OP501C InGaAs 4x4 Array SPAD Component

Product Features

OP501C InGaAs 4×4 single photon array detector component (hereinafter referred to as "detector") consists of InGaAs avalanche photodiode 4×4 array chip, active and passive fast quenching circuit, refrigeration circuit, and signal control circuit.
The detector array size is 4×4 elements with 100 μm spacing between image centers, and the operating wavelength is in the near-infrared band from 1.0 to 1.65 μm.
The detector's probe measurement of high sensitivity, able to detect weak light signals (single photon signals); detector image elements in the adjustable pulse width within the free operation, and each image element independently of the output detection signals, processing output electrical signals, by the noise is very small.
Characterized by high sensitivity and simple system structure, the detector assembly can be applied in the fields of long-distance laser ranging, long-distance space optical communication, and optoelectronic radar.

Main photoelectric indicators

Parameterization	Notation	Test Condition	Minimum Value	Typical Value	Maximum values	Unit
Detector Specifications and Configuration Parameters						
Array size	*M*	—	4x4			—
Size of target surface	T_s	—	0.4x0.4			mm
pixel center distance	*D*	—	—	100	—	μm
pixel spacing	D_G	—	—	—	20	μm
operating wavelength	λ	—	1000	—	1650	μm
Output signal amplitude	V_{out}	—	2.5	3.3		V
serial port baud rate	*Baud*	—	—	115200	—	Baud/s
power wastage	*PDC*	V_{IN} =5V, T_{th} =-30°C±5°C	—	15	—	W
Input Voltage	V_{IN}		—	5.0	—	V
Input Current	I_{IN}	V_{IN} =5V, T_{th} =-30°C±5°C	—	3.0	—	A
Operating Temperature	T_A	—	-40	—	55	℃
weights	W_t	—	—	180		g
Detector Size	S_C	—	75 x 50 x 28			mm

Parameterization	Notation	Test Condition	Minimum Value	Typical Value	Maximum Values	Unit
Optical performance parameters						
photon efficiency	*PDE*	T_A =25±5°C, T_{th} =-30°C± 5 °C, λ = 1570 ± 50 nm. τ=0.8μs±0.1μs	10	15	—	%
dark count rate	*DCR (PDE=10%)*		—	—	10	kHz
backpulse probability	*APP (PDE=10%)*		—	—	20	%

1. the working wavelength: can be in the working wavelength range of optional standard narrow band filter.
2. T_{th} : InGaAs avalanche photodiode 4×4 array chip operating temperature.
3. τ: dead time.
4. Ambient temperature for testing the above parameters: T_A = 25 ±5°C.

Parameter setting range and recommended operating conditions

Serial Number		Parameters	Rated Value
Parameter setting range	1	Detector operating temperature	-30℃~30℃, Minimum step value:0.1℃.
	2	Dead Time Adjustment	0.1μs to 2.0μs, step value: 0.025μs.
	3	Avalanche voltage threshold adjustment	50.0V to 85.0V, step value: 0.1V.
	4	Geiger avalanche comparison voltage setting	0.35V to 1.10V, step value: 0.01V.
	5	Detector door width and duty cycle adjustment	Working gate width: ≥0.1us, working period: >0.1us; step value: 0.01us.

Serial Number		Parameters	Rated Value
Recommendation Referral conditions	1	Detector operating temperature	-30℃ ~ 0℃
	2	dead time value	0.80μs
	3	Avalanche voltage threshold adjustment	See test report for details
	4	Geiger avalanche comparison voltage setting	0.45V to 0.90V

