PSS Series SiPMs

Specifications subject to change without notice

Compared to conventional SiPM, ZJGD SiPM employs an intrinsic epitaxial layer as the quenching resistors and uses a continuous silicon capping layer as an anode to connect all APD cells. Thus, the device has a more compact structure and simpler fabrication technology, which allows for a larger micro-cell density (larger dynamic range) while adequate PDE. Furthermore, ZJGD SiPM helps implement a two-dimensional (2D) position-sensitive (PS) SiPM, which has attractive advantages of fewer output electrodes, simple readout electronics and a high position resolution.

Features

- **Simple Readout Electronics**
- **High Position Resolution**
- **Large Dynamic Range While High PDE**
- **Fast Rise Time and Short Pulse Width**
- **Short Recovery Time and High Time Resolution**
- **Cost Effective**

Applications

- **High Energy Physics**
- **LiDAR**
- **Nuclear Medical Imaging (PET, SPECT)**
- **Radiation Detection and Imaging**
- **Optical Spectroscope**
- **Other Low Level Light Position-Sensitive Detection**

Specifications

Type	PSS 11-3030-S	PSS 11-6060-S
Effective Pitch	**10 μm**	**20 μm**
Active Area	**3.0×3.0 mm^2**	**6.24×6.24 mm^2**
Micro-cell Number	10000 /mm^2	2500 /mm^2
Typical Breakdown Voltage (V_B)	26.5 V	27.5 V
Peak PDE @420nm	32 %	40 %
Recommended Operation Voltage	V_B + 5 V	V_B + 5 V
Gain	2.0 × 10^5	8.0 × 10^5
Dark Count Rate (DCR)	650 kHz / mm^2	150 kHz / mm^2
Configuration of Anodes	Tetra-Lateral Anodes	Square-Bordered Anodes

Above parameters are measured at their recommended operation voltage and 20 ℃.

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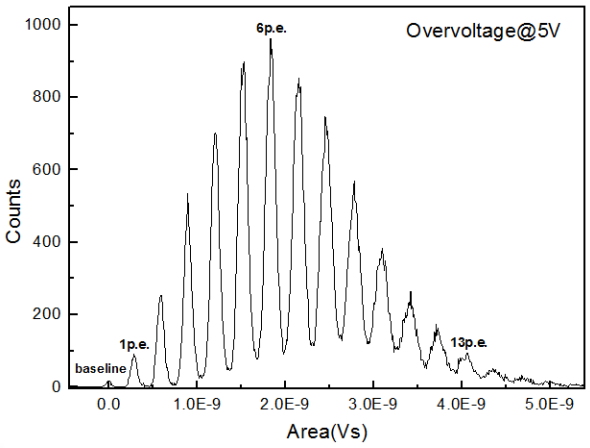
Characteristics of PSS 11-3030-S

