SPD6524Q Dual-Channel InGaAs

SPAD Detector Module



Description

The SPD6524Q is a Geiger-mode InGaAs avalanche photodiode (APD) module with Dual-Channel. Operating wavelength 0.95μm ~ 1.65μm; Specifically designed for single-photon detection applications; Internally integrated with a three-stage cooler; Butterfly hermetically sealed dual-channel module with pigtail.

Features

- Operating wavelength: 0.95μm ~ 1.65μm;
- Specifically designed for single-photon detection applications;
- Internally integrated with a three-stage cooler;
- Butterfly hermetically sealed dual-channel module with pigtail.

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Key Parameter

Main Optoelectronic Indicators

1. Linear mode parameters

Parameters	Test conditions（unless otherwise specified， TC =25±5℃)	Min	Max	Unit
Effective detection surface diameter	—	25	—	μm
Spectral response range	—	950	1650	nm
Reverse breakdown voltage V_{BR}	I_R=10 μA ， Φe=0	60	85	V
Responsivity Re	Φe=1μW， VR=(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 Ctot	V_{DC} =(V_{BR}-1) V， f=1MHz	—	0.2	pF
Breakdown voltage temperature coefficient η	TC =-45～+30℃ , IR =10μA， φe=0	0.10	0.2	V/℃

2. Geiger Mode Parameters

Parameters	Test Conditions	Min	Max	Unit
Single photon detection efficiency PDE	T_A = -30±5℃, μ=1, fg = 100 MHz, f_P = 500 kHz, D_{CR} ≤ 5.0 kHz ， λ = 1.55μm	10		%
Dark count rate DCR	TA = -30±5℃, fg = 100 MHz， SPDE = 10%±0.5 % ， λ = 1.55μm		2.5	kHz
After pulse probability APP (1000 ns)	TA = -30±5℃, μ=1, fg = 100 MHz, fP = 500 kHz, SPDE = 10%±0.5 % ， λ = 1.55μm		3	%
Time jitter TJ	S_{PDE}=10%		500	ps

Note: λ is the incident light wavelength, T_a is the test temperature value, μ is the average number of photons per pulse, fg is the gating signal frequency, and f_p is the optical pulse signal frequency.

Absolute Maximum Ratings and Recommended Operating Conditions

Item		Parameter	Rating
Absolute Maximum Ratings	1	Storage temperatureTSTG	-50℃~+85℃
	2	Operating environment temperatureTC	-50℃~60℃
	3	Soldering temperatureTsld（time）	260℃（10s）
	4	Reverse DC bias voltage VDC	VBR+5 V
	5	Input optical powerφe（continuous）	1 mW
	6	Forward currentIF（continuous）	200 μA
	7	Electrostatic discharge sensitivityESD	≥300 V
	8	Pigtail pulling force	3.0 N
	9	TEC voltage	11.9 V
	10	TEC current	0.8 A

