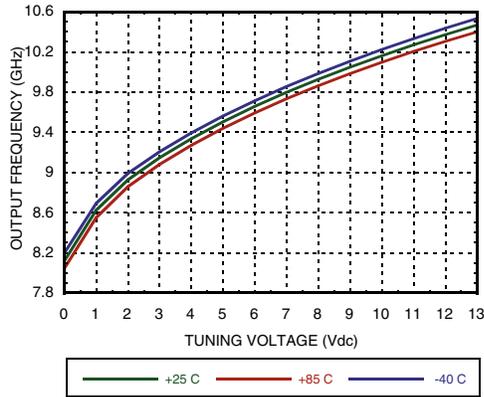


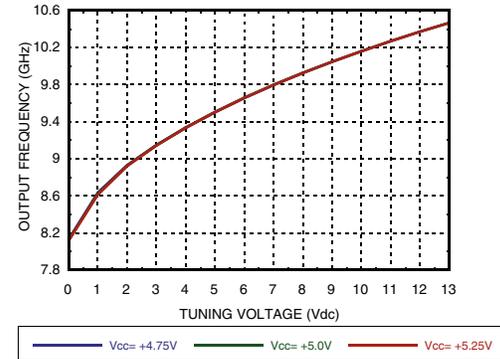
**MMIC VCO WITH HALF FREQUENCY OUTPUT  
9.05 - 10.15 GHz**



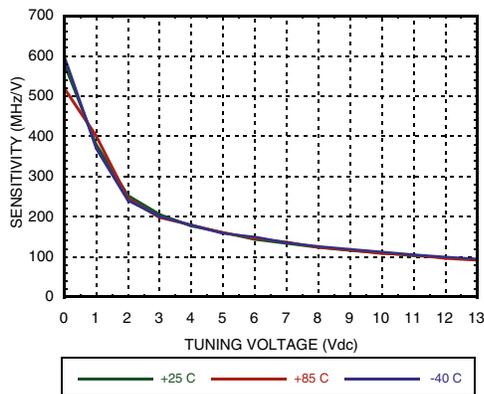
**Frequency vs. Tuning Voltage**



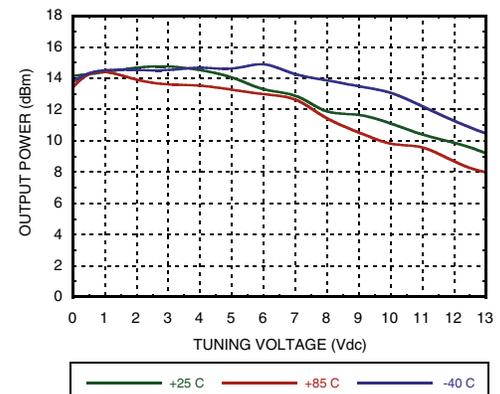
**Frequency vs. Tuning Voltage, T = 25C**



