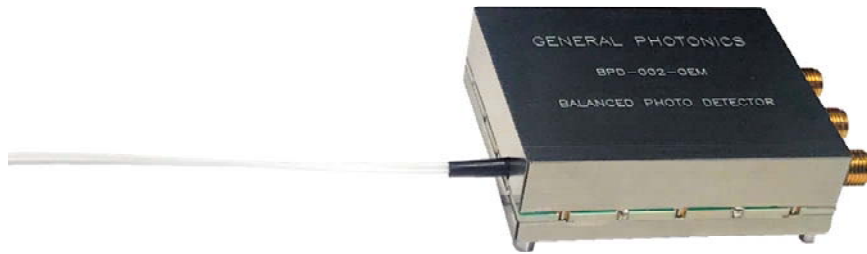


BPD-002-OEM-400-15

OEM Balanced Photodetector

Instruction Note



August 14, 2020

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Section 1. Specifications:

| <i>Photodetector</i> | |
|---|--|
| Operating Wavelength | 1550 ± 50nm |
| Photodetector Type | InGaAs |
| PD Responsivity ² | > 0.8mA / mW at 1550nm |
| PDL | <0.2 dB |
| Return Loss | >45 dB |
| Maximum Input Power | 10 mW |
| <i>RF and Monitor Outputs</i> | |
| RF Output Bandwidth (3dB) | ≥400 MHz |
| Coupling | AC |
| Lower cut-off frequency | <1 MHz |
| Transimpedance Gain at 50Ω | >18 × 10 ³ mV/mA |
| Conversion Gain at 50Ω | >14 × 10 ³ mV/mW (1550nm) |
| CW Balanced Saturation Power | >120 μW at 1550nm |
| Common Mode Rejection Ratio | >25 dB (DC to 400MHz) |
| NEP (10 - 100MHz) | <6 pW / √Hz |
| Bandpass Ripple (150-400 MHz) | ±2dB max. |
| RF Output Impedance | 50 Ω |
| RF Output Voltage Linear Range | >-1V to 1V at 50 Ω load >-2V to 2V at high impedance load |
| RF Output Connector | SMA |
| Monitor Output Bandwidth | DC to 1kHz |
| Monitor Output Impedance | 200 Ω |
| Monitor Gain at High impedance ³ | 0.42 × 10 ³ mV/mW |
| Monitor Voltage (high Z and DC input) | >4V |
| Monitor Output Connector | SMA |
| <i>Power Supply</i> | |
| Power Supply Input Connectors | 2 rows (6 pins/row) with 0.1" pitch |
| Power Supply | ±5V / 200 mA |
| PSRR (power supply rejection ratio, f < 1MHz, differential referred to output, ΔVCC = 30mV P-P) | >30 dB |
| | |
| <i>General</i> | |
| Pigtail Length | 1 m |
| Fiber Type | SMF-28e or equivalent |
| Operating Temperature | 0 to 50 °C (Target : 0~70 °C) |
| Storage Temperature | -40 to 85 °C |
| Dimensions | 2.21"(L) × 1.81"(W) × 0.65"(H) |

Notes: Values are referenced without connectors.

1. All specifications in this table are tested under 23± 5°C
2. Includes the coupling loss of fiber to photodiode.
3. If the output voltages for the monitor ports are equal, then the photocurrents are equal.

Section 2. Overview:

The BPD-002-OEM is a compact, high performance, AC coupled balanced detector specially designed for OEM applications. It has 3 SMA connectors for the RF output and two power monitors. The balanced detectors, monitors, and amplifier circuits are packaged in a compact shielding box with metal standoffs for mounting. With a bandwidth of up to 400 MHz and a high conversion gain, the BPD-002-OEM is ideal for integration into OCT, fiber sensor and high performance optical measurement systems.

