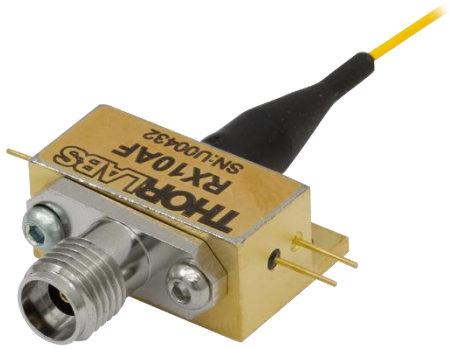
RX10 Series: 10 GHz Amplified Photoreceivers

Features

- 10 GHz Bandwidth
- PIN/TIA Configuration
- Single Mode or Multimode Models
  - **RX10AF**: Ø9 µm, SMF-28 Fiber, 780 – 1650 nm
  - **RX10BF**: Ø50 µm, OM4 Fiber, 750 – 1650 nm
  - **RX10CF**: Ø9 µm, SMF-28 Fiber, 700 – 870 nm
  - **RX10DF**: Ø50 µm, OM4 Fiber, 700 – 870 nm
- AC-Coupled, 500 mV Output Swing
- 50 Ω Reverse Termination



RX10AF

Applications

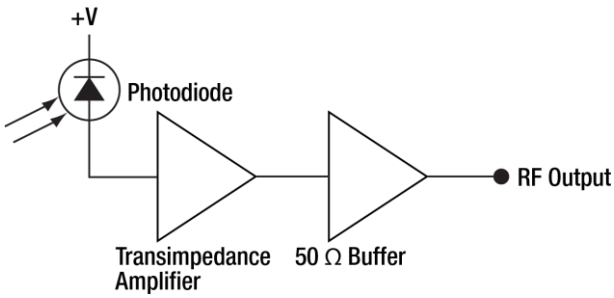
- Test and Measurement
- Instrument O-E Front End
- High-Speed Communications
- OEM Integration

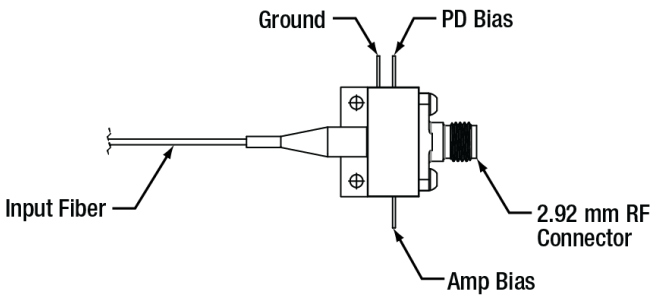
Description

The RX10 series are general-purpose, 10 GHz, medium gain, linear photoreceivers (photodiode + amplifier). The AC-coupled output is through a 2.92 mm coaxial connector (compatible with SMA). The compact, hermetic package provides independent 3.3 V bias pins for the photodiode and amplifier. Optical fiber input is coupled into the detector through an FC/PC narrow key (2.0 mm) connector. Custom units with FC/APC connectors are also available upon request.

- **RX10AF** RX10 Series Module with Single Mode Input Fiber, SMF-28, 780 – 1650 nm, Yellow Buffer, FC/PC
- **RX10BF** RX10 Series Module with Multimode Input Fiber, OM4, 750 – 1650 nm, Aqua Buffer, FC/PC
- **RX10CF** RX10 Series Module with Single Mode Input Fiber, SMF-28, 700 – 870 nm, Yellow Buffer, FC/PC
- **RX10DF** RX10 Series Module with Multimode Input Fiber, OM4, 700 – 870 nm, Aqua Buffer, FC/PC

Block Diagram & Pin-Out





Absolute Maximum Ratings

All specifications are at 25 °C and at 1550 nm (RX10AF and RX10BF) and 850 nm (RX10CF and RX10DF) unless noted.

