

Product Specification

50 GHz High-Power Photodetector

HPDV2120R

PRODUCT FEATURES

- 50 GHz 3 dB bandwidth
- 3 dBm RF output power @ 50 GHz
- 6 dBm RF output power @ 20 GHz
- High Linearity
(>25 dBm OIP3 @ 40 GHz)
- No cooling required

APPLICATIONS

- Microwave Photonics
- Analog Photonic links
- Radio-over-Fiber



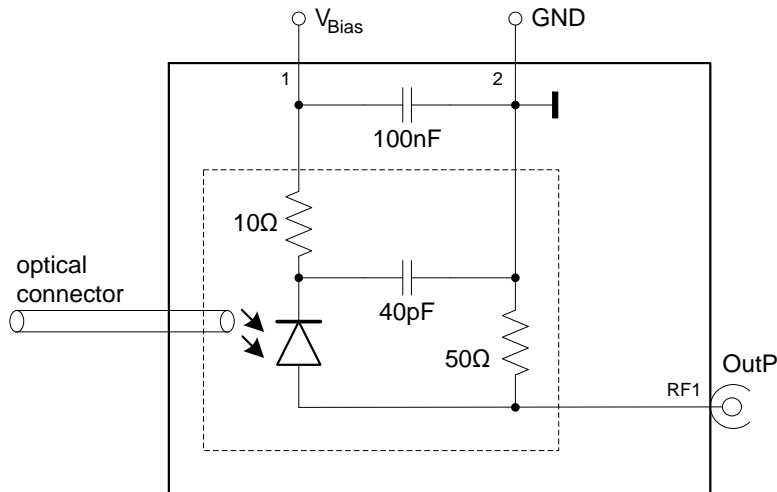
The HPDV is a compact module that is based on an advanced waveguide photodetector chip integrated with a Bias-Tee. The HP-PD utilizes a mode-converting tapered waveguide for efficient fiber-to-chip coupling and a 1×4 Multi-Mode Interference (MMI) Coupler. The optical signal is split by the MMI coupler into 4 equal parts and then it is fed into an array of 4 photodiodes which are connected in-parallel. It has a responsivity of 0.52 A/W @ 1550 nm and a high saturation photocurrent of 35 mA @ 20 GHz. The HP-PD is capable of delivering 6 dBm RF output power @ 20 GHz and 3 dBm @ 50 GHz. The device exhibits a high linearity with typical OIP3 values above 20 dBm at a frequency of 40 GHz.

ORDERING INFORMATION

HPDV2120R-VF-zz

| | | |
|-----|----|------------------------------------|
| R: | R | = internal 50Ω termination |
| VF: | VF | = V-connector, female |
| zz: | FC | = FC/PC connector |
| | FA | = FC/APC connector |

I. Block Diagram



II. Absolute Maximum Ratings

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-------------------------------------|----------------------|--|------|------|------|------|
| Storage Temperature | T_{STORAGE} | non condensing | -40 | | +85 | °C |
| Photodiode Bias Voltage | V_{PD} | | 0 | | 5.2 | V |
| Maximum Average Optical Input Power | P_{OPT} | continuous wave (CW) or 40 Gb/s NRZ | | | 18.5 | dBm |
| Maximum Peak Optical Input Power | P_{peak} | pulse width ≤ 25 ps or 40 Gb/s RZ | | | 24 | dBm |
| Electrostatic Discharge | V_{ESD} | 100pF, 1.5kΩ HBM | -250 | | +250 | V |
| Fiber Bend Radius | r_{bend} | | 16 | | | mm |



Notice

Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operations section for extended periods of time may affect reliability.

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

III. Environmental Conditions

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-------------------------|--------|----------------|------|------|------|------|
| Relative Humidity Range | RH | non condensing | 5 | | 85 | % |

IV. Operating Conditions

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-----------------------------|------------|-----------|------|------|------|------|
| Case Temperature Range | T_{CASE} | | 0 | | +50 | °C |
| Wavelength Range | λ | | 1520 | | 1570 | nm |
| Average Optical Input Power | P_{OPT} | | | | 18 | dBm |
| Photodiode Bias Voltage | V_{PD} | | 2.8 | 4.0 | 5.0 | V |

