

## W-Band Quadrature Mixer with External Bias, 98 to 102 GHz

### Description:

**Model SFQ-98310415-1010SF-E1** is a W band quadrature mixer that covers the frequency range of 98 to 102 GHz. The mixer requires a nominal external DC bias of +5.0 V<sub>DC</sub> with a current draw of 4 mA and an LO power of +4.5 dBm. The typical LO to RF port isolation of the mixer is 30 dB, which is high enough for most applications without the requirement of additional port filtering. The low LO power requirement makes this a cost effective option. 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 reject mixer or single side-band modulator by adding an IF quadrature coupler.



### Features:

- Low required LO power
- Broadband operation
- Good gain flatness

### Applications:

- Phase detector
- Directional radar systems
- Communication Systems

### Electrical Specifications:

Parameter	Minimum	Typical	Maximum
RF Frequency	98 GHz		102 GHz
LO Frequency	98 GHz		102 GHz
IF Frequency	DC		1 GHz
LO Pumping Power	+4 dBm	+4.5 dBm	+6 dBm
Combined Damage RF and LO Power			+23 dBm
External Bias		+5.0 V <sub>DC</sub> / 4 mA	+5.5 V <sub>DC</sub> / 6 mA
Conversion Loss		18 dB	20 dB
I/Q Phase Unbalance		±15°	
LO to RF Port Isolation		30 dB	
Specification Temperature		+25 °C	
Case Temperature	0 °C		+50 °C

### Mechanical Specifications:

Item	Specification
RF Port	WR-10 Waveguide with UG-387/U-M Flange
LO Port	WR-10 Waveguide with UG-387/U-M Flange
IF-I, IF-Q	SMA(F), SMA(F)
DC Bias	Solder Pins
Case Material	Aluminum
Finish	Gold Plated
Weight	1.8 Oz
Size	1.15" (L) 1.15" (W) X 0.88" (H)
Outline	FQ-WE

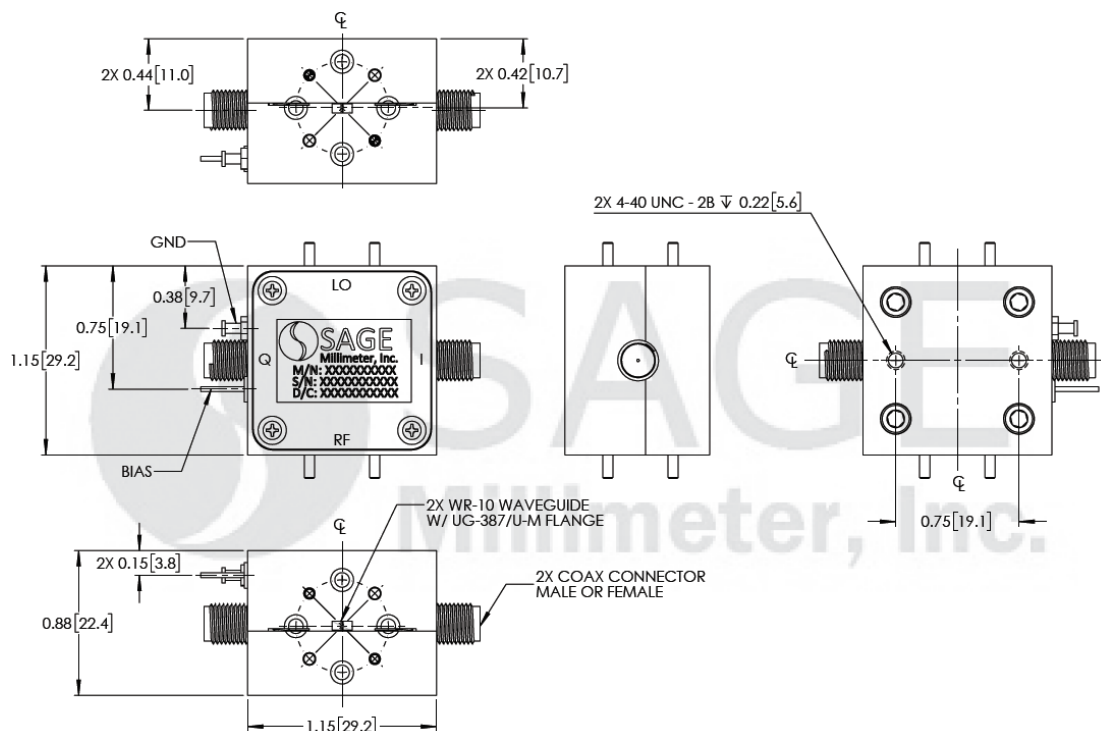


## W-Band Quadrature Mixer with External Bias, 98 to 102 GHz

Measured Typical I/Q Output:



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





## W-Band Quadrature Mixer with External Bias, 98 to 102 GHz

### Note:

- All data presented is collected from a sample lot. Actual data may vary unit to unit.
- All testing was performed under +25 °C case temperature.
- 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,  $8.0 \pm 0.15$  inch-pounds ( $0.92 \pm 0.05$  Nm), should be applied. **SAGE Millimeter torque wrench, model SCH-08008-S1, is highly recommended.**
- Any foreign objects in the waveguide will cause performance degradation and possible device damage.

