

1,7 μ m Single Photon InGaAs Avalanche Photodiode

for Geiger Mode Operation, Single Photon Detection

SPAD Series

800nm – 1700nm

Stand 2025

Electro-Optical Characteristics & Specifications T(ambient) @ +25°C

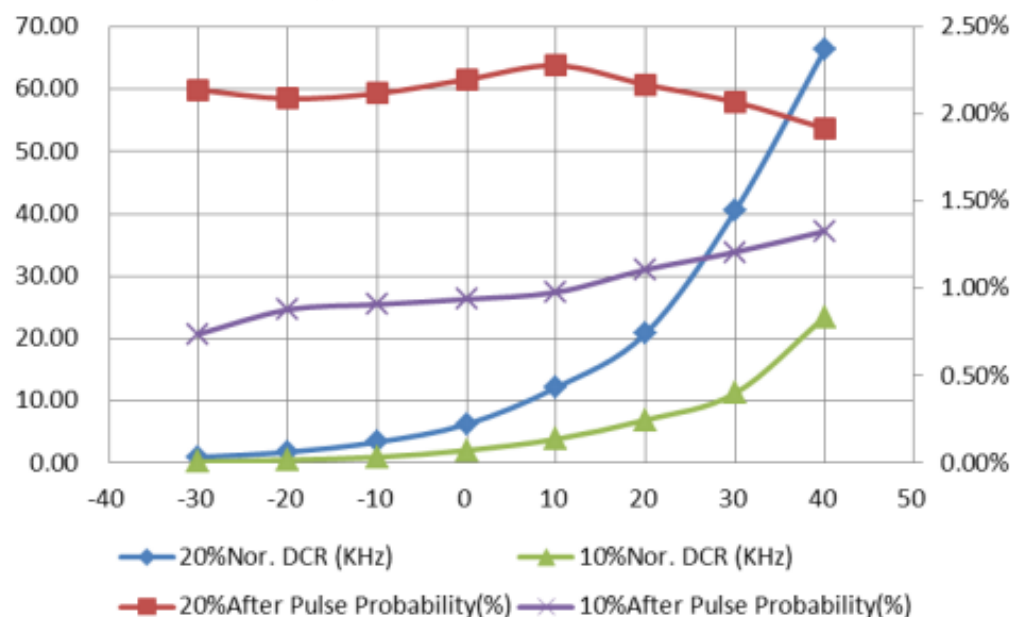
Parameter	Condition	Min	Typ	Max	Unit
GEIGER MODE					
Detection Efficiency, PDE	0,1ph/Pulse, λ_p 1,55 μ m	20			%
Dark Count Rate, DCR	F 100MHz, PDE 20%			10	kHz
Afterpulsing, APP	F100MHz, PDE 20%			1,5	%

Custom Options DCR < 3kHz @ 0°C APP < 0,5% @ 0°C

Absolute Maximum Ratings T(ambient) @ +25°C

Parameter	Condition	Min	Typ	Max	Unit
Operating Temperature		-50		+ 80	°C
Storage Temperature		-50		+ 85	°C
Soldering Temperature	260°C			10	s
Reverse Voltage	Vbr			80	V
Overbias Pulse Amplitude				10	V
Optical Power	CW			1	mW
Forward Current	CW			1	mA
ESD				>/=300	V

DCR and APP Typical Curves



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Devices, Overview

Name	Part No.	Drawing
InGaAs SPAD 3pin TO46 With fiber	PGA-284	
TEC InGaAs SPAD 6pin TO8 with fiber	PGA-285	
	PGA-286	
TEC InGaAs SPAD 10pin	PGA-287	

The information in this data sheet is believed to be correct and reliable. However, no responsibility is assumed for possible inaccuracies or omissions. The specifications are subject to change without notice.

