



# Surface Mount Voltage Controlled Oscillator WLAN 2050 - 2150 MHz



## Features

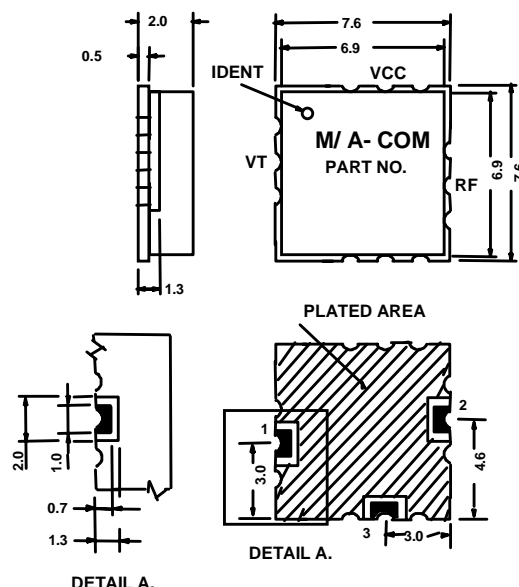
- Miniature SMT Package
- Low Phase Noise
- Highly Linear Tuning
- +3V Operation

## Description

The V42100 is a fundamental single ended oscillator designed for use in cost sensitive wireless applications. The VCO integrates a bipolar transistor, varactor diode and high Q resonator in a surface mount package. The standard SMT packaging provides electrical shielding and easy PCB assembly. The circuit design and component device selection have been optimised for low phase noise and highly linear tuning performance.

M/A-COM VCOs are manufactured in facilities using advanced surface mount assembly and automated electrical test equipment. This ensures consistent electrical performance and product quality over volume manufacturing quantities.

## LSM4 Package



## Electrical Specifications<sup>1</sup>, $T_A = +25^\circ\text{C}$ , $V_{CC} = +3\text{V}$ (unless otherwise stated)

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Frequency Range ( $F_{OUT}$ )	Over $T_{OP}$	MHz	2050		2150
Tuning Voltage ( $V_T$ ) <sup>2</sup>	Over $T_{OP}$	V	+0.6		+4.0
RF Output Power ( $P_{OUT}$ ) <sup>3</sup>	Over $T_{OP}$	dBm	+5.0		+10.0
Harmonic Output <sup>4</sup>		dBc		-20	
Phase Noise <sup>5</sup>	SSB at 10 kHz offset from carrier	dBc/Hz		-87	-82
	SSB at 100 kHz offset from carrier	dBc/Hz		-108	-103
Average Tuning Sensitivity <sup>6</sup>		MHz/V		100	
Tuning Linearity <sup>7</sup>		Ratio		1.4	
Frequency Pushing	$V_{CC} +3\text{V} \pm 0.15\text{V}$	MHz/V		5	10
Frequency Pulling	Over all phases of a 1.14:1 VSWR load	MHz		10	12
Frequency Drift	Over $T_{OP}$	MHz/ $^\circ\text{C}$		-0.51	
Tune Input Capacitance		pF			50
Supply Current ( $I_{CC}$ )		mA		13	18
Supply Voltage ( $V_{CC}$ )	Recommended operating limit	V	+2.85		+3.15

1. All specification limits are indicated values and apply over  $F_{OUT}$  and for 50  $\Omega$  load impedance.
2. Tuning voltages shown are the minimum and maximum voltages required to tune the frequency range, including temperature effects over  $0^\circ\text{C}$  to  $+70^\circ\text{C}$ . Devices will oscillate normally with tuning voltages from 0V to +6V.
3. Output power window includes variation over operating temperature range ( $T_{OP}$ )  $0^\circ\text{C}$  to  $+70^\circ\text{C}$  and output frequency range ( $F_{OUT}$ ).

4. Non harmonic spurious less than -70 dBc.
5. See plot for typical phase noise at other offset frequencies.
6. Defined as  $(2150 - 2050) / (V_T 2150 - V_T 2050)$  MHz/V.
7. The max/min ratio of tuning sensitivity over  $F_{OUT}$ , see plot for typical tuning linearity measured over 0.5V intervals



## Functional Configuration

Pin	Function
1	Tuning Voltage ( $V_T$ )
2	RF Output
3	Supply Voltage ( $V_{CC}$ )
Case/Lid	Ground

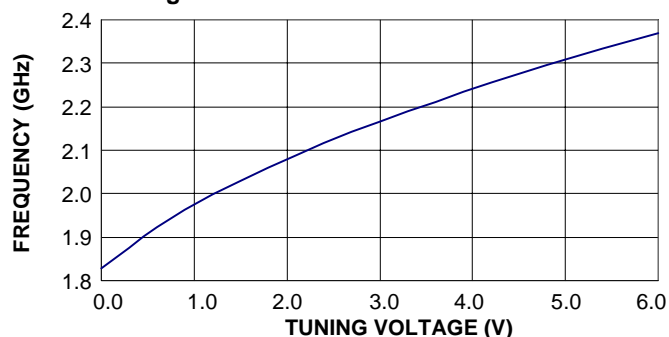
Substrate material is RO4003.