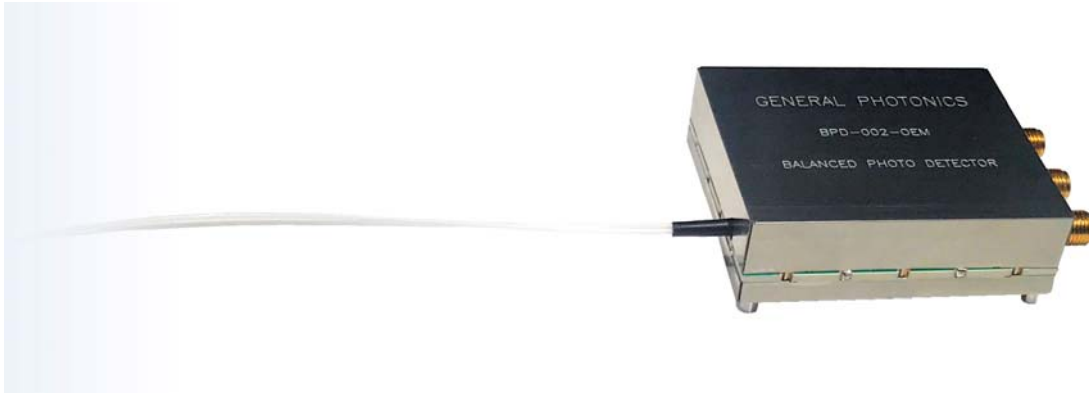


Figure 1 BPD-002-OEM balanced photodetector.

Section 3. Device Description:

3.1 General Description

The BPD-002-OEM is a compact module packaged in a shielding box. Physical and electrical features are described below.

3.1.1 Dimensions

Dimensions are shown in Figure 2.

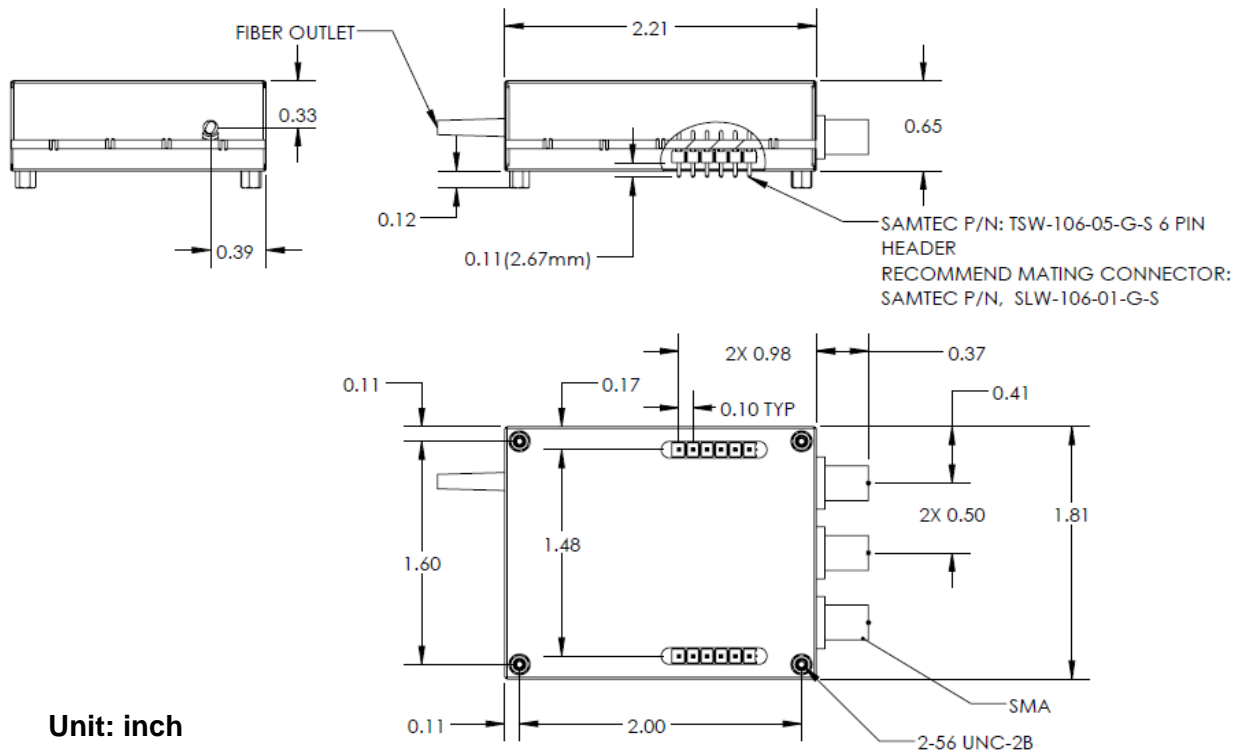


Figure 2 Package dimensions (in inches)

The BPD can be mounted by using 2-56 screws to connect to the 4 metal standoffs on the bottom of the shielding box.

