RXM40AF: 40 GHz Amplified Photoreceiver

Features

- Self-Contained 40 GHz Photoreceiver
- 1250 - 1650 nm InGaAs Detector
- USB Power Supply Included
- PIN/TIA/VGA Configuration
- AC-Coupled Differential Outputs
- SMF-28 Fiber with FC/PC Input Connector

Applications

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



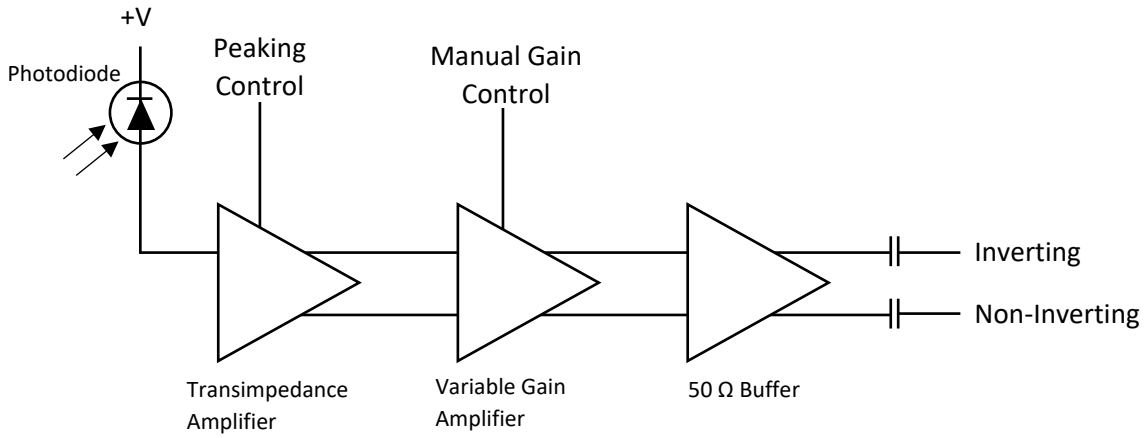
RXM40AF

Description of Model

The RXM40AF provides an easy to use 40 GHz amplified photoreceiver with SMF-28 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. The unit also provides variable gain control and frequency response shape control via the peaking control. Optical input is through an FC/PC bulkhead-type connector, while the differential outputs are AC-coupled through 2.92 mm coaxial connectors (K). Custom units with FC/APC connectors also available upon request.

- **RXM40AF** 40 GHz Photoreceiver Instrument, Single Mode Input Fiber, 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	-	-	2	dBm	5 dBm Peak at 50% Duty Cycle
Abs. Max Input Power	-	-	10	dBm	-

O-E Specifications

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

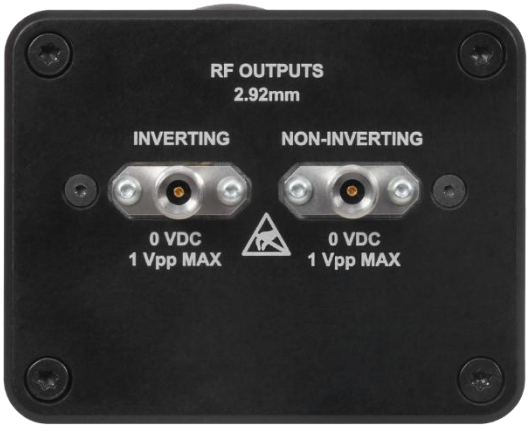
Parameter	Min	Typ.	Max	Unit	Note
Wavelength Range	1250	-	1650	nm	-
-3 dB Bandwidth	35	40	-	GHz	Gain = 8, Peak = 4
Low Frequency Cutoff	-	300	-	kHz	AC Coupled
Responsivity	0.6	0.7	0.8	A/W	-
Conversion Gain (Differential, Adjustable)	140	-	3650	V/W	-
Noise-Equivalent Power	-	24	-	pW/√Hz	At Maximum Gain Setting
Optical Return Loss	-	-33	-28	dB	-
Output Swing (Differential)	-	-	1800	mV	Linear to 700 mV, THD = 2%
Electrical Return Loss	-	-10	-	dB	To 35 GHz
Current Monitor Output	-	200	-	mV/mA	DC Level Proportional to Avg. Photocurrent

Mechanical Specifications

Parameter	Value
Fiber Connector	2.0 mm Narrow Key FC/PC (FC/APC Available Upon Request)
Internal Fiber Type	SMF-28
Unit Dimensions	106.4 x 61.4 x 48.7 mm
RF Output Connectors	Dual 2.92 mm (K) Jacks; 8 in·lb Torque Spec.
Current Monitor Connector	SMA Jack; 5 in·lb Torque Spec.

