

## W Band Ranging Sensor Module, Single Channel, 94 GHz, 5 GHz

### Description:

**Model SSP-94312-S1** is a W band ranging sensor module that is designed and manufactured for medium range measurements of a moving target's speed and distance. The sensor module has an operating frequency range of 91.5 to 96.5 GHz and takes a nominal bias of  $+8.0 V_{DC}/1,030 \text{ mA}$ . The sensor module is configured with a varactor tuned oscillator, an isolator, an amplifier, 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. The varactor has tuning voltage range of  $2.8 V_{DC}$  to  $+30 V_{DC}$  and provides  $\pm 2.5 \text{ GHz}$  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*		$\pm 2.5 \text{ GHz}$	
Tx Output Power		+12 dBm	
Rx Frequency Range	91.5 GHz	94.00 GHz	96.50 GHz
Rx IF Frequency Range	DC		5 GHz
Rx Conversion Loss		10 dB	
Frequency Stability		-6.0 MHz/ $^{\circ}\text{C}$	
Power Stability		-0.05 dB/ $^{\circ}\text{C}$	
Varactor Tuning Voltage	$2.8 V_{DC}$	$+5 V_{DC}$	$+30 V_{DC}$
Varactor Tuning Speed		1 $\mu\text{S}$	
Gunn Bias Voltage**		$+4.5 V_{DC}$	$+5.5 V_{DC}$
Gunn Bias Current		780 mA	
Amplifier Bias Voltage		$+8 V_{DC}$	$+15 V_{DC}$
Amplifier Bias Current		250 mA	
Specification Temperature		$+25 \text{ }^{\circ}\text{C}$	
Operating Temperature	$0 \text{ }^{\circ}\text{C}$		$+50 \text{ }^{\circ}\text{C}$

