THE DATASHEET OF

123987-HMC737LP4

www.win-source.net 0086-755-83957316

HMC737LP4 / 737LP4E

v01.0209

MMIC VCO w/ HALF FREQUENCY OUTPUT 14.9 - 15.5 GHz

Typical Applications

The HMC737LP4(E) is ideal for:

- Point to Point/Multipoint Radio
- Test Equipment & Industrial Controls
- SATCOM
- Military End-Use

Features

Dual Output: Fo = 14.9 - 15.5 GHz
Fo/2 = 7.45 - 7.75 GHz

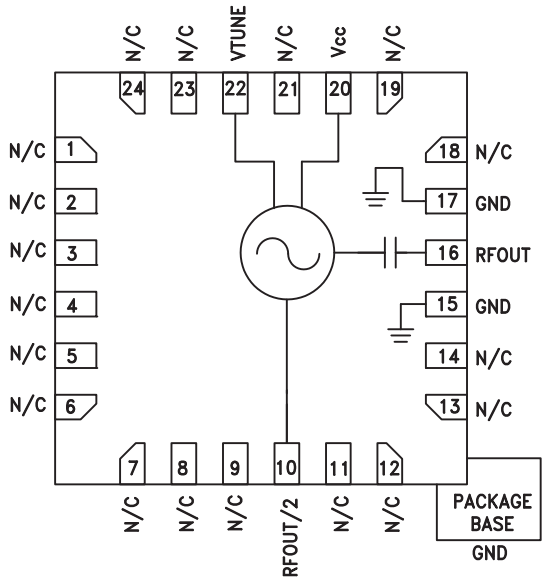
Pout: +9 dBm

Phase Noise: -105 dBc/Hz @ 100 kHz

No External Resonator Needed

24 Lead 4x4mm SMT Package: 16mm²

Functional Diagram



General Description

The HMC737LP4(E) is a GaAs InGaP Heterojunction Bipolar Transistor (HBT) MMIC VCO. The HMC737LP4(E) integrate a resonator, negative resistance device, varactor diode and feature half frequency output. The VCO's phase noise performance is excellent over temperature, shock, and process due to the oscillator's monolithic structure. Power output is +9 dBm typical from a +4.2V supply voltage. The voltage controlled oscillator is packaged in a leadless QFN 4x4 mm surface mount package, and requires no external matching components.

Electrical Specifications, T_A = +25° C, Vcc = +4.2V

Parameter		Min.	Typ.	Max.	Units
Frequency Range	Fo Fo/2		14.9 - 15.5 7.45 - 7.75		GHz GHz
Power Output	RFOUT RFOUT/2	6 -8	9 -3	13 2	dBm dBm
SSB Phase Noise @ 100 kHz Offset, Vtune= +5V @ RFOUT			-105		dBc/Hz
Tune Voltage	Vtune	1		13	V
Supply Current		120	150	180	mA
Tune Port Leakage Current (Vtune= 13V)				10	µA
Output Return Loss			2.5		dB
Harmonics/Subharmonics	1/2 3/2		-45 -42		dBc dBc
Pulling (into a 2.0:1 VSWR)			12		MHz pp
Pushing @ Vtune= 5V			24		MHz/V
Frequency Drift Rate			1.2		MHz/°C

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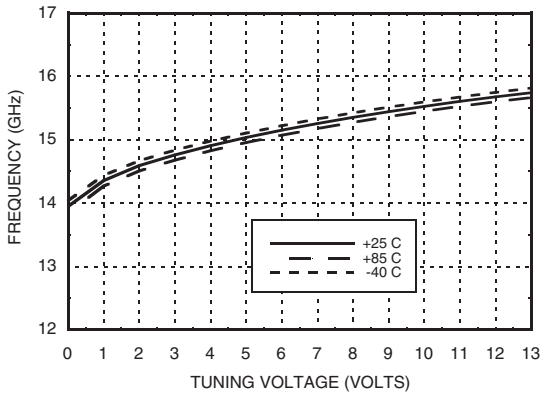
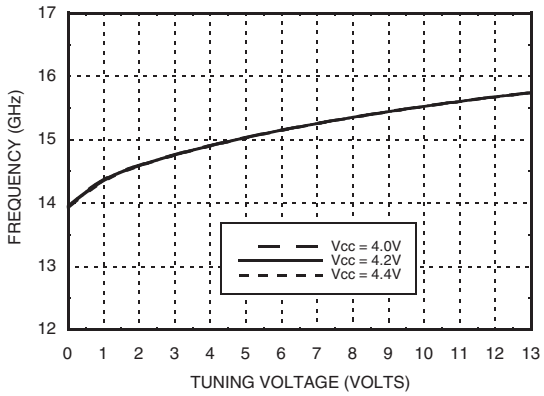
Application Support: Phone: 1-800-ANALOG-D