## Environmental Specifications

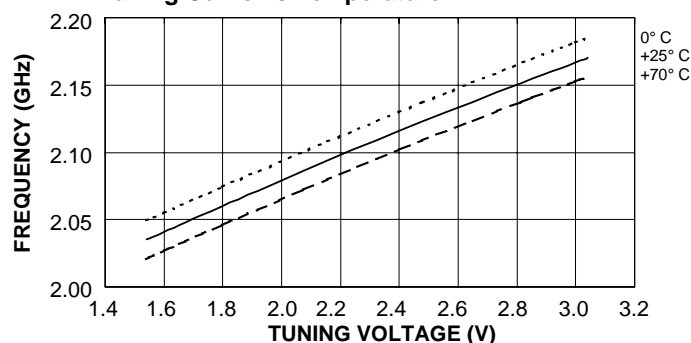
Devices are designed to function over the operating temperature range ( $T_{OP}$ ) of 0°C to +70°C and after exposure to the shock, vibration, thermal shock and moisture conditions typically encountered in base station and subscriber terminal environments.

## Typical Performance

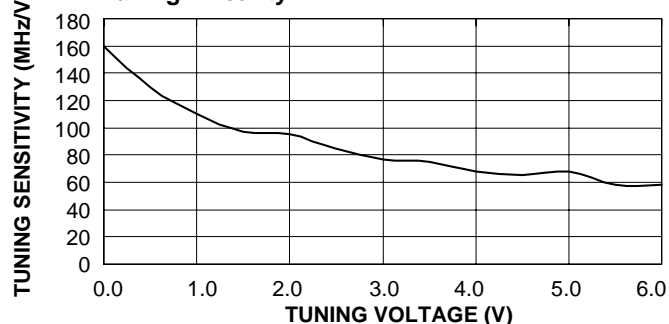
Tuning Curve



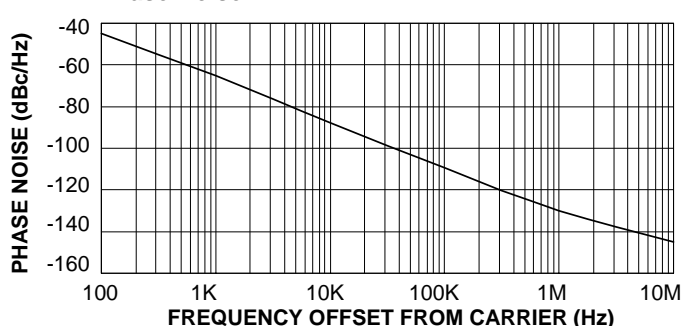
Tuning Curve vs Temperature



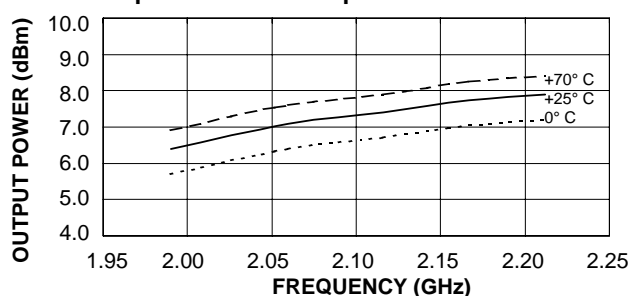
Tuning Linearity



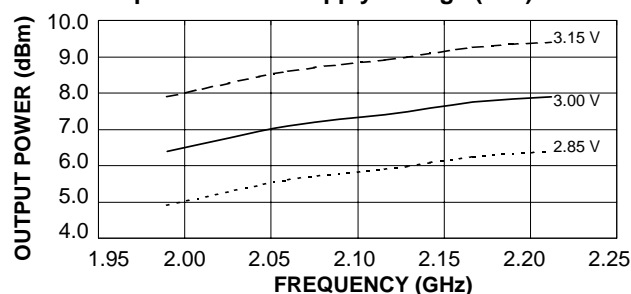
Phase Noise



Output Power vs Temperature



Output Power vs Supply Voltage ( $V_{CC}$ )



## Absolute Maximum Ratings<sup>1, 2</sup>

Parameter	Absolute Maximum
Tuning Voltage ( $V_T$ )	0V to +9V
Supply Voltage ( $V_{CC}$ ) <sup>3</sup>	+5V
Storage Temperature ( $T_{STOR}$ )	-45°C to +125°C
Solder Assembly Temperature	See App Note M2032

1. Exceeding these limits may cause permanent damage.
2. Static sensitive, observe appropriate handling precautions.
3. An external series resistor and bypass capacitor will allow operation at higher supply voltage and will improve power supply decoupling and noise suppression.

## Ordering Information

VCOs are available in either tape and reel or tube packaging. To order devices in tape and reel requires the suffix TR be added to the part number, i.e. V42100TR. Quantity 1500 per 13 inch reel, see Application Note M2037.