



Typical Applications

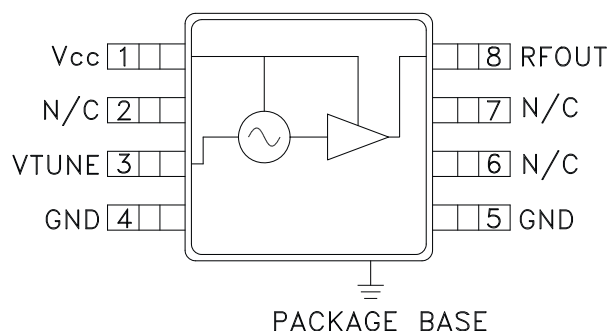
Low noise MMIC VCO w/Buffer Amplifier for C-Band applications such as:

- 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/ $^\circ\text{C}$ |

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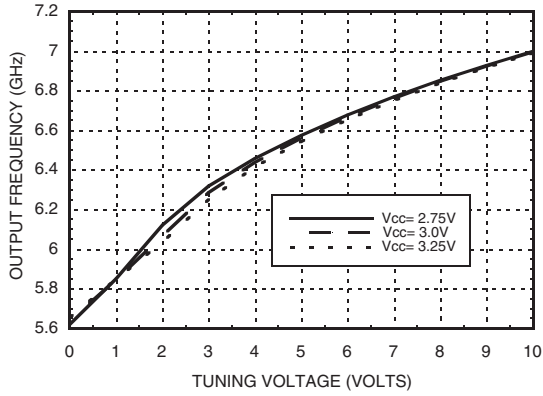
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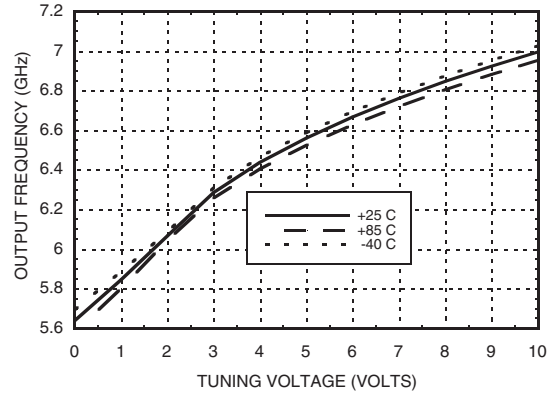
HMC358MS8G / 358MS8GE