Parameter	Min	Typical	Max	Unit	Note
Optical Input Power	-	-	6	dBm	-
Amplifier Bias Voltage	-0.5	-	5	V	-
Photodiode Bias Voltage	0	-	5	V	-
Fiber Bend Radius	15	-	-	mm	Breakage

Operating Conditions

Parameter	Min	Typical	Max	Unit	Note
Operating Temperature	0	-	70	°C	-
Relative Humidity	-	-	85	%	Non-Condensing
PD Bias Voltage	3.0	3.3	4.0	V	-
Optical Input Power		-	3 3 5 5	dBm	RX10AF RX10BF RX10CF RX10DF Average Power
Amplifier Bias Voltage	3.1	3.3	3.5	V	5 V Absolute Max
Amplifier Supply Current	39	45	71	mA	-
Output Load Impedance	-	50	-	Ω	-

SPECIFICATIONS

All specifications for RX10AF and RX10BF are at 25 °C, at 1550 nm, and into 50 Ω unless noted.
All specifications for RX10CF and RX10DF are at 25 °C, at 850 nm, and into 50 Ω unless noted.

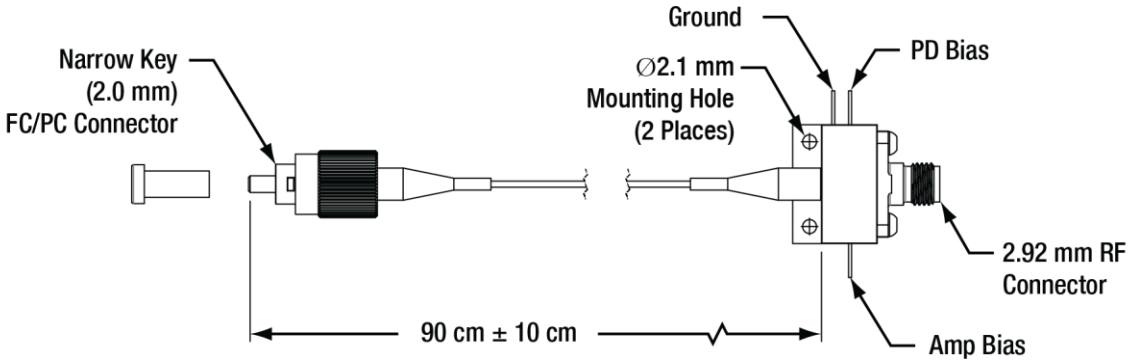
Parameter	Min	Typical	Max	Unit	Note
Wavelength Range	780 750 700 700	-	1650 1650 870 870	nm	RX10AF RX10BF RX10CF RX10DF See Performance Graphs for Full Spectral Response
-3 dB Bandwidth	-	10 10 10 10	-	GHz	RX10AF at 1560 nm RX10BF at 1560 nm RX10CF at 780 nm RX10DF at 780 nm
Low Frequency Cutoff	-	40	-	kHz	-
Impulse Response	-	50 45 50 50	-	ps	RX10AF FWHM at 1560 nm RX10BF FWHM at 1560 nm RX10CF FWHM at 780 nm RX10DF FWHM at 780 nm
Impulse Undershoot	-	25 25 28 28	-	%	RX10AF at 1560 nm RX10BF at 1560 nm RX10CF at 780 nm RX10DF at 780 nm
Responsivity	-	0.9 0.85 0.5 0.45	-	A/W	RX10AF at 1550 nm, SM RX10BF at 1310 nm, MM RX10CF at 850 nm, SM RX10DF at 850 nm, MM
Conversion Gain	-	450 430 230 210	-	V/W	RX10AF at 1560 nm RX10BF at 1560 nm RX10CF at 780 nm RX10DF at 780 nm Across External 50 Ω Load
Transimpedance Gain	-	460	-	V/A	-
Noise-Equivalent Power	-	10 10.5 18 20	-	pW/√Hz	RX10AF RX10BF RX10CF RX10DF 10 GHz Bandwidth
Optical Return Loss	-	-	-25 -17 -25 -17	dB	RX10AF at 1550 nm, SM RX10BF at 1310 nm, MM RX10CF at 850 nm, SM RX10DF at 850 nm, MM
Polarization-Dependent Responsivity	-	0.05 0.05 0.15 0.02	-	dB	RX10AF RX10BF RX10CF RX10DF
Dark Current	-	-	50	nA	-
Output Swing	-	-	500	mV	<2% THD for Swing <250 mV
Electrical Return Loss	-	-10 -4 -10 -10 -10	-	dB dB dB dB dB	To 6 GHz, RX10AF To 10 GHz, RX10AF To 7 GHz, RX10BF To 7 GHz, RX10CF To 7 GHz, RX10DF

