InSb photovoltaic detectors

P5968/P4247 series

High-speed response, low-noise photovoltaic detectors

The P5968/P4247 series are photovoltaic detectors having high sensitivity in the so-called atmospheric window at 3 to 5 μm. Custom devices are also available to meet your special request.

Features

- Cooling hold time: 8 hours
  Repumpable metal dewars (liquid nitrogen cooling) allow 8-hour hold time.
- Built-in preamp type available
  Built-in preamp allows high precision photometry.
  P7751-01 (Uses P5968-060.)
  P7751-02 (Uses P5968-200.)

Applications

- Thermometers (radiometers)
- Thermal imaging
- Remote sensing
- Gas analysis
- FTIR
- Spectrophotometry

Structure/Absolute maximum ratings

<table>
<thead>
<tr>
<th>Type no.</th>
<th>Dimensional outline/Window material *1</th>
<th>Package</th>
<th>Cooling</th>
<th>Active area (mm)</th>
<th>Number of element</th>
<th>Absolute maximum ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>P5968-060</td>
<td>1/Si</td>
<td>Metal dewar</td>
<td>Liquid nitrogen</td>
<td>ø0.6</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>P5968-100</td>
<td></td>
<td></td>
<td></td>
<td>ø1</td>
<td>1</td>
<td>-40 to +60</td>
</tr>
<tr>
<td>P5968-200</td>
<td></td>
<td></td>
<td></td>
<td>ø2</td>
<td>1</td>
<td>-55 to +60</td>
</tr>
<tr>
<td>P5968-300</td>
<td></td>
<td></td>
<td></td>
<td>ø3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>P4247-16</td>
<td>2/Si</td>
<td></td>
<td></td>
<td>0.25 × 1.4²</td>
<td>1 × 16</td>
<td></td>
</tr>
<tr>
<td>P4247-44</td>
<td></td>
<td></td>
<td></td>
<td>0.45 × 0.45³</td>
<td>4 × 4</td>
<td></td>
</tr>
</tbody>
</table>

*1: Window material Si=silicon (with AR coated)
*2: Size per 1 element (16 element array)
*3: Size per 1 element (4 × 4 element array)

Note: Absolute maximum ratings are the values that must not be exceeded at any time. If even one of the absolute maximum ratings is exceeded even for a moment, the product quality may be impaired. Always be sure to use the product within the absolute maximum ratings.

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Electrical and optical characteristics (Typ. unless otherwise noted)

<table>
<thead>
<tr>
<th>Type no.</th>
<th>Measurement condition</th>
<th>Element temperature Td (°C)</th>
<th>Peak sensitivity wavelength λc (µm)</th>
<th>Cutoff wavelength λc (µm)</th>
<th>Photo sensitivity S (λ=λc) (A/W)</th>
<th>Shunt resistance Rsh (Ω)</th>
<th>D+ (500 K, 1200, 1) (cm · Hz1/2/W)</th>
<th>D+ (λp, 1200, 1) (cm · Hz1/2/W)</th>
<th>NEP (λ=λp) (W/Hz1/2)</th>
<th>Rise time tr (Vr=0 V, RL=50 Ω, 0 to 63 %) (ns)</th>
<th>Terminal capacitance Ct (pF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P5968-060</td>
<td></td>
<td>-196</td>
<td>5.3</td>
<td>5.5</td>
<td>2.5</td>
<td>1 × 107</td>
<td>3.3 × 10-12</td>
<td>30</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5968-100</td>
<td></td>
<td></td>
<td>5.3</td>
<td>5.5</td>
<td>2.5</td>
<td>1 × 106</td>
<td>5.5 × 10-12</td>
<td>70</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5968-200</td>
<td></td>
<td></td>
<td>5.3</td>
<td>5.5</td>
<td>2.5</td>
<td>1 × 106</td>
<td>1.1 × 10-12</td>
<td>150</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5968-300</td>
<td></td>
<td></td>
<td>5.3</td>
<td>5.5</td>
<td>2.5</td>
<td>5 × 107</td>
<td>1.6 × 10-12</td>
<td>600</td>
<td>900</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4247-16</td>
<td></td>
<td></td>
<td>5.3</td>
<td>5.5</td>
<td>2.5</td>
<td>1 × 107</td>
<td>6.5 × 10-13</td>
<td>70</td>
<td>100</td>
<td></td>
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<td>5.3</td>
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<td>5.0 × 10-13</td>
<td>60</td>
<td>60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Spectral response

![Spectral response graph](Typ. Td=-196 °C)

Linearity (P5968-100)

![Linearity graph](Typ. Td=-196 °C)

Measurement circuit

![Measurement circuit diagram](Typ. Td=-196 °C)

- Chopper 1200 Hz
- Black body 500 K
- Detector
- Band-pass filter
- r.m.s. meter

fo=1200 Hz
Δf=120 Hz
Incident energy: 2.64 µW/cm²
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### Dimensional outline (unit: mm)

1. P5968-060/-100/-200/-300

   ![Diagram of P5968 series]

   - LN2 fill port ø12.5 ± 0.5
   - Pump-out pipe ø9.5 ± 0.5
   - Signal output lead
   - Detector (anode)
   - NC
   - Detector (cathode)

2. P4247 series

   ![Diagram of P4247 series]

   - LN2 fill port ø12.5 ± 0.5
   - 18-pin connector
   - Plug
   - Pump-out bulb
   - Photosensitive surface

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Details of multi-element detectors (unit: μm)

For custom devices with different number of elements, size and package, please consult our sales office.

<table>
<thead>
<tr>
<th>P4247-16</th>
<th>P4247-44</th>
</tr>
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<tbody>
<tr>
<td><img src="image1.png" alt="Diagram of P4247-16" /></td>
<td><img src="image2.png" alt="Diagram of P4247-44" /></td>
</tr>
</tbody>
</table>

Information described in this material is current as of December, 2011.
Product specifications are subject to change without prior notice due to improvements or other reasons. Before assembly into final products, please contact us for the delivery specification sheet to check the latest information.

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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