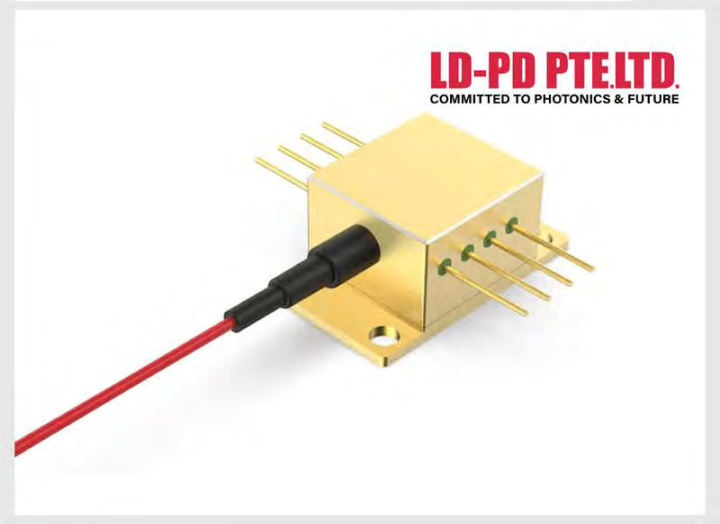
SPD6528Q InGaAs Negative-Feedback Avalanche Photodiode Module



Description

The SPD6528Q is a Geiger-mode InGaAs avalanche photodiode (APD) module with single-photon sensitivity and integrated negative feedback resistance. It utilizes Geiger-mode high gain to amplify detected photons into macroscopic current, while the feedback resistor dynamically quenches and restores the avalanche field.

The module integrates an NFAD chip, capacitor, thermistor, ceramic carrier, and TEC in a butterfly hermetic package with metalized fiber coupling. Optical input: 62.5 μm multimode fiber (0.9 mm tight buffer) with FC/UPC connector.

Key Parameter

Main Optoelectronic Indicators

1. Linear mode parameters

Parameters1. Linear mode parameters	Test conditions（unless otherwise specified， TC =25±5℃)	Min	Max	Unit
Spectral response range	—	950	1650	nm
Reverse breakdown voltage V_{BR}	I_R=10 μA ， Φe=0	60	85	V
Responsivity Re	Φe=1μW， $V_R=(V_{BR}-1)$V, λ=1550 nm±50 nm	8		A/W
Dark current I_D	$V_{DC}=(V_{BR}-1)$ V， Φe=0		1	nA
Capacitance C_{tot}	$V_{DC}=(V_{BR}-1)$ V， f=1MHz	—	0.6	pF
Integrated resistance (Re)	I=200μA,Φe=0	200±50		KΩ
Breakdown voltage temperature coefficient η	T_C =-45 ~ +30℃ , I_R =10μA， φ_e=0	0.10	0.15	V/℃

2. Geiger Mode Parameters

Parameters	Test Conditions TC =-40±3℃ , fp=50KHz	Min	Max	Unit
Single photon detection efficiency PDE	λ=1550nm	15		%
Dark count rate DCR	PDE=15%		10	kcps
After pulse probability APP	PDE=15% ， λ=1550nm ， Δt=1us		15	%
Pulse output amplitude Vout	PDE=15% ， R=50 Ω	0.5		mV

Note: λ is the wavelength of incident light, fp is the frequency of the optical pulse signal, and R is the sampling resistor.

Absolute Maximum Ratings and Recommended Operating Conditions

Item		Parameter	Rating
Absolute Maximum Ratings	1	Storage temperature T_{STG}	-50℃~+85℃
	2	Operating environment temperature T_C	-50℃~60℃
	3	Soldering temperature T_{sld} (time)	260℃（10s）
	4	Reverse D_C bias voltage V_{DC}	VBR+5 V
	5	Input optical powerφe（continuous）	1 mW
	6	Forward currentIF（continuous）	200 μA
	7	Electrostatic discharge sensitivity E_{SD}	≥300 V
	8	Pigtail pulling force	3.0 N

Item		Parameter	Rating
Recommended Operating Conditions	1	APD chip operating temperature T_{th}	-50℃~-30℃
	2	Reverse D_C bias voltage V_{DC}	V_{BR}+1V～V_{BR}+5V

