

Typical Applications

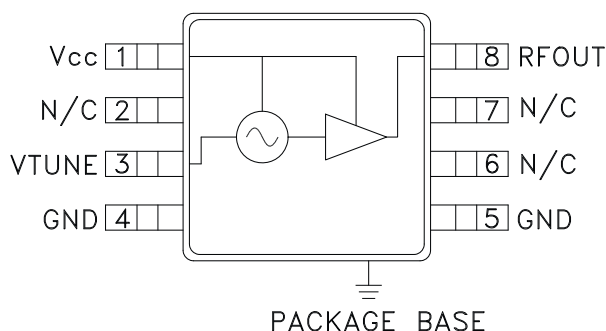
Low noise MMIC VCO w/Buffer Amplifier
for C-Band applications such as:

- UNII & Pt. to Pt. Radios
- 802.11a & HiperLAN WLAN
- VSAT Radios

Features

Pout: +11 dBm
Phase Noise: -110 dBc/Hz @100 KHz
No External Resonator Needed
Single Supply: 3V @ 100 mA
15mm² MSOP8G SMT Package

Functional Diagram



General Description

The HMC358MS8G & HMC358MS8GE are GaAs InGaP Heterojunction Bipolar Transistor (HBT) MMIC VCOs. The HMC358MS8G & HMC358MS8GE integrate resonators, negative resistance devices, varactor diodes, and buffer amplifiers. The VCO's phase noise performance is excellent over temperature, shock, and process due to the oscillator's monolithic structure. Power output is 11 dBm typical from a 3V supply voltage. The voltage controlled oscillator is packaged in a low cost, surface mount 8 lead MSOP package with an exposed base for improved RF and thermal performance.

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

Parameter	Min.	Typ.	Max.	Units
Frequency Range		5.8 - 6.8		GHz
Power Output	8	11		dBm
SSB Phase Noise @ 100 kHz Offset, $V_{tune} = +5\text{V}$ @ RF Output		-110		dBc/Hz
Tune Voltage (V_{tune})	0		10	V
Supply Current (I_{CC})		100		mA
Tune Port Leakage Current ($V_{tune} = 10\text{V}$)			10	μA
Output Return Loss		9		dB
Harmonics				
2nd		-10		dB
3rd		-20		dB
Pulling (into a 2.0:1 VSWR)		10		MHz pp
Pushing @ $V_{tune} = +3\text{V}$		150		MHz/V
Frequency Drift Rate		0.8		MHz/ $^\circ\text{C}$

HMC358* PRODUCT PAGE QUICK LINKS

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COMPARABLE PARTS

View a parametric search of comparable parts.

EVALUATION KITS

- HMC358MS8G Evaluation Board

DOCUMENTATION

Application Notes

- Determining the FM Bandwidth of a Wideband Varactor Tuned VCO

Data Sheet

- HMC358 Data Sheet

REFERENCE MATERIALS

Quality Documentation

- HMC Legacy PCN: MS##, MS##E and MS##G,MS##GE packages - Relocation of pre-existing production equipment to new building
- Package/Assembly Qualification Test Report: MS8G (QTR: 2014-00393)
- PCN: MS, QS, SOT, SOIC packages - Sn/Pb plating vendor change
- Semiconductor Qualification Test Report: GaAs HBT-A (QTR: 2013-00228)

DESIGN RESOURCES

- HMC358 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC358 EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

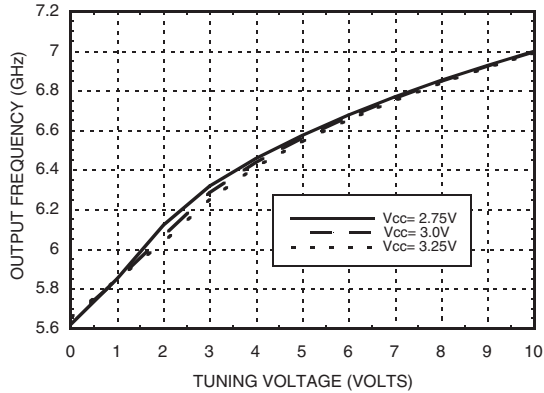
TECHNICAL SUPPORT

Submit a technical question or find your regional support number.

