

Dual Wavelength InGaAs Avalanche Photodiode Pre-amplifier Module

Features

- 200 μm InGaAs APD
- 50-100 MHz built-in trans-impedance amplifier
- Spectral Response: 1050-1600nm (typical use: 1570nm)
- Low k of 0.2 (Low noise) InGaAs APD
- Low Noise Equivalent Power (NEP)
- Fast Overload Recovery
- High Quantum Efficiency
- Hermetically-Sealed TO-8 Package
- ITAR free

Description

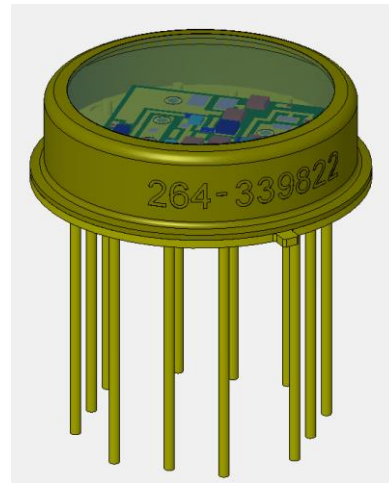
CMC Electronics' 264-339822 series uses an InGaAs APD with low ionization ratio of 0.2, with a built-in preamplifier, enabling optimum signal to noise performance.

The APD is coupled to a GaAsFET input trans-impedance amplifier in a 12-lead TO-8 package. The amplifier has an overload input protection circuit which sustains high optical power exposure with a very fast recovery time. The internal temperature can be monitored via an embedded thermal sensor located close to the APD. The module is designed for a 100-ohm output load connection (AC or DC coupled, as required by design).

Customizations such as bandwidth selection, NEP screening, responsivity optimization and packaging are available, to fit your system design needs.

Applications

- Range Finding
- LIDAR
- Instrumentation
- Laser Profiling
- Free-Space Communications
- Industrial, Medical
- Photometry



Block Diagram

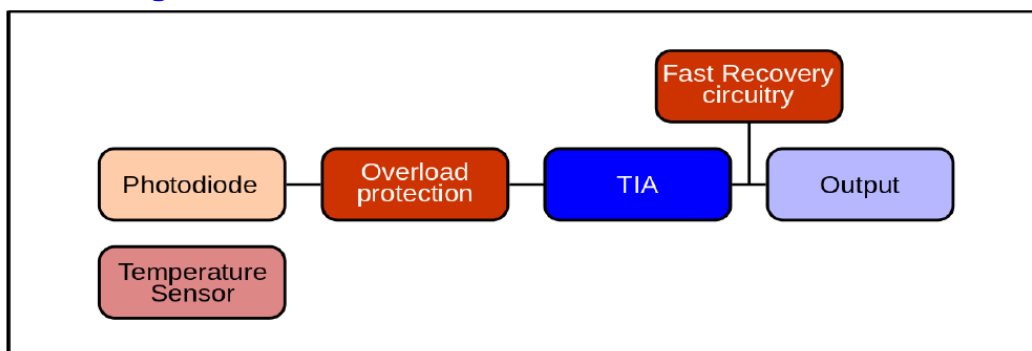


Figure 1: CMC 264-339822 SERIES BLOCK DIAGRAM

Dual Wavelength InGaAs Avalanche Photodiode Preamplifier Module

Electro-Optical Characteristics at $T_A=25^\circ\text{C}$

Unless otherwise specified: $V_+=5\text{V}$, $V_-=-5\text{V}$, $R_L=100\Omega$ AC, $\lambda = 1570\text{ nm} \pm 10\text{ nm}$
(Externally AC coupled through $4.7\mu\text{F}$)

