SPD65112S InGaAs 8×8 Array

Single-Photon Detector Module



Description

SSPD65112S InGaAs 8×8 Single-Photon Array Detector Module (hereinafter referred to as "the detector") is composed of an InGaAs avalanche photodiode 8×8 array chip, active and passive fast quenching circuits, refrigeration circuits, signal control circuits, etc.

The detector array has a scale of 8×8 elements, with a center-to-center spacing of 50μm between pixels, and operates in the near-infrared band with a wavelength range of 1.0～1.65μm. The detector features high detection sensitivity, capable of detecting extremely weak optical signals (single-photon signals). Each pixel of the detector operates freely within an adjustable pulse width, and each pixel independently outputs detection signals and processes output electrical signals, with minimal influence from noise.

The detector module is characterized by high sensitivity and a simple system structure, and can be applied in fields such as long-distance laser ranging, long-distance spatial optical communication, and photoelectric radar.

Specifications

Characteristic parameters	Sign	Test conditions	Min.	Typ.	Max.	Unit
Detector Specifications and Configuration Parameters						
Array scale	M		8 ×8			
Target surface size	Ts	—	0.4×0.4			mm
Pixel center distance	D	—	—	50	—	μm
Pixel spacing	DG	—	—	—	25	μm
Operating wavelength	λ	—	1000	—	1650	μm
Output signal amplitude	Vout		—	—	5.0	V
Serial port baud rate	Baud	—	—	115200	—	Baud/s
Power consumption	PDC	VIN =12V ，Tth=-30℃±5℃	—	15	30	W
Input voltage	VIN	—	—	12.0	—	V
Input current	IIN	VIN =12V ，Tth=-30℃±5℃	—	1.2	—	A
Operating ambient temperature	TA	—	-40	—	55	℃
Weight	Wt	—	—	450	—	g
Detector size	SC	—	100 ×74 ×62			mm

Characteristic parameters	Sign	Test conditions	Min.	Typ.	Max.	Unit
Optoelectronic Performance Parameters						
Photon Efficiency	PDE	TA=25±5℃, Tth=-30℃±5℃,τ=0.8 μs±0.1 μs λ=1550±50nm(InGaAs), λ=1064±10nm(InGaAsP)	10	—	—	%
Dark Count Rate (InGaAs)	DCR(PDE=10%)		—	—	10	kHz
Photon Efficiency (InGaAsP)	DCR(PDE=10%)		—	—	5	%
After pulse Probability	APP(PDE=10%)		—	—	20	%

Operating wavelength: Standard narrowband filters can be selected within the operating wavelength range.

Tth: Operating temperature of the InGaAs avalanche photodiode 8×8 array chip.

τ: Dead time.

Ambient temperature for the above parameter tests: TA = 25 ± 5℃.

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Parameter Setting Range and Recommended Operating Conditions

No.		Parameters	Rated Values
Parameter Setting Range	1	Detector operating temperature	-30℃~30℃, minimum step value: 0.1℃
	2	Dead time adjustment	0.1μs～2.0μs, step value: 0.025μs
	3	Avalanche voltage threshold adjustment	50.0V～85.0V, step value: 0.1V
	4	Geiger avalanche comparison voltage setting	0.35V～1.10V, step value: 0.01V
	5	Detector operating gate width and operating cycle adjustment	Operating gate width: ≥0.1μs; operating cycle: ＞0.1μs; step value: 0.01μs

No.		Parameters	Rated Values
Recommended Operating Conditions	1	Detector operating temperature	-30℃~0℃
	2	Dead time value	0.80μs
	3	Avalanche voltage threshold adjustment	See the test report for details
	4	Geiger avalanche comparison voltage setting	0.45V～0.90V