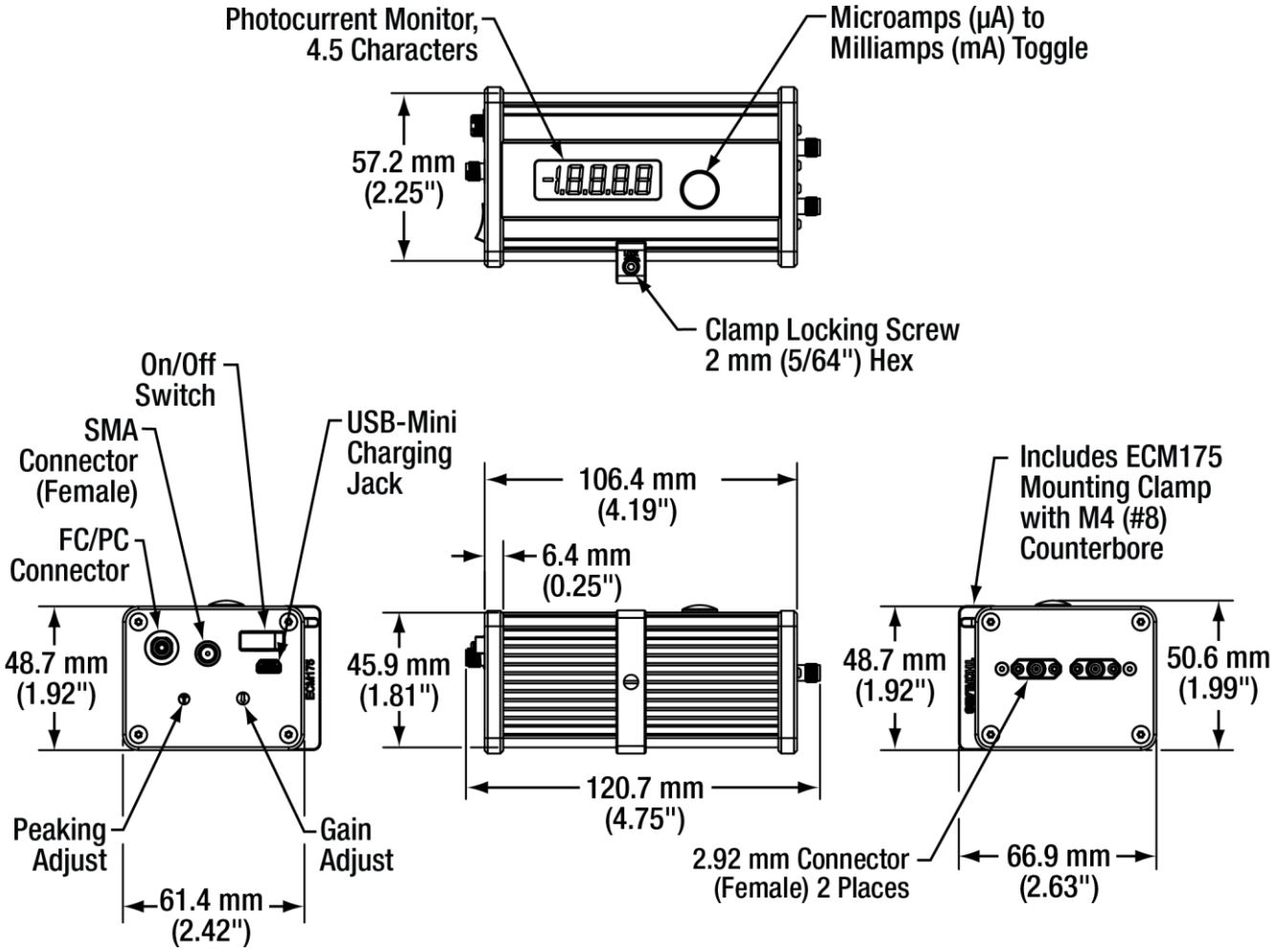


Input Panel



Output Panel

MECHANICAL DRAWING



PRECAUTIONS

The components inside this instrument 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 charge.

