FINISAR

Product Specification

70 GHz Balanced Photodetector

BPDV3120R

PRODUCT FEATURES

- 70 GHz bandwidth guaranteed
- Unsurpassed high-power capability
- Detection of 64 Gbaud x-QAM signals
- Integrated 50 Ω termination
- Unique on-chip biasing network

APPLICATIONS

- Transmission systems of 400 Gb/s through 1 Tb/s
- Coherent Test- & Measurement systems
- Research- and Development systems
- Microwave photonics

The balanced photodetector consists of two optimized 75 GHz, waveguide-integrated photodiodes on one single chip. As a single balanced photodetector, this configuration ensures an excellent uniformity of the paired photodiodes and is biased via integrated biasing network. Due to optimized combination of waveguide and PD design, even at high optical powers, a linear frequency response can be guaranteed. The integrated 50 **Ω** termination allows an excellent match of the electrical output signal. Tailored configurations are available, such as BPDV dual pair -and quad sets, including connector customization and fiber matching to enable coherent detection.

ORDERING INFORMATION

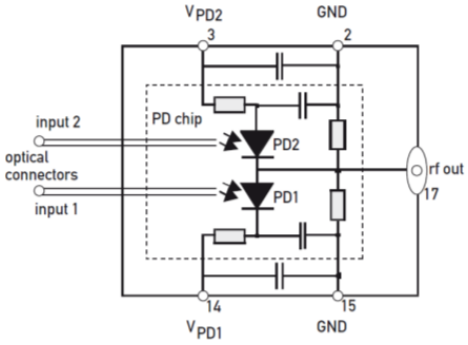
BPDV3120Rx-Vy-zz

Rx:	R	= single balanced detector
	RM	= dual pair of balanced detectors
	RQ	= quad set of balanced detectors
Vy:	VF	= female V® connector (standard)
	VM	= male V® connector
zz:	FP	= FC/PC connector (standard)
		Customized configurations upon request

I. Pin Description

# Pin	Symbol	Description
3	V_{PD2}	PD2 supply input (Typ.= –2.8V)
2/15	GND	ground= case ground
14	V_{PD1}	PD1 supply input (Typ.= +2.8V)
17	rf out	RF output V® connector

II. Block Diagram



III. Absolute Maximum Ratings

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photodiode Bias Voltage	V_{PD1}		0		4	V
	V_{PD2}		-4.0		0	V
Maximum Average Optical Input Power	P_{opt}	NRZ, per channel			16	dBm
Maximum Output Peak Voltage	$V_{Peak, PD1}$				+1.5	V
	$V_{Peak, PD2}$				-1.5	V
Electro Static Discharge (ESD)	V_{ESD}	C= 100 pF, R= 1.5 kΩ HBM	-250		+250	V
Fiber Bend Radius			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

IV. Environmental Conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Case Temperature	T_{Case}		0		75	°C
Relative Humidity	RH	non condensing	5		85	%
Storage Temperature	T_{sto}		-40		85	°C

V. Operating Conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Average Optical Input Power Range	P_{OPT}	for each diode			10	dBm
Wavelength Range	λ		1480	1550	1620	nm
Photodiode Bias Voltage	V_{PD1}		+2.5	+3.3	+3.8	V
	V_{PD2}		-3.8	-3.3	-2.5	V

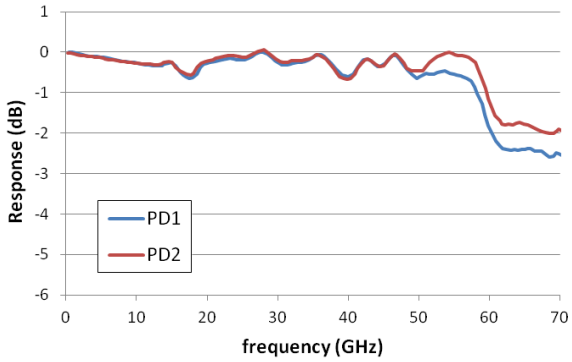
VI. Electro-Optical Specifications[1]

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photodiode DC Responsivity	R	optimum polarization	0.45			A/W
Imbalance of Responsivity	Imb	Imb= $\lvert 10*\log10(R_{PD1}/R_{PD2}) \rvert$		0.15	0.5	dB
Polarization Dependent Loss	PDL			0.4		dB
Photodiode Dark Current	I_{dark}			5	200	nA
Optical Return Loss	ORL		27			dB
Pulse Width		measured with Tektronix oscilloscope 50 GHz sampling head		11	12	ps
3dB Cut-off Frequency	f_{3dB}		65	70		GHz
RF Common Mode Rejection Ratio	CMRR	CMRR= $20*\log10\lvert (S21-S31)/(S21+S31) \rvert$		15		dB
Output Reflection Coefficient	S22	0…15 GHz		-15	-10	dB
		15…30 GHz		-10	-7	
		30…67 GHz		-2.6	-1.5	
Skew					2	ps
Skew (Inter Detector Module)		RM & RQ version			10	ps

