InGaAsP/InP single photon avalanche detector



Description

The SGA-16-40-TO66 single-photon avalanche detector is mainly composed of an InGaAsP/InP APD chip and a two-stage thermoelectric cooler (TEC). It adopts a TO66 package and can be used for lidar, ranging,Low light detection, high-speed laser communication and other fields. This user manual only describes this product.

Key Parameter

Optoelectronic performance characteristics

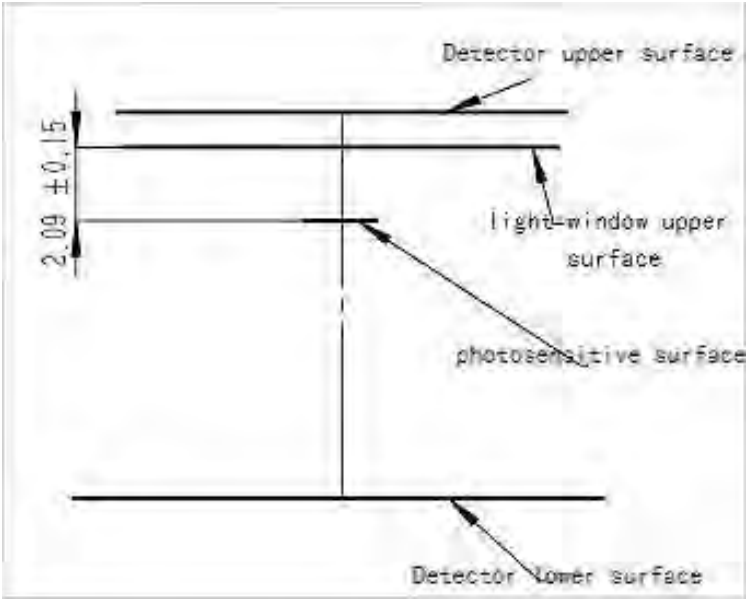
Indicator name	Typ
Effective photosensitive surface diameter(μm)	40
Response spectral range(μm)*1	0.95 ±0.05~1.25 ±0.05
Breakdown voltage Vbr (V) *2	69.8@Id=1μA
Breakdown voltage temperature coefficientΔVbr/ΔT (V/K)	0.13
Current response rate Ri (A/W)	0.75@1064nm, M=1
Dark current Id (nA)	0.26@M=10
Junction capacitanceCj (fF)	40@90% Vbr
Bandwidth F3dB (GHz)	13@M=10
Operating mode	Linear/Geiger pattern

* 1 focal plane temperature=25℃

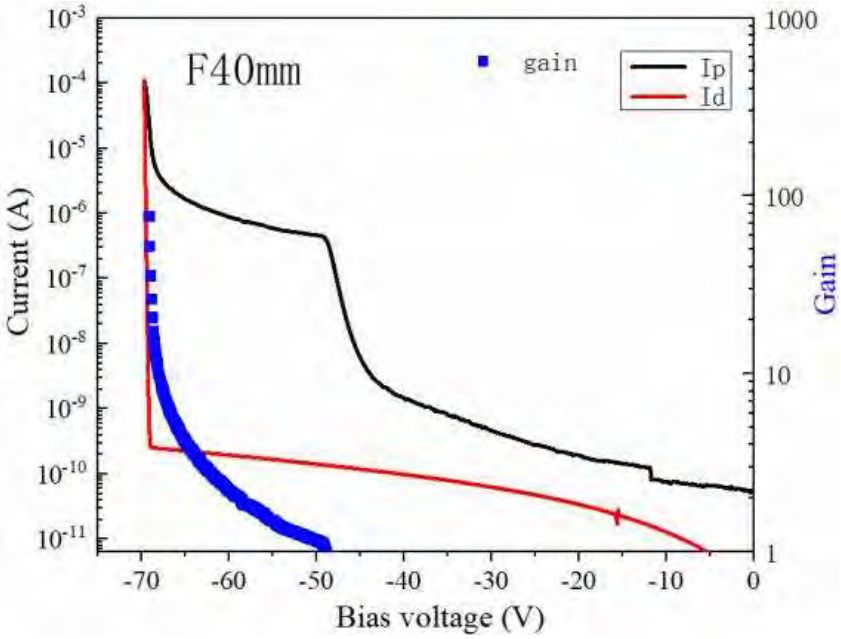
Optical parameters

Optical structure

This product uses a unit InGaAs photosensitive chip, the pixel shape is circular, and the photosensitive size diameter is 40μm. The design value of the distance between the photosensitive surface and the upper surface of the window is 2.09±0.15mm, optical interface design drawing. As the picture shows

