1,7µm Single Photon InGaAs Avalanche Photodiode

for Geiger Mode Operation, Single Photon Detection

SPAD Series

800nm – 1700nm

Stand 2026

Description

The SPAD is an InGaAs/InP avalanche photodetector designed specifically for single photon counting applications. The device is intended for use at voltage biases above the breakdown voltage (in the so-called “Geiger mode”) so that a single photon incident on the detector will give rise to a macroscopic current pulse. Combined with an appropriate pulse detection circuitry, this device allows for the detection of single photons in the wavelength range from 0.95 to 1.65 um.

The SPAD described in this datasheet is a back-illuminated device provided in a pigtailed 10 pin butterfly package with a single stage thermoelectric cooler.

Our back-illuminated single photon 1,7µm InGaAs Avalanche Photodiode designed for Geiger-Mode operation This meets the prerequisites for applications like Spatial Light Transmission, Spatial Single Photon and Low Light Level Detection etc.

Features

→ Full series of package types	3pin TO46	6pin TO8-TEC	10pin mini Butterfly	FC/PC SM or MM fiber
→ High PDE	＞20%@ afterpulsing less than2%			
→ To work well at gate control model	≥100MHz	or	free space model	
→ Low DCE for high temperature	＜2kHz @ 20% PDE @ 0°C @ 100MHz			

Applications

* Quantum Optics, Quantum Computing
* Fluorescence Measurements
* Optical Communication
* Spectroscopy
* Low Light Level Detection
* Medical Application

Electro-Optical Characteristics & Specifications

T(ambient) @ +25°C

Parameter	Condition	Min	Typ	Max	Unit
LINEAR MODE					
Spectral Range	V_R 0V	900		1650	nm
Spectral Peak	V_R 0V		1550		nm
Responsivity	λ_p 1,55µm, Ev 1µW, Vbr-2V	8			A/W
Temperature Coefficient	Vbr, λ_p 1,55µm, Ev 10µW		0,1	0,15	v / °C
Response Time	f 1MHz, R_L 50Ω		1		ns
Dark Current	Vbr – 2 V			1	nA
Reverse Breakdown Voltage	I_R 10µA	50		80	V
Junction Capacitance	VR=V_{BR}-2V, F 1M			0,25	pF
Operating Voltage			0,9*V_{BR}		V

Electro-Optical Characteristics & Specifications

T(ambient) @ +25°C

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

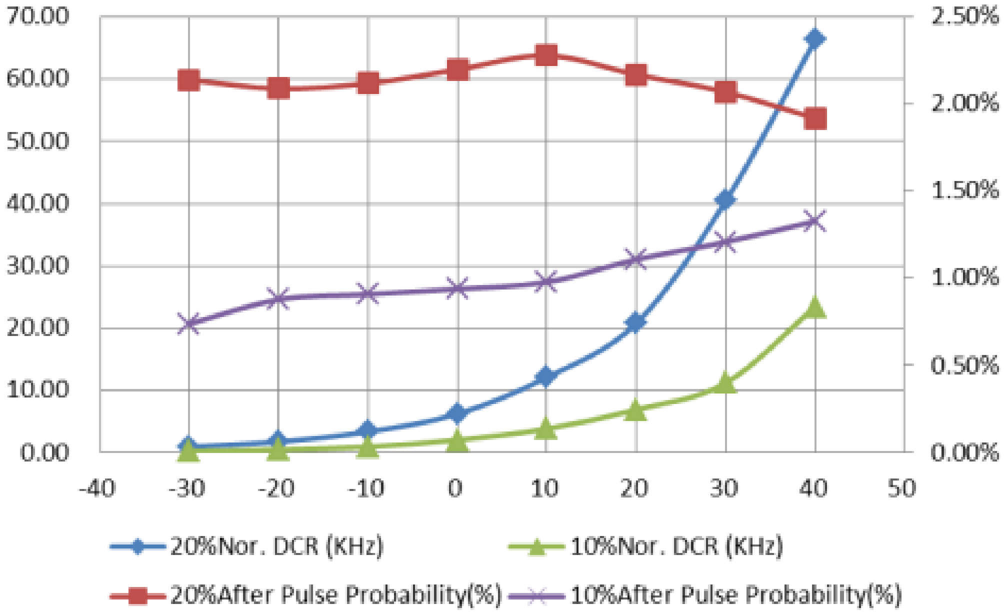
Custom Options DCR < 3kHz @ 0°C APP < 0,5% @ 0°C