Typical Characteristic Curve

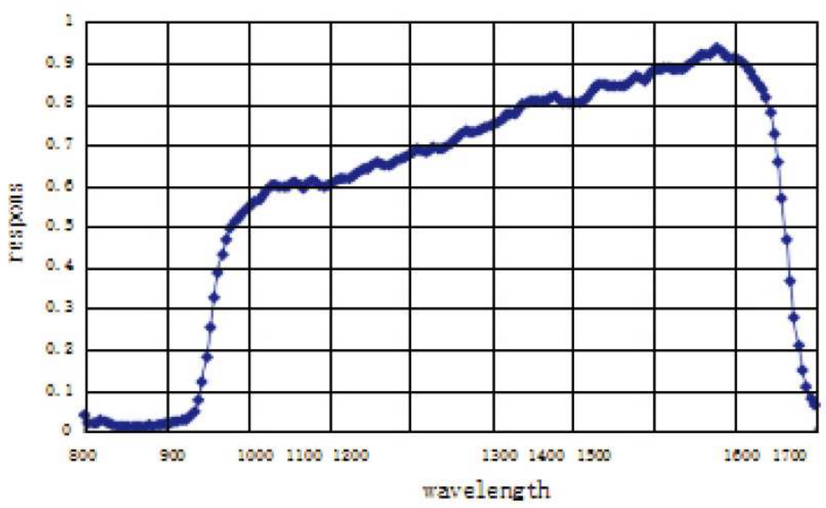


Fig. 1 InGaAs spectral response characteristic curve

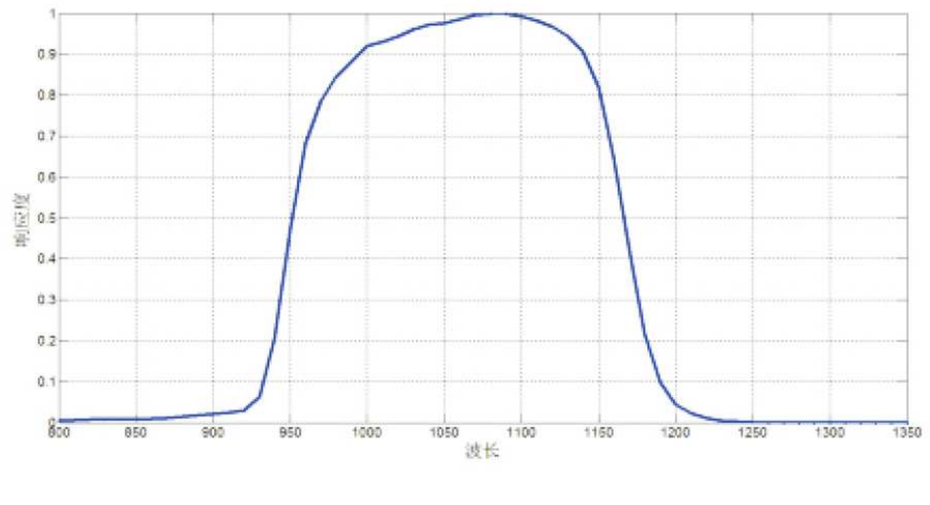


Fig. 2 InGaAsP spectral response characteristic curve

Shape, Dimensions and Pinout Definitions (in mm)