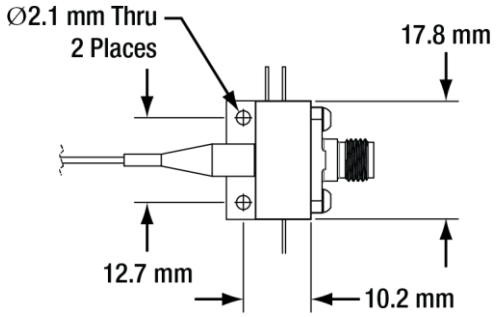
QUALIFICATION TESTING

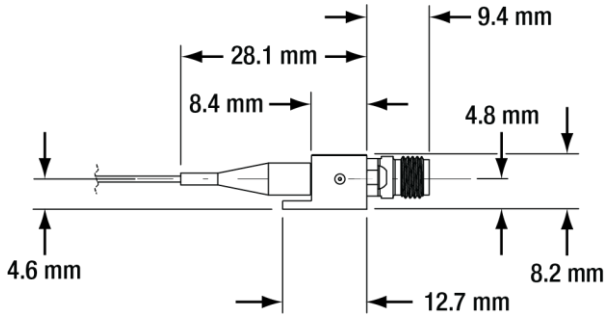
Parameter	Conditions
Mechanical Shock	500 g, Six Axes, 5 Times
Thermal Cycling	100 Cycles, 0 °C to 70 °C
Temperature Storage	100 Hours at -40 °C
Fiber Pull	Straight Pull: 0.5 kg, 60 s Side Pull: 0.25 kg, 10 s, 4 Directions

MECHANICAL & PIN-OUT

Parameter	Value
Fiber Connector	2.0 mm Narrow Key FC/PC (FC/APC Available Upon Request)
Fiber Type	**RX10AF, RX10CF**: Ø9 µm Core, SMF-28 Fiber with Ø900 µm Yellow Buffer **RX10BF, RX10DF**: Ø50 µm Core, OM4, Multimode Fiber with Ø900 µm Aqua Buffer
Fiber Length	90 cm ± 10 cm
RF Output Connector	Female 2.92 mm, 50 Ω, Field Replaceable
Lead Soldering	Max 10 s at 250 °C per Lead