Absolute Maximum Ratings

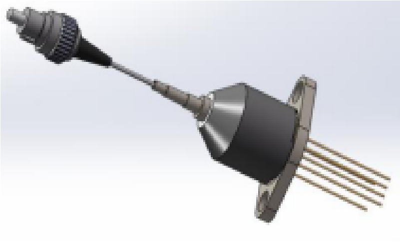
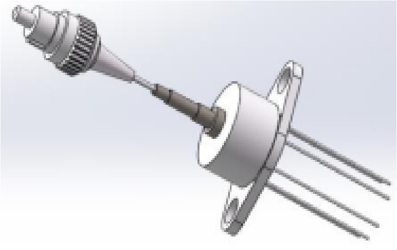
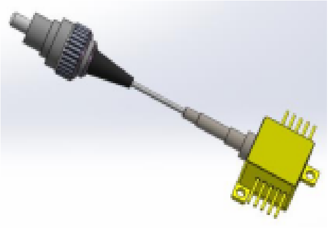
T(ambient) @ +25°C

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



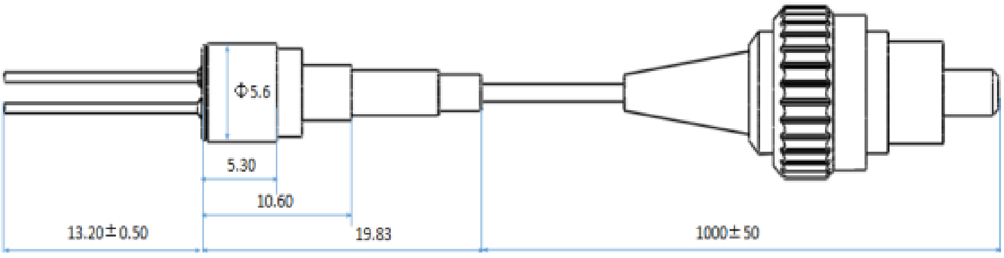
Devices, Overview

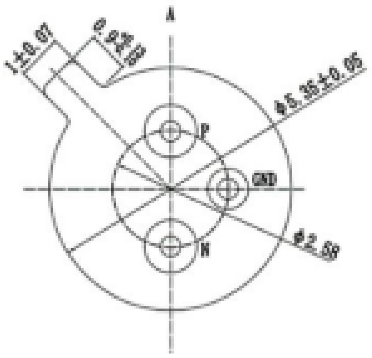
Name	Part No.	Drawing
InGaAs SPAD 3pin TO46 With fiber	PGA-284	
TEC InGaAs SPAD 6pin TO8 with fiber	PGA-285	
	PGA-286	
TEC InGaAs SPAD 10pin	PGA-287	

Mechanical Dimensions & Pin Layout

PGA-284

InGaAs SPAD 3pin **TO46** **Pigtailed Coaxial Type**

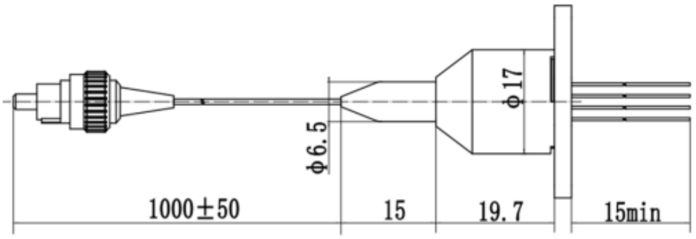


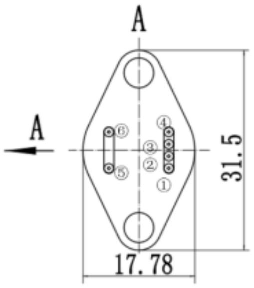


Bottom Layer

PGA-285

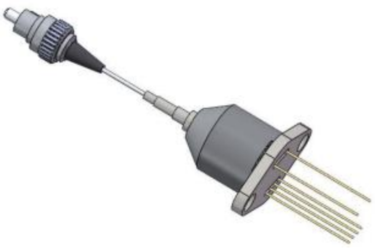
TEC3 Type of InGaAs SPAD **6pin TO8** **Pigtailed Coaxial**





