Photomicrosensor (Transmissive)
EE-SX1108

Be sure to read Precautions on page 24.

■ Dimensions

Note: All units are in millimeters unless otherwise indicated.

- Ultra-compact with a 5-mm-wide sensor and a 2-mm-wide slot.
- PCB surface mounting type.
- High resolution with a 0.3-mm-wide aperture.

■ Absolute Maximum Ratings (Ta = 25°C)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Rated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emitter Forward current</td>
<td>IF</td>
<td>25 mA</td>
</tr>
<tr>
<td>(see note 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse forward current</td>
<td>IFP</td>
<td>100 mA</td>
</tr>
<tr>
<td>(see note 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse voltage</td>
<td>VR</td>
<td>5 V</td>
</tr>
<tr>
<td>Detector Collector–Emitter voltage</td>
<td>VCEO</td>
<td>20 V</td>
</tr>
<tr>
<td>Collector–Emitter voltage</td>
<td>VECO</td>
<td>5 V</td>
</tr>
<tr>
<td>Collector current</td>
<td>IC</td>
<td>20 mA</td>
</tr>
<tr>
<td>Collector dissipation</td>
<td>PC</td>
<td>75 mW</td>
</tr>
<tr>
<td>(see note 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>Toper</td>
<td>–30°C to 85°C</td>
</tr>
<tr>
<td>Storage</td>
<td>Tstg</td>
<td>–40°C to 90°C</td>
</tr>
<tr>
<td>Reflow soldering</td>
<td>Tsol</td>
<td>255°C</td>
</tr>
<tr>
<td>Manual soldering</td>
<td>Tsol</td>
<td>350°C</td>
</tr>
</tbody>
</table>

Note: 1. Refer to the temperature rating chart if the ambient temperature exceeds 25°C.
2. Duty: 1/100; Pulse width: 0.1 ms
3. Complete soldering within 10 seconds for reflow soldering and within 3 seconds for manual soldering.

■ Electrical and Optical Characteristics (Ta = 25°C)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Value</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emitter Forward voltage</td>
<td>VF</td>
<td>1.1 V typ., 1.3 V max.</td>
<td>IF = 5 mA</td>
</tr>
<tr>
<td>Reverse current</td>
<td>IR</td>
<td>10 μA max.</td>
<td>VR = 5 V</td>
</tr>
<tr>
<td>Peak emission wavelength</td>
<td>λp</td>
<td>940 nm typ.</td>
<td>IF = 20 mA</td>
</tr>
<tr>
<td>Detector Light current</td>
<td>IL</td>
<td>50 μA min., 150 μA typ., 500 μA max.</td>
<td>IF = 5 mA, VCE = 5 V</td>
</tr>
<tr>
<td>Dark current</td>
<td>ID</td>
<td>100 nA max.</td>
<td>VCE = 10 V, 0 lx</td>
</tr>
<tr>
<td>Leakage current</td>
<td>ILEAK</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Collector–Emitter saturated voltage</td>
<td>VCE(sat)</td>
<td>0.1 V typ., 0.4 V max.</td>
<td>IF = 20 mA, IL = 50 μA</td>
</tr>
<tr>
<td>Peak spectral sensitivity wavelength</td>
<td>λp</td>
<td>900 nm typ.</td>
<td>---</td>
</tr>
<tr>
<td>Rising time</td>
<td>tr</td>
<td>10 μs typ.</td>
<td>VCC = 5 V, Rl = 1 kΩ, IL = 100 μA</td>
</tr>
<tr>
<td>Falling time</td>
<td>tf</td>
<td>10 μs typ.</td>
<td>VCC = 5 V, Rl = 1 kΩ, IL = 100 μA</td>
</tr>
</tbody>
</table>
## Engineering Data

### Forward Current vs. Collector Dissipation Temperature Rating

- **Ambient temperature** $T_a$ (°C)
- **Forward current** $I_F$ (mA)
- **Collector dissipation** $P_C$ (mW)

![Graph showing Forward Current vs. Collector Dissipation Temperature Rating](image)

### Light Current vs. Collector–Emitter Voltage Characteristics (Typical)

- **Collector–Emitter voltage** $V_{CE}$ (V)
- **Light current** $I_L$ (μA)

![Graph showing Light Current vs. Collector–Emitter Voltage](image)

### Response Time vs. Load Resistance Characteristics (Typical)

- **Load resistance** $R_L$ (kΩ)
- **Response time** $t_r, t_f$ (μs)

![Graph showing Response Time vs. Load Resistance](image)

### Forward Current vs. Forward Voltage Characteristics (Typical)

- **Forward voltage** $V_F$ (V)
- **Forward current** $I_F$ (mA)

![Graph showing Forward Current vs. Forward Voltage](image)

### Light Current vs. Forward Current Characteristics (Typical)

- **Forward current** $I_F$ (mA)
- **Light current** $I_L$ (μA)

![Graph showing Light Current vs. Forward Current](image)

### Sensing Position Characteristics (Typical)

- **Relative light current** $I_L$ (%)

![Graph showing Sensing Position Characteristics](image)

### Dark Current vs. Ambient Temperature Characteristics (Typical)

- **Ambient temperature** $T_a$ (°C)
- **Dark current** $I_D$ (nA)

![Graph showing Dark Current vs. Ambient Temperature](image)

### Response Time Measurement Circuit

- **Input** $V_F$
- **Output** $R_L$

![Response Time Measurement Circuit Diagram](image)
Unit: mm (inch)

■ Tape and Reel

Reel

Tape configuration

Tape quantity
2,000 pcs./reel

EE-SX1108 Photomicrosensor (Transmissive)
Precautions

Soldering Information

Reflow soldering
- The following soldering paste is recommended:
  - Melting temperature: 216 to 220°C
  - Composition: Sn 3.5 Ag 0.75 Cu
- The recommended thickness of the metal mask for screen printing is between 0.2 and 0.25 mm.
- Set the reflow oven so that the temperature profile shown in the following chart is obtained for the upper surface of the product being soldered.

Manual soldering
- Use "Sn 60" (60% tin and 40% lead) or solder with silver content.
- Use a soldering iron of less than 25 W, and keep the temperature of the iron tip at 300°C or below.
- Solder each point for a maximum of three seconds.
- After soldering, allow the product to return to room temperature before handling it.

Storage
To protect the product from the effects of humidity until the package is opened, dry-box storage is recommended. If this is not possible, store the product under the following conditions:
  - Temperature: 10 to 30°C
  - Humidity: 60% max.

The product is packed in a humidity-proof envelope. Reflow soldering must be done within 48 hours after opening the envelope, during which time the product must be stored under 30°C at 80% maximum humidity.
If it is necessary to store the product after opening the envelope, use dry-box storage or reseal the envelope.

Baking
If a product has remained packed in a humidity-proof envelope for six months or more, or if more than 48 hours have lapsed since the envelope was opened, bake the product under the following conditions before use:
  - Reel: 60°C for 24 hours or more
  - Bulk: 80°C for 4 hours or more