

## Product Specification

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### Ultra-High Power Photodetector

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#### VPDV2120

#### PRODUCT FEATURES

- Operational up to 20 GHz
- $\geq 23$  dBm RF output power @ 10 GHz
- High Linearity ( $> 30$  dBm OIP3 @ 10GHz)
- No cooling required

#### APPLICATIONS

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



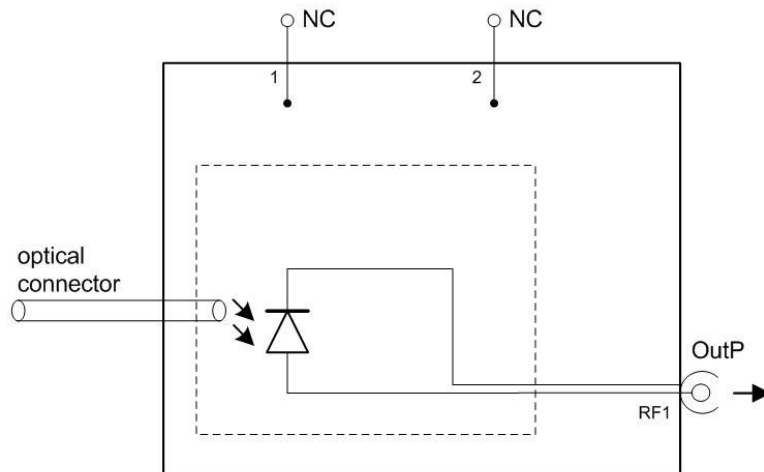
The VPDV2120 is a compact module that is based on a modified uni-travelling carrier (MUTC) photodetector chip. The VPDV2120 is not matched to  $50 \Omega$ . For applying a bias voltage of 6 V, an external bias-Tee is required. It has a responsivity of 0.35 A/W (1550 nm) and a high saturation photocurrent of 150 mA @ 10 GHz. The Ultra-high power PD is capable of delivering  $\geq 23$  dBm RF output power @ 10 GHz. The device exhibits a high linearity with typical OIP3 values above 30 dBm at a frequency of 10 GHz.

#### ORDERING INFORMATION

|                       |
|-----------------------|
| <b>VPDV2120-VF-FP</b> |
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VF:               = V connector, female  
FP:               = FC/PC connector

## I. Block Diagram



## II. Absolute Maximum Ratings

| Parameter                           | Symbol    | Condition                  | Min. | Typ. | Max. | Unit |
|-------------------------------------|-----------|----------------------------|------|------|------|------|
| Photodiode Bias Voltage             | $V_{PD}$  |                            | 0    |      | 8    | V    |
| Maximum Average Optical Input Power | $P_{OPT}$ | continuous wave (CW)       |      |      | 28   | dBm  |
| Electro Static Discharge            | $V_{ESD}$ | C=100 pF, R= 1.5 kΩ<br>HBM | -250 |      | 250  | V    |



### 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 |
|----------------------------------|----------------------|----------------|------|------|------|------|
| Storage Temperature              | T <sub>storage</sub> | non condensing | -40  |      | +85  | °C   |
| Operating Case Temperature Range | T <sub>CASE</sub>    |                | 0    |      | +75  | °C   |
| Relative Humidity Range          | RH                   | non condensing | 5    |      | 85   | %    |

**IV. Operating Conditions**

| Parameter                         | Symbol           | Condition | Min. | Typ. | Max. | Unit |
|-----------------------------------|------------------|-----------|------|------|------|------|
| Operating Wavelength Range        | $\lambda$        |           | 1520 |      | 1570 | nm   |
| Average Optical Input Power Range | P <sub>OPT</sub> |           |      |      | 27   | dBm  |
| Photodiode Bias Voltage           | V <sub>PD</sub>  |           | 5    | 6    | 7    | V    |

**V. Electro-Optical Specifications**

| Parameter                                                           | Symbol            | Condition                      | Min. | Typ. | Max. | Unit |
|---------------------------------------------------------------------|-------------------|--------------------------------|------|------|------|------|
| Photodiode DC Responsivity                                          | R                 | optimum polarization           | 0.3  | 0.4  |      | A/W  |
| Polarization Dependent Loss                                         | PDL               |                                |      | 0.3  | 0.7  | dB   |
| Optical Return Loss                                                 | ORL               |                                | 27   |      |      | dB   |
| 3dB Cut-off Frequency <sup>1)</sup>                                 | f <sub>3dB</sub>  |                                | 12   | 18   |      | GHz  |
| RF Output Power                                                     | P <sub>out</sub>  | 10 GHz, V <sub>PD</sub> = 6.0V |      | 23   |      | dBm  |
| Output 3 <sup>rd</sup> Order Intercept Point                        | OIP3              | 10 GHz, V <sub>PD</sub> = 6.0V |      | 30   |      | dBm  |
| Photodiode Dark Current                                             | I <sub>dark</sub> |                                |      | 100  | 500  | nA   |
| Notes:                                                              |                   |                                |      |      |      |      |
| 1. measured using Agilent 86030A 50GHz Lightwave component analyzer |                   |                                |      |      |      |      |

