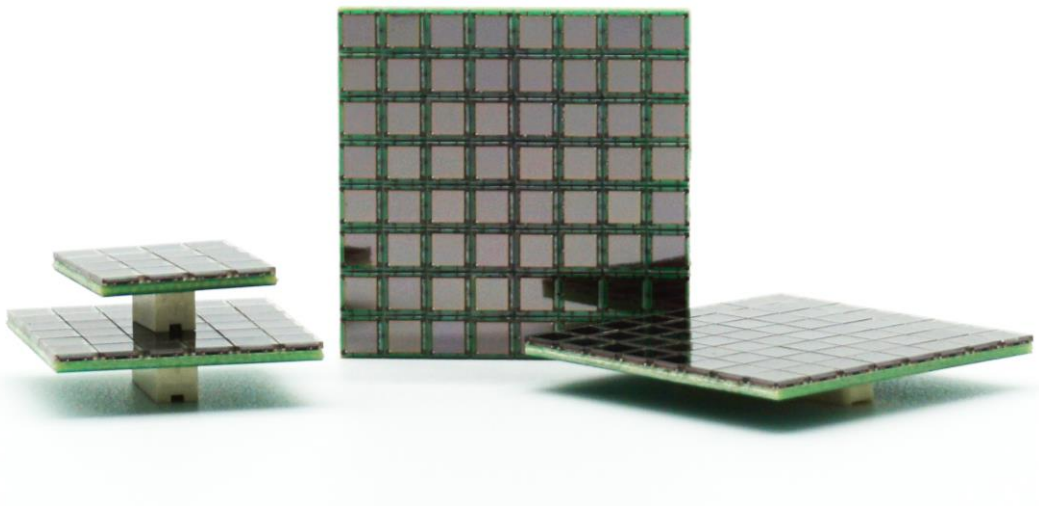
Joinbon
PASSION FOR LIGHT DETECTION

Array with TN series SiPM

Plug and play SiPM array module



HIGHLIGHT FEATURES

- Excellent Time Resolution
- Low Dark Count Rate
- High PDE Up To 40%
- Single Photon Sensitivity
- Excellent Magnetic Immunity
- Plug And Play

APPLICATIONS

- PET/Small Animal PET
- Spectral Analyzer
- High Energy Physical Experiment
- Fluorescence Analysis

ARRAY INPUTS and OUTPUTS (I/O)

Figure 1 shows the array schematic for a portion of an Array. Each SiPM sensor in the array has two electrical connections: output and common.

The cathodes of all sensors are summed together to form the common pin.

Each individual output is routed to its own output pin.

The pixel-level performance of the sensors in the array can be found in the TN Series datasheet.

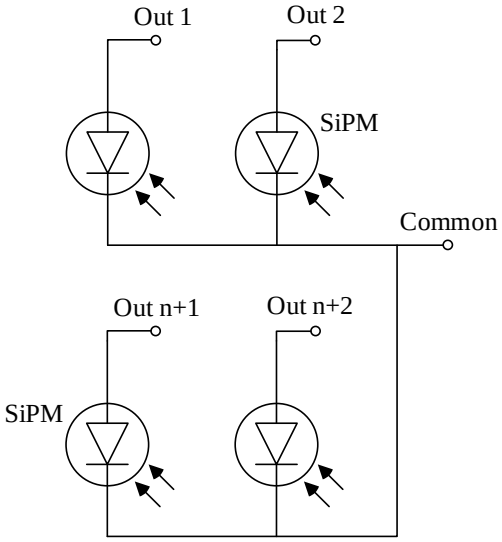


Fig.1 Signal connections of an SiPM array

STRUCTURE

JARY-TN30XX-4×4C

Parameter	JARY-TN3037-4×4C	JARY-TN3050-4×4C	JARY-TN3075-4×4C	Unit
Number of channels	16（4×4）			-
Active area	3×3			mm
Pixel pitch	37	50	75	μm
Number of pixels per SiPM	5929	3364	1439	-
Fill factor	60.2	70.6	79.8	%
Package type	With connector [1]			-

*1 A connector (DF12B(5.0)-20DP-0.5V(86)) made by HIROSE is mounted on the back side of the board.
This connector mates with a HIROSE receptacle (DF12B-20DS-0.5V(86)).

