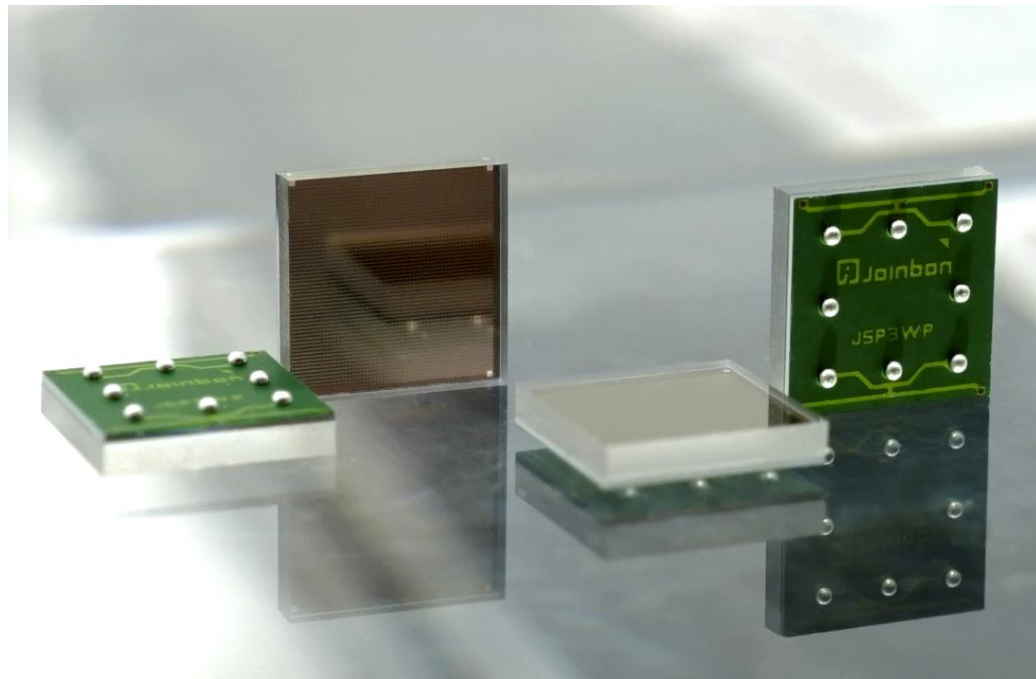


# TP3050 SiPM

SiPM with compact WLCSP package



## HIGHLIGHT FEATURES

- Wafer-level packaging based on TSV technology
- Compact size
- Excellent signal uniformity
- Excellent timing resolution
- Beneficial for large area splicing
- High PDE up to 35%
- Single photon sensitivity

## APPLICATIONS

- PET/small animal PET
- Spectral analysis
- Laser detection and measurement
- Ray detection
- Radiation measurement and analysis
- Fluorescence analysis
- High-energy physics experiment

## Geometry Parameter

Product	Active Area	Pixel Pitch	No. of Pixels	Fill Factor	Package Dimension
JSP-TP3050-SMT	3mm×3mm	50 μm	3364	70.6%	3.03mm×3.03mm×0.62mm

## Performance Parameter

Parameter	Value		Condition	Unit
	JSP-TP3050-SMT			
Spectral Response Range	250-950		--	nm
Peak Sensitivity Wavelength	420		--	nm
Breakdown Voltage	25±0.2		@ 25°C	V
Overvoltage <sup>1</sup>	1 - 5		--	V
PDE @420nm <sup>2</sup>	35%		V <sub>ov</sub> =2V	--
Gain	2.5×10 <sup>6</sup>		V <sub>ov</sub> =2V	--
Rise Time	1		V <sub>ov</sub> =2V	ns
Recovery Time τ <sup>3</sup>	42		V <sub>ov</sub> =2V	ns
Dark Count Rate <sup>4</sup>	Typ.	120	V <sub>ov</sub> =2V	kHz/mm <sup>2</sup>
	Max.	270	V <sub>ov</sub> =2V	
Dark Current	Typ.	650	V <sub>ov</sub> =2V	nA
	Max.	1440	V <sub>ov</sub> =2V	
Temperature Dependency of V <sub>br</sub>	34.4		--	mV/°C
Crosstalk Probability	3.1%		V <sub>ov</sub> =2V	--
Afterpulse Probability	3.9%		V <sub>ov</sub> =2V	--
Pixel Capacitance	169		V <sub>ov</sub> =2V	fF

