Silicon APD Avalanche Photodiode Preamplifier Module

MICROELECTRONICS

264-339794-VAR

Description

CMC Electronics' 264-339794 Series are using a silicon reach through APD with a GaAs FET input transimpedance amplifier in a 12-lead TO-8 package. The amplifier internal feedback resistor is listed in the characteristics' tables. The amplifier has an overload input protection circuit for fast recovery. The output can be AC or DC coupled to a 100 ohm load.

Features

- Ionisation ratio of 0.02 typ
- High Quantum Efficiency 500-1050nm
- Low noise (NEP) TIA
- Fast overload recovery
- Hermetically-Sealed TO-8 Package
- ITAR Free

Applications

- Range Finding
- LIDAR
- Laser Profiling
- Free –Space Optical Communication Systems

Diagram

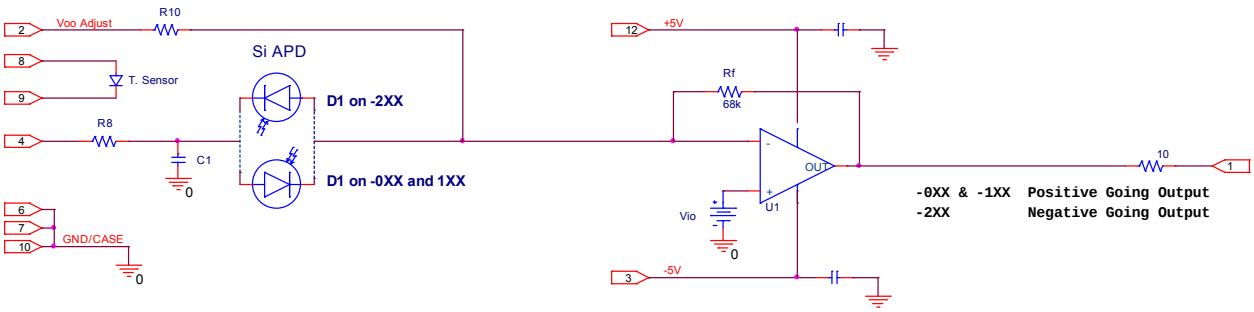

Figure 1: CMC 264-339794 SERIES BLOCK DIAGRAM

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Esterline CMC Electronics

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500µm Silicon Avalanche Photodiode 50MHz Preamplifier Module

MICROELECTRONICS

264-339794-002

Electro-Optical Characteristics at T_A=25°C

Unless otherwise specified: V+=5V, V-=-5V, VR, R_L=100Ω AC.
(Externally AC coupled through 4.7uF)

	Min.	Typ.	Max.	Unit.
Active Area DIA		500		µm
V_R for specified responsivity.....	-400	NOTE 1	-140	V
Temperature Coefficient of VR.....	-	-1	-	V/°C
Id APD dark current	-1	-0.5	-	nA
Responsivity (R) 905 nm, M=100	4.5	5.5	-	MV/W
Noise Equivalent Power (NEP = E_n/R) 905 nm, M=100	-	15	25	fW/√Hz
Output Spectral Noise Voltage Density (E_n): Average over 100 kHz to 50MHz ...	-	80	135	nV/√Hz
Output Impedance	-	10	-	Ω
Bandwidth, f_{-3dB}.....	40	50	-	MHz
Rise Time (10-90%)	-	7	10	ns
Fall Time t_F (90-10%)	-	7	10	ns
Linear Output Voltage Swing (Pulse)	1.5	2.5	-	V
Output Offset Voltage NOTE 2	-0.5	0	0.5	V
TS (Temperature sensor, 1N914 diode) At 1mA bias	-	-2	-	mV/°C
Supply current V+	-	25	40	mA
V-	-	12	20	mA
Internal Components				
R8		10		kΩ
C1		10		nF
Rf		100		kΩ
R10		470		kΩ

Note:

1 - Vr as specified on datasheet of each module.

2 - Output Offset (Voo) can be nulled by applying on pin 2, 5.7 X the uncompensated Voo.

200µm Silicon Avalanche Photodiode 50MHz Preamplifier Module

MICROELECTRONICS

264-339794-201

Electro-Optical Characteristics at T_A=25°C

Unless otherwise specified: V+=5V, V-=-5V, VR, R_L=100Ω AC.
(Externally AC coupled through 4.7uF)

	Min.	Typ.	Max.	Unit.
Active Area DIA		200		µm
V_R for specified responsivity.....	150	NOTE 1	300	V
Temperature Coefficient of VR.....	-	0.5	-	V/°C
Id APD dark current	-	20	50	nA
Responsivity (R) 905 nm, M=100	2.4	3.0	-	MV/W
Noise Equivalent Power (NEP = E_n/R) 905 nm, M=100	-	20	25	fW/√Hz
Output Spectral Noise Voltage Density (E_n):				
Average over 100 kHz to 50MHz ...	-	60	75	nV/√Hz
Output Impedance	-	10	-	Ω
Bandwidth, f_{-3dB}.....	40	50	-	MHz
Rise Time (10-90%)	-	7	10	ns
Fall Time t_F (90-10%)	-	7	10	ns
Linear Output Voltage Swing (Pulse)	1.5	2.5	-	V
Output Offset Voltage NOTE 2	-0.5	0	0.5	V
TS (Temperature sensor, 1N914 diode) At 1mA bias	-	-2	-	mV/°C
Supply current V+	-	25	40	mA
V-	-	12	20	mA
Internal Components				
R8		10		kΩ
C1		10		nF
Rf		68		kΩ
R10		330		kΩ

Note:

1 - Vr as specified on datasheet of each module.

2 - Output Offset (Voo) can be nulled by applying on pin 2, 5.9 X the uncompensated Voo.

200,500µm Si APD Preamplifier Module

MICROELECTRONICS

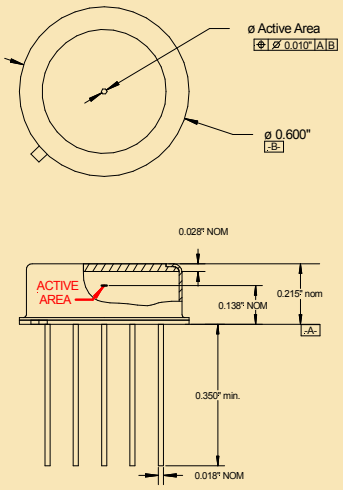
264-339794-VAR

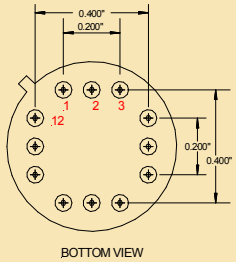
Absolute-Maximum Ratings, Limiting Values

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, Ö$_M$			Ambient Temperature:		
Average value	10	uW	Storage, T_{stg}	-55 to +125	°C
Peak value, 20ns pulses < 100Hz	100	kW/cm^2	Operating, T_A	-40 to + 85	°C

PACKAGE OUTLINE and PINOUT

TO-8 Style, 12 pins, Gold plated





BOTTOM VIEW

Pinout:

1	O/P	7	GND
2	Voo Comp.	8	TS Anode
3	-5V	9	TS Cathode
4	HV	10	GND
5	NC	11	NC
6	GND	12	V+

VAR options:

-002 Si APD 500um, 50 MHz TIA

-201 Si APD 200um, 50 MHz TIA

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