RXM10 Series: 10 GHz Amplified Photoreceivers

Features

- Self-Contained 10 GHz Photoreceivers
- PIN/TIA Configuration
- Single Mode or Multimode Models
  - **RXM10AF**: Ø9 µm, SMF-28 Fiber, 780 – 1650 nm
  - **RXM10BF**: Ø50 µm, OM4 Fiber, 750 – 1650 nm
  - **RXM10CF**: Ø9 µm, SMF-28 Fiber, 700 – 870 nm
  - **RXM10DF**: Ø50 µm, OM4 Fiber, 700 – 870 nm
- USB Power Supply Included
- AC-Coupled, 500 mV Output Swing
- FC/PC Input Connector

Applications

- Test and Measurement



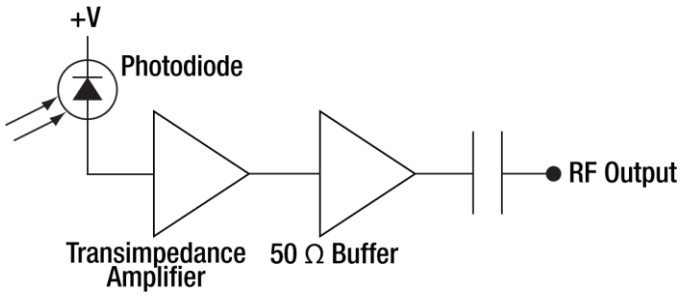
RXM10AF

Description of Models

The RXM10 photoreceivers are available in four versions: the **RXM10AF** is for long-wavelength, single mode applications, the **RXM10BF** is designed for broad-wavelength, multimode applications, the **RXM10CF** is designed for short-wavelength, single mode applications, and the **RXM10DF** is designed for short-wavelength, multimode applications. These are easy-to-use, fully integrated, 10 GHz amplified photoreceivers for general laboratory use. Each unit comes with a mini-B USB power supply and full photocurrent monitoring capability via an analog output as well as a digital display. Optical input is through an FC/PC narrow key (2.0 mm) bulkhead-type connector, while the output is AC-coupled through a 2.92 mm coaxial connector (K) which is also SMA compatible. Custom units with FC/APC connectors also available upon request.

- **RXM10AF** 10 GHz Photoreceiver Instrument, Single Mode Input Fiber, 780 – 1650 nm, FC/PC Connector
- **RXM10BF** 10 GHz Photoreceiver Instrument, 50 µm Multimode Input Fiber, 750 – 1650 nm, FC/PC Connector
- **RXM10CF** 10 GHz Photoreceiver Instrument, Single Mode Input Fiber, 700 – 870 nm, FC/PC Connector
- **RXM10DF** 10 GHz Photoreceiver Instrument, 50 µm Multimode Input Fiber, 700 – 870 nm, FC/PC Connector

Block Diagram



O-E SPECIFICATIONS

All specifications for RXM10AF are at 25 °C, at 1550 nm, and into 50 Ω unless noted.

All specifications for RXM10BF are at 25 °C, at 1310 nm, and into 50 Ω unless noted.