Unit: mm

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



OEC Opto-Electronic Components

1,7µm Single Photon InGaAs Avalanche Photodiode

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SPAD Series

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Stand 2026

TEC & NTC Specifications

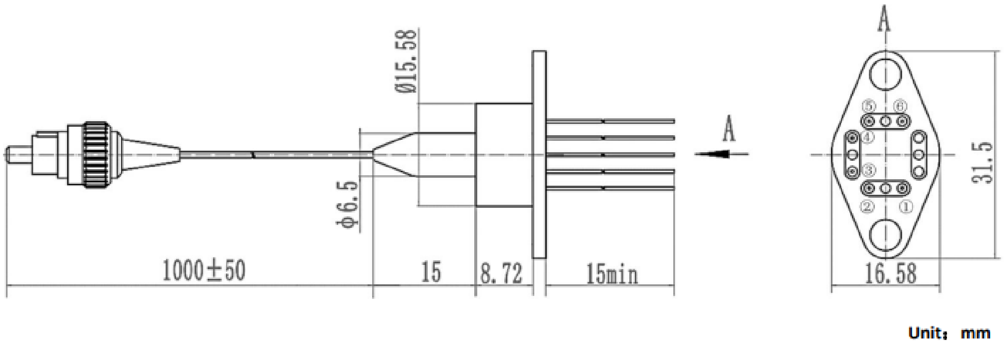
TEC (323k / N2)

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 kΩ 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**



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

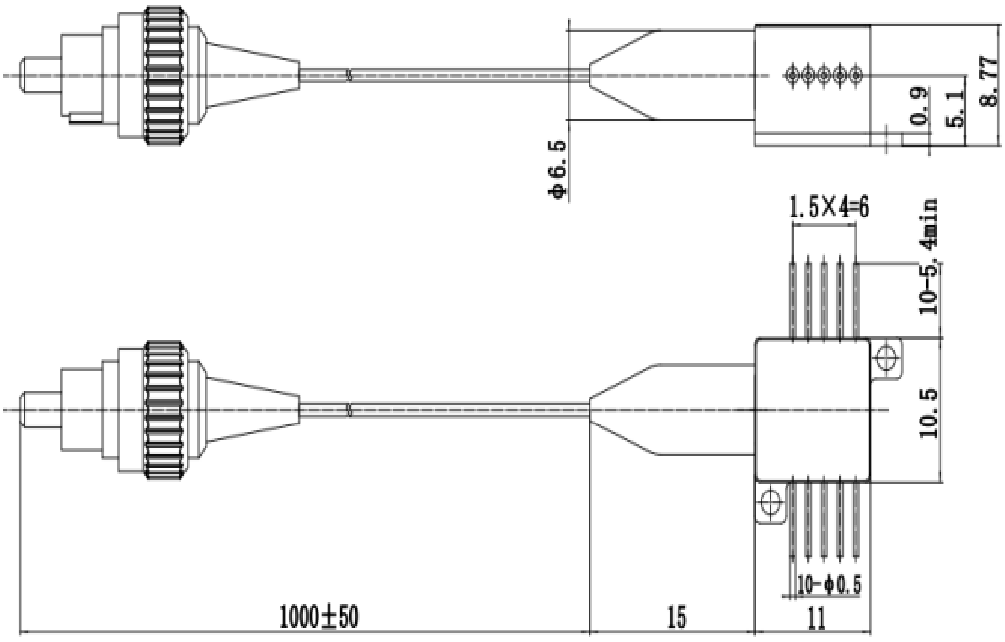
TEC & NTC Specifications

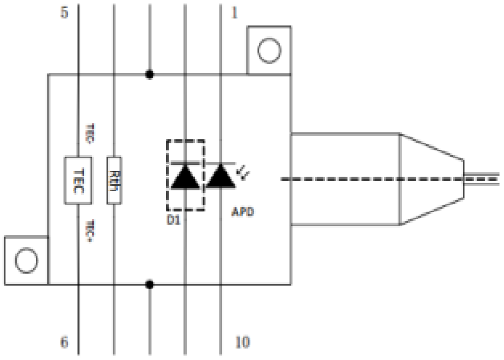
TEC (323k / N2)

