S7815 consists of a photodiode and a signal processing circuit for amplifying the photocurrent generated from the photodiode up to 1400 times. Despite a small active area, S7815 provides an output nearly equal to that from photodiodes with a 20 × 20 mm active area. S7815 can be used the same way as a reverse-biased photodiode, and in most cases, it delivers a sufficient output voltage by just connecting a load resistor.

### Features
- Subminiature, clear plastic package
- Operation just as easy as using photodiodes
- Large output current rivaling that of a phototransistor
- Good linearity

### Applications
- Energy saving sensors for TV brightness controls, etc.
- Light dimmers for liquid crystal panels
- Various types of light level measurement

### Absolute maximum ratings (Ta=25 °C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse voltage</td>
<td>VR</td>
<td>-0.5 to +16</td>
<td>V</td>
</tr>
<tr>
<td>Photocurrent</td>
<td>IL</td>
<td>10</td>
<td>mA</td>
</tr>
<tr>
<td>Forward current</td>
<td>IF</td>
<td>10</td>
<td>mA</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>P</td>
<td>150</td>
<td>mW</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Topr</td>
<td>-30 to +80</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tstg</td>
<td>-40 to +85</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering</td>
<td></td>
<td>260 °C, 3 s, at least 2.5 mm away from package surface</td>
<td>-</td>
</tr>
</tbody>
</table>

### 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>λ</td>
<td></td>
<td>-</td>
<td>300</td>
<td>-</td>
<td>nm</td>
</tr>
<tr>
<td>Peak sensitivity wavelength</td>
<td>λp</td>
<td></td>
<td>-</td>
<td>650</td>
<td>-</td>
<td>nm</td>
</tr>
<tr>
<td>Operating reverse voltage</td>
<td>VR</td>
<td></td>
<td>3</td>
<td>12</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Dark current</td>
<td>ID</td>
<td>VR=5 V</td>
<td>-</td>
<td>0.3</td>
<td>10</td>
<td>nA</td>
</tr>
<tr>
<td>Photocurrent</td>
<td>IL</td>
<td>VR=5 V, 2856 K, 100 lx</td>
<td>0.16</td>
<td>0.23</td>
<td>0.30</td>
<td>mA</td>
</tr>
<tr>
<td>Rise time</td>
<td>tr</td>
<td>10 to 90 %, VR=5 V</td>
<td>-</td>
<td>0.2</td>
<td>-</td>
<td>ms</td>
</tr>
<tr>
<td>Fall time</td>
<td>tf</td>
<td>90 to 10 %, VR=5 V</td>
<td>-</td>
<td>0.3</td>
<td>-</td>
<td>ms</td>
</tr>
</tbody>
</table>

### Rise/fall time measurement method

![Rise/fall time measurement method diagram](image)
**Spectral response**

(Typ. Ta=25 °C, Vi=5 V)

- **WAVELENGTH (nm)**
- **RELATIVE SENSITIVITY**
  - 0.2
  - 0.4
  - 0.6
  - 0.8
  - 1.0

**Power dissipation vs. ambient temperature**

(Typ.)

- **AMBIENT TEMPERATURE (°C)**
- **POWER DISSIPATION (mW)**
  - 0
  - 20
  - 40
  - 60
  - 80
  - 100

**Dark current vs. ambient temperature**

(Typ. Vi=5 V)

- **AMBIENT TEMPERATURE (°C)**
- **DARK CURRENT (μA)**
  - 10 μA
  - 1 μA
  - 100 nA
  - 10 nA
  - 1 nA
  - 100 pA
  - 10 pA
  - 1 pA

**Rise/fall time vs. load resistance**

(Typ. Ta=25 °C, Vi=5 V, λ=660 nm, Vo=2.5 V)

- **LOAD RESISTANCE (Ω)**
- **RISE/FALL TIME (μs)**
  - 10
  - 100
  - 1 k
  - 10 k
  - 100 k
  - 1 M

**Dimensional outline (unit: mm)**

- **ANODE**
- **CATHODE**
- Shaded area indicates burr.
- Tolerance unless otherwise noted ±0.2, ±2 °C
- Values in parentheses are not guaranteed, but for reference.

**Operating circuit example**

The photo IC diode must be reverse-biased so that a positive potential is applied to the cathode. To eliminate high-frequency components, we recommend placing a load capacitance CL in parallel with load resistance RL as a low-pass filter.

\[
\text{Cut-off frequency (fc) } \approx \frac{1}{2\pi CLRL}
\]