SSP-94312-D1

Rev 1.1

W Band Ranging Sensor Module, Dual Channel, 94 GHz

Description:

Model SSP-94312-D1 is a W band ranging sensor module that is designed and manufactured for medium range measurements of a moving target's speed, distance and direction. The sensor module has an operating frequency range of 91.5 to 96.5 GHz and takes a nominal bias of +8.0 VDC/250 mA. The sensor module is configured with a varactor tuned oscillator, an isolator, an amplifier, a power divider, a circulator and a I-Q mixer. The power divider is used to sample the LO power to pump the mixer, and the circulator is used as a TX/RX diplexer. The varactor has tuning voltage range of 2.8 V_{DC} to +30 V_{DC} and provides ±2.5 GHz tuning bandwidth. Various antennas can be integrated with the module to form sensor heads for many system applications.

Features:

- 94.0 GHz Operation
- Low FM/AM Noise and High Sensitivity
- Low Harmonic Emission
- Common Tx/Rx Port

Applications:

- True Ranging Radar Systems
- High Resolution Target Detection Systems
- Military Surveillance Systems

Electrical Specifications:

Parameter	Minimum	Typical	Maximum
Tx Frequency Range	91.5 GHz	94.00 GHz	96.5 GHz
Tx Frequency Tuning Bandwidth*		±2.5 GHz	
Tx Output Power		+12 dBm	
Rx Frequency Range	91.5 GHz	94.00 GHz	96.50 GHz
Rx IF Frequency Range	DC		1 GHz
Rx Conversion Loss		15 dB	
I/Q Phase Unbalance		±15°	
Rx I/Q Amplitude Δ		0 dB	3 dB
Frequency Stability		-6.0 MHz/°C	
Power Stability		-0.05 dB/°C	
Varactor Tuning Voltage	2.8 V_{DC}	+5 V_{DC}	+30 V_{DC}
VCO Bias Voltage		+5 V_{DC}	+5.5 V_{DC}
VCO Current		780 mA	
Amplifier Bias Voltage		+8 V_{DC}	+15 V_{DC}
Amplifier Bias Current		250 mA	
Specification Temperature		+25˚C	
Operating Temperature	0˚C		+50˚C

*The center frequency is factory preset per user's request

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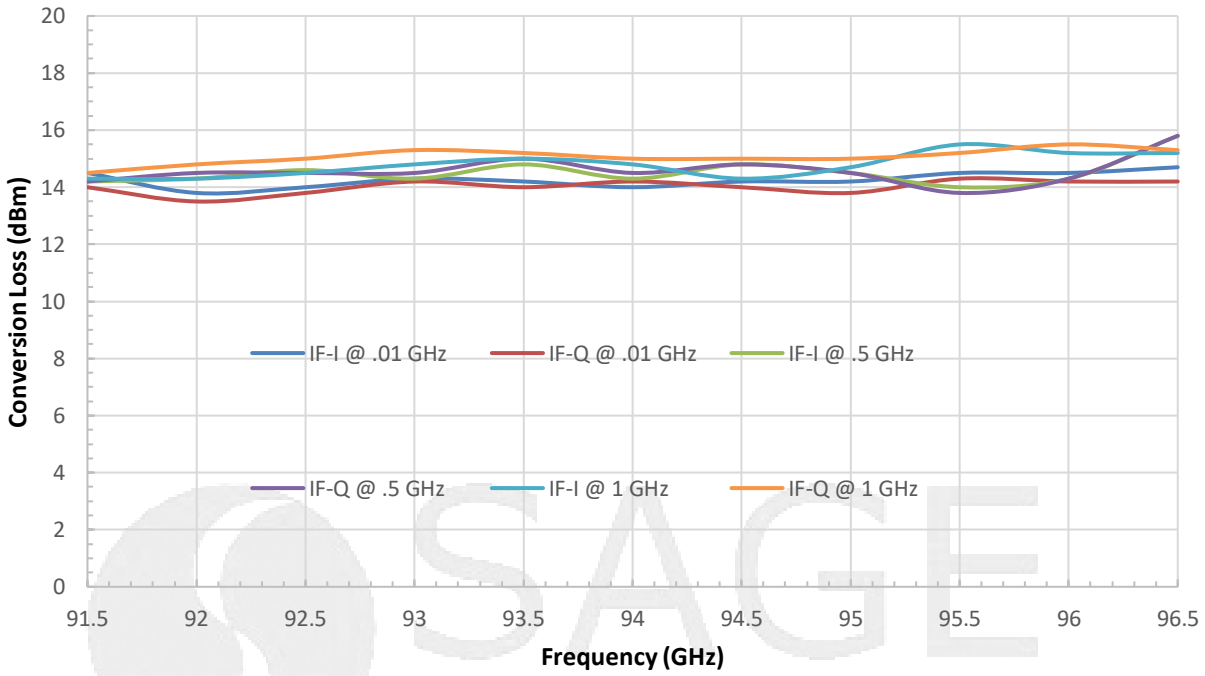
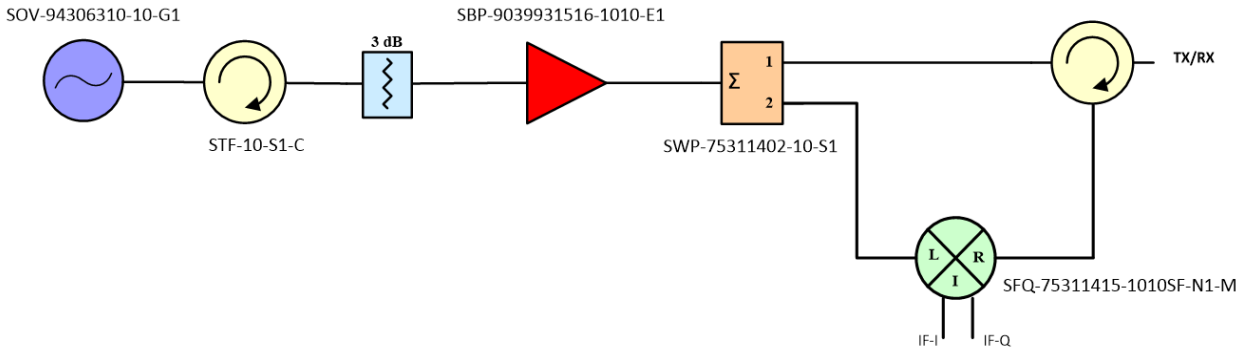
Mechanical Specifications:

Item	Specification
Tx/Rx Port	WR-10 Waveguide with UG-387/U-M Flange
IF Port	SMA (F)
DC Bias	Solder Pins
Material	Aluminum and Brass
Finish	Gold Plated
Weight	2 lbs
Size	11” (L) X 7” (W) X 1.96” (H)
Outline	SP-EW-DB

Typical Conversion Loss vs. Frequency



Block Diagram:



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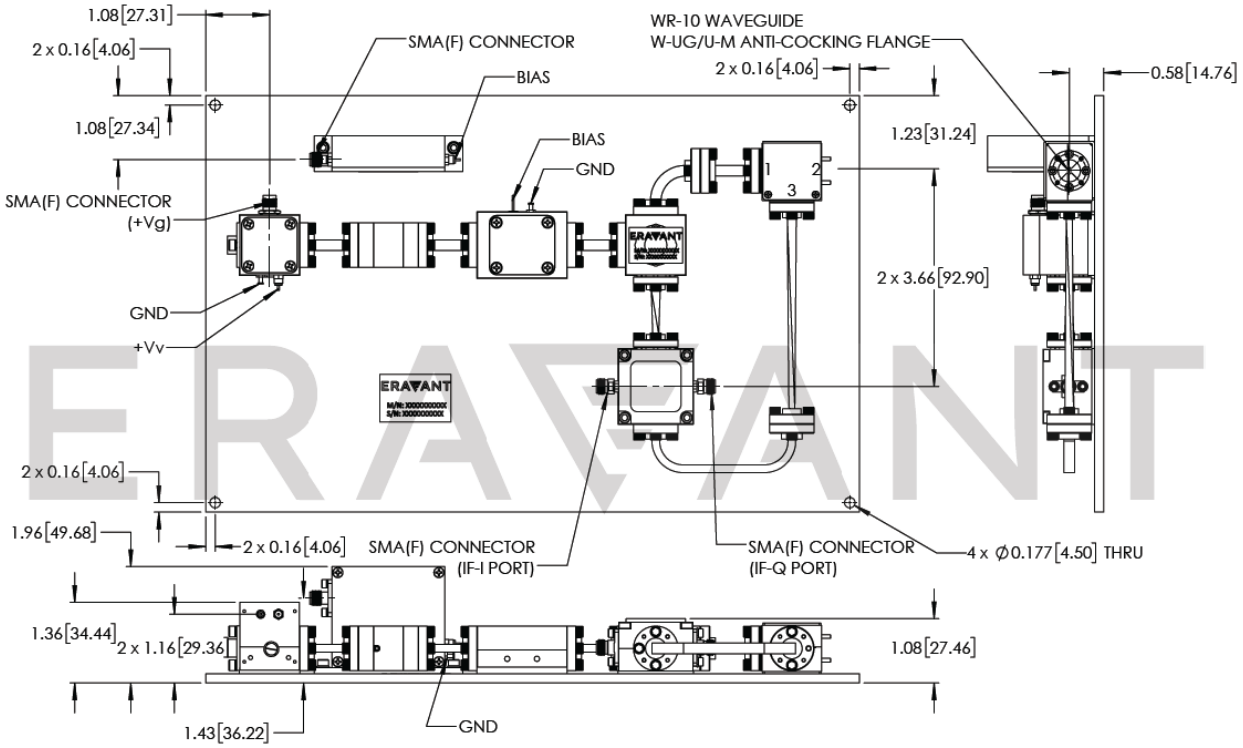
Mechanical Outline: (Unless otherwise specified, all dimensions are in inches [millimeters])



Note:

- All data presented is collected from a sample lot. Actual data may vary unit to unit slightly.
- All testing as performed under +25˚C case temperature.
- Other mechanical configurations are available under different model numbers.
- SAGE Millimeter, Inc. reserves the right to change the information presented without notice.

Caution:

- Exceeding absolute maximum ratings shown will damage the device.
- The device is static sensitive. Always follow ESD rules when working with the device.
- Any foreign objects in the waveguide will cause performance degradation and possibly damage the device.
- The case temperature of the device shall never exceed +50˚C. Use a proper heatsink or fan if necessary.
- Proper torque, 8.0 ± 0.15 inch-pounds (0.90 ± 0.02 Nm), should be applied. **SAGE Millimeter torque wrench, model SCH-08008-S1, is highly recommended.**

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