Typical Characteristic Curves

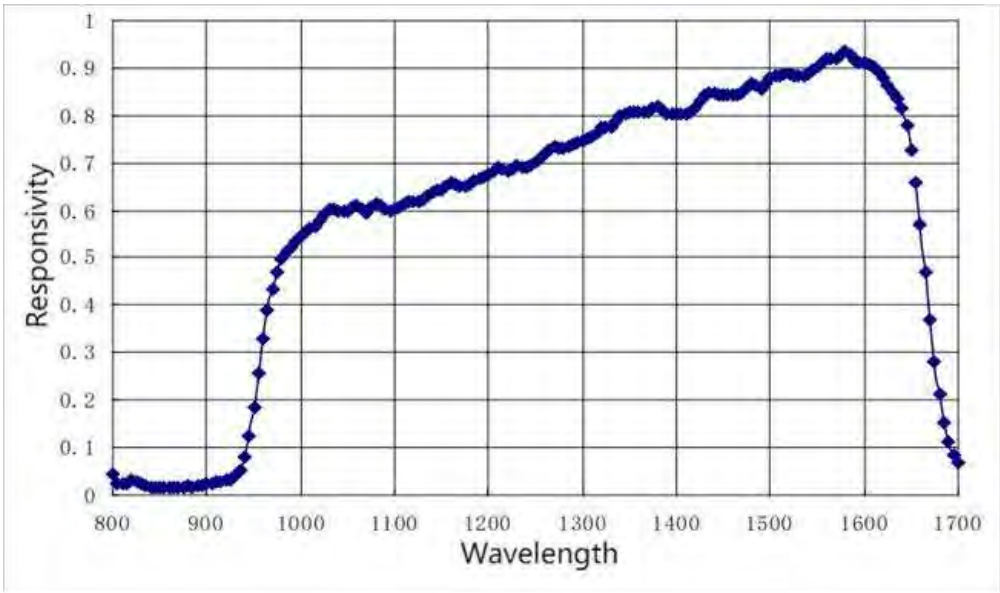


Figure 1 InGaAs Spectral Response Characteristic Curve

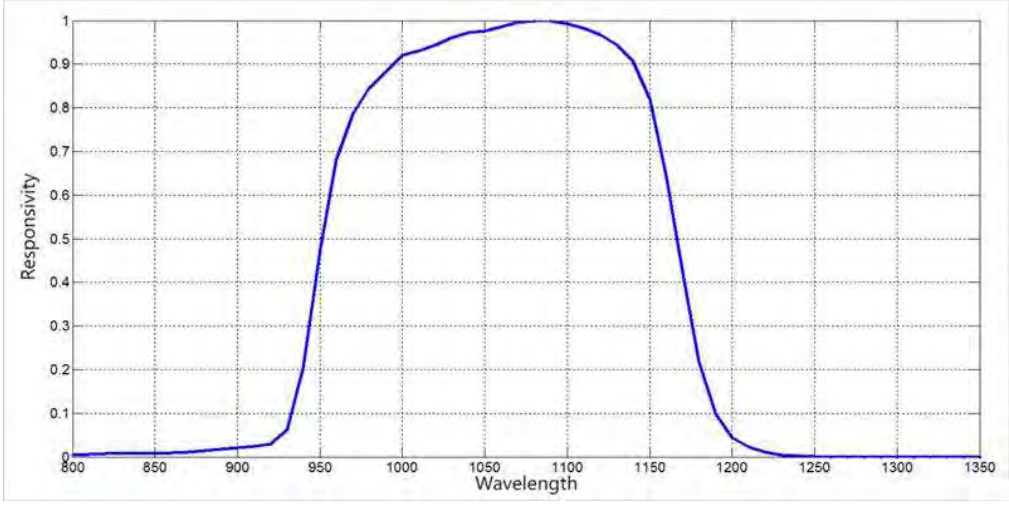


Figure 2 InGaAsP Spectral Response Characteristic Curve

Dimensions and Pin definitions

Outline, Dimensions and Definition of Lead-out Ports (Unit: mm)