All specifications for RXM10CF and RXM10DF 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	RXM10AF RXM10BF RXM10CF RXM10DF See Performance Graphs for Full Spectral Response
-3 dB Bandwidth	-	10 10 10 10	-	GHz	RXM10AF at 1560 nm RXM10BF at 1560 nm RXM10CF at 780 nm RXM10DF at 780 nm
Low Frequency Cutoff	-	40	-	kHz	-
Impulse Response	-	50 45 50 50	-	ps	RXM10AF FWHM at 1560 nm RXM10BF FWHM at 1560 nm RXM10CF FWHM at 780 nm RXM10DF FWHM at 780 nm
Impulse Undershoot	-	25 25 28 28	-	%	RXM10AF at 1560 nm RXM10BF at 1560 nm RXM10CF at 780 nm RXM10DF at 780 nm
Responsivity	-	0.9 0.85 0.5 0.45	-	A/W	RXM10AF at 1550 nm, SM RXM10BF at 1310 nm, MM RXM10CF at 850 nm, SM RXM10DF at 850 nm, MM
Conversion Gain	-	450 430 230 210	-	V/W	RXM10AF at 1550 nm RXM10BF at 1310 nm RXM10CF at 850 nm RXM10DF at 850 nm Across External 50 Ω Load
Transimpedance Gain	-	460	-	V/A	-
Noise-Equivalent Power	-	10 10.5 18 20	-	pW/√Hz	RXM10AF RXM10BF RXM10CF RXM10DF 10 GHz Bandwidth
Optical Return Loss	-	-	-25 -17 -25 -17	dB	RXM10AF at 1550 nm, SM RXM10BF at 1310 nm, MM RXM10CF at 850 nm, SM RXM10DF at 850 nm, MM
Polarization-Dependent Responsivity	-	0.05 0.05 0.15 0.02	-	dB	RXM10AF RXM10BF RXM10CF RXM10DF
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, RXM10AF To 10 GHz, RXM10AF To 7 GHz, RXM10BF To 7 GHz, RXM10CF To 7 GHz, RXM10DF
Current Output Monitor	-	200	-	mV/mA	DC Level Proportional to Avg. Photocurrent

Operating Conditions

Parameter	Min	Typ.	Max	Unit	Note
Operating Temperature	10	-	50	°C	-
Storage Temperature	0	-	70	°C	-
Relative Humidity	-	-	85	%	Non-Condensing
Optical Input Power		-	3 3 5 5	dBm	RXM10AF RXM10BF RXM10CF RXM10DF
Abs. Max Input Power	-	-	6	dBm	-

Mechanical Specifications

Parameter	Value
Fiber Connector	2.0 mm Narrow Key FC/PC (FC/APC Available Upon Request)
Internal Fiber Type	RXM10AF & RXM10CF: SMF-28 RXM10BF & RXM10DF: 50 µm MM OM4
Unit Dimensions	88.6 mm x 61.4 mm x 29.6 mm
RF Output Connectors	2.92 mm (K) Jack; 8 in·lb Torque Spec. (SMA Compatible)
Current Monitor Connector	SMA Jack; 5 in·lb Torque Spec.