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

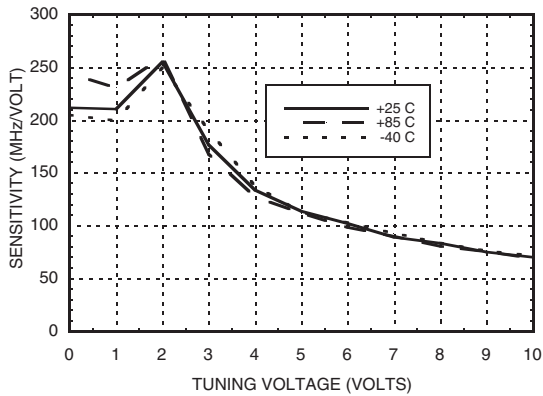
Frequency vs. Tuning Voltage, T= 25°C



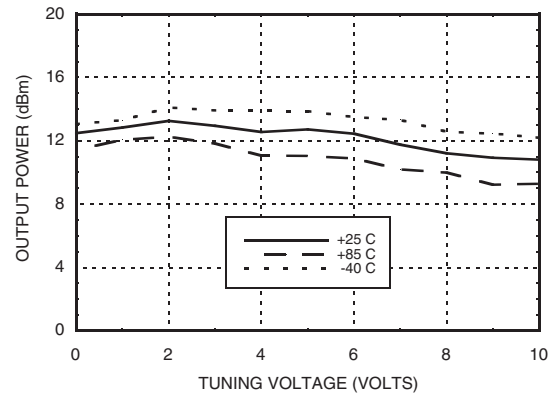
Frequency vs. Tuning Voltage, Vcc= +3V



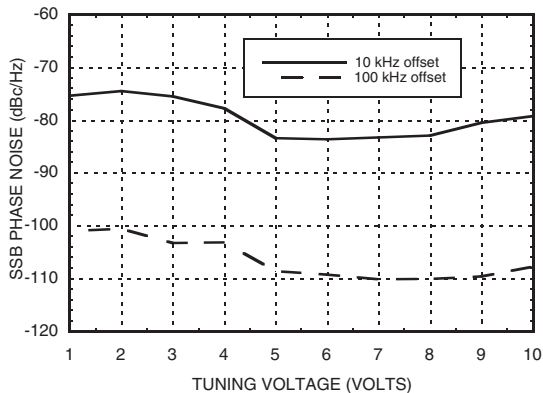
Sensitivity vs. Tuning Voltage, Vcc= +3V



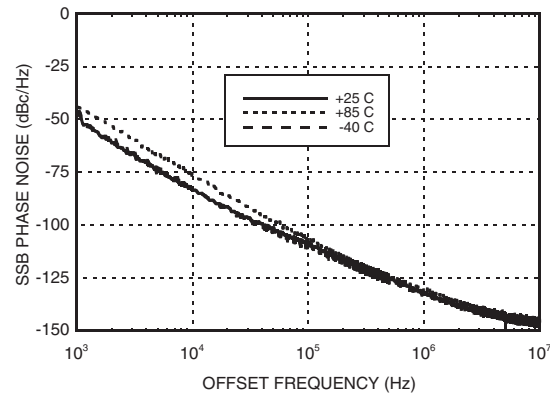
Output Power vs. Tuning Voltage, Vcc= +3V



Phase Noise vs. Tuning Voltage



Typical SSB Phase Noise @ Vtune= +5V



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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

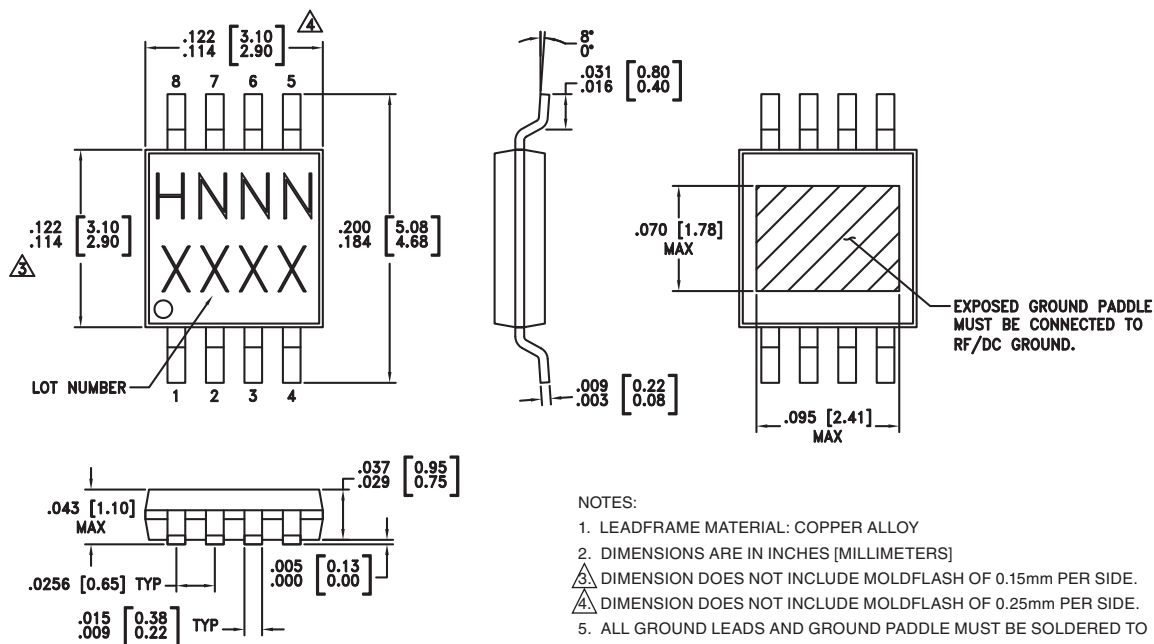
| Vcc (V) | Icc (mA) |
|---------|----------|
| 2.75 | 80 |
| 3.0 | 100 |
| 3.25 | 115 |