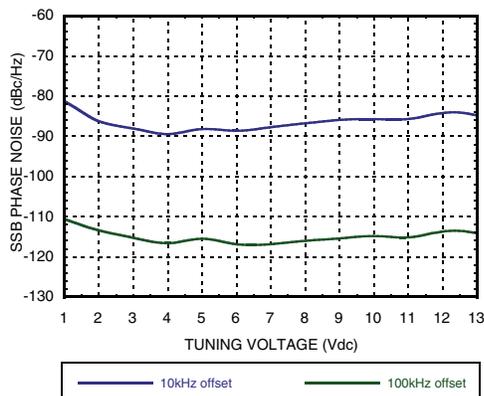
**Sensitivity vs. Tuning Voltage**



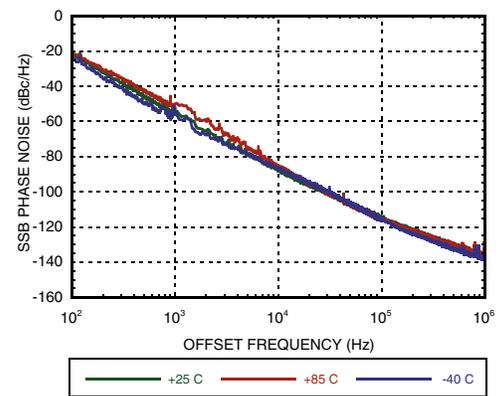
**Output Power vs. Tuning Voltage**



**SSB Phase Noise vs. Tuning Voltage**



**SSB Phase Noise @ Vtune = +5V**



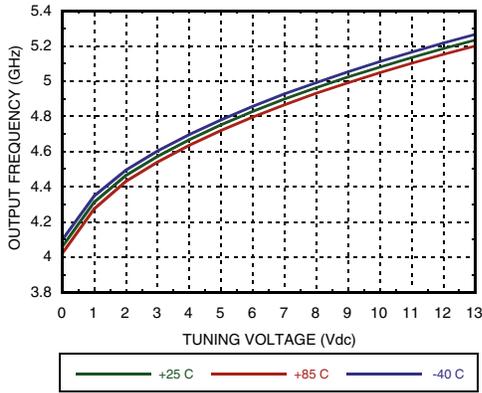
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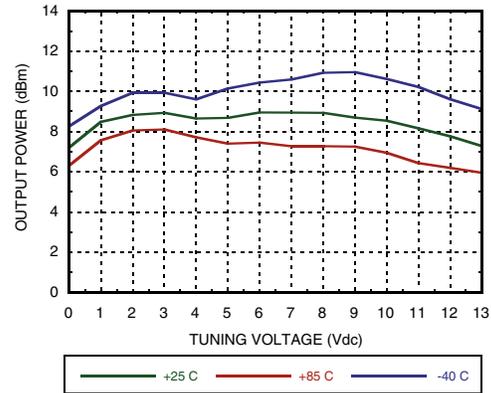
## MMIC VCO WITH HALF FREQUENCY OUTPUT 9.05 - 10.15 GHz



**RFOUT/2 Frequency vs. Tuning Voltage**



**RFOUT/2 Output Power vs. Tuning Voltage**



**Absolute Maximum Ratings**

Vcc	+5.5 Vdc
Vtune	0 to +15V
Storage Temperature	-65 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)	126.9 °C
Thermal Resistance (junction to ground paddle)	31.6 °C/W
Operating Temperature	-40 to +85 °C



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Typical Supply Current vs. Vcc**

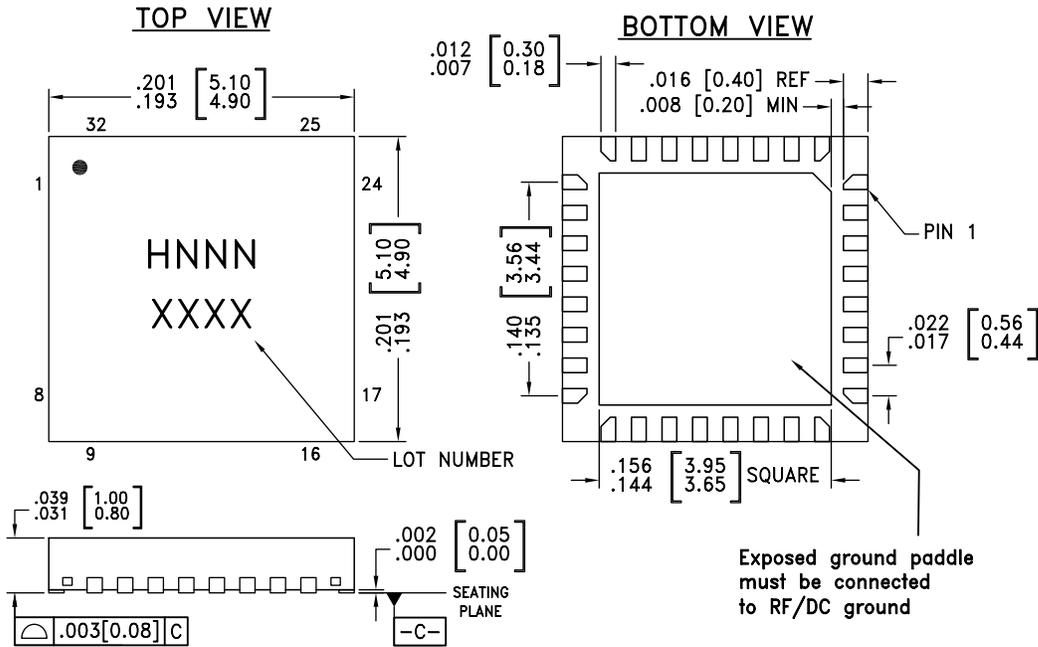
Vcc (V)	Icc (mA)
4.75	245
5.0	265
5.25	285