Outline dimension parameters

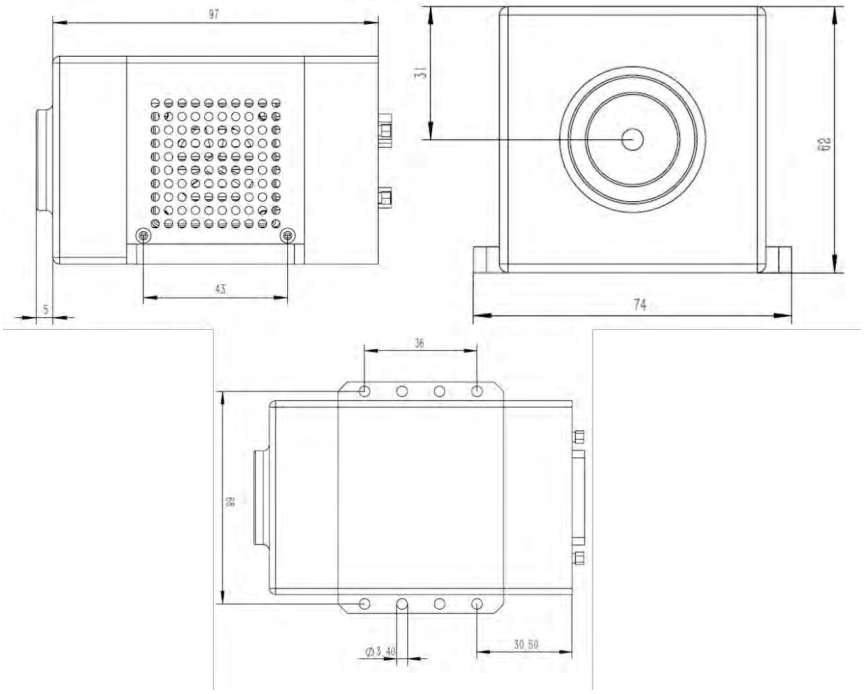


Figure 3 Outline Dimension Drawing (Unmarked tolerances are all ± 0.1mm)

Definition of Lead-out Ports

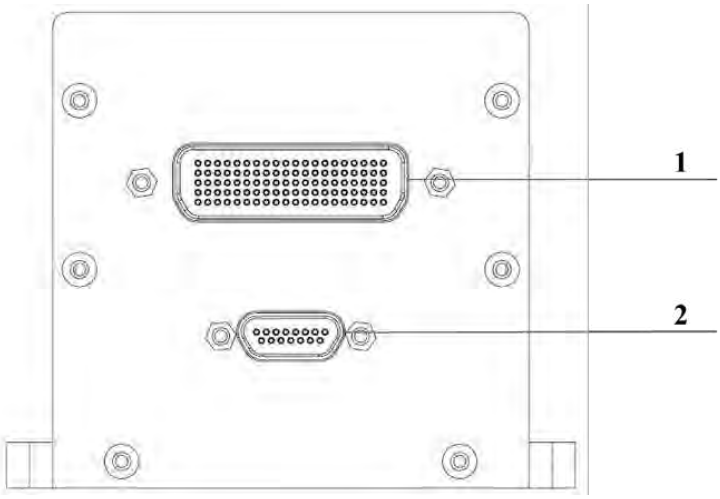


Figure 4 Arrangement and Numbering of Electrical Connectors

Electrical Connector Number	Electrical Connector Type	Function
1	HJ30J-100ZKN	64-channel pixel signal output port
2	J30J-15 ZKN	+12.0V single power supply, synchronous signal input, synchronous signal output, RS422 signal output port

The port numbering of J30J-100ZKN is shown in Figure 5

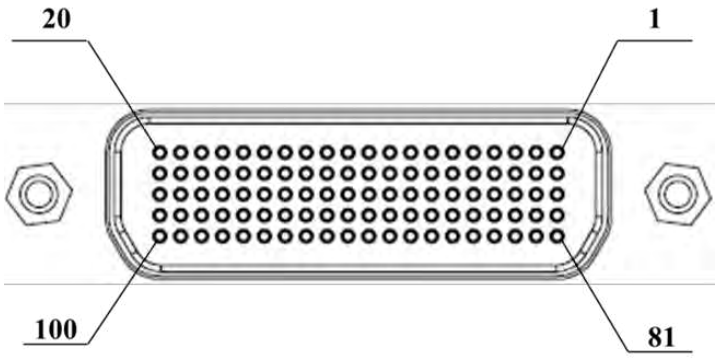


Figure 5 Port Numbering of J30J-100ZKN

Pin No.	Name	Function	Pin No.	Name	Function
1	D11	Pixel port	51	GND	Ground port
2	GND	Ground port	52	D47	Pixel port
3	D12	Pixel port	53	GND	Ground port
4	D14	Pixel port	54	D46	Pixel port
5	GND	Ground port	55	D45	Pixel port
6	D13	Pixel port	56	GND	Ground port
7	D15	Pixel port	57	GND	Ground port
8	GND	Ground port	58	D44	Pixel port
9	D16	Pixel port	59	D43	Pixel port
10	D17	Pixel port	60	GND	Ground port
11	GND	Ground port	61	GND	Ground port
12	D18	Pixel port	62	D48	Pixel port
13	D21	Pixel port	63	D81	Pixel port
14	GND	Ground port	64	GND	Ground port
15	D22	Pixel port	65	D78	Pixel port

