



W Band Ranging Sensor Module, Single Channel, 94 GHz

Description:

Model SSP-94310-S1 is a W band ranging sensor module based on FMCW radar principles. This sensor module is designed and manufactured for measurements of a moving target's speed. The sensor module has a center frequency of 94 GHz and takes a nominal bias of +5.0 VDC/250 mA. The frequency modulation bandwidth of ± 250 MHz is realized via a tuning voltage of 0 to +20 Volts. The sensor module is configured with a Varactor tuned oscillator, an isolator, a directional coupler, a circulator and a balanced mixer. The directional coupler is used to sample the LO power to pump the mixer, and the circulator is used as a TX/RX diplexer. Various antennas can be integrated with the module to form sensor heads for many system applications.



Features:

- 94.0 GHz FMCW 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	93.75 GHz	94.00 GHz	94.25 GHz
Tx Output Power		+10 dBm	
FMCW Tuning Bandwidth		± 250 MHz	
Rx Frequency Range	93.75 GHz	94.00 GHz	94.25 GHz
Rx IF Frequency Range	DC		1 GHz
Rx Conversion Loss		11 dB	
Varactor Voltage		0 to +20 Volts	
Varactor Tuning Speed		1 ms	
Frequency Stability		-6.0 MHz/ $^{\circ}$ C	
Power Stability		-0.04 dB/ $^{\circ}$ C	
Bias Voltage		+10 V _{DC}	+10.5 V _{DC}
Bias Current		200 mA	250 mA
Specification Temperature		+25 $^{\circ}$ C	
Operating Temperature	0 $^{\circ}$ C		+50 $^{\circ}$ C





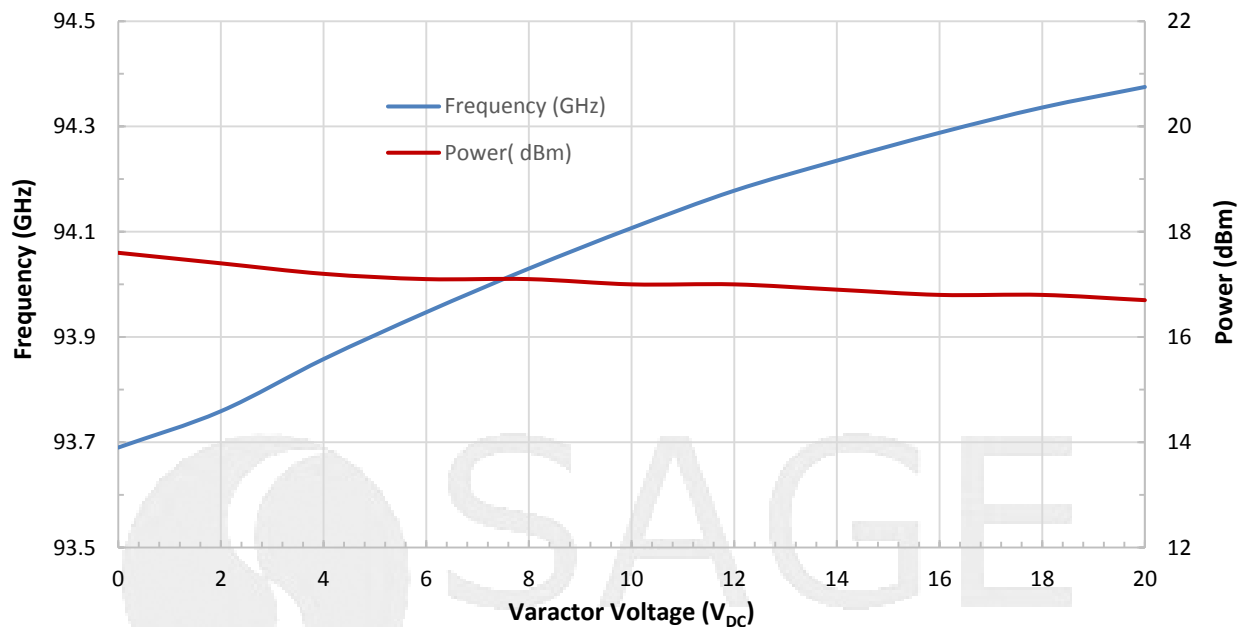
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Mechanical Specifications:

