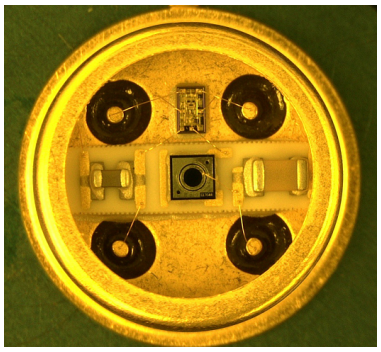
Marktech Optoelectronics

Silicon NIR (800nm) APD w/ TIA

Product No: MTAPD-05-003

NIR enhanced (800nm) Silicon Avalanche Photodiode coupled to a transimpedance amplifier in a hermetic TO-5 package.



The MTAPD-05-003 is a NIR (800nm) enhanced 500µm diameter APD inputing into a high speed TIA to produce a differential output voltage. Positive voltage supply required for the TIA. Positive high voltage supply required for the APD.

FEATURES

- > TO-5 Metal Can Package
- > High Speed
- > High Reliability

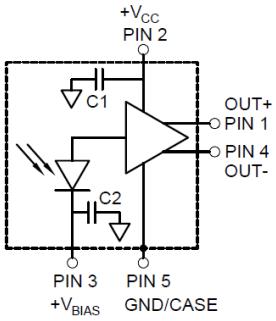
APPLICATIONS

- > LiDAR
- > Free Space Optical
- > Fiber Applications

Absolute Maximum Ratings

ITEMS	SYMBOL	RATING	UNITS
Supply Voltage	Vcc	+3.0 to +5.5	V
Supply Current	Icc	63	mA
Operating Temperature Range	Topr	-20 to +55	ºC
Storage Temperature Range	Tstg	-40 to +100	ºC
Soldering Temperature (*1)	Ts	260	ºC

*1: Time: 5 sec max.; Position: Up to 3mm from header body.



lead-free

RoHS COMPLIANT

ESD SENSITIVE

Electrical & Optical Characteristics (Ta = 25°C)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
TIA Supply Voltage		+3.0	+3.3	+5.5	V
TIA Supply Current		--	34	63	mA
APD Breakdown Voltage	I_R > 2µA	160	--	200	V
APD Responsivity Range		450	--	1050	nm
APD Responsivity @ 800nm	APD V_R for M=100	--	50	--	A/W
Temperature Coefficient of	TC = -40°C to +85°C	--	0.6	--	V/°C
APD Sensitivity @ 800nm	APD V_R for M=100	--	130	--	mV/µW
Small Signal Bandwidth	R_L = 100Ω differential	--	400	--	MHz
Low-Frequency Cutoff	-3dB; input < 20µA DC	--	30	--	kHz
Output Impedance	Single ended (per side)	48	50	52	Ω

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APD Information:

Fig. 1 Typical APD Responsivity @ 0V

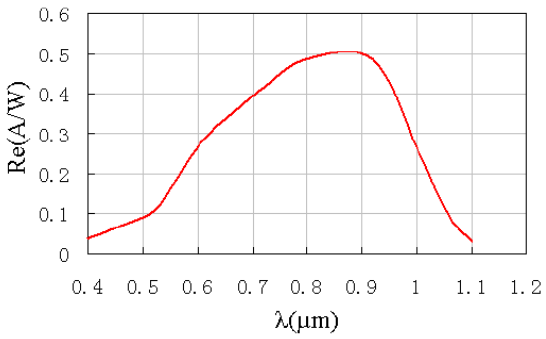


Fig. 2 Typical APD Dark Current

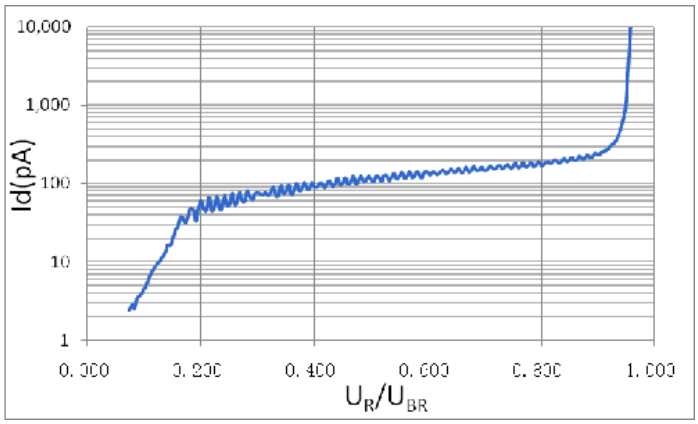


Fig. 3 Typical APD Multiplication (M)

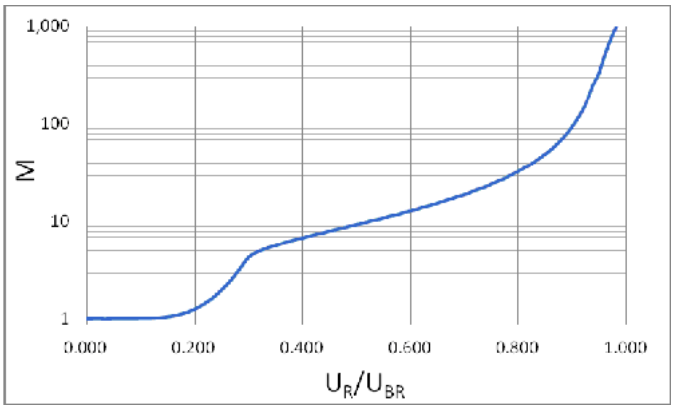
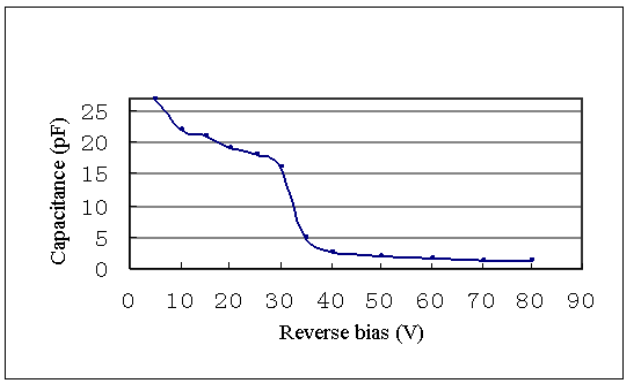
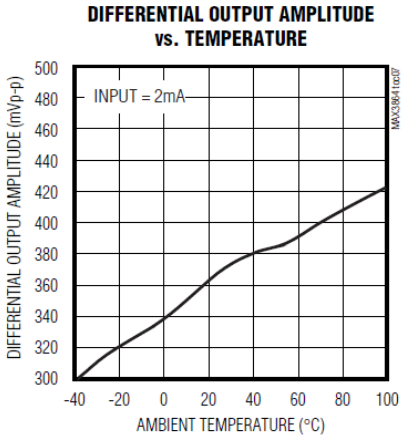
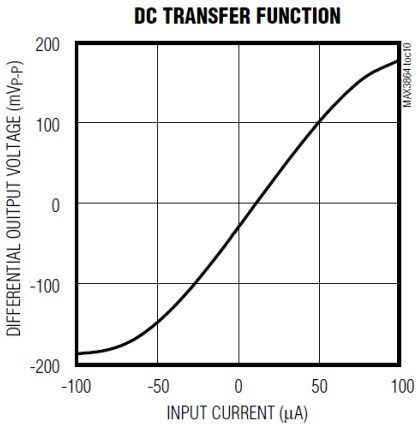