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

## MMIC VCO WITH HALF FREQUENCY OUTPUT 9.05 - 10.15 GHz



### 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.

### Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking <sup>[3]</sup>
HMC511LP5	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL3 <sup>[1]</sup>	H511 XXXX
HMC511LP5E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3 <sup>[2]</sup>	H511 XXXX

[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

## MMIC VCO WITH HALF FREQUENCY OUTPUT 9.05 - 10.15 GHz



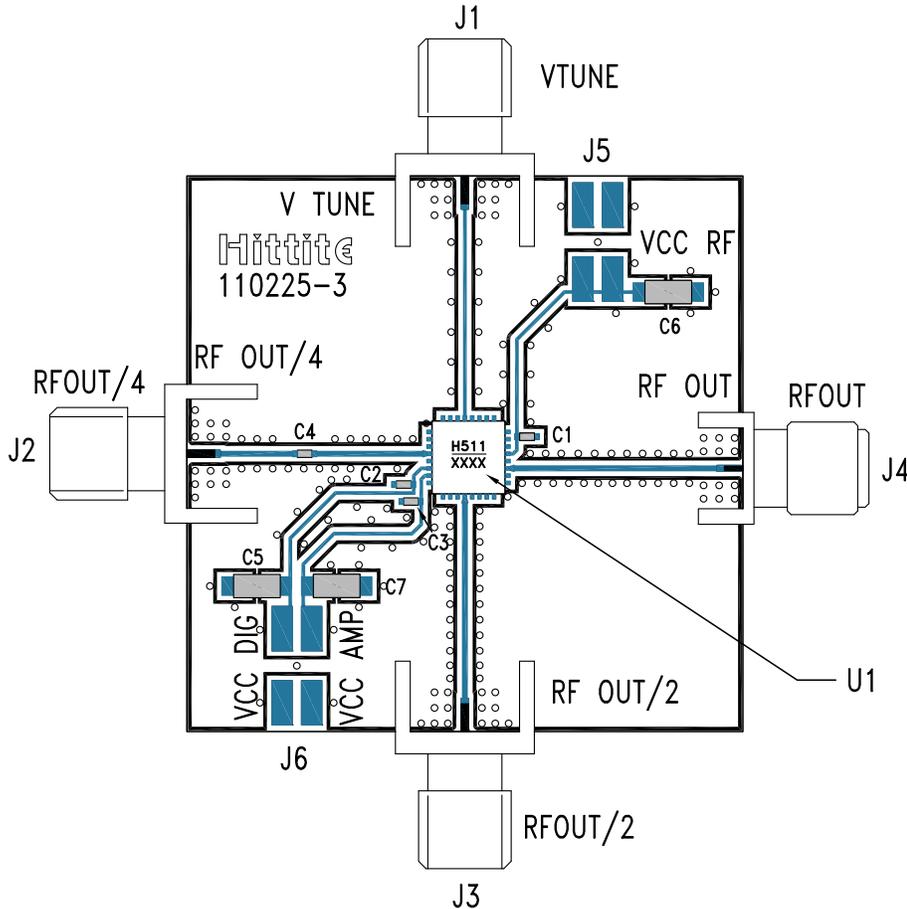
### Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1 - 4, 6 - 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.	
12	RFOUT/2	Half frequency output (AC coupled).	
19	RFOUT	RF output (AC coupled).	
21	Vcc	Supply Voltage, +5V	
29	VTUNE	Control Voltage Input. Modulation port bandwidth dependent on drive source impedance.	
5, 11 Paddle	GND	Package bottom has an exposed metal paddle that must be connected to RF/DC ground.	

**MMIC VCO WITH HALF FREQUENCY OUTPUT  
9.05 - 10.15 GHz**



**Evaluation PCB**



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

Item	Description
J1 - J4	PCB Mount SMA RF Connector
J5	2 mm DC Header
C1 - C3	100 pF Capacitor, 0402 Pkg.
C4	1,000 pF Capacitor, 0402 Pkg.
C5 - C7	2.2 μF Tantalum Capacitor
U1	HMC511LP5(E) VCO
PCB [2]	110225 Eval Board

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: 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.