Electrical and optical interfaces are shown in Figure 3.

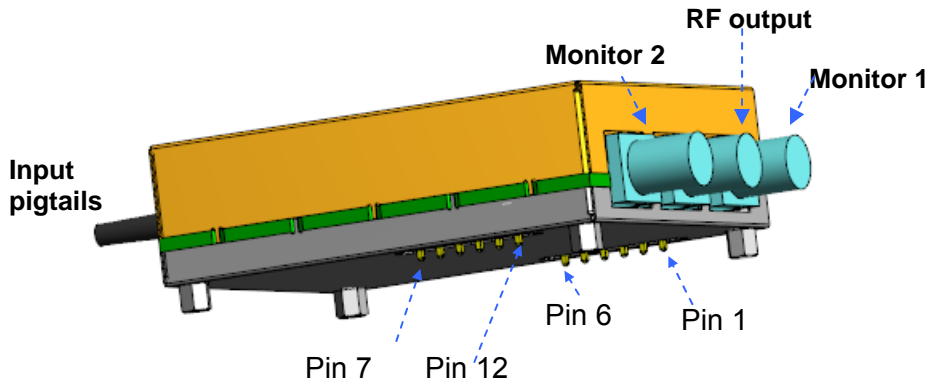


Figure 3 BPD-002-OEM with electrical and optical interfaces labeled

Optical interface:

Input 1 and Input 2 pigtails.
Pigtails are labeled.

Electrical interfaces:

Outputs:

RF signal: SMA connector (50Ω)
Monitor 1: SMA connector (200Ω)
Monitor 2: SMA connector (200Ω)

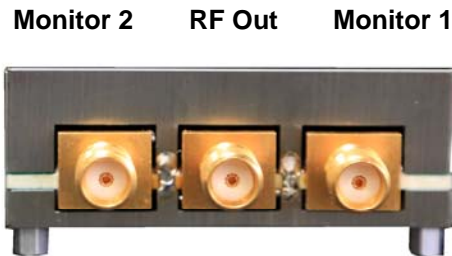


Figure 4 Side view, showing electrical output connectors (SMA)

Power supply:

Description: 12-pin connector (2 rows) for ±5V power supply.
Connector type on module: Samtec TSW-106-05-G-S or equivalent
Mating part: Samtec SLW-106-01-G-S or equivalent

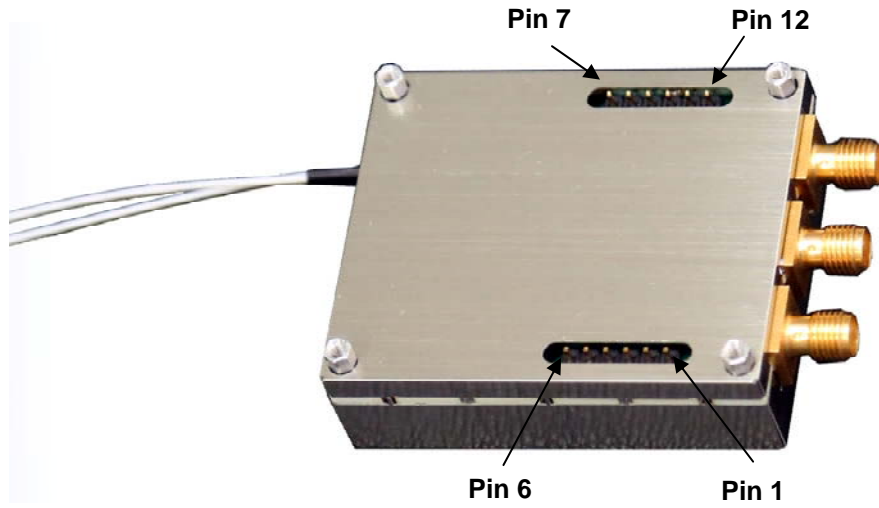


Figure 5 Bottom view of BPD-002-OEM

Power connector pinout:

| Pin # | Description |
|-------|-------------|
| 1 | GND |
| 2 | GND |
| 3 | GND |
| 4 | GND |
| 5 | -5V |
| 6 | -5V |
| 7 | +5V |
| 8 | +5V |
| 9 | GND |
| 10 | GND |
| 11 | GND |
| 12 | GND |

Section 4. Device Operation:

Electrical and optical connections are required during setup of the BPD-002-OEM. Follow safety precautions when making these connections.