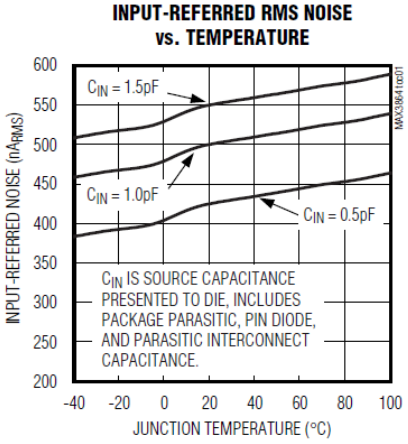
Fig. 4 Typical APD Capacitance



Amplifier Information:







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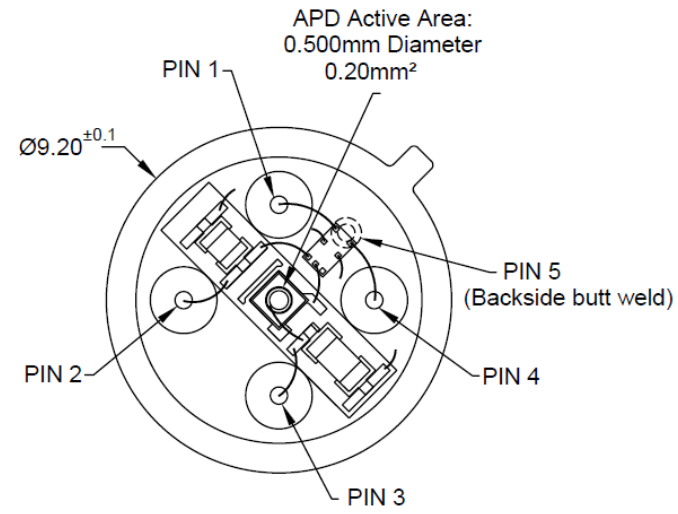
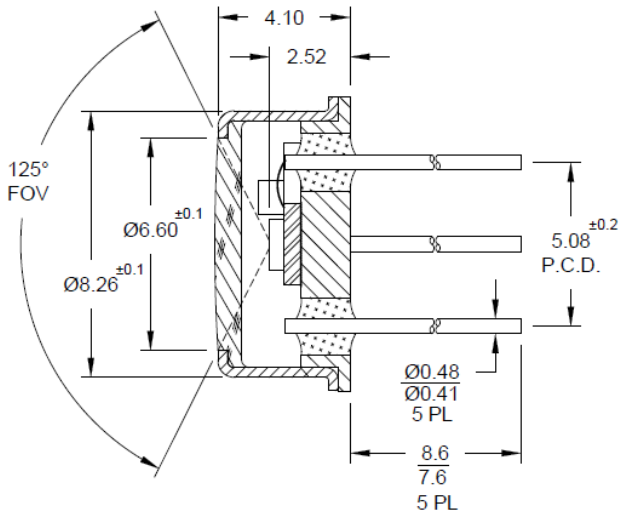
Package Information:



Window Cap removed to show internal construction



Unit: mm, Tolerance: ±0.2

Application Notes:

The MTAPD-05-003 is a high speed optical data receiver. It combines a silicon avalanche photodiode with a transimpedance amplifier in a single hermetic TO5 package.

To operate the MTAPD-05-003 requires a +3.0V to +5.5V voltage supply for the TIA and a separate high voltage supply (+100 to +200V) for biasing the APD.

The APD will perform similar to the typical multiplication (gain) curve in Fig. 3. The TIA produces maximum differential output signals just less than ±200 millivolts. A current limiting resistor must be placed in series with the APD bias voltage to limit the current into the APD and subsequently into the transimpedance amplifier. Failure to limit this current may result in permanent damage/failure of the device. As the value of this resistor can effect performance, an initial value of 390kΩ is recommended as a starting point with additional experimentation providing the optimum resistance value for the application.

As with all high frequency devices, careful attention must be taken when designing the layout and component placement of the carrier PCB/substrate to maximize performance.

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