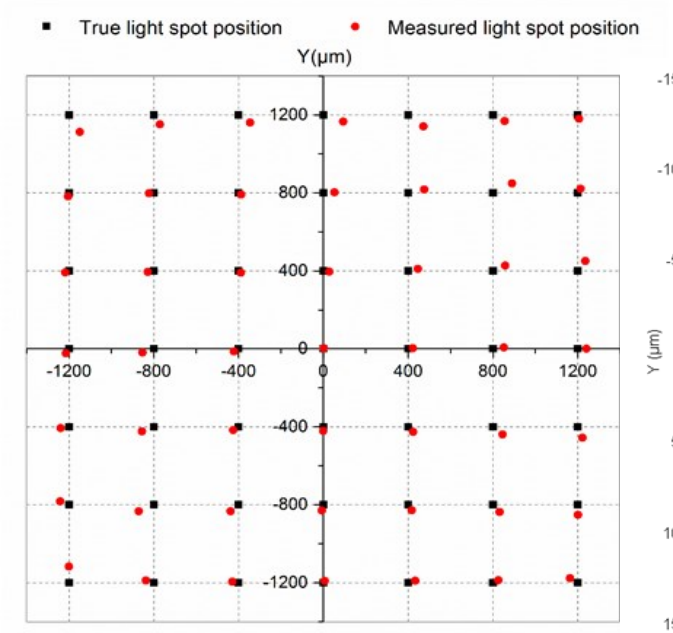
Position Algorithm

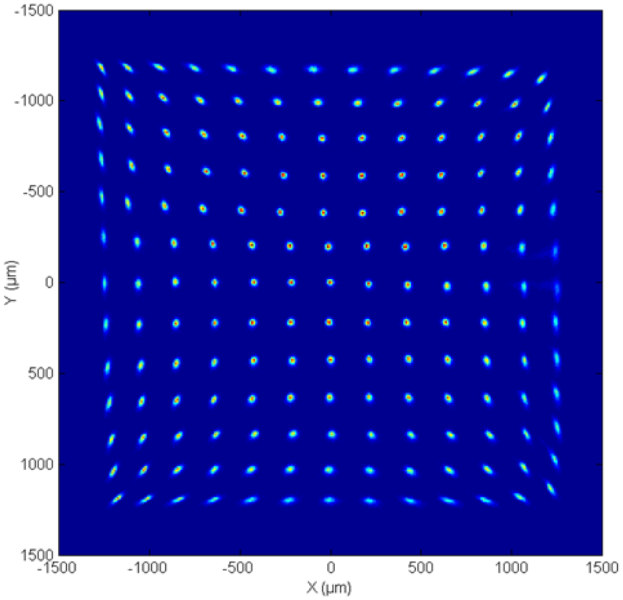
$$x_c = \frac{L}{2}\cdot\frac{\left(\frac{R_0}{R_s}+8.7492\right)(Q_4-Q_3)\left[\left(\frac{1.7R_0}{R_s}+5.8156\right)(Q_1+Q_2)+\left(\frac{R_0}{R_s}-5.8156\right)(Q_3+Q_4)\right]}{\left[\frac{R_0}{R_s}(Q_1+Q_2+Q_3+Q_4)\right]^2-\left[1.02\left(\frac{R_0}{R_s}+8.7492\right)(Q_2-Q_1)\right]^2}$$

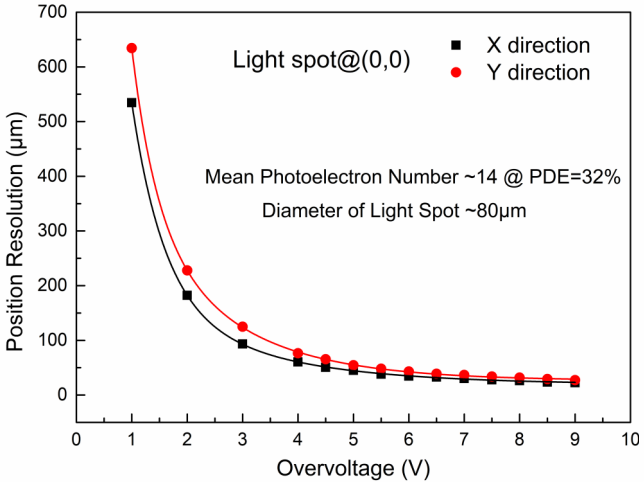
$$y_c = \frac{L}{2}\cdot\frac{\left(\frac{R_0}{R_s}+8.7492\right)(Q_2-Q_1)\left[\left(\frac{R_0}{R_s}-5.8156\right)(Q_1+Q_2)+\left(\frac{1.7R_0}{R_s}+5.8156\right)(Q_3+Q_4)\right]}{\left[\frac{R_0}{R_s}(Q_1+Q_2+Q_3+Q_4)\right]^2-\left[1.02\left(\frac{R_0}{R_s}+8.7492\right)(Q_4-Q_3)\right]^2}$$

