

# OP520C InGaAs 8x8 Array SPAD Component

## Product Features

OP520C InGaAs 8×8 single photon array detector components (hereinafter referred to as "detector"), consists of InGaAs avalanche photodiode 8×8 array chip, active and passive fast quenching circuit, refrigeration circuit, signal control circuit and other components.

The size of the detector array is 8x8 elements with 50μm spacing between the centers of the elements, and the operating wavelength is 1.0-1.65μm in the nearinfrared wavelength band. The detector has high detection sensitivity and is capable of detecting weak optical signals (single-photon signals); the detector's pixels can be detected at the center of the detector.

Free operation within the adjusted pulse width, and each image element independently outputs the detection signal and processes the output electrical signal, with minimal influence by noise. The detector assembly is characterized by high sensitivity, simple system structure, etc. It can be applied to long-distance laser ranging, long-distance Space optical communication, optoelectronic radar and other fields.



## Main photoelectric indicators

Parameterization	Notation	Test Condition	Minimum Value	Typical Value	Maximum Value	Unit
Detector Specifications and Configuration Parameters						
Array size	$M$	—	8x8			—
Size of target surface	$T_s$	—	0.4x0.4			mm
Pixel center distance	$D$	—	—	50	—	μm
Pixel spacing	$D_G$	—	—	—	25	μm
Operating wavelength	$\lambda$	—	1000	—	1650	μm
Output signal amplitude	$V_{out}$	—	—	—	5.0	V
Serial port baud rate	$Baud$	—	—	115200	—	Baud/s
Power wastage	$PDC$	$V_{IN} = 12V, T_{th} = -30^{\circ}C \pm 5^{\circ}C$	—	15	30	W
Input Voltage	$V_{IN}$	—	—	12.0	—	V
Input Current	$I_{IN}$	$V_{IN} = 12V, T_{th} = -30^{\circ}C \pm 5^{\circ}C$	—	1.2	—	A
Operating Temperature	$T_A$	—	-40	—	55	°C
Weights	$W_t$	—	—	450	—	g
Detector Size	$S_c$	—	100 x 74 x 62			mm

Parameterization	Notation	Test Condition	Minimum Value	Typical Value	Maximum Value	Unit
Optical performance parameters						
Photon efficiency	$PDE$	$T_A = 25 \pm 5^{\circ}C, T_{th} = -30^{\circ}C \pm 5^{\circ}C,$ $T = 0.8 \mu s \pm 0.1 \mu s,$ $\lambda = 1550 \pm 50 nm (InGaAs),$ $\lambda = 1064 \pm 10 nm (InGaAsP)$	10	15	—	%
Dark count rate (InGaAs)	$DCR (PDE=10\%)$		—	—	10	kHz
Dark count rate (InGaAsP)	$DCR (PDE=10\%)$		—	—	5	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.  $\tau$ : dead time.

4. Ambient temperature for testing the above parameters:  $T_A = 25 \pm 5^{\circ}C$ .

## Parameter setting range and recommended operating conditions

Serial Number	Parameters	Rated Value	
Parameter setting range	1	Detector operating temperature	-30°C~30°C, Minimum step value:0.1°C.
	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 working Conditions	1	Detector operating temperature	-30°C ~ 0°C
	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

