

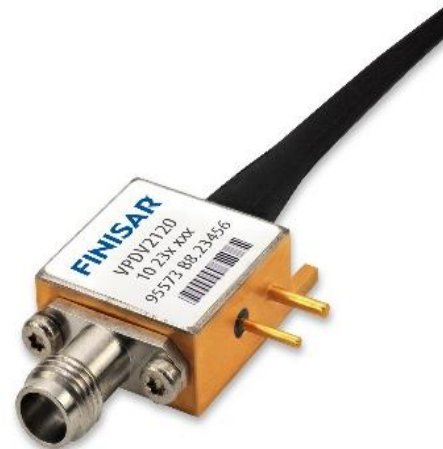
Product Specification

Ultra-High Power Photodetector

VPDV2120

PRODUCT FEATURES

- Ultra-High RF Output Power of $\geq 22\text{dBm}$ @ 10GHz
- High Linearity ($\text{OIP3} > 30\text{dBm}$ @ 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

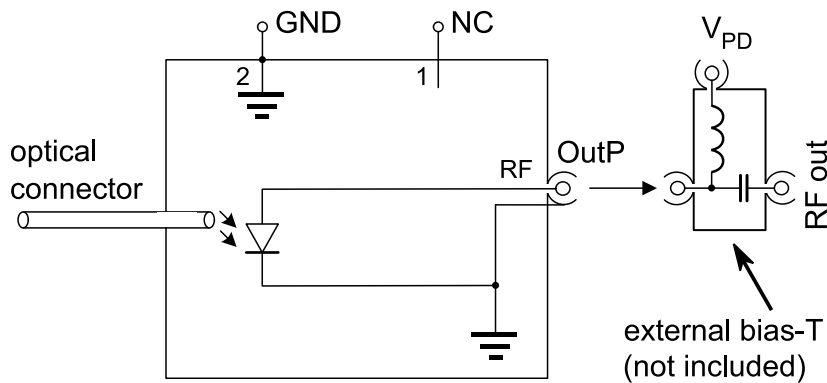
VF: = V-connector, female

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	λ		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}	$T_{\text{case}} = 25^{\circ}\text{C}$	-200	-10		nA
3dB cut-off frequency	$f_{3\text{dB}}$	$V_{\text{PD}} = -6.0\text{V}$, $I_{\text{PD}} = -115\text{mA}$		12		GHz
RF output power	P_{out}	$V_{\text{PD}} = -6.0\text{V}$, $I_{\text{PD}} = -115\text{mA}$, 10GHz		22		dBm
Output 3 rd order intercept point	OIP3	$V_{\text{PD}} = -6.0\text{V}$, $I_{\text{PD}} = -115\text{mA}$, 10GHz		33		dBm

