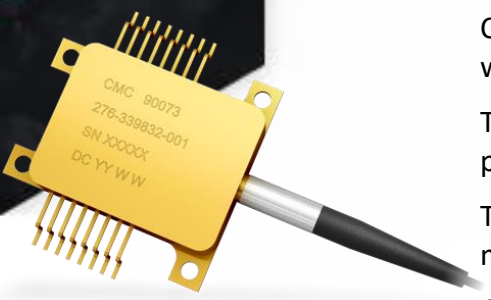
Fiber Pigtailed InGaAs Avalanche Photodiode Preamplifier Module



CMC Electronics' 264-339832 series use an InGaAs APD with a low k-factor of 0.2, with a built-in preamplifier enabling optimum signal-to-noise performance.

The APD preamplifier receiver is housed in a robust 16-pin surface mount butterfly package with a 50 µm multimode (MM) graded-index core fiber.

The internal temperature can be monitored via an embedded thermal sensor. The module is designed with a 10 Ω output impedance and can be AC- or DC-coupled.

Customizations such as fiber diameter and type, bandwidth selection, NEP screening, different temperature sensors and further responsivity optimization are available upon request.

Features

- 120 MHz Preamplifier Module
- Spectral Response: 1050 – 1600nm
- Low k-factor InGaAs APD
- Low Noise Equivalent Power (NEP)
- 50 µm Multimode fiber pigtail
- High dynamic range
- Hermetically Sealed 16-pin package
- ITAR free

Applications

- Range Finding
- LiDAR
- Distributed Temperature Sensing
- High resolution Laser scanning
- Free-Space Communications (FSO)

Table 1. Electro-Optical Characteristics

Unless otherwise specified: T_A = 25°C, V_+ = 5.0 V, V_- = -5.0 V, V_{HV} = 40 to V_{BR}, V_{OO_ADJ} = -5 V, R_L = 100 Ω, λ = 1570 nm +/- 20 nm

		276-339832-001 Standard recovery			276-339832-002 Fast recovery			
Parameter		**Min.**	**Typ.**	**Max.**	**Min.**	**Typ.**	**Max.**	**Units**
Operating Voltage, V_{OP} (Note 1)		40	54	85	40	54	85	V
Temperature coefficient of V_{OP}			0.07			0.07		V/˚C
Responsivity			2.0			2.0		MV/W
Noise equivalent power (Note 2)								
1570 nm [T_{case}=25 °C]			40			40		fW/√Hz
1570 nm [T_{case}=85 °C]			85			110		fW/√Hz
Output impedance			10			10		Ω
Bandwidth		100	120		100	120		MHz
Rise time (10-90 %)			3			3		ns
Fall time (90-10 %)			3			3		ns
Linear output voltage swing (Pulse)		1.5	2.5	4.0	1.5	2.5	4.0	V
Output offset voltage		-0.75	-0.45	0	-0.75	-0.45	0	V
Thermal sensor (1N914 diode) (Note 3)								
I_f of 5 mA at 25°C			645			645		mV
Sensor sensitivity			-1.9			-1.9		mV/°C
Overload recovery for optical power input signal: 1 mW, 20 ns pulse width:								
V_{out} → 200 ns after pulse start				250			250	mV
V_{out} → 1 µs after pulse start				40			40	mV
5 W, 20 ns pulse width (Note 4)			525			325		ns
Hybrid Supply current	V_POS (pin 10)	25		35	25		35	mA
	V_NEG (pin 11)	-20		-10	-20		-10	mA

Notes:
1. Each APD receiver will have its individual V_{OP} (provided on its production tests report).
2. NEP values for 85°C are by design and are for reference only. No test values provided on individual test reports. Integration of the noise calculation is based on minimum bandwidth.
3. Alternate thermal sensors (IC sensors or thermistance) are available upon request.
4. Not tested on all units

Table 2. Absolute-Maximum Ratings, Limiting Values

Parameter	Min.	Max.	Units
APD breakdown, Maximum voltage [HV_POS (pin 4)] (Note 1)		105	V
Recommended overcurrent limit		100	µA
Photodiode Total Current (All temp.)		1	mA
Input Voltage Positive Supply [V_POS (+5V) (pin 7)]		6	V
Input Voltage Negative Supply [V_NEG (-5V) (pin 5)]		6	V
Maximum Optical Power, CW		10	µW
Peak value, 20 ns pulses < 100 Hz		100	kW/cm^2
Temperature sensor fixed input current between Sensor V_{in} → TSensor ANODE (pin 8) Sensor output → TSensor CATHODE (pin 9)	1	10	mA
Operating Temperature	-40	85	°C
Storage Temperature	-55	125	°C
Soldering Temperature (5 s, leads only)		250	°C

Note: 1. Absolute maximum over the product Temperature Operating Range (-40°C to +85°C).

