



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

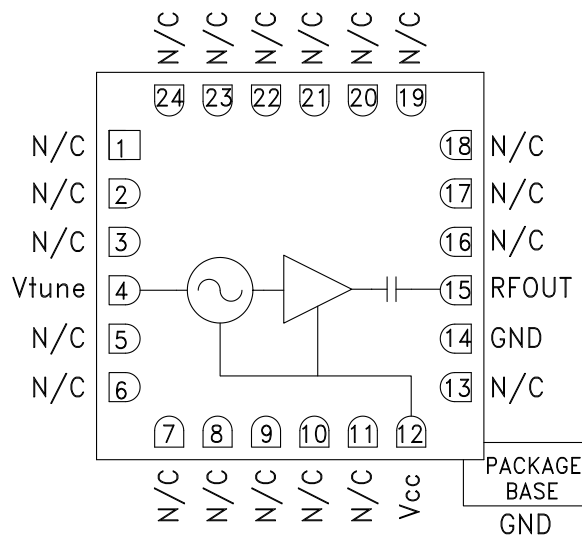
Low SSB Phase Noise: -106 dBc/Hz @100 kHz

No External Resonator Needed

Single Positive Supply: +5V @ 53 mA

Ceramic Leadless SMT Package: 16 mm²

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 $+85\text{ }^\circ\text{C}$, $V_{CC} = +5\text{V}$

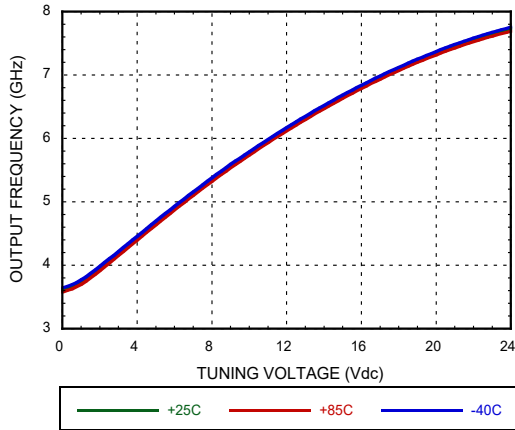
Parameter	Min.	Typ.	Max.	Units
Frequency Range		3.90 - 7.50		GHz
Power Output	-1	5		dBm
SSB Phase Noise @ 100 kHz Offset		-106		dBc/Hz
SSB Phase Noise @ 1 MHz Offset		-130		dBc/Hz
Supply Current (Icc) (Vcc = +5V)		53	70	mA
Tune Voltage (Vtune)	0		23	V
Tune Port Leakage Current (Vtune = +23V)			100	μA
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/ $^\circ\text{C}$



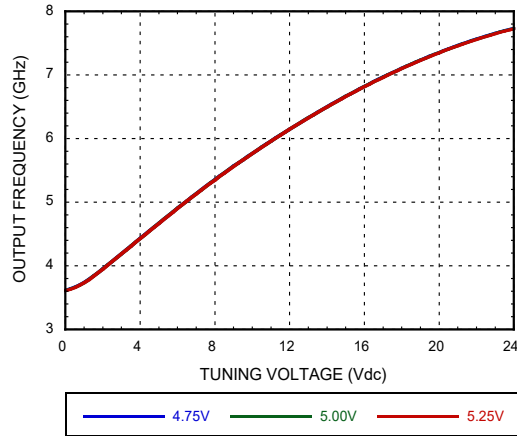
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VCOS - SMT

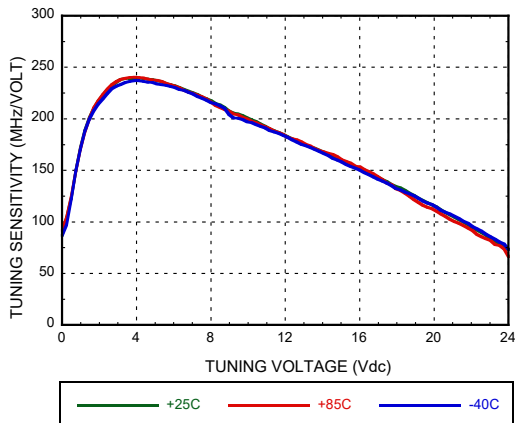
Frequency vs. Tuning Voltage



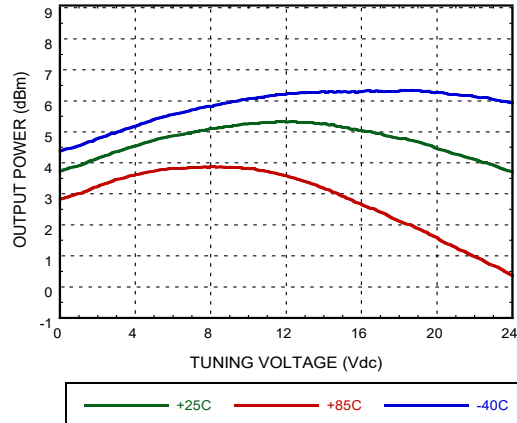
Frequency vs. Tuning Voltage, T = +25 °C



