

Product Datasheet

20 GHz Ultra-High-Power Photodetector

VPDV2120

PRODUCT FEATURES

- Ultra-High RF Output Power of ≥ 22 dBm at 10 GHz
- High Linearity (OIP3 > 30 dBm at 10 GHz)
- High Responsivity of 0.55 A/W
- High Saturation Photocurrent of 120 mA at 10 GHz
- No cooling required
- Operational up to 20 GHz and beyond



Picture shows product example, actual product might differ

APPLICATIONS

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

Ordering Information:



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Ph: 203-401-8093

Email orders to: sales@xsoptix.com
Fax orders to: 800-878-7282

The VPDV2120 is a very compact, hermetically packaged, optical detector module with an ultra-high RF output power of >22 dBm at a frequency of 10 GHz. It offers a high responsivity of 0.55 A/W (1550 nm) and a very high saturation photocurrent of 120 mA at 10 GHz. The device exhibits a high linearity, with typical OIP3 values above 30 dBm at a frequency of 10 GHz and does not require any cooling. The device is using a modified uni-travelling carrier (MUTC) photodetector chip.

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

PRODUCT SELECTION

VPDV2120-VF-zz

VF: VF = Female V[®] connector

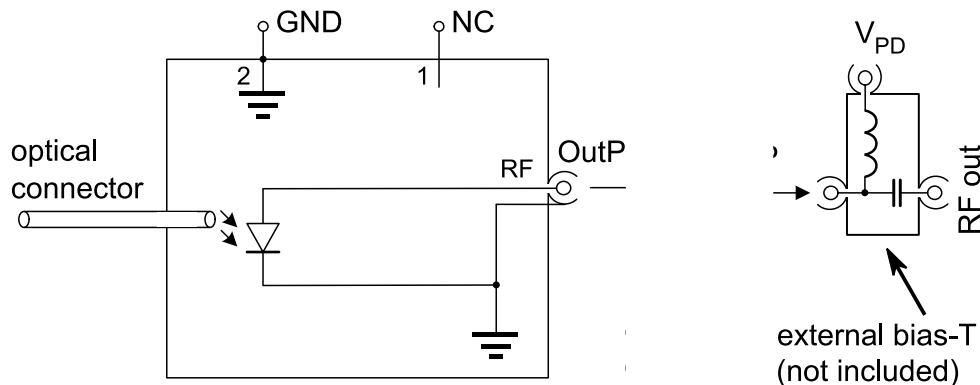
zz: FP = FC/PC connector (standard)

FA = FC/APC connector

I. Pin Descriptions

# Pin	Symbol	Description
1	NV	Do not connect
2	GND	Ground = case ground

II. Block Diagram



III. Absolute Maximum Ratings

Stress beyond the absolute maximum ratings specified in the table below may cause permanent damage to the photodiode. Functional operation of the photodiode at these or any other conditions beyond those indicated in the operation conditions is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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

Note

- 1) Maximum ratings for photocurrent (I_{PD}) and optical power, pulsed (P_{OPT_peak}) and continuous wave (P_{OPT_avg}), are linked. None of the limits must be exceeded, even if the other parameter limit is not reached yet.

IV. Environmental Specifications

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Case Temperature	T_{CASE}		0		50	°C
Relative Humidity	RH	noncondensing	5		85	%
Storage Temperature	T_{STORE}		-40		85	°C

V. Operating Conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Wavelength Range	λ	C-band		1550		nm
Average Optical Input Power	P_{OPT_avg}				23.5	dBm
Photodiode Supply Voltage	V_{PD}		-6.0	-5.0	-4.0	V

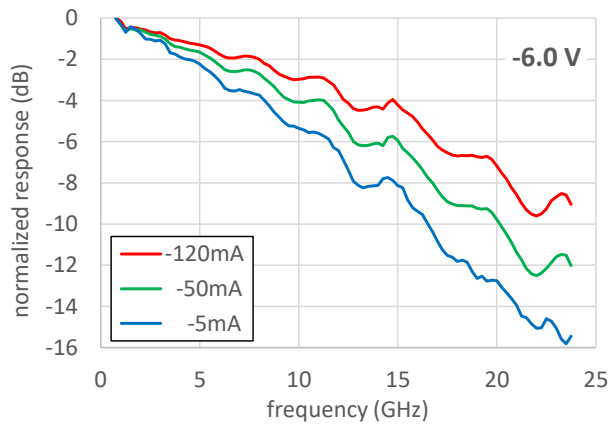
VI. Electro-Optical Specifications¹

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
Photodiode Dark Current	I_{DARK}	$T_{CASE} = 25\text{ °C}$	-200	-10		nA
Optical Return Loss	ORL		30			dB
3 dB Cut-off Frequency	f_{3dB}	¹⁾		12		GHz
RF output power	P_{out}	¹⁾ , 10 GHz		22		dBm
Output 3 rd order intercept point	OIP3	¹⁾ , 10 GHz		33		dBm

