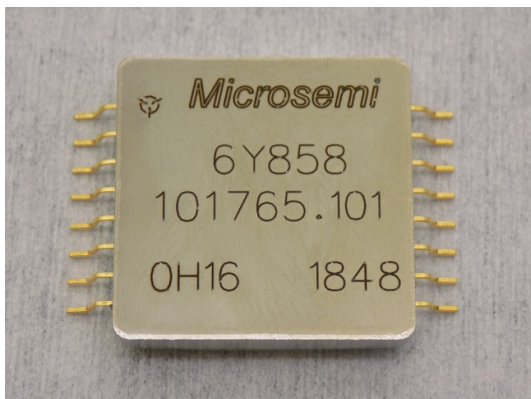


101765

Ultra-Low Phase Noise Voltage Controlled SAW Oscillator (VCSO)

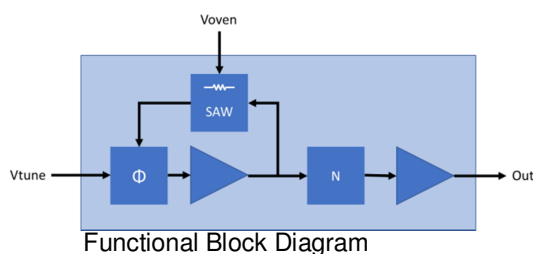


Features

- Frequency range: 320 to 2,500 MHz
- Ultra-Low Phase Noise Performance
 - 160 dBc/Hz @ 10 kHz offset
 - 180 dBc/Hz noise floor
- High output power: +18 dBm
- Supply Voltage: 5V – 15V
- Package size: 1"x1"x0.2", 16 Lead, hermetic
- High reliability
- Single ended sinewave output

Applications

- PLL Circuits
- Coherent local oscillator and/or clock in radar receiver exciter module
- Low noise source for test & measurement



Description

The 101765 is a Voltage Controlled SAW Oscillator (VCSO) that operates at the fundamental frequency of the internal SAW resonator. The SAW resonator is a high-Q quartz device that enables the circuit to achieve ultra-low phase noise performance. It employs our patented micro-oven technology to stabilize frequency over ambient temperature variations while consuming very little power. Fundamental performance is available from 320 MHz to 850 MHz. An internal multiplier circuit is deployed to achieve frequencies up to 2,500 MHz. The oscillator is housed in a hermetically sealed Kovar flat-pack package suitable for surface mount installation.

101765 Ultra-Low Phase Noise VCSO

Electrical Performance						
Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes
Fundamental Frequency			320-850		MHz	2, 7
Frequency Multiplier		1		3		
Output VSWR (50 Ohms)				1.5:1		
Output Power			9 - 18		dBm	3
Temperature Stability – Frequency			10	20	ppm p-p	4
Temperature Stability – Power			1	2	dB p-p	
Aging			30		ppm	
Frequency Pushing		-0.5	0.1	0.5	ppm/V	5
Frequency Pulling		-5	1	5	ppm	6
Tuning Range			250		ppm	7
Tuning Linearity			10		%	
Tuning Voltage	V_t	0		V_s	V	
Sub-Harmonic Spurious			-25	-20	dBc	
Harmonic Spurious			-55	-50	dBc	
Phase Noise at 10 kHz			-160		dBc/Hz	7,8
Phase Noise at >1 MHz			<-180		dBc/Hz	8
Supply Voltage $\pm 5\%$	V_s		5-15		V	
Supply Current (no heater power)				0.125	A	9
Heater Power Consumption (SS)			0.5	1	W	
Time to Performance			2		sec	
Vibration Sensitivity			1		ppb/g	
Operating Temperature		-40		85	C	
Lifetime		20			years	

Notes:

- The ppm and ppb values are with reference to nominal output frequency
- Units are screened and tested to achieve nominal output frequency under all conditions, end of life
- Nominal output power can be set between +10 dBm and +18dBm at fundamental
 - Frequency Doubled power +13 dBm typical
 - Frequency Tripled power +10 dBm typical
- Requires use of micro-oven and associated power, otherwise +/-100 ppm typical
- Measured over nominal supply voltage $\pm 5\%$
- 2.0:1 VSWR, all phases, 50 Ohms
- Resonator frequency, bandwidth (Tune range) and delay (Phase Noise) are all related and are selected at design
- Performance of a fundamental frequency oscillator at 600 MHz, spurious omitted
 - Multiplied performance degrades $20 \cdot \log(M)$ where M is the multiplication factor
- Supply current is approximately the same regardless of supply voltage. Operating at lower supply voltage will consume less power.

