

Si Avalanche Photodiode Receiver

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 optional embedded thermistor or diode 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 & packaging are available, to fit your system design needs.



Features

- 500 μm Silicon APD
- 60-100 MHz Preamplifier Module
- Spectral Response: 550-1100 nm
- Low Noise Equivalent Power (NEP)
- Fast Overload Recovery
- High Quantum Efficiency
- Hermetically-Sealed TO-8 Package



Applications

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

Table 1. Electro-Optical Characteristics

Unless otherwise specified: $T_A = 25^\circ\text{C}$, $V_+ = 5\text{ V}$, $V_- = -5\text{ V}$, $R_L = 100\ \Omega$ AC, $\lambda = 1064\text{ nm} \pm 10\text{ nm}$
(Externally AC-coupled through $4.7\ \mu\text{F}$)

Parameter	Min.	Typ.	Max.	Units
Active area		500		μm
Operating Voltage (Note 1)	150	225	300	V
Temperature coefficient of V_{OP}		0.6	1.5	$\text{V}/^\circ\text{C}$
ADP dark current		7	50	nA
Responsivity	1000			kV/W
Noise equivalent power (Note 2)				
1064 nm [$T_{\text{case}}=25^\circ\text{C}$]		100	120	fW/VHz
1604 nm [$T_{\text{case}}=70^\circ\text{C}$]		220	475	fW/VHz
Output impedance		10		Ω
Bandwidth	60	80		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
Thermal sensor (in option)				mV
Overload recovery for optical power input signal of 1 mW, 20 ns pulse width: $V_{\text{out}} \rightarrow 200\text{ ns}$ after pulse start			300	mV
$V_{\text{out}} \rightarrow 1\ \mu\text{s}$ after pulse start			20	mV
Hybrid Supply current				
V_{POS} (pin 10)	25	30	40	mA
V_{NEG} (pin 11)	-20	-15	-10	mA

- Notes:**
- Each APD receivers will have its individual V_{OP} (provided on its production tests report).
 - NEP values for $+85^\circ\text{C}$ 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.

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	$^\circ\text{C}$
Storage Temperature	-55	125	$^\circ\text{C}$

- Note:**
- Absolute maximum over the product Temperature Operating Range (-40°C to $+85^\circ\text{C}$).
 - Assuming light spreads uniformly over APD's active area.

Figure 1. CMC 264-339829 Series block diagram

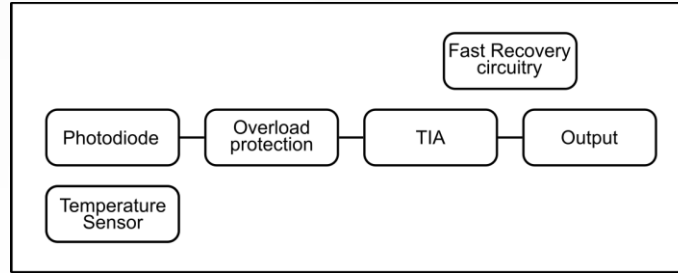
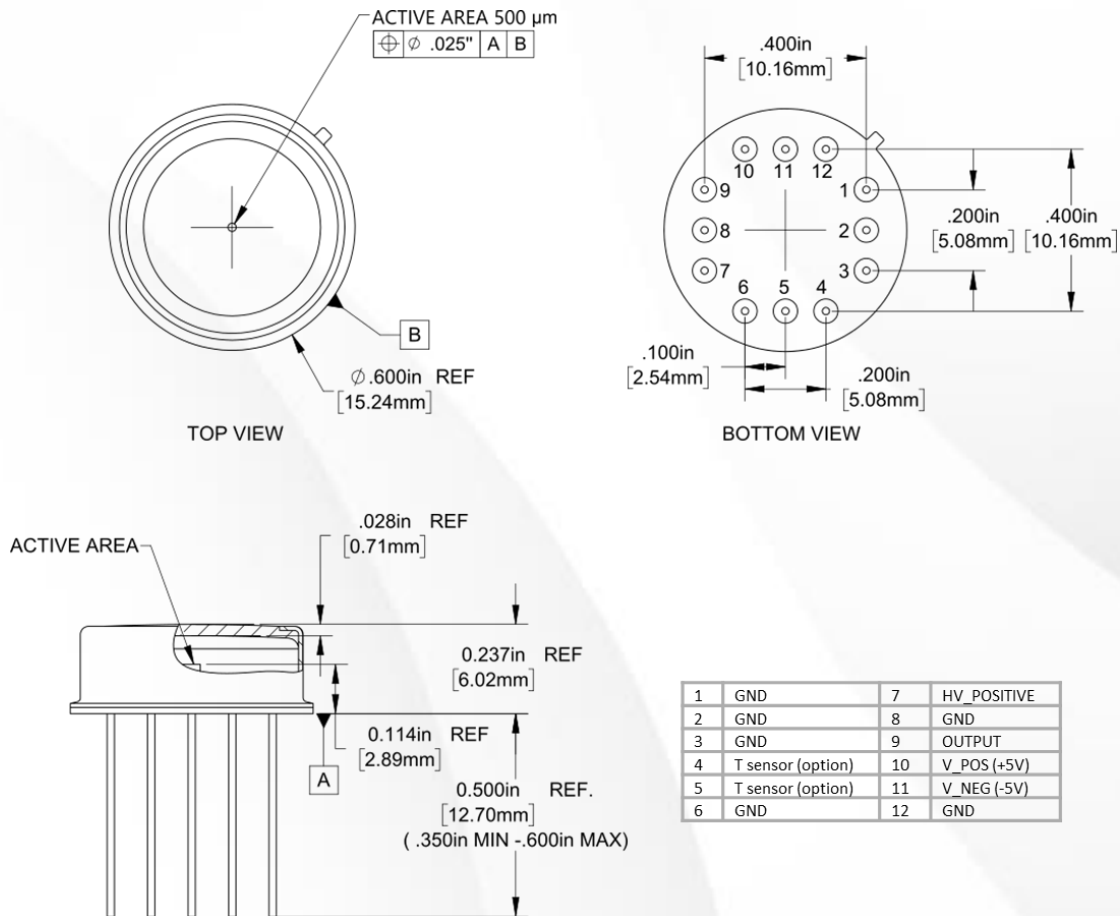


Figure 2. Package Dimension and Pinout

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



VAR Options

-001	Silicon APD 500 μm, 60-100 MHz TIA with Fast Recovery branch
------	--

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

For information purposes only. To accommodate product improvements, specifications are subject to change without notice.

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED
CMC-MEG-OPTO829-VAR
March 2023