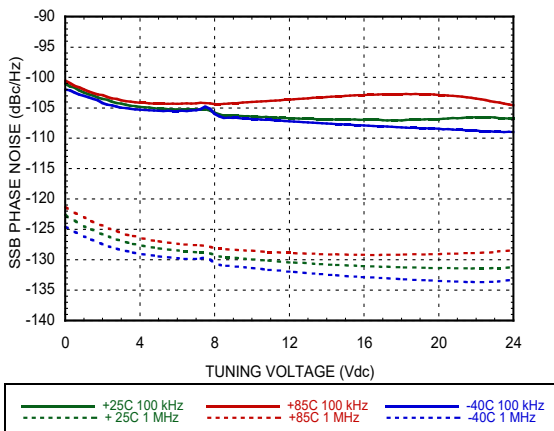
Sensitivity vs. Tuning Voltage



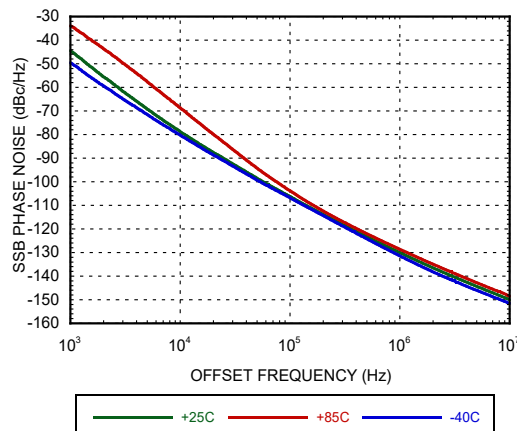
Output Power vs. Tuning Voltage



SSB Phase Noise vs. Tuning Voltage



Typical SSB Phase Noise @ Vtune = +10V

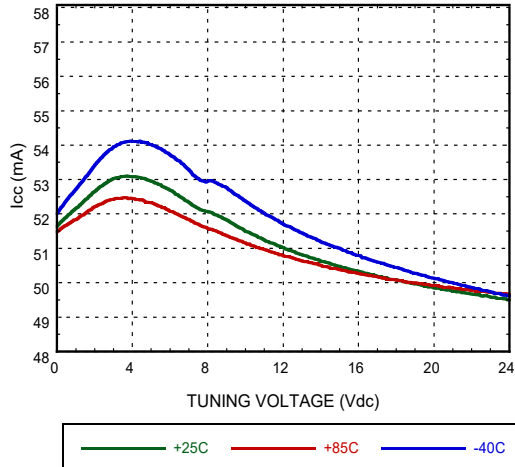




**WIDEBAND MMIC VCO WITH BUFFER AMPLIFIER
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VCOS - SMT

Supply Current, Vcc = +5V



Absolute Maximum Ratings

Vcc	+5.5 V
Vtune	-1 to +25V
Storage Temperature	-65 °C to +150 °C
ESD Sensitivity (HBM)	Class 1A

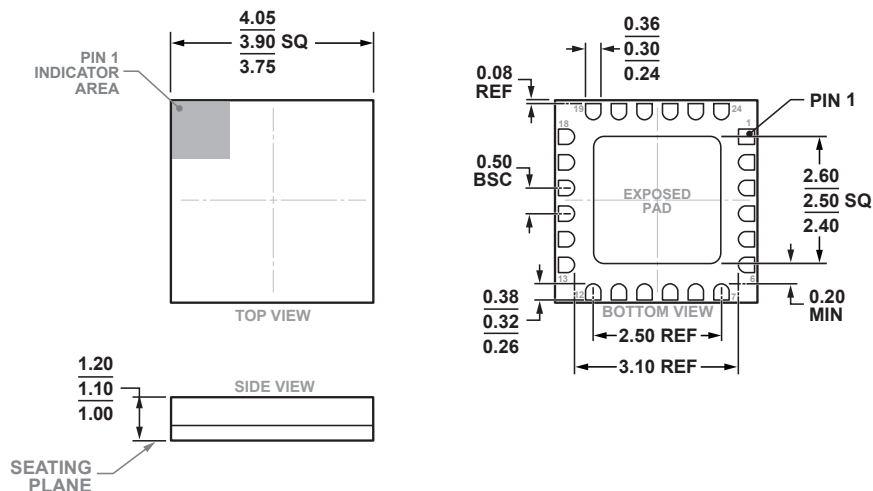
Reliability Information

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.



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Ordering Guide

Model	Temperature Range	MSL Rating ^[1]	Package Body Material	Lead Finish	Package Description	Package Option	Qty.	Package Marking ^[2]
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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