S7686 is a Si photodiode having a spectral response characteristic that is more similar to the human eye sensitivity (spectral luminous efficiency) than our conventional visible-compensated sensors (S1133, etc.).

**Features**

- Spectral response analogous to CIE spectral luminous efficiency
  - Spectral response range: 480 to 660 nm
  - Peak sensitivity wavelength: 550 nm
- Ceramic package for reliability
- Active area: 2.4 \( \times \) 2.8 mm
- High-speed response: 0.5 \( \mu \)s (\( V_R=0 \) V, \( R_L=1 \) k\( \Omega \))
- \( fs \) value: 8 % Typ. (vertical light input)

**Applications**

- Illuminometer
- Luminance meter

**Absolute maximum ratings (\( Ta=25 \) °C)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse voltage</td>
<td>( V_R ) Max.</td>
<td></td>
<td>10</td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>( T_{opr} )</td>
<td>No dew condensation(^1)</td>
<td>-10 to +60</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>( T_{stg} )</td>
<td>No dew condensation(^1)</td>
<td>-20 to +70</td>
<td>°C</td>
</tr>
</tbody>
</table>

\(^1\): When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

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>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectral response range</td>
<td>( \lambda )</td>
<td>-</td>
<td>480 to 660</td>
<td>-</td>
<td>nm</td>
<td></td>
</tr>
<tr>
<td>Peak sensitivity wavelength</td>
<td>( \lambda_p )</td>
<td>-</td>
<td>550</td>
<td>-</td>
<td>nm</td>
<td></td>
</tr>
<tr>
<td>Photo sensitivity</td>
<td>( S )</td>
<td>( \lambda=\lambda_p )</td>
<td>0.38</td>
<td>-</td>
<td>A/W</td>
<td></td>
</tr>
<tr>
<td>Short circuit current</td>
<td>( I_{sc} )</td>
<td>( 100 \ lumen, 2856 \ K )</td>
<td>0.45</td>
<td>-</td>
<td>( \mu A )</td>
<td></td>
</tr>
<tr>
<td>Dark current</td>
<td>( I_0 )</td>
<td>( V_R=1 ) V</td>
<td>2</td>
<td>20</td>
<td>pA</td>
<td></td>
</tr>
<tr>
<td>Rise time</td>
<td>( tr )</td>
<td>( V_R=0 ) V, ( R_L=1 ) k( \Omega )</td>
<td>0.5</td>
<td>-</td>
<td>( \mu s )</td>
<td></td>
</tr>
<tr>
<td>Terminal capacitance</td>
<td>( C_t )</td>
<td>( V_R=0 ) V, ( f=10 ) kHz</td>
<td>200</td>
<td>-</td>
<td>pF</td>
<td></td>
</tr>
</tbody>
</table>
**Si photodiode | S7686**

**Spectral response**

![Spectral response](Typ. Ta=25 °C)

- **Photosensitivity (AW)**
  - Wavelength (nm)
  - Photosensitivity (AW)

- **QE=100 %**

---

**Spectral response (relative value)**

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

- **Relative sensitivity (%)**
  - Wavelength (nm)
  - Relative sensitivity (%)

---

**Linearity**

![Linearity](Typ. Ta=25 °C, Vx=0 V, 2856 K)

- **Short circuit current (A)**
  - Illuminance (lx)
  - Short circuit current (A)

- **Typ. Ta=25 °C**

---

**Dark current vs. reverse voltage**

![Dark current vs. reverse voltage](Typ. Ta=25 °C)

- **Dark current**
  - Reverse voltage (V)
  - Dark current

- **Typ. Ta=25 °C**

---

*Hamamatsu Photonics K.K.*
Si photodiode | S7686

**Terminal capacitance vs. reverse voltage**

![Terminal capacitance vs. reverse voltage graph](Typ. Ta=25 °C)

**Directivity**

![Directivity graph](Typ. Ta=25 °C)

**Dimensional outline (unit: mm, tolerance unless otherwise noted: ±0.15)**

![Dimensional outline](Typ. Ta=25 °C)

---

**Relative sensitivity (%)**

- **X direction**
  - 90°: 0.1
  - 80°: 0.2
  - 70°: 0.3
  - 60°: 0.4
  - 50°: 0.5
  - 40°: 0.6
  - 30°: 0.7
  - 20°: 0.8
  - 10°: 0.9
  - 0°: 1.0
  - 10°: 1.1
  - 20°: 1.2

- **Y direction**
  - 80°: 1.3
  - 70°: 1.4
  - 60°: 1.5
  - 50°: 1.6
  - 40°: 1.7
  - 30°: 1.8
  - 20°: 1.9
  - 10°: 2.0
  - 0°: 2.1
  - 10°: 2.2
  - 20°: 2.3

**Terminal capacitance vs. reverse voltage**

- **Terminal capacitance vs. reverse voltage (Typ. Ta=25 °C)**
  - 1 nF
  - 100 pF
  - 10 pF

**Reverse voltage (V)**

- 0.1
- 1
- 10
Si photodiode | S7686

Related information
www.hamamatsu.com/sp/ssd/doc_en.html

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

- Technical information
- Si photodiode / Application circuit examples

Information described in this material is current as of April, 2016.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest 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. Copying or reprinting the contents described in this material in whole or in part is prohibited without our prior permission.

www.hamamatsu.com