

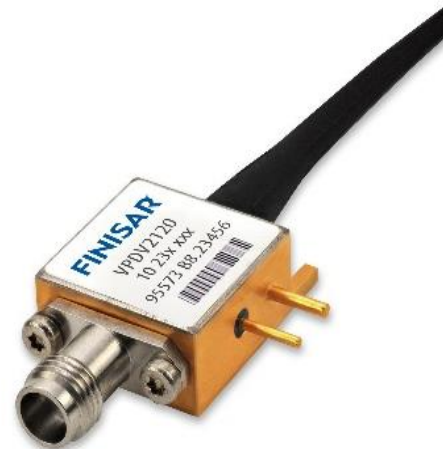
## Product Specification

### Ultra-High Power Photodetector

#### VPDV2120

#### PRODUCT FEATURES

- Ultra-High RF Output Power of  $\geq 22\text{dBm}$  @ 10GHz
- High Linearity (OIP3 > 30dBm@10GHz)
- High Responsivity of 0.55A/W
- High Saturation Photocurrent of 150mA @ 10GHz
- No cooling required
- Operational up to 20GHz and beyond



#### APPLICATIONS

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

The VPDV2120 is a very compact, hermetically packaged, optical detector module with an ultra-high RF output power of  $>22\text{dBm}$  at a frequency of 10GHz. It offers a high responsivity of 0.55A/W (1550nm) and a very high saturation photocurrent of 150mA @10GHz. The device exhibits a high linearity with typical OIP3 values above 30dBm at a frequency of 10GHz and doesn't require any cooling. The device is using a modified uni-travelling carrier (MUTC) photodetector chip.

The VPDV2120 is not matched to 50Ω. For applying a bias voltage of -6V, an external bias-Tee is required.

#### PRODUCT SELECTION

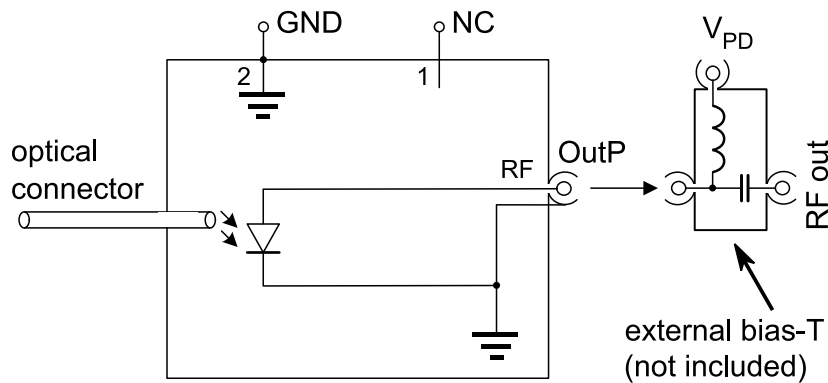
**VPDV2120-VF-FA**

VF: = V-connector, female  
FA: = FC/PC connector (standard)

## I. Pin Descriptions

# Pin	Symbol	Description
1	NC	Do not connect
2	GND	Case ground

## II. Block Diagram



## III. Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photodiode Bias Voltage	$V_{PD}$		-6.5		0	V
Maximum Average Optical Input Power	$P_{opt}$	Continuous wave (CW)			24	dBm
Maximum Peak Optical Input Power	$P_{peak}$	Pulse <1ns			27	dBm
Photocurrent	$I_{PD}$	DC	-120			mA
Electro Static Discharge (ESD)	$V_{ESD}$	C= 100pF, R= 1.5kΩ HBM	-250		+250	V
Fiber Bend Radius			16			mm

#### IV. Environmental Specifications

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Storage temperature	$T_{storage}$	non condensing	-40		+85	°C
Operating case temperature	$T_{case}$		0		+50	°C
Relative humidity range	RH	non condensing	5		85	%

#### V. Operating Conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating wavelength range	$\lambda$		1525		1575	nm
Optical input power	$P_{OPT}$				23.5	dBm
Photodiode bias voltage	$V_{PD}$		-6.0	-5.0	-4.0	V

#### VI. Electro-Optical Specifications

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photodiode DC responsivity	R	optimum polarization	0.4	0.55		A/W
Polarization dependent loss	PDL			0.1	0.3	dB
Optical return loss	ORL		30	40		dB
Photodiode dark current	$I_{dark}$	$T_{case} = 25^{\circ}C$	-200	-10		nA
3dB cut-off frequency	$f_{3dB}$	$V_{PD} = -6.0V, I_{PD} = -115mA$		12		GHz
RF output power	$P_{out}$	$V_{PD} = -6.0V, I_{PD} = -115mA, 10GHz$		22		dBm
Output 3 <sup>rd</sup> order intercept point	OIP3	$V_{PD} = -6.0V, I_{PD} = -115mA, 10GHz$		33		dBm

