Balanced Photodetector

OCT and sensor systems require high performance balanced photodetectors to increase system signal to noise ratio. The BPD-002 is specially designed for use in research and development, with ease of use and high performance as the primary design goals. The device is fully enclosed in a compact, sturdy aluminum box with two optical input ports, a balanced RF output port, two 1-MHz monitor ports, and a power supply port. With a bandwidth up to 200 MHz, a trans-impedance gain larger than 30K and a saturation power larger than 130 µW, the BPD-002 is ideal for integration into laboratory or commercial OCT, fiber sensor, and high performance optical measurement systems.

Specifications:

- Photodetector Type: InGaAs
- Wavelength Range: 1060nm, 1310nm, or 1550nm ±50nm
- PD Responsivity: 0.7 mA / mW @ 1310 nm
- Transimpedance Gain (Total, including TIA and OP-AMP): $3 \times 10^4$ V / A
- RF Bandwidth (3dB): DC – 200, 100, 50, 10, or 5 MHz
- CW Balanced Saturation Power: > 130 µW @ 1310 nm
- PD Input Power Linear Range at Monitor Channels: 0 to 1 mW @ 1310 nm
- NEP (DC – 100MHz): < 10 pW / $\sqrt{Hz}$
- Common Mode Rejection Ratio: > 25 dB
- RF Output Impedance: 50 Ω
- Electrical Connector: SMA
- RF Output Voltage Range (at 50Ω): ±1.8 V
- DC Offset RF Output: < ±3 mV
- Monitor Output Impedance: 200 Ω
- Monitor Gain: 10 V / mW (high impedance)
- Monitor Bandwidth (3dB): > 1000 Hz
- Monitor Voltage: 4 V max.
- PD Damage Threshold Power: 20 mW
- Power Supply: ±12 V
- Operating Temperature: 10 to 50 °C
- Storage Temperature: -40 to 85 °C
- Dimensions: 3.82” (L) x 2.40” (W) x 0.75” (H)

Features:
- Ultra low noise
- Excellent CMRR
- High conversion gain
- Wide bandwidth
- Compact

Applications:
- Optical Coherence Tomography
- Fiber sensing interrogator
- Instrumentation
- R&D

Ordering Information:


Bandwidth:
- 200 = 200 MHz
- 100 = 100 MHz
- 50 = 50 MHz
- 10 = 10 MHz
- 05 = 5 MHz

Wavelength:
- 10 = 1060nm
- 13 = 1310nm
- 15 = 1550nm

Connector type: FC/PC, FC/APC

Dimensions (in inches):
OCT and sensor systems require high performance balanced photodetectors to increase system signal to noise ratio. Polarization sensitive OCT and similar applications require separate analysis of the two polarization components of a signal. The PBPD-001 is specially designed for use in such systems. The device is fully enclosed in a compact, sturdy aluminum box with two optical input ports, a balanced RF output port and two monitor ports for each polarization component, and a power supply port. With a bandwidth up to 200 MHz, a transimpedance gain larger than 30K and a saturation power larger than 130 µW, the PBPD-001 is ideal for integration into laboratory or commercial OCT, fiber sensor, and high performance optical measurement systems with polarization dependent detection requirements.

### Applications:
- Polarization sensitive OCT
- Fiber optic distributed sensing
- Polarization resolved sensing
- Instrumentation
- R&D

### Unique Features:
- Low Noise
- Excellent CMRR
- High conversion gain
- Wide bandwidth
- Compact

#### Preliminary Specifications:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Wavelength</td>
<td>1310 ± 50nm standard (1550 ± 50nm optional)</td>
</tr>
<tr>
<td>Polarization Crosstalk</td>
<td>&lt; 25 dB (splitting element)</td>
</tr>
<tr>
<td>PDL (before polarization splitting)</td>
<td>&lt; 0.25 dB</td>
</tr>
<tr>
<td>Return Loss</td>
<td>&gt; 50 dB</td>
</tr>
<tr>
<td>Input Power Damage Threshold</td>
<td>20 mW</td>
</tr>
<tr>
<td>Transimpedance Gain</td>
<td>3 × 10⁴ V/A</td>
</tr>
<tr>
<td>Signal Conversion Gain</td>
<td>&gt; 30 V/mW (interference signal)</td>
</tr>
<tr>
<td>RF Bandwidth</td>
<td>DC to 210 MHz</td>
</tr>
<tr>
<td>RF Output Impedance</td>
<td>50 Ω</td>
</tr>
<tr>
<td>RF Output Voltage Range</td>
<td>± 1.75 V @ 50Ω load</td>
</tr>
<tr>
<td></td>
<td>± 3.5 V @ high impedance load</td>
</tr>
<tr>
<td>RF Output DC Offset</td>
<td>&lt; ±5 mV</td>
</tr>
<tr>
<td>CW Balanced Saturation Power (at input)</td>
<td>&gt;150 µW</td>
</tr>
<tr>
<td>NEP</td>
<td>&lt; 11 µW / √Hz</td>
</tr>
<tr>
<td>Overall Output Voltage Noise</td>
<td>&lt; 5 mV RMS</td>
</tr>
<tr>
<td>Overall Common Mode Rejection Ratio</td>
<td>&gt; 25 dB</td>
</tr>
<tr>
<td>Monitor Bandwidth</td>
<td>DC to 1MHz</td>
</tr>
<tr>
<td>Monitor Output Impedance</td>
<td>200 Ω</td>
</tr>
<tr>
<td>Monitor Conversion Gain</td>
<td>2 V/mW</td>
</tr>
<tr>
<td>Max. Monitor Voltage²</td>
<td>4 V</td>
</tr>
<tr>
<td>Power Supply</td>
<td>±12 V DC / 200 mA</td>
</tr>
<tr>
<td>Signal Output Connector</td>
<td>SMA</td>
</tr>
<tr>
<td>Input Optical Fiber</td>
<td>SMF - 28 standard (PMF optional)</td>
</tr>
<tr>
<td>Input Pigtail Length</td>
<td>&gt; 0.75m</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>10 to 50 ºC</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>40 to 85 ºC</td>
</tr>
<tr>
<td>Dimensions</td>
<td>100mm x 80mm x 27mm</td>
</tr>
</tbody>
</table>

**Notes:**
1. At center wavelength.
2. Linear range.

### Ordering Information:

PBPD — 001