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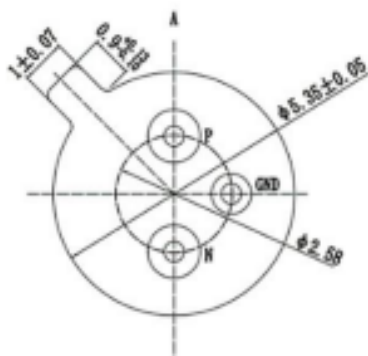
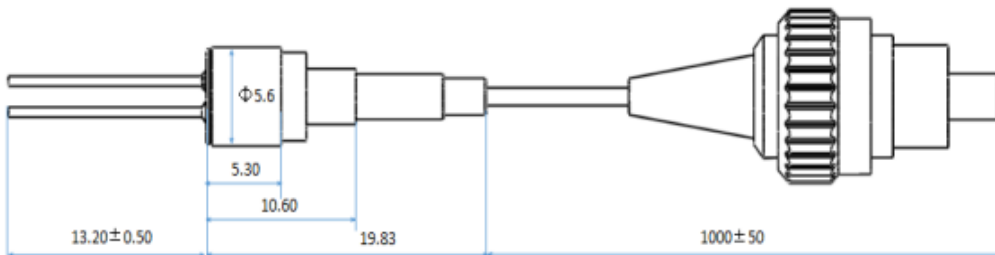
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Mechanical Dimensions & Pin Layout

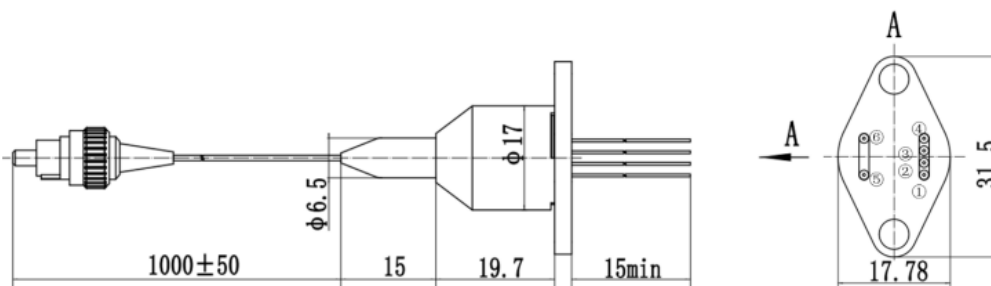
PGA-284 InGaAs SPAD 3pin TO46 Pigtailed Coaxial Type



Bottom Layer



PGA-285 TEC3 Type of InGaAs SPAD 6pin TO8 Pigtailed Coaxial



Unit: mm

①	APD -
②	NTC
③	NTC
④	APD +
⑤	TEC-
⑥	TEC+



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TEC & NTC Specifications

TEC (323k / N2)

Parameter	Unit	MAX
ΔT_{max}	K	113
Q_{max}	W	0.4
ΔI_{max}	A	0.7
U_{max}	V	4.3
ACR	Ohm	5.51

Thermistor

5 k Ω at 25°C

Thermistor Constant

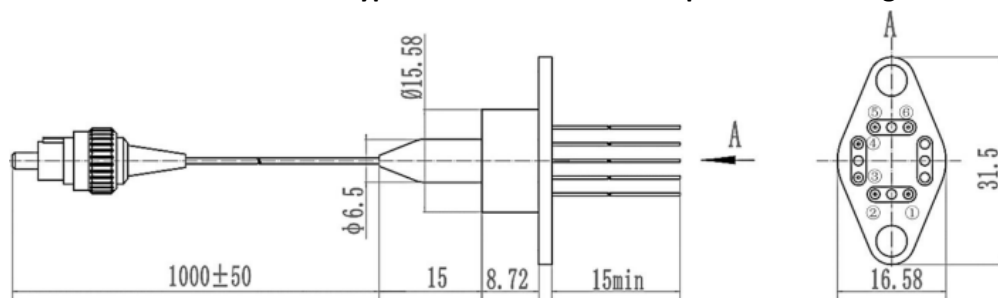
A = 1.2548E-03, B = 2.3738E-04, C = 1.3222E-07

