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PD-20







20 GHz Linear InGaAs PIN Photodetector

The Optilab PD-20 is a highly linear, 20 GHz bandwidth InGaAs PIN photodetector that is ideal for use in O/E front-ends requiring wide band frequency response. The coplanar waveguide photodiode design optimizes speed and sensitivity for the 1260 nm through 1610 nm wavelength range, and assures a 20 GHz frequency response necessary for digital and analog applications. The front-illuminated mesa-structured PIN design allows a high input power level of up to 40 mW. The PD-20 is available in a standard 2-pin package with SMA RF connector output for ease of assembly, and can be ordered with or without the external protective housing. Contact Optilab for more information.

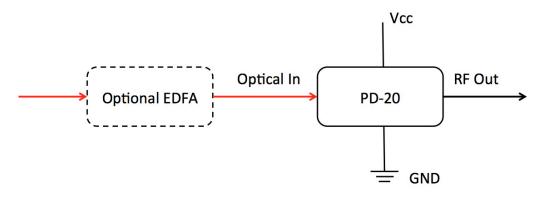
Features

- ➤ Bandwidth 60 KHz to 20 GHz
- ➤ DC to 20 GHz, DC version
- ➤ Highly linear to 40 mW+ input power
- ➤ Operating temperature from -30 °C to +60 °C TQ Version: -55 °C to +70 °C
- ➤ High current handling up to 35 mA
- ➤ Flat frequency response, ±1 dB
- ➤ Useful spectral range 850 nm -1650 nm
- ➤ Hermetically sealed

Applications

- > 20 GHz Analog RF over Fiber
- > Optically amplified photonics link
- > RZ and NRZ up to 20 Gb/s
- ➤ Coherent lightwave systems
- ➤ Front-End O/E converter for test instruments

Functional Diagram



20 GHz Linear InGaAs PIN Photodetector

OPTIONS

PD-20-X-YY

Housing Type:
A, No Housing, default
B, Legacy Housing
C, External Housing

YY DC, DC Version

ZZ TQ: Temperature Qualified

TECHNICAL INFO

For technical info and support:

sales@optilab.com

www.optilab.com

WEB ORDER

To order, please visit OEQuest.com.



Optilab Advantage

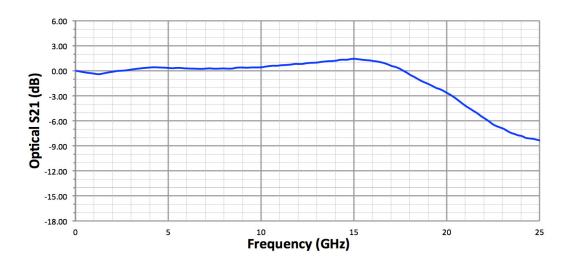
- ➤ Innovation
- ➤ Performance
- ➤ Quality
- ➤ Customization
- ➤ Warranty

Optimized Operating Wavelength 1260 nm to 1650 nm Useful Operating Wavelength 850 nm to 1650 nm Optical Input Level 40 mW max. S21 3 dB Bandwidth 17 GHz min., 19 GHz typ. \$22 Characteristics < -10 dB @ 12 GHz; \$1 0 dB @ 12 GHz; < -6 dB @ 20 GHz Low Frequency Cut off 60 KHz; DC for DC version Repsonsitivity 0.85 A/W @ 1550 nm typ. 0,40 A/W @ 850 nm typ. 0.40 A/W @ 850 nm typ. Optical Return Loss -30.00 dB typ. Optical PDL @ 1550 nm 0.05 dB max. Optical Fiber SMF-28 Bias Voltage 5 V typ. Impedance 50 Ω Coupling AC-Coupled; DC Coupled is available Analog Applications Ripple over any 1 GHz ±1.0 dB max. Group Delay < 7.0 ps 2nd Harmonics Distortion -75.0 dBc max. Link Performance with LT-20 SFDR SFDR 113 dB Hz²/³ Link Loss -25 dB @ 10 dBm Optical Input Mechanical Specifications -25 dB @ 10 dBm Optical Input Operating Temperature 5c ° C to +75 ° C	General Specifications	
Useful Operating Wavelength Optical Input Level 40 mW max. 521 3 dB Bandwidth 17 GHz min., 19 GHz typ. 522 Characteristics - 10 dB @ 12 GHz; - 6 dB @ 20 GHz - 6 dB @ 20 GHz Low Frequency Cut off 60 KHz; DC for DC version Repsonsitivity 0.46 A/W @ 850 nm typ. 0.40 A/W @ 850 nm typ. 0.40 A/W @ 850 nm typ. Dark Current @ 25° C, 5 V 10 nA typ., 100 nA max. Optical Return Loss -30.00 dB typ. Optical PDL @ 1550 nm Optical Fiber SMF-28 Bias Voltage Impedance 50 Ω Coupling AC-Coupled; DC Coupled is available Analog Applications Ripple over any 1 GHz 41.0 dB max. Group Delay -70.0 dBc max. 3rd Harmonics Distortion -75.0 dBc max. Link Performance with LT-20 SFDR 113 dB Hz²²/3 Link Loss -25 dB @ 10 dBm Optical Input Mechanical Specifications Operating Temperature Standard: -30 °C to +60 °C; TQ Version: -55 °C to +70 °C Storage Temperature -65 °C to +75 °C Operating Humidity 85% Package type 2-pin module with SMA Female RF connector Dimensions 30 mm x 20 mm x 14 mm Fiber Connector FC/APC Optical Fiber SMF-28 with 900 mm Tube Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current 35 mA Optical Input Power	•	1260 nm to 1610 nm
Optical Input Level 40 mW max. 521 3 dB Bandwidth 17 GHz min., 19 GHz typ. \$22 Characteristics < -10 dB @ 12 GHz;	, , ,	
S22 Characteristics C - 10 dB @ 12 GHz; C - 6 dB @ 20 GHz	1 0	40 mW max.
Comparison Co	S21 3 dB Bandwidth	17 GHz min., 19 GHz typ.
Repsonsitivity 0.85 A/W @ 1550 nm typ. 0.40 A/W @ 850 nm typ. Dark Current @ 25° C, 5 V 10 nA typ., 100 nA max. Optical Return Loss -30.00 dB typ. Optical PDL @ 1550 nm 0.05 dB max. Optical Fiber SMF-28 Bias Voltage 5 V typ. Impedance Coupling AC-Coupled; DC Coupled is available Analog Applications Ripple over any 1 GHz 41.0 dB max. Group Delay 70.0 dBc max. 3rd Harmonics Distortion -75.0 dBc max. Link Performance with LT-20 SFDR 113 dB Hz²/3 Link Loss -25 dB @ 10 dBm Optical Input Mechanical Specifications Operating Temperature Standard: -30 °C to +60 °C; TQ Version: -55 °C to +70 °C Storage Temperature Operating Humidity 85% Package type Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber SMF-28 with 900 mm Tube Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current Optical Input Power	S22 Characteristics	
Dark Current @ 25° C, 5 V	Low Frequency Cut off	60 KHz; DC for DC version
Optical Return Loss	Repsonsitivity	
Optical PDL @ 1550 nm Optical Fiber Sias Voltage Sias Voltage Impedance So 0 Coupling AC-Coupled; DC Coupled is available Analog Applications Ripple over any 1 GHz Aron Delay A	Dark Current @ 25° C, 5 V	10 nA typ., 100 nA max.
Optical Fiber SMF-28 Bias Voltage 50 y typ. Impedance 50 \(\text{D} \) Coupling AC-Coupled; DC Coupled is available Analog Applications Ripple over any 1 GHz ±1.0 dB max. Group Delay <7.0 ps 2nd Harmonics Distortion -70.0 dBc max. 3rd Harmonics Distortion -75.0 dBc max. Link Performance with LT-20 SFDR 113 dB Hz ^{2/3} Link Loss -25 dB @ 10 dBm Optical Input Mechanical Specifications Operating Temperature Standard: -30 °C to +60 °C; TQ Version: -55 °C to +70 °C Storage Temperature -65 °C to +75 °C Operating Humidity 85% Package type 2-pin module with SMA Female RF connector Dimensions 30 mm x 20 mm x 14 mm Fiber Connector FC/APC Optical Fiber SMF-28 with 900 mm Tube Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current 35 mA Optical Input Power 40 mW	Optical Return Loss	-30.00 dB typ.
Bias Voltage5 V typ.Impedance50 ΩCouplingAC-Coupled; DC Coupled is availableAnalog ApplicationsFipple over any 1 GHzRipple over any 1 GHz±1.0 dB max.Group Delay< 7.0 ps	Optical PDL @ 1550 nm	0.05 dB max.
Impedance 50 Ω Coupling AC-Coupled; DC Coupled is available Analog Applications **1.0 dB max. Ripple over any 1 GHz ±1.0 dB max. Group Delay < 7.0 ps	Optical Fiber	SMF-28
Coupling AC-Coupled; DC Coupled is available Analog Applications Ripple over any 1 GHz Group Delay 2 7.0 ps 2nd Harmonics Distortion 3rd Harmonics Distortion Link Performance with LT-20 SFDR 113 dB Hz²/3 Link Loss -25 dB @ 10 dBm Optical Input Mechanical Specifications Operating Temperature Standard: -30 °C to +60 °C; TQ Version: -55 °C to +70 °C Storage Temperature Operating Humidity Package type Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current 35 mA Optical Input Power 40 mW	Bias Voltage	5 V typ.
Analog Applications Ripple over any 1 GHz	Impedance	50 Ω
Ripple over any 1 GHz	Coupling	
Group Delay 2nd Harmonics Distortion 3rd Harmonics Distortion -75.0 dBc max. Link Performance with LT-20 SFDR 113 dB Hz²/3 Link Loss -25 dB @ 10 dBm Optical Input Mechanical Specifications Operating Temperature Standard: -30 °C to +60 °C; TQ Version: -55 °C to +70 °C Storage Temperature Operating Humidity Package type 2-pin module with SMA Female RF connector Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current 35 mA Optical Input Power 40 mW	Analog Applications	
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3rd Harmonics Distortion Link Performance with LT-20 SFDR 113 dB Hz ^{2/3} Link Loss -25 dB @ 10 dBm Optical Input Mechanical Specifications Operating Temperature Standard: -30 °C to +60 °C; TQ Version: -55 °C to +70 °C Storage Temperature -65 °C to +75 °C Operating Humidity 85% Package type 2-pin module with SMA Female RF connector Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current 35 mA Optical Input Power 40 mW	Group Delay	< 7.0 ps
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SFDR Link Loss -25 dB @ 10 dBm Optical Input Mechanical Specifications Operating Temperature Standard: -30 °C to +60 °C; TQ Version: -55 °C to +70 °C Storage Temperature -65 °C to +75 °C Operating Humidity 85% Package type 2-pin module with SMA Female RF connector Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber SMF-28 with 900 mm Tube Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current Optical Input Power 40 mW	3rd Harmonics Distortion	-75.0 dBc max.
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Mechanical Specifications Operating Temperature Standard: -30 °C to +60 °C; TQ Version: -55 °C to +70 °C Storage Temperature -65 °C to +75 °C Operating Humidity 85% Package type 2-pin module with SMA Female RF connector Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber SMF-28 with 900 mm Tube Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current Optical Input Power 40 mW	SFDR	113 dB Hz ^{2/3}
Operating Temperature Standard: -30 °C to +60 °C; TQ Version: -55 °C to +70 °C Storage Temperature -65 °C to +75 °C Operating Humidity 85% Package type 2-pin module with SMA Female RF connector Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber SMF-28 with 900 mm Tube Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current Optical Input Power 40 mW	Link Loss	-25 dB @ 10 dBm Optical Input
Operating Temperature TQ Version: -55 °C to +70 °C Storage Temperature -65 °C to +75 °C Operating Humidity 85% Package type Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber Absolute Maximum Ratings PIN Bias Voltage Forward Current Optical Input Power TQ Version: -55 °C to +70 °C 65 °C to +75 °C 85% 2-pin module with SMA Female RF connector SMF-28 with 900 mm x 14 mm Fiber Connector FC/APC SMF-28 with 900 mm Tube 40 mW	Mechanical Specifications	
Operating Humidity Package type 2-pin module with SMA Female RF connector Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current Optical Input Power 85% 2-pin module with SMA Female RF connector SMF-28 with 900 mm x 14 mm FC/APC SMF-28 with 900 mm Tube 40 mW	Operating Temperature	
Package type 2-pin module with SMA Female RF connector Dimensions 30 mm x 20 mm x 14 mm Fiber Connector FC/APC Optical Fiber Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current Optical Input Power 2-pin module with SMA Female RF connector SMF-28 with 900 mm x 14 mm FC/APC SMF-28 with 900 mm Tube 40 mW	Storage Temperature	-65 °C to +75 °C
Dimensions 30 mm x 20 mm x 14 mm Fiber Connector Optical Fiber Absolute Maximum Ratings PIN Bias Voltage Forward Current Optical Input Power Connector FC/APC SMF-28 with 900 mm Tube +2.0 to +7 V 35 mA Optical Input Power	Operating Humidity	85%
Fiber Connector Optical Fiber SMF-28 with 900 mm Tube Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current Optical Input Power 40 mW	Package type	·
Optical Fiber SMF-28 with 900 mm Tube Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current 35 mA Optical Input Power 40 mW	Dimensions	30 mm x 20 mm x 14 mm
Absolute Maximum Ratings PIN Bias Voltage +2.0 to +7 V Forward Current 35 mA Optical Input Power 40 mW	Fiber Connector	FC/APC
PIN Bias Voltage +2.0 to +7 V Forward Current 35 mA Optical Input Power 40 mW	Optical Fiber	SMF-28 with 900 mm Tube
Forward Current 35 mA Optical Input Power 40 mW	Absolute Maximum Ratings	
Optical Input Power 40 mW	PIN Bias Voltage	+2.0 to +7 V
	Forward Current	35 mA
Lead Soldering Temp (10 s) 250 °C	Optical Input Power	40 mW
	Lead Soldering Temp (10 s)	250 °C



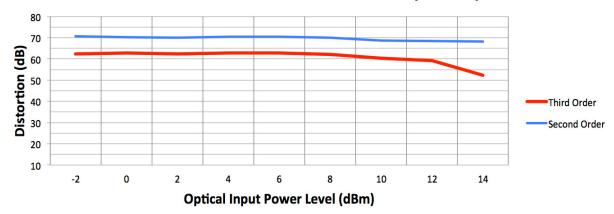
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S21 O/E Response¹

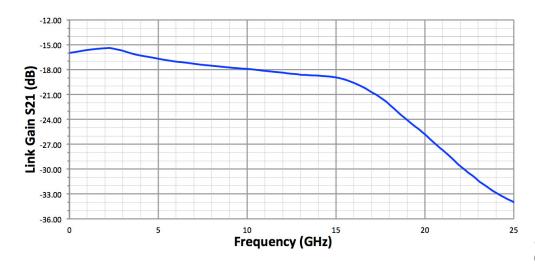


CSO, CTB Linearity Measurement²

Second and Third Order Distortion vs. Optical Input



Link Gain with IM-1550-20



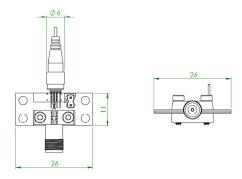
¹ Measured by Agilent 86030A Lightwave Component Analyzer



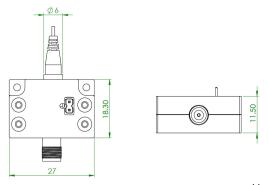
² 40 Channel Analog Channel Loading

20 GHz Linear InGaAs PIN Photodetector

PD-20-A Mechanical Drawing¹



PD-20-C Mechanical Drawing w/ External Housing²



- ¹ All measurements are in Metric
- ² External housing is for Mechanical Protection Only Legacy housing information available upon request

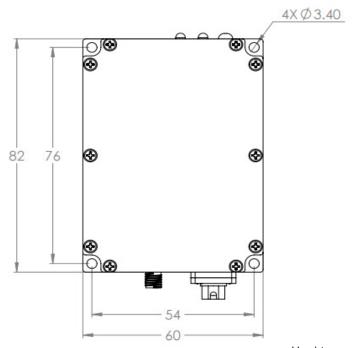
Unit: mm

PD-20-M: Module



Ready to use module

- ➤ Power and Remote Monitoring via USB Port
- > Status Monitoring: RS-232 (Standard)
- ➤ No TIA for Intrinsic Phase Linearity



Unit: mm

