Si PIN photodiodes

S9055 series

Flat response characteristics up to high frequency bands

The S9055 series Si PIN photodiodes deliver a high-speed response exceeding 1 GHz at low bias voltage (VR=2 V). Their low capacitance (less than 1 pF) makes them ideal for combination with high-speed transimpedance amplifiers.

Features

- **Flat response characteristics up to high frequency bands**
  - Frequency flatness: -0.5 dB max. (VR=2 V, λ=830 nm, f=100 MHz)

- **High-speed response**
  - S9055: 1.5 GHz (VR=2 V, -3 dB)
  - S9055-01: 2 GHz (VR=2 V, -3 dB)

- **Low capacitance**
  - S9055: 0.8 pF (VR=2 V)
  - S9055-01: 0.5 pF (VR=2 V)

- **Highly reliable package**: 3-pin TO-18 package

Applications

- Optical fiber communications
- High-speed measurement system
- Optical inter-connection

Structure / Absolute maximum ratings (Ta=25 °C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>S9055</th>
<th>S9055-01</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photosensitive area</td>
<td>-</td>
<td>0.2</td>
<td>0.1</td>
<td>mm</td>
</tr>
<tr>
<td>Reverse voltage</td>
<td>VR max</td>
<td>20</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Topr</td>
<td>-40 to +100</td>
<td></td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tstg</td>
<td>-55 to +125</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)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>S9055</th>
<th>S9055-01</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectral response range</td>
<td>λ</td>
<td></td>
<td>320 to 1000</td>
<td>320 to 1000</td>
<td>nm</td>
</tr>
<tr>
<td>Peak sensitivity wavelength</td>
<td>λp</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photosensitivity</td>
<td>S</td>
<td>λ=850 nm</td>
<td>0.2</td>
<td>0.25</td>
<td>-</td>
</tr>
<tr>
<td>Dark current</td>
<td>ID</td>
<td>VR=2 V</td>
<td>-</td>
<td>700</td>
<td>-</td>
</tr>
<tr>
<td>Terminal capacitance</td>
<td>Ct</td>
<td>VR=2 V, f=1 MHz</td>
<td>0.8</td>
<td>0.8 100</td>
<td>1 100</td>
</tr>
<tr>
<td>Cutoff frequency</td>
<td>fc</td>
<td>VR=2 V, RL=25 Ω</td>
<td>1.0 1.2</td>
<td>1.5 2</td>
<td>-</td>
</tr>
<tr>
<td>Frequency flatness</td>
<td>-</td>
<td>VR=2 V, λ=850 nm</td>
<td>0.5</td>
<td>0.5</td>
<td>-</td>
</tr>
</tbody>
</table>

www.hamamatsu.com
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**Spectral response**

(Wavelength (nm) vs. Photosensitivity (AW))

(Typ. Ta=25 °C)

**Dark current vs. reverse voltage**

(Reverse voltage (V) vs. Dark current (Typ. Ta=25 °C))

**Terminal capacitance vs. reverse voltage**

(Reverse voltage (V) vs. Terminal capacitance (Typ. Ta=25 °C))
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**Frequency characteristics**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Relative output (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 kHz</td>
<td>-15</td>
</tr>
<tr>
<td>1 MHz</td>
<td>-5</td>
</tr>
<tr>
<td>10 MHz</td>
<td>-10</td>
</tr>
<tr>
<td>1 GHz</td>
<td>0</td>
</tr>
<tr>
<td>10 MHz</td>
<td>5</td>
</tr>
</tbody>
</table>

(Typ. Ta=25 °C, Vf=2 V, R/=25 Ω)

**Dimensional outline (unit: mm)**

- Window: ø3.0 ± 0.1
- Photosensitive surface: ø4.7 ± 0.1
- ø0.45 lead
- ø2.54 ± 0.2

The glass window does not extend beyond the upper edge of cap but may be recessed a maximum of 0.1 mm from the cap edge.
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Related information
www.hamamatsu.com/sp/ssd/doc_en.html

- Precautions
- Disclaimer
- Metal, ceramic, plastic package products

Technical information
- Si photodiode/Application circuit examples

Information described in this material is current as of September 2017.

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