PGA-286

TEC Type of InGaAs SPAD

6pin TO8

Pigtailed Coaxial



Unit: mm

①	TEC-
②	TEC+
③	APD +
④	APD -
⑤	NTC
⑥	NTC



TEC & NTC Specifications

TEC (323k / N2)

Parameter	Unit	MAX
ΔT_{max}	K	119
Q_{max}	W	0.8
ΔI_{max}	A	2.5
U_{max}	V	2.2
ACR	Ohm	0.78

Thermistor

5 k Ω at 25°C

Thermistor Constant

A = 1.2548E-03, B = 2.3738E-04, C = 1.3222E-07

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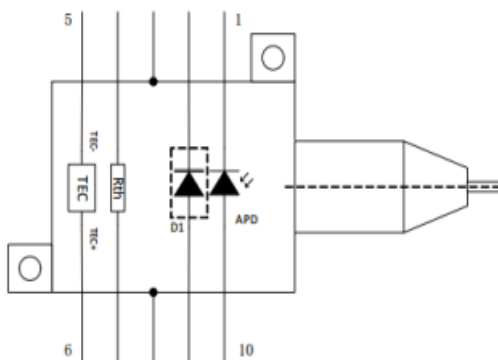
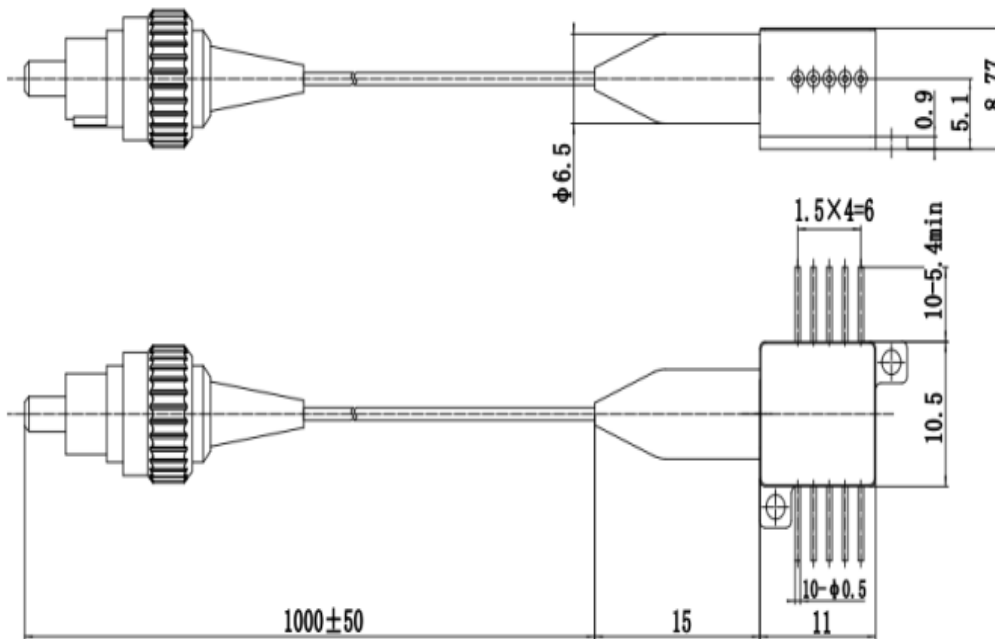
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PGA-287 TEC type of InGaAs SPAD 10pin Butterfly package



Pin Number	Symbol	Description
1	APD_C	APD cathode
2	D1_C	Balance diode cathode
3	GND	Case ground
4	TH1	Thermistor terminal 1
5	TEC-	TEC negative terminal
6	TEC+	TEC positive terminal
7	TH2	Thermistor terminal 2
8	GND	Case ground
9	D1_A	Balance diode anode
10	APD_A	APD anode

TEC & NTC Specifications

TEC (323k / N2)

Parameter	Unit	MAX
ΔT_{max}	K	119
Q_{max}	W	0.8
ΔI_{max}	A	2.5
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ACR	Ohm	0.78