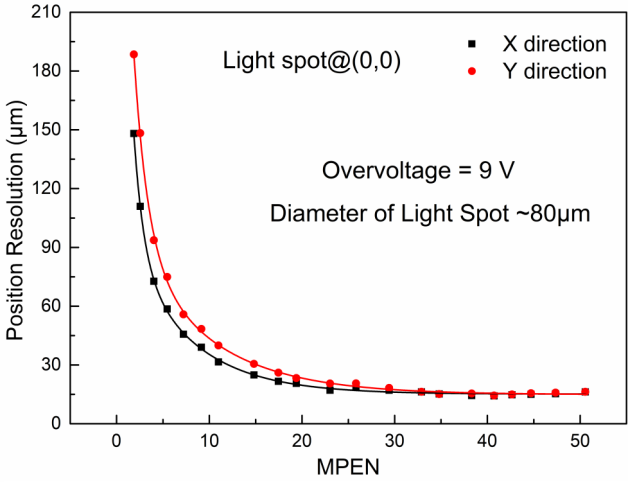
L is the length of the active area. R_0 is the sheet impedance, which is equal to 320 Ω. R_s is the load impedance. Q_i (i = 1, 2, 3, 4) is the shared charge of the corresponding anode.











Test Conditions: OV=9 V if not specified, Temp.=20 °C, Load Impedance = 50 Ω.