Parameter/Condition	Min.	Typ.	Max.	Unit
Active area		200		μm
V_R for specified responsivity	40	NOTE ¹	80	V
Temperature coefficient of V_R	-	0.07	-	$\text{V}/^\circ\text{C}$
ADP dark current (I_d)	-	20	55	nA
Responsivity (R)	-	580	-	kV/W
Noise equivalent power ($\text{NEP} = E_n/R$)				
Wavelength = 1570 nm [$T_{\text{case}} = 25^\circ\text{C}$]	-	110	135	$\text{fW}/\sqrt{\text{Hz}}$
[$T_{\text{case}} = 85^\circ\text{C}$] ²	-	255		$\text{fW}/\sqrt{\text{Hz}}$
Output impedance	-	10	-	Ω
Bandwidth = $f_{-3\text{dB}}$	50	60	100	MHz
Rise time (10-90%)	-	6	-	ns
Fall time = t_F (90-10%)	-	6	-	ns
Linear output voltage swing (Pulse)	1.5	2.5	4.0	V
Output offset voltage	-0.75	-0.45	0	V
Temperature sensor (1N914 diode) with bias current=5mA	-	700	-	mV
Overload recovery for optical power input signal of 1mW, 20 ns pulse width:				
$V_{\text{out}} \rightarrow$ 200 ns after pulse start	-	-	250	mV
$V_{\text{out}} \rightarrow$ 1 μs after pulse start	-	-	40	mV
Hybrid Supply current V_{POS} (pin 12)	25		35	mA
V_{NEG} (pin 3)	-20		-10	mA

Note (1): Individual APD receivers will have its V_R provided on receiver test data.

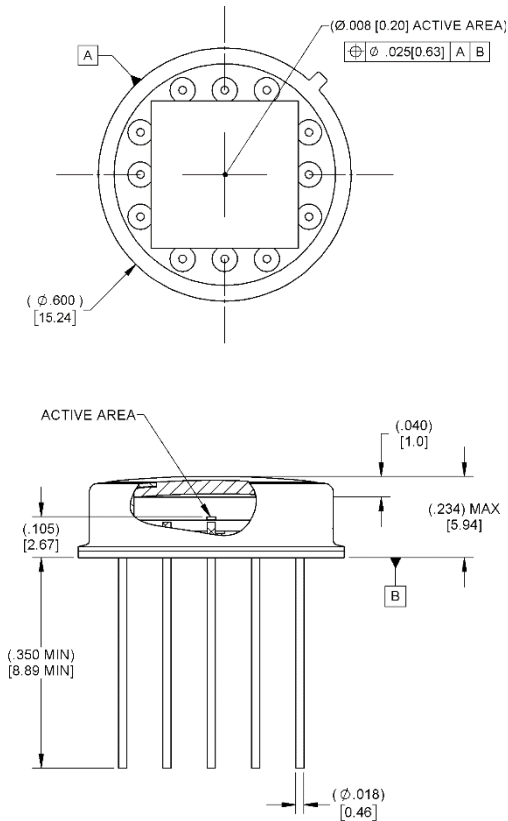
Note (2): This value is for reference only.

Absolute-Maximum Ratings, Limiting Values

Photodiode total current (HV-POS – pin4) APD breakdown, Maximum voltage Recommended overcurrent limit	72 volts 100 μA
Photodiode total current (V-NEG – pin3) Minimum Maximum	-6.0 V -4.8 V
Total incident radian flux Φ_M Max. Optical Power, CW Peak value, 20ns pulses <100Hz	10 μW 100KW/cm ²
Temperature sensor fixed input current between IN \rightarrow TS_AN (pin 8) Return \rightarrow TS_CA (pin 9) Minimum (recommended) Maximum (recommended)	1 mA 10 mA
Ambient Temperature: Storage Range, T_{stg} Operating Range, T_A	-55 to +125 $^\circ\text{C}$ -40 to +85 $^\circ\text{C}$

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Mechanical Dimension



Unless otherwise specified, dimensions are in inches" (mm) and are for reference only.

Pinout:

1	OUTPUT	7	GND
2	NC	8	TSensor_ANODE
3	V_NEG (-5V)	9	TSensor_CATHODE
4	HV_POSITIVE	10	GND
5	NC	11	NC
6	GND	12	V_POS (+5V)

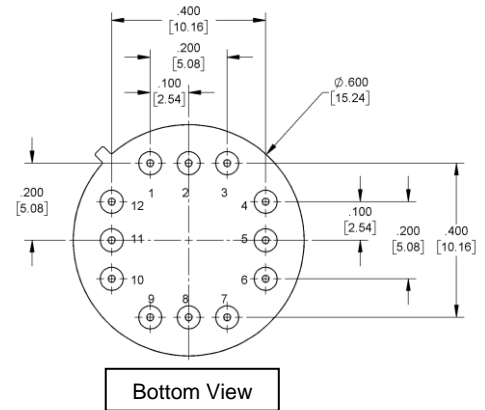


Figure 2: PACKAGE DIMENSIONS & PINOUT

VAR Options:

-001 InGaAs APD 200um, 50-100 MHz TIA

For more information, visit www.cmcelectronics.ca or email us at opto@cmcelectronics.ca



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