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

Typical characteristic curve

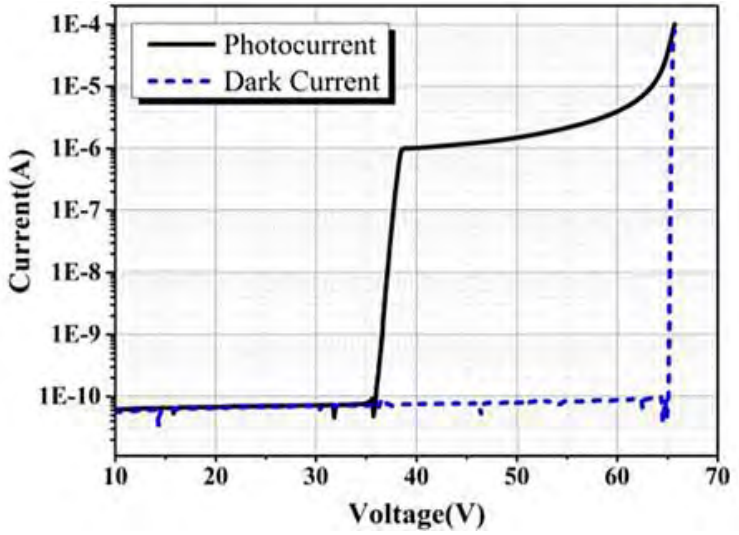


Figure 1 Photocurrent and dark current curves

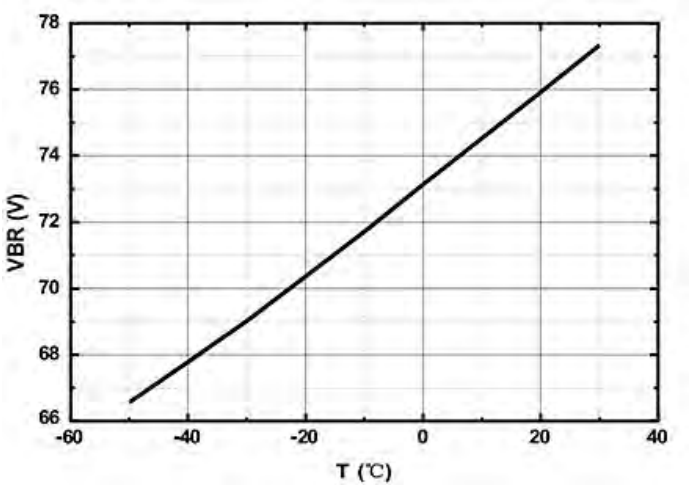
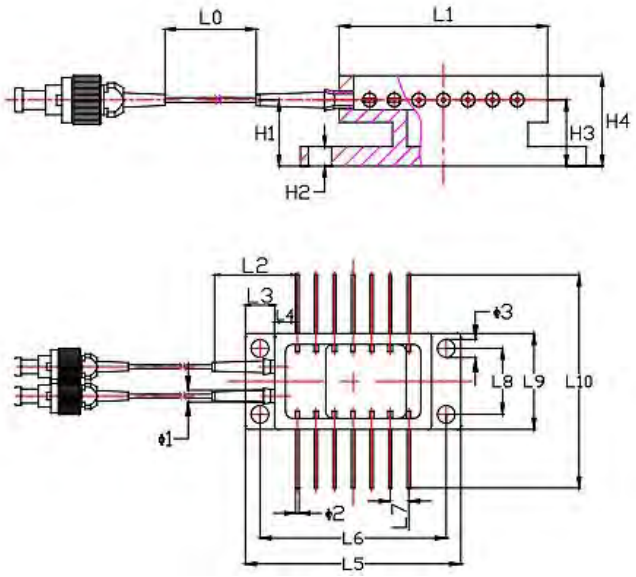


Figure 2 Breakdown voltage temperature coefficient

Dimensions and Pin definitions

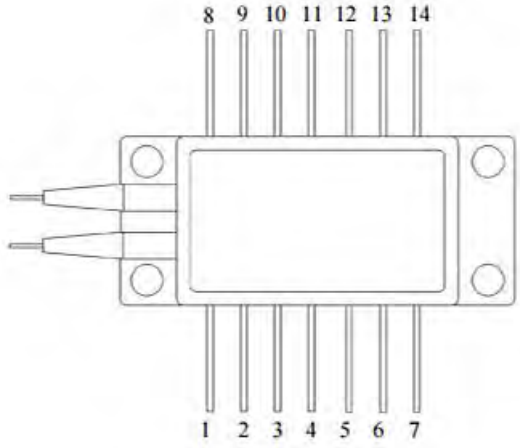
Package Outline



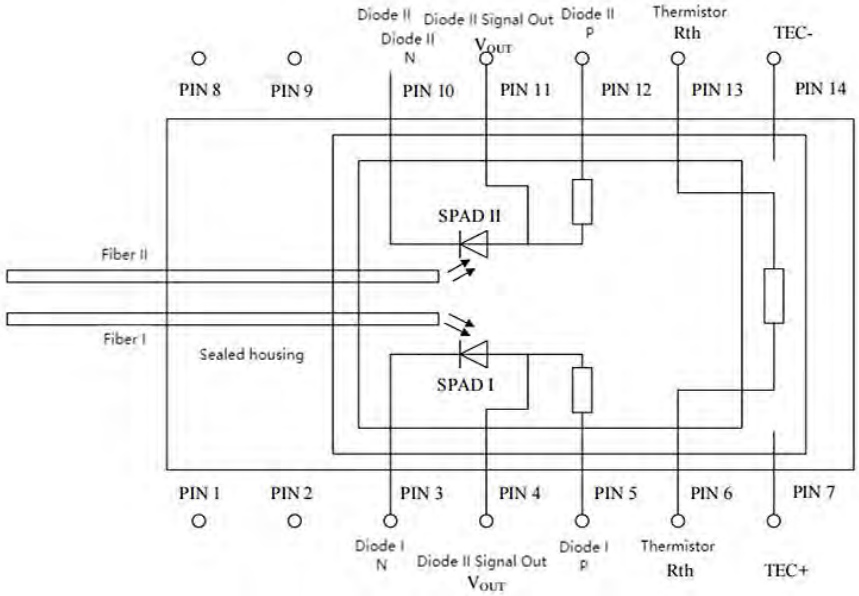
Dimensions

Symbol	Min		Max	Symbol	Min		Max	Symbol	Min		Max
H1	6.5	-	7.0	L2	10.0	-	30.0	L8	8.8	-	9.2
H2	1.8	-	2.2	L3	3.8	-	4.2	L9	12.5	-	13.5
H3	6.5	-	7.0	L4	3.0	-	3.3	L10	28.5	-	30.5
H4	9.0	-	10.5	L5	29.2	-	29.8	ϕ 1	3.0	-	6.6
L0	1000.0	-	-	L6	24.5	-	25.5	ϕ2	0.35	-	0.50
L1	21.2	-	21.8	L7	-	2.54	-	ϕ3	2.2	-	2.6

Equivalent Circuit and Pin Definitions



Pin#	Function	Pin#	Function
1	Reserved	8	Reserved
2	Reserved	9	Reserved
3	Diode I (N)	10	Diode II (N)
4	Diode I Signal Out (Vout)	11	Diode II Signal Out (Vout)
5	Diode I (P)	12	Diode II (P)
6	Thermistor (Rth)	13	Thermistor (Rth)
7	TEC+	14	TEC-



Electrical Block Diagram

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

SPD6524Q-XX-XX/XXX(XXX)

XX:Fiber Type

SM

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%.