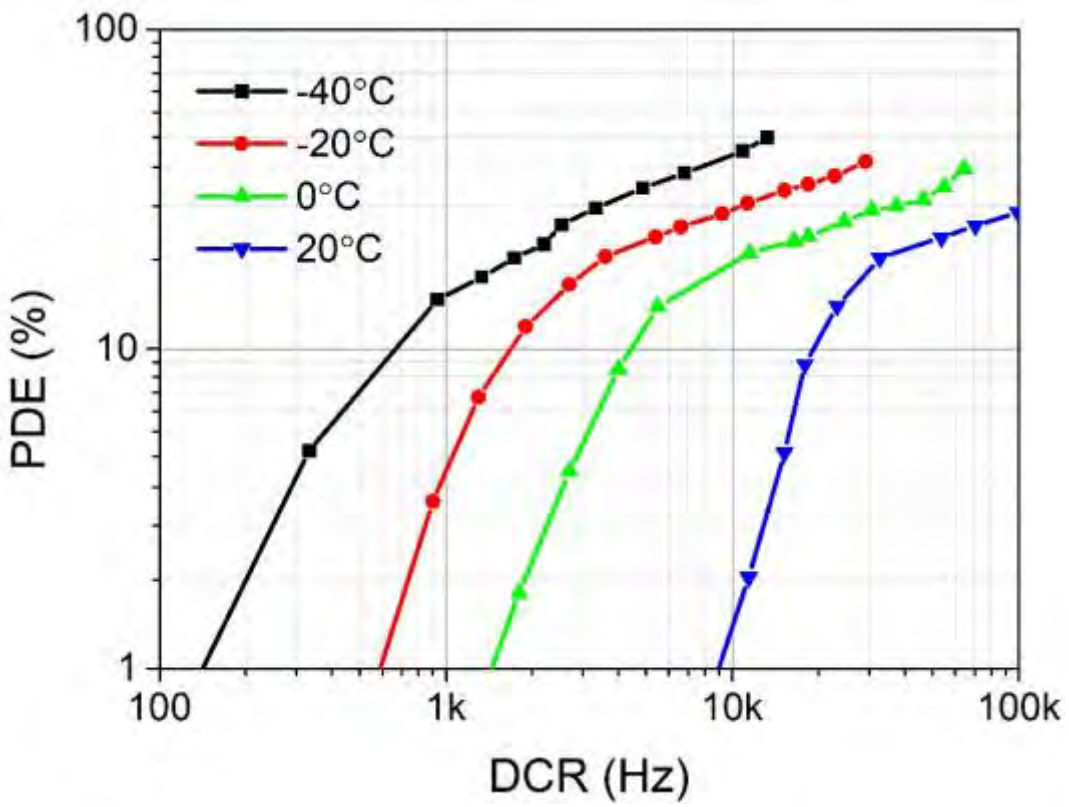


Photocurrent dark current curve (typical value, tested at 25℃)



Single photon detection efficiency dark count rate curve

（Test conditions: 100kHz, 5ns, 0. 1 photon/pulse）



Mechanical parameters

Indicator name	Typ
Length×width×height(mm)	31.5×17.5×16(Contains pins)
Pixel size	unit
Package form	TO66，Optional fiber coupling