JARY-TN30XX-6×6C

Parameter	JARY-TN3037-6×6C	JARY-TN3050-6×6C	JARY-TN3075-6×6C	Unit
Number of channels	36（6×6）			-
Active area	3×3			mm
Pixel pitch	37	50	75	μm
Number of pixels per SiPM	5929	3364	1439	-

Fill factor	60.2	70.6	79.8	%
Package type	With connector [2]			-

*2 A connector (DF12B(5.0)-40DP-0.5V(86)) made by HIROSE is mounted on the back side of the board. This connector mates with a HIROSE receptacle (DF12B-40DS-0.5V(86)).

JARY-TN30XX-8×8C

Parameter	JARY-TN3037-8×8C	JARY-TN3037-8×8C	JARY-TN3037-8×8C	Unit
Number of channels	64 (8×8)			-
Active area	3×3			mm
Pixel pitch	37	50	75	μm
Number of pixels	5929	3364	1439	-
Fill factor	60.2	70.6	79.8	%
Package type	With connector [3]			-

*3 A connector (DF17B(1.0H)-80DP-0.5V(57)) made by HIROSE is mounted on the back side of the board. This connector mates with a HIROSE receptacle (DF17B(3.0)-80DS-0.5V(57)).

ELECTRICAL and OPTICAL CHARACTERISTICS----------

Parameter		Value			Condition	Unit
		JARY-TN3037-X×XC	JARY-TN3050-X×XC	JARY-TN3075-X×XC		
Spectral Response Range		250-900			--	nm
Peak Sensitivity Wavelength		420			--	nm
Breakdown Voltage		25±0.2			@ 25℃	V
Overvoltage [4]		1 - 5			--	V
PDE @420nm [5]		32%	35%	40%	Vov=2V	--
Gain		2.1×10^6	2.7×10^6	4.5×10^6	Vov=2V	--
Rise Time		1.2	1.3	1.3	Vov=2V	ns
Recovery Time τ [6]		29	45	88	Vov=2V	ns
Dark Count Rate[7]	Typ.	88	124	175	Vov=2V	kHz/mm²
	Max.	200	288	420	Vov=2V	
Dark Current	Typ.	463	714	2148	Vov=2V	nA
	Max.	980	1600	4120	Vov=2V	
Temperature Dependency of V_{br}		34.6	35.2	35.3	--	mV/℃
Crosstalk Probability		1.3%	3.0%	6.2%	Vov=2V	--
Afterpulse		2.1%	2.7%	4.1%	Vov=2V	--
Pixel Capacitance		98	165	387	Vov=2V	fF

*4 Overvoltage(V_{ov})=Operating Voltage(V_{op})-Breakdown Voltage(V_{br})

