RXM15EF: 15 GHz Amplified Photoreceiver

Features

- Self-Contained 15 GHz Photoreceiver
- 750 - 1650 nm InGaAs Detector
- Ø62.5 µm Multimode OM1 Fiber with FC/PC Input
- DC-Coupled Output, Inverting
- USB Power Supply Included
- Linear Response

Applications

- Test and Measurement
- High-Speed Communications
- Instrumentation O-E Front End



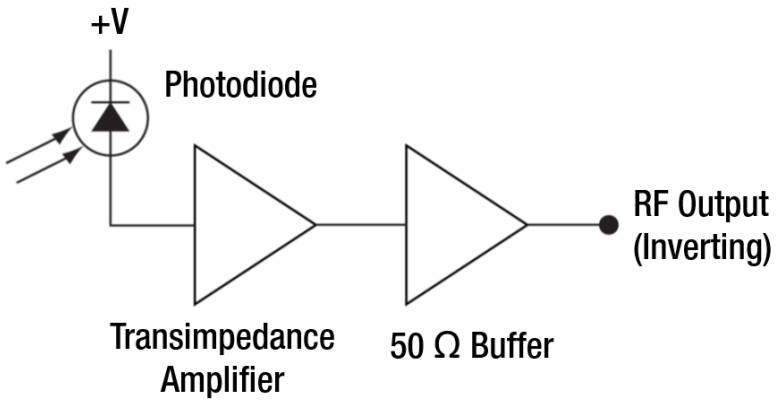
RXM15EF

Description of Model

The RXM15EF provides an easy to use 15 GHz amplified photoreceiver with Ø62.5 µm Multimode OM1 fiber input for general laboratory use. The self-contained unit comes with a USB-type power supply and full photocurrent monitoring capability via an analog output as well as a digital display. Optical input is through an FC/PC bulkhead-type connector, while the inverting output is DC-coupled through an SMA connector. Custom units with FC/APC connectors are also available upon request.

- **RXM15EF** 15 GHz Photoreceiver Instrument, Ø62.5 µm Multimode Input Fiber, 750 - 1650 nm, FC/PC Connector

Block Diagram



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	dBm	6 dBm Peak at 50% Duty Cycle
Abs. Max Input Power	-	-	4	dBm	7 dBm Peak at 50% Duty Cycle

O-E Specifications

All specifications are typical at 25 °C, at 1550 nm, and into 50 Ω external load unless otherwise noted.

Parameter	Min	Typ.	Max	Unit	Note
Wavelength Range	750	-	1650	nm	-
-3 dB Bandwidth	-	15	-	GHz	-
Low Frequency Cutoff	DC	-	-	-	-
Responsivity	0.45 0.85 0.80	0.55 1.00 0.95	-	A/W	850 nm, Ø62.5 µm MM OM1 1310 nm, Ø9 µm SMF-28 1550 nm, Ø9 µm SMF-28
Conversion Gain	-	-200 -315 -300	-	V/W	850 nm, Ø62.5 µm MM OM1 1310 nm, Ø9 µm SMF-28 1550 nm, Ø9 µm SMF-28 Into 50 Ω External Load, Output is Inverting
Noise-Equivalent Power	-	38 25	-	pW/√Hz	850 nm, Ø62.5 µm MM OM1 1550 nm, Ø9 µm SMF-28
Maximum Linear Input	-3.0	-2.0	-	dBm	1 dB Compression, 1550 nm, Ø9 µm SMF-28
Maximum Output Swing	-	400	-	mV	Into 50 Ω External Load
Optical Return Loss	-	-16 -30	-14 -27	dB	850 nm, Ø62.5 µm MM OM1 1310/1550 nm, Ø9 µm SMF-28
Dark Current	-	-	60	nA	-
DC Output Offset[a]	-	0	-	V	Into 50 Ω External Load
Electrical Return Loss	-	-	-15 -10	dB	0.1 to 8 GHz 8 to 10 GHz
Current Monitor Output	-	200	-	mV/mA	DC Level Proportional to Avg. Photocurrent

a. On initial powerup, DC offset is positive (tens of millivolts) and reduces to 0 V (typ.) during a 30-minute warm-up period.

Mechanical Specifications

Parameter	Value
Fiber Connector	2.0 mm Narrow Key FC/PC (FC/APC Available Upon Request)
Internal Fiber Type	Ø62.5 µm MM OM1, 1 m
Unit Dimensions	106.4 mm x 61.4 mm x 48.7 mm
RF Output Connectors	SMA Jack; 5 in·lb Torque Spec.
Current Monitor Connector	SMA Jack; 5 in·lb Torque Spec.