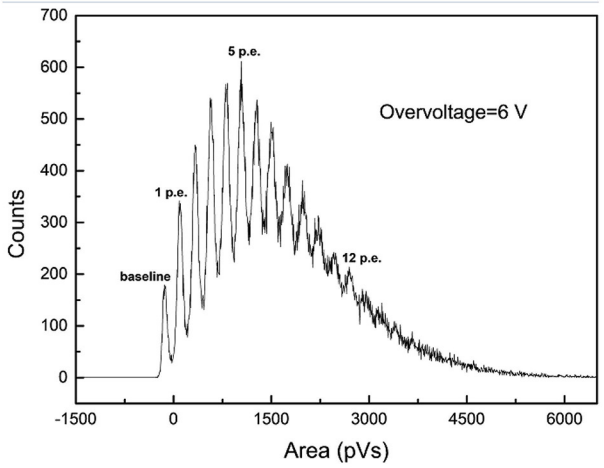
Characteristics of PSS 11-6060-S

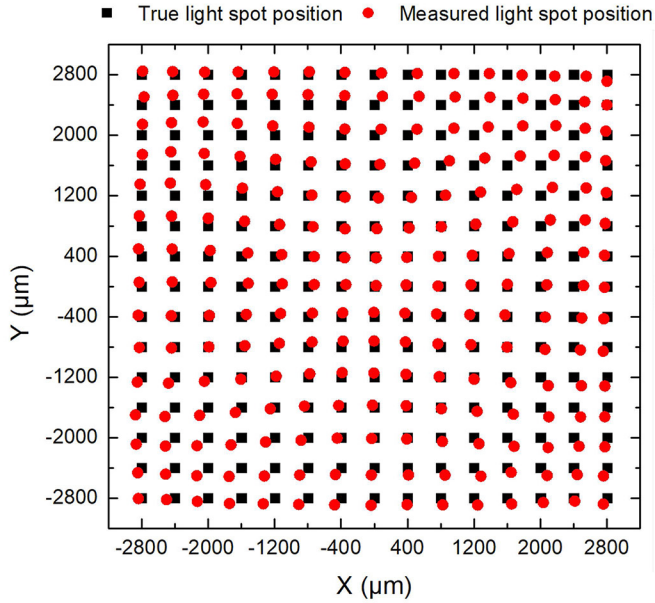
Position Algorithm

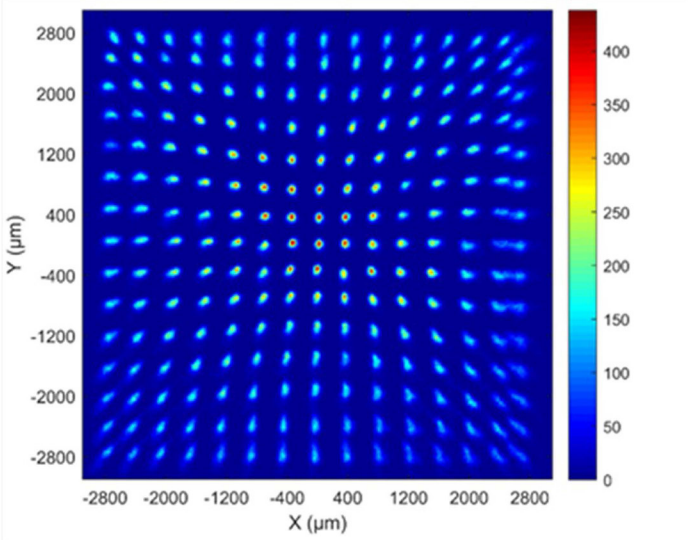
$$x_c = \frac{L}{2} \cdot k \cdot \frac{(Q_2 + Q_3) - (Q_1 + Q_4)}{(Q_1 + Q_2 + Q_3 + Q_4)}$$

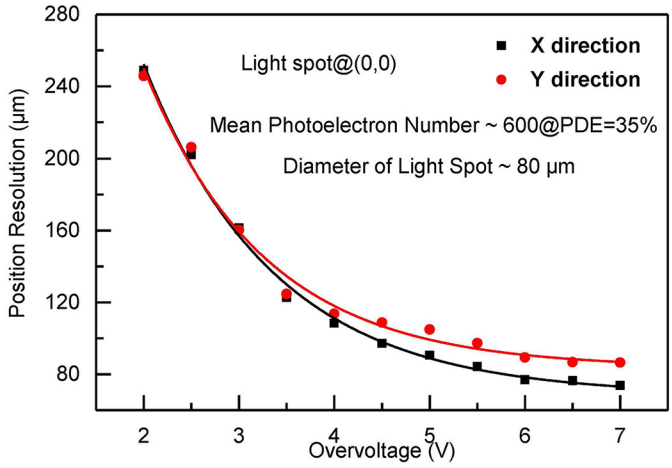
$$y_c = \frac{L}{2} \cdot k \cdot \frac{(Q_3 + Q_4) - (Q_1 + Q_2)}{(Q_1 + Q_2 + Q_3 + Q_4)}$$

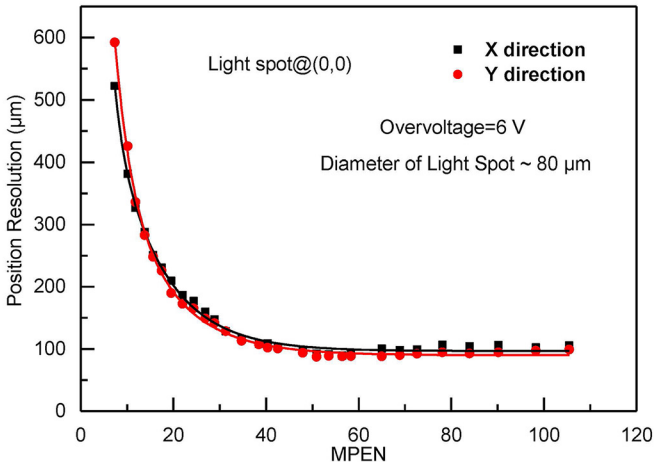
L is the length of the active area. Q_i (i = 1, 2, 3, 4) is the shared charge of the corresponding anode. k is the calibration factor.







