



## E-Band Harmonic Mixer, Keysight Spectrum Analyzer

### Description:

**Model SFH-12SFSF-A3** is an E-Band balanced harmonic mixer that is specially designed for using with Keysight’s spectrum analyzer series. The mixer employs high performance, GaAs Schottky flip chip diodes, a high-performance built-in diplexer and a balanced configuration to produce superior RF performance. The harmonic mixer is an even harmonic mixer, which works with LO frequency in the range of 3.0 to 6.1 GHz. With an IF range of DC to 1.3 GHz, the harmonic mixer gives a calibrated conversion loss table at the 16<sup>th</sup> of LO harmonics at +16 dBm input power level to translate RF frequency range of 60 to 90 GHz to IF frequency range of DC to 1.3 GHz. At 16<sup>th</sup> harmonic of LO, the harmonic mixer has a typical conversion loss of 45 dB.



### Features:

- Full Waveguide Band Operation
- No External Bias Required
- 16<sup>th</sup> Harmonic Detection

### Applications:

- Keysight Spectrum Analyzers
- Frequency Meters
- Phase Locked Loops

### Electrical Specifications:

Parameter	Minimum	Typical	Maximum
RF Frequency	60 GHz		90 GHz
LO Frequency	3.0 GHz		6.1 GHz
IF Frequency	DC		1.3 GHz
RF Power		- 20 dBm	+19 dBm
LO Power		+16 dBm	+19 dBm
Harmonic Number		16	
Conversion Loss		45 dB	
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

### Mechanical Specifications:

Item	Specification
RF Port	WR-12 Waveguide with UG-387/U Flange
LO Port	SMA (F)
IF Port	SMA (F)
Case Material	Brass
Finish	Gold Plated
Weight	5.4 Oz
Size	1.50" (L) x 1.20" (W) x 1.75" (H)
Outline	FH-E2