**VII. Typical Performance Behavior**

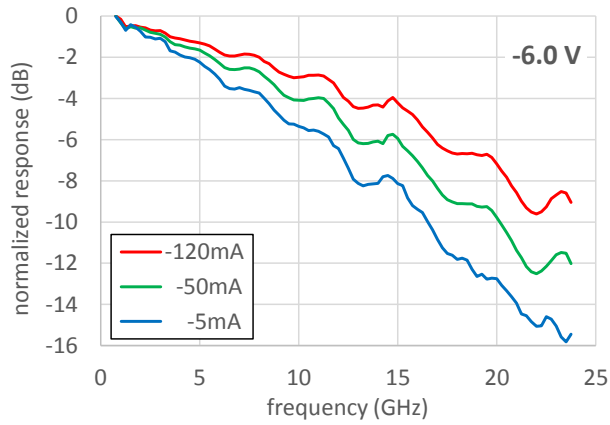


Figure 2: Frequency response of the VPDV2120 measured with a heterodyne signal

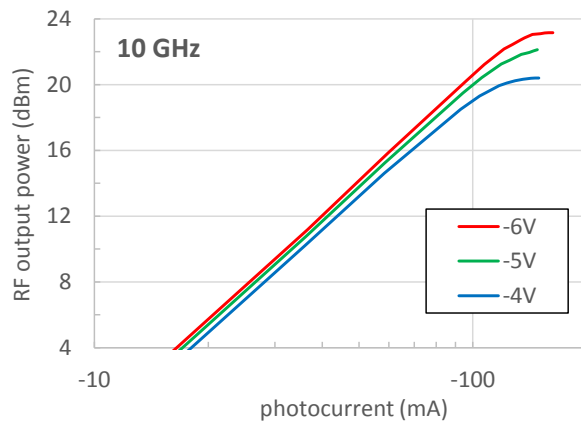


Figure 3: RF output power as a function of the photocurrent

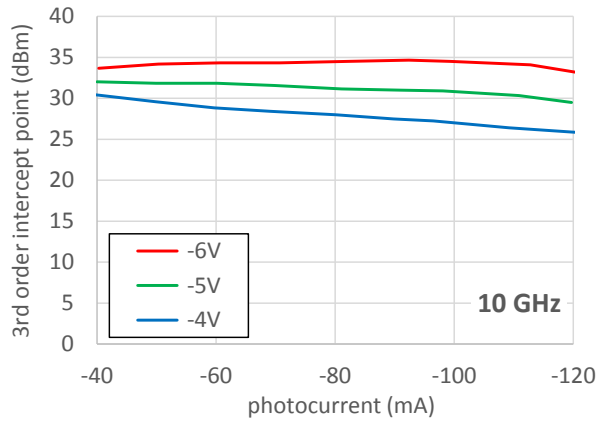
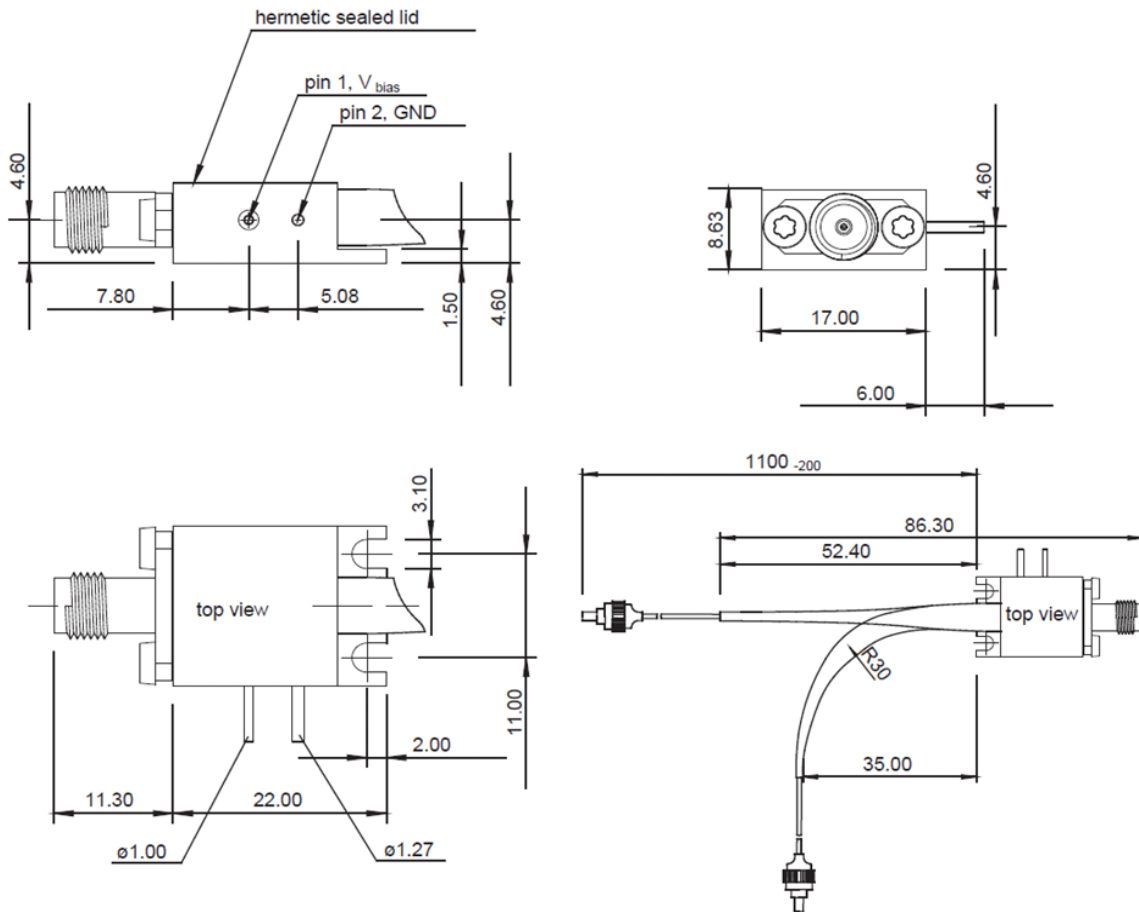


Figure 4: Output IP3 versus photocurrent

**IX. Mechanical Specifications**

All Dimensions in mm



Parameter	Description
Signal fiber	SMF-28, 900 loose buffer, yellow

**Notes**

- Any trademarks used in this document are properties of their respective owners.
- II-VI Incorporated reserves the right to make changes without notice.

**X. Revision History**

Revision	Date	Description
A04	2020-01-30	Transition to II-VI template.