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 kΩ at 25˚C
Thermistor Constant A = 1.2548E-03, B = 2.3738E-04, C = 1.3222E-07

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

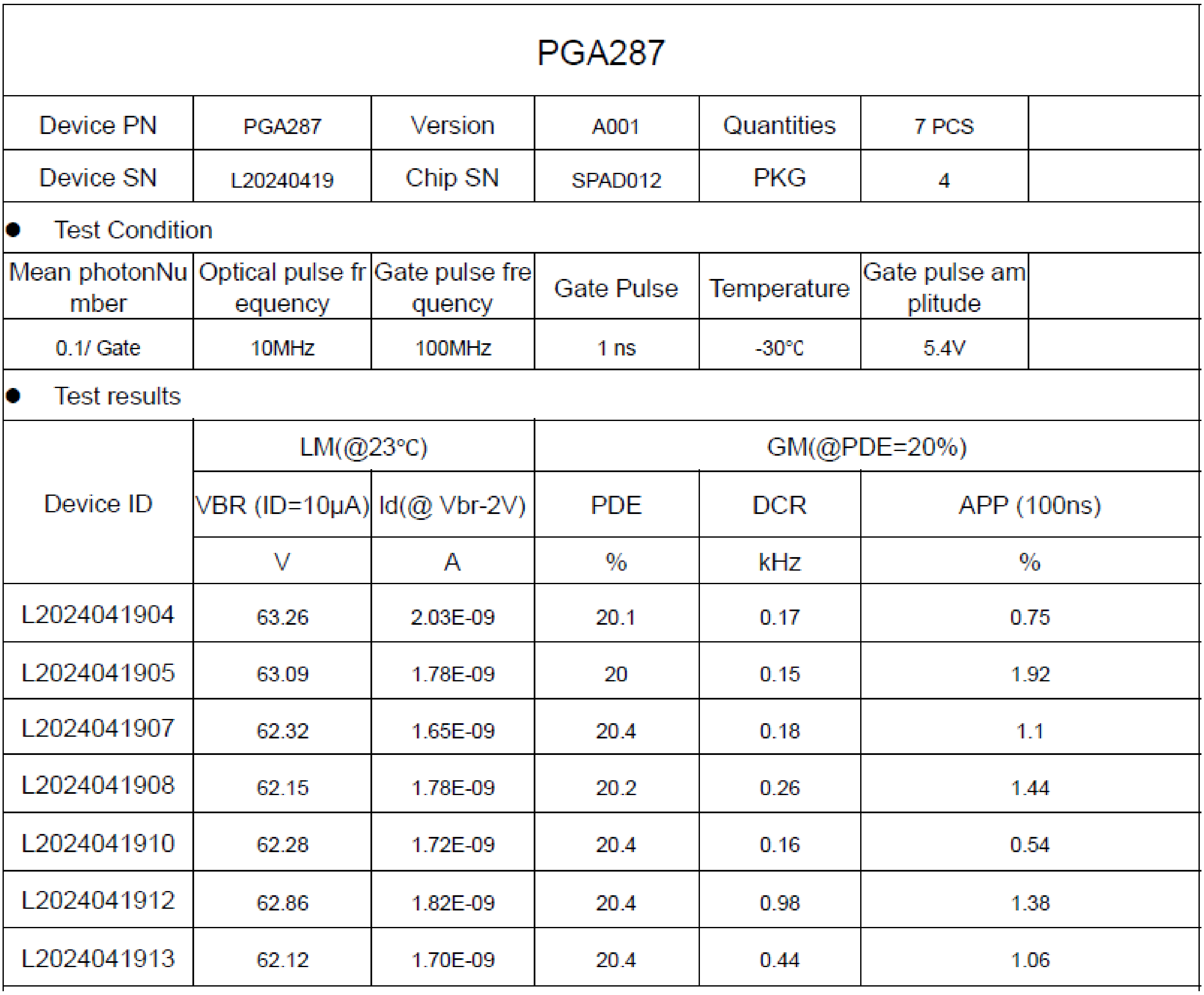
