Si PIN photodiodes
S5980, S5981, S5870

Multi-element photodiodes for surface mounting

**Features**
- Large photosensitive area
  - S5980: 5 × 5 mm
  - S5981: 10 × 10 mm
  - S5870: 10 × 10 mm
- Chip carrier package suitable for surface mounting
  - Facilitates automated surface mounting by solder reflow
- Thin package: 1.26 mmt
- Photosensitivity: 0.72 A/W (\(\lambda=960\) nm)

**Applications**
- Laser beam axis alignment
- Level meters
- Pointing devices, etc.

**Structure**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>SS980</th>
<th>SS981</th>
<th>SS870</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window material</td>
<td></td>
<td>-</td>
<td>Resin coating</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Gap between elements</td>
<td></td>
<td>-</td>
<td>30</td>
<td>-</td>
<td>(\mu m)</td>
</tr>
<tr>
<td>Photosensitive area</td>
<td>A</td>
<td>□5.0/4 elements</td>
<td>□10.0/4 elements</td>
<td>□10.0/2 elements</td>
<td>mm</td>
</tr>
</tbody>
</table>

**Absolute maximum ratings**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>SS980</th>
<th>SS981</th>
<th>SS870</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse voltage</td>
<td>VR max</td>
<td>30 V</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Topr</td>
<td>-40 to +100 °C</td>
<td>-40 to +100 °C</td>
<td>-40 to +125 °C</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tstg</td>
<td>-40 to +125 °C</td>
<td>-</td>
<td>-</td>
<td>°C</td>
</tr>
</tbody>
</table>

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

**Electrical and optical characteristics (Ta=25 °C, per one element)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>SS980</th>
<th>SS981</th>
<th>SS870</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectral response range</td>
<td>(\lambda)</td>
<td>320 to 1100 nm</td>
<td>-</td>
<td>320 to 1100 nm</td>
<td>-</td>
<td>nm</td>
</tr>
<tr>
<td>Peak sensitivity wavelength</td>
<td>(\lambda_{p})</td>
<td>960 nm</td>
<td>-</td>
<td>960 nm</td>
<td>-</td>
<td>nm</td>
</tr>
<tr>
<td>Photosensitivity</td>
<td>(S)</td>
<td>(\lambda=\lambda_{p})</td>
<td>0.72 A/W</td>
<td>-</td>
<td>0.72 A/W</td>
<td>- A/W</td>
</tr>
<tr>
<td>Dark current</td>
<td>(I_D)</td>
<td>(VR=10) V</td>
<td>0.3 nA</td>
<td>2</td>
<td>0.6 nA</td>
<td>4</td>
</tr>
<tr>
<td>Temperature coefficient of (I_D)</td>
<td>(T_CID)</td>
<td>1.15 times/°C</td>
<td>-</td>
<td>1.15 times/°C</td>
<td>-</td>
<td>- times/°C</td>
</tr>
<tr>
<td>Cutoff frequency</td>
<td>(f_c)</td>
<td>(VR=10) V, (RL=50) Ω, -3 dB</td>
<td>25 Hz</td>
<td>-</td>
<td>20 Hz</td>
<td>- 10 MHz</td>
</tr>
<tr>
<td>Terminal capacitance</td>
<td>(C_T)</td>
<td>(VR=10) V, (f=1) MHz</td>
<td>10 pF</td>
<td>-</td>
<td>35 pF</td>
<td>- 50 pF</td>
</tr>
<tr>
<td>Noise equivalent power</td>
<td>(NEP)</td>
<td>(VR=10) V, (\lambda=\lambda_{p})</td>
<td>(1.4 \times 10^{-14}) W/Hz(^{1/2})</td>
<td>-</td>
<td>(1.9 \times 10^{-14}) W/Hz(^{1/2})</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: SS980: For mass production, order unit is 100 pieces.
SS981, SS870: For mass production, order unit is 50 pieces.
**Precautions**

- The light input window of this product uses soft silicone resin. Avoid touching the window to keep it from grime and damage that can decrease sensitivity. External force applied to the resin surface may deform or cut off the wires, so do not touch the window to prevent such troubles.
- Use rosin flux when soldering, to prevent the terminal lead corrosion. Reflow oven temperature should be at 260 °C maximum for 5 seconds maximum time under the conditions that no moisture absorption occurs. Reflow soldering conditions differ depending on the type of PC board and reflow oven. Carefully check these conditions before use.
- Silicone resin swells when it absorbs organic solvent, so do not use any solvent other than alcohol.
- Avoid unpacking until you actually use this product to prevent the terminals from oxidation and dust deposits or the coated resin from absorbing moisture.

When the product is stored for 3 months while not unpacked or 24 hours have elapsed after unpacking, perform baking in nitrogen atmosphere at 150 °C for 3 to 5 hours or at 120 °C for 12 to 15 hours before use.

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**Spectral response**

![Spectral response diagram]

**Photosensitivity temperature characteristics**

![Photosensitivity temperature characteristics diagram]

**Dark current vs. reverse voltage**

![Dark current vs. reverse voltage diagram]

**Terminal capacitance vs. reverse voltage**

![Terminal capacitance vs. reverse voltage diagram]
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**Dimensional outlines (unit: mm)**

**S5980**

- Photosensitive area
- Index mark
- Details of photosensitive area

**S5981**

- Photosensitive area
- Details of photosensitive area

**S5870**

- Photosensitive area
- Details of photosensitive area

Burrs shall protrude no more than 0.3 mm on any side of package.
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Related information
www.hamamatsu.com/sp/ssd/doc_en.html

Precautions
- Disclaimer
- Surface mount type products

Technical information
- Si photodiodes / Application circuit examples

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The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use.

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