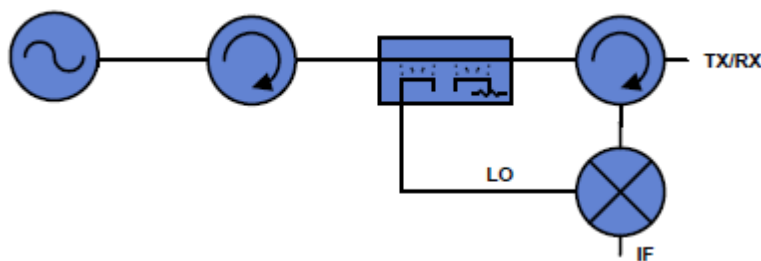
Item	Specification
Tx/Rx Port	WR-10 Waveguide with UG-387/U-M Flange
IF Port	SMA (F)
DC Bias	Solder Pins
Case Material	Aluminum and Brass
Finish	Gold Plated
Size	2.25" (W) X 1.71" (H) X 6.35" (L)
Weight	5.0 Oz
Outline	SP-NWEV-S1

Typical Performance of Varactor Tuned Oscillator

Bias: +4.2 Vdc/760 mA



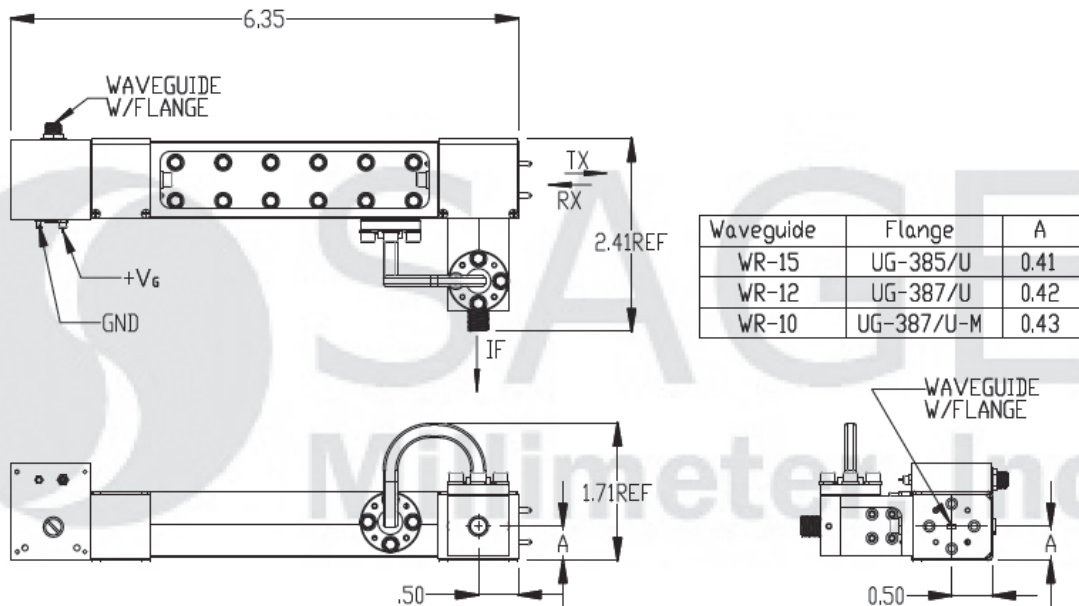
Block Diagram:





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



Note:

- All data are presented using a limited sample lot. Actual data may vary unit to unit.
- 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 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.

