Si PIN photodiode arrays

Surface mountable 16-element arrays

The S8558 and S15158 are 16-element Si PIN photodiode arrays in surface mountable chip carrier packages. They can be mounted using solder reflow and used in a wide variety of applications such as spectrophotometers and position detection.

Features
- Photosensitive area: 0.7 × 2.0 mm (× 16 elements)
- Surface mountable chip carrier package
- Compatible with lead-free solder reflow
- High sensitivity

Applications
- Spectrophotometers
- Position measurement

Structure

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>S8558</th>
<th>NEW S15158</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of elements</td>
<td></td>
<td></td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Element pitch</td>
<td></td>
<td></td>
<td>0.8 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Element size</td>
<td></td>
<td></td>
<td>0.7 × 2.0 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Package</td>
<td></td>
<td></td>
<td>Ceramic</td>
<td>Glass epoxy</td>
<td></td>
</tr>
<tr>
<td>Window material</td>
<td></td>
<td></td>
<td>Silicone resin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Absolute maximum ratings (Ta=25 °C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>S8558</th>
<th>NEW S15158</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse voltage</td>
<td>Vr max</td>
<td></td>
<td>30</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature*1</td>
<td>Topr</td>
<td>-40 to +100</td>
<td>-40 to +100</td>
<td>-</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature*1</td>
<td>Tstg</td>
<td>-40 to +125</td>
<td>-40 to +100</td>
<td>-</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering conditions</td>
<td>Peak temperature</td>
<td>260 °C max., 3 times*2</td>
<td></td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

*1: No dew condensation. 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.

*2: See P.S. JIEDEC J-STD-020 MSL 3

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, per element, unless otherwise noted)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>S8558</th>
<th>NEW S15158</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectral response range</td>
<td>λ</td>
<td></td>
<td>-320 to 1100</td>
<td>-380 to 1100</td>
<td>nm</td>
</tr>
<tr>
<td>Peak sensitivity wavelength</td>
<td>λp</td>
<td></td>
<td>960</td>
<td>960</td>
<td>nm</td>
</tr>
<tr>
<td>Photosensitivity</td>
<td>S</td>
<td>λ=λp</td>
<td>0.72</td>
<td>0.63</td>
<td>A/W</td>
</tr>
<tr>
<td>Dark current</td>
<td>Id</td>
<td>Vr=10 V</td>
<td>0.05</td>
<td>1</td>
<td>nA</td>
</tr>
<tr>
<td>Temperature coefficient of Id</td>
<td>ΔTid</td>
<td>Vr=10 V</td>
<td>1.15</td>
<td>1.15</td>
<td>times/°C</td>
</tr>
<tr>
<td>Cutoff frequency</td>
<td>fc</td>
<td>Vr=10 V, RL=50 Ω</td>
<td>25</td>
<td>25</td>
<td>MHz</td>
</tr>
<tr>
<td>Noise equivalent power</td>
<td>NEP</td>
<td>Vr=10 V, λ=λp</td>
<td>5.6 x 10^-14</td>
<td>1.2 x 10^-14</td>
<td>W/Hz^1/2</td>
</tr>
<tr>
<td>Terminal capacitance</td>
<td>Ct</td>
<td>Vr=10 V, f=10 kHz</td>
<td>5</td>
<td>10</td>
<td>pF</td>
</tr>
</tbody>
</table>

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Si PIN photodiode arrays

Spectral response

(Day. Ta=25 °C)

Photosensitivity (AW)

300 400 500 600 700 800 900 1000 1100

Wavelength (nm)

QE=100%

S8558

S15158

Dark current vs. reverse voltage (per element)

(Day. Ta=25 °C)

Dark current

1 nA

Revers voltage (V)

0.01 0.1 1 10 100

1 pA

10 pA

100 pA

1 nA

Terminal capacitance vs. reverse voltage (per element)

(Day. Ta=25 °C)

Terminal capacitance

1 nF

100 pF

10 pF

1 pF

0.1 1 10 100

Reverse voltage (V)

Cutoff frequency vs. reverse voltage (per element)

(Day. Ta=25 °C, λ=830 nm, RL=50 Ω)

Cutoff frequency

100 MHz

1 MHz

10 MHz

10 MHz

Reverse voltage (V)
Si PIN photodiode arrays  |  S8558, S15158

**Dimensional outline (unit: mm)**

### S8558

- Index mark \( \phi 0.4 \)
- Photosensitive area
- Silicone resin
- Photosensitive surface
- Index mark \( \phi 0.4 \)
- \( P \ 1.27 \times 8 = 10.16 \)
- \( 0.6 \)

### S15158

- Index mark \( \phi 0.35 \)
- Photosensitive area
- Silicone resin
- Photosensitive surface
- Index mark \( \phi 0.5 \)
- \( 1.3 \pm 0.05 \)
- \( 3.31 \pm 0.05 \)
- \( 10.4 \pm 0.05 \)
- \( 0.6 \pm 0.05 \)

**Recommended land pattern (unit: mm)**

### S8558

- \( x: 0.6 \text{ max.} \)
- \( 3.0 \text{ mm.} \)

### S15158

- \( 0.8 \)
- \( 3.31 \)

1. Solder all terminals.
2. Do not make the land area larger than necessary.
3. It is preferable that the land sizes be about equal.
4. Make land width \( x \) about the same as the terminal width.
5. Make land length \( y \) at least 1 mm longer than the terminal length, protruding outside the package.
Si PIN photodiode arrays | S8558, S15158

### Standard packing specifications

**S8558**

- Packing quantity
  100 pcs max./tray

- Packing state
  Tray and desiccant in moisture-proof packaging (vacuum-sealed)

**S15158**

- Reel (conforms to JEITA ET-7200)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Hub diameter</th>
<th>Tape width</th>
<th>Material</th>
<th>Electrostatic characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>330 mm</td>
<td>100 mm</td>
<td>24 mm</td>
<td>PS</td>
<td>Conductive</td>
</tr>
</tbody>
</table>

- Embossed tape (unit: mm, material: PS, conductive)

- Packing quantity
  1000 pcs/reel

- Packing state
  Reel and desiccant in moisture-proof packaging (vacuum-sealed)
Si PIN photodiode arrays

Recommended reflow soldering conditions

- After unpacking, keep it in an environment at 5 to 30 °C and a humidity of 60% or less, and perform soldering within 168 hours.
- The effect that the product receives during reflow soldering varies depending on the circuit board and reflow oven that are used.
- When you set reflow soldering conditions, check that problems do not occur in the product by testing out the conditions in advance.

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Related information

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

- Precautions
  - Disclaimer
  - Surface mount type products

- Technical information
  - Si photodiodes / Application circuit examples

Information described in this material is current as of October 2019.

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.

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