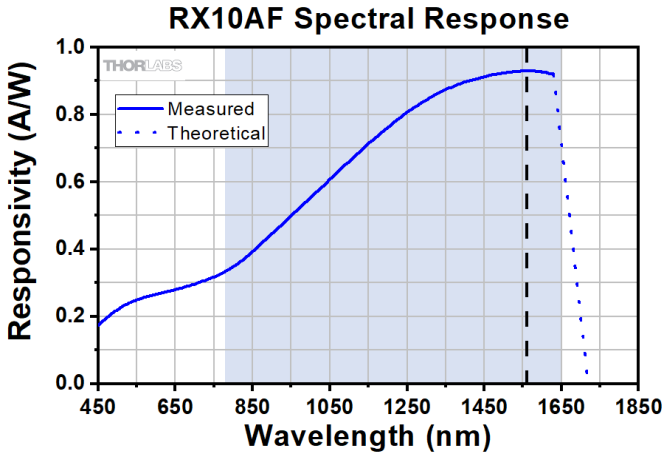




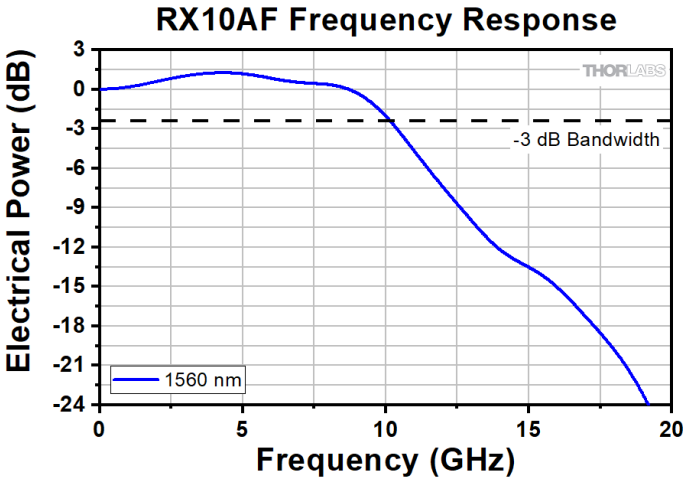


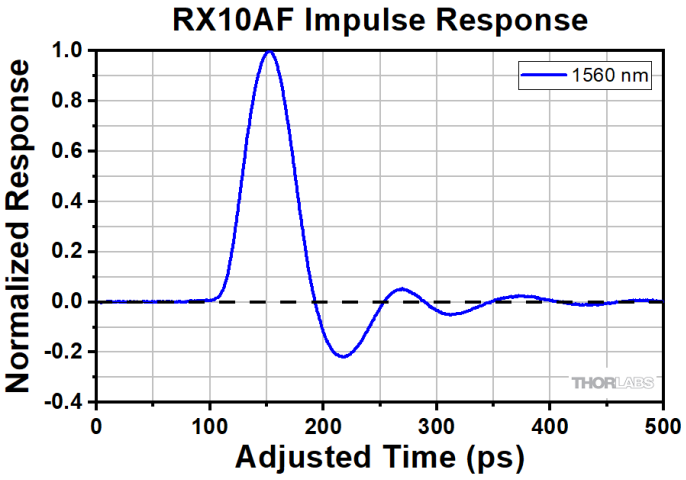
Typical Performance Graphs

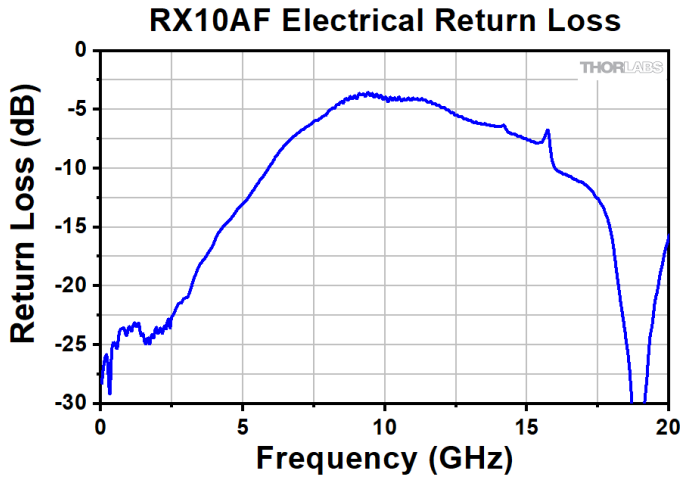
RX10AF Photoreceiver Module, Single Mode Input Fiber, 780 -1650 nm

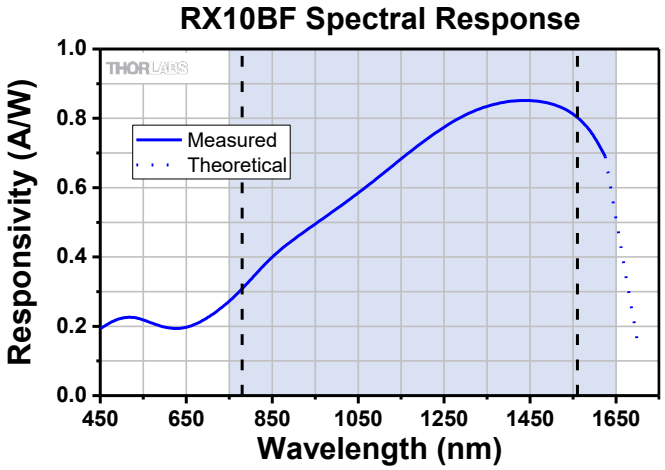


ertical dashed line indicates the wavelength at which the quency and impulse responses are measured. The blue-shaded region indicates the wavelength range.