Figure 1. Typical Normalized Responsivity at 25°C

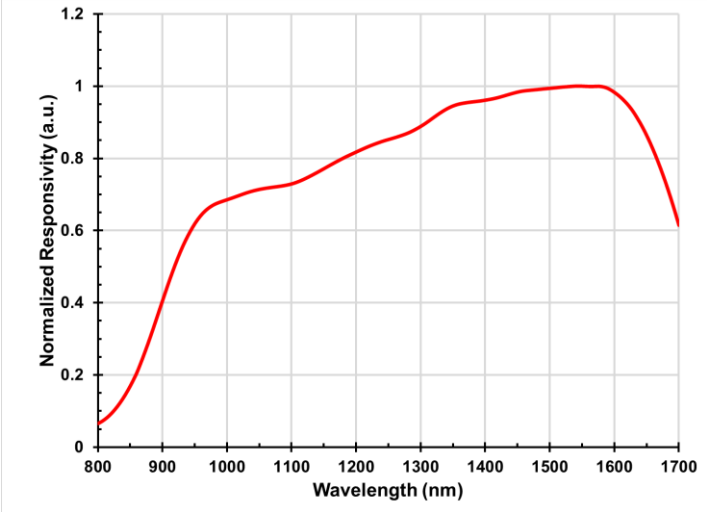


Figure 2. Typical Normalized Frequency Response

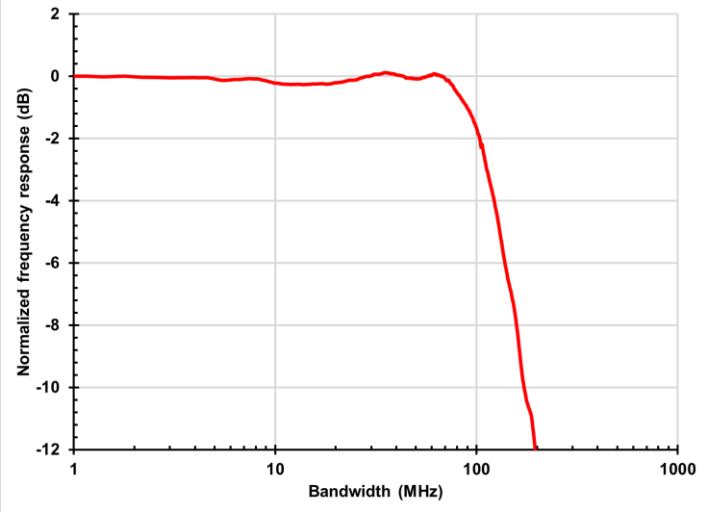


Figure 3. Typical Responsivity and NEP
λ = 1570 nm ± 10 nm (-001)

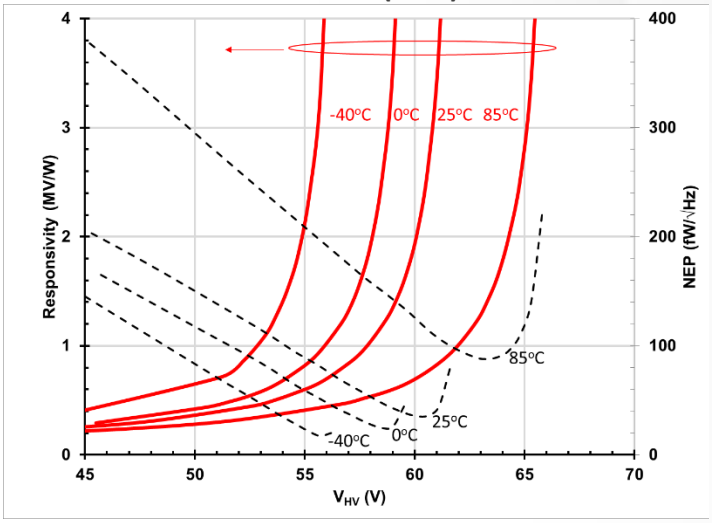


Figure 4. Typical Responsivity and NEP
λ = 1570 nm ± 10 nm (-002)

