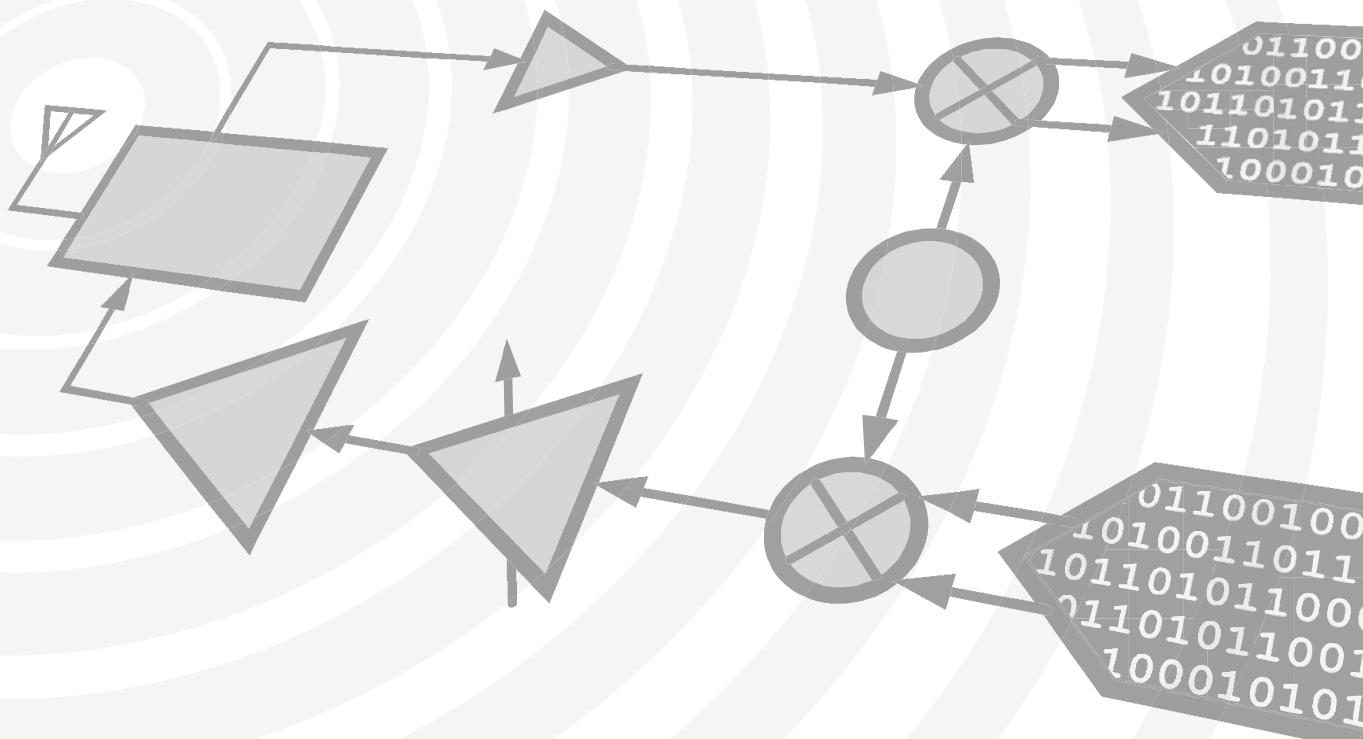




Hittite MICROWAVE PRODUCTS FROM ANALOG DEVICES

Analog Devices Welcomes Hittite Microwave Corporation

NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED



www.analog.com

www.hittite.com

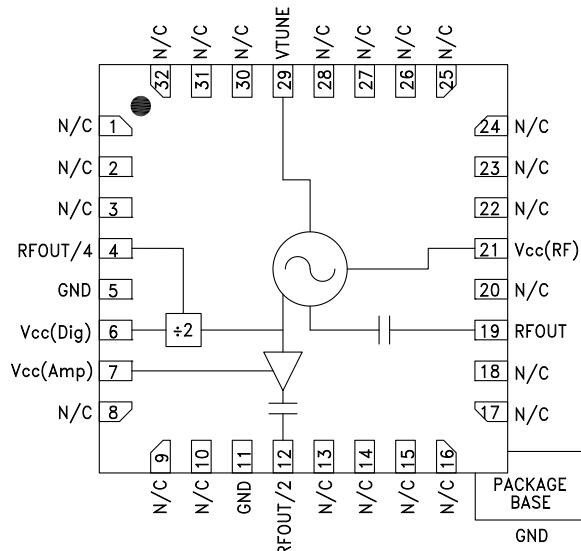
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Typical Applications

