



Q-band Quadrature Mixer or Phase Detector, 33 to 50 GHz

Description:

Model SFQ-33350312-222SF-N1-M is a broadband quadrature mixer that covers the frequency range of 33 to 50 GHz. The typical conversion loss of the quadrature mixer is 12 dB with an LO driving power of +17 dBm. The typical LO to RF port isolation is 30 dB. Since the IF port of the quadrature mixer is DC coupled, the mixer can be used as a phase detector. In addition, the mixer can be readily configured into an image rejection mixer or single sideband modulator by adding an IF quadrature coupler. The mechanical configuration offers an inline structure with WR-22 Uni-Guide™ waveguides. Other port configurations, such as 2.4 mm connectors, are also available under different model number, **SFQ-30350311-222SF-N1-M**.



Features:

- Compact Package
- Low Conversion Loss
- High Port Isolations
- IF Port DC Coupled for Phase Detection

Applications:

- Phase Detection
- Speed and Ranging Radar Systems
- Communication Systems
- Test Equipment

Electrical Specifications:

Parameter	Minimum	Typical	Maximum
RF Frequency	33 GHz		50 GHz
LO Frequency	33 GHz		50 GHz
LO Pumping Power	+16 dBm	+17 dBm	+20 dBm
IF Frequency	DC		2.0 GHz
Conversion Loss		12 dB	14 dB
I/Q Phase Unbalance		±15°	
I/Q Amplitude Unbalance		±1.0 dB	
LO to RF Port Isolation	20 dB	30 dB	
LO to IF Port Isolation		15 dB	
RF to IF Port Isolation		20 dB	
IP1dB		+4 dBm	
IP3dB		+13 dBm	
Combined RF & LO Power			+20 dBm
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C





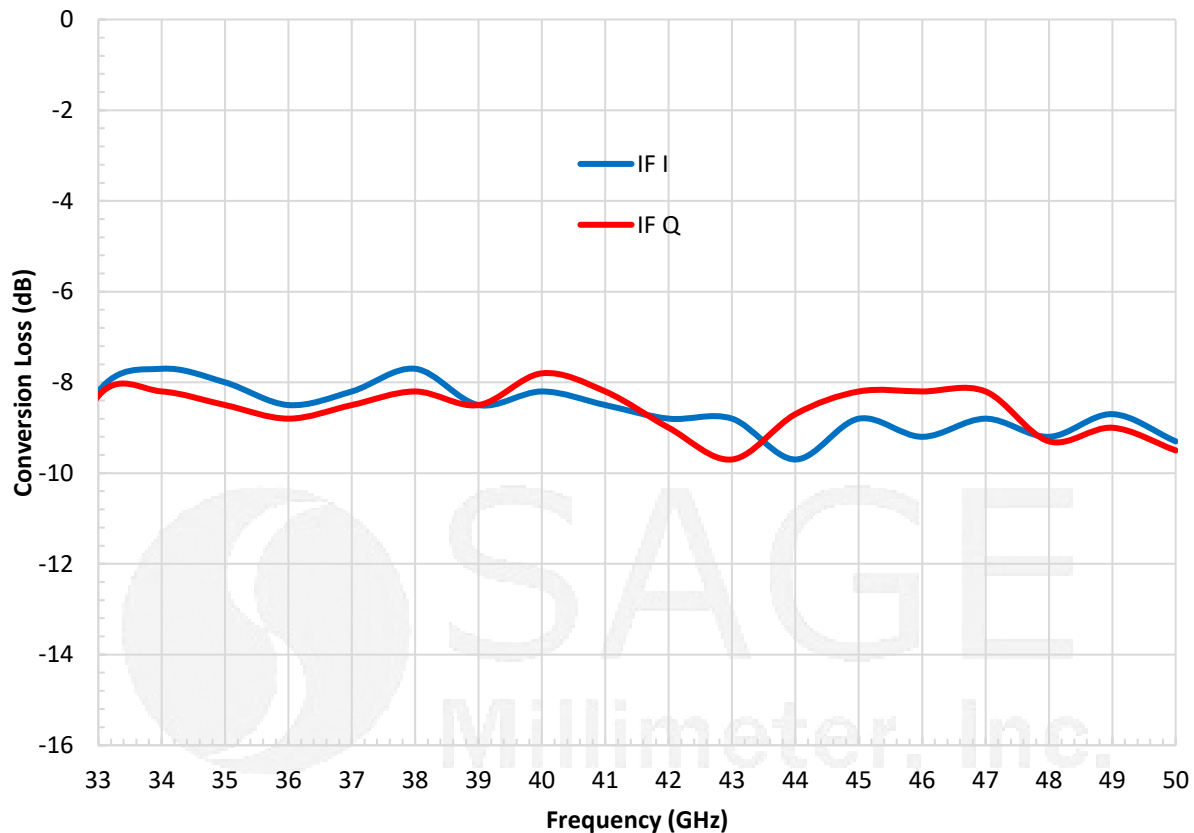
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Mechanical Specifications:

Item	Specification
RF Port	WR-22 Uni-Guide™ Waveguide with UG-383/U Anti-Cocking Flange
LO Port	WR-22 Uni-Guide™ Waveguide with UG-383/U Anti-Cocking Flange
IF-I Port	SMA (F)
IF-Q Port	SMA (F)
Case Material	Aluminum
Finish	Gold Plated
Weight	1.12 Oz
Size	1.56" (L) x 1.13" (Φ)
Outline	UH-235-2Q2C-A

Typical Conversion Loss vs. Frequency

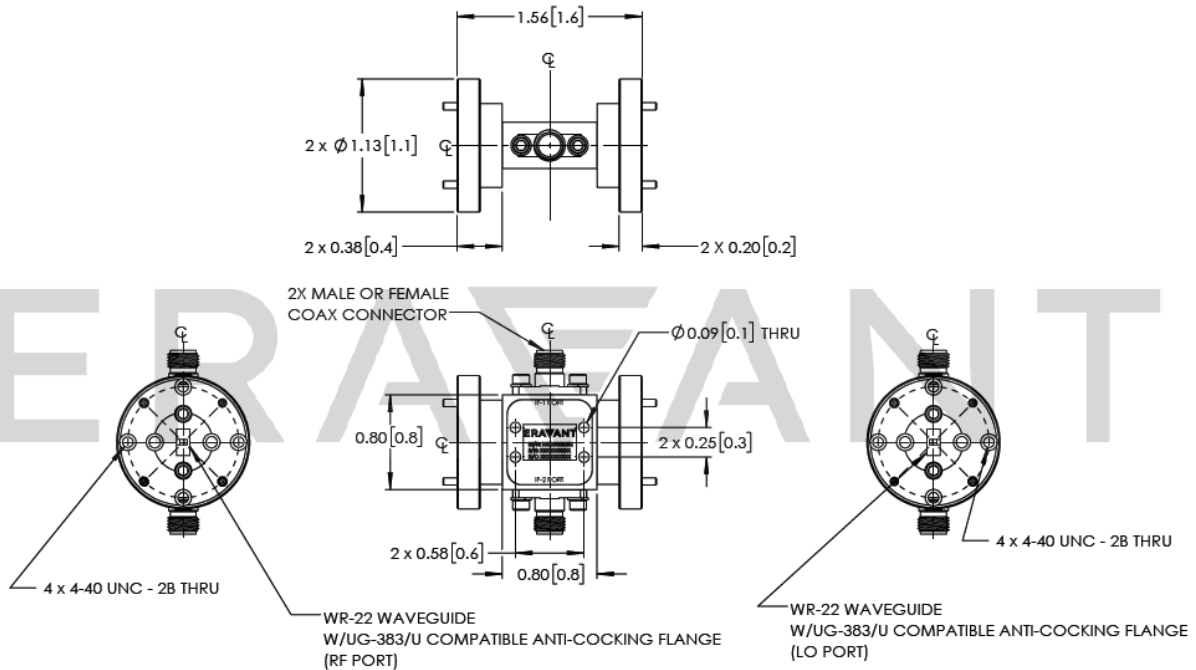
LO Power: +17 dBm; RF Power: - 20 dBm; IF: 1 GHz





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Mechanical Outline: (Unless otherwise specified, all dimensions are in inches [millimeters])



Note:

- All data presented is collected from a sample lot. Actual data may vary unit to unit, slightly.
- All testing was performed under +25 °C case temperature.
- The mixer employs SAGE Millimeter’s trademarked and patent pending technology, **Uni-Guide™**, as its waveguide interfaces. The orientation of the input and the output waveguides can be specified through corresponding model numbers. For example, the model number for a horizontal output waveguide configuration would be **SFQ-33350312-22H22HSF-N1-M** instead of the default **SFQ-33350312-222SF-N1-M** which indicates vertical orientation output.
- The I/Q mixer can be configured as an image rejection mixer or used as an I/Q up-converter, single sideband modulator and phase detector.
- SAGE Millimeter, Inc. reserves the right to change the information presented without notice.

Caution:

- Exceeding absolute maximum ratings will damage the device.
- The mixer is a static sensitive device. Always follow ESD rules when working with the device.
- The IF ports are DC coupled. Use DC blocks if necessary. **Do not apply an external bias voltage to the IF port.**
- Proper torque, 8.0 ± 0.15 inch-pounds (0.92 ± 0.05 Nm), should be applied. **SAGE Millimeter torque wrench, model SCH-08008-S1, is highly recommended.**

