

Dual Wavelength InGaAs Avalanche Photodiode Preamplifier Module with Thermoelectric Cooler

Features

- 200 μm InGaAs APD
- 60-100 MHz Preamplifier Module
- 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 Efficiency TEC
- High Quantum Efficiency
- Hermetically-Sealed TO-8 Package

Applications

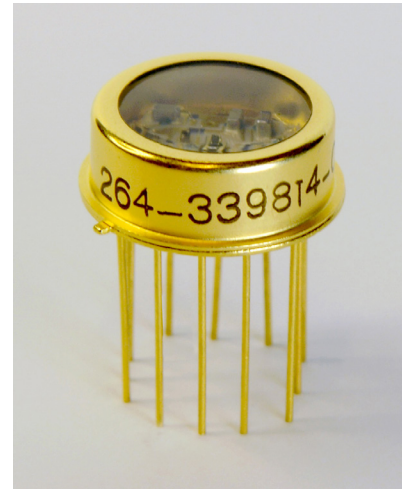
- Range Finding
- LIDAR
- Instrumentation
- Laser Profiling
- Free -Space Communications
- Industrial, Medical
- Photometry

Description

CMC Electronics' 264-339814 series uses an InGaAs APD with low ionization ratio of 0.2, with a built-in preamplifier and a thermoelectric cooler (TEC), 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. An integral TEC allows temperature control of the APD, supporting APD module gain and temperature stabilization. The internal temperature can be monitored via an embedded thermal sensor 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.



Block Diagram

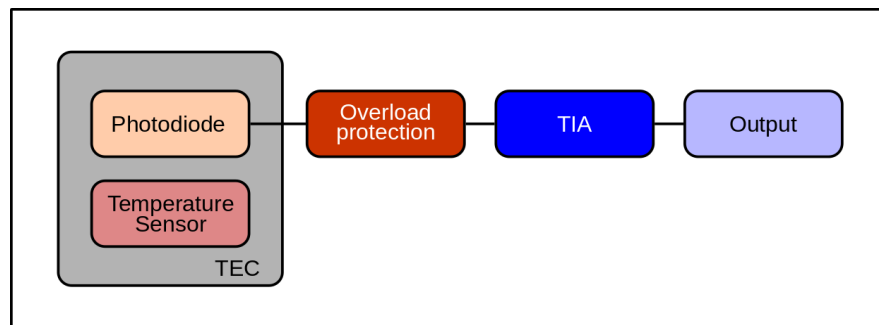


Figure 1: CMC 264-339814 SERIES BLOCK DIAGRAM

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

Unless otherwise specified: $V_+=5\text{V}$, $V_-=-5\text{V}$, V_R , $R_L=100\Omega$ AC, Cooler OFF

(Externally AC coupled through 4.7 μF)

Parameter/Condition	Min.	Typ.	Max.	Unit.
V_R for Specified Responsivity	40	NOTE 1	85	V
Temperature Coefficient of V_R	-	0.080	-	V/ $^\circ\text{C}$
APD dark current (I_d) @ 25°C	-	20	50	nA
Responsivity (R) 1570 nm, M=10	-	580	-	kV/W
Noise Equivalent Power (NEP = E_n/R)				
1570 nm, Cooler OFF [$T_{\text{case}}=25^\circ\text{C}$]	-	110	135	fW/ $\sqrt{\text{Hz}}$
1570 nm, Cooler OFF [$T_{\text{case}}=85^\circ\text{C}$]	-	255	525	fW/ $\sqrt{\text{Hz}}$
1570 nm, Cooler ON [$T_{\text{case}}=85^\circ\text{C}$]	-	155	280	fW/ $\sqrt{\text{Hz}}$
Output Impedance	-	10	-	Ω
Bandwidth, $f_{-3\text{dB}}$	60	85	100	MHz
Rise Time (10-90%)	-	6	-	ns
.....Fall Time (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
Overload recovery for optical power input signal of 1mW, 15ns pulse width:				
$V_{\text{out}} - V_{\text{out_PrePulse}} \rightarrow 300$ ns after pulse start	-	-	250	mV
$V_{\text{out}} - V_{\text{out_PrePulse}} \rightarrow 1.0$ us after pulse start	-	-	50	mV
Thermal Sensor				
Voltage Output @ 25°C	-	1.55	-	V
Accuracy (at $+30^\circ\text{C}$)	± 1.5		± 4	$^\circ\text{C}$ (max)
Accuracy (-55°C to $+130^\circ\text{C}$)	± 2.5		± 5	$^\circ\text{C}$ (max)
Nonlinearity		± 0.4		% (typ)
Thermoelectric Cooler (TEC)				
Current		0.6	1.75	A
Voltage Drop (typical, for Reference Only)		0.7	1.1	V
Hybrid Supply Current:				
V_+	-	30	40	mA
V_-	-	15	20	mA

Note: 1 - V_R as specified on datasheet of each module.

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Absolute-Maximum Ratings, Limiting Values

Photodiode Total Current (All temp.)		Preamplifier Voltage:	
Average	100 uA	V+ Max	6 V
Peak (1s).....	1 mA	V- Max	6 V
Incident Radiant Flux, Φ_M		TEC	
Average	10 uW	Current	0 – 1.75 A max
Peak, 20ns pulses < 100Hz	100 kW/cm ²		
Ambient Temperature:			
Storage Range, T _{stg}	-55 to +125 °C		
Operating Range, T _A	-40 to +85 °C		

Mechanical

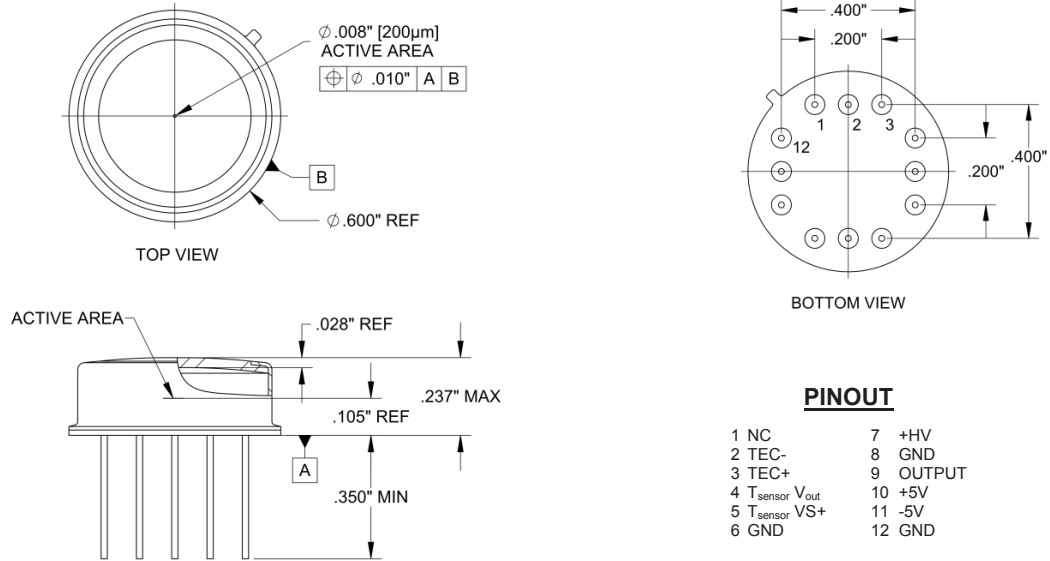


Figure 2: PACKAGE DIMENSIONS & PINOUT

VAR Options:

-000 InGaAs APD 200um, 60-100 MHz TIA, TEC