Input & Output Panels

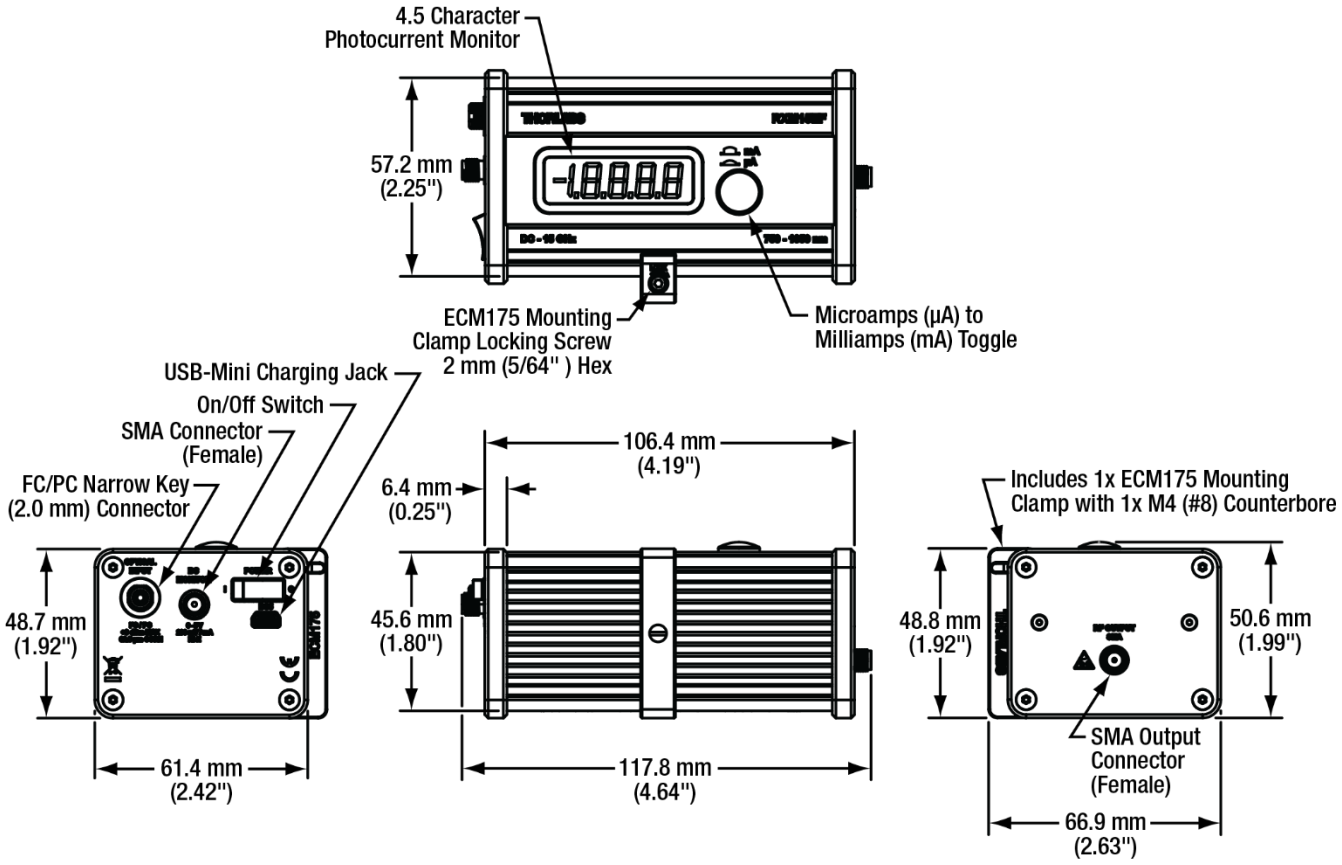


Input Panel



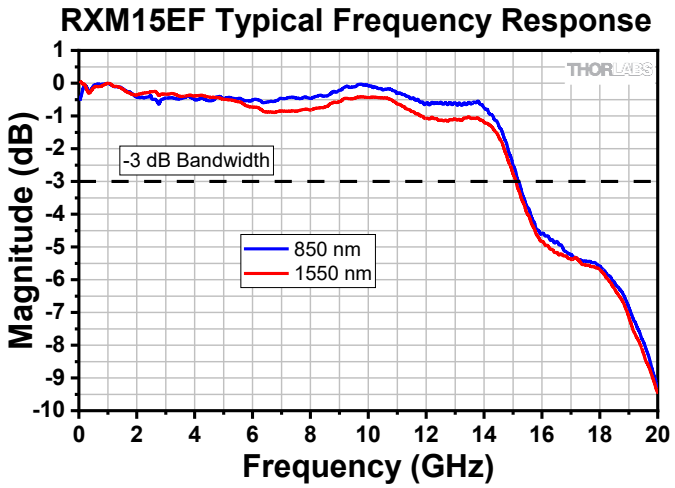
Output Panel

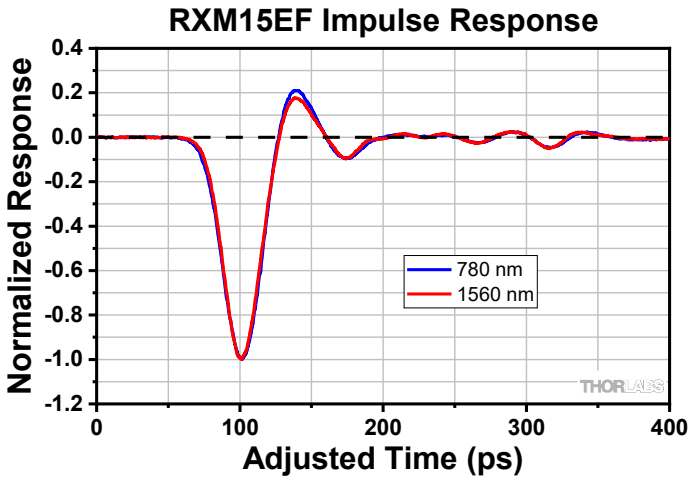
Mechanical Drawing

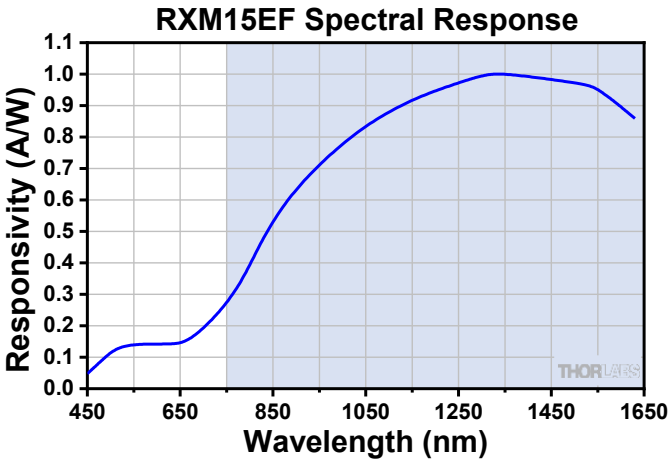


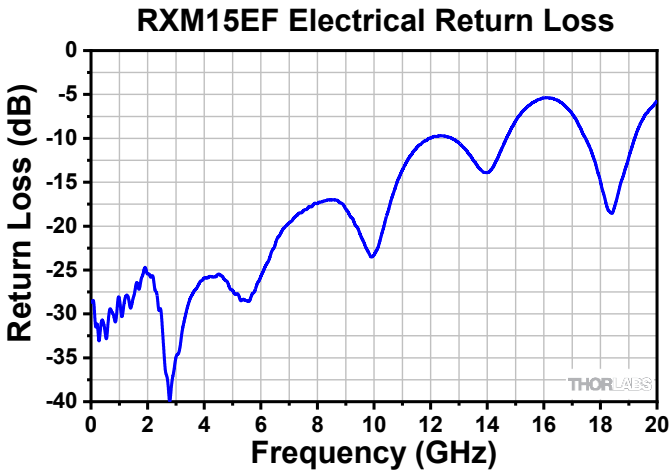
Typical Performance Graphs

The performance of each detector is factory tested. Please contact Tech Support if you would like to receive a data file containing these test results. Contact information can be found at www.thorlabs.com/locations.









Operating Guide



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 to a 50 Ω load. Do not over torque the RF connector. Thorlabs offers a 5 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. Adjust the input level as necessary with an optical attenuator.
5. 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.
- **Optical Input Power**: Ensure the average input optical power does not exceed the absolute maximum of 4 dBm. Use an optical attenuator when input optical power may exceed this rating.
- **Mounting the Detector**: The included mounting clamp, also available separately, has a single counterbore that accepts an 8-32 (M4) cap screw (not included). Screw the clamp to the desired base or post before snapping it to the side of the detector housing and securing it using the integrated 5/64" (2 mm) locking screw.
