

## DRAFT Product Datasheet

### 100 GHz Photodetector with PPS

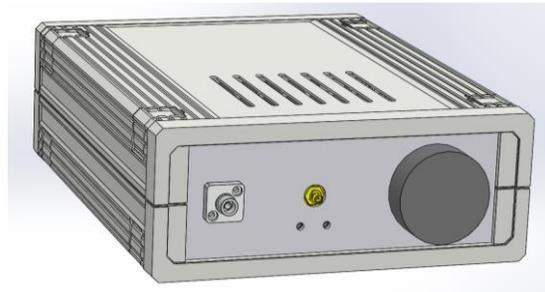
#### TXPDV4121R-WF-FA

#### PRODUCT FEATURES

- Robust Lab tool
- Integrated power supply and photodetector
- 100 GHz typical 3 dB bandwidth
- Flat frequency response
- Battery driven for low noise operation
- High linearity
- Well matched 50  $\Omega$  output



Picture shows product example, actual product might differ



Backside: Optical input, RF output, battery case (left to right)

#### APPLICATIONS

- Optical communications research
- High speed Lightwave characterization
- Test and Measurement applications
- Microwave Photonics

The TXPDV4121R-WF-FA comprises an optimized 100 GHz waveguide-integrated photodiode, which shows an extremely flat frequency response in both power and phase. The battery driven tool offers an undisturbed frequency response from DC to the 3 dB cut-off frequency and doesn't require any additional power supply and is especially designed for optimal RF performance; therefore, the pulse response reveals virtually no ringing. 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 Vpp can be achieved for short pulses without any degradation of the pulse response. No additional impairments on RF line due to direct RF connection to photodetector. Each photodetector module is characterized in the frequency domain using a heterodyne technique.

#### PRODUCT SELECTION

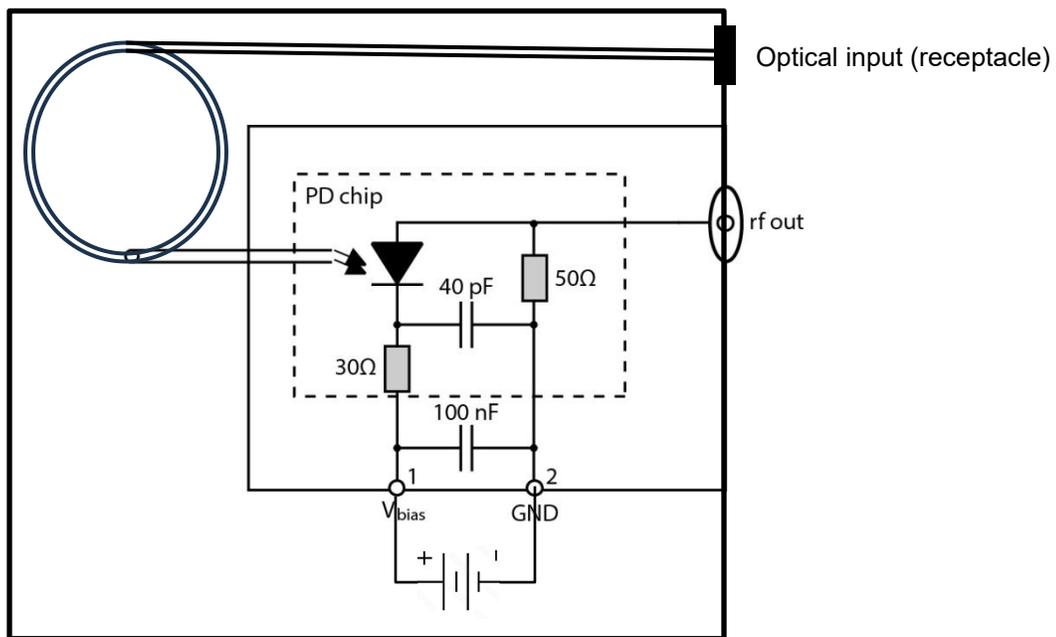
**TXPDV4121R-WF-FA-WF**

WF = female 1mm RF connector  
FA = FC/APC connector

### I. Contact Descriptions

Contact	Symbol	Description
Optical connector	n/a	FC/APC receptacle
RF connector	n/a	1mm female RF connector

### 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
Average Optical Input Power	P <sub>OPT_avg</sub>	Continuous wave (cw)			16	dBm
Peak Optical Input Power	P <sub>PEAK</sub>	Pulse of <25 ps or 40 Gb/s RZ			19	dBm
Electrostatic Discharge (ESD)	V <sub>ESD</sub>	C= 100 pF, R= 1.5 kΩ HBM	-250		+250	V

#### IV. Environmental Specifications

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature	$T_{CASE}$		5		65	°C
Relative Humidity	RH	Non-condensing	5		85	%
Storage Temperature	$T_{STORE}$		-40		85	°C

#### V. Operating Conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Wavelength Range	$\lambda$	C-band	1525		1575	nm
Average Optical Input Power	$P_{OPT\_avg}$				10	dBm
Photodiode Supply Voltage	$V_{PD}$	Provided internally by two batteries		2.0		V

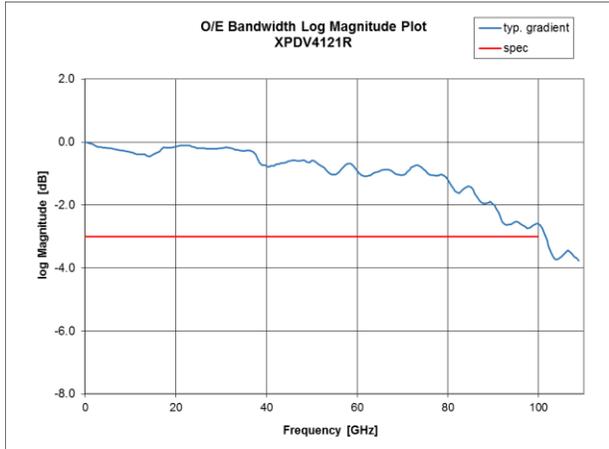
#### VI. Electro-Optical Specifications<sup>1)</sup>

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Photodiode DC Responsivity <sup>2)</sup>	R		0.4	0.6		A/W
Polarization-Dependent Loss	PDL			0.3	0.6	dB
Photodiode Dark Current	$I_{DARK}$			5	200	nA
Optical Return Loss	ORL		27			dB
3 dB Cut-off Frequency <sup>3)</sup>	$f_{3dB}$	XPDV4121R	96	100		GHz
Output Reflection Coefficient <sup>4)</sup>	$S_{22}$	0.05 – 35 GHz		-15	-12	dB
		35 – 50 GHz		-10	-5	
		50 – 67 GHz		-5	-3	

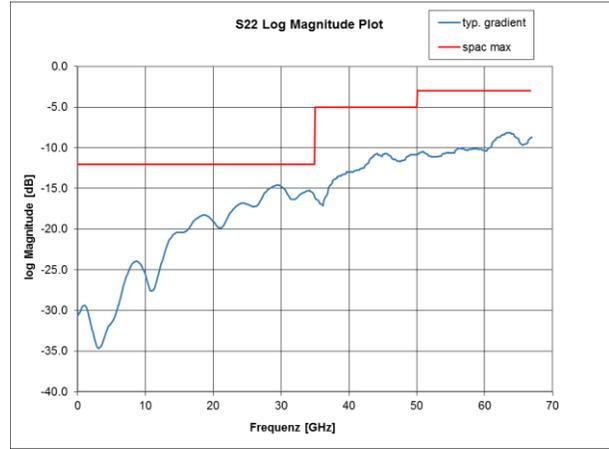
Notes (Photodetector tested as component):

- $\lambda = 1550$  nm,  $V_{PD} = 2.0$  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  $s_{21}$  XPDV4121R (Heterodyne measurement)



Typical  $s_{22}$  XPDV412xR

### VIII. Mechanical and Other Specifications

Parameter	Conditions	Value	Unit
Current display ranges	0...1.999	2	mA
	0...19.99	20	mA
Dimensions		158 x 65 x 220	mm <sup>2</sup>
Weight	<b>Incl. batteries</b>	660	g
Batteries	(non-rechargeable), type R14 (IEC), C-cell (USA) or 14A (ANSI, NEDA), alkaline battery, typical capacity 8000mAh	2x1.5V	pcs

Parameter	Description
Internal signal fiber	Standard SMF-28

#### Product Handling

Please read supporting documentation such as the Manual carefully before using the product. Damages because of mishandling are not covered by the 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
A00	2026-01	Initial version