SSP-94310-S1

Rev. 1.1

W Band Ranging Sensor Module, Single Channel, 94 GHz, ± 250 MHz

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 or stationary target's speed and distance. The sensor module has a center frequency of 94 GHz and takes a nominal bias of +4.5 VDC/650 mA. The frequency modulation bandwidth of ±250 MHz is realized via a tuning voltage of 0 to +25 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		5 GHz
Rx Conversion Loss		11 dB	
Varactor Voltage		0 to +25 Volts	
Varactor Tuning Speed		1 µs	
Frequency Stability		-6.0 MHz/°C	
Power Stability		-0.04 dB/°C	
Bias Voltage		+4.5 V_{DC}	+5.0 V_{DC}
Bias Current		650 mA	950 mA
Specification Temperature		+25˚C	
Operating Temperature	0˚C		+50˚C

*Note: If the SOR-R3 regulator is used, the required DC bias voltage to regulator input is +8 V_{DC}.

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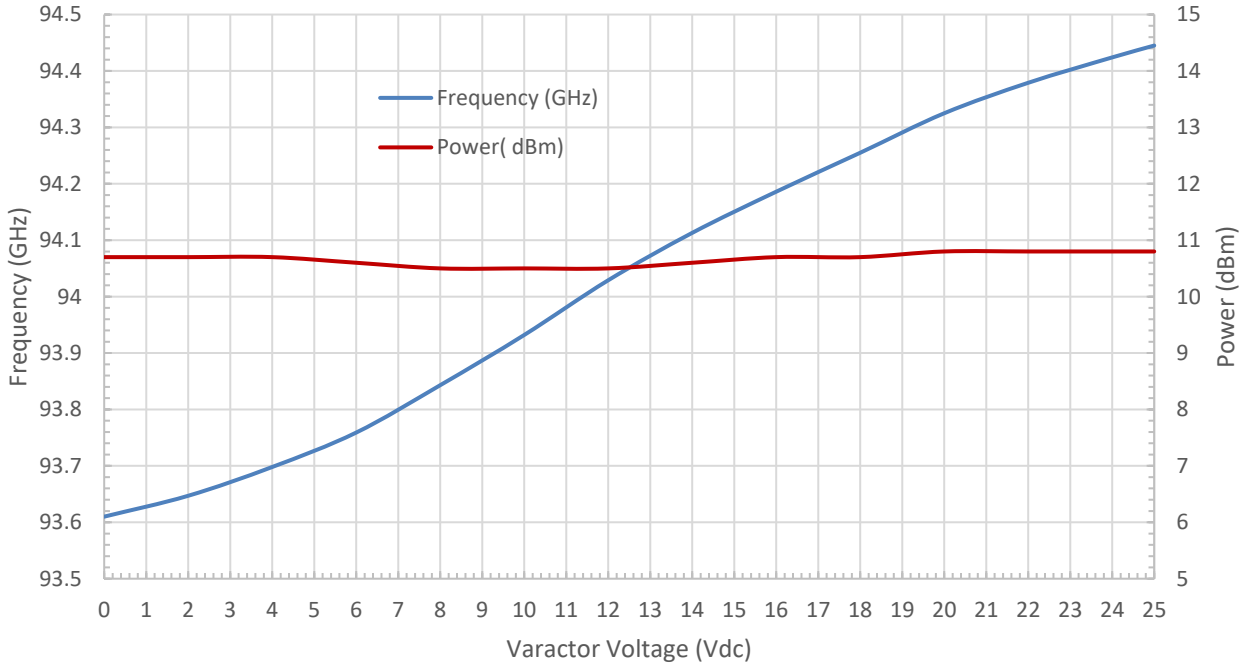
Mechanical Specifications:

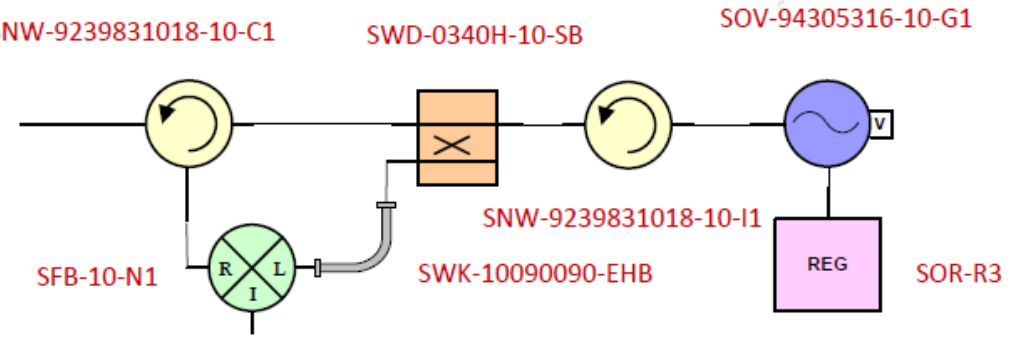
Item	Specification
Tx/Rx Port	WR-10 Waveguide with UG-387/U-M Flange
IF Port	SMA (F)
DC Bias Port	Solder Pins
Varactor Bias Port	SMA (F)
Case Material	Aluminum and Brass
Finish	Gold Plated
Size	2.25” (W) X 1.71” (H) X 6.35” (L)
Weight	5.0 Oz
Outline	SP-NWEV-S1

TX Frequency and Power Output vs. Varator Voltage

Bias: +4.5 Vdc/700 mA



Block Diagram:



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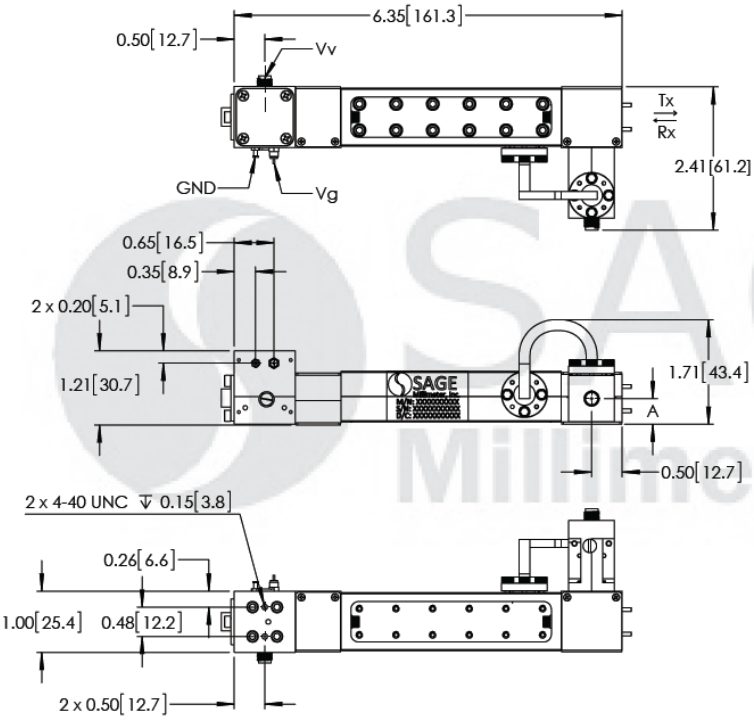
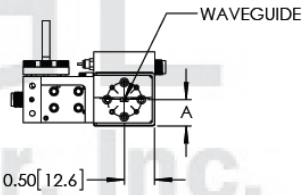
Mechanical Outline: (Unless otherwise specified, all dimensions are in inches)



Waveguide	Flange	A
WR-15	UG-385/U	0.41[10.4]
WR-12	UG-387/U	0.42[10.7]
WR-10	UG-387/U-M	0.43[10.9]



Note:

- All data are presented using a limited sample lot. Actual data may vary unit to unit.
- All testing was performed under +35 ˚C case temperature.
- Eravant 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.
- Proper torque, 8.0 ± 0.4 inch-pounds (0.90 ± 0.02 Nm), should be applied. **Eravant torque wrench, model SCH-08008-S1, is highly recommended.**
- 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.