

Product Datasheet

70 GHz High Speed Photodetector

XPDV3x20R

PRODUCT FEATURES

- 70 GHz typical bandwidth with flat response
- High linearity
- C- band and dual window (O- /C- band) version
- Unique on-chip integrated bias network

APPLICATIONS

- Optical communications components
- Advanced component R&D
- Test and Measurement applications
- Microwave Photonics up to 60 GHz



Picture shows product example, actual product might differ

The XPDV3x20R comprises an optimized 70 GHz waveguide-integrated photodiode, which shows an extremely flat frequency response, both in power and in phase. COHERENT's on-chip integrated bias network with an optimized RF design ensures an undisturbed frequency response from DC to the 3 dB cut-off frequency and saves cost for an external bias tee. The hermetic module is especially designed for optimal RF performance; therefore, the pulse response reveals virtually no ringing. It is best suited for test and measurement or microwave photonics applications up to 60 GHz. A further advantage of the waveguide structure is the unbeatable high-power behavior. The photodetector shows a linear response up to an optical input power of 10 dBm. An output voltage swing of more than 0.5 V_{pp} can be achieved for short pulses without any degradation of the pulse response.

Besides the standard version optimized for C-band support a dual window version supporting O- and C-band is also offered.

PRODUCT SELECTION

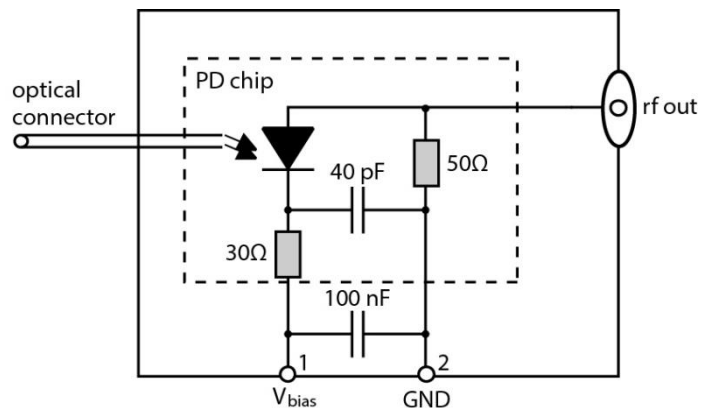
XPDV3x20R-Vy-zz

x:	1	= C-band version
	3	= Dual window O- /C- band
Vy:	VF	= Female V [®] connector
	VM	= Male V [®] connector
zz:	FP	= FC/PC connector (standard)
	FA	= FC/APC connector
Other customized configurations on request		

I. Pin Descriptions

# Pin	Symbol	Description
1	V_{PD}	PD supply voltage
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}		0		4.0	V
Average Optical Input Power	P_{OPT_avg}	Continuous wave (cw)			16	dBm
Peak Optical Input Power	P_{PEAK}	Pulse of <25 ps or 40 Gb/s RZ			19	dBm
Electrostatic Discharge (ESD)	V_{ESD}	C= 100 pF, R= 1.5 kΩ 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	noncondensing	5		85	%
Storage Temperature	T_{STORE}		-40		85	°C

V. Operating Conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Wavelength Range	λ	O-band	1300	1310	1330	nm
		C-band	1525	1550	1575	
Average Optical Input Power	P_{OPT_avg}				10	dBm
Photodiode Supply Voltage	V_{PD}		2.0	2.8	3.3	V

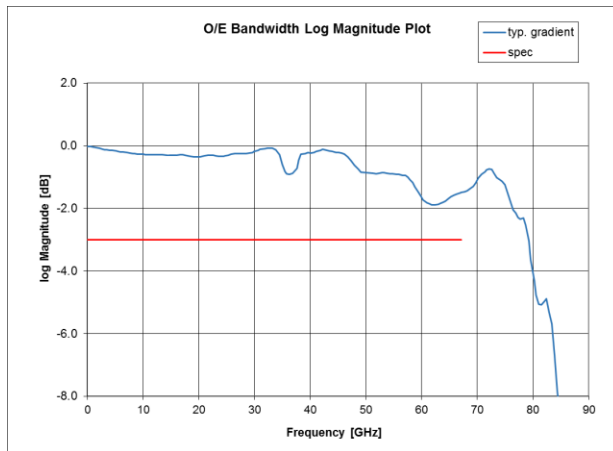
VI. Electro-Optical Specifications¹⁾

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photodiode DC Responsivity ²⁾	R	XPDV3120R, 1550 nm	0.5	0.65		A/W
		XPDV3320R, 1550 nm	0.45	0.65		
		XPDV3320R, 1310 nm	0.3	0.45		
Polarization-Dependent Loss	PDL	XPDV3120R, 1550 nm		0.3	0.5	dB
		XPDV3320R, 1550 nm		0.3	0.6	
		XPDV3320R, 1310nm,		0.4	0.7	
Photodiode Dark Current	I_{DARK}			5	200	nA
Optical Return Loss	ORL		27			dB
3 dB Cut-off Frequency ³⁾	f_{3dB}		65	70		GHz
Output Reflection Coefficient ⁴⁾	S_{22}	0.05 – 30 GHz		-12	-8	dB
		30 – 50 GHz		-10	-6	
		50 – 67 GHz		-8	-4	