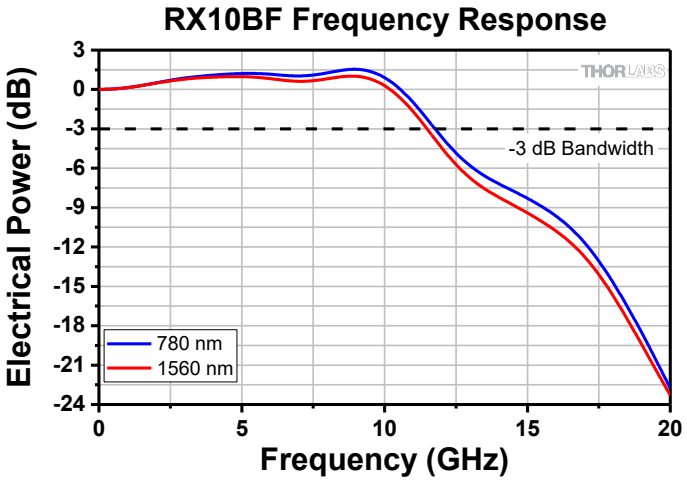


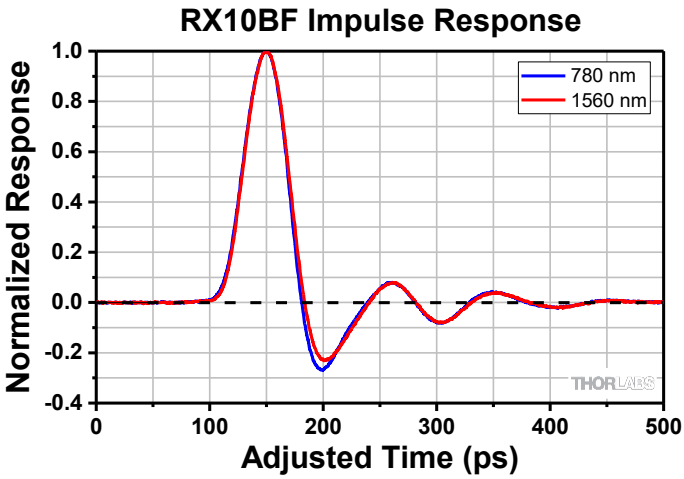


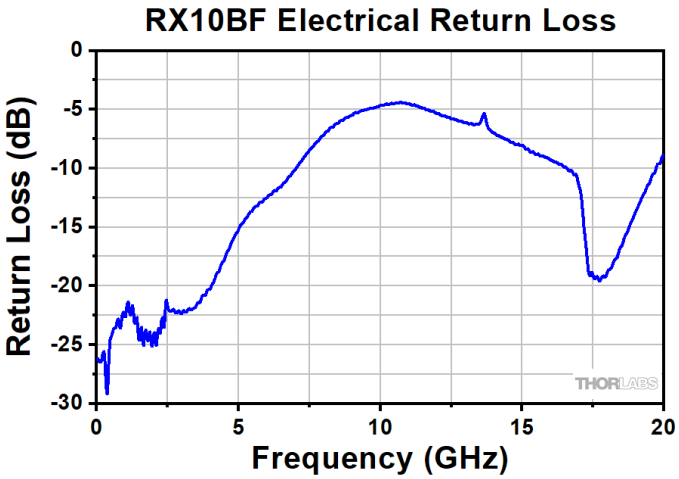


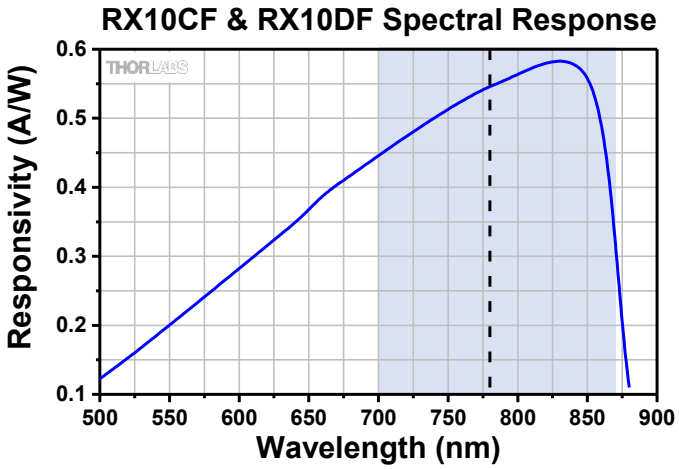


Vertical dashed lines indicate the wavelengths at which the frequency and impulse responses are measured. The blue-shaded region indicates the wavelength range.

