



PRELIMINARY DATASHEET

Cooled 1064nm Single Photon Counting Avalanche

Photodiode (SPAD)– MMF Fiber Pigtailed

PGA-308-1064

1. Product Description

The RMY SPAD is an InGaAs/InP avalanche photodetector (transferred technology from previous Princeton Lightwave Inc.) designed specifically for single photon counting applications. The device is intended for use at voltage biases above the breakdown voltage (in the so-called “Geiger mode”) so that a single photon incident on the detector will give rise to a macroscopic current pulse. Optimized designed the performance in the 1064nm window, combined with appropriate pulse detection circuitry, this device allows for the detection of single photons in the wavelength range from 0.95 to 1.1 μ m.

The RMY SPAD described in this datasheet is a back-illuminated device provided in a standard TO-8 can, 40 μ m diameter chip is inside. The pigtail is GI 62.5/125 μ m multi-mode optical fiber.

2. Linear Mode Parameters ($T_{OP}=298K$, all voltages and currents are reverse biased)

Parameter Description	Test Conditions	Specifications			Unit
		Min	Typical	Max	
Breakdown voltage (V_b)	at $I_d = 10\mu A$	80	90	100	V
Temperature dependence of V_b	$\Delta V_b/\Delta T$, linear approximation		0.15		V/ $^{\circ}C$
Total Dark Current (I_D)	$M=10$; primarily non-multiplied I_d		10		nA
Capacitance (C)	$M=10$, 1MHz		0.4		pF

3. Low Rate Geiger Mode Parameters ($T_{OP}=233K$, No blanking)

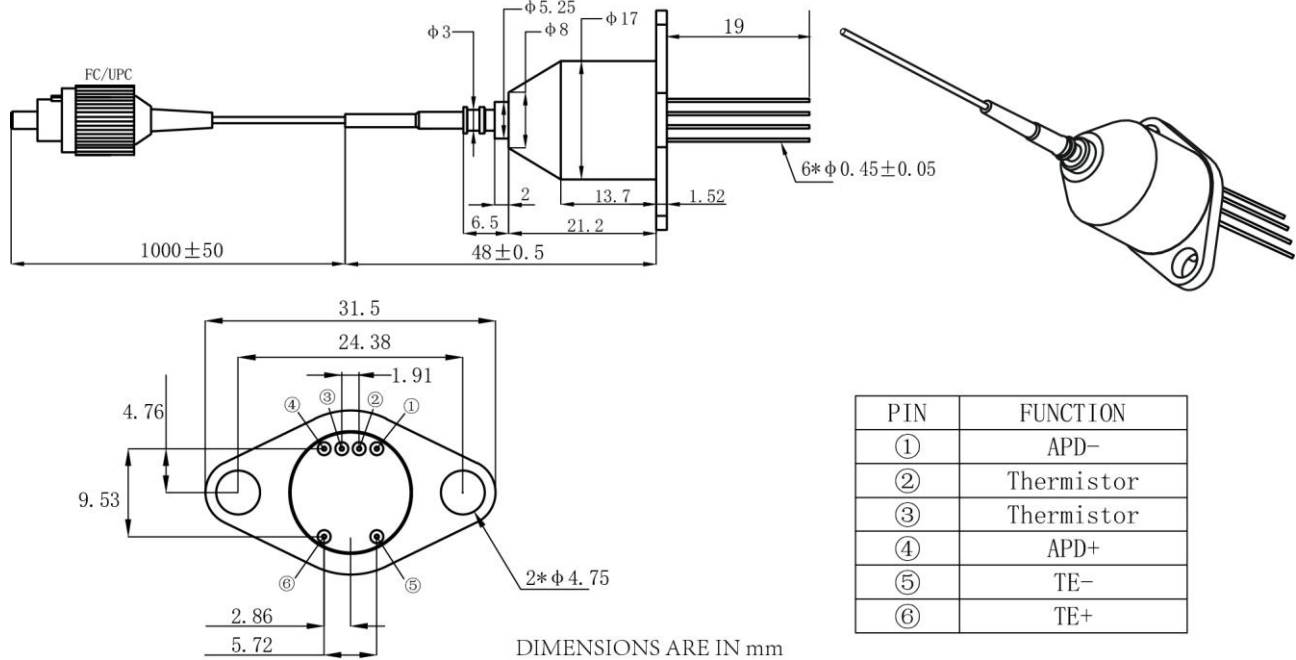
Test Conditions	Parameter Description	Parameter Definition	PGA-308-1064		Unit
			Min	Max	
2MHz Rate Gating 1064nm 1MHz 0.1Photon/Pulse	Detection Efficiency (DE)	at DCR maximum	20		%
	Dark Count Rate (DCR)	at DE minimum		1	kHz
	Afterpulse Probability (APP)	at DE minimum		0.05%	/Pulse

4. High Rate Geiger Mode Parameters ($T_{OP}=233K$, No blanking)

Test Conditions	Parameter Description	Parameter Definition	PGA-308-1064		Unit
			Min	Max	
100MHz Rate Gating 1064nm 10MHz 0.1Photon/Pulse	Detection Efficiency (DE)	at DCR maximum	20		%
	Dark Count Rate (DCR)	at DE minimum		1	kHz
	Afterpulse Probability (APP)	at DE minimum		4%	/Pulse

5. Mechanical Specifications

The PGA-308-1064 is packaged in a standard 6 pin TO-8 header with a three stage thermo-electric cooler capable of cooling the APD from package temperature of 25°C to -50°C (223K). A multimode fiber (62.5/125μm) pigtail with an FC/PC connector is coupled to the APD. Fiber length: 1.0±0.05m



TEC SPECIFICATIONS

Parameter	Conditions	Max	Units
TEC Current		1.5	A
TEC Voltage		1.9	V
TEC deltaT	Device case at 298K	77	°C

Thermistor = 2.20KΩ at 298K, 291.75KΩ at 223K

Steinhart-Hart Thermistor Constants: A=1.629E-03; B=2.242E-04; C=4.316E-09

6. Maximum Ratings

Parameter	Conditions	Min.	Max.	Units
Forward Current	Continuous bias		1	mA
Forward Voltage	Continuous bias		1	V
Reverse Current	Continuous bias		1	mA
Reverse Voltage	Continuous bias		(V _b +5)	V
Reverse Voltage	Pulsed (gated operation)		(V _b +10)	V
Optical Power	Continuous wave (CW)		1	mW

7. Product Handling

These avalanche photodiodes are sensitive to electrostatic discharge (ESD) and should be handled with appropriate caution, including the use of ESD protective equipment such as grounding straps and anti-static mats.

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