*5 Photo detection efficiency does not include crosstalk and afterpulse

*6 RC charging time of the pixel

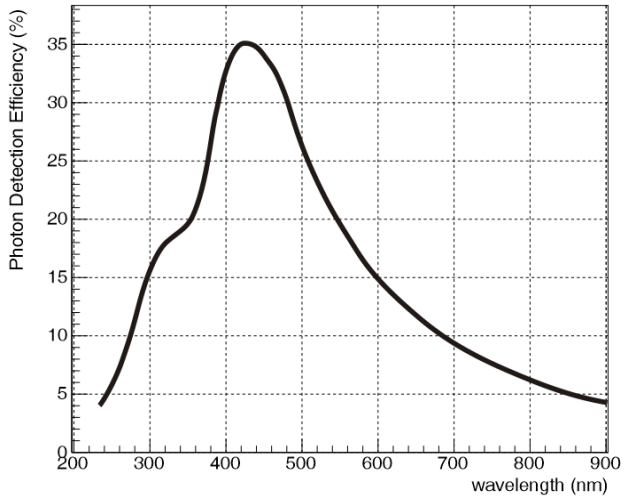
*7 Threshold=0.5 p.e at 25℃

ABSOLUTE MAXIMUM RATINGS

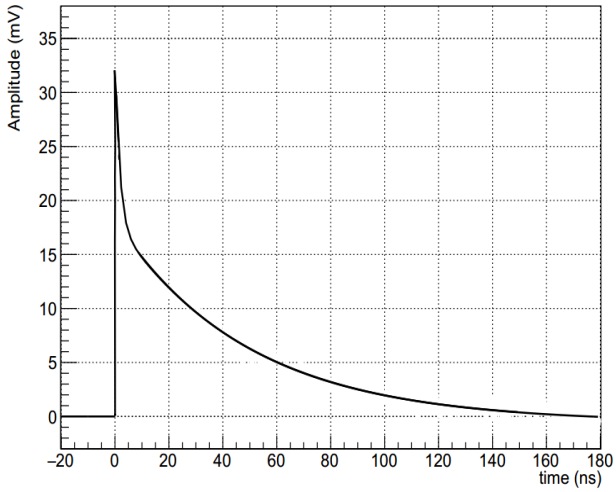
Parameter	JARY-TN30XX-X×XC
Storage Temperature Range	-20℃~+45℃
Operating Temperature Range	-45℃~+85℃
Peak Temperature and Condition	250℃，5second×twice

PERFORMANCE PLOTS

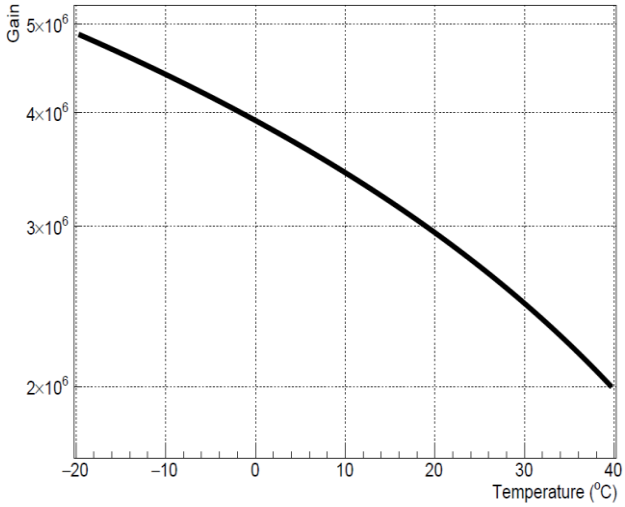
PDE versus Wavelength
JSP-TN3050-SMT



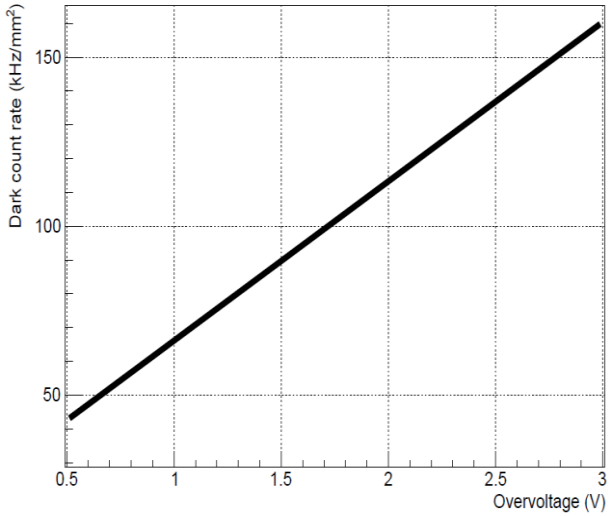
Typical Impulse Response
JSP-TN3050-SMT



Gain versus Temperature*
JSP-TN3050-SMT



Dark count rate versus Overvoltage
JSP-TN3050-SMT



*This data is tested at a fixed voltage of 26.9V (Vov=2V at room temperature, the breakdown voltage is typically 24.9V)