101765 Ultra-Low Phase Noise VCSO

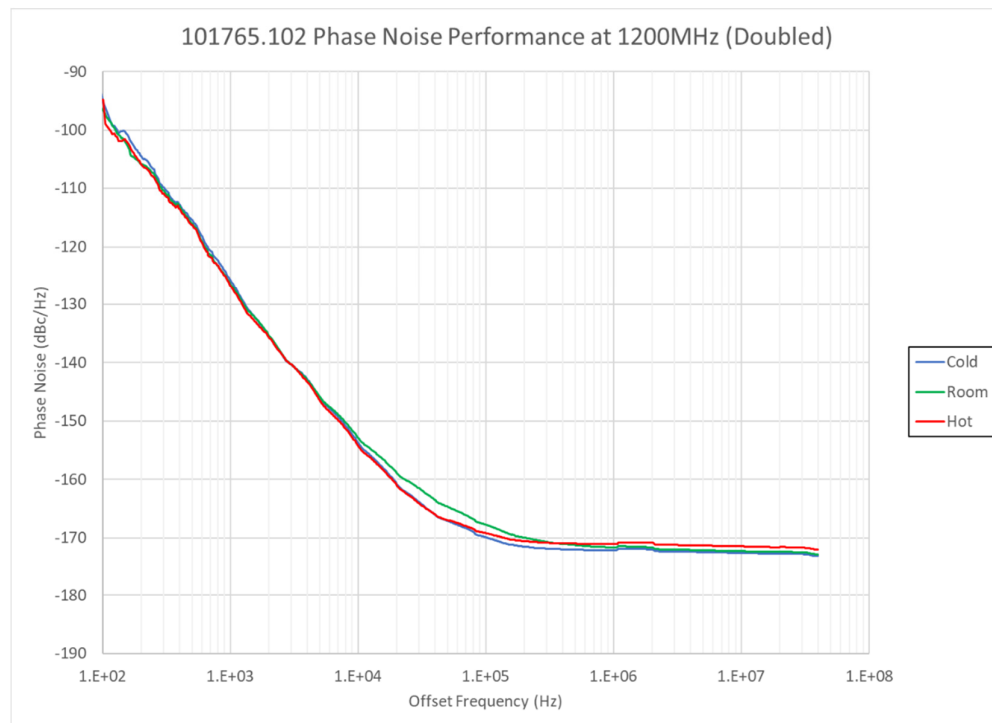
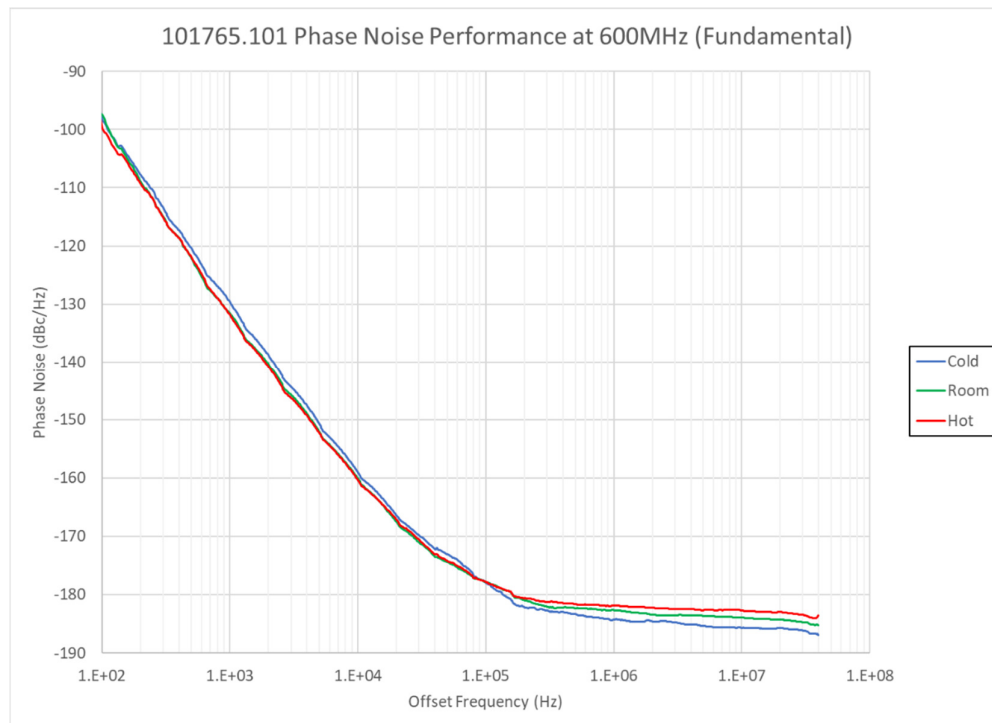
Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply Voltage	V_s	Nominal + 1	V
Supply Current (no heater power)		0.150	A
Tuning Voltage	V_t	V_s	V
Storage Temperature		-55 to 125	C

