

Preliminary Product Specification

70GHz Dual Window Balanced Photodetector

BPDV3320R

PRODUCT FEATURES

- 70GHz typical bandwidth
- Unsurpassed high-power capability
- Detection of 64Gbaud x-QAM signals
- Support of 1310nm and 1550nm
- Unique on-chip biasing network

APPLICATIONS

- Transmission systems up to 1Tb/s
- Coherent Test- & Measurement systems
- Research- and Development systems
- Microwave photonics



Picture shows product package but may differ in details such as the label

The balanced photodetector consists of two optimized 70GHz, 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 at both 1310nm as well as 1550nm. The integrated 50Ω 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. Tailored configurations are available, such as BPDV dual pair -and quad sets, including connector customization and fiber matching to enable coherent detection.

PRODUCT SELECTION

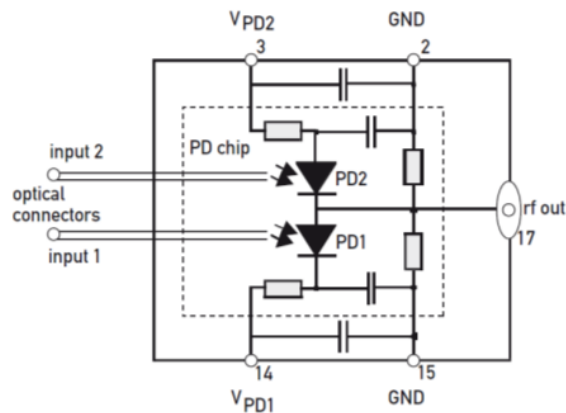
BPDV3320Rx-Vy-zz

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|-----|----|--|
| 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) |
- Other available choices are: FA-FC/APC

I. Pin Descriptions

# Pin	Symbol	Description
3	VPD2	PD2 supply input
2/15	GND	ground= case ground
14	VPD1	PD1 supply input

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_{PD1}	—	0		4.0	V
	V_{PD2}		-4.0		0	
Maximum Average Optical Input Power	P_{opt}	40Gb/s NRZ, per channel			16	dBm
Maximum Average Optical Input Power	P_{opt}	Pulse <25ps or RZ at 40Gb/s, per channel			19	dBm
Electro Static Discharge (ESD)	V_{ESD}	C= 100pF, R= 1.5k Ω HBM	-250		+250	V
Fiber Bend Radius			16			mm

IV. Environmental Specifications

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

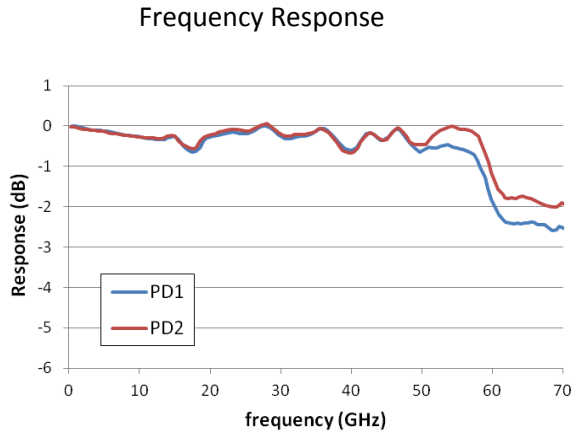
V. Operating Conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Wavelength Range	λ		1300 1525	1310 1550	1330 1575	nm
Average Optical Input Power Range	P_{OPT}	for each diode	-20		10	dBm
Photodiode Bias Voltage	V_{PD1}		2.0	2.8	3.3	V
	V_{PD2}		-3.3	-2.8	-2.0	V