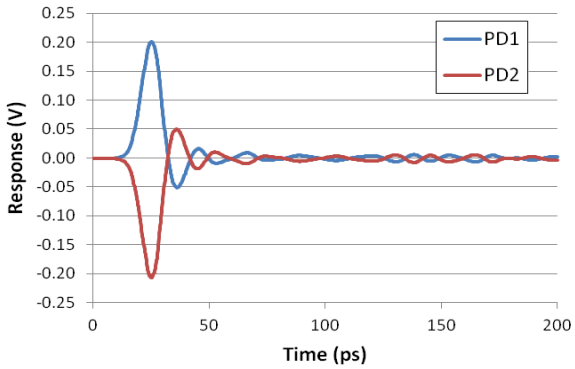
Notes:
1. λ = 1550 nm, V_{PD} = ± 2.8 V, T = 25°C, P_{OPT} = +3dBm

VII. Typical Performance Curves

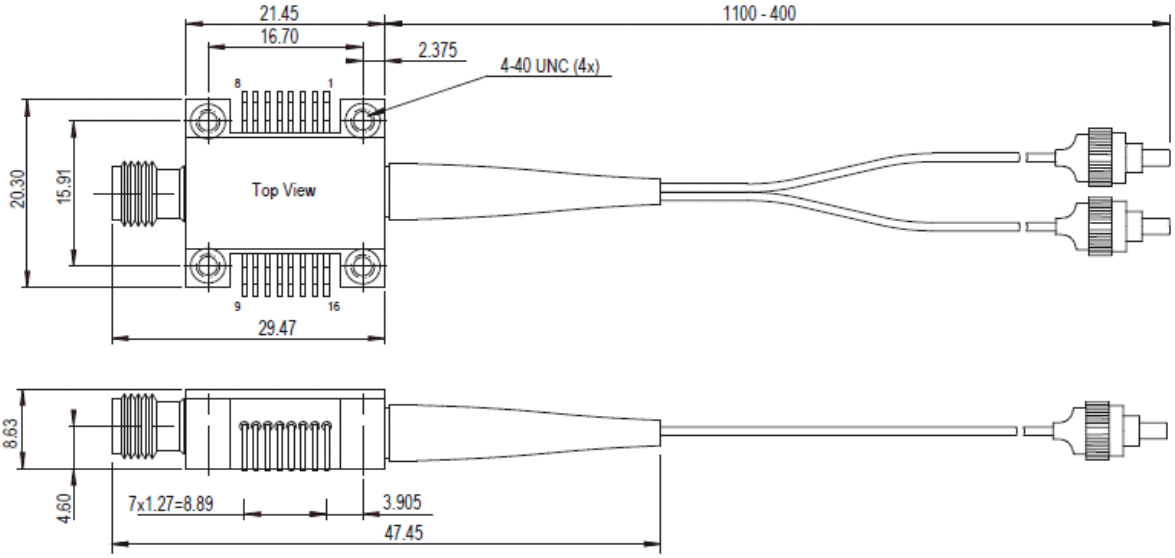
Frequency Response



Pulse Response



VIII. Mechanical Specifications

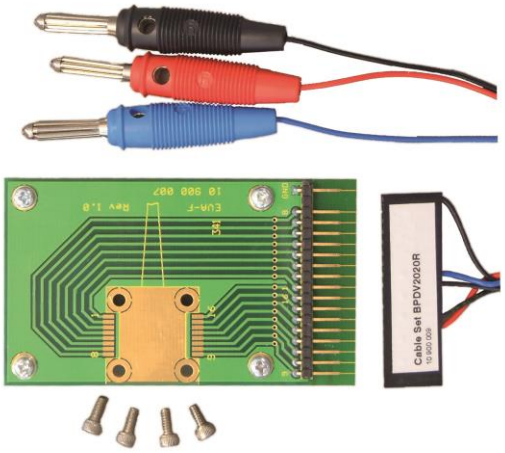


All Dimensions in mm

IX. Accessories

Evaluation Kit

The kit serves as easy-to-use utility to characterize the balanced photodetector under laboratory conditions and contents of a printed circuit board (PCB), four screws to establish removable connectivity between photodetector and board, as one DC cable to ensure the photodiode bias voltage.



ORDERING INFORMATION

EVA-BPDV

Evaluation board for all balanced detectors; includes 1x PCB, 1x DC cable set and 4x socket head screws 4-40 UNC

Photodetector Power Supply

We recommend usage of our individually accessible photodetector power supply (PPS), in particular for optimized performance at high optical input levels. As portable device it provides stable biasing voltage supply and a front display for review on photocurrent.

ORDERING INFORMATION

PPS-03-B

Photodetector power supply for all balanced detectors; includes 2x PPS, 1x cable-set B-type. The PPS is compatible with EVA-board (specified scheme applicable to RM & RQ version). PPS units include 2x 1.5V batteries

X. 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.

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