



## WIDEBAND MMIC VCO WITH BUFFER AMPLIFIER 3.90 - 7.50 GHz

### Typical Applications

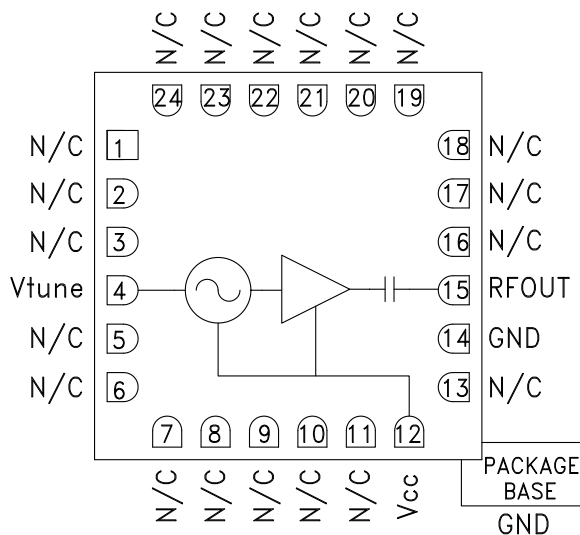
Low Noise wideband MMIC VCO is ideal for:

- Industrial/Medical Equipment
- Test & Measurement Equipment
- Satcom
- Military Radar, EW, & ECM

### Features

- Wide Tuning Bandwidth
- Pout: +5 dBm
- Low SSB Phase Noise: -106 dBc/Hz @100 kHz
- No External Resonator Needed
- Single Positive Supply: +5V @ 53 mA
- Ceramic Leadless SMT Package: 16 mm<sup>2</sup>

### Functional Diagram



### General Description

The HMC6475LC4B is a wideband MMIC Voltage Controlled Oscillator which incorporates the resonator, negative resistance device, and varactor diode. Output power and phase noise performance are excellent over temperature due to the oscillator's monolithic construction. The Vtune port accepts an analog tuning voltage from 0 to +23V. The HMC6475LC4B VCO operates from a single +5V supply, consumes only 53 mA of current, and is housed in a RoHS compliant SMT package. This wideband VCO uniquely combines the attributes of ultra small size, low phase noise, low power consumption, and wide tuning range.

### Electrical Specifications, $T_A = -40\text{ }^\circ\text{C to }+85\text{ }^\circ\text{C}$ , $V_{cc} = +5\text{V}$

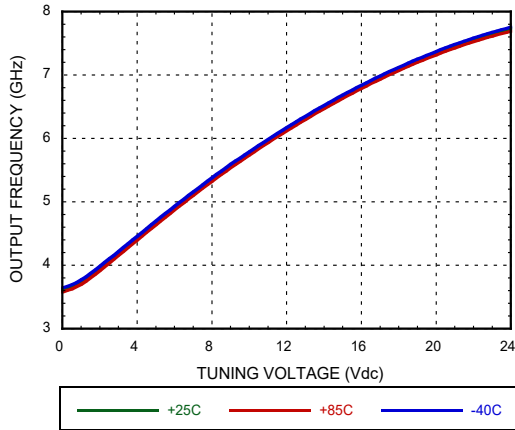
Parameter	Min.	Typ.	Max.	Units
Frequency Range		3.90 - 7.50		GHz
Power Output	-1	5		dBm
SSB Phase Noise @ 100 kHz Offset		-106		dBc/Hz
SSB Phase Noise @ 1 MHz Offset		-130		dBc/Hz
Supply Current (Icc) (Vcc = +5V)		53	70	mA
Tune Voltage (Vtune)	0		23	V
Tune Port Leakage Current (Vtune = +23V)			100	$\mu\text{A}$
Output Return Loss		7		dB
2nd Harmonic		-11		dBc
3rd Harmonic		-22		dBc
Pulling (into a 2.0:1 VSWR)		7		MHz pp
Pushing		10		MHz/V
Frequency Drift Rate		0.45		MHz/ $^\circ\text{C}$