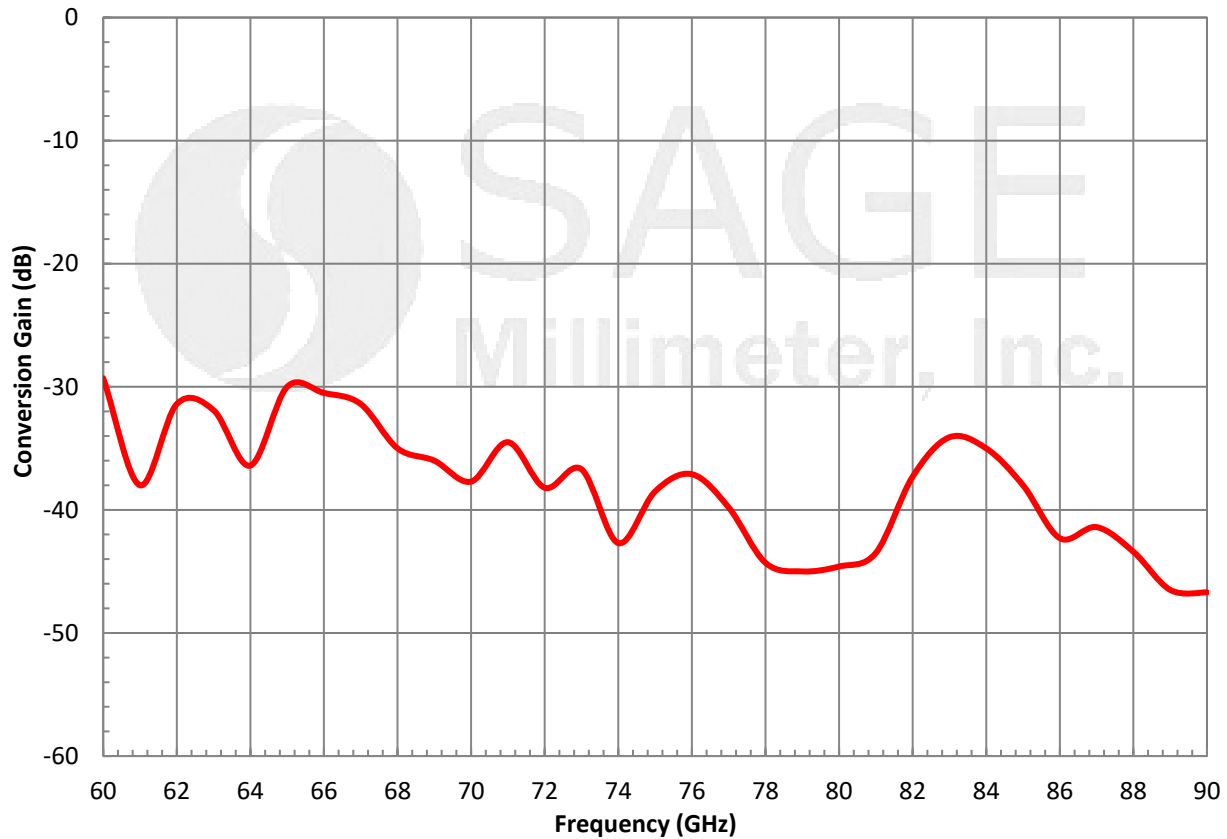




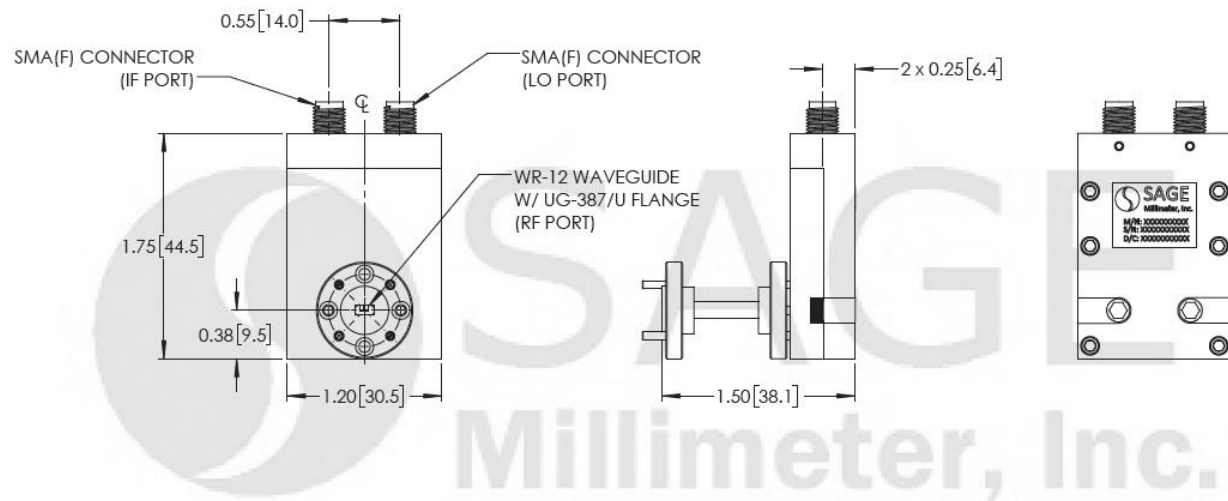
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### Typical Conversion Gain vs. Frequency

$P_{RF} = -20$  dBm, LO = +16 dBm, 16th Harmonic



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





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### Note:

- All data presented is collected from a sample lot. Actual data may vary unit to unit.
- The harmonic mixer is for small signal detection. The recommended the RF power range is -10 dBm or below.
- The Harmonic mixer work in any even harmonics of LO to yield the IF frequency in the range of DC to 1.3 GHz with different conversion loss.
- All testing was performed under **+25 °C** case temperature.
- SAGE Millimeter, Inc. reserves the right to change the information presented without notice.

### Caution:

- Exceeding absolute maximum ratings of the mixer will damage the device.
- Any foreign objects in the waveguide will degrade performance and/or damage the device.
- The mixer is a static sensitive device. Always follow ESD rules when working with the mixer.
- 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.**