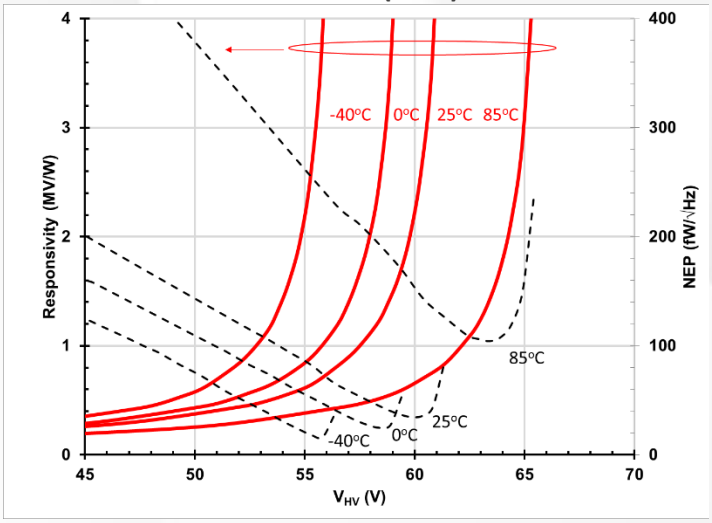


Figure 5. CMC 276-339832 Series block diagram

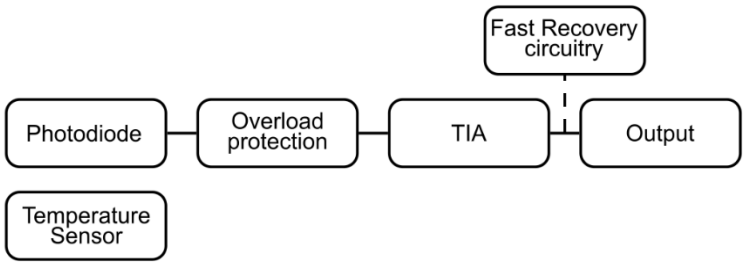
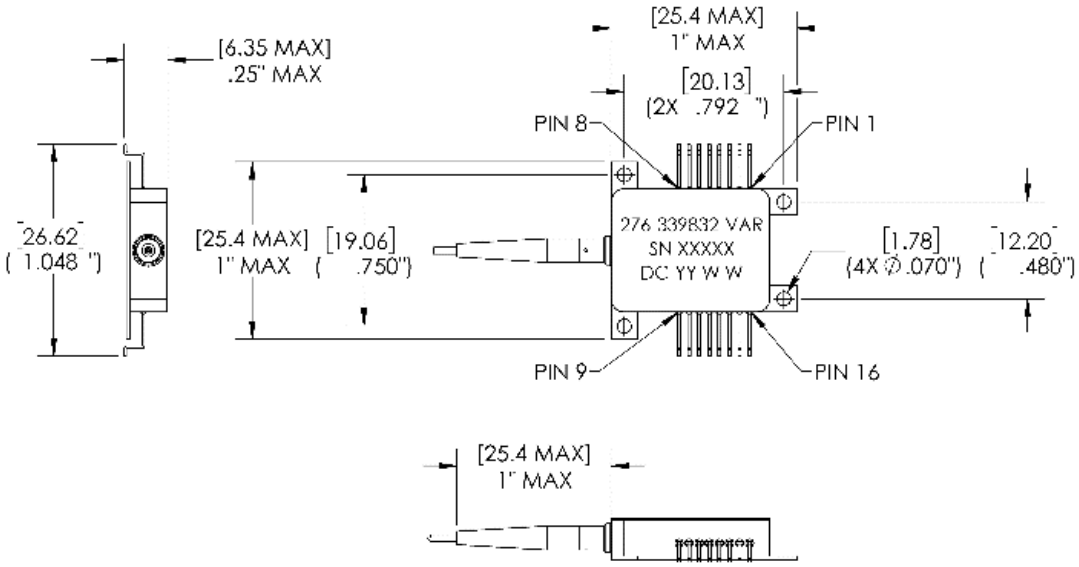


Figure 6. Package Dimension and Pinout

Unless otherwise specified, dimensions are in inches [mm] and are for reference only.



1	GND
2	TSensor ANODE
3	TSensor CATHODE
4	NC
5	V_NEG (-5V)
6	GND
7	V_POS (+5V)
8	GND
9	HV_POSITIVE
10	GND
11	GND
12	GND
13	OUTPUT
14	GND
15	VOO_ADJ
16	GND

VAR Options

-001	Standard recovery
-002	Fast recovery from high power pulses

For more information, visit www.cmcelectronics.ca/optoelectronics
Or email us at opto@cmcelectronics.ca

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