

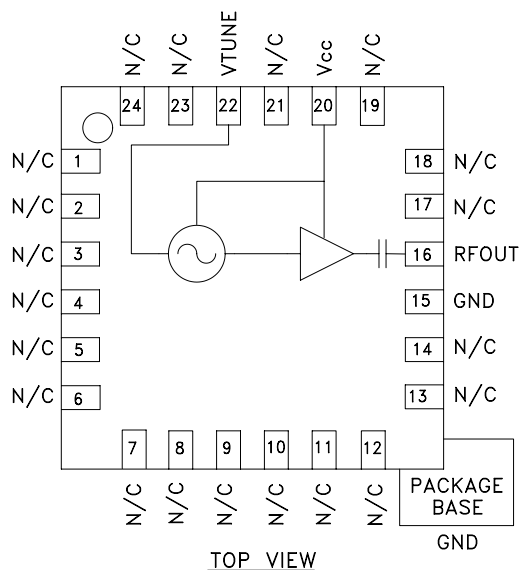
MMIC VCO w/ BUFFER AMPLIFIER, 4.45 - 5.0 GHz

Typical Applications

Low noise MMIC VCO w/Buffer Amplifier for:

- 802.11a, HiperLAN WLAN
- VSAT, UNII & Microwave Radio
- Test Equipment & Industrial Controls
- Military

Functional Diagram



Features

Pout: +4.0 dBm

Phase Noise: -105 dBc/Hz @100 KHz

No External Resonator Needed

Single Supply: 3V @ 30 mA

QFN Leadless SMT Package, 16 mm²

General Description

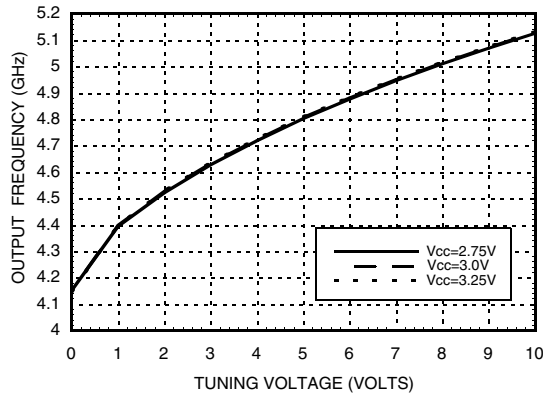
The HMC429LP4 is a GaAs InGaP Heterojunction Bipolar Transistor (HBT) MMIC VCO with integrated resonator, negative resistance device, varactor diode, and buffer amplifier. Covering 4.45 to 5.0 GHz, the VCO's phase noise performance is excellent over temperature, shock, vibration and process due to the oscillator's monolithic structure. Power output is 4.0 dBm typical from a single supply of 3.0V @ 30mA. The voltage controlled oscillator is packaged in a low cost leadless QFN 4 x 4 mm surface mount package.

Electrical Specifications, $T_A = +25^\circ\text{C}$, $V_{CC} = +3\text{V}$

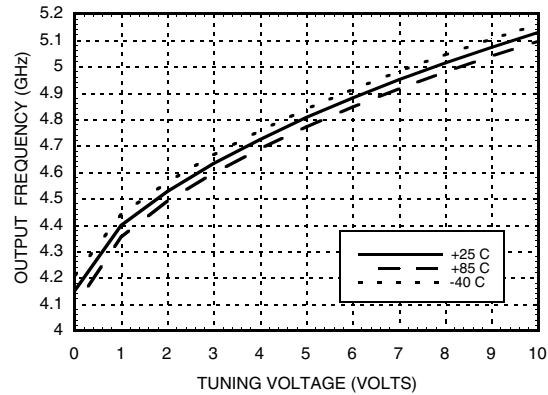
Parameter	Min.	Typ.	Max.	Units
Frequency Range	4.45 - 5.0			GHz
Power Output	1.0	4.0		dBm
SSB Phase Noise @ 100 kHz Offset, $V_{tune} = +5\text{V}$ @ RF Output		-105		dBc/Hz
Tune Voltage (V_{tune})	0		10	V
Supply Current (I_{CC}) ($V_{CC} = +3.0\text{V}$)		30		mA
Tune Port Leakage Current			10	μA
Output Return Loss		6		dB
Harmonics 2nd 3rd		-11 -23		dBc dBc
Pulling (into a 2.0:1 VSWR)		10		MHz pp
Pushing @ $V_{tune} = +5\text{V}$		14		MHz/V
Frequency Drift Rate		0.4		MHz/ $^\circ\text{C}$

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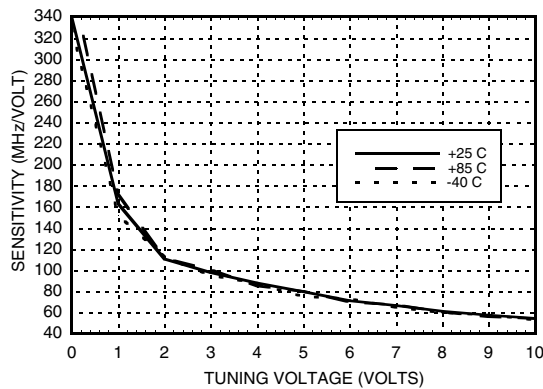
Frequency vs. Tuning Voltage, $T = 25^{\circ}\text{C}$