Low noise MMIC VCO w/Half Frequency, Divide-by-4 Outputs for:

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

Functional Diagram



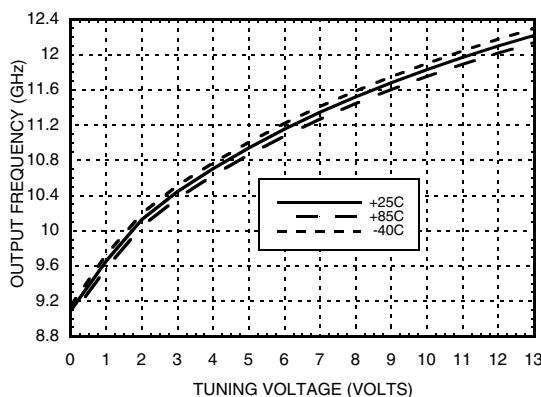
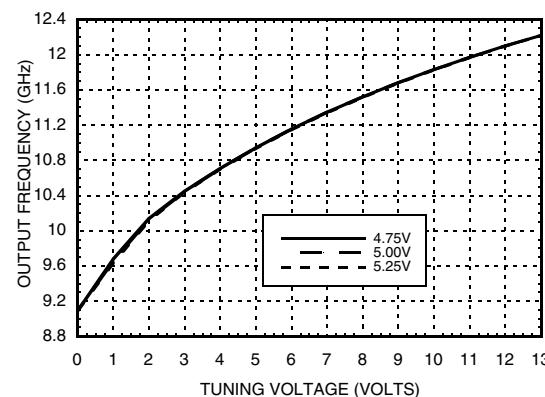
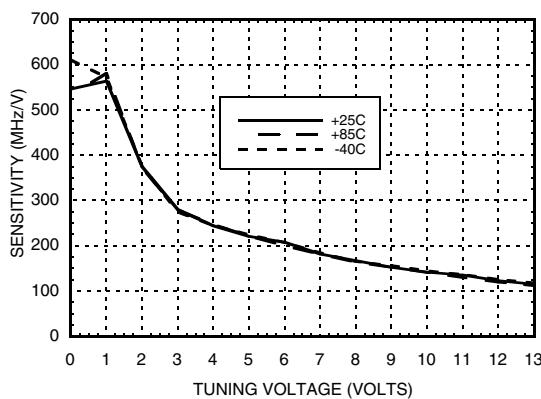
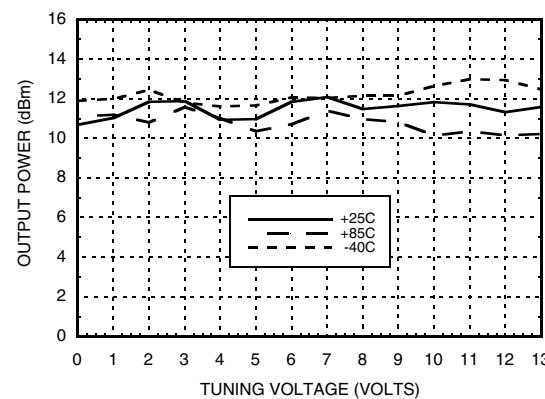
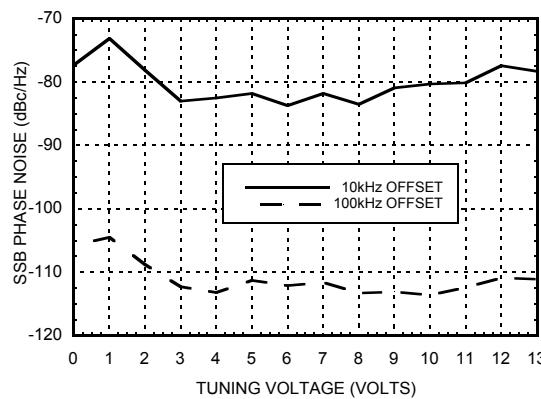
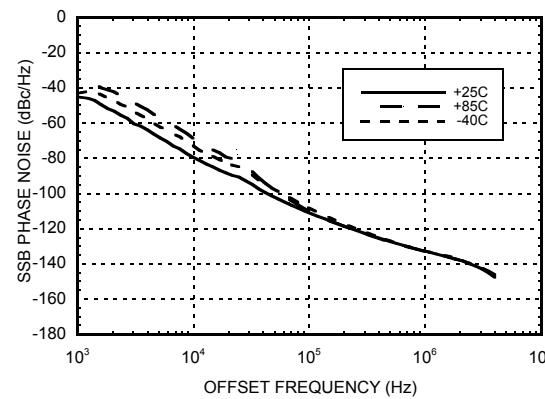
Electrical Specifications, $T_A = +25^\circ C$, $Vcc(Dig)$, $Vcc(Amp)$, $Vcc(RF) = +5V$

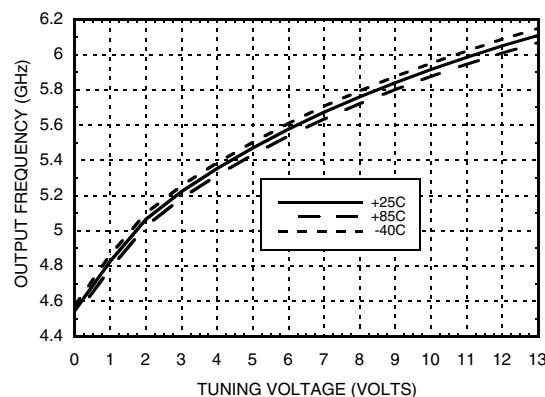
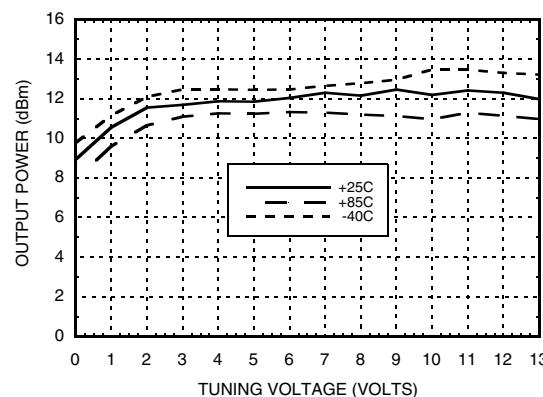
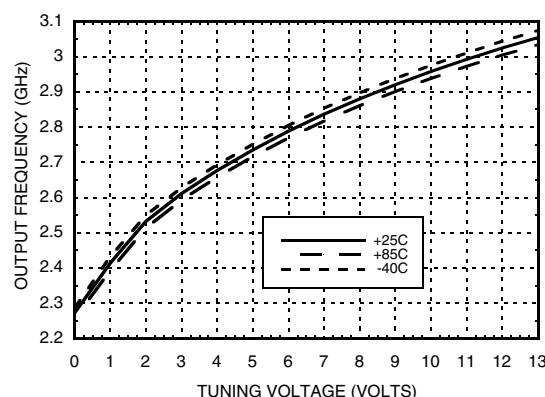
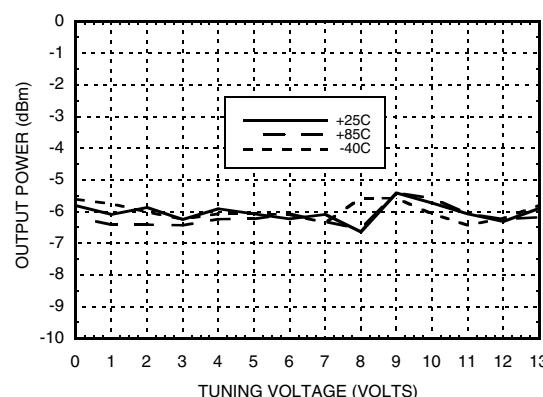
Parameter	Min.	Typ.	Max.	Units	
Frequency Range	Fo Fo/2	10.6 - 11.8 5.3 - 5.9		GHz GHz	
Power Output	RFOUT RFOUT/2 RFOUT/4	+9 +8 -9	+14 +14 -3	dBm dBm dBm	
SSB Phase Noise @ 100 kHz Offset, Vtune= +5V @ RFOUT		-110		dBc/Hz	
Tune Voltage	Vtune	2	12	V	
Supply Current	Icc(Dig) + Icc(Amp) + Icc(RF)	310	350	380	mA
Tune Port Leakage Current (Vtune= 12V)			10	μA	
Output Return Loss		2		dB	
Harmonics/Subharmonics	1/2 3/2 2nd 3rd	27 23 17 31		dBc dBc dBc dBc	
Pulling (into a 2.0:1 VSWR)		2		MHz pp	
Pushing @ Vtune= 5V		20		MHz/V	
Frequency Drift Rate		1.3		MHz/°C	