1 Overvoltage (V<sub>ov</sub>) = Operating Voltage (V<sub>op</sub>) - Breakdown Voltage (V<sub>br</sub>)

2 Photon detection efficiency does not include crosstalk and afterpulse

3 RC charging time of the pixel

4 Threshold=0.5 p.e at 25°C

## General Parameters

	JSP-TP3050-SMT
Storage Temperature Range	-45°C~+100°C
Operating Temperature Range	-45°C~+85°C
Reflow Solder Compatibility	YES
Peak Temperature and Condition	260°C
Cover Material	glass
Cover Refractive Index	1.52@589nm
Moisture Sensitivity Level	MSL3 <sup>1</sup>

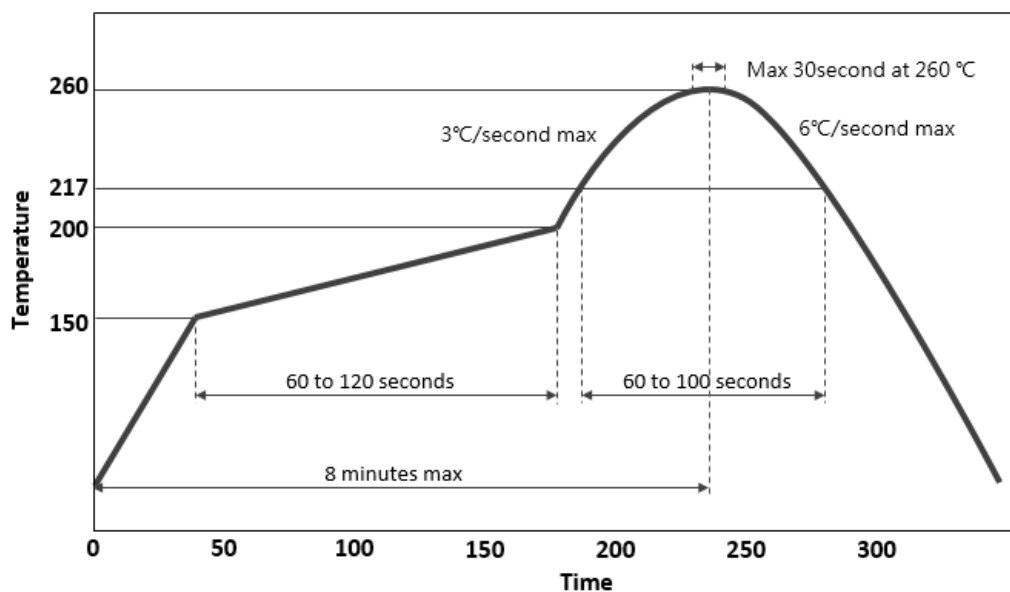
1 Refer to JEDEC J-STD-020 standard, a MSL3 device is exposed at the condition of <30 °C, <60% RH, the device should be soldered within 168 hours. If the exposure time exceeds 168 hours, the device needs to be baked to remove the moisture inside the chips.

## Soldering Condition

TP3050 SiPM are packed in tape & reel in MBB (Moisture Barrier Bag), Please follow the introductions below before reflow solder or other high temperature process:

1. Please don't open the MBB before the reflow solder process;
2. If the MBB is opened before reflow solder or other high temperature process, please follow the operating standard procedure of moisture sensitive device (JEDEC J-STD-033), the devices should be mounted within 168 hours. If the exposure time exceeds 168 hours, it needs to be baked to remove the moisture inside the chips before apply it to reflow solder.

To execute the reflow solder for surface mount type SiPM, the recommended temperature curve shown as below.