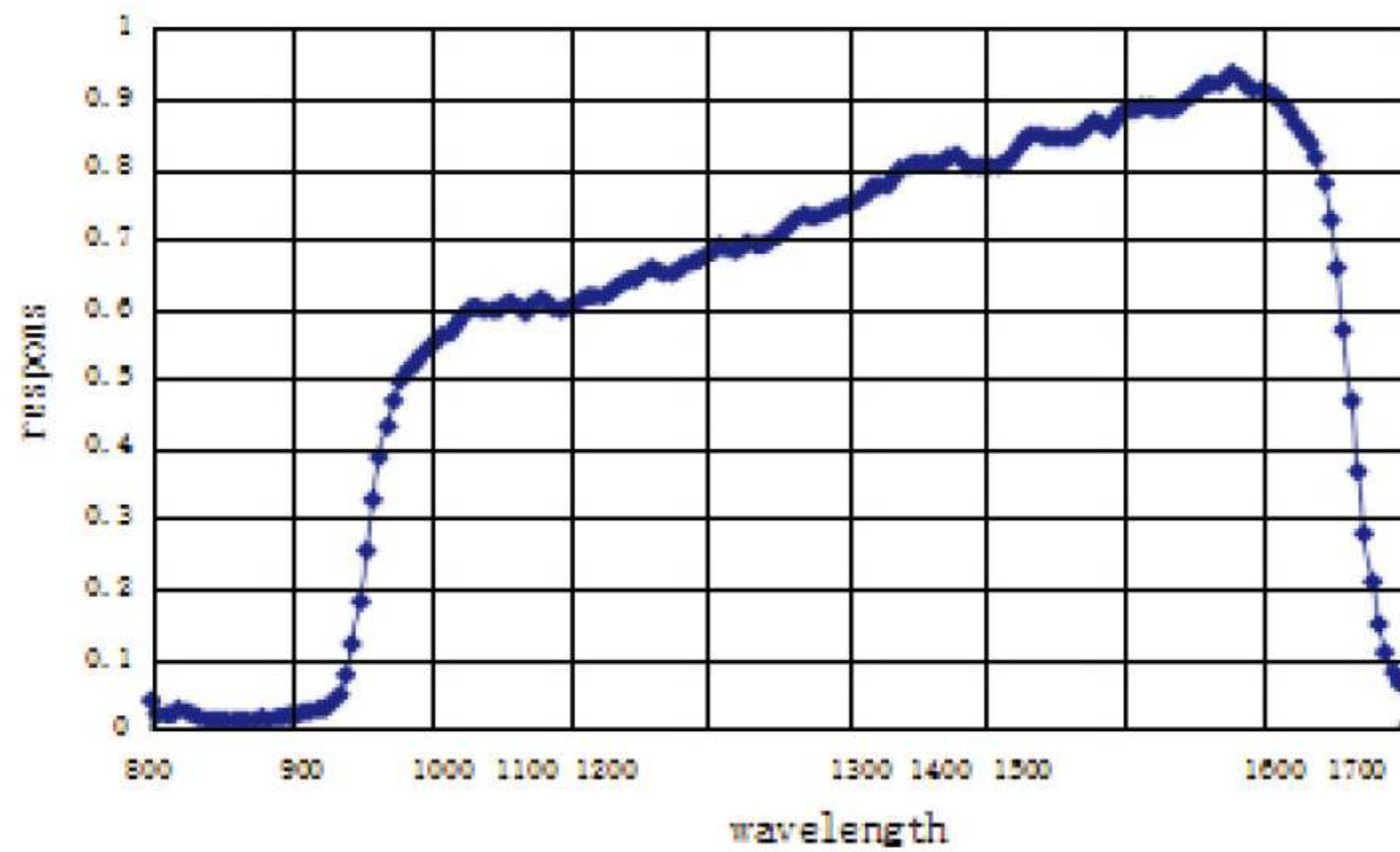


Fig. 1 InGaAs spectral response characteristic curve

