First Sensor APD Data Sheet
Part Description AD230-9 SMD
Order # 3001493

Features
- APD with 0.04 mm² active area
- Slow multiplication curve
- QE > 80% @ 750 nm-910 nm
- Fast rise time, low noise
- Optimum gain: 50-60

Description
Circular active area APD chip with NIR enhanced sensitivity. Ceramic carrier type non hermetic SMD package with filter window. Reflow solderable.

Application
- Laser range finder
- High speed photometry
- High speed optical communications
- Medical equipment

RoHS
2011/65/EU

Absolute maximum ratings

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSTG</td>
<td>Storage temp</td>
<td>-40</td>
<td>100</td>
<td>°C</td>
</tr>
<tr>
<td>TOP</td>
<td>Operating temp</td>
<td>-20</td>
<td>70</td>
<td>°C</td>
</tr>
<tr>
<td>Mmax</td>
<td>Gain (I0 = 1 nA)</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPEAK</td>
<td>Peak DC current</td>
<td>0.25</td>
<td>mA</td>
<td></td>
</tr>
</tbody>
</table>

Spectral response (M = 100)

Electro-optical characteristics @ 23 °C

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Characteristic</th>
<th>Test Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Active area</td>
<td>diameter 230</td>
<td>μm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Active area</td>
<td></td>
<td>0.04</td>
<td></td>
<td></td>
<td>mm²</td>
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<tr>
<td>I0</td>
<td>Dark current</td>
<td></td>
<td></td>
<td>0.5</td>
<td>1.0</td>
<td>nA</td>
</tr>
<tr>
<td>C</td>
<td>Capacitance</td>
<td></td>
<td>0.3</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>R5</td>
<td>Responsivity with filter</td>
<td>M = 100; λ = 905 nm</td>
<td>42</td>
<td>55</td>
<td></td>
<td>A/W</td>
</tr>
<tr>
<td>tR</td>
<td>Rise time</td>
<td>M = 100; λ = 905 nm; RL = 50 Ω</td>
<td>0.5</td>
<td></td>
<td></td>
<td>ns</td>
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<tr>
<td>fC</td>
<td>Cut-off frequency</td>
<td></td>
<td>-3dB</td>
<td></td>
<td></td>
<td>GHz</td>
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<tr>
<td>VBR</td>
<td>Breakdown voltage</td>
<td>I0 = 2 μA</td>
<td>160</td>
<td></td>
<td>200</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>Temperature coefficient</td>
<td>Change of VBR with temperature</td>
<td>1.25</td>
<td></td>
<td>1.55</td>
<td>V/K</td>
</tr>
<tr>
<td></td>
<td>Excess noise factor</td>
<td>M = 100</td>
<td></td>
<td>2.5</td>
<td></td>
<td></td>
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<td>Excess noise index</td>
<td>M = 100</td>
<td></td>
<td>0.2</td>
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</table>
Quantum efficiency (23 °C)

Capacitance as fct of reverse bias (23 °C)

Multiplication as fct of bias (23 °C)

Dark current as fct of bias (23 °C)

Filter characteristics 905 nm band pass
**Application hints:**

- Current should be limited by a protecting resistor or current limiting - IC inside the power supply
- For low light level applications blocking of ambient light should be used
- For high gain applications bias voltage should be temperature compensated
- Please consider basic ESD protection while handling
- Use low noise read-out - IC
- For further questions please refer to document "Instructions for handling and processing"
- Optimum gain: 50-60
Package dimension, large quantities on reel

![Large Reel Diagram]

Package dimension, small quantities in trays

![Small Tray Diagram]

Pocket location
- M = 11.81 mm ± 0.13 mm
- M1 = 11.81 mm ± 0.13 mm
- M2 = 8.64 mm ± 0.13 mm
- M3 = 8.64 mm ± 0.13 mm
- Array = 10 x 10 (100)

Pocket details
- X = 4.60 mm ± 0.13 mm
- Y = 3.71 mm ± 0.13 mm
- Z = 2.16 mm ± 0.13 mm
- A = 5° ± 0.5°, no cross slots

Overall tray size
- Size = 101.60 mm ± 0.13 mm
- Height = 8.00 mm ± 0.13 mm
- Flatness = 0.51 mm

Disclaimer: Due to our strive for continuous improvement, specifications are subject to change within our PCN policy according to JESD46C.