

PAD Series High Sensitivity Large Area APD Components



Princeton Lightwave's PAD series APD offers industry-leading performance in terms of dark current, sensitivity, and reliability. It leverages Princeton Lightwave's proprietary high-performance, planar InP-InGaAs APD device design, and high-reliability packaging platforms. The device is designed for operation in the linear mode with voltage bias below breakdown, at typical optical gains of 10-15. The APDs employ a front-illuminated design and are packaged in either a standard TO-18 or ceramic sub-mount.

The component manufacturing occurs in a high-quality, ISO certified facility. Every device undergoes a rigorous quality and reliability regimen, including temperature cycling and high temperature, high bias burn-in. The package construction is organic free with hermetic sealing of the APD. These devices are designed to operate robustly in harsh environment applications.

Applications

- Laser Radar (LADAR) and Range finding
- Low-level Optical Pulse Discrimination
- Free-space Optical Communication
- Optical Time Domain Reflectometry
- Confocal Microscopy

Key Features and Benefits

- 80 or 200 μm InGaAs APD
- Small form-factor design
- Low dark current
- High-reliability, hermetic packaging
- High responsivity in the 0.95-1.65 μm wavelength



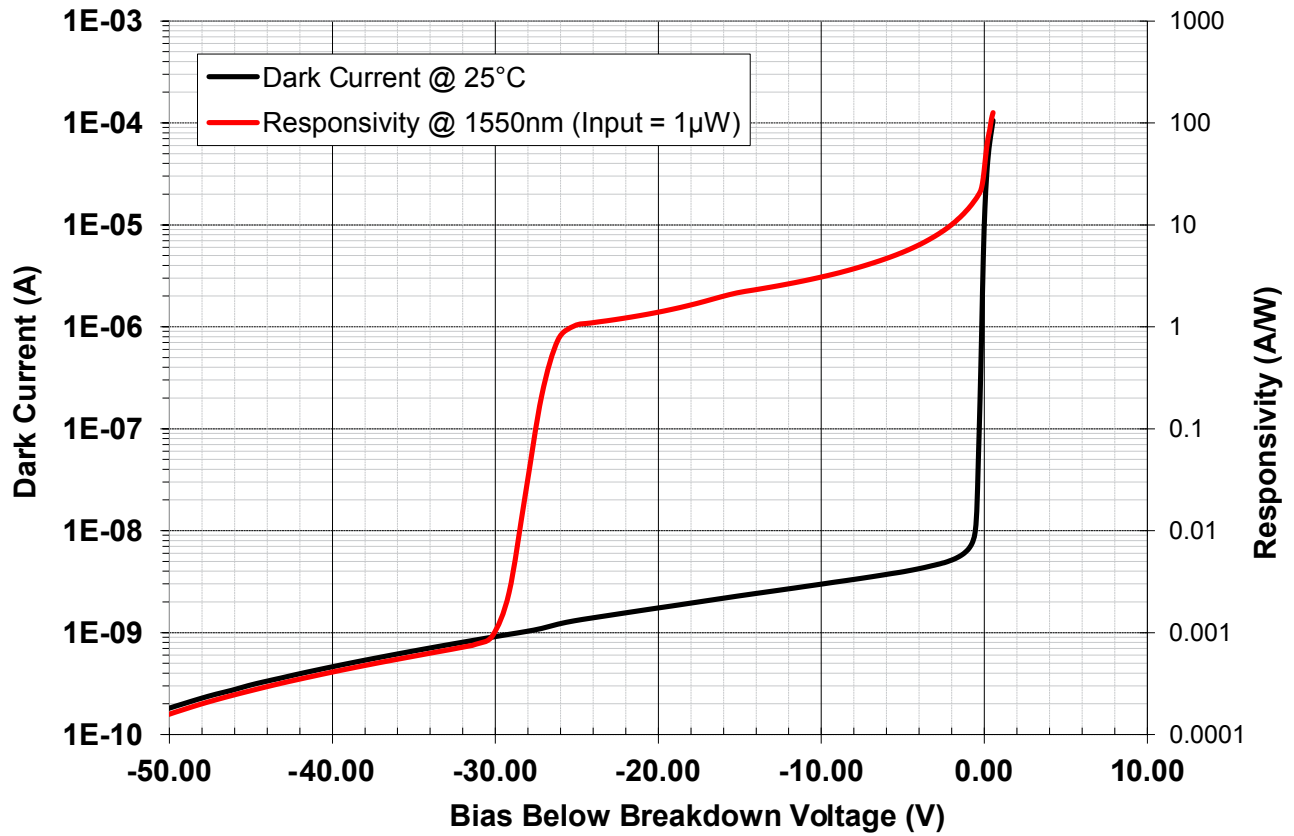
Performance Specifications

Parameter	Conditions	Specifications PAD-080u-1550TO			Specifications PAD-200u-1550TO			Units
		Min	Typ.	Max	Min	Typ.	Max	
Effective Optical Diameter			80			200		μm
Breakdown Voltage, V_b	$I_d = 10 \mu\text{A}$	55		80	55		80	V
Temp. Dependence of V_b , $\Delta V_b/\Delta T$			0.1			0.1		V/ $^{\circ}\text{C}$
Responsivity, R	1550 nm, M=1		0.85			0.85		A/W
Total Dark Current, I_d	M=10		3	10		5	50	nA
Dark Noise Current Density, J_n	M=10		0.2			0.4		pA/ $\sqrt{\text{Hz}}$
Capacitance, C^{\dagger}	Differential output		0.8	1		1.8	2	pF
Bandwidth, F_{3dB}	M=10, Referenced to 1 MHz		1			0.4		GHz
Noise Equivalent Power, NEP	M=10, $\lambda = 1550 \text{ nm}$		0.027			0.050		pW/ $\sqrt{\text{Hz}}$

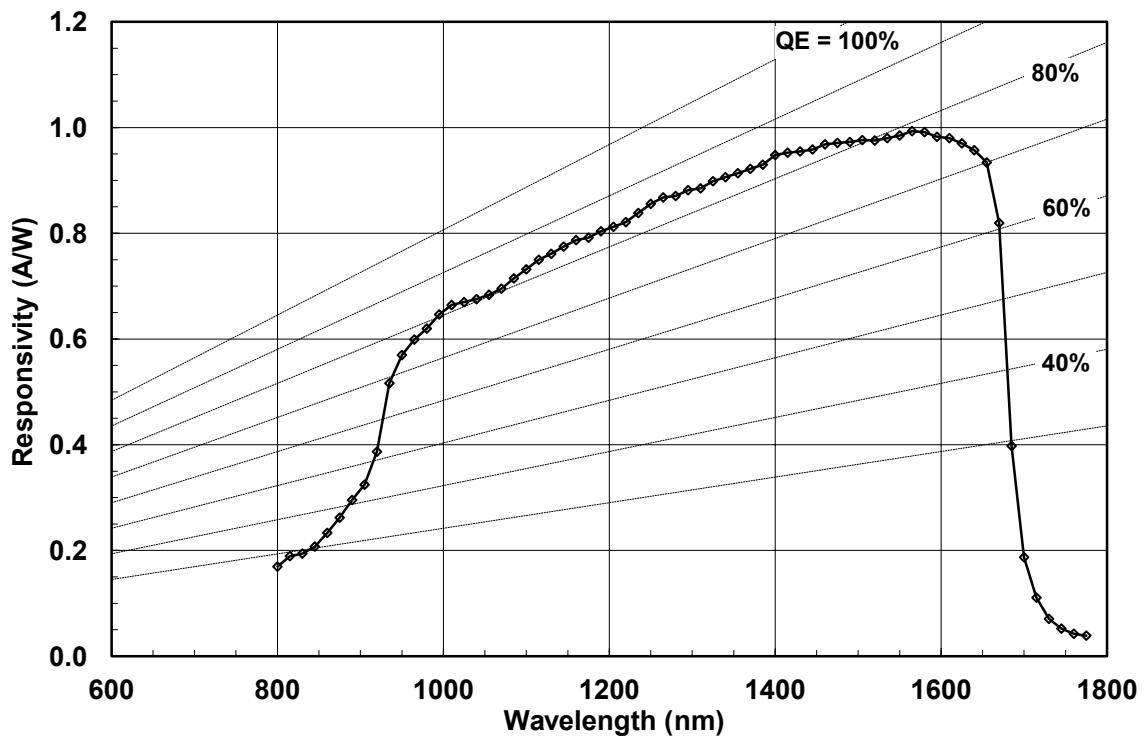
† Capacitance values include the package capacitance, COC capacitance is 0.15 pF lower

PAD-200u-1550TO 200 μ m Active Area Linear Mode APD

Typical Response Curve v. Bias



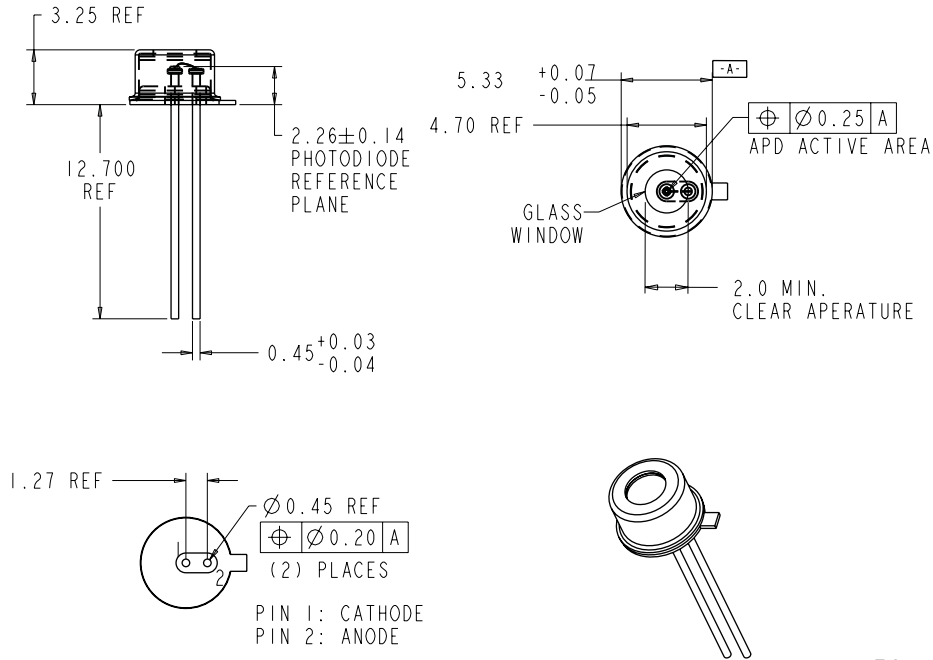
Normalized Spectral Response for PDA Series APD



MECHANICAL SPECIFICATIONS

PAD-080u-1550TO and PAD-200u-1550TO in TO-18

The PAD-080u-1550TO and PAD-200u-1550TO are provided in a standard 2-lead TO-18 housing.



TO-18 Pin-out

Pin	Function
1	Cathode
2	Anode

Princeton Lightwave's large area APDs can be provided on a customer-supplied or Princeton Lightwave designed ceramic sub-mount.

ABSOLUTE MAXIMUM RATINGS¹

CW operation unless specified

Parameter	Min	Max	Units
Storage Temperature	-40	85	°C
Operating Temperature	-40	85	°C
Forward Current		+1	mA
Forward Voltage		+1	V
Reverse Current		-1	mA
Reverse Voltage		V _b	V
CW Optical Power ²		1	mW

1. Maximum operating ratings indicate operating conditions that the device can sustain without damage for short time intervals. Long term operation under these conditions is not recommended.
 2. Assumes a beam spot > 50 um in diameter

PRODUCT HANDLING

These APDs 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.

Ordering Information

PAD-080u-1550TO

80 um APD in TO-18 (formerly PLA-280)

PAD-200u-1550TO

200 um APD in TO-18 (formerly PLA-200)

Specifications subject to change without notice

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