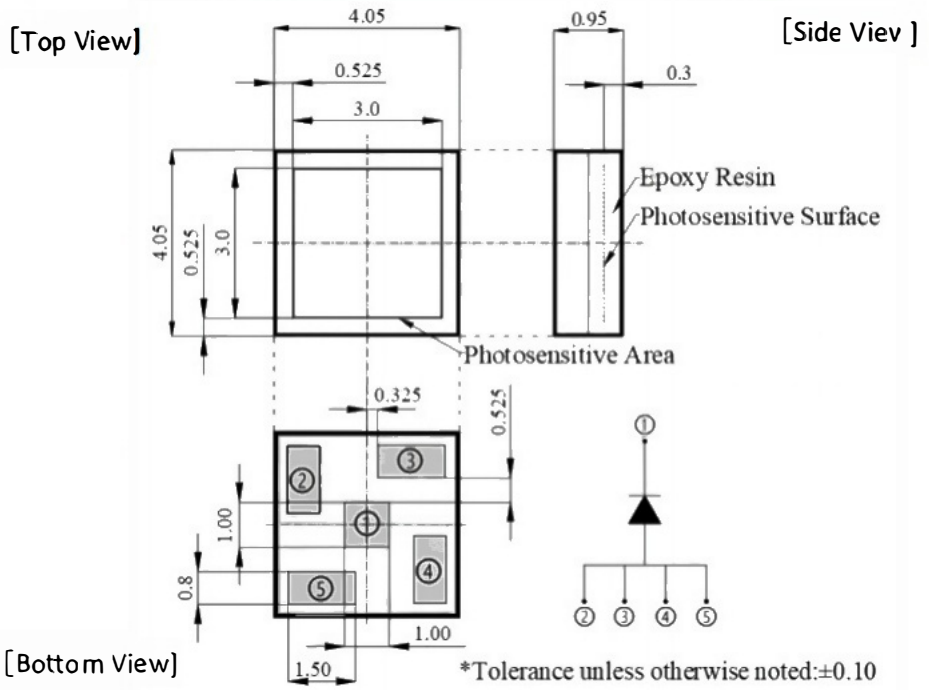




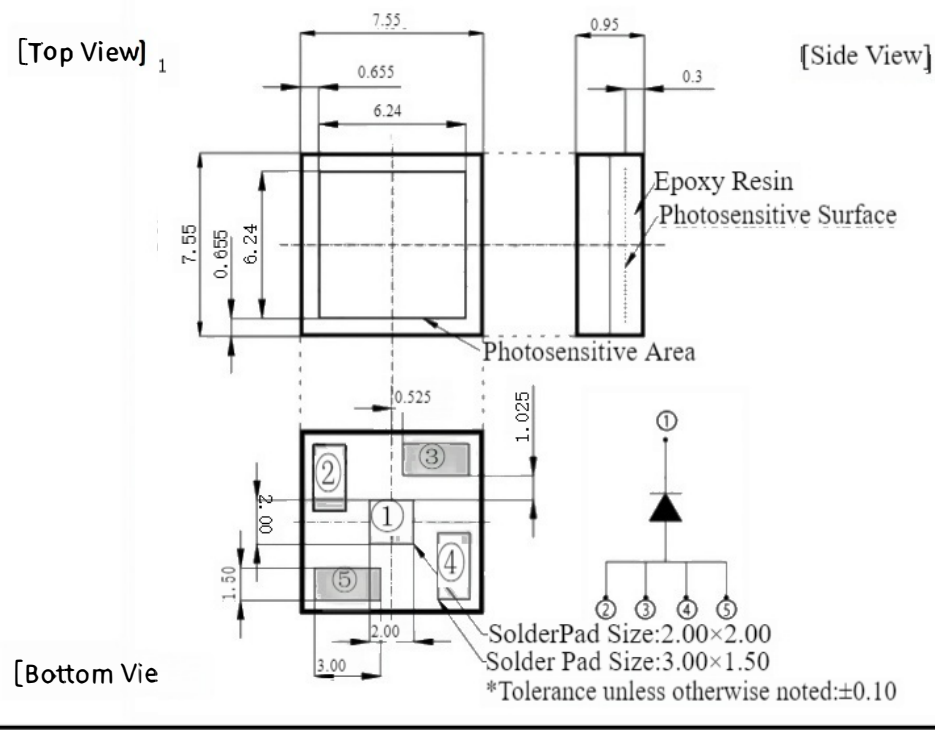
Test Conditions: OV=6 V if not specified, Temp.=20 °C.