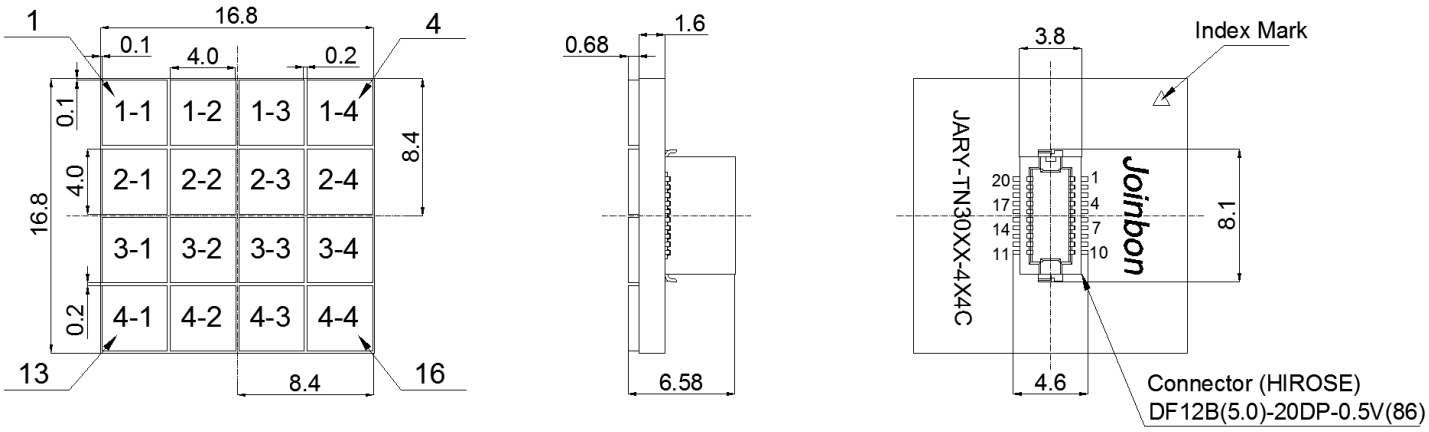
1 To use the product exceed the maximum rating condition may cause performance reduction or permanent damage.

2 All the measurement are made at voltage of Vov=2V unless otherwise noted.

DIMENSIONAL OUTLINES AND CONNECTOR PIN-OUTS ----------

JARY-TN30XX-4×4C DIMENSIONAL OUTLINES

unit：mm



Top view　　Side view　　Bottom view

The connector will be changed without notice, please contact our sales before ordering.

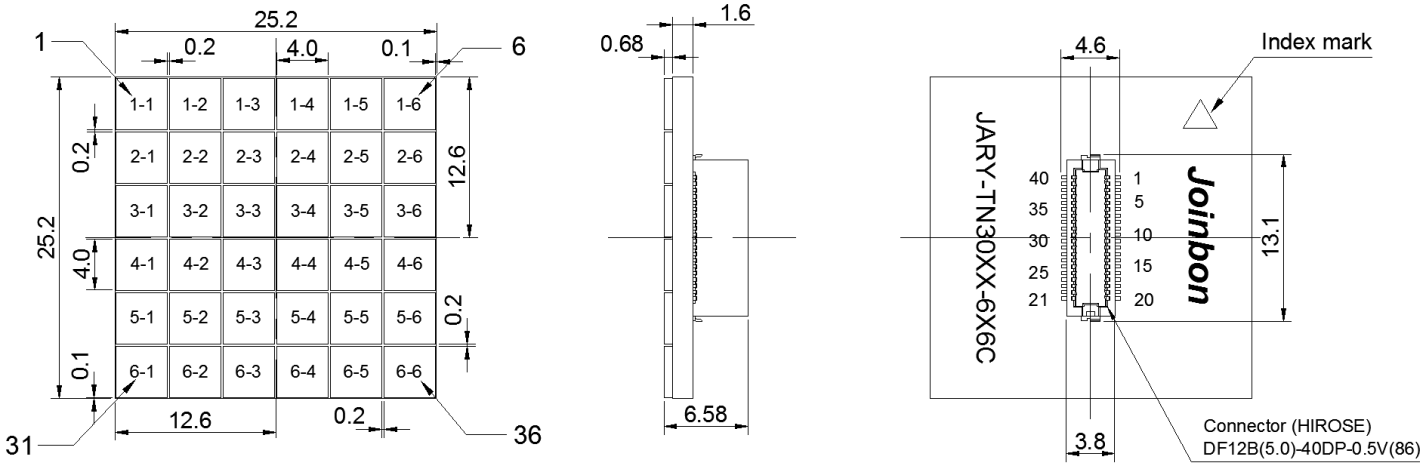
Connector Pin-Outs for JARY-TN30XX-4×4C

Pin	Connection	Signal	Pin	Connection	Signal
20	A(1-3)	Out3	1	A(2-2)	Out6
19	A(2-3)	Out7	2	A(1-2)	Out2
18	A(2-4)	Out8	3	A(2-1)	Out5
17	C(1-3, 1-4, 2-3, 2-4)	Bias3	4	C(1-1, 1-2, 2-1, 2-2)	Bias1
16	A(1-4)	Out4	5	A(1-1)	Out1
15	A(4-4)	Out16	6	A(4-1)	Out13
14	C(3-3, 3-4, 4-3, 4-4)	Bias4	7	C(3-1, 3-2, 4-1, 4-2)	Bias2
13	A(3-4)	Out12	8	A(3-1)	Out9
12	A(4-3)	Out15	9	A(3-2)	Out10
11	A(3-3)	Out11	10	A(4-2)	Out14

Note: A= Anode, C= Cathode.

JARY-TN30XX-6×6C

unit: mm



Top view Side view Bottom view

The connector will be changed without notice, please contact our sales before ordering.

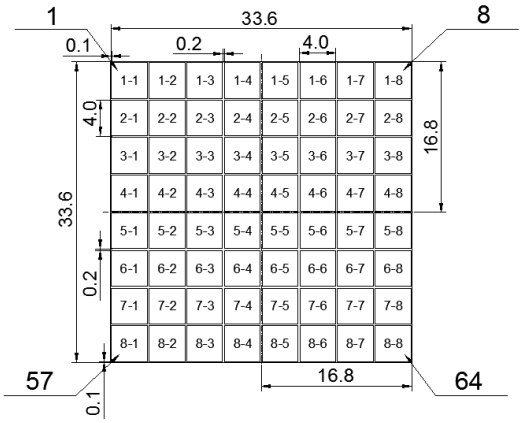
Connector Pin-Outs for JARY-TN30XX-6×6C

Pin	Connection	Signal	Pin	Connection	Signal
40	A(2-4)	Out10	1	A(2-3)	Out9
39	A(1-4)	Out4	2	A(1-3)	Out3
38	A(2-5)	Out11	3	A(2-2)	Out8
37	A(1-5)	Out5	4	A(1-2)	Out2
36	A(1-6)	Out6	5	A(1-1)	Out1
35	A(3-5)	Out17	6	A(3-3)	Out15
34	A(3-4)	Out16	7	A(3-2)	Out14
33	C(1-4, 1-5, 1-6, 2-4, 2-5, 2-6, 3-4, 3-5, 3-6)	Bias3	8	C(1-1, 1-2, 1-3, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3)	Bias1
32	A(2-6)	Out12	9	A(2-1)	Out7
31	A(3-6)	Out18	10	A(3-1)	Out13
30	A(4-6)	Out24	11	A(4-1)	Out19
29	A(5-6)	Out30	12	A(5-1)	Out25
28	C(4-4, 4-5, 4-6,5-4, 5-5, 5-6, 6-4, 6-5, 6-6)	Bias4	13	C(4-1, 4-2, 4-3, 5-1, 5-2, 5-3, 6-1, 6-2, 6-3)	Bias2
27	A(4-5)	Out23	14	A(4-3)	Out21
26	A(4-4)	Out22	15	A(4-2)	Out20
25	A(6-6)	Out36	16	A(6-1)	Out31
24	A(6-5)	Out35	17	A(6-2)	Out32
23	A(5-5)	Out29	18	A(5-2)	Out26
22	A(6-4)	Out34	19	A(6-3)	Out33
21	A(5-4)	Out28	20	A(5-3)	Out27

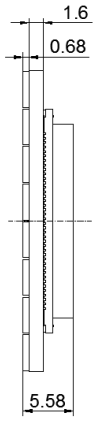
Note: A= Anode, C= Cathode.