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Frequency vs. Tuning Voltage, $V_{cc} = +5V$

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

Sensitivity vs. Tuning Voltage, $V_{cc} = +5V$

**Output Power
vs. Tuning Voltage, $V_{cc} = +5V$**

SSB Phase Noise vs. Tuning Voltage

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


MMIC VCO w/ HALF FREQUENCY OUTPUT & DIVIDE-BY-4, 10.6 - 11.8 GHz
RFOUT/2 Frequency vs. Tuning Voltage, Vcc = +5V

RFOUT/2 Output Power vs. Tuning Voltage, Vcc = +5V

Divide-by-4 Frequency vs. Tuning Voltage, Vcc = +5V

Divide-by-4 Output Power vs. Tuning Voltage, Vcc = +5V

Absolute Maximum Ratings

Vcc(Dig), Vcc(Amp), Vcc(RF)	+5.5 Vdc
Vtune	0 to +15V
Junction Temperature	135 °C
Continuous Pdiss (T=85 °C) (derate 43.5 mW/C above 85 °C)	2.17 W
Thermal Resistance (junction to ground paddle)	23 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A

Typical Supply Current vs. Vcc

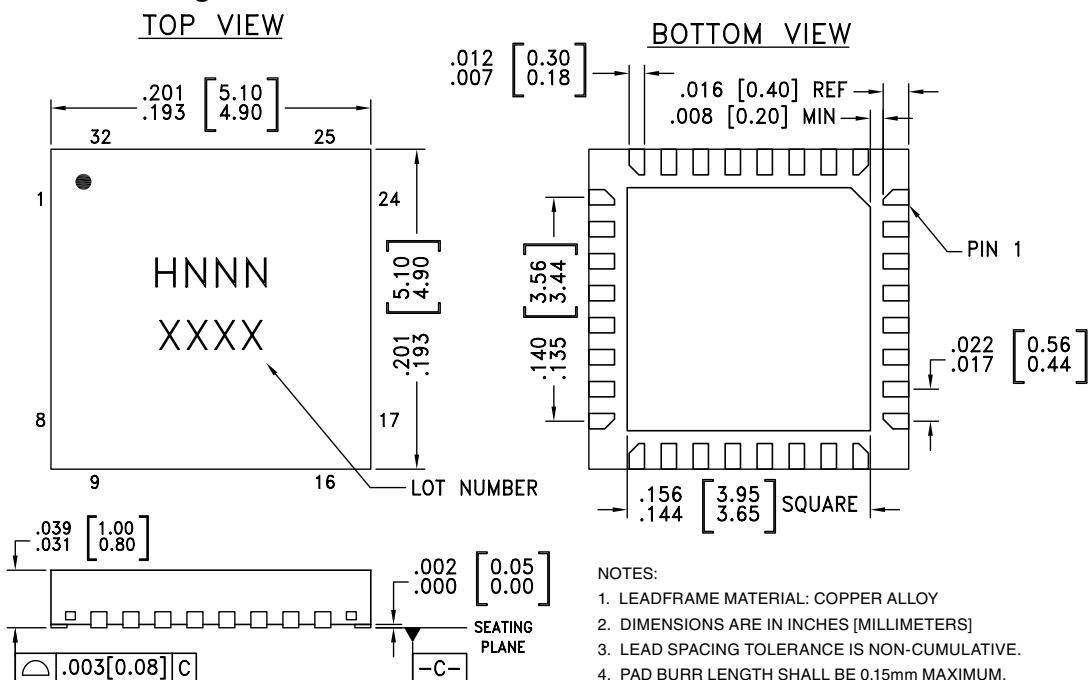
Vcc (V)	Icc (mA)
4.75	320
5.00	350
5.25	380

