Si PIN photodiode

S5971, S5972 and S5973 series are high-speed Si PIN photodiodes designed for visible to near infrared light detection. These photodiodes provide wideband characteristics at a low bias, making them suitable for optical communications and other high-speed photometry. S5973 series includes a mini-lens type (S5973-01) that can be efficiently coupled to an optical fiber and a violet sensitivity enhanced type (S5973-02) ideal for violet laser detection.

### Features
- **High-speed response**
  - S5971: 100 MHz (VR=10 V)
  - S5972: 500 MHz (VR=10 V)
  - S5973 series: 1 GHz (VR=3.3 V)
- **Low price**
- **High sensitivity**
  - S5973-02: 0.3 A/W, QE=91 % (\(\lambda=410\) nm)
- **High reliability**

### Applications
- Optical fiber communications
- High-speed photometry
- Violet laser detection (S5973-02)

### General ratings / Absolute maximum ratings

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Dimensional outline/Window material</th>
<th>Package</th>
<th>Active area size</th>
<th>Effective active area</th>
<th>Absolute maximum ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm(^2))</td>
<td></td>
<td>Reverse voltage VR Max. (V)</td>
</tr>
<tr>
<td>S5971</td>
<td>5.5/K</td>
<td>TO-18</td>
<td>(\phi 1.2)</td>
<td>1.1</td>
<td>20</td>
</tr>
<tr>
<td>S5972</td>
<td>0.8</td>
<td></td>
<td>(\phi 0.8)</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>S5973</td>
<td>0.4</td>
<td></td>
<td>(\phi 0.4)</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>S5973-01</td>
<td>(\phi/L)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5973-02</td>
<td>(\phi/K)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Electrical and optical characteristics

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Spectral response range (\lambda) (nm)</th>
<th>Peak sensitivity wavelength (\lambda_p) (nm)</th>
<th>Photo sensitivity (S) (A/W)</th>
<th>Short circuit current (I_{sc}) 100 lx</th>
<th>Dark current (I_0)</th>
<th>Temp. coefficient of (I_0) Tcd (nA/°C)</th>
<th>Temp coefficient of (I_0) Tcd (°C)</th>
<th>Cut-off frequency (f_c) (GHz)</th>
<th>Terminal capacitance (C_T) (pF)</th>
<th>NEP VR=10 V (\lambda=\lambda_p) (W/Hz(^{1/2}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>S5971</td>
<td>320 to 1060</td>
<td>900</td>
<td>0.64</td>
<td>0.6</td>
<td>1.0</td>
<td>0.07 (\times 3)</td>
<td>1 (\times 3)</td>
<td>0.1 (\times 3)</td>
<td>3 (\times 3)</td>
<td>7.4 (\times 10^{-15})</td>
</tr>
<tr>
<td>S5972</td>
<td>320 to 1000</td>
<td>800</td>
<td>0.57</td>
<td>0.55</td>
<td>0.55</td>
<td>0.01 (\times 3)</td>
<td>0.5 (\times 3)</td>
<td>0.5 (\times 3)</td>
<td>3.1 (\times 10^{-15})</td>
<td></td>
</tr>
<tr>
<td>S5973</td>
<td>320 to 1000</td>
<td>760</td>
<td>0.52</td>
<td>0.51</td>
<td>0.47</td>
<td>0.001 (\times 4)</td>
<td>1 (\times 4)</td>
<td>1 (\times 4)</td>
<td>1.1 (\times 10^{-15})</td>
<td></td>
</tr>
<tr>
<td>S5973-01</td>
<td>760</td>
<td>45</td>
<td>0.3</td>
<td>0.42</td>
<td>0.37</td>
<td>0.07</td>
<td>1.6 (\times 4)</td>
<td>1.9 (\times 10^{-15})</td>
<td>(\times 2), (\times 4)</td>
<td></td>
</tr>
<tr>
<td>S5973-02</td>
<td>760</td>
<td>45</td>
<td>0.3</td>
<td>0.42</td>
<td>0.37</td>
<td>0.07</td>
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<td>1.1 (\times 10^{-15})</td>
<td>(\times 2), (\times 4)</td>
<td></td>
</tr>
</tbody>
</table>

*1: Window material K: borosilicate glass, L: lens type borosilicate glass
*2: \(\lambda=410\) nm
*3: VR=10 V
*4: VR=3.3 V
Si PIN photodiode  |  S5971, S5972, S5973 series

**Spectral response**

![Spectral response graph](Typ. Ta=25 °C)

- WAVELENGTH (nm)
- PHOTO SENSITIVITY (A/W)
- WAVELENGTH (nm)

**Photo sensitivity temperature characteristics**

![Photo sensitivity temperature characteristics graph](Typ.)

- TEMPERATURE COEFFICIENT (%/°C)
- WAVELENGTH (nm)

**Frequency response**

![Frequency response graph](Typ. Ta=25 °C, λ=830 nm, RL=50 Ω)

- FREQUENCY
- RELATIVE OUTPUT (dB)

**Cut-off frequency vs. reverse voltage**

![Cut-off frequency vs. reverse voltage graph](Typ. Ta=25 °C, λ=830 nm, RL=50 Ω)

- REVERSE VOLTAGE (V)
- CUT-OFF FREQUENCY
**Si PIN photodiode**

**S5971, S5972, S5973 series**

### Dark current vs. reverse voltage

![Graph showing dark current vs. reverse voltage for S5971, S5972, and S5973 series.](image)

**Terminal capacitance vs. reverse voltage**

![Graph showing terminal capacitance vs. reverse voltage for S5971, S5972, and S5973 series.](image)

### Fiber coupling characteristics (S5973-01)

**X, Y direction**

![Graph showing fiber-coupled sensitivity for X, Y direction.](image)

**Z direction**

![Graph showing fiber-coupled sensitivity for Z direction.](image)

- **Light source**: 780 nm LD
- **Optical fiber**: Core diameter: 50 μm

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**Hamamatsu**

**Photon is our business**
Si PIN photodiode  |  S5971, S5972, S5973 series

Information described in this material is current as of June, 2011. Product specifications are subject to change without prior notice due to improvements or other reasons. Before assembly into final products, please contact us for the delivery specification sheet to check the latest information.

Type numbers of products listed in the delivery specification sheets or supplied as samples may have a suffix "(X)" which means preliminary specifications or a suffix "(Z)" which means developmental specifications.

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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