



## E Band Ranging Sensor Module, Single Channel, 76.5 GHz, ± 250 MHz

### Description:

**Model SSP-77310-S1** is an E 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 76.5 GHz and takes a nominal bias of +4.5 V<sub>DC</sub>/750 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:

- 76.5 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
- Automotive Radar Systems

### Electrical Specifications:

Parameter	Minimum	Typical	Maximum
Tx Frequency Range	76.25 GHz	76.50 GHz	76.75 GHz
Tx Output Power		+10 dBm	
FMCW Tuning Bandwidth		±250 MHz	
Rx Frequency Range	76.25 GHz	76.50 GHz	76.75 GHz
Rx IF Frequency Range	DC		1 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 <sub>DC</sub>	+5.0 V <sub>DC</sub>
Bias Current		750 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<sub>DC</sub>.





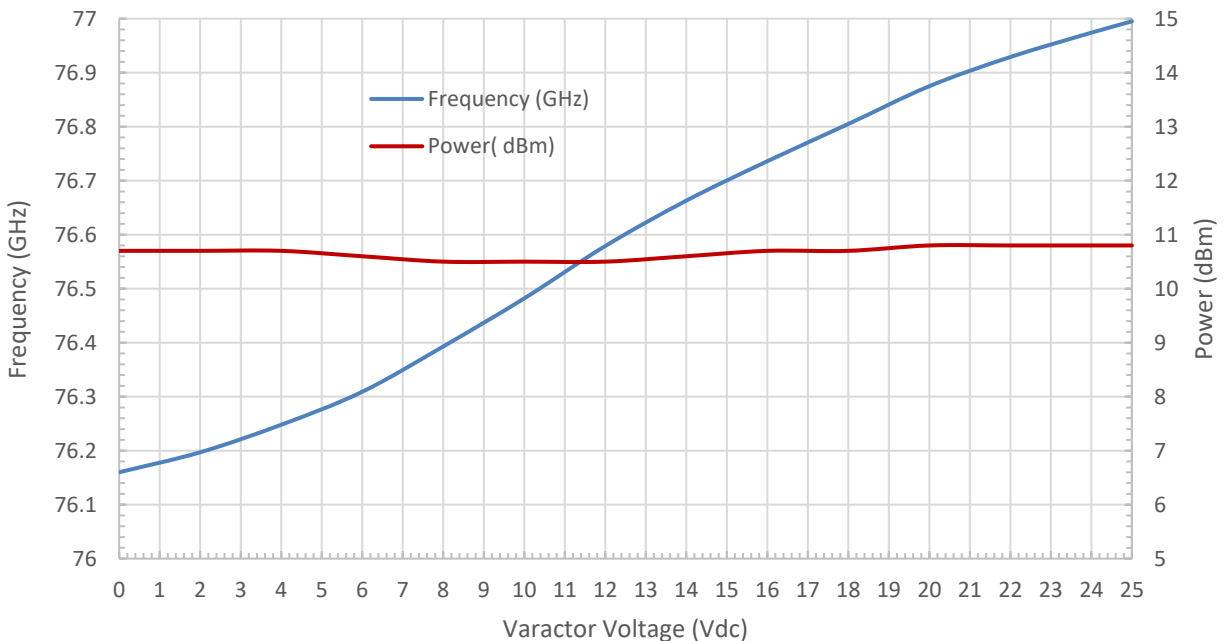
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### Mechanical Specifications:

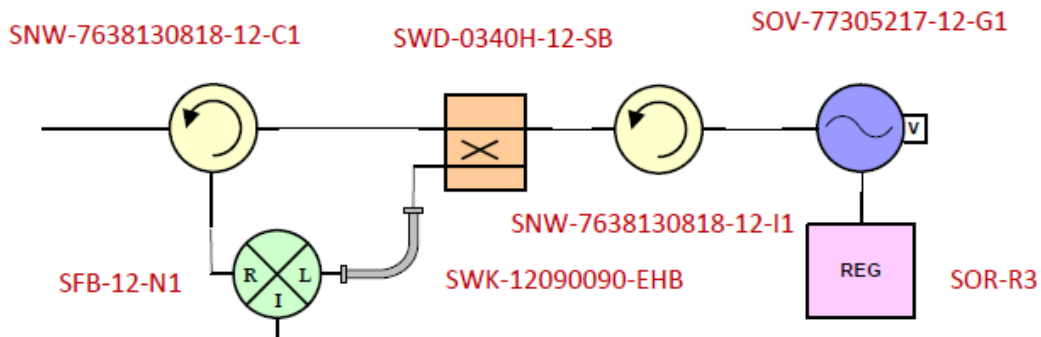
Item	Specification
Tx/Rx Port	WR-12 Waveguide with UG-387/U Flange
IF Port	SMA (F)
DC Bias Port	Solder Pins
Varactor Bias Port	SMA (F)
Case Material	Aluminum and Brass
Finish	Gold Plated
Size	2.25" (W) X 1.71" (H) X 6.35" (L)
Weight	5.0 Oz
Outline	SP-NWEV-S1

### TX Frequency and Power Output vs. Varator Voltage

Bias: +4.5 Vdc/750 mA



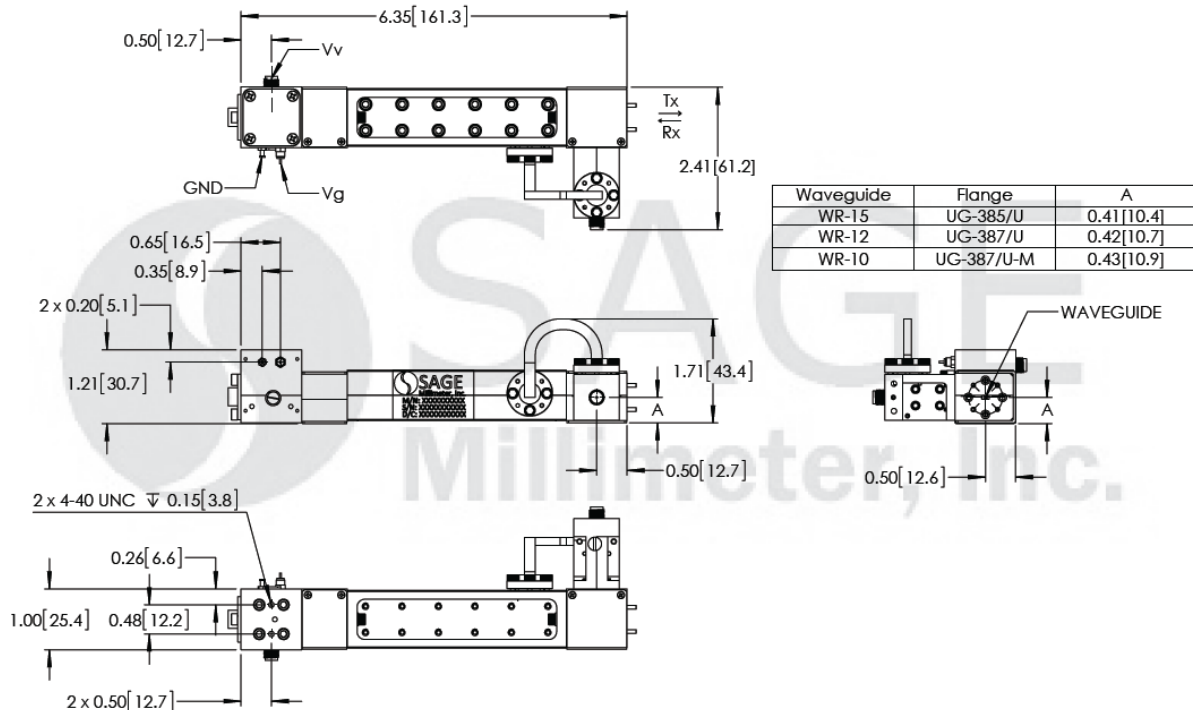
### Block Diagram:





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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 +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.



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The Outline of the Gunn Oscillator Regulator Model [SOR-R3](#). (Unless otherwise specified, all dimensions are in inches.)