Stresses in excess of the absolute maximum ratings can permanently damage the device. Also, exposure to these absolute maximum ratings for extended periods may adversely affect device reliability. Functional operation is not implied at these or any other conditions in excess of those represented in the operational sections of this datasheet.

101765 Ultra-Low Phase Noise VCSO

Typical Characteristics: Phase Noise



101765 Ultra-Low Phase Noise VCSO

Reliability

The 101765 VCSO product family is capable of meeting the following qualification tests. These tests are also available as production screening tests.

Environmental Compliance

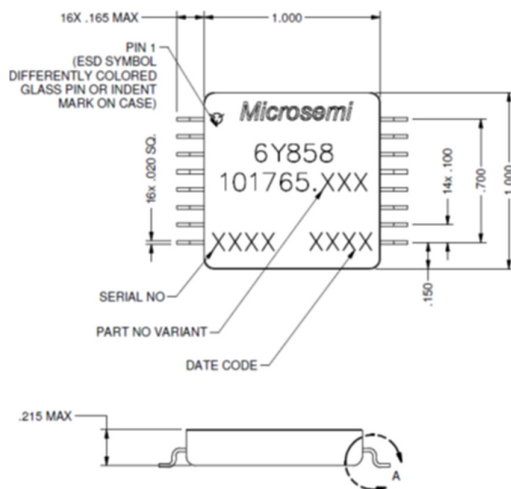
Parameter	Conditions
Internal Visual	MIL-STD-883, Method 2017
Burn-In Aging	MIL-STD-883, Method 1015
Mechanical Shock	MIL-STD-883, Method 2002
Mechanical Vibration	MIL-STD-883, Method 2007
Thermal Cycling	MIL-STD-883, Method 1010
Solderability	MIL-STD-883, Method 2003
Gross Leak	MIL-STD-202, Method 112
Fine Leak	MIL-STD-883, Method 1014
Resistance to Solvents	MIL-STD-883, Method 2016
External Visual	MIL-STD-883, Method 2009

Handling Precautions

Device is susceptible to ESD. Proper precautions should be taken when handling and mounting.

101765 Ultra-Low Phase Noise VCSO

Outline & Marking Diagram



Pin Out

PIN OUTS	
PIN NO	FUNCTION
1	Vcontrol
2	NC
3	GND
4	NC
5	NC
6	NC
7	GND
8	Voven
9	OUTPUT
10	GND
11	GND
12	NC
13	NC
14	GND
15	NC
16	Vcc

NOTES:

1. MICROSEMI RECOMMENDS GROUNDING NC PINS IN APPLICATION.

101765 Ultra-Low Phase Noise VCSO

Standard Frequencies (MHz)

600	1,200					
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Other frequencies available upon request.

Ordering Information

Consult with factory

Contact Information:

USA: Microsemi • 90 Wolcott Road, Simsbury, CT 06070
Tel: 1.860.651.0211



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101765 Ultra-Low Phase Noise VCSO

Revision History

Date	Approved	Description
5/30/19	Approved	Initial release for 101765