VII. Typical Performance Behavior

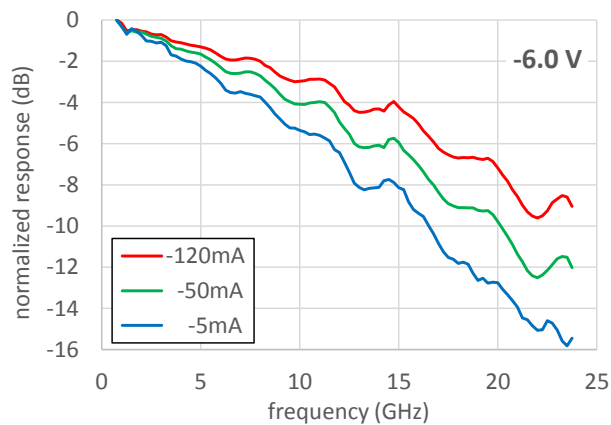


Figure 2: Frequency response of the VPDV2120 measured with a heterodyne signal

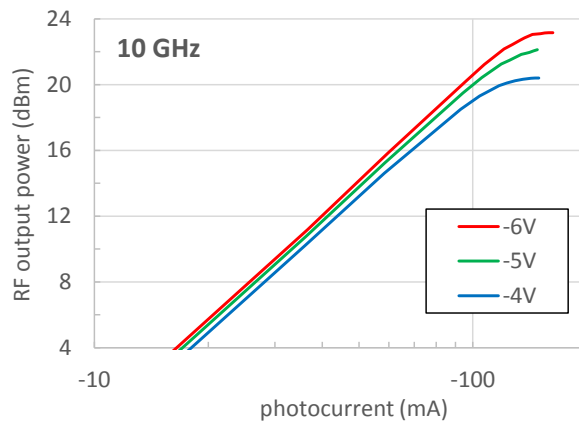


Figure 3: RF output power as a function of the photocurrent

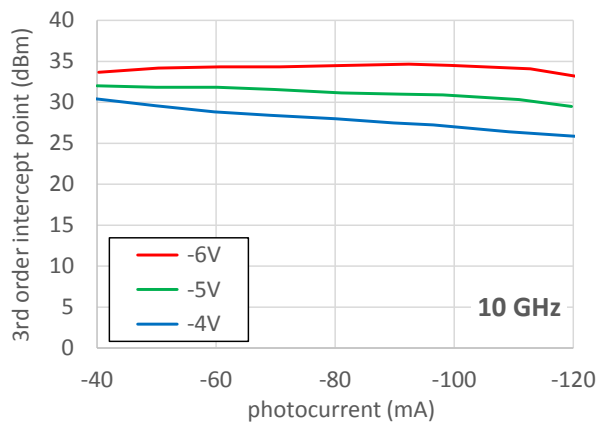
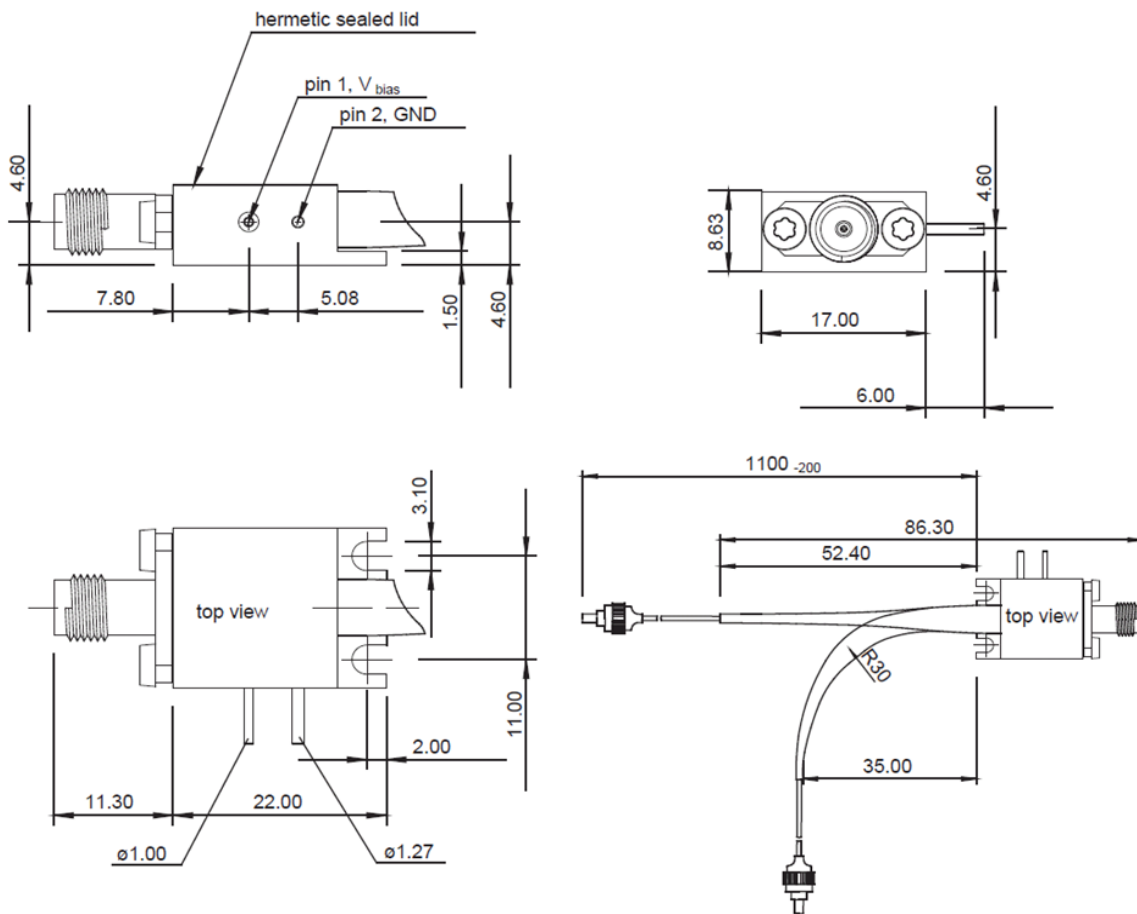


Figure 4: Output IP3 versus photocurrent

IX. Mechanical Specifications

All Dimensions in mm



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

Notes

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- 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.