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Operational Sequence

1. Make sure device is mounted firmly as desired and the RF outputs are connected. Do not over torque the RF connectors. 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. Operate the device, then adjust the input level, gain, and peaking as necessary.
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. Input fiber should be SMF-28 or equivalent. Ensure the average input optical power does not exceed the absolute maximum of 10 dBm.
- See the graphs on the next page of this data sheet to see how the controls affect the output response.
- Peaking the frequency response of the photoreceiver can be useful if other components in the signal chain have excess high-frequency roll-off.
- Adjusting the gain allows the output swing to be matched to the next device in the signal chain and optimize the signal-to-noise ratio. Note that adjustment of the gain also affects the shape of the frequency response, so the peaking controls can be used in combination to optimize the signal.
- The Monitor Output provides a DC signal level that is proportional to the photocurrent. Use any standard, high impedance voltmeter to measure this voltage.
- Note that the linear response of the device is limited to an output swing 700 mV differential (for < 2% THD).
  Output swing can be calculated by multiplying the peak-peak input power by the conversion gain.

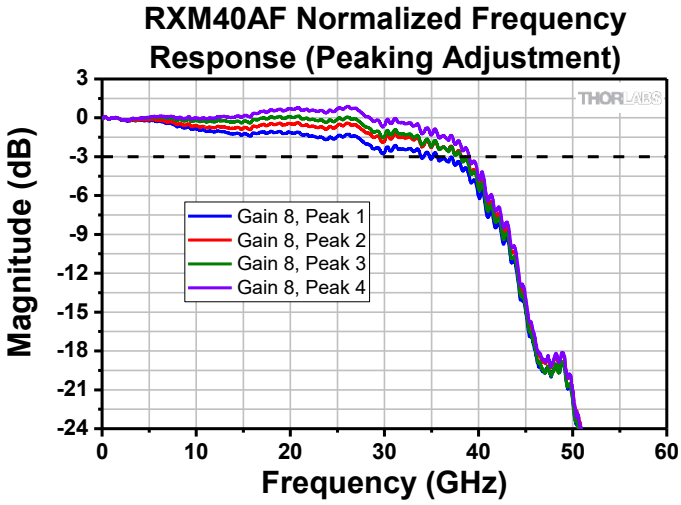


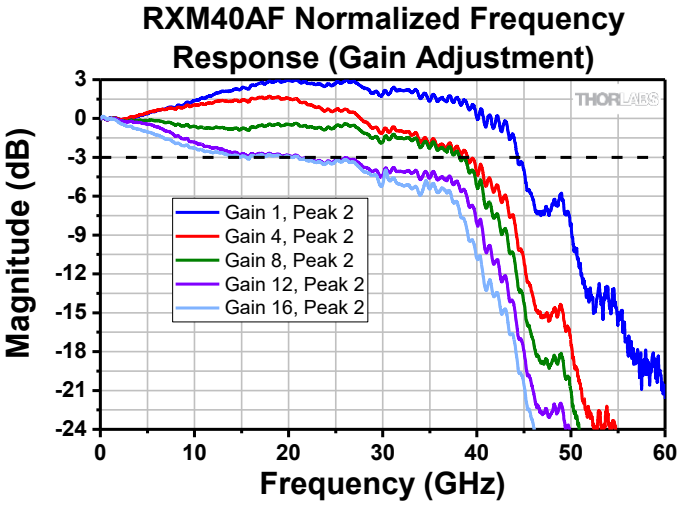
RXM40AF Output Panel

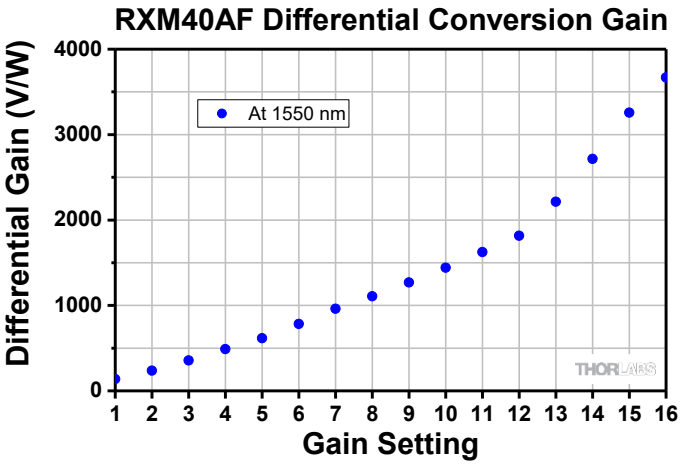
Typical Performance Graphs

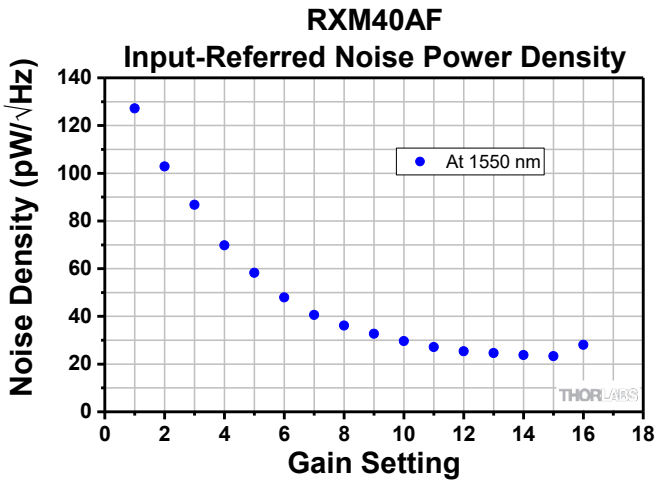
The dashed line in these graphs indicates the -3 dB bandwidth for the module. The amplifier gain graph shows the total gain of the combined internal stages. The performance of each detector is factory tested. Please contact Tech Support if you would like to receive a data file containing these test results. Contact information can be found at www.thorlabs.com/locations.

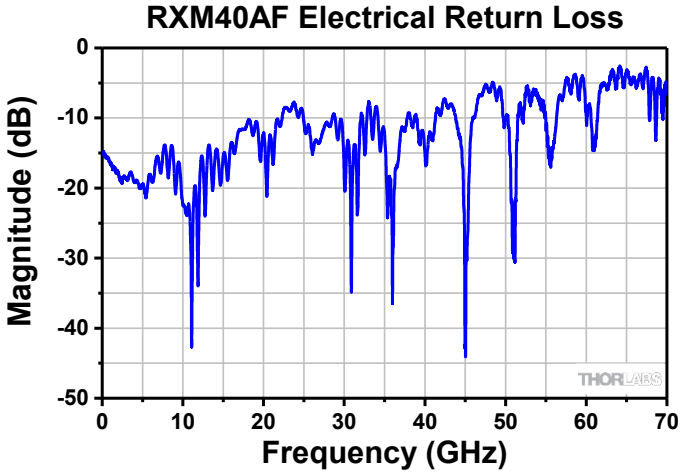
The adjustment pots on the input panel of the instrument directly control the internal voltages that affect the gain and the peaking performance.

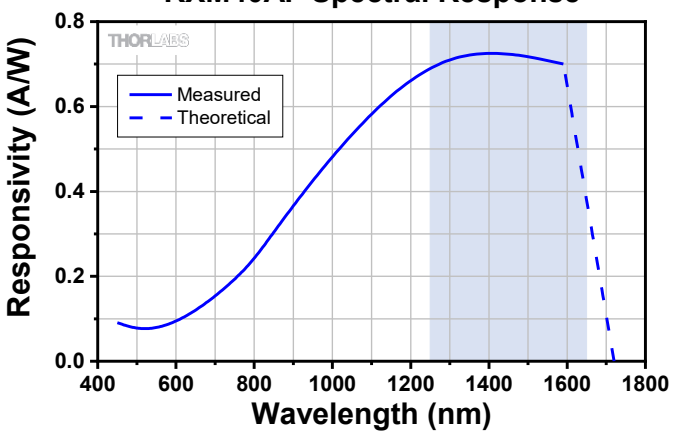












MANUFACTURING AND COMPLIANCE

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

All specifications are subject to change without notice.