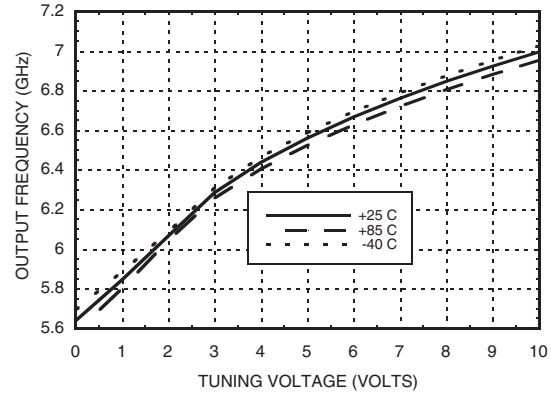
DOCUMENT FEEDBACK

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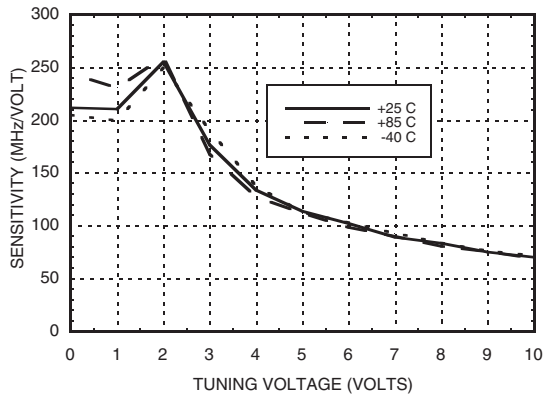
Frequency vs. Tuning Voltage, $T = 25^\circ\text{C}$



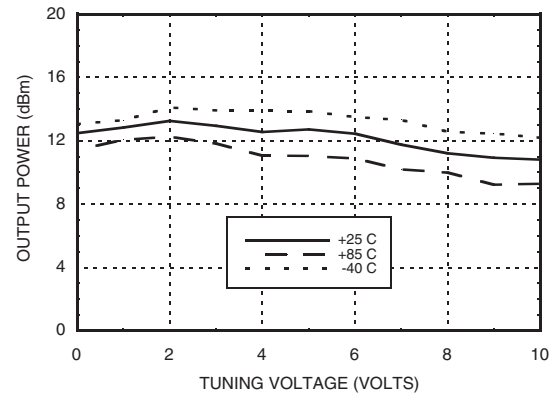
Frequency vs. Tuning Voltage, $V_{cc} = +3\text{V}$



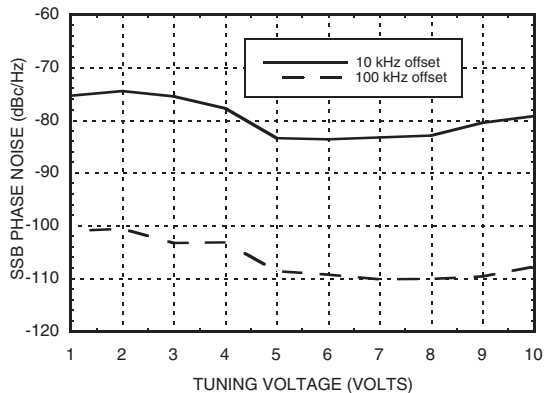
Sensitivity vs. Tuning Voltage, $V_{cc} = +3\text{V}$



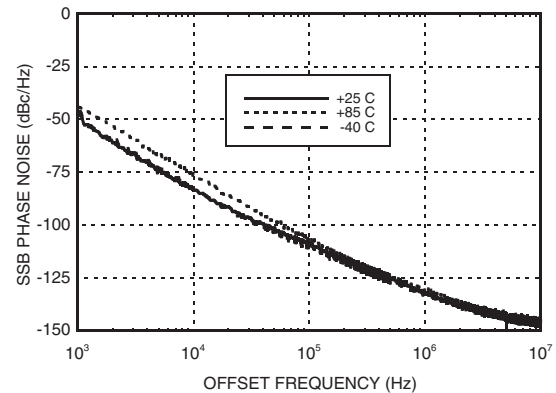
**Output Power vs.
Tuning Voltage, $V_{cc} = +3\text{V}$**



Phase Noise vs. Tuning Voltage



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




**MMIC VCO w/ BUFFER
AMPLIFIER, 5.8 - 6.8 GHz**
Absolute Maximum Ratings

Vcc	3.5 Vdc
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
Vtune	0 to 11V
ESD Sensitivity (HBM)	Class 1A