VI. Electro-Optical Specifications¹

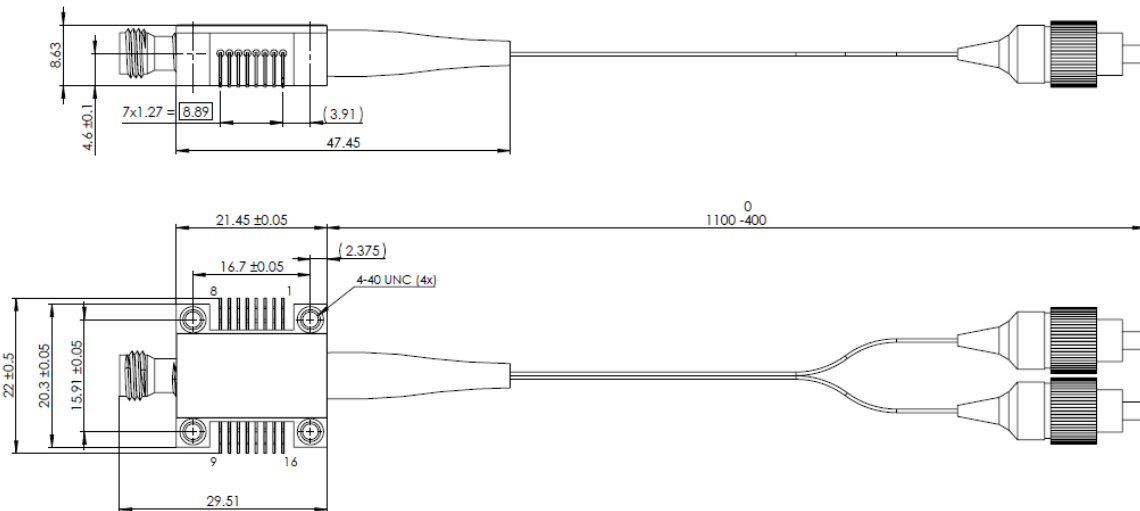
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photodiode DC Responsivity	R	1310nm 1550nm optimum polarization	0.35 0.45	0.45 0.6		A/W
Imbalance of Responsivity	I_{mb}	$I_{mb} = 10 * \log_{10}(R_{PD1}/R_{PD2}) $		0.15	0.5	dB
Polarization Dependent Loss	PDL	1310nm 1550nm		0.6 0.4	0.9 0.8	dB
Photodiode Dark Current	I_{dark}			5	200	nA
Optical Return Loss	ORL	1550nm	27			dB
3dB Cut-off Frequency ²	f_{3dB}		59	69		GHz
RF Common Mode Rejection Ratio	CMRR	$CMRR = 20 * \log_{10} (S_{21} - S_{31}) / (S_{21} + S_{31}) $		15		dB
Output Reflection Coefficient	S_{22}	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. $\lambda = 1550\text{nm}$, $V_{PD} = \pm 2.8\text{V}$, $T = 25^\circ\text{C}$, $P_{OPT} = -3\text{dBm}$						
2. Measured using Agilent 86030A 67GHz Lightwave component analyzer						

VII. Typical Performance



VIII. Mechanical Specifications

All Dimensions in mm

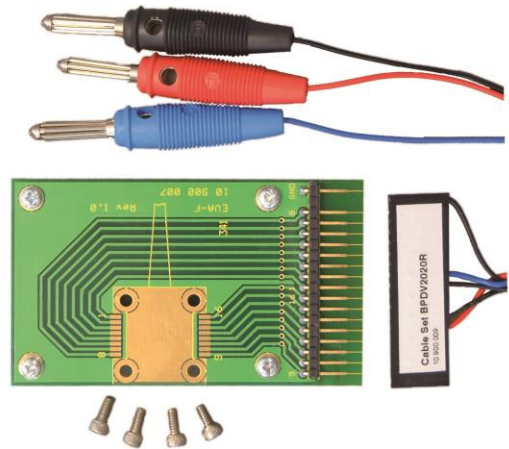


Parameter	Description
Signal fiber PD1	SMF 28, 900µm loose buffer, yellow, label "1"
Signal fiber PD2	SMF 28, 900µm loose buffer, yellow, label "2"

IX. Accessories

A. 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

B. 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

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
A01	2019	Initial draft
A02	2020-03-05	Transition to II-VI template, added optical specifications