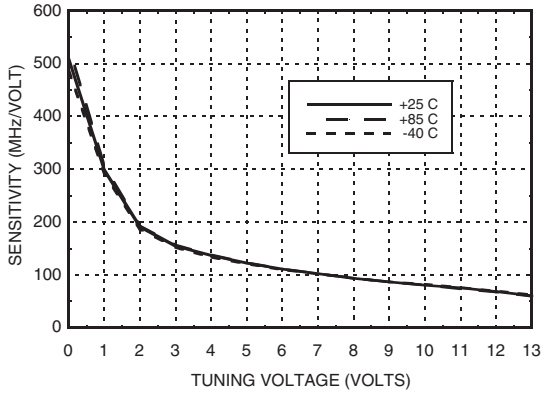
Frequency vs. Tuning Voltage, Vcc = +4.2V



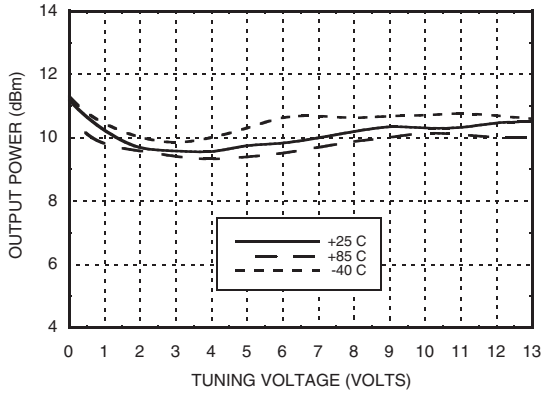
Frequency vs. Tuning Voltage, T= 25°C



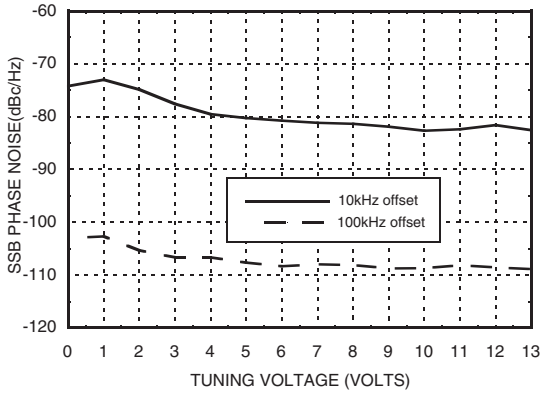
Sensitivity vs. Tuning Voltage, Vcc = +4.2V



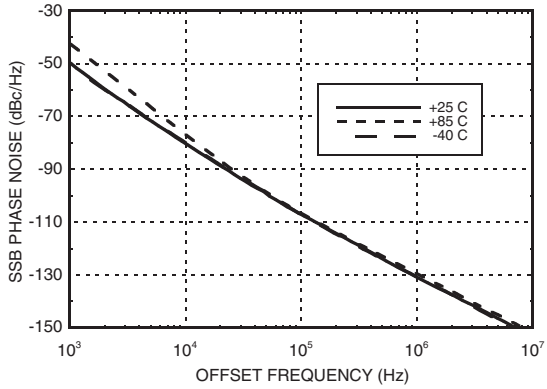
Output Power vs. Tuning Voltage, Vcc = +4.2V



SSB Phase Noise vs. Tuning Voltage



SSB Phase Noise @ Vtune = +5V



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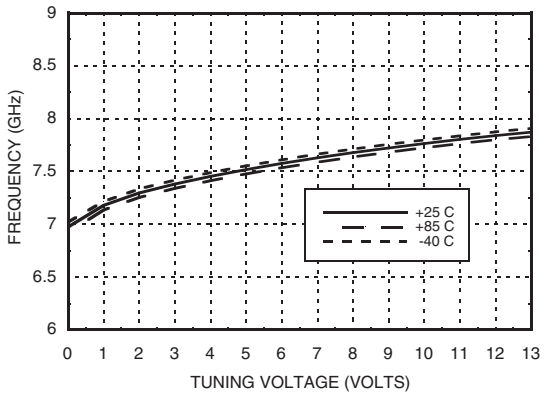
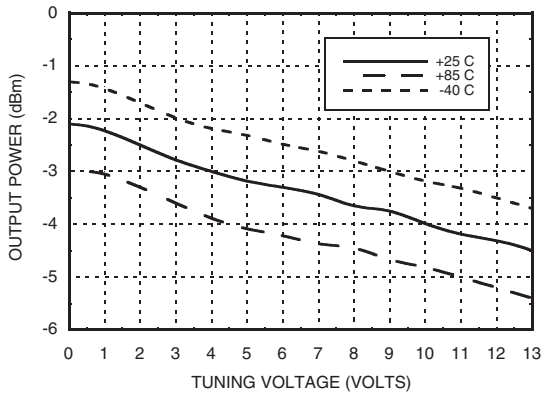
MMIC VCO w/ HALF FREQUENCY OUTPUT 14.9 - 15.5 GHz