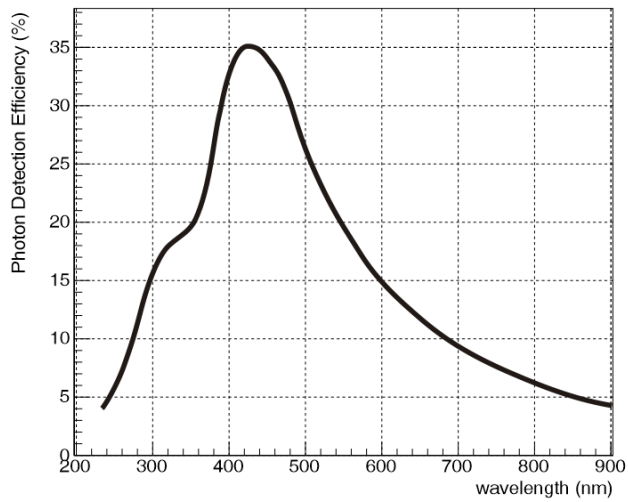


Recommended Temperature Curve

## Performance Plots

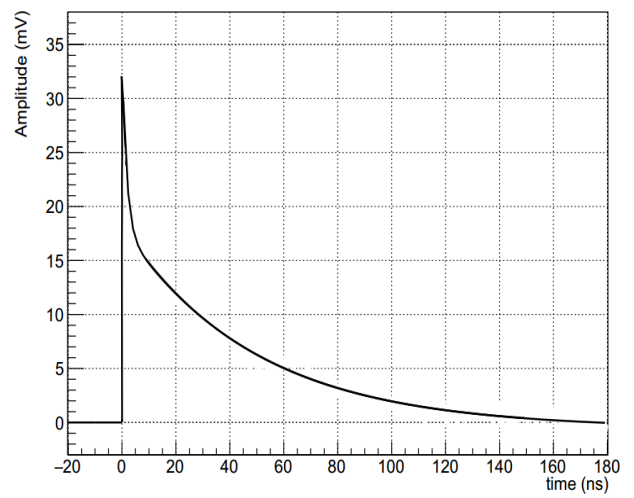
**PDE versus Wavelength**

JSP-TP3050-SMT



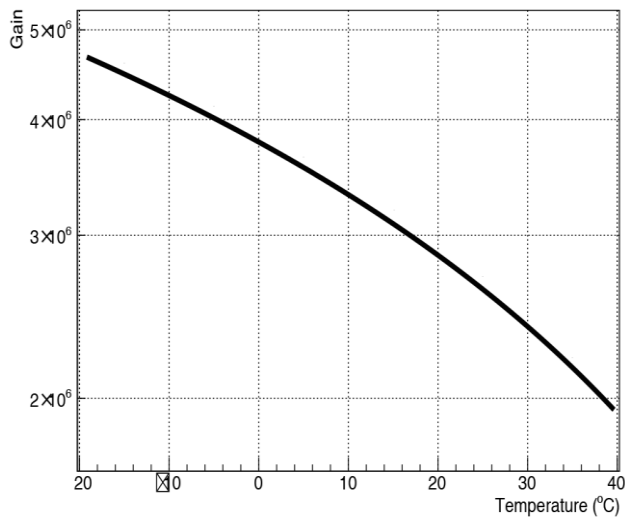
**Typical Impulse Response**

JSP-TP3050-SMT



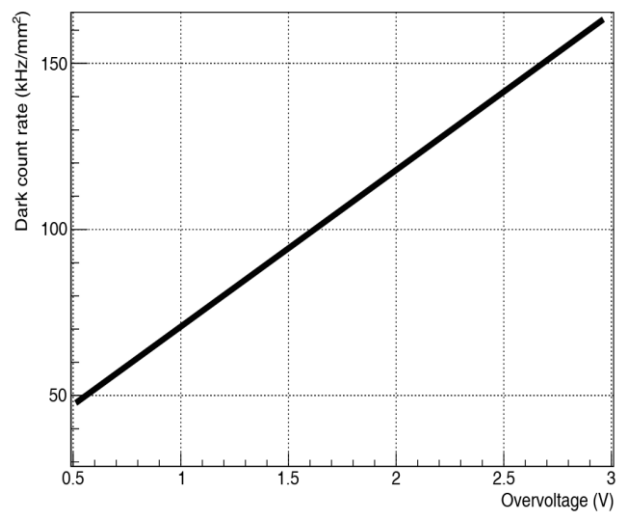
**Gain versus Temperature \***

JSP-TP3050-SMT



**Dark Count Rate versus Overvoltage**

JSP-TP3050-SMT

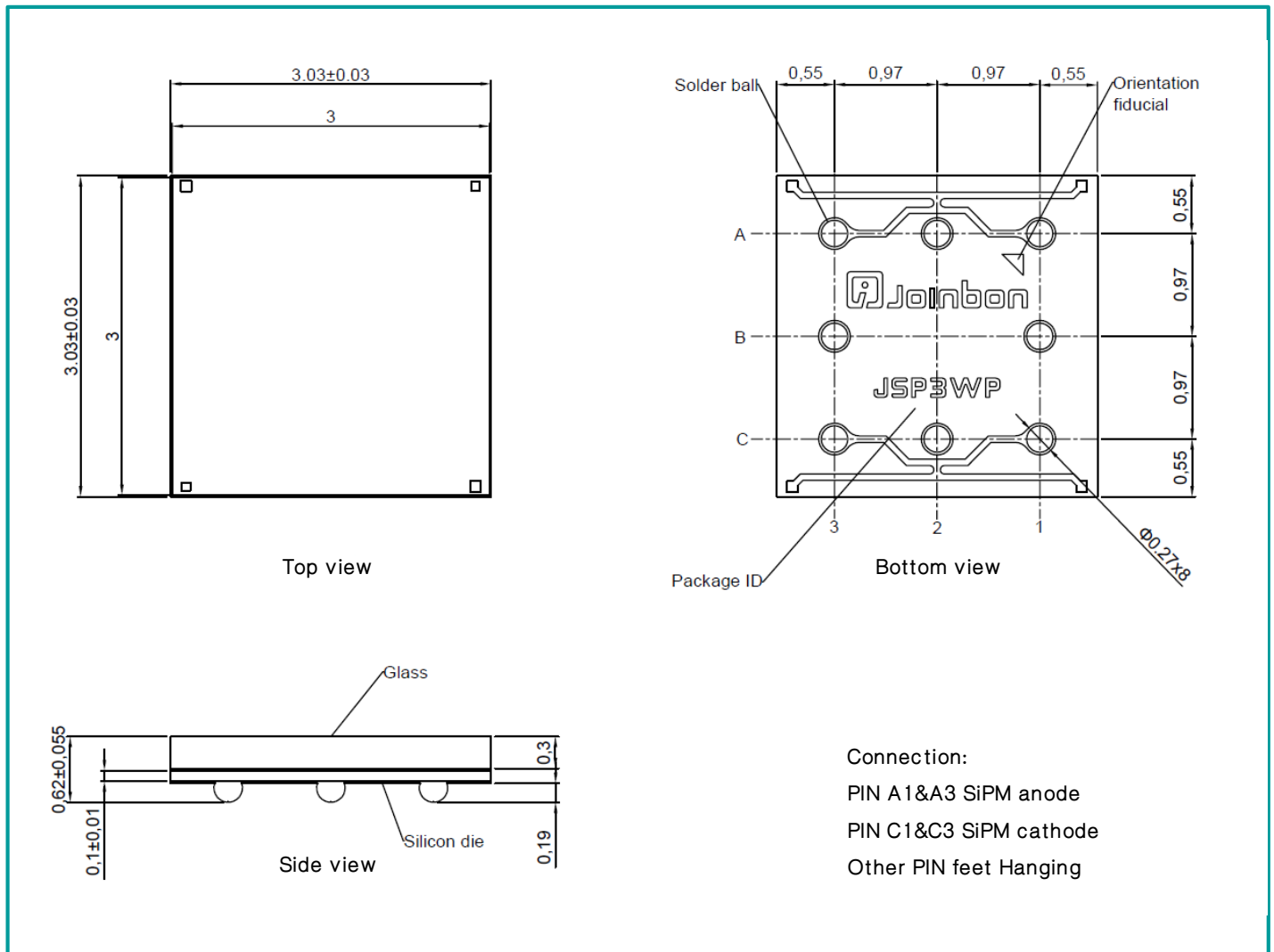


- 1 To use the product exceed the maximum rating condition may cause performance reduction or permanent damage
- 2 All the data above are measured at overvoltage of 2V unless otherwise noted

## Package Drawing

unit: mm

### TP3050 series SiPM Package Outline



The detailed drawing of JSP-TP3050-SMT is available to download here [JSP-TP3050-TSV-CAD](#)

More information about the handling, storage, soldering and the basic of readout of TP series products is available to download.

[Handling, Storage and Soldering for SMT Products](#)

■ All specifications are subject to change without notice

## Joinbon Technology Co., Ltd. (Hubei)



Building A03, East Lake Hi-Tech Innovation City, No.9 Phoenix Avenue, Phoenix Lake, Ezhou, Hubei, P.R.China.

Postcode: 436060

Tel: 027-5937 0337

Fax: 027-5937 0337

Email: [info@joinbon.com](mailto:info@joinbon.com)

Site: [www.joinbon.com](http://www.joinbon.com)