# HMC204MS8G / 204MS8GE

v04.0505

## GaAs MMIC SMT PASSIVE FREQUENCY DOUBLER, 4 - 8 GHz INPUT

### Typical Applications

The HMC204MS8G / HMC204MS8GE is suitable for:

- Wireless Local Loop
- LMDS, VSAT, and Point-to-Point Radios
- UNII & HiperLAN
- Test Equipment

### Features

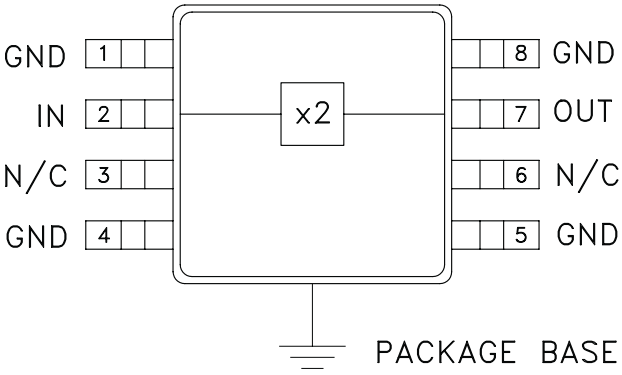
Conversion Loss: 17 dB

Fo, 3Fo, 4Fo Isolation: 42 dB

Passive: No Bias Required

Ultra Small Package: MSOP8

### Functional Diagram



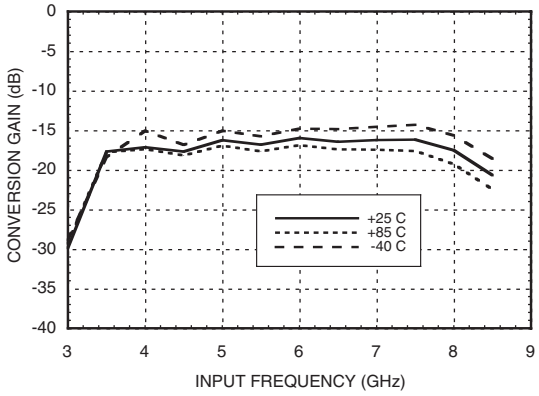

### General Description

The HMC204MS8G & HMC204MS8GE are passive miniature frequency doublers in 8 lead MSOP surface mount packages. Suppression of undesired fundamental and higher order harmonics is 42 dB typical with respect to input signal level. The doubler utilizes the same GaAs Schottky diode/balun technology found in Hittite MMIC mixers. It requires no DC bias and adds no measurable phase noise onto the multiplied signal.