TEC & NTC Specifications

TEC (323k / N2)

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

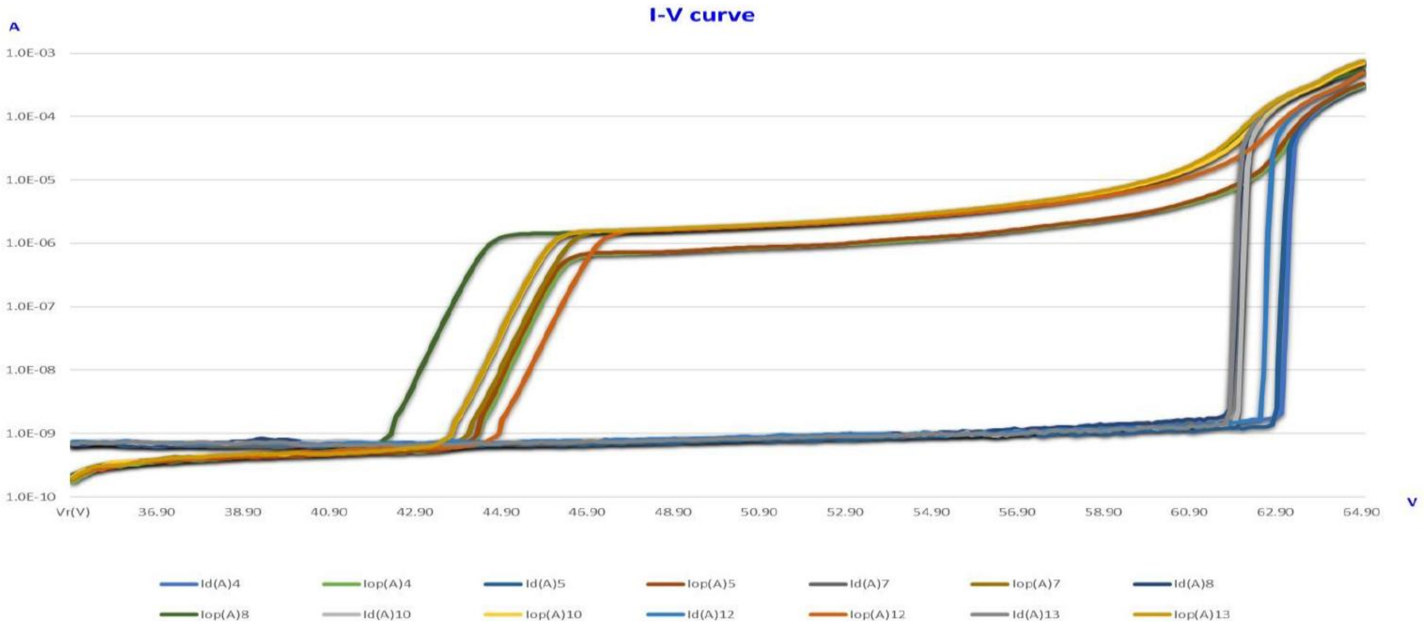
Thermistor	5 kΩ at 25˚C
Thermistor Constant	A = 1.2548E-03, B = 2.3738E-04, C = 1.3222E-07

