

Product Specification

43 GHz Balanced Photodetector

BPDV21x0R

PRODUCT FEATURES

- 43 GHz bandwidth with flat response
- Excellent pulse behavior
- Unsurpassed high-power handling capability
- Integrated 50 Ω termination
- Unique on-chip integrated bias network



APPLICATIONS

- 40/43 Gb/s DQPSK optical communication systems
- Advanced Test & Measurement systems
- High speed optical sensing

The balanced photodetector consists of two optimized, 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. Customized configurations are available, such as BPDV dual pair -and quad sets, including fiber matching and connector customization.

ORDERING INFORMATION

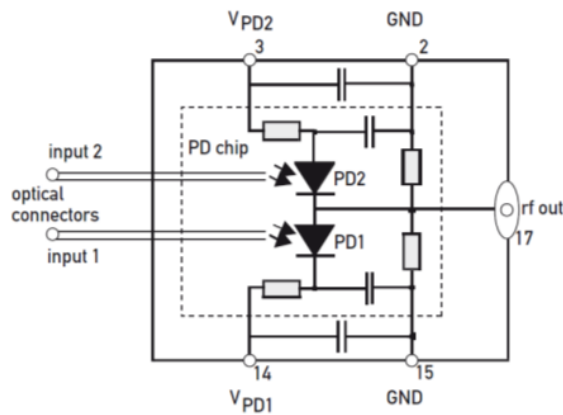
BPDV21x0Rv-Vy-zz

x:	2	= standard PDL
	5	= low PDL
Rv:	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
2/15	GND	ground= case ground
14	V_{PD1}	PD1 supply input
17	rf out	RF output V ^o 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 this product.

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

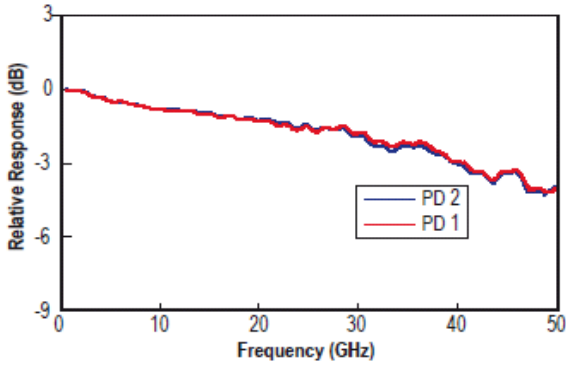
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Average Optical Input Power Range	P_{OPT}	for each diode			10	dBm
Wavelength Range	λ		1480	1550	1620	nm
Photodiode Bias Voltage	V_{PD1}		+2.8	+3.3	+3.8	V
	V_{PD2}		-3.8	-3.3	-2.8	V

VI. Electro-Optical Specifications¹

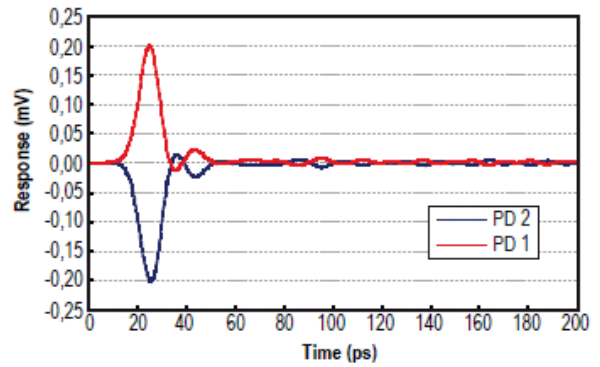
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photodiode DC Responsivity	R	optimum polarization	0.45			A/W
Imbalance of Responsivity	I_{mb}	$I_{mb} = 10 \cdot \log_{10}(R_{PD1}/R_{PD2}) $		0.15	0.5	dB
Polarization Dependent Loss	PDL	BPDV2120		0.4	0.8	dB
		BPDV2150		0.2	0.3	dB
Photodiode Dark Current	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}		37	42		GHz
RF Common Mode Rejection Ratio	CMRR	$CMRR = 20 \cdot \log_{10} (S_{21} - S_{31}) / (S_{21} + S_{31}) $		15		dB
Output Reflection Coefficient	S22	0...50 GHz		-5	-3	dB
Skew					2	ps
Skew (Inter Detector Module)		RM & RQ version			10	ps
Notes:						
1. $\lambda = 1550$ nm, $V_{PD} = \pm 3.3$ V, $T = 25^{\circ}\text{C}$, $P_{OPT} = +3\text{dBm}$						