- **RF and Photocurrent Monitor Output**: Connection cables attached to the RF output ports and SMA photocurrent monitor port must be properly shielded. Attach the RF output of the unit to the measurement instrument using suitable cables or adapters, such as Thorlabs' microwave cables and adapters. The measurement instrument must have a 50 Ω input and adequate bandwidth to resolve the high-speed signal from the RXM series ultrafast receiver.
- **DC Photocurrent Monitor**: DC Photocurrent Monitor: The DC photocurrent can be monitored directly by viewing the built-in digital display as well as by using most voltmeters to read the analog voltage signal output via the high-impedance SMA jack located on the input panel. The units on the displayed digital current measurement can be toggled between µA and mA using the button on the front panel. There may be a small discrepancy (within specification) between the screen and SMA monitor output signal. The digital display reports a wide range of current values, up to 20 mA with a resolution of 1 nA, with the display automatically changing range in response to the signal magnitude. The analog voltage signal sent to the SMA connector has a linear relationship with the measured DC photocurrent up to 3.5 V: the transimpedance gain of the current monitor provides 200 mV per 1 mA of photocurrent. This linear relationship limits the current range reported by the analog SMA output signal, so that the range is smaller than that provided by the digital display.

Manufacturing and Compliance

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

All specifications are subject to change without notice.