Input and Output Panels

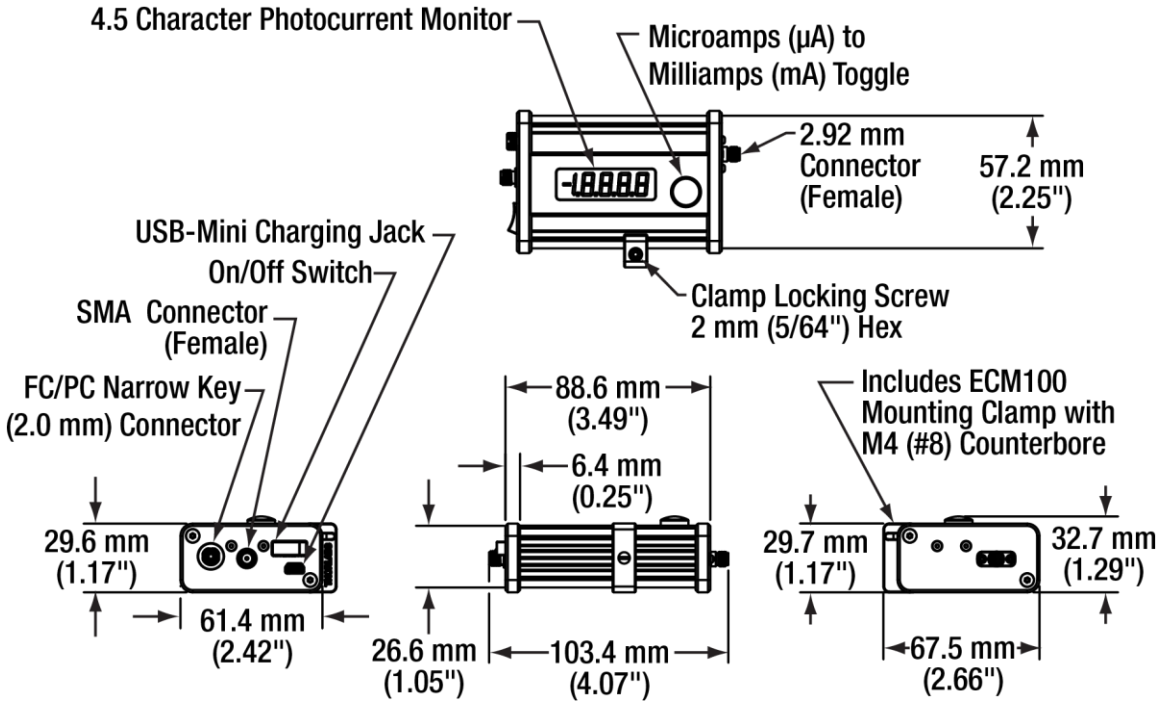


RXM10 Series Input Panel



RXM10 Series Output Panel

MECHANICAL DRAWING



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

Operational Sequence

1. Make sure device is mounted firmly as desired and the RF output is connected. Do not over-torque the RF connector. Thorlabs offers an 8 in·lb, 5/16" hex torque wrench suitable for securing this connection.
2. Connect the USB power cable and switch the unit ON.
3. Couple the optical input signal to the unit via the FC connector.
   NOTE: Be sure to not exceed the maximum optical input power rating.
4. To power down, remove optical input first, then turn the switch OFF.

Additional Considerations

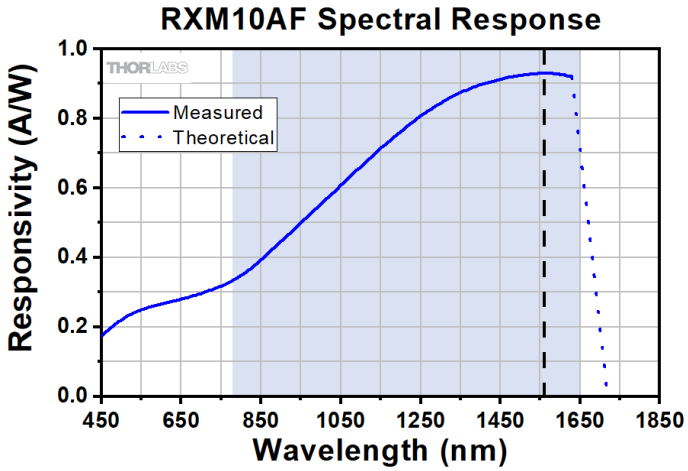
- **Optical Input Connector**: Clean the FC input connector before every connection. This is the number one source of reduced sensitivity. Keep the FC connector capped when not in use. Input fiber for single mode detectors should be SMF-28 or equivalent. Input fiber for multimode detectors should be OM4 or SMF-28 or equivalent. Ensure the average input optical power does not exceed the absolute maximum of 6 dBm.
- The Monitor Output provides a DC signal level that is proportional to the photocurrent. Use any standard, high-impedance voltmeter to measure this voltage.