JARY-TN30XX-8×8C

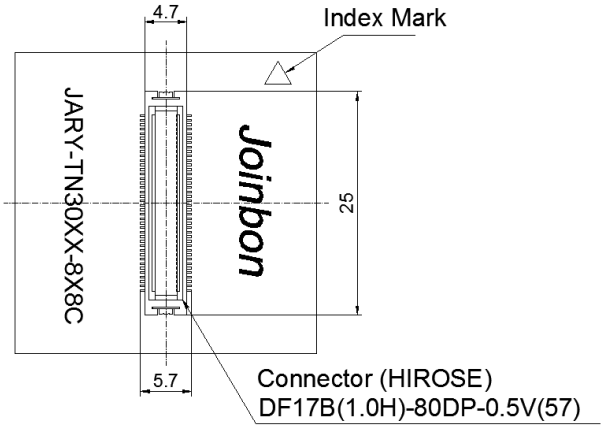
unit: mm



Top view



Side view



Bottom view

The connector will be changed without notice, please contact our sales before ordering.

Connector Pin-Outs for JARY-TN30XX-8×8C

Pin	Connection	Signal	Pin	Connection	Signal
80	A(1-5)	Out5	1	A(2-4)	Out12
79	A(2-5)	Out13	2	A(1-4)	Out4
78	A(2-6)	Out14	3	A(2-3)	Out11
77	A(1-6)	Out6	4	A(1-3)	Out3
76	A(1-7)	Out7	5	A(1-2)	Out2
75	A(2-7)	Out15	6	A(2-2)	Out10
74	NC	NC	7	A(3-4)	Out20
73	A(3-6)	Out22	8	A(3-3)	Out19
72	NC	NC	9	NC	NC
71	C(1-1, 1-2, 1-3, 1-4, 2-1, 2-2, 2-3, 2-4, 3-1, 3-2, 3-3, 3-4, 4-1, 4-2, 4-3, 4-4)	Bias3	10	C(1-5, 1-6, 1-7, 1-8, 2-5, 2-6, 2-7, 2-8, 3-5, 3-6, 3-7, 3-8, 4-5, 4-6, 4-7, 4-8)	Bias1
70	A(3-5)	Out21	11	A(3-2)	Out18
69	A(3-7)	Out23	12	A(1-1)	Out1
68	A(1-8)	Out8	13	A(2-1)	Out9
67	A(2-8)	Out16	14	A(4-4)	Out28
66	A(3-8)	Out24	15	A(3-1)	Out17
65	A(4-6)	Out30	16	NC	NC
64	A(4-5)	Out29	17	A(4-3)	Out27
63	A(4-7)	Out31	18	NC	NC
62	A(4-8)	Out32	19	A(4-2)	Out26
61	NC	NC	20	A(4-1)	Out25

60	A(5-8)	Out40	21	NC	NC
59	A(5-7)	Out39	22	A(5-1)	Out33
58	NC	NC	23	A(5-2)	Out34
57	A(5-6)	Out38	24	A(5-4)	Out36
56	NC	NC	25	A(5-3)	Out35
55	A(6-8)	Out48	26	A(6-1)	Out41
54	A(5-5)	Out37	27	A(7-1)	Out49
53	A(7-8)	Out56	28	A(8-1)	Out57
52	A(8-8)	Out64	29	A(6-2)	Out42
51	A(6-7)	Out47	30	A(6-4)	Out44
50	C(5-1, 5-2, 5-3, 5-4, 6-1, 6-2, 6-3, 6-4, 7-1, 7-2, 7-3, 7-4, 8-1, 8-2, 8-3, 8-4)	Bias4	31	C(5-5, 5-6, 5-7, 5-8, 6-5, 6-6, 6-7, 6-8, 7-5, 7-6, 7-7, 7-8, 8-5, 8-6, 8-7, 8-8)	Bias2
49	NC	NC	32	NC	NC
48	A(6-6)	Out46	33	A(6-3)	Out43
47	A(6-5)	Out45	34	NC	NC
46	A(7-7)	Out55	35	A(7-2)	Out50
45	A(8-7)	Out63	36	A(8-2)	Out58
44	A(8-6)	Out62	37	A(8-3)	Out59
43	A(7-6)	Out54	38	A(7-3)	Out51
42	A(8-5)	Out61	39	A(7-4)	Out52
41	A(7-5)	Out53	40	A(8-4)	Out60

Note: A= Anode, C= Cathode, NC= Not Connected.

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