HAMAMATSU has developed various types of Si detectors that offer enhanced near-infrared sensitivity due to a MEMS structure formed on the back side of the photodiode. The S11519 series are a family of Si APDs with improved sensitivity in the near infrared region.

The S11519 series provides significantly higher sensitivity to YAG laser light (1.06 μm) compared to our conventional product (S8890 series). The S11519 series is a low bias operation type with enhanced sensitivity in the near infrared region. Compared to the conventional product S8890 series, the S11519 series has improved various characteristics such as breakdown voltage, dark current, and cut-off frequency.

**Features**
- High sensitivity in the near infrared region
- High gain
- Stable operation at low bias

**Applications**
- YAG laser monitor
- Long wavelength light detection

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**General ratings / absolute maximum ratings**

<table>
<thead>
<tr>
<th>Type no.</th>
<th>Window material*1</th>
<th>Package</th>
<th>Active area size*2</th>
<th>Operating temperature Topr (°C)</th>
<th>Storage temperature Tstg (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S11519-10</td>
<td>K</td>
<td>TO-5</td>
<td>φ1.0</td>
<td>-20 to +85</td>
<td>-55 to +125</td>
</tr>
<tr>
<td>S11519-30</td>
<td>K</td>
<td>TO-8</td>
<td>φ3.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1: K=borosilicate glass
*2: Area in which a typical gain can be obtained

---

**Electrical and optical characteristics (Typ. Ta=25 °C, unless otherwise noted)**

<table>
<thead>
<tr>
<th>Type no.</th>
<th>Spectral response range λp (nm)</th>
<th>Peak sensitivity wavelength λp (nm)</th>
<th>Breakdown voltage VBR</th>
<th>Temp. coefficient of VBR</th>
<th>Dark current Id</th>
<th>Terminal capacitance Ct</th>
<th>Cut-off frequency fc Rl=50 Ω (MHz)</th>
<th>Excess noise figure x λ=890 nm</th>
<th>Gain M λ=890 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>S11519-10</td>
<td>600 to 1150</td>
<td>960</td>
<td>Typ. (V) 350</td>
<td>Max. (V) 500</td>
<td>3</td>
<td>2.0</td>
<td>400</td>
<td>0.3</td>
<td>100</td>
</tr>
<tr>
<td>S11519-30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td>12.0</td>
<td>230</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*3: Values measured at a gain listed in the characteristics table
Si APD  |  S11519 series

**Spectral response**

(Typ. \( T_a = 25 \, ^\circ C, \, M = 100 \))

![Spectral response graph](image)

**Spectral response (quantum efficiency)**

(Typ. \( T_a = 25 \, ^\circ C, \, M = 1 \))

![Spectral response (quantum efficiency) graph](image)
**Gain vs. reverse voltage**

![Graph showing gain vs. reverse voltage](image1)

**Dark current vs. reverse voltage**

![Graph showing dark current vs. reverse voltage](image2)

**Terminal capacitance vs. reverse voltage**

![Graph showing terminal capacitance vs. reverse voltage](image3)
**Si APD | S11519 series**

### Dimensional outlines (unit: mm)

<table>
<thead>
<tr>
<th>S11519-10</th>
<th>S11519-30</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Dimensional outline S11519-10" /></td>
<td><img src="image2.jpg" alt="Dimensional outline S11519-30" /></td>
</tr>
</tbody>
</table>

**Chip position accuracy with respect to the cap center**

- \( X, Y \leq \pm 0.3 \)
- \( X, Y \leq \pm 0.4 \)

*The glass window may extend a maximum of 0.2 mm beyond the upper surface of the cap.*

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