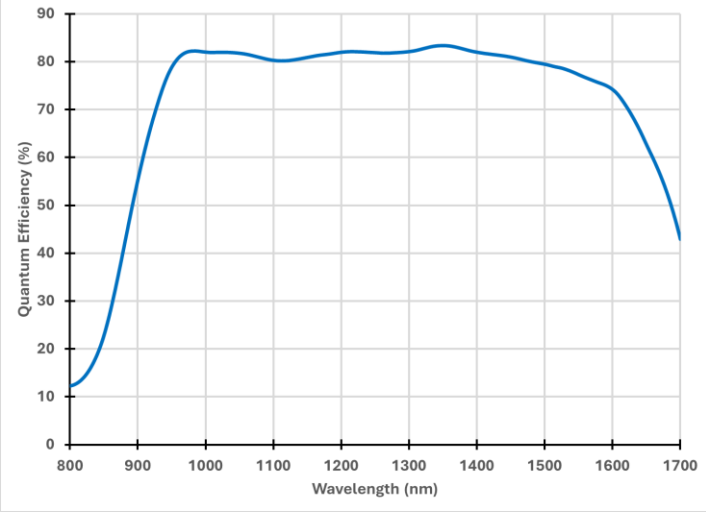


Figure 2. Typical APD Gain

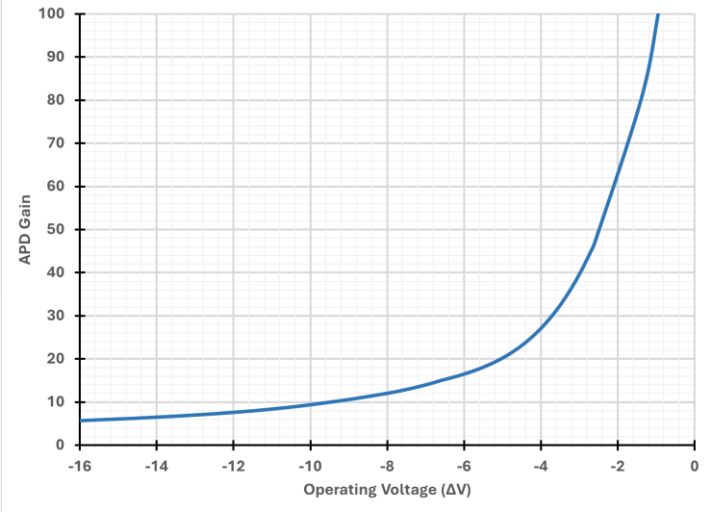


Figure 3. 276-339767 Package Dimension and Pinout

Unless otherwise specified, dimensions are in mm and are for reference only. Connector options available upon request

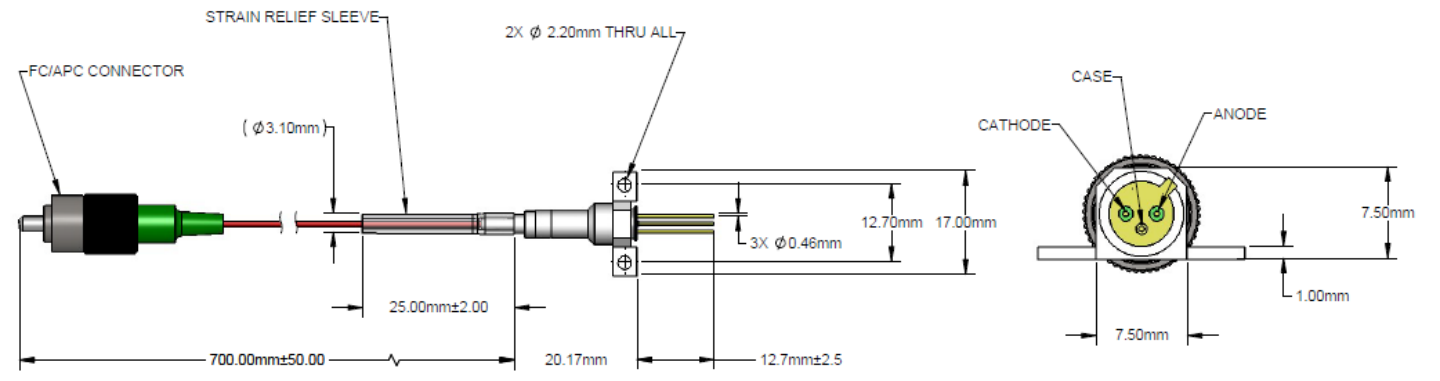


Table 4. Ordering Guide

VAR	Typical Bandwidth	Active Diameter	Comments
264-339767-002	5.8 GHz	80 µm	Fiber Pigtail 62.5 MMF
264-339767-004	6.5 GHz	30 µm	Fiber Pigtail 9 µm SMF

For more information, visit www.cmcelectronics.ca/optoelectronics
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