PRELIMINARY DATASHEET

Cooled 1064nm Single Photon Counting Avalanche Photodiode – 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 1.1µm.

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

2. Performance Specifications

Parameter Description	Test Conditions	Specifications			Unit
		Min	Typ	Max	
Linear Mode Parameters (temperature 295 K, all voltages and currents are reverse biased)					
Breakdown voltage, V_b	I_d = 10 uA	80	90	100	V
Temperature dependence of V_b, γ	$\Delta V_b/\Delta T$, linear approximation		0.1		V/ºC
Total Dark Current, I_d	M=10; primarily non-multiplied I_d		10		nA
Capacitance, C	M=10, 1 MHz		0.4		pF
Geiger Mode Parameters					
Detection Efficiency, DE	T=233K, 1064 nm, at DCR max	20			%
Dark Count Rate, DCR	T=233K, 1064 nm, at DE min			10	kHz
Afterpulse Probability(APP)	T=233K, 1064 nm, at DE min		$2x10^{-4}$		

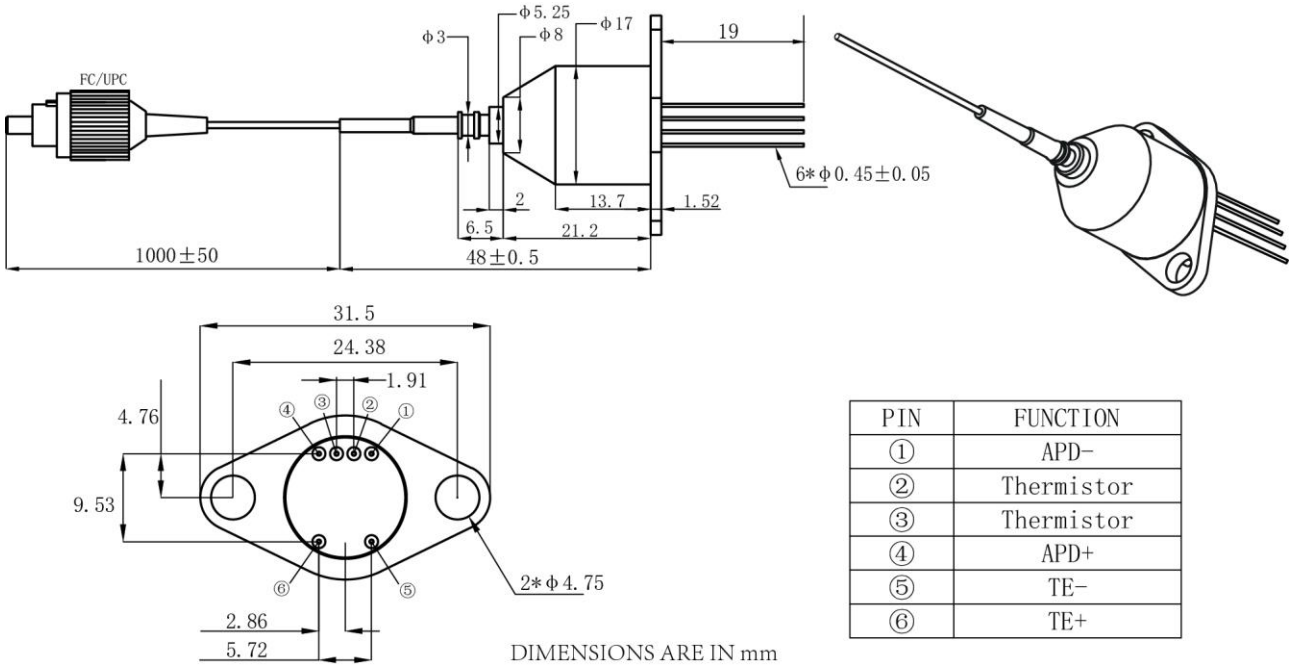
3. Maximum Ratings

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

Maximum ratings indicate conditions that the device can be exposed for short periods of time without damage. Although InGaAs SPADs are sometimes operated at temperatures below -60 °C, these devices have not yet been tested to establish their reliability characteristics at very low temperatures and under extreme conditions of thermal cycling.

4. 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



PIN	FUNCTION
①	APD−
②	Thermistor
③	Thermistor
④	APD+
⑤	TE−
⑥	TE+

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

5. 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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