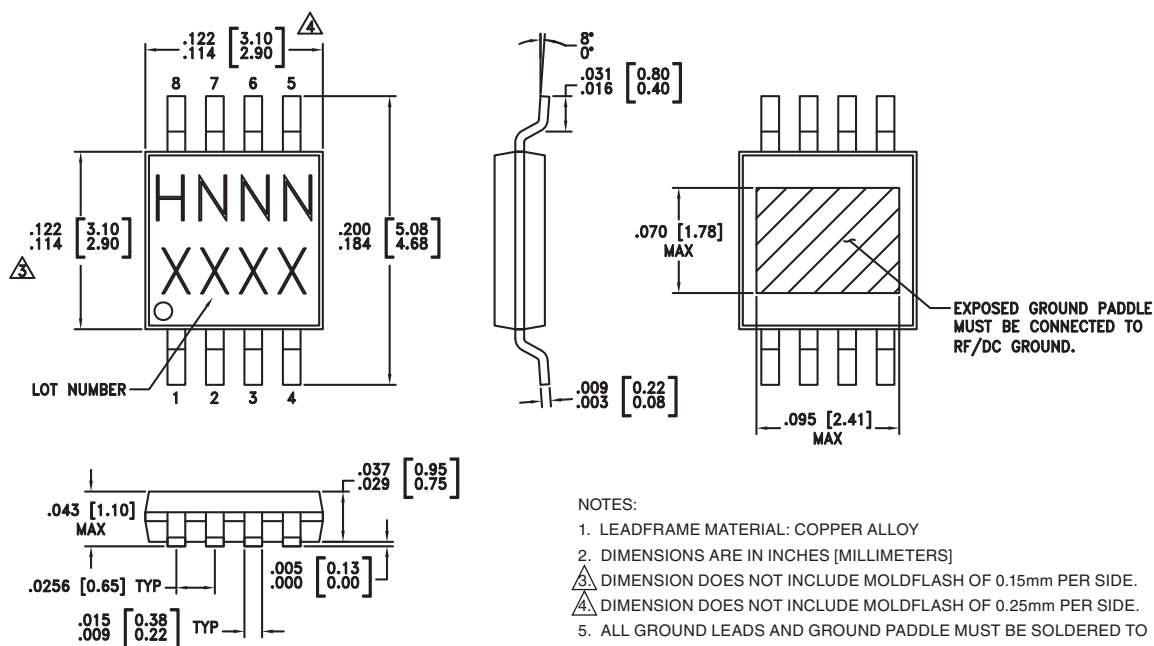
Typical Supply Current vs. Vcc

Vcc (V)	Icc (mA)
2.75	80
3.0	100
3.25	115

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]
HMC358MS8G	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 ^[1]	H358 XXXX
HMC358MS8GE	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 ^[2]	<u>H358</u> XXXX

[1] Max peak reflow temperature of 235 °C

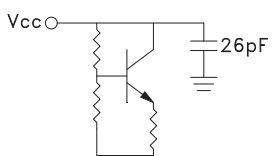
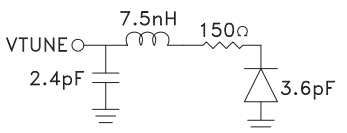

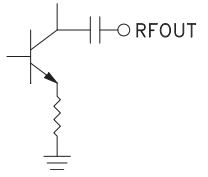
[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

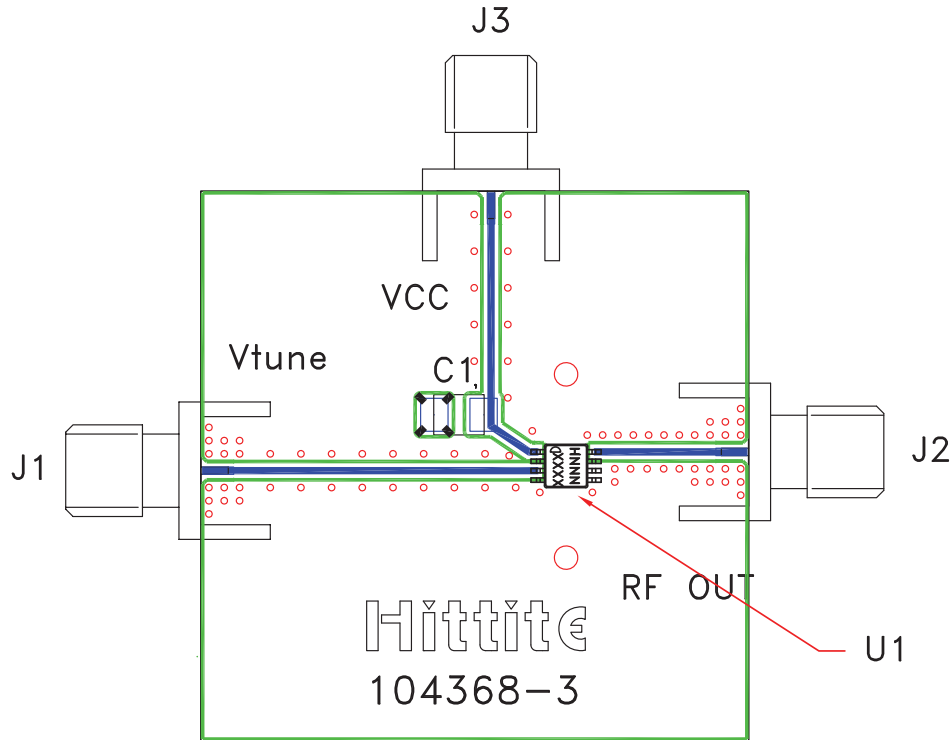
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Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	Vcc	Supply Voltage Vcc= 3V	
2, 6, 7	N/C	No Connection	
3	VTUNE	Control Voltage Input. Modulation port bandwidth dependent on drive source impedance.	
4, 5	GND	Package bottom has an exposed metal paddle that must be RF & DC grounded.	
8	RFOUT	RF output (AC coupled).	

Evaluation PCB



List of Materials for Evaluation PCB 104713 ^[1]

Item	Description
J1 - J3	PCB Mount SMA RF Connector
C1	10 μ F Tantalum Capacitor
U1	HMC358MS8G / HMC358MS8GE VCO
PCB [2]	104368 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 slug 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.



Notes:

HMC358MS8G / 358MS8GE

v04.0607

**MMIC VCO w/ BUFFER
AMPLIFIER, 5.8 - 6.8 GHz**

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VCOs & PLOs - SMT

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