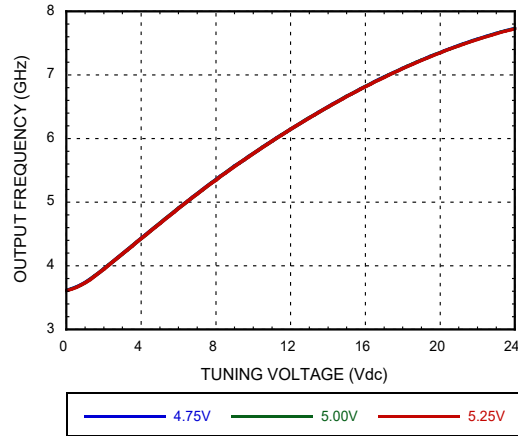
**WIDEBAND MMIC VCO WITH BUFFER AMPLIFIER**  
**3.90 - 7.50 GHz**

VCOS - SMT

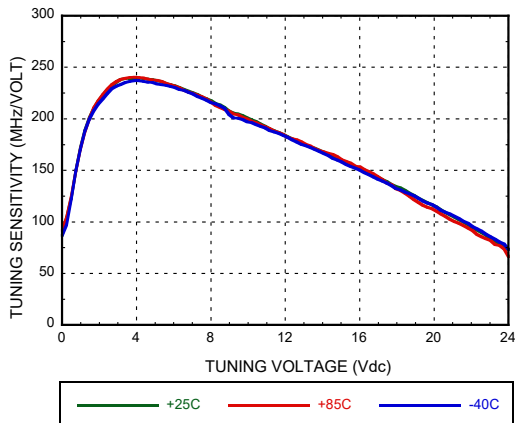
**Frequency vs. Tuning Voltage**



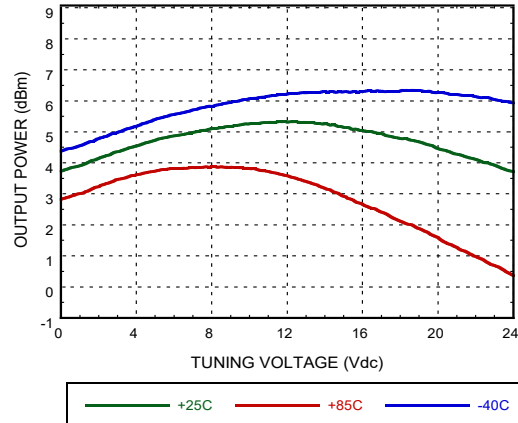
**Frequency vs. Tuning Voltage, T = +25 °C**