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

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



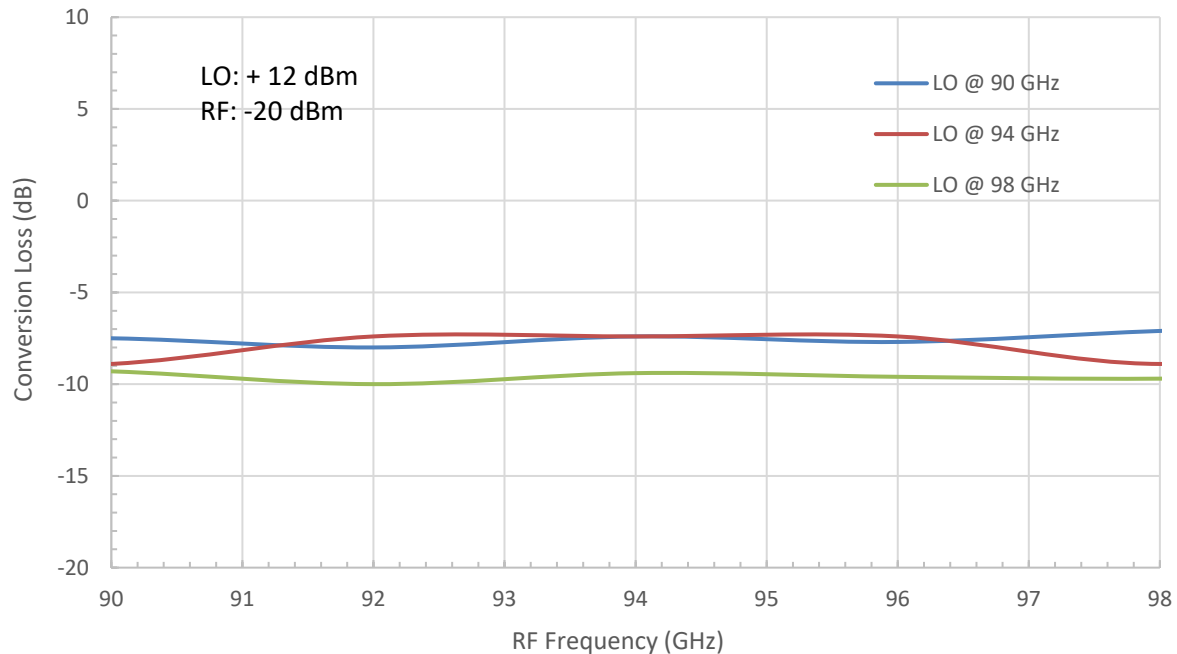


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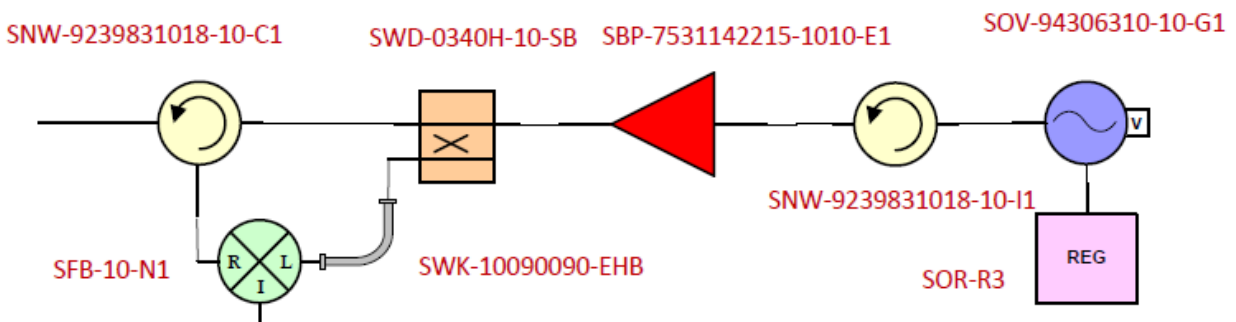
### Mechanical Specifications:

Item	Specification
Tx/Rx Port	WR-10 Waveguide with UG-387/U-M Anti-Cocking Flange
IF Port	SMA (F)
DC Bias Port (Vg)	SMA (F)
Varactor Bias Port (Vv)	Solder Pins
Material	Aluminum and Brass
Finish	Gold Plated
Weight	5 Oz
Size	8.06" (L) X 3.03" (W) X 1.99" (H)
Outline	SP-NWEV-S1-A

### Typical Conversion Loss vs. Frequency



### Block Diagram:

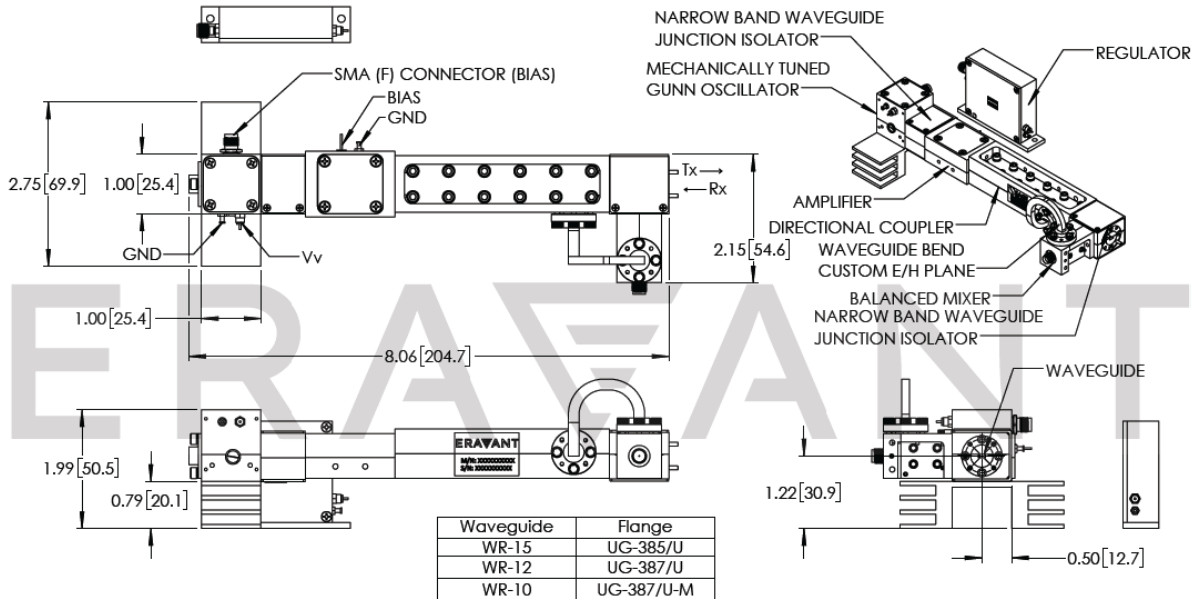


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## W Band Ranging Sensor Module, Single Channel, 94 GHz, 5 GHz

**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.
- 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.
- 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. **Eravant torque wrench, model SCH-08008-S1, is highly recommended.**



## W Band Ranging Sensor Module, Single Channel, 94 GHz, 5 GHz

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

