

FMCW Transceiver

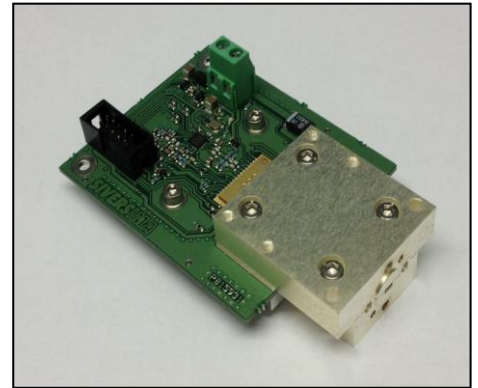
RS3400W/04

Features:

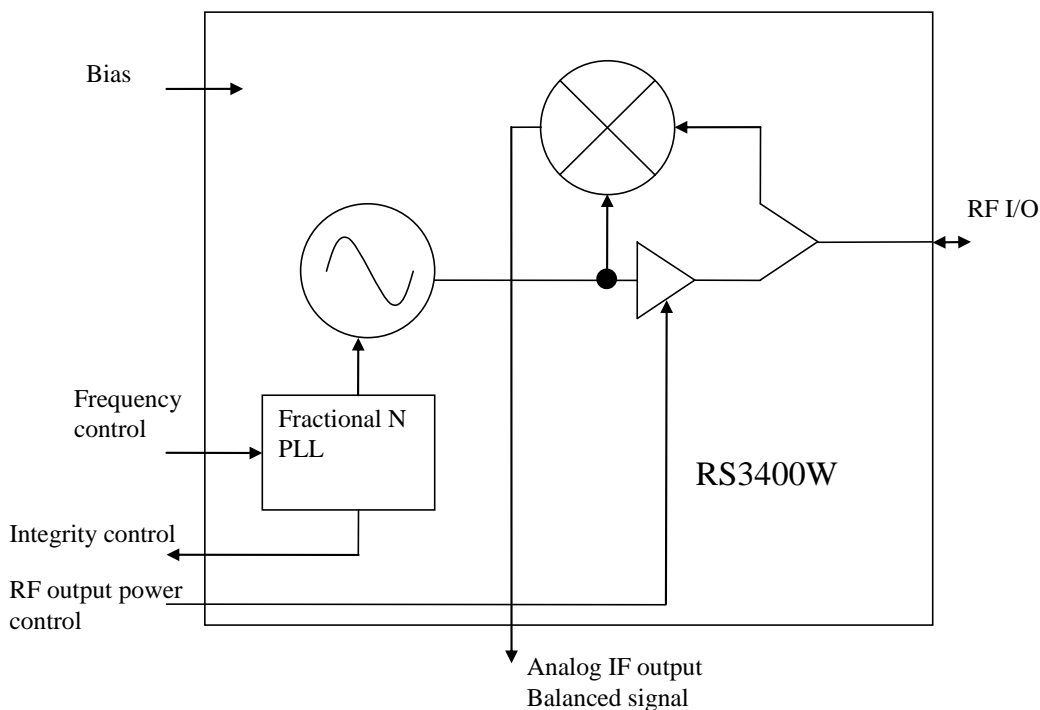
- Complete 76-77GHz band FMCW Radar Front End
- Synthesized frequency source
- Wideband Sweep

Description:

The RS3400W/04 is a W-band FMCW radar front end featuring synthesized frequency sweeps. A fast sweep mode enables complete sweeps below 1ms. The system provides one Tx/Rx with a WR12 waveguide interface suitable for attaching compact high directivity antennas.



Block Diagram:



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Performance Specification:

Estimated values. Tested or implicated by design. All units are tested at room temperature.

Parameter	Min.	Typ.	Max.	Unit
RF: (Probing signal)				
Minimum output frequency			76000	MHz
Maximum output frequency	77000			MHz
Frequency stability ¹			35	ppm
Bandwidth stability			35	ppm
Frequency setting resolution		200		kHz
Frequency settling time ^{2,3}	40			μs
IF: (Sensor output)				
Full reflection response amplitude ⁴	4	6	12	dBV _{pp}
Reflection response amplitude variation		4	5	dB

Typical values, not tested.

Parameter	Min.	Typ.	Max.	Unit
RF output power	4	6	9	dBm
RF output power variation (over frequency)			2	dB
RF output power variation (over temperature)			4	dB
Harmonics related to carrier			TBD	dBc
Spurious (synthesizer related) ⁵			TBD	dBc
Spurious (not synthesizer related)			TBD	dBc
SSB phase noise @ 100 kHz from carrier		-64		dBc/Hz
RF to IF conversion efficiency ⁶		3		dB
Sensor dynamic range ⁷		80		dBc
Power consumption ⁸		3.5		W

¹ Over operating temperature range, input voltage variation, aging, shock, and vibration.

² Defined as time elapsed for a signal to settle within 0.1MHz of a 1 MHz frequency step. Settling time is strongly dependent on digital parameters settings of the FMCW module.

³ A synthesized, free running, mode is available enabling complete frequency sweep in times below 1 millisecond.