Typical characteristic curve

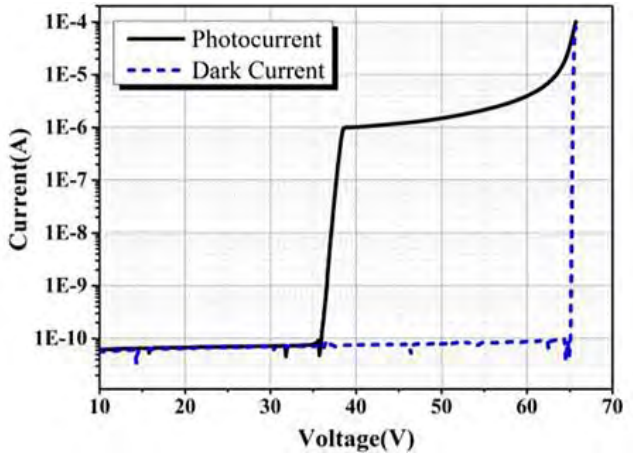


Figure 1 Photocurrent and dark current curves

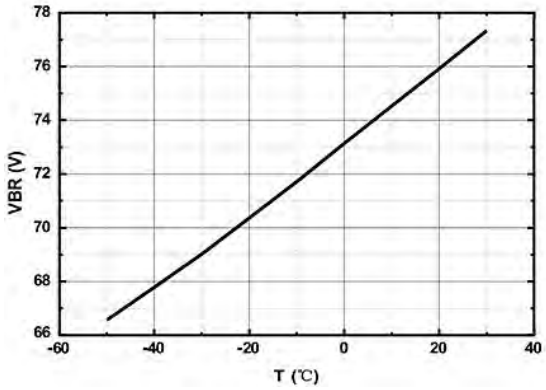
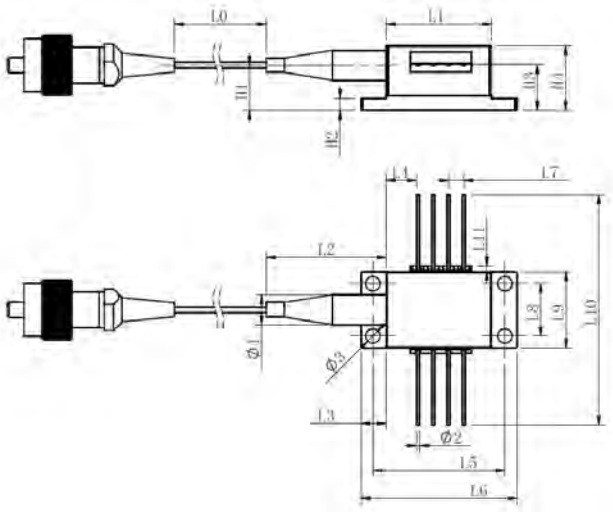


Figure 2 Breakdown voltage temperature coefficient

Dimensions and Pin definitions

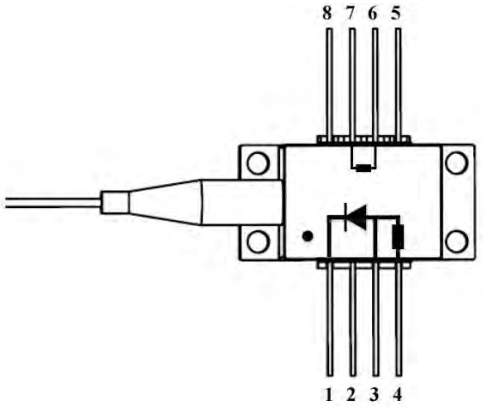
Package Outline



Dimensions

Symbol	Min		Max	Symbol	Min		Max	Symbol	Min		Max
H1	7.40	7.45	7.50	L2	10.00	13.50	30.00	L8	8.70	8.90	9.10
H2	1.80	2.00	2.20	L3	4.05	4.25	4.45	L9	12.50	12.70	12.90
H3	7.57	7.77	7.97	L4	3.74	3.94	4.14	L10	38.20	38.40	38.60
H4	10.50	10.70	10.90	L5	21.80	22.00	22.20	ϕ 1	3.00	3.50	6.60
L0	1000.0	-	-	L6	25.80	26.00	26.20	ϕ2	0.40	0.50	0.60
L1	17.30	17.50	17.70	L7	-	2.54	-	ϕ3	2.20	2.40	2.60

Equivalent Circuit and Pin Definitions



Pin#	Function	Pin#	Function
1	Diode N (APD_N)	5	TEC-
2	Case Ground (GND)	6	Thermistor (R_th)
3	Diode P (APD_P)	7	Thermistor (R_th)
4	Signal Ground (DGND)	8	TEC+

TEC\NTC Electrical parameters

NTC (Thermistor): RT=10 kΩ @ 25℃, β=3450,5%.

TEC (Thermoelectric Cooler): IMAX=0.8 A, VMAX=11.9 V, THMAX=200℃

Ordering Info

SPD6528Q-XX-XX/XXX(XXX)

XX:Fiber Type

SM

MM(62.5)
MM(50)
XX/XXX:Fiber Connector
XX: FC
SC
LC
NC
XXX:UPC
APC
(XXX):Fiber Length
1.0m
1.5m

Note:

● The product is an electrostatic sensitive device, and ESD protection must be taken during storage and use.

● The bending radius of the product fiber is not less than 30mm. Avoid fiber breakage and contamination or damage to the connector during storage and use.

● The product requires external refrigeration. The clamping carrier used for refrigeration needs to be made of a material with good thermal conductivity, keep the cavity wall at one end of the device lead and the contact surface of the clamping carrier tightly matched, and apply thermal conductive material on the contact surface of the two.

● The product should be stored in a clean environment with ventilation and no corrosive gas at a temperature of -10~+40℃ and a relative humidity of no more than 80%.