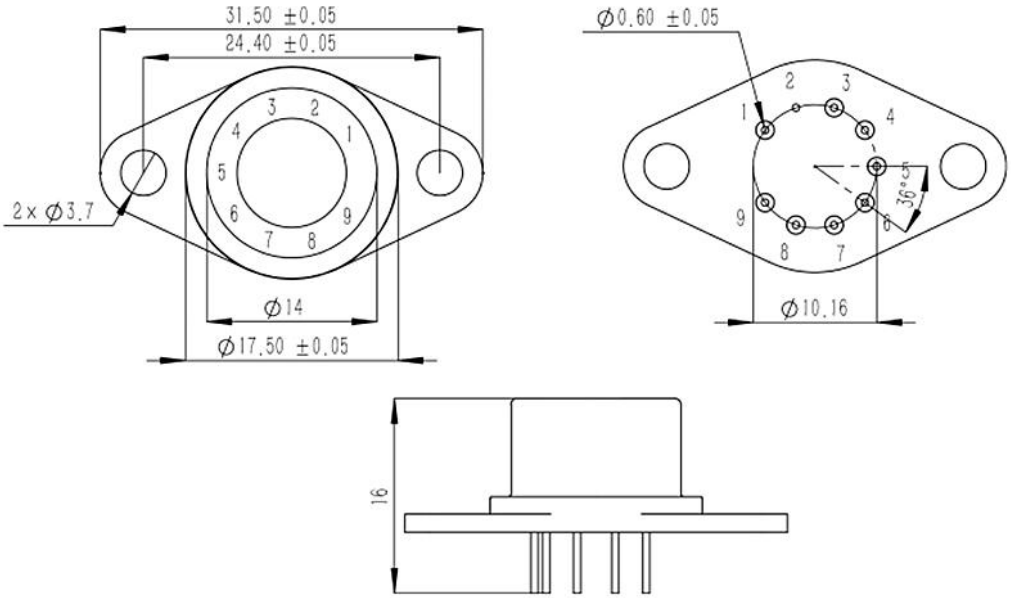
Usage environment

Indicator name	Typ
Operating temperature(˚C)	-30 ~ +40
Storage temperature(˚C)	-55 ~ +70

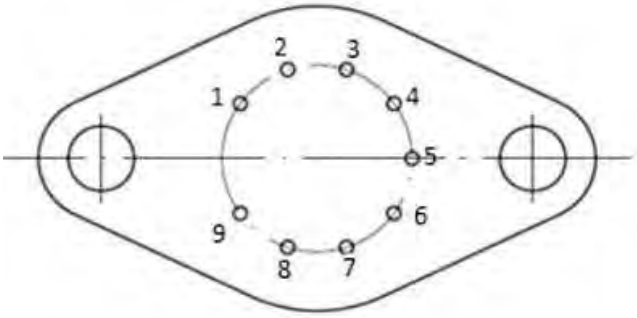
Dimensions and Pin definitions

Mechanical parameters

This detector is airtightly packaged, with dimensions of 31.5mm×17.5mm×16mm (including pins); 9 φ0.6±0.05mm pins are distributed on the bottom of the shell for TEC power supply and temperature Sensor,Signal reading, detection signal reading. The appearance and dimensions of the mechanical interface are as shown in the figure.



Detector pin diagram



Detector pin description

Pin number	Definition	Pin number	Definition
1	TEC+	6	TS
2	CASE	7	NO
3	P	8	NO
4	N	9	TEC-
5	TS		

Thermal parameters

Thermoelectric cooler characteristics

A thermoelectric cooler (TEC) is integrated into the detector, and its performance parameters are shown in the following table:

Performance	Numerical value
Maximum load current allowed（ITEC-max/A）	1.2
Maximum load voltage allowed（VTEC-max/V）	2.1

Temperature monitoring module features

This detector uses the thermistor as the temperature monitoring module, B25/50=3200, at 25℃. The resistance value is 1.5kΩ.

Precautions：

a) During the TEC installation process, attention should be paid to the new resistance introduced by

b) the external electrical structure. If the new resistance exceeds 10% of the TEC resistance, the I-V curve needs to be recalibrated;

c) It is recommended to connect the TEC with a smaller connection resistance. If welding is required,

d) a short circuit is required.For grounding protection, the welding temperature should be ≤250℃ and the welding time should be<10s;

e) If you need higher measurement accuracy in a small temperature range, you can calculate the B value yourself according to the requirements;

f) Before turning on TEC, you must confirm that the temperature monitoring module is working

g) normally, that the heat dissipation surface is in full contact with the radiator, that the heat dissipation

h) surface is not less than the required size area, and that the radiator is working normally. Do not

i) install the TEC without installing the radiator. Turn on TEC when the radiator or radiator is not working;

j) When turning on the TEC for the first time, the current or voltage should be gradually loaded starting from 0A or 0V, and the temperature should be monitored at the same time.
temperature changes until it reaches the preset temperature;

k) Since the performance of the detector is affected by temperature, the TEC should be turned on first until the temperature is stable before turning on the detector.
It is not recommended that the detector work in an environment with temperature changes;

l) When the detector is not working, power supply to the TEC should be stopped to extend the service life of the TEC;

m) The cooling and heating effects of the detector are related to the ambient temperature, power supply performance, and heat dissipation status. It is recommended that Properly match the heat dissipation system according to your own use environment and detector performance requirements.