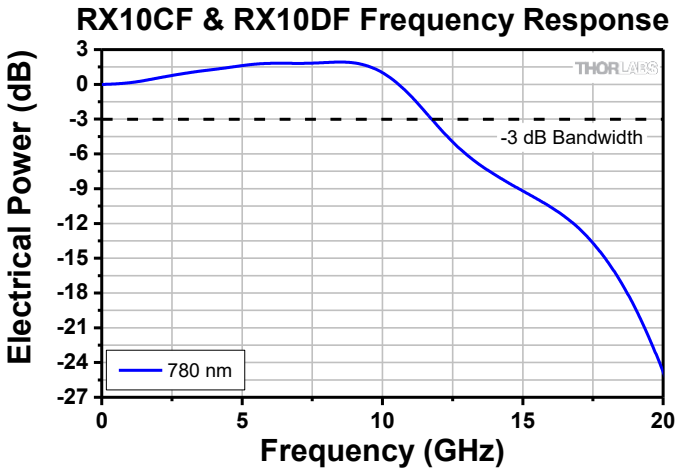


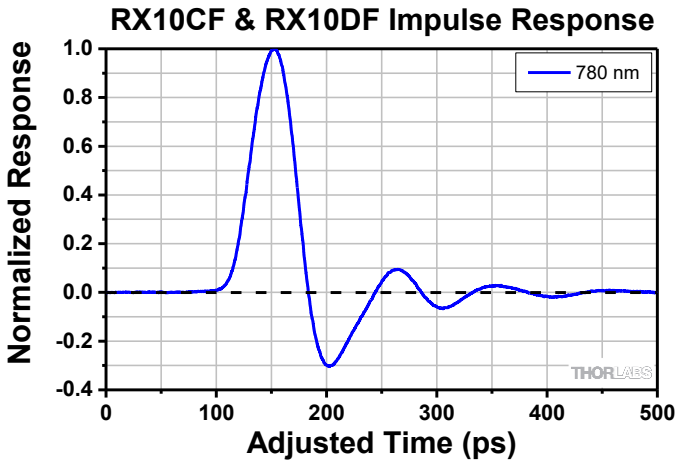


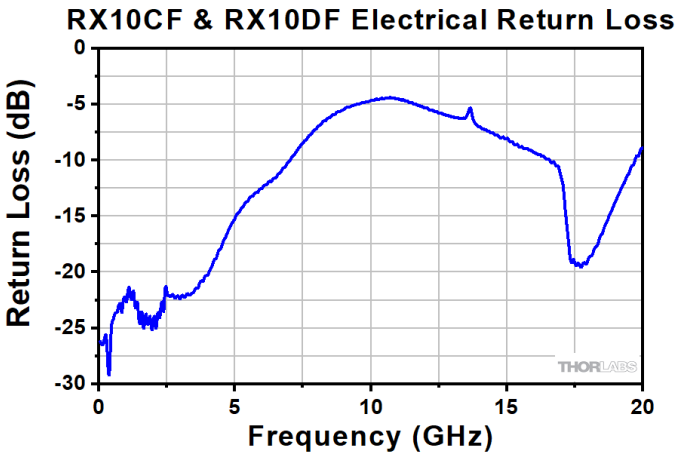




Vertical dashed line indicates the wavelength at which the frequency and impulse responses are measured. The blue-shaded region indicates the wavelength range.







PRECAUTIONS



The components inside this module are ESD sensitive. Take all appropriate precautions to discharge personnel and equipment before making any electrical connections to the unit. This also applies to coaxial cables that easily accumulate capacitive change.

MANUFACTURING AND COMPLIANCE

Manufactured by: Thorlabs Inc., Ann Arbor, MI 48103 USA