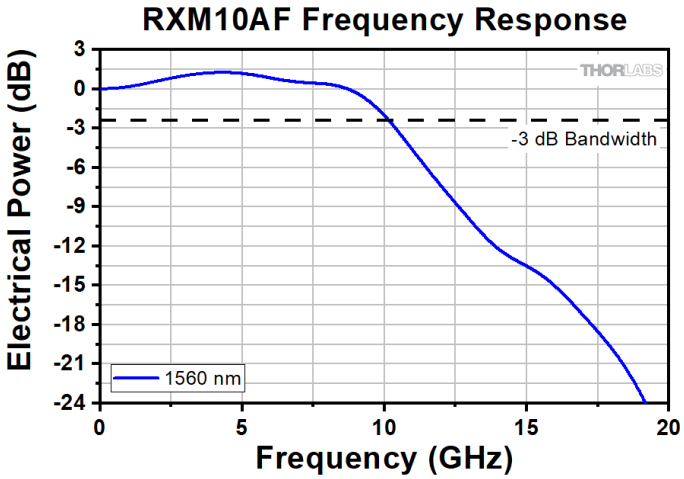
RXM10DF
Output Panel

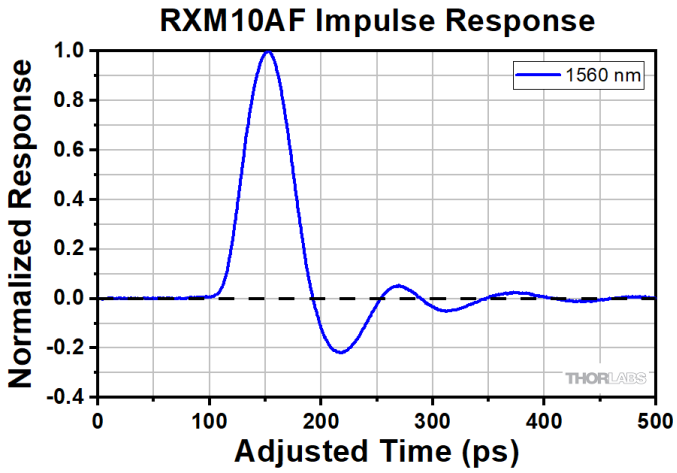
Typical Performance Graphs

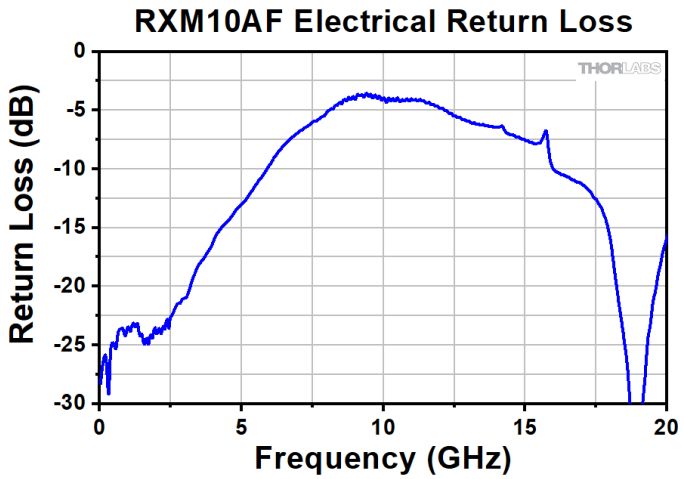
RXM10AF Photoreceiver Instrument, Single Mode Input Fiber, 780 – 1650 nm

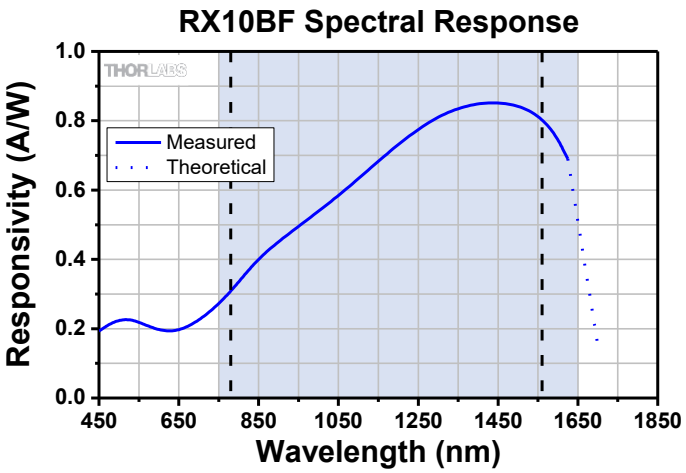


Vertical dashed line indicates the wavelength at which the frequency and impulse responses are measured. The blue-shaded region indicates the wavelength range.