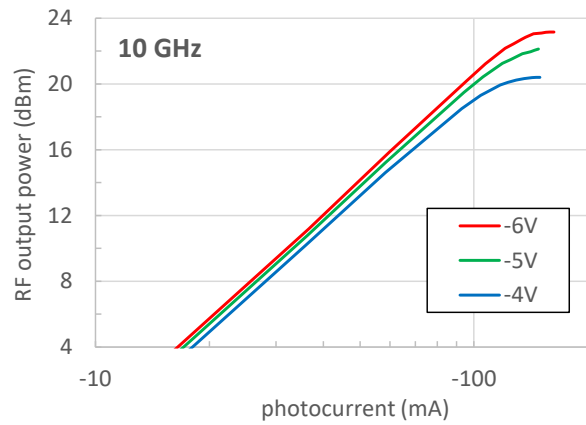
Notes:

- $V_{PD} = -6.0\text{ V}$, $I_{PD} = -115\text{ mA}$

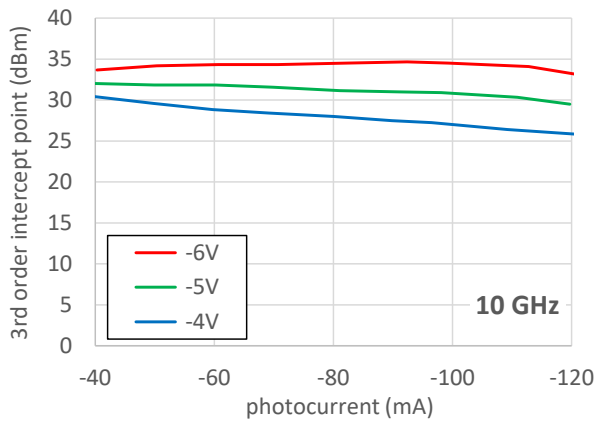
VII. Typical Performance



Frequency response of the VPDV2120 measured with a heterodyne signal



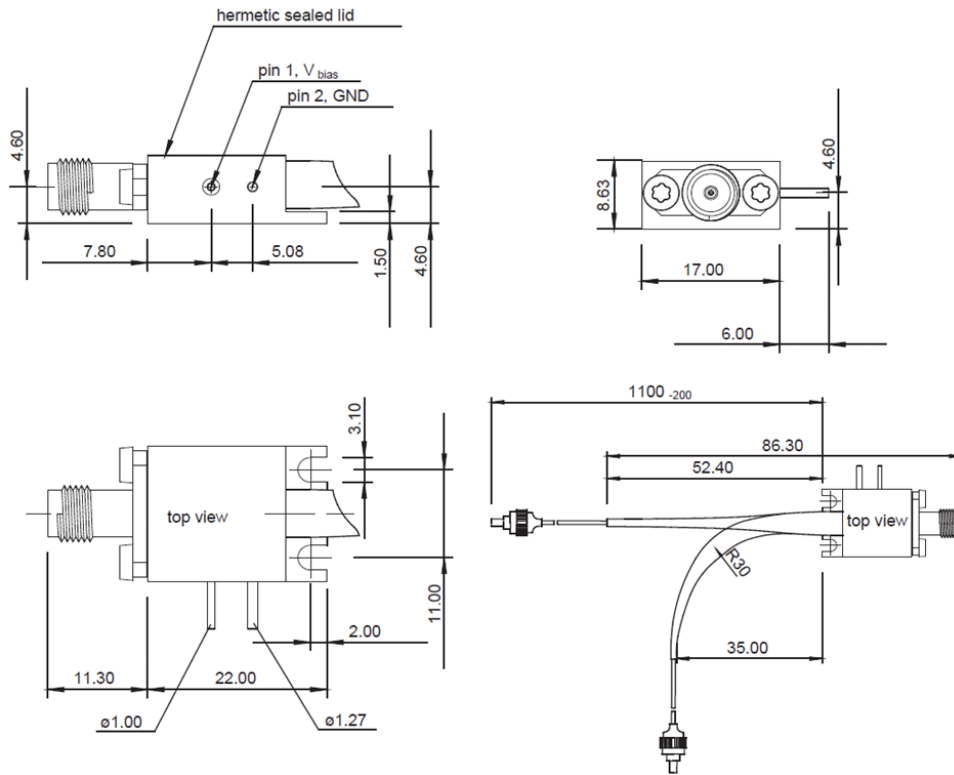
RF output power as a function of the photocurrent



Output IP3 versus photocurrent

VIII. Mechanical Specifications

All dimensions in mm



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

Product Handling

Please read supporting documentation such as the Manual carefully before using the product. Damages because of mishandling are not covered by warranty

Notes

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Revision History

Revision	Date	Description
A06	Aug 2022	Added reference to supporting documents and warranty exclusion
A07	Jan 2023	Transfer to COHERENT template
A08	April 2023	Increase avg. optical input power operations to 23.5 dBm, added max rating for photocurrent, reduced max operations temperature