Thermistor

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Thermistor Constant

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Sample Test Data of the PGA-287

PGA287						
Device PN	PGA287	Version	A001	Quantities	7 PCS	
Device SN	L20240419	Chip SN	SPAD012	PKG	4	
● Test Condition						
Mean photon Number	Optical pulse frequency	Gate pulse frequency	Gate Pulse	Temperature	Gate pulse amplitude	
0.1/ Gate	10MHz	100MHz	1 ns	-30°C	5.4V	
● Test results						
Device ID	LM(@23°C)		GM(@PDE=20%)			
	VBR (ID=10 μ A)	Id(@ Vbr-2V)	PDE	DCR	APP (100ns)	
	V	A	%	kHz	%	
L2024041904	63.26	2.03E-09	20.1	0.17	0.75	
L2024041905	63.09	1.78E-09	20	0.15	1.92	
L2024041907	62.32	1.65E-09	20.4	0.18	1.1	
L2024041908	62.15	1.78E-09	20.2	0.26	1.44	
L2024041910	62.28	1.72E-09	20.4	0.16	0.54	
L2024041912	62.86	1.82E-09	20.4	0.98	1.38	
L2024041913	62.12	1.70E-09	20.4	0.44	1.06	

Sample PGA-287 I-V Curve

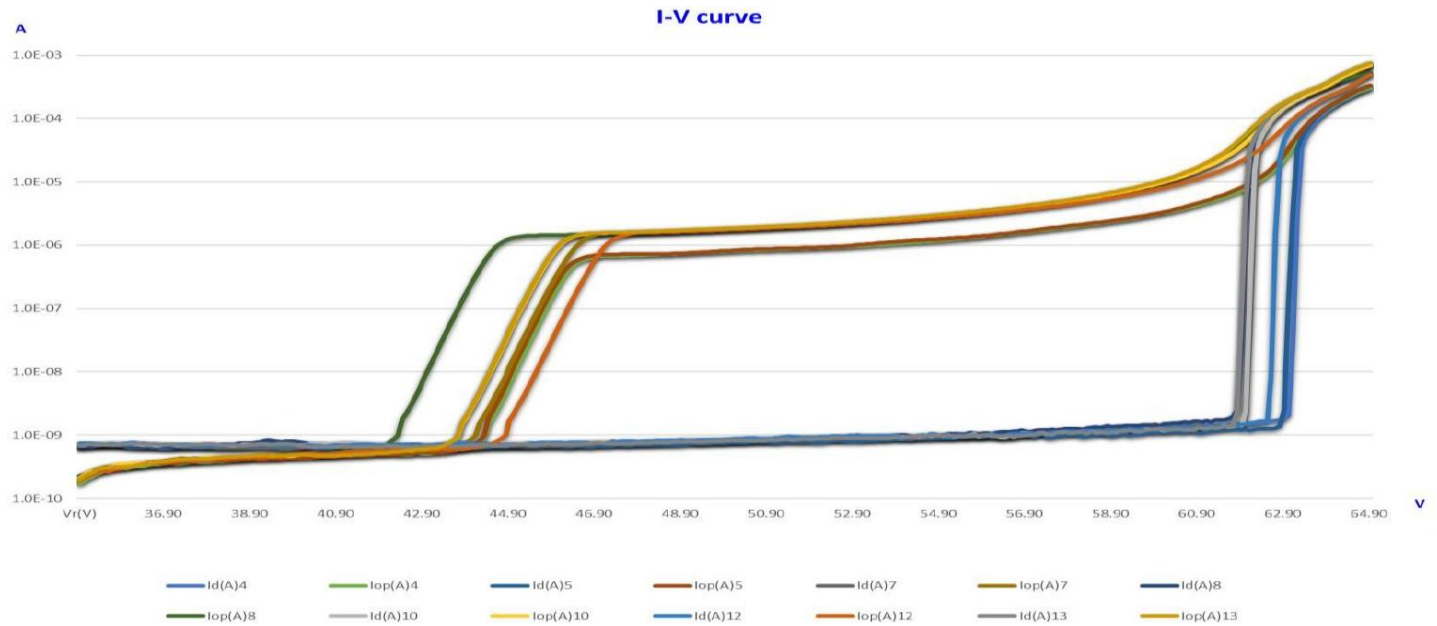
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Sample PGA-287 Questions & Responses