Sample Test Data of the PGA-287



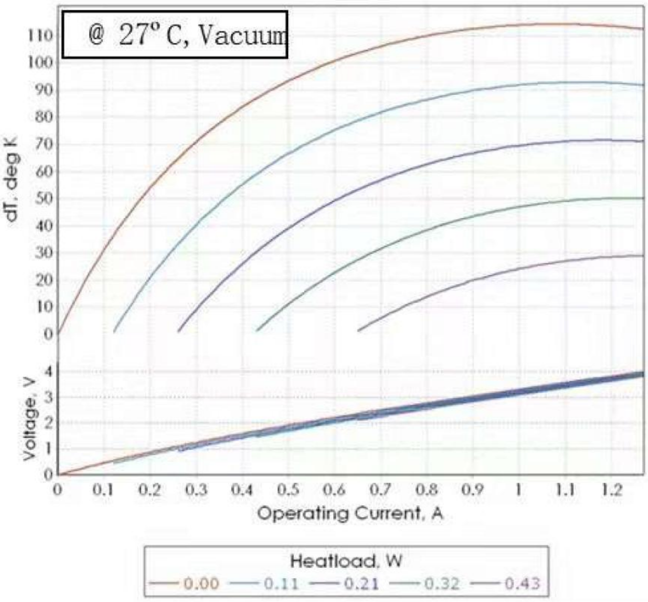
PGA287						
Device PN	PGA287	Version	A001	Quantities	7 PCS	
Device SN	L20240419	Chip SN	SPAD012	PKG	4	
● Test Condition						
Mean photonNumber	Optical pulse frequency	Gate pulse frequency	Gate Pulse	Temperature	Gate pulse amplitude	
0.1/ Gate	10MHz	100MHz	1 ns	-30℃	5.4V	
● Test results						
Device ID	LM(@23℃)		GM(@PDE=20%)			
	VBR (ID=10μA)	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	