4.1. Getting Started

Unpacking

Be careful when unpacking the BPD from its original packaging.

Avoid applying any force to optical fiber pigtails, and do not let any free-drop of fiber connectors occur at any time. Excessive force to fiber pigtails may degrade device performance or damage the module.

Observe standard electrical safety and antistatic precautions when handling the BPD and making electrical connections.

Operation

Follow the steps below to operate the BPD-002

1. Connect the $\pm 5V$ power supplies to 12-pin power connector.
2. Connect RF output connector (SMA, 50Ω impedance).
3. Connect monitor output connectors (SMA, 200Ω impedance).
Note that the gains of the monitor outputs have been set to compensate for differences in the responsivities of the detectors. If the monitor 1 and monitor 2 outputs are equal, the inputs are balanced.
4. Connect optical inputs to the 2 input pigtails. Make sure that optical power levels are within range and that the two inputs are balanced to within the balanced saturation power.

4.2. Test Fixture

General Photonics provides a test fixture and cables to facilitate power connections to the BPD-002-OEM for testing.

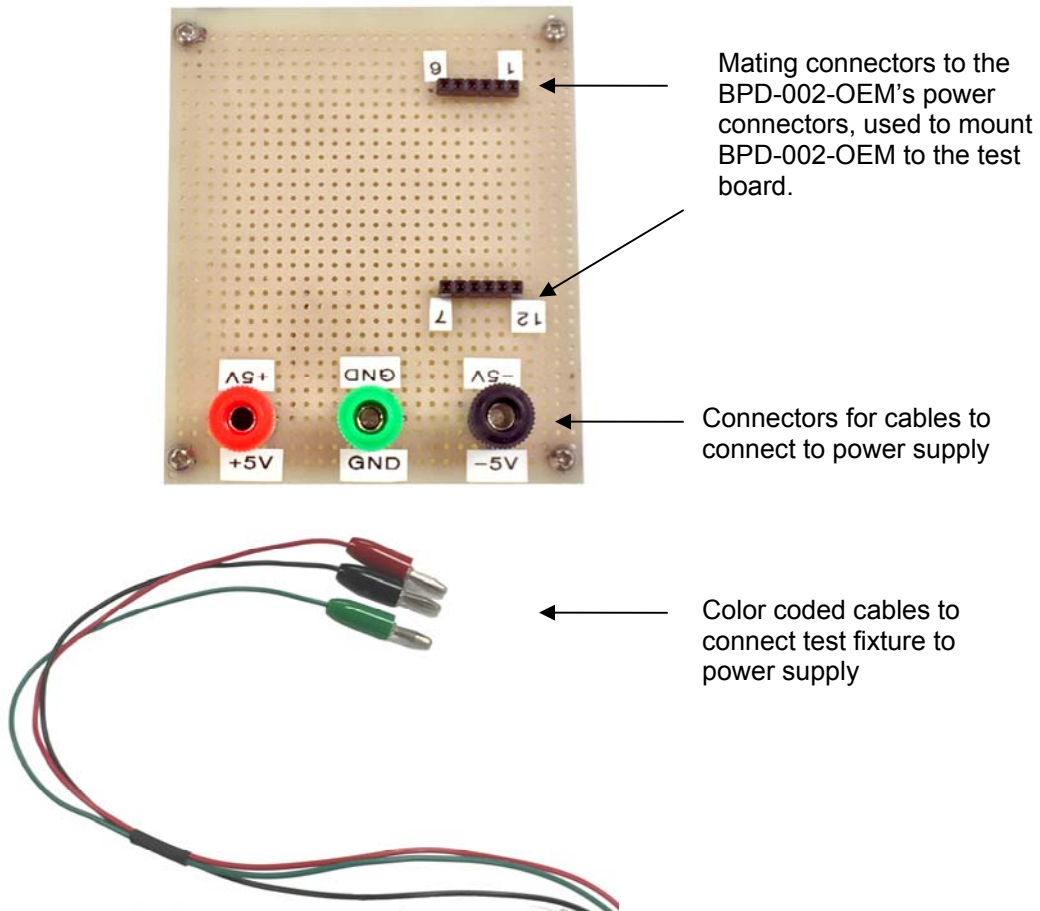


Figure 6 Test fixture and power cables

To use the test fixture with the BPD-002-OEM:

1. Mount the BPD-002-OEM to the board by connecting the power connectors on the bottom of the BPD to the mating connectors on the board. The pins are labeled.
2. Connect the 3 power cables to the corresponding connectors on the board. The cables are color coded.
 - Red: +5V
 - Green: Ground
 - Black: -5V

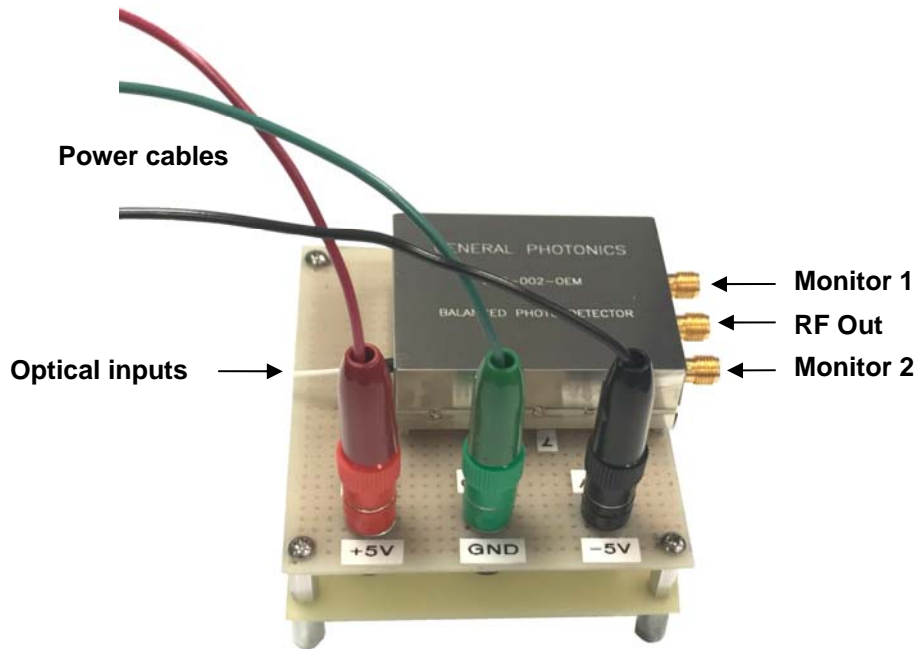


Figure 7 Test fixture with BPD-002-OEM

3. Verify power supply settings and connect the cables to the $\pm 5V$ power supplies and to ground.
4. Connect RF output connector (SMA, 50Ω impedance).
5. Connect monitor output connectors (SMA, 200Ω impedance).
Note that the gains of the monitor outputs have been set to compensate for differences in the responsivities of the detectors. If the monitor 1 and monitor 2 outputs are equal, the inputs are balanced.
6. Connect optical inputs to the 2 input pigtailed. Make sure that optical power levels are within range and that the two inputs are balanced to within the balanced saturation power.

Section 5. Warranty and Technical Support:

All of General Photonics' products have been inspected and found to comply with our quality assurance standards before shipping. If any damage occurs during shipment, please contact the carrier and inform us or your distributor as soon as possible.

Do not attempt repair of any General Photonics product. Repair of defective products must be performed by factory trained engineers.

General Photonics warrants that this product will be free from defects in materials or workmanship for a period of one year from the date of shipment. A product found to be defective during the warranty period will be repaired or replaced, at no charge, at General Photonics' option.

If a problem is found, please contact General Photonics for assistance and instructions for any necessary returns.

General Photonics Customer Service
T: 909-590-5473
Email: support@generalphotonics.com

www.generalphotonics.com

You will be provided with a problem report form. Please complete the form with as complete a description of the problem and the conditions under which it occurred as possible. If the product is found to require factory repair, General Photonics will issue an RMA number for the return. Please label the product clearly with the RMA number. Failure to follow this procedure may delay the evaluation and repair of the product.

The above warranty specifically excludes products that have been repaired or modified by non-manufacturer-authorized personnel, products with a broken warranty seal or opened enclosure, and damage caused by misuse, abuse, improper storage or handling, or acts of nature. This warranty is in lieu of all other warranties, expressed or implied. General Photonics will not be liable for any indirect or consequential damages or losses resulting from the use of its products.