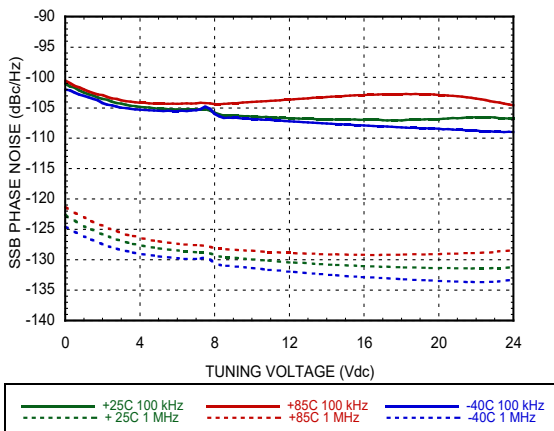
**Sensitivity vs. Tuning Voltage**



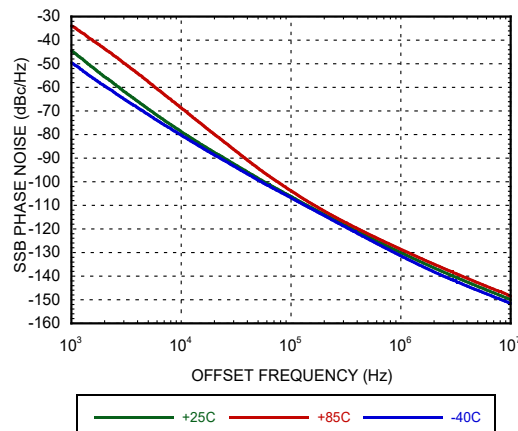
**Output Power vs. Tuning Voltage**

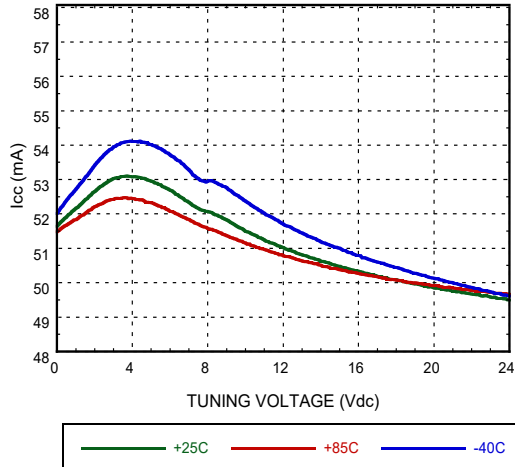


**SSB Phase Noise vs. Tuning Voltage**



**Typical SSB Phase Noise @ Vtune = +10V**




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**Supply Current,  $V_{cc} = +5V$** 

**Absolute Maximum Ratings**

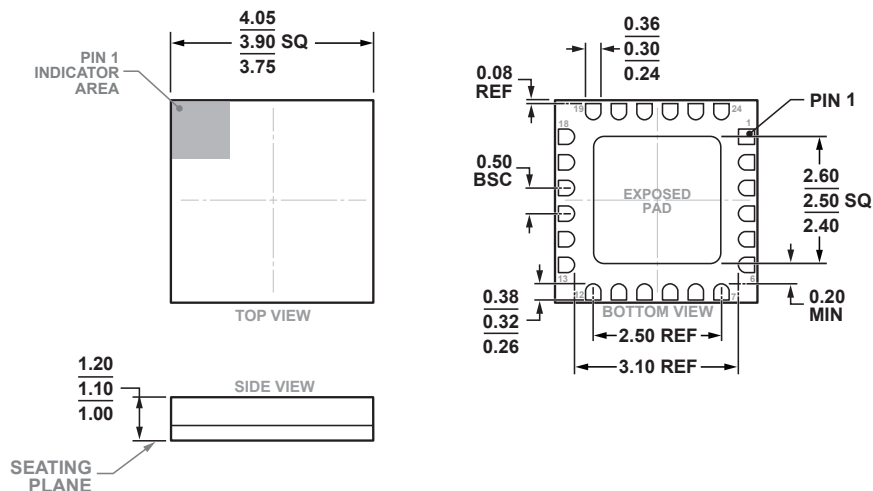
V <sub>cc</sub>	+5.5 V
V <sub>tune</sub>	-1 to +25V
Storage Temperature	-65 °C to +150 °C
ESD Sensitivity (HBM)	Class 1A

**Reliability Information**

Junction Temperature To Maintain 1 Million Hour MTTF	135 °C
Nominal Junction Temperature (T = 85 °C)	106.2 °C
Thermal Resistance (Junction to GND paddle, 5V supply)	80 °C/W
Operating Temperature	-40 °C to + 85 °C



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Outline Drawing**


**24-Terminal Ceramic Leadless Chip Carrier (LCC)  
(E-24-2)**

Dimensions shown in millimeters.



## WIDEBAND MMIC VCO WITH BUFFER AMPLIFIER 3.90 - 7.50 GHz

### Ordering Guide

Model	Temperature Range	MSL Rating <sup>[1]</sup>	Package Body Material	Lead Finish	Package Description	Package Option	Qty.	Package Marking <sup>[2]</sup>
HMC6475LC4B	-40C to +85C	MSL3	Alumina, White	Gold over Nickel	24-LCC-4X4_MM	E-24-2		H6475 XXXX
HMC6475LC4BTR	-40C to +85C	MSL3	Alumina, White	Gold over Nickel	24-LCC-4X4_MM	E-24-2	100	H6475 XXXX
HMC6475LC4BTR-R5	-40C to +85C	MSL3	Alumina, White	Gold over Nickel	24-LCC-4X4_MM	E-24-2	500	H6475 XXXX

[1] Max peak reflow temperature of 260 °C

[2] 4-Digit lot number XXXX

### Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1 - 3, 5 - 11, 13, 16 - 24	N/C	No Connection. These pins may be connected to RF/DC ground. Performance will not be affected.	
4	Vtune	Control Voltage and Modulation Input. Modulation bandwidth dependent on drive source impedance. .	
12	Vcc	Supply Voltage, Vcc= +5V	
15	RFOUT	RF output (AC coupled)	
14, 16 Paddle	GND	Package bottom has an exposed metal paddle that must be connected to RF & DC ground.	

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