Si PIN photodiode
S5971, S5972, S5973 series

High-speed photodiodes (S5973 series: 1 GHz)

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% (λ=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 *1</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>(mm²)</td>
<td></td>
<td>Reverse voltage VR Max. (V)</td>
</tr>
<tr>
<td>S5971</td>
<td>φ1.2</td>
<td>1.1</td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>S5972</td>
<td>φ0.8</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5973</td>
<td>φ0.4</td>
<td>0.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5973-01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5973-02</td>
<td></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 λp (nm)</th>
<th>Peak sensitivity wavelength λp (nm)</th>
<th>Photodetector sensitivity S (A/W)</th>
<th>Short circuit current Isc (100 lx) (µA)</th>
<th>Dark current Id (nA)</th>
<th>Temp. coefficient of Id Tocd (times/°C)</th>
<th>Cut-off frequency fc (GHz)</th>
<th>Terminal capacitance Ct f=1 MHz (pF)</th>
<th>NEP yr=10 V (W/Hz⁴/2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S5971</td>
<td>320 to 1060</td>
<td>900</td>
<td>0.64</td>
<td>0.55</td>
<td>0.6</td>
<td>100</td>
<td>0.07 × 10³</td>
<td>1 × 10⁴</td>
<td>7.4 × 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>0.42</td>
<td>50</td>
<td>0.01 × 10⁴</td>
<td>0.5 × 10⁴</td>
<td>3.1 × 10⁻¹⁵</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>100</td>
<td>0.001 × 10⁴</td>
<td>1 × 10⁴</td>
<td>1.6 × 10⁻¹⁵</td>
</tr>
<tr>
<td>S5973-01</td>
<td></td>
<td></td>
<td>0.45</td>
<td>0.42</td>
<td>0.37</td>
<td>100</td>
<td>0.01 × 10⁴</td>
<td>1.6 × 10⁴</td>
<td>1.5 × 10⁻¹⁵</td>
</tr>
<tr>
<td>S5973-02</td>
<td></td>
<td></td>
<td>0.45</td>
<td>0.42</td>
<td>0.37</td>
<td>100</td>
<td>0.01 × 10⁴</td>
<td>1.6 × 10⁴</td>
<td>1.5 × 10⁻¹⁵</td>
</tr>
</tbody>
</table>

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

### Spectral response

![Spectral response graph](image1)

**WAVELENGTH (nm)**

**PHOTO SENSITIVITY (A/W)**

#### Photo sensitivity temperature characteristics

![Temperature coefficient graph](image2)

**WAVELENGTH (nm)**

**TEMPERATURE COEFFICIENT (%/°C)**

### Frequency response

![Frequency response graph](image3)

**RELATIVE OUTPUT (dB)**

**FREQUENCY**

### Cut-off frequency vs. reverse voltage

![Cut-off frequency graph](image4)

**REVERSE VOLTAGE (V)**

**CUT-OFF FREQUENCY**

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*Typ. Ta=25 °C, λ=830 nm, R_L=50 Ω*
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■ Dark current vs. reverse voltage

![Dark current vs. reverse voltage graph](image1)

■ Terminal capacitance vs. reverse voltage

![Terminal capacitance vs. reverse voltage graph](image2)

■ Fiber coupling characteristics (S5973-01)

**X, Y direction**

![Fiber coupling characteristics X, Y direction graph](image3)

**Z direction**

![Fiber coupling characteristics Z direction graph](image4)
Si PIN photodiode S5971, S5972, S5973 series

Dimensional outlines (unit: mm)

① S5971, S5972, S5973

- WINDOW ø3.0 ± 0.2
- PHOTORECEPTIVE SURFACE
- ø0.45 LEAD
- CASE

② S5973-01

- WINDOW ø1.5 LENS
- PHOTORECEPTIVE SURFACE
- ø0.45 LEAD
- CASE

③ S5973-02

- WINDOW ø2.0 MIN.
- PHOTORECEPTIVE SURFACE
- ø0.45 LEAD
- CASE