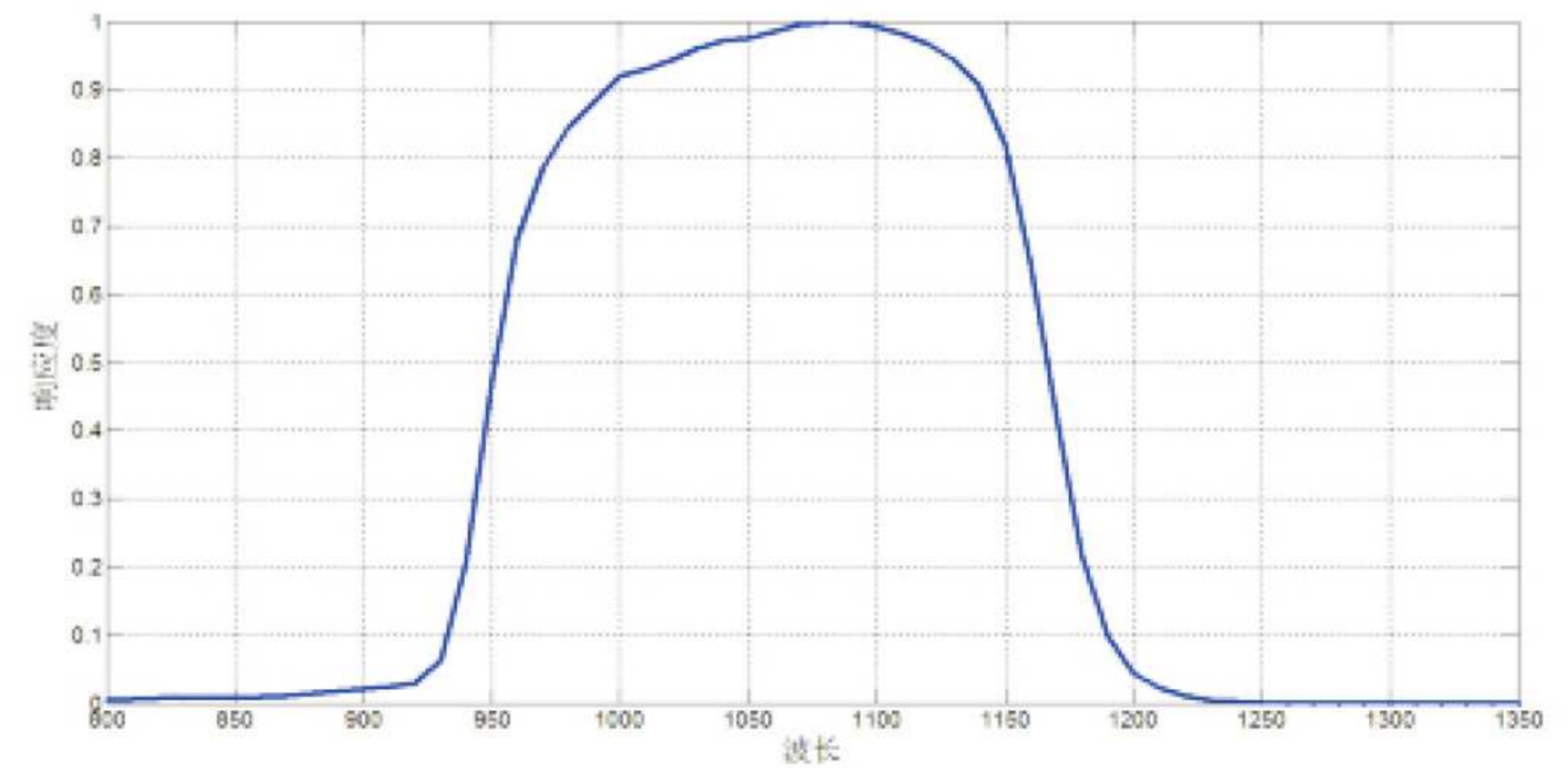
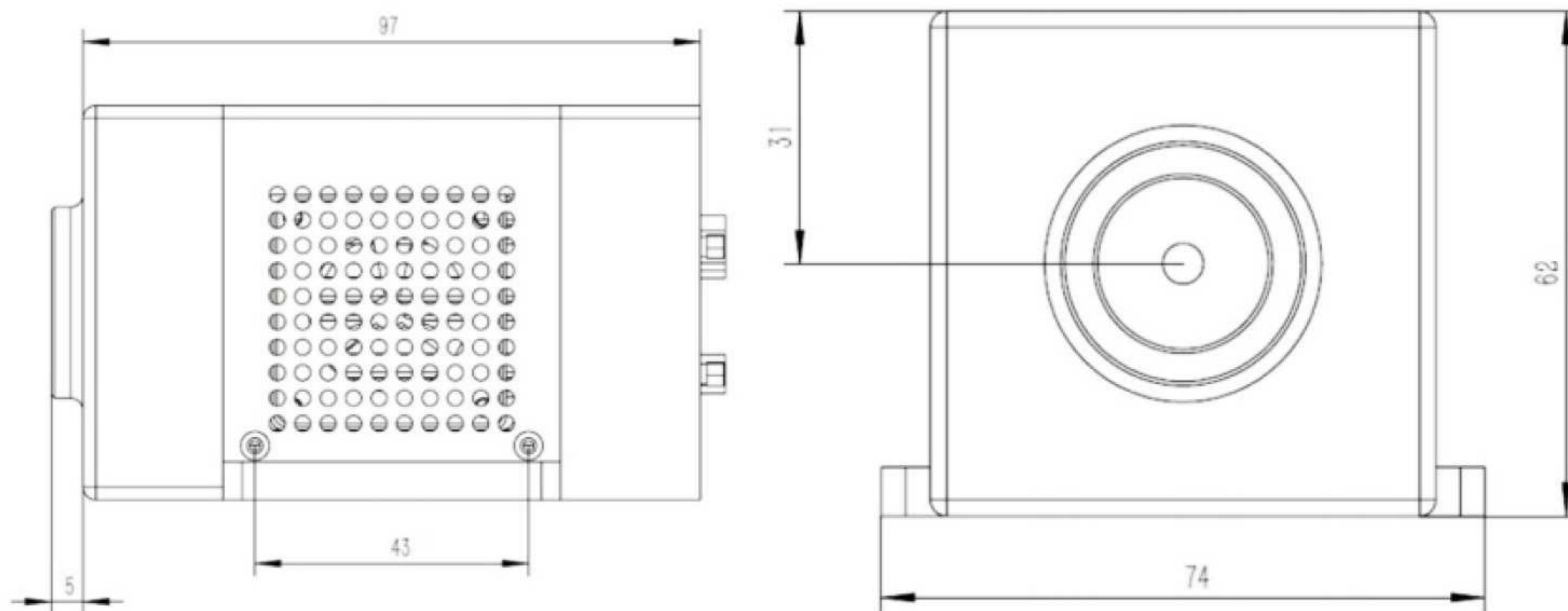


Fig. 2 InGaAsP spectral response characteristic curve

## Shape, Dimensions and Pinout Definitions (in mm)



### Pinout Port Definition

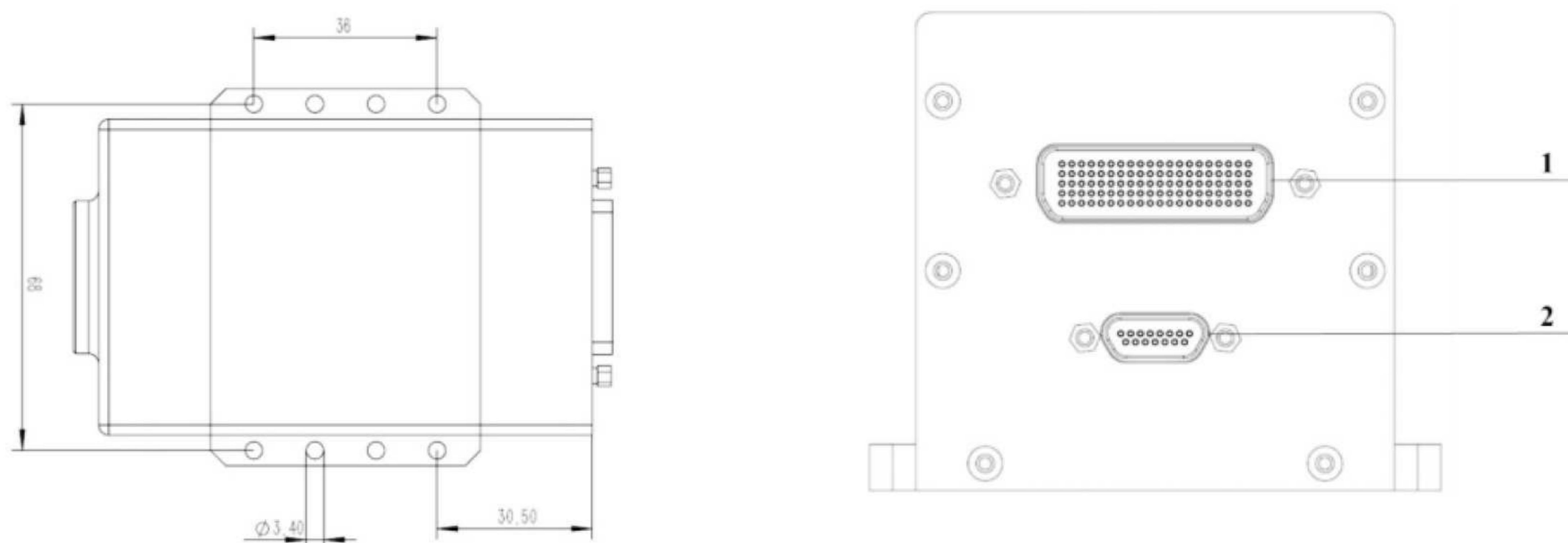


Fig. 3 External dimensions (tolerance of  $\pm 0.1\text{mm}$ )

Figure 4 Electrical connector arrangement and numbering