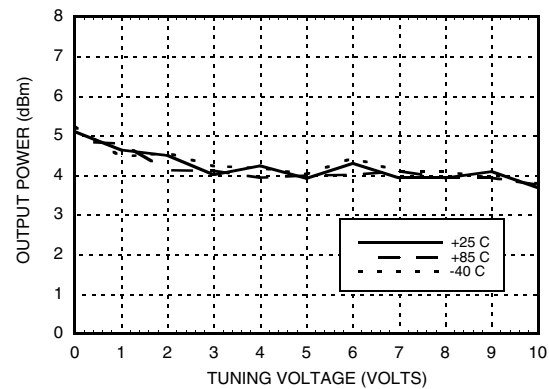
Frequency vs. Tuning Voltage, $V_{cc} = +3\text{V}$



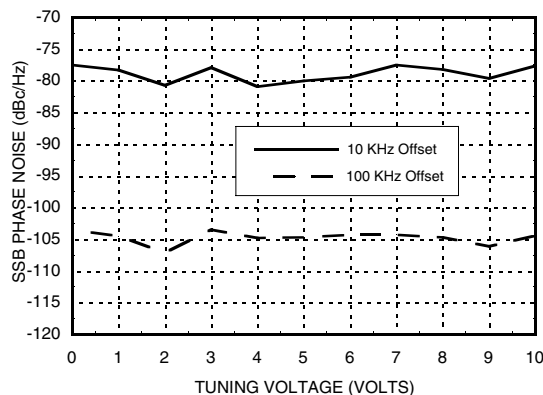
Sensitivity vs. Tuning Voltage, $V_{cc} = +3\text{V}$



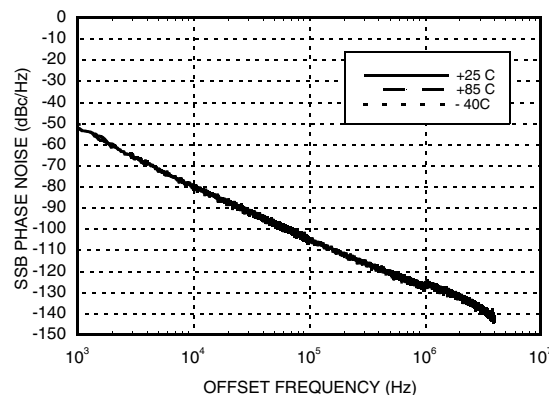
**Output Power vs.
Tuning Voltage, $V_{cc} = +3\text{V}$**



Phase Noise vs. Tuning Voltage

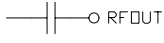
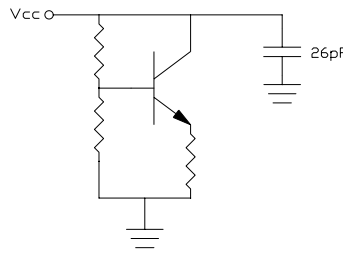
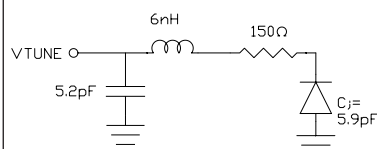


Typical SSB Phase Noise @ $V_{tune} = +5\text{V}$



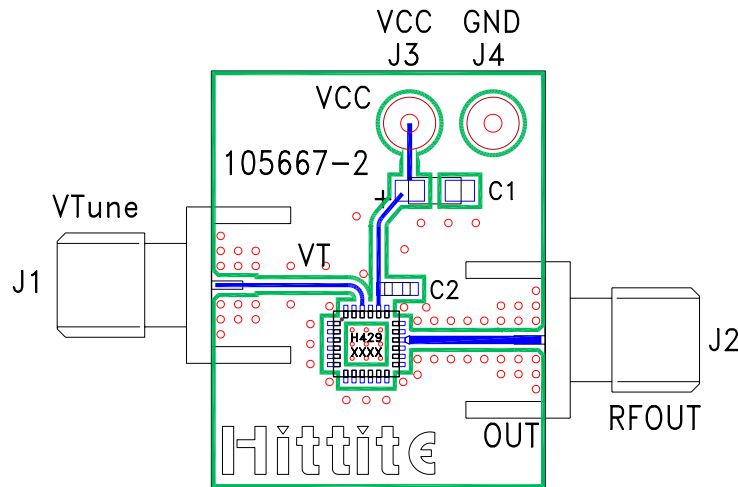
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Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1- 14, 17 - 19, 21, 23, 24	N/C	No Connection	
15	GND	This pin must be connected to RF & DC ground.	
16	RFOUT	RF output (AC coupled)	
20	Vcc	Supply Voltage Vcc= 3V	
22	VTUNE	Control Voltage Input. Modulation port bandwidth dependent on drive source impedance.	
	GND	Package bottom has an exposed metal paddle that must be RF & DC grounded.	

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Evaluation PCB



List of Materials

Item	Description
J1 - J2	PC Mount SMA RF Connector
J3 - J4	DC Pin
C1	4.7 μ F Tantalum Capacitor
C2	10,000 pF Capacitor, 0603 Pkg.
U1	HMC429LP4 VCO
PCB*	105667 Eval Board
* Circuit Board Material: Rogers 4350	

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available from Hittite upon request.

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Notes: