

Large Area Avalanche Photodiode

PLA-xx0 series



The Princeton Lightwave Large Area APD is a discrete InGaAs/InP avalanche photodetector designed for high performance in linear mode applications requiring a large optical active area. The device is intended for use at voltage biases below breakdown to provide gains

on the order of 10 to 15, for which most APD-based receivers achieve optimal performance. This APD has high responsivity in the wavelength range from 0.95 to 1.65 μm .

The PLI Large Area APD described in this datasheet is a front-illuminated device provided either in a standard TO-18 can with a window cap or on a custom ceramic. Devices are available with a clear optical active area of 80 μm , and 200 μm .

Performance Specifications

Parameter Description	Test Conditions	80 μm APD Specifications			200 μm APD Specifications			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Optical Diameter			80			200		μm
Breakdown Voltage, V_b	$I_d=10 \mu\text{A}$	40		80	40		80	V
Temperature Dependence of V_b , γ			0.15			0.15		V/ $^{\circ}\text{C}$
Responsivity, R	1550 nm, M=1	0.85			0.85			A/W
Total Dark Current, I_d	M=10		3	15		10	50	nA
Dark Noise Current Density, J_n	M=10		0.22			0.40		pA/ $\sqrt{\text{Hz}}$
Capacitance, C	M=10, 1 MHz		0.8	1.0		1.8	2.0	pF
Bandwidth, F_{3dB}	M=10, 50 Ω load		1.0			0.4		GHz
Noise Equivalent Power, NEP	1550 nm		0.027			0.050		pW/ $\sqrt{\text{Hz}}$

- NOTES: [1] All specifications at 22 $^{\circ}\text{C}$, unless noted otherwise.
 [2] All currents and voltages are reverse bias, unless noted otherwise.
 [3] Capacitance values for APD chip only. Packaged-related capacitance will add to these values.

Maximum Ratings

Parameter	Conditions	Min.	Max.	Units.
Storage Temperature		-40	+85	$^{\circ}\text{C}$
Operating Temperature		-40	+85	$^{\circ}\text{C}$
Forward Current			+1	mA
Forward Voltage			+1	V
Reverse Current			-1	mA
Reverse Voltage			V_b	V
Optical Power (cw)	Assumes beam spot > 50 μm diameter		1	mW

Maximum ratings indicate conditions under which the device may be damaged during short periods of time and which should be avoided.

Mechanical Specifications

APD in TO-18 package

The TO-18 package is an industry-standard format in which the chip is mounted directly to the center pin of the package.

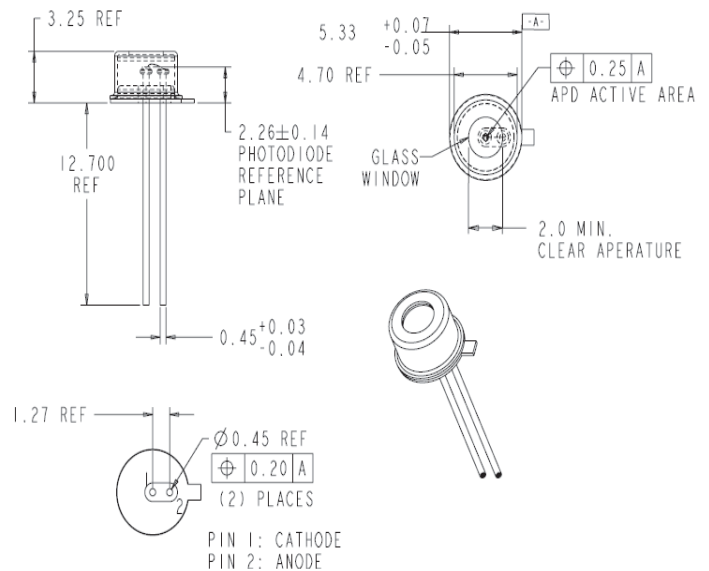
The TO-18 package adds approximately 0.15 pF to the chip capacitance.

TO-18 Pin-out

Pin	Description
#1	Cathode
#2	Anode

APD on Ceramic Submount

PLI's large area APDs can be provided on a customer-supplied submount or on a submount of PLI's design. The submount will generally add approximately 0.1 to 0.2 pF of capacitance to the chip capacitance, although this value will depend on the submount design.



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.

Ordering Information

Product Number	Description
PLA-280	80 μ m APD in TO-18
PLA-200	200 μ m APD in TO-18
PLA-180	80 μ m APD on Submount
PLA-100	200 μ m APD on Submount