V. Electro-Optical Specifications

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|--|------------|---------------------------|------|-----------|-----------|------|
| DC responsivity | R | optimum polarization | 0.4 | 0.5 | | A/W |
| Polarization dependent loss | PDL | | | 0.3 | 0.7 | dB |
| Optical return loss | ORL | | 27 | | | dB |
| 3dB cut-off frequency | f_{3dB} | | 48 | 54 | | GHz |
| Output reflection coefficient | S_{22} | 0...15 GHz 15...50 GHz | | -15 -3 | -10 -1 | dB |
| Output 1dB compression | P_{1dB} | 50 GHz, $V_{PD} = 4.0V$ | | 3 | | dBm |
| Output 3 rd order intercept point | OIP3 | 50 GHz, $V_{PD} = 4.0V$ | | 20 | | dBm |
| Dark current | I_{dark} | | | 25 | 200 | nA |

VI. Typical Performance Curves

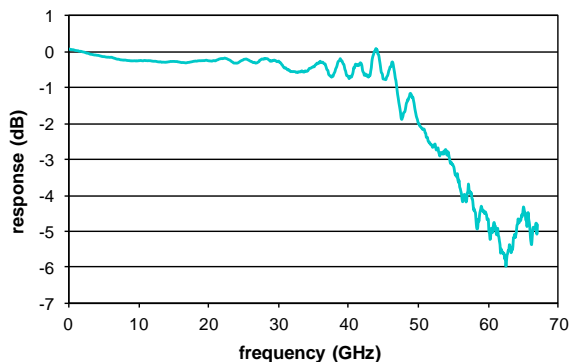


Fig. 1: Frequency response measured with a Lightwave Component Analyzer.

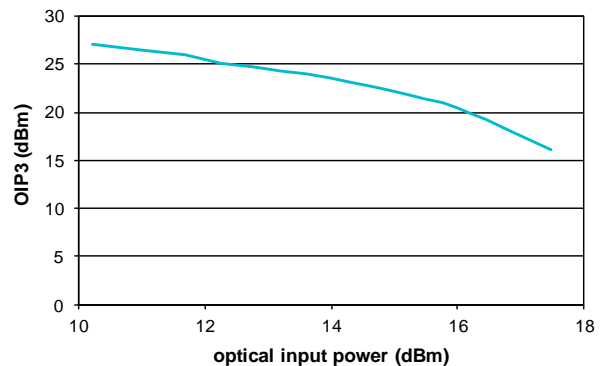


Fig. 2: Output IP3 at a frequency of 20 GHz and at a bias voltage of 4 V.

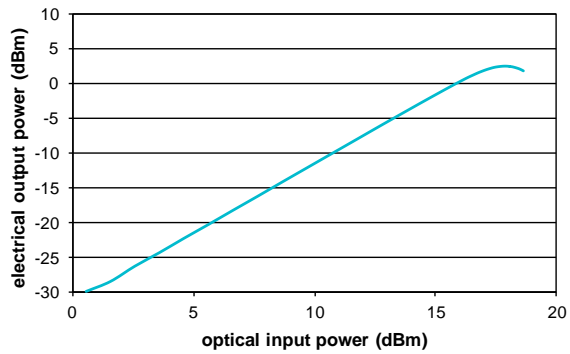


Fig. 3(a): RF output power as a function of the optical input power for a bias voltage of 4 V at a frequency of 50 GHz.

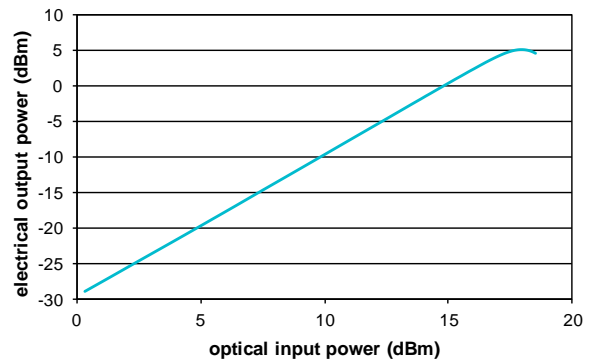


Fig. 3(b): RF output power as a function of the optical input power for a bias voltage of 4 V at a frequency of 20 GHz.

VII. Revision History

| Revision | Date | Description |
|----------|------------|---------------------------------------|
| A1 | 04/09/2014 | • Document created. |
| A2 | 06/27/2014 | • Data and design update according M4 |

Notes

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- Finisar Corporation reserves the right to make changes without notice.

For More Information

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