⁴ Defined as the IF output signal level (voltage peak-to-peak) when the complete RF (probing signal) is returned from a reflecting target.

⁵ Average over whole frequency band.

⁶ The IF signal power is measured as a voltage over 10kΩ from the balanced IF port. This voltage is used to calculate a power assuming the voltage was dissipated in a 50Ω resistor.

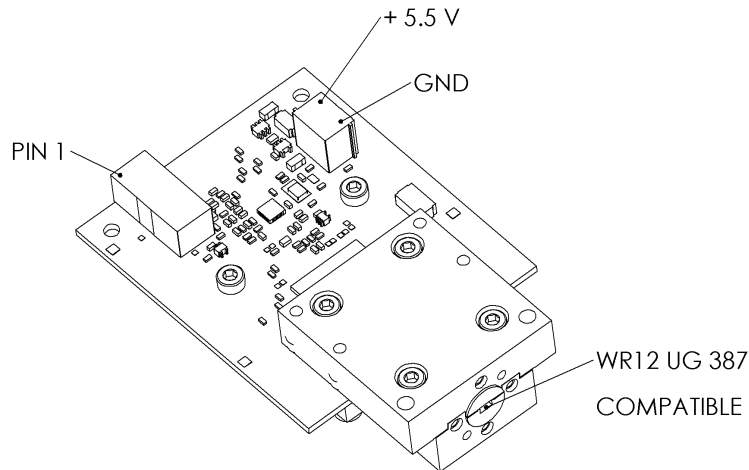
⁷ Defined as signal level below full reflection response adjacent to detected peak in a Fourier transformed IF signal.

⁸ Power is delivered as +5.5V +/- 0.1V, current consumption is typically 630mA.

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Interfaces and Electrical Specification:



Connector / pin	Pin	Direction/ type	Description	Specification
DC connector			Single power supply	Phoenix contact MKDSN2,5/2-5.08 or similar
	+	POWER	VDC, regulated voltage	5.5V ± 0.25V, approx. 650mA
	GND	POWER	Power ground	
Control and IF signal			2x5 pole 0.1" lead spacing	TE Connectivity PN 2-1761603-3 or similar
	1	IN	CLK	Microwire 3.3V
	2	SIG GND	GND	Digital ground
	3	IN	DATA	Microwire 3.3V
	4	SIG GND	GND	Digital ground
	5	IN	LATCH	Microwire 3.3V
	6	IN	Power GO, active low	0/3.3V
	7	OUT	IF+	0-5.5V
	8	SIG GND	GND	Analog ground
	9	OUT	IF-	0-5.5V
RF I/O	N/A	IN/OUT	PLL integrity control WR12 waveguide	Open collector Compatible with UG-387/U flange

Note on control and IF signal:

Power GO: Controls output RF power. A low voltage (<1.0V) will enable full output power. A high voltage (>3.0V) will reduce output power by at least 20dB.

PLL integrity control: Provides a low pass connection to the PLL MUX pin with which different signals can be tapped. Frequency lock can be reported as a test of integrity.

IF+, IF-: Balanced IF output signal, short circuit protected. Output impedance is approximately 3kΩ.

Programming of the RS3400W is done through a 3 wire interface. Please contact factory for details.

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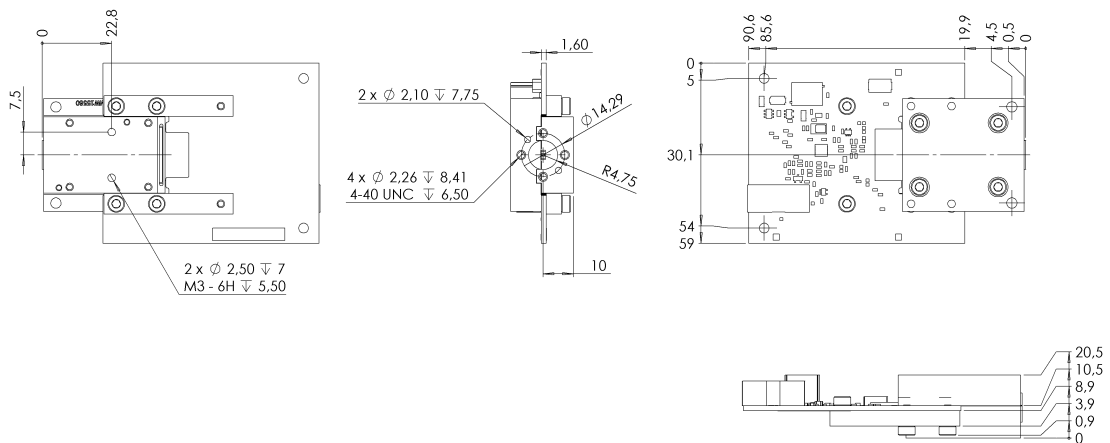
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Environmental Specification:

Parameter	Min.	Max.	Unit
Operational temperature range ⁹	0	70	°C
Storage temperature range	-50	+100	°C

⁹ Other temperature ranges available upon request.

Mechanical drawing:



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