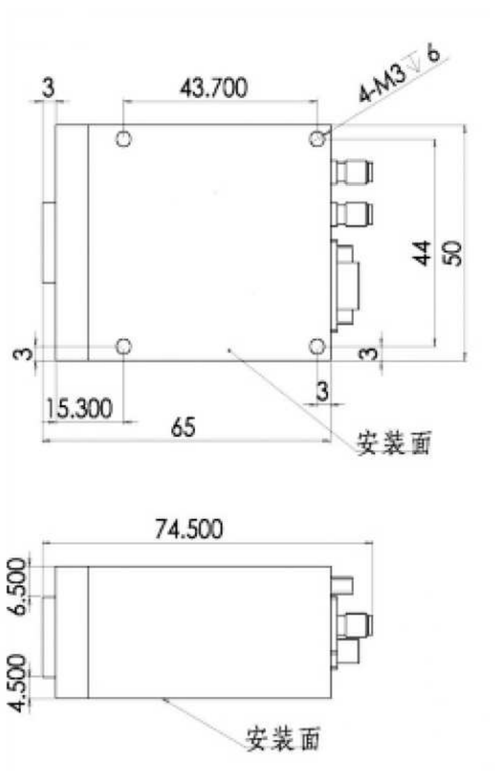
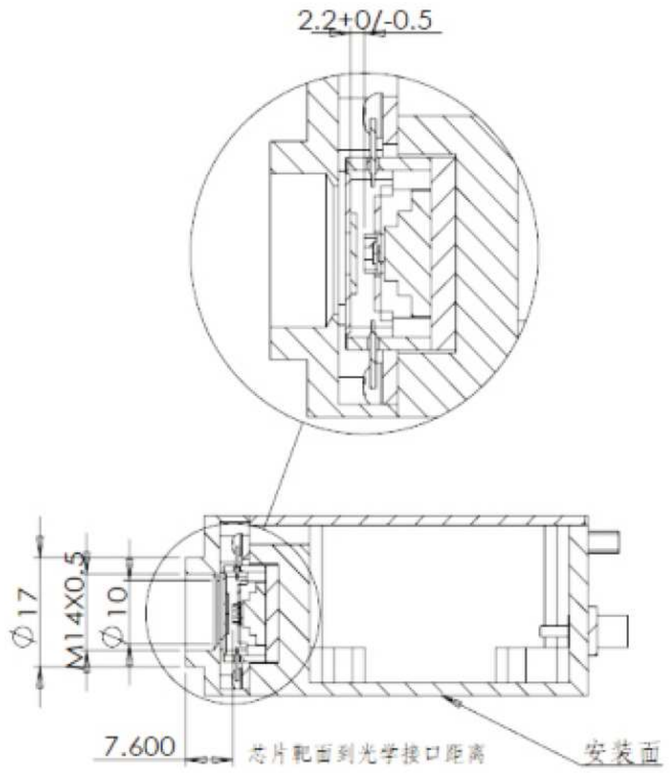


Figure 3 External dimensions Figure



4 Chip target surface to optical interface dimensions

▶ Output Port Definitions

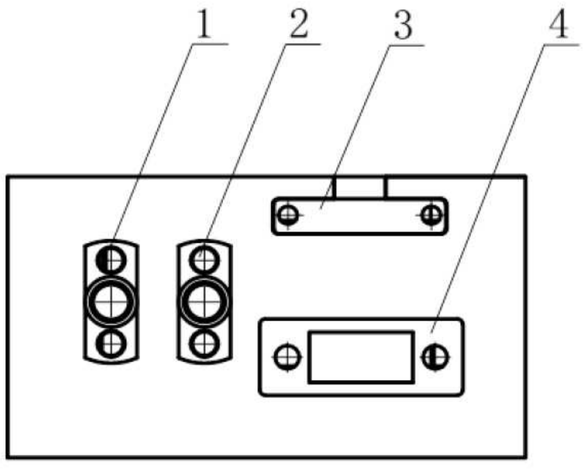


Figure 5 Electrical connector arrangement and numbering

Electrical Connector Number	Electrical Connector Type	Functionality
1	SSMA	Synchronized signal output port
2	SSMA	Synchronized signal input port
3	J63A-31	UART and 16-channel pixel signal output
4	J30J-2	+5.0 V single power supply

The J31J-2 port numbers are shown in Figure 9.

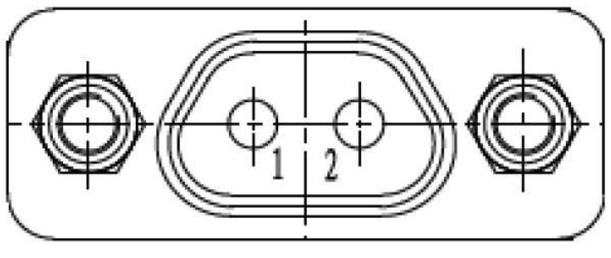


Figure 6 J31J-2 Port Numbering

Pin Number	Name (of A Thing)	Functionality	Pin Number	Name (of A Thing)	Functionality
1	GND	grounding port	2	POWER_+5V	+5V power positive input port