## VI. Typical Performance Curves

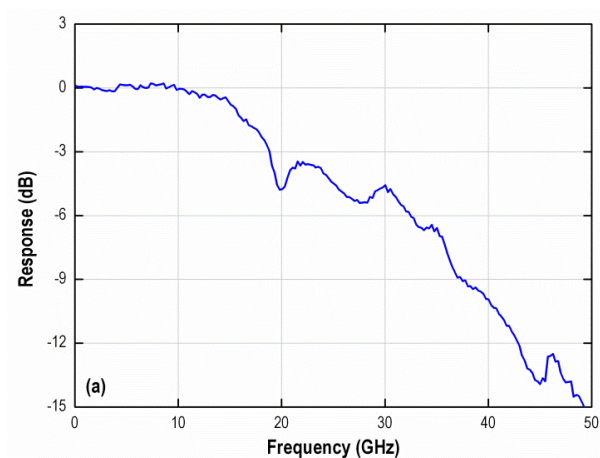


Fig. 1(a): Frequency response of the VPDV2120 measured with a Lightwave Component Analyzer. The device is operational up to 20 GHz.

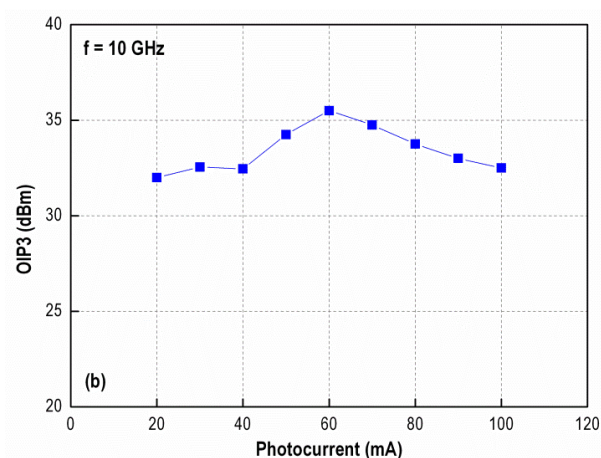


Fig. 1(b): Output IP3 at a frequency of 10 GHz versus photocurrent.

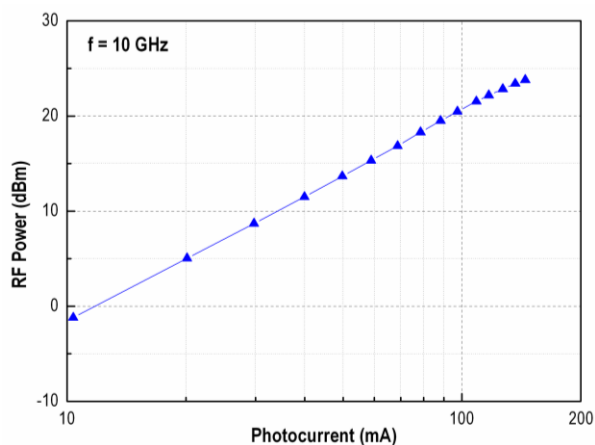


Fig. 2(a): RF output power as a function of the photocurrent at a bias voltage of 6 V and a frequency of 10 GHz.

**VII. Revision History**

| Revision | Date       | Description         |
|----------|------------|---------------------|
| A1       | 04/09/2014 | • Document created. |

**Notes**

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

**For More Information**

Finisar Corporation  
1389 Moffett Park Drive  
Sunnyvale, CA 94089-1133  
Tel. 1-408-548-1000  
Fax 1-408-541-6138  
[sales@finisar.com](mailto:sales@finisar.com)  
[www.finisar.com](http://www.finisar.com)

*Ordering Information:*

800 Village Walk #316  
Guilford, CT 06437  
Ph: 203-401-8093

Email orders to: [sales@xsoptix.com](mailto:sales@xsoptix.com)  
Fax orders to: 800-878-7282