VII. Typical Performance Curves

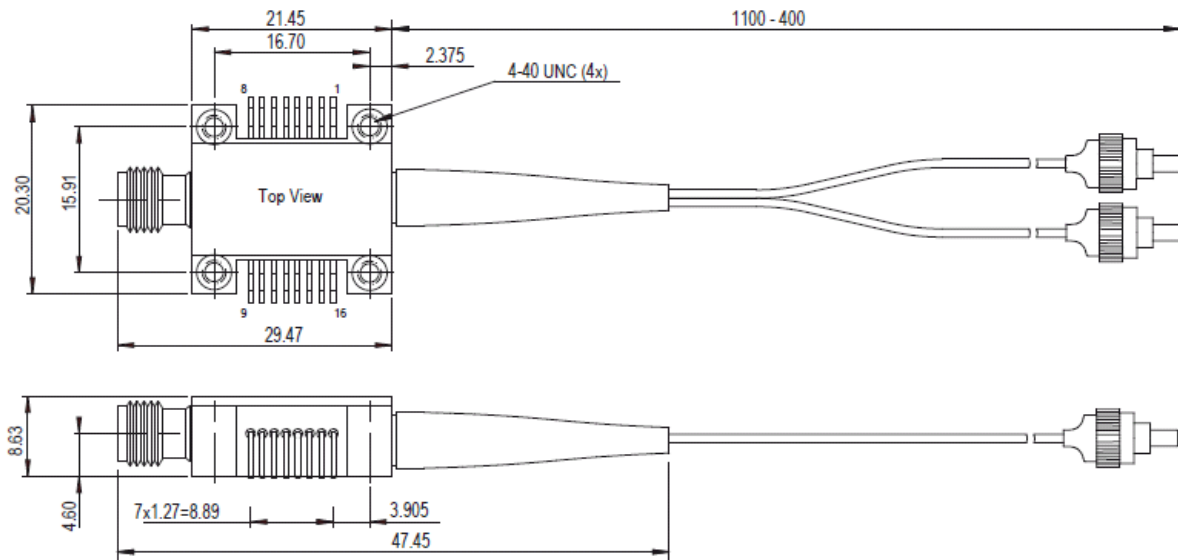
Frequency Response



Pulse Response



VIII. Mechanical Specifications

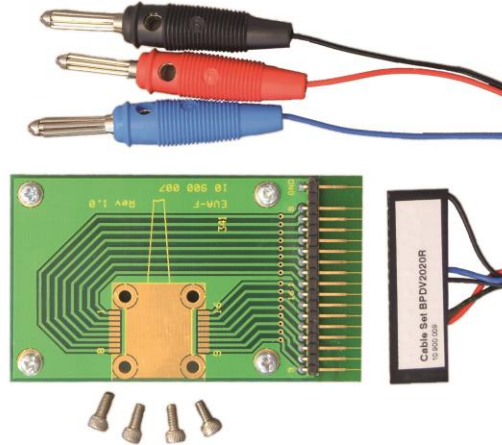


All Dimensions in mm

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	<ul style="list-style-type: none">• Document created
A2	10/12/2014	<ul style="list-style-type: none">• Adjusted information on photodiode bias voltage

Notes

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