TEC	All with a 3 stages TEC	= TE3
TEC Operating Conditions	PGA-285, PGA-286	I _{max} 1,1A U _{max} 3,7V
	PGA-287	I _{max} 0,76A U _{max} 3,7V
TEC Lowest operating Temperature	-48°C	
Delta T between T @ Chip and T @ ambient	see below curves:	

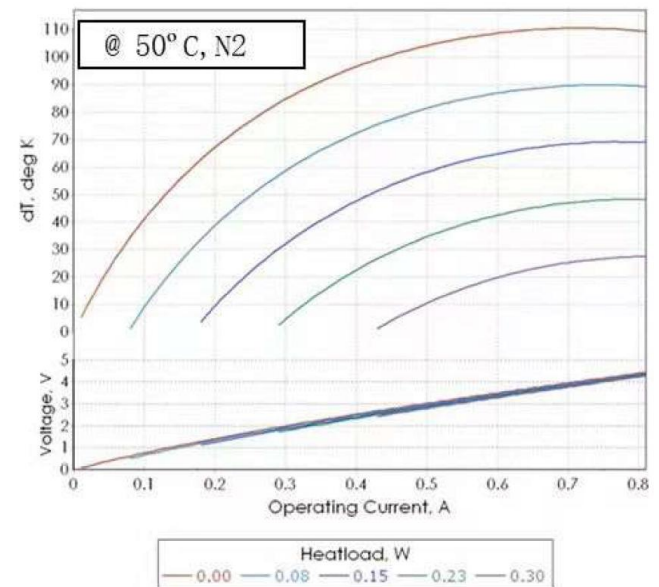
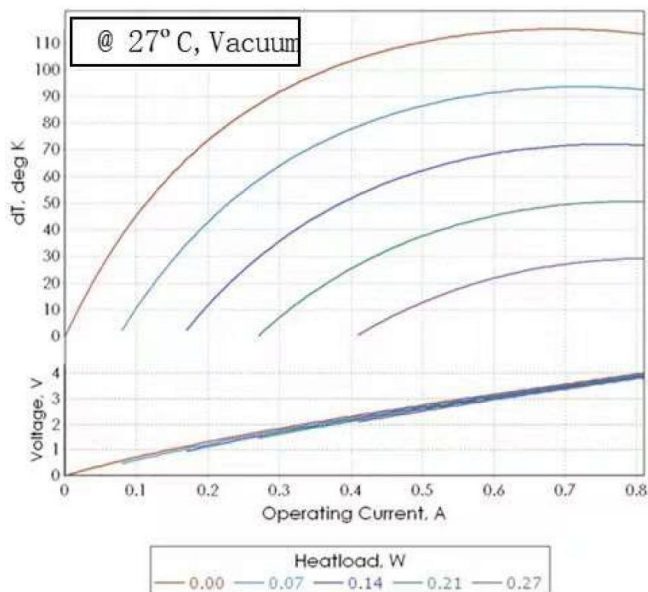
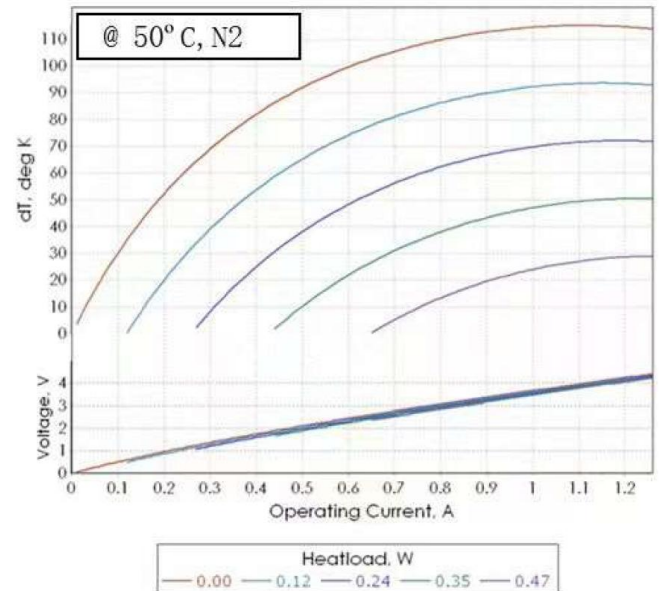
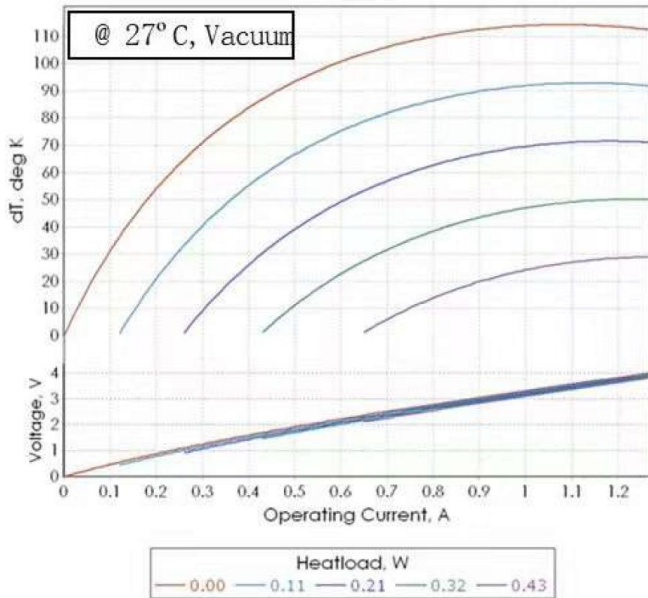
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FIBER

	Please, see separate files	
Single Mode	Corning	SMF-28e Optical Fiber
Multimode	Corning	FREEDM LST Loose Tube, Gel Free Interlocking armoured Cable, Riser 6F, 50 μ m Multimode (OM3)

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Test Conditions

100MHz	Gate Pulse Frequency
10MHz	Optical Pulse Frequency
-30°C	TE3 Setting
1ns	Gate Pulse
5,5V	Gate Pulse Amplitude
0,1	Post Pulse Probability
20%	PDE
<2KHz	DCR
<2%	APP

Sample Test Data

ID	标注	测试日期	LM(@25°C)			GM(@PDE=20%)		
			Vbr (V)	Id(@Vbr-2V) (A)	Re	PDE (%)	Norm.DCR (kHz)	APP (%)
L2024042002		2024/4/19	61.79	1.38E-09		19.9	0.19	2
L2024042005		2024/4/19	62.27	1.61E-09		20.4	0.19	0.58
L2024042006		2024/4/29	61.99	1.25E-09		20	0.2	0.5
L2024042007		2024/4/29	61.71	1.10E-09		20	0.12	0.45
L2024042008		2024/4/29	62.31	2.44E-09		20.8	0.25	0.51
L2024042009		2024/4/29	60.14	1.29E-09		20.1	0.3	0.68
L2024042010		2024/4/29	60.00	1.49E-09		21	0.14	0.65
L2024042012		2024/4/29	61.76	1.30E-09		20.4	0.26	0.44
L2024042013		2024/4/29	61.02	1.23E-09		19.8	0.3	0.62
L2024042015		2024/4/29	60.36			20	1.84	1.62
L2024042016		2024/4/29	61.69	1.11E-09		20.5	0.2	0.87

Typical Lead Times

<= 20 pcs	4-8 weeks following receipt of Purchase Order
> 20 pcs	8-12 weeks following receipt of Purchase Order

Recommendation

Please, test and evaluate 2 pcs to start with before talking about volume.