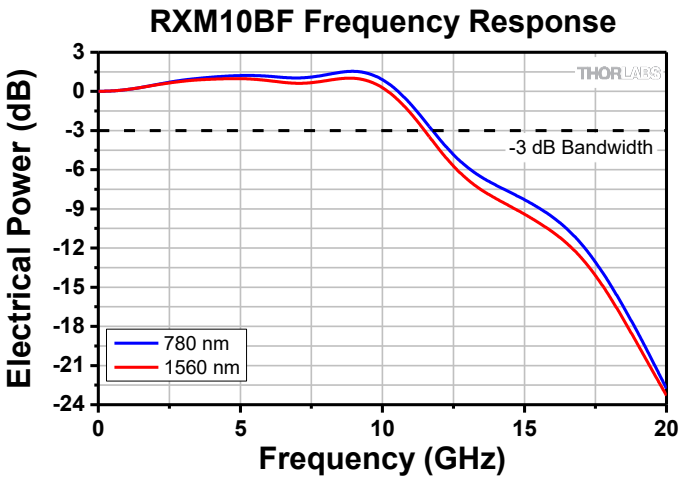


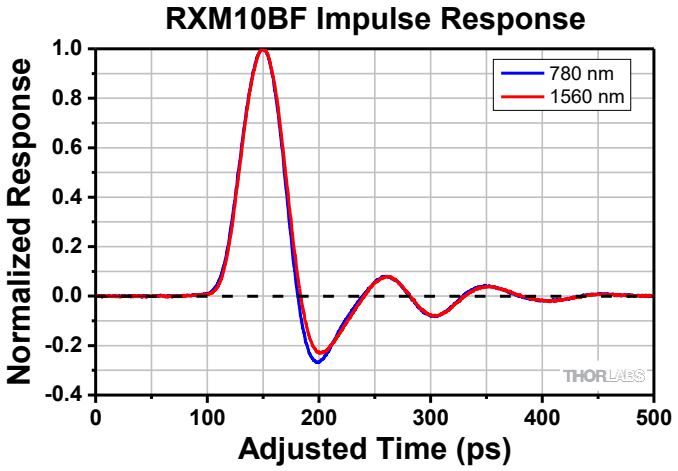


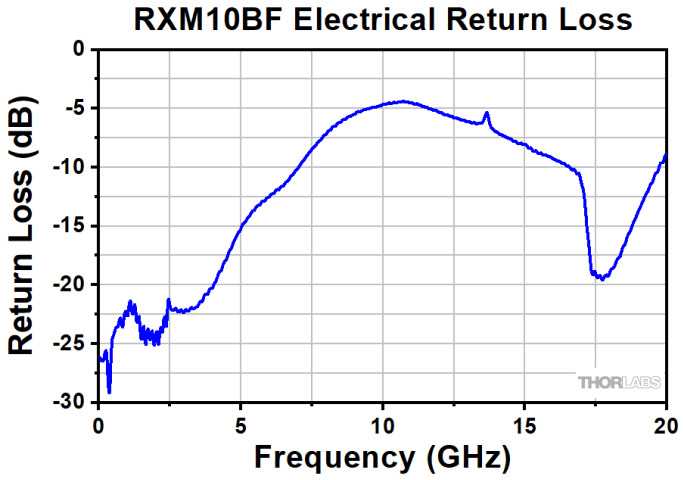


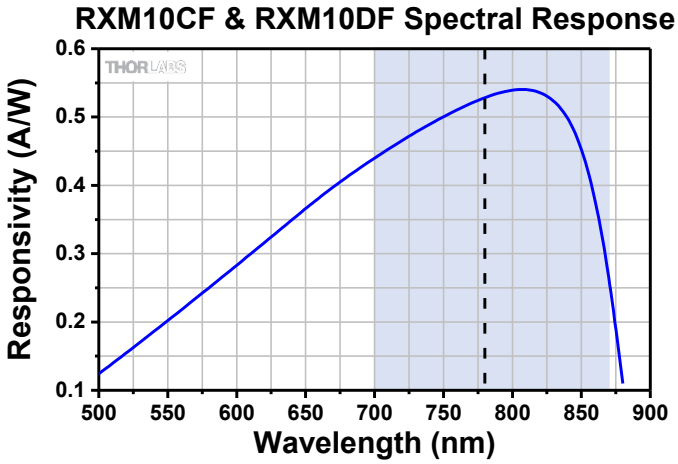


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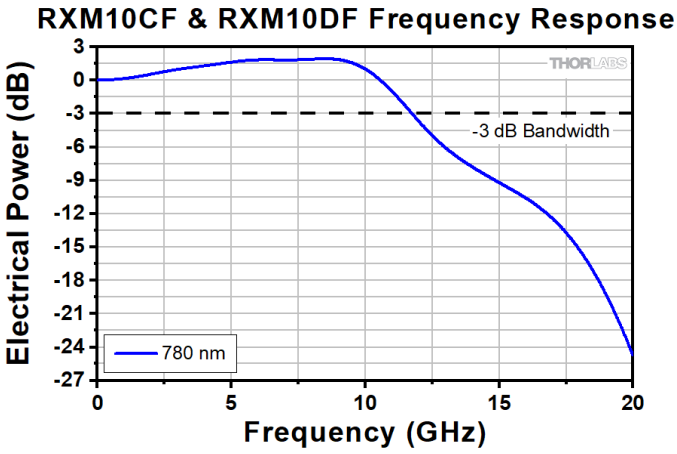


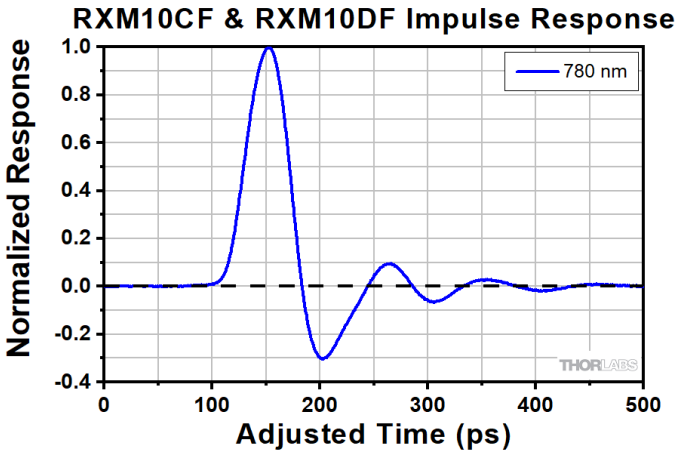


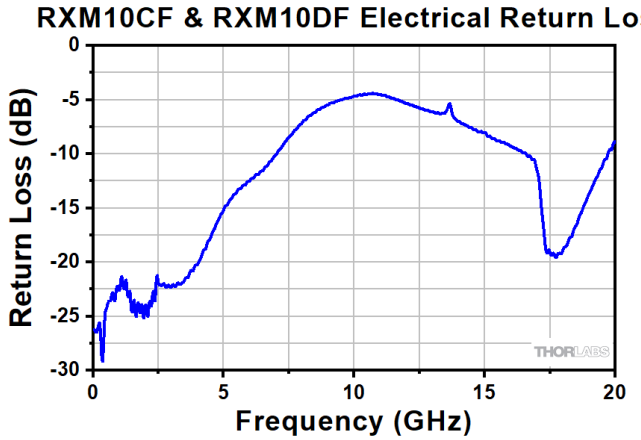




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PRECAUTIONS



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MANUFACTURING AND COMPLIANCE

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

All specifications are subject to change without notice.