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] | H358 XXXX |

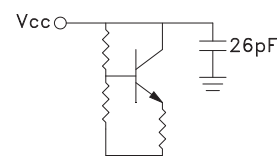
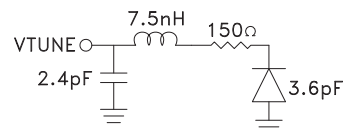

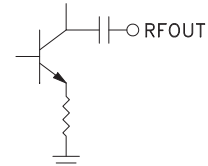
[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX



Pin Descriptions

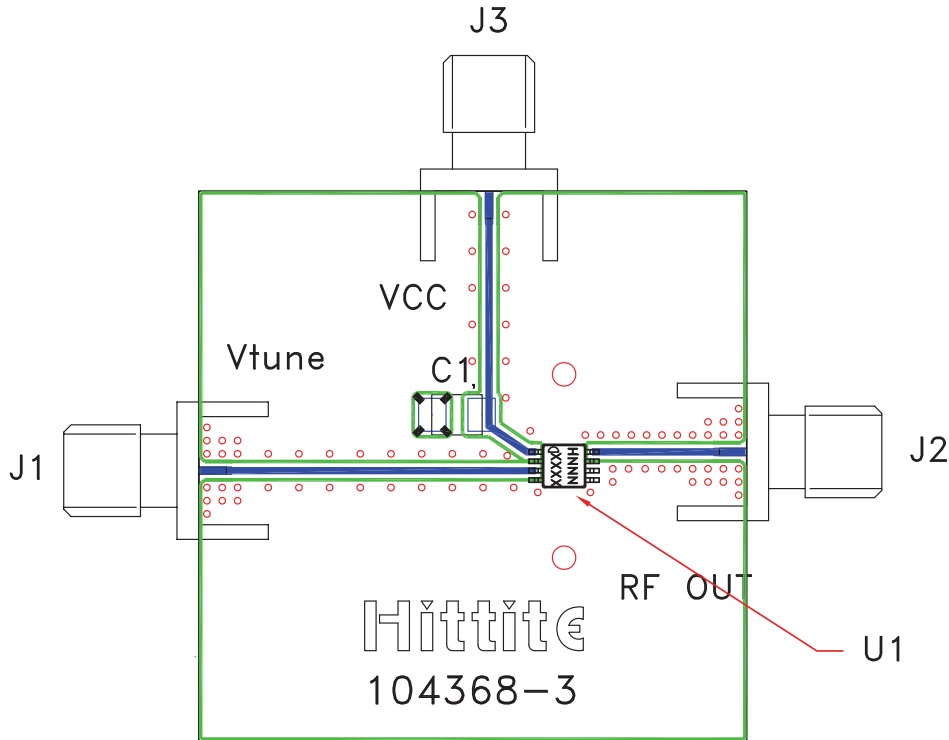
| Pin Number | Function | Description | Interface Schematic |
|------------|----------|---|---|
| 1 | Vcc | Supply Voltage Vcc= 3V |  |
| 2, 6, 7 | N/C | No Connection | |
| 3 | VTUNE | Control Voltage Input. Modulation port bandwidth dependent on drive source impedance. |  |
| 4, 5 | GND | Package bottom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

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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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