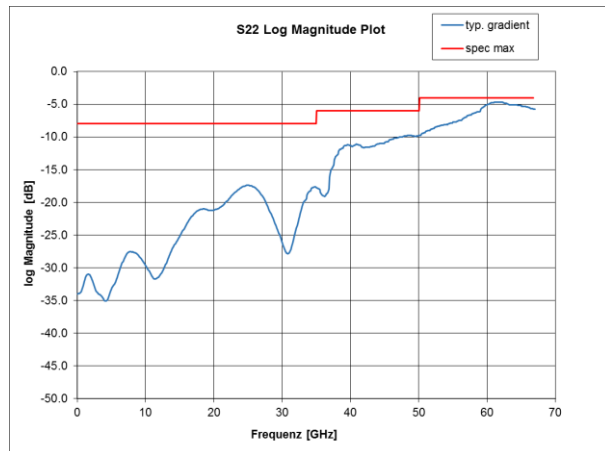
Notes:

- $\lambda = 1550$ (1310) nm, $V_{PD} = 3.3$ V, $T_{CASE} = 25$ °C, $P_{OPT_avg} = -3$ dBm
- Optimum polarization
- Measured using heterodyne measurement system
- Measured using Agilent N4373D 67 GHz Lightwave component analyzer

VII. Typical Performance



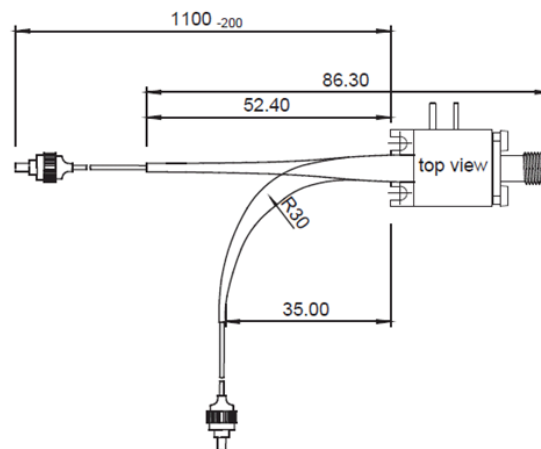
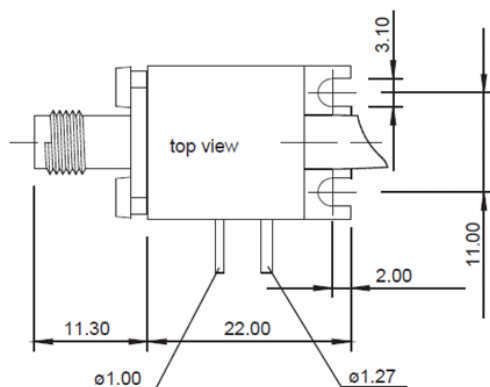
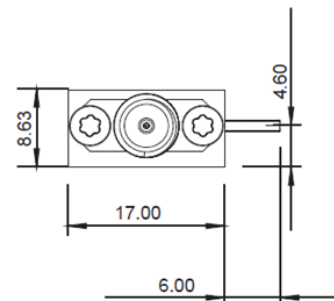
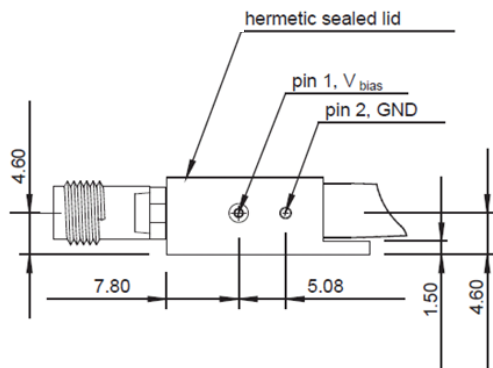
Typical s21 Frequency Response



Typical s22 Backreflection

VIII. Mechanical Specifications

All dimensions in mm



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

IX. Accessories

Accessories serving easy use of the product are being offered. Details can be found in separate datasheets.

A. Photodetector Power Supply

PPS-03-X

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

- Any trademarks used in this document are properties of their respective owners.
- COHERENT Incorporated reserves the right to make changes without notice.

Revision History

Revision	Date	Description
A07	Jan 2023	Transfer to COHERENT template, inclusion of dual window version
A08	Feb 2023	Updated branded product picture