RFOUT/2 Frequency vs. Tuning Voltage, Vcc = +4.2V



RFOUT/2 Output Power vs. Tuning Voltage, Vcc = +4.2V



Absolute Maximum Ratings

Vcc	+5.5V
Vtune	0 to 15V
Junction Temperature	135 °C
Continuous Pdiss (T=85 °C) (derate 19.6 mW/C above 85 °C	1 W
Thermal Resistance (junction to ground paddle)	51 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Typical Supply Current vs. Vcc

Vcc (V)	Icc (mA)
4.0	140
4.2	150
4.4	160

Note: VCO will operate over full voltage range shown above.

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC737LP4	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H737 XXXX
HMC737LP4E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	H737 XXXX

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX

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RoHS EARTH FRIENDLY

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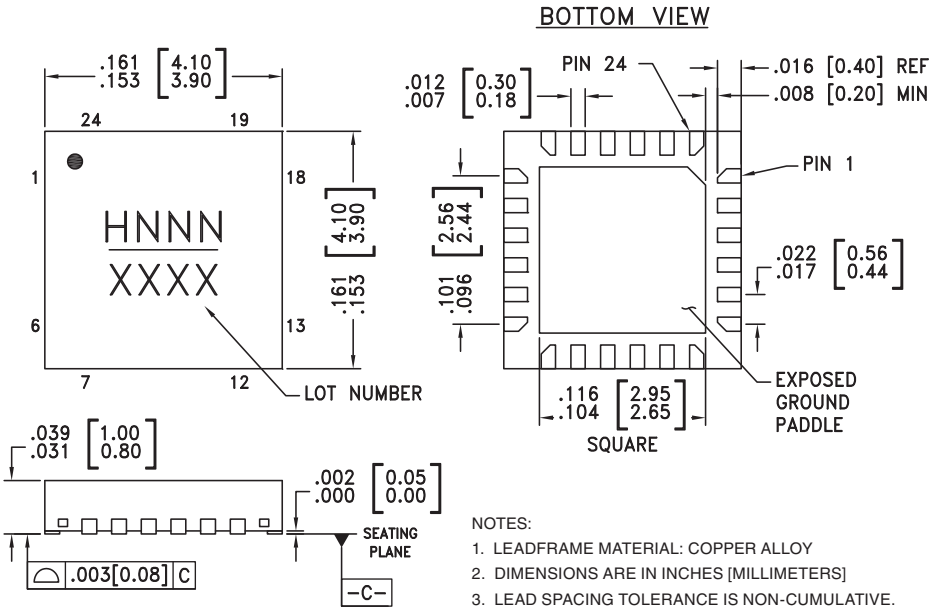
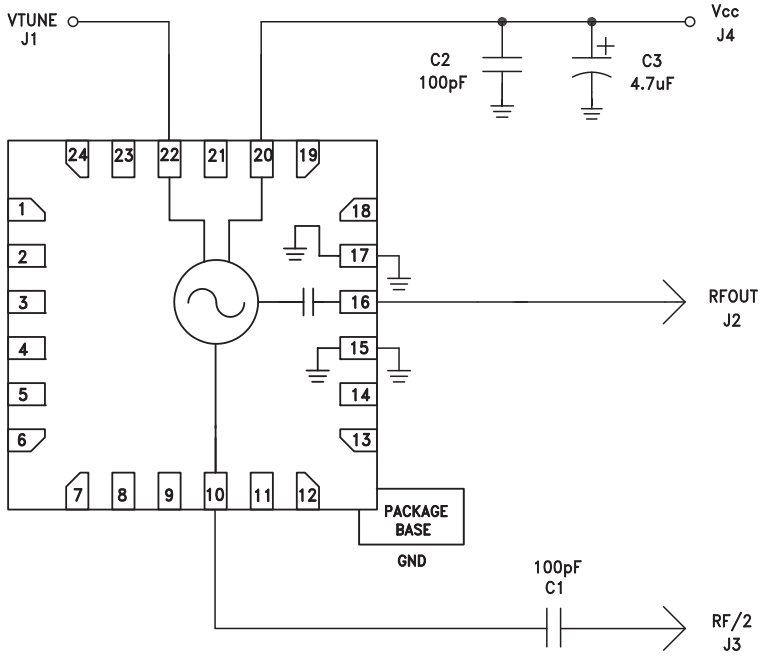
Outline Drawing



NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
4. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM. PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
5. PACKAGE WARP SHALL NOT EXCEED 0.05mm.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
7. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED LAND PATTERN.

Application Circuit



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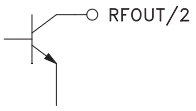
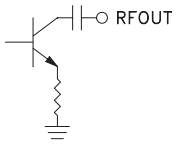
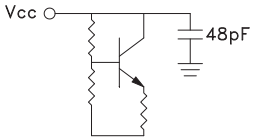
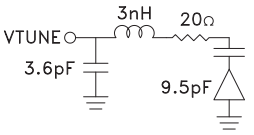
Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1 - 9, 11 - 14, 18, 19, 21, 23, 24	N/C	No Connection. These pins may be connected to RF/DC ground. Performance will not be affected.	
10	RFOUT/2	Half frequency output (AC coupled). Requires external AC coupling capacitors.	
16	RFOUT	RF output (AC coupled).	
20	Vcc	Supply Voltage, +4.2V	
22	VTUNE	Control voltage and modulation input. Modulation bandwidth dependent on drive source impedance. See “Determining the FM Bandwidth of a Wideband Varactor Tuned VCO” application note.	
15, 17, Paddle	GND	Package bottom has an exposed metal paddle that must be connected to RF/DC ground.	

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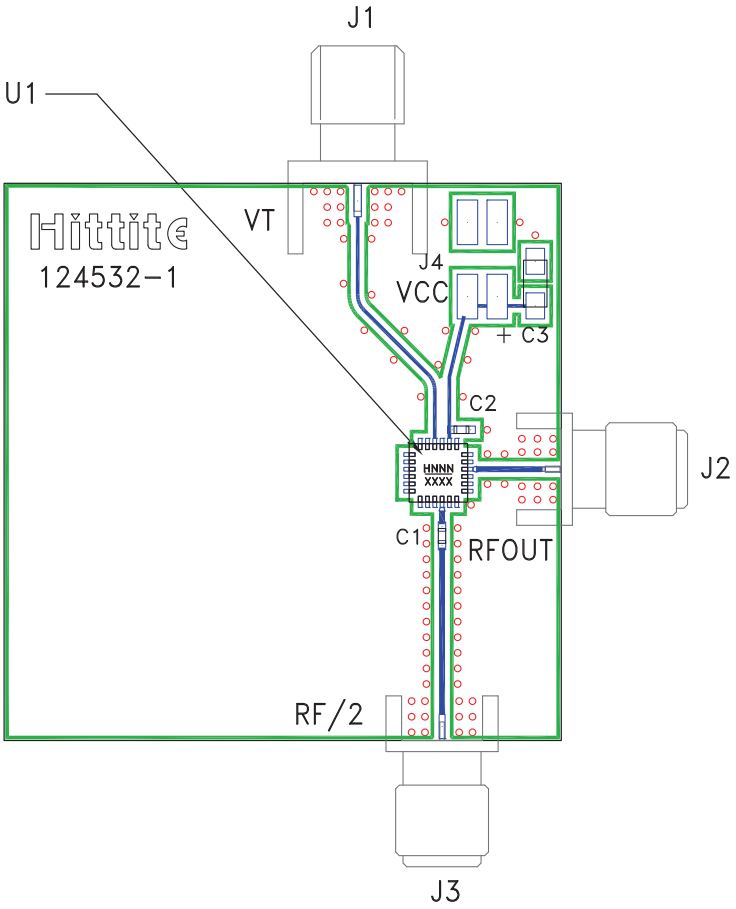
Evaluation PCB



List of Materials for Evaluation PCB 123987 [1]

Item	Description
J1 - J3	PCB Mount SMA RF Connector
J4	2 mm DC Header
C1, C2	100 pF Capacitor, 0402 Pkg.
C3	4.7 µF Tantalum Capacitor
U1	HMC737LP4(E) VCO
PCB [2]	124532 Eval Board

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350 or Arlon 25FR

The circuit board used in the application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and backside ground 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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