16	D24	Pixel port	66	D77	Pixel port
17	GND	Ground port	67	GND	Ground port
18	D26	Pixel port	68	D76	Pixel port
19	D27	Pixel port	69	D75	Pixel port
20	GND	Ground port	70	GND	Ground port
21	D25	Pixel port	71	D74	Pixel port
22	D23	Pixel port	72	D73	Pixel port
23	GND	Ground port	73	GND	Ground port
24	D28	Pixel port	74	D72	Pixel port
25	D31	Pixel port	75	D71	Pixel port
26	GND	Ground port	76	GND	Ground port
27	D32	Pixel port	77	D68	Pixel port
28	D34	Pixel port	78	D67	Pixel port
29	GND	Ground port	79	GND	Ground port
30	D35	Pixel port	80	D66	Pixel port
31	D37	Pixel port	81	D65	Pixel port
32	GND	Ground port	82	GND	Ground port
33	D36	Pixel port	83	D64	Pixel port
34	D33	Pixel port	84	D63	Pixel port
35	GND	Ground port	85	GND	Ground port
36	D38	Pixel port	86	D62	Pixel port
37	D41	Pixel port	87	D61	Pixel port
38	GND	Ground port	88	GND	Ground port
39	D82	Pixel port	89	D58	Pixel port
40	D83	Pixel port	90	D57	Pixel port
41	GND	Ground port	91	GND	Ground port
42	D84	Pixel port	92	D56	Pixel port
43	D85	Pixel port	93	D55	Pixel port
44	GND	Ground port	94	GND	Ground port
45	D86	Pixel port	95	D54	Pixel port
46	D87	Pixel port	96	D53	Pixel port
47	GND	Ground port	97	GND	Ground port
48	D88	Pixel port	98	D52	Pixel port
49	D42	Pixel port	99	D51	Pixel port

50	GND	Ground port	100	GND	Ground port

The numbering of J30J-15ZKN is shown in Figure 6.

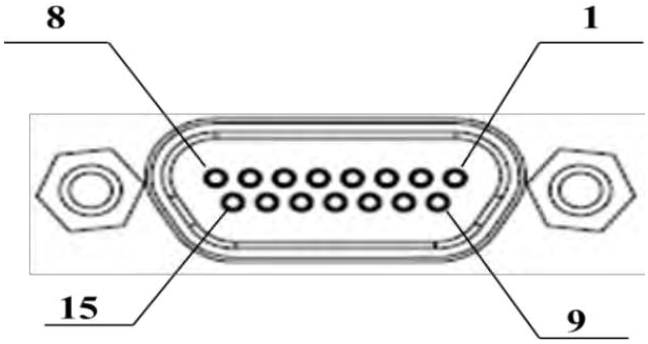


Figure 6 Port Numbering of J30J-100ZKN

Port No.	Sign	Function	Port No.	Name	Function
1	POWER_+12V	Power input	9	RS422_RX_P	RS422 receiving port +
2	POWER_+12V	Power input	10	RS422_RX_N	RS422 receiving port -
3	POWER_+12V	Power input	11	RS422_TX_P	RS422 transmitting port +
4	GND	Ground port	12	RS422_TX_N	RS422 transmitting port -
5	GND	Ground port	13	GND	Ground port
6	GND	Ground port	14	OUT_SIGNAL	Signal output port
7	GND	Ground port	15	GND_EX	Ground port
8	IN_SIGNAL	Signal input			

Notes

(1) Before power supply, carefully check whether the voltage of the power supply meets the requirements;

(2) Pay attention to electrostatic protection when using in a dry environment;

(3) The recommended operating ambient temperature should not exceed 40℃;

(4) Be careful not to use excessive force when plugging or unplugging interfaces;

(5) Pay attention to the sequence of switching on the power supply and setting parameters;

(6) Good heat dissipation must be ensured during use.