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



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



Package Information

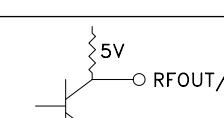
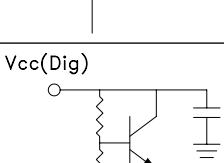
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[3]
HMC534LP5	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL3 ^[1]	H534 XXXX
HMC534LP5E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3 ^[2]	H534 XXXX

[1] Max peak reflow temperature of 235 °C

[1] Max peak reflow temperature of 265 °C

[2] Max peak follow tempera
[3] 4-Digit lot number XXXX

Pin Descriptions

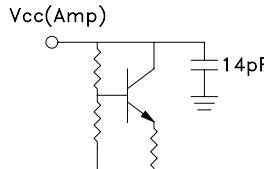
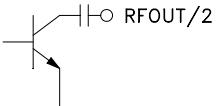
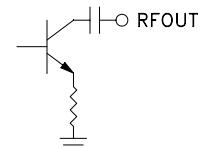
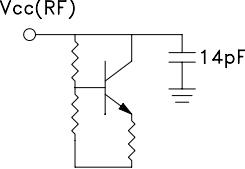
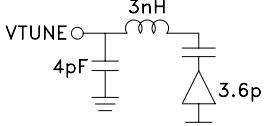
Pin Number	Function	Description	Interface Schematic
1 - 3, 8 - 10, 13 - 18, 20, 22 - 28, 30 - 32	N/C	No Connection. These pins may be connected to RF/ DC ground. Performance will not be affected.	
4	RFOUT/4	Divide-by-4 output. DC block required	
6	Vcc (Dig)	Supply voltage for prescaler. If prescaler is not required, this pin may be left open to conserve approximately 65 mA of current.	

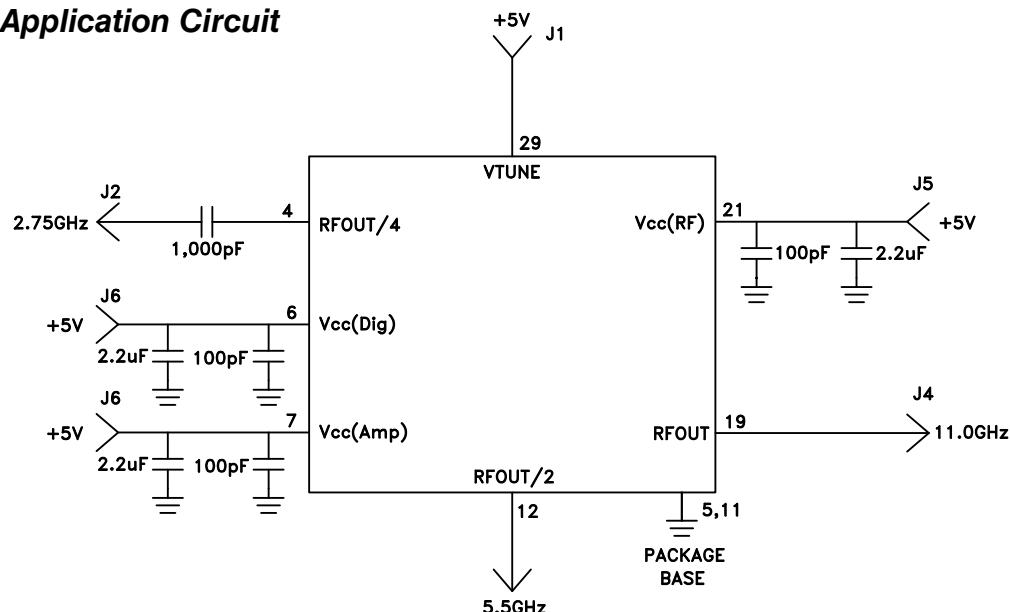
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Pin Descriptions

