Si APD Preamplifier Module

CMC Electronics' 264-339829 series uses a Silicon APD with a built-in preamplifier, enabling optimum signal-to-noise performance.

The APD is coupled to a GaAs FET 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 has a 10 Ω output impedance and can be AC- or DC-coupled.

Customizations such as bandwidth selection, NEP screening, responsivity optimization and packaging are available upon request.

Features

- 500 µm Silicon APD
- 60 – 100 MHz Preamplifier Module
- Spectral Response: 550 – 1100 nm
- Low Noise Equivalent Power (NEP)
- Overload Input Protection circuit
- Hermetically Sealed TO-8 Package
- ROHS compliant
- ITAR free

Applications

- Laser Range Finding
- LiDAR
- Instrumentation
- Laser Profiling
- Industrial
- Photometry

Table 1. Electro-Optical Characteristics

Conditions: T_{case} = 25°C, V+ = 5 V, V-=-5 V, λ = 1064 nm +/- 10 nm, (Externally AC coupled through 4.7µF)

Parameter	Min.	Typ.	Max.	Units
Active diameter		500		µm
Operating Voltage (Note 1)	150	225	300	V
Temperature coefficient of V_{OP}		0.6	1.5	V/˚C
ADP dark current		7	50	nA
Responsivity	1000			kV/W
Noise equivalent power (Note 2)		100	120	fW/√Hz
Output impedance		10		Ω
Bandwidth, f_{-3dB}	60	80		MHz
Rise time (10-90 %) & 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
Thermal sensor (1N914 diode) (Note 3) I_f of 5 mA at 25°C Sensor sensitivity		 645 -1.9		 mV mV/°C
Overload recovery for optical power input signal of 1 mW, 20 ns pulse width: V_{out} → 200 ns after pulse start V_{out} → 1 µs after pulse start			 300 20	 mV mV
Hybrid Supply current V_POS (pin 10) V_NEG (pin 11)	25 -20	30 -15	40 -10	mA mA

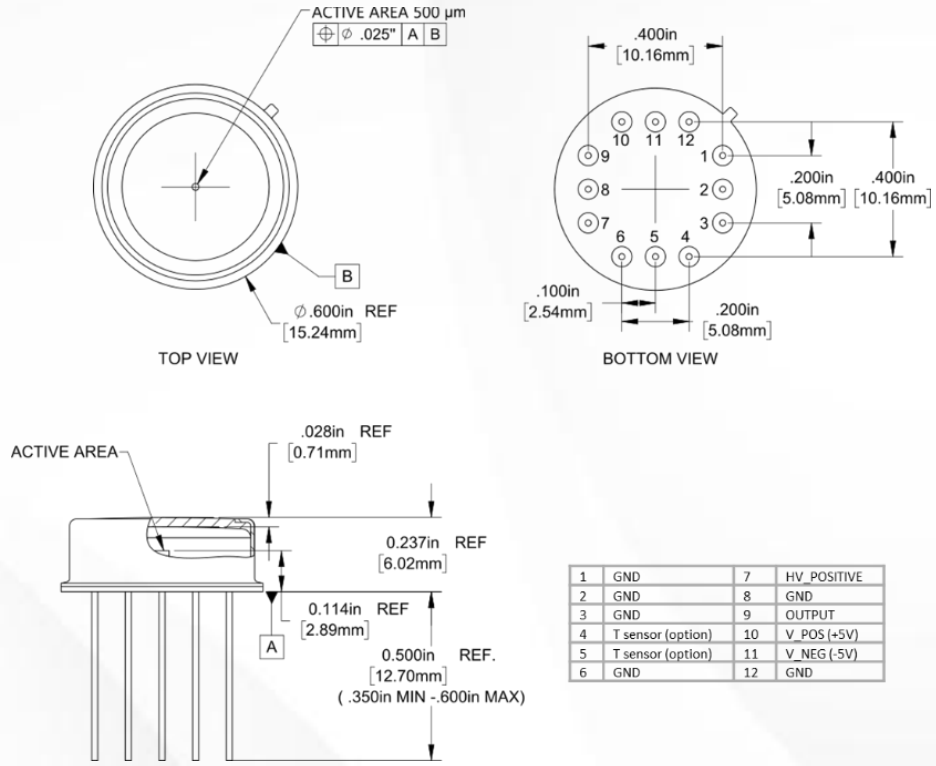
Notes:
1. Each APD receiver will have its individual V_{OP} (provided on its production tests report).
2. Integration of the noise calculation is based on f_{-3dB} bandwidth.
3. Alternate thermal sensors (thermistance or diode) are available upon request.

Table 2. Absolute-Maximum Ratings, Limiting Values

Parameter	Min.	Max.	Units
APD breakdown, Maximum voltage [HV_POS (pin7)] (Note 1)		450	V
Recommended overcurrent limit		100	µA
Input Voltage Positive Supply [V_POS (+5V) (pin10)] (Note 2)	+4.8	+6.0	V
Input Voltage Negative Supply [V_NEG (-5V) (pin11)] (Note 2)	-4.8	-6.0	V
Maximum Optical Power, M = 100		300	µW
Maximum Optical Power, M = 1		30	mW
Operating Temperature	-20	70	°C
Storage Temperature	-55	125	°C

Note:
1. Absolute maximum over the product Temperature Operating Range (-40°C to +85°C).
2. Assuming light spreads uniformly over APD's active area.

Figure 1. Package Dimension and Pinout



1	GND	7	HV_POSITIVE
2	GND	8	GND
3	GND	9	OUTPUT
4	T sensor (option)	10	V_POS (+5V)
5	T sensor (option)	11	V_NEG (-5V)
6	GND	12	GND

Figure 2. CMC 264-339829 Series block diagram

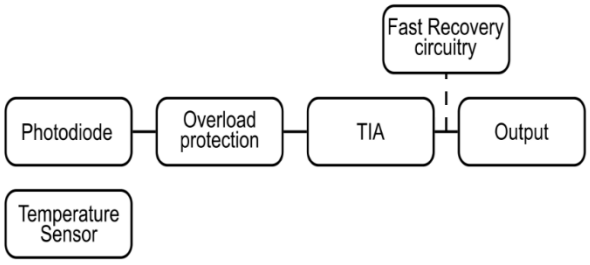


Figure 3. FC connector (617-339829)

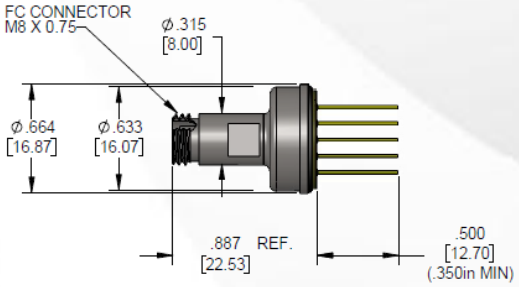


Table 3. Ordering Guide

VAR	Typical Bandwidth	Active Diameter	Comments
264-339829-001	100 MHz	500 µm	
617-339829-001			with FC connector

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

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