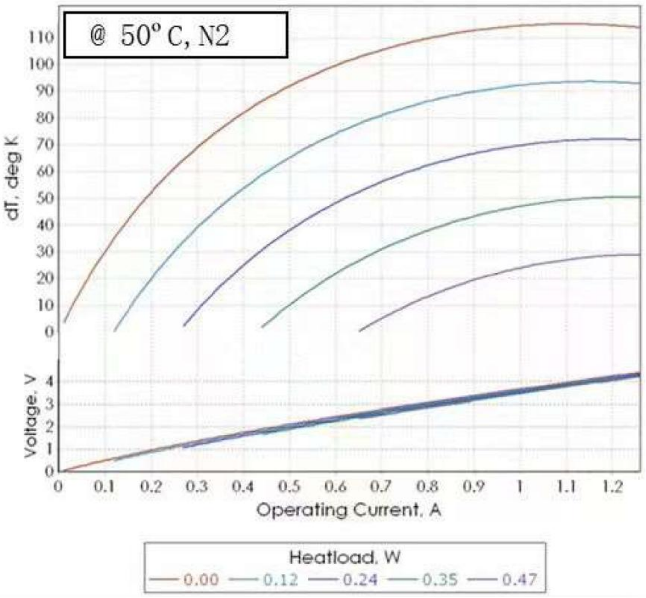
Sample PGA-287 I-V Curve

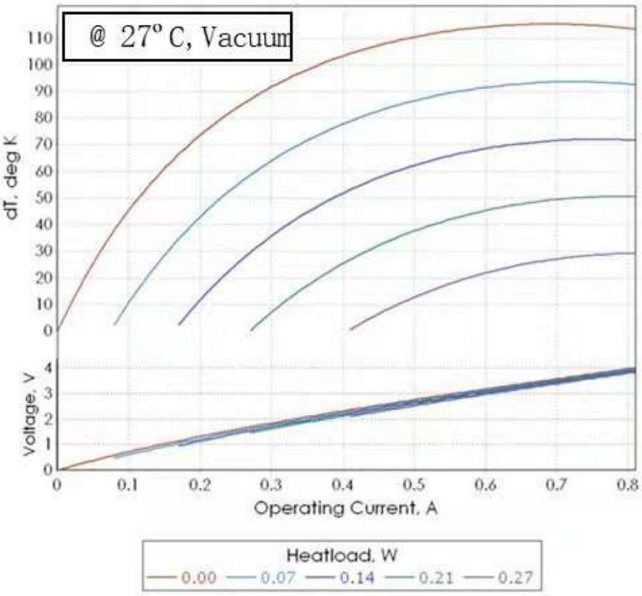


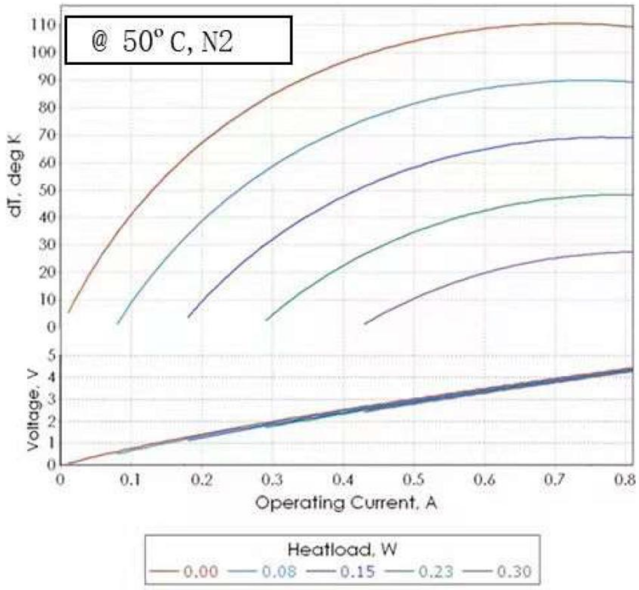
Sample PGA-287 Questions & Responses

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







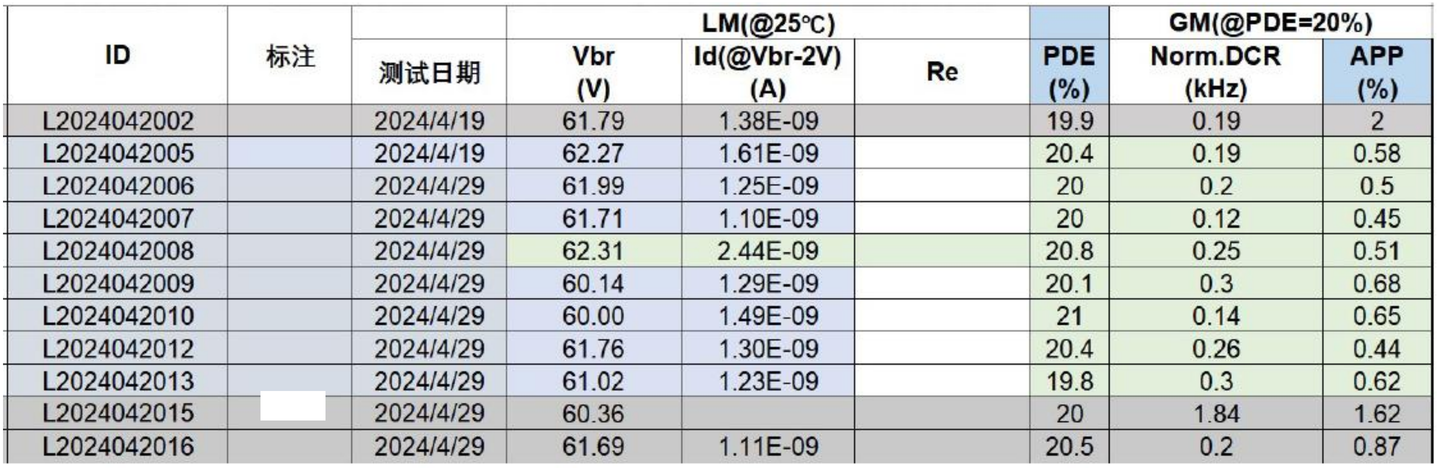


FIBER		Please, see separate files	
	Single Mode	Corning	SMF-28e Optical Fiber
	Multimode	Corning	FREEDM LST Loose Tube, Gel Free Interlocking armoured Cable, Riser 6F, 50µm Multimode (OM3)

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		LM(@25℃)				GM(@PDE=20%)	
		测试日期	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	[redacted]	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.