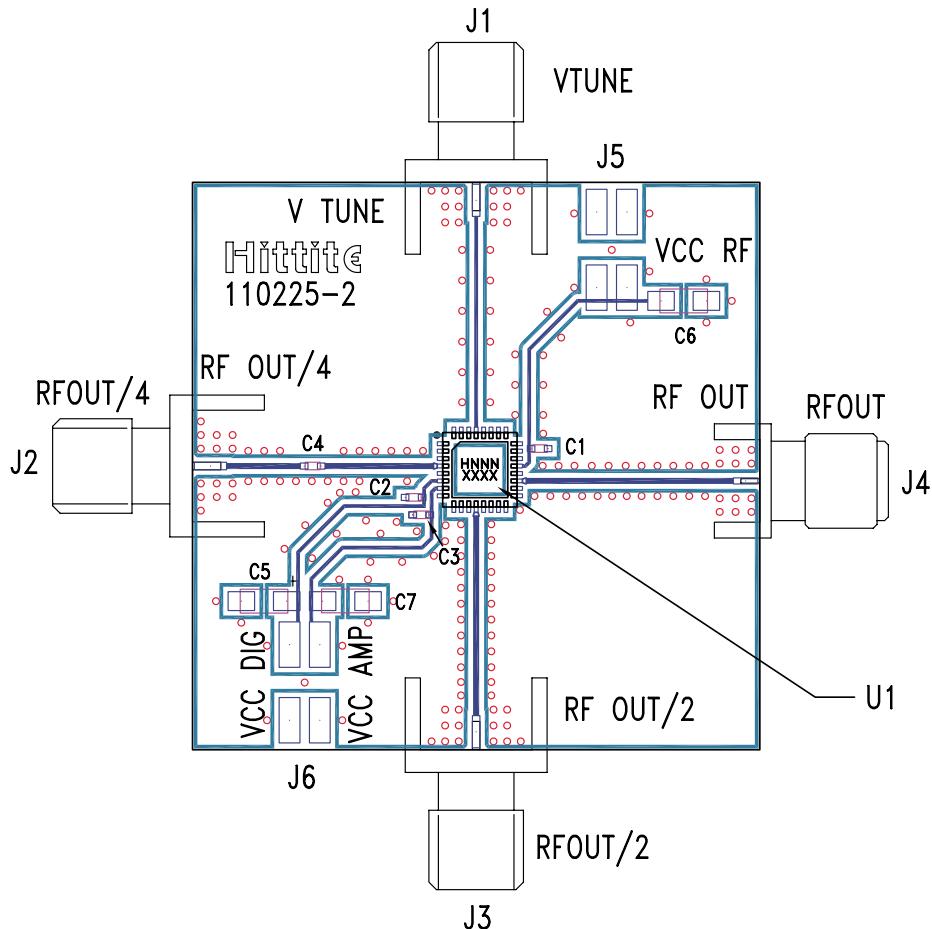
Pin Number	Function	Description	Interface Schematic
7	Vcc (Amp)	Supply voltage, for RFOUT/2 output. If RFOUT/2 is not required. This pin may be left open to conserve approximately 30 mA of current.	
12	RFOUT/2	Half frequency output (AC coupled).	
19	RF OUT	RF output (AC coupled).	
21	Vcc (RF)	Supply Voltage, +5V	
29	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.	
5, 11, Paddle	GND	Package bottom has an exposed metal paddle that must be connected to RF/DC ground.	

Typical Application Circuit

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Evaluation PCB**List of Materials for Evaluation PCB 110227^[1]**

Item	Description
J1 - J4	PCB Mount SMA RF Connector
J5 - J6	2 mm DC Header
C1 - C3	100 pF Capacitor, 0402 Pkg.
C4	1,000 pF Capacitor, 0402 Pkg.
C5 - C7	2.2 μ F Tantalum Capacitor
U1	HMC534LP5 / HMC534LP5E VCO
PCB ^[2]	110225 Eval Board

[1] Reference this number when ordering complete evaluation PCB

[2] 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 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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