Dimensional outlines (unit: mm)

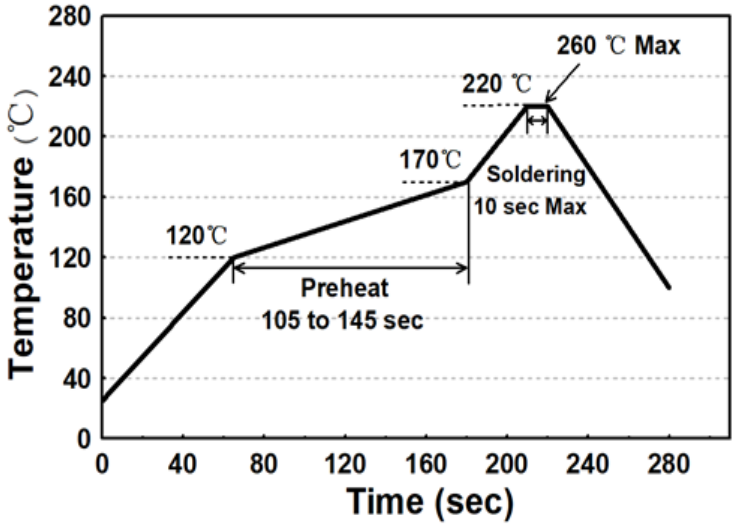
PSS 11-3030-S



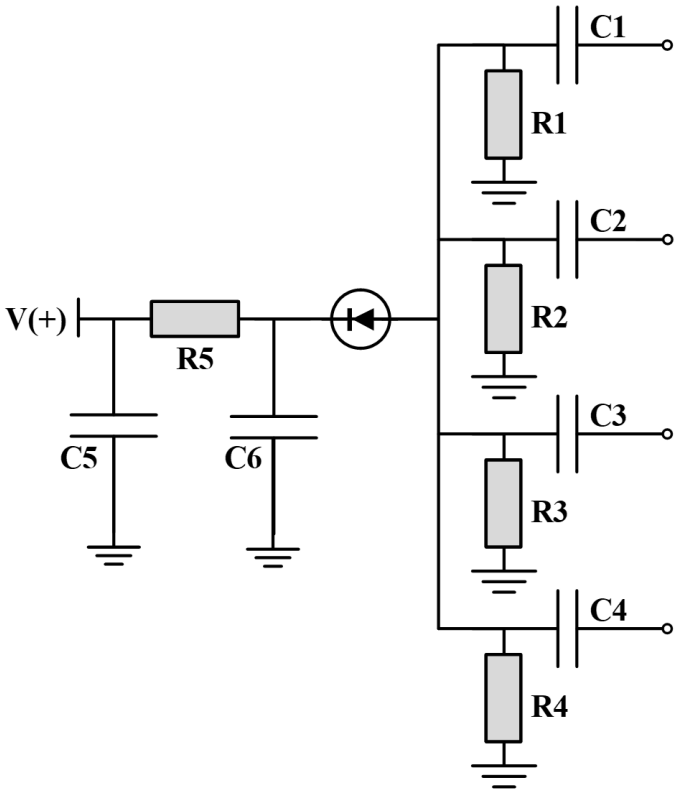
PSS 11-6060-S



Recommended Solder Reflow Conditions



Basic Connection Diagrams



R1-4 = 1 kΩ
R5 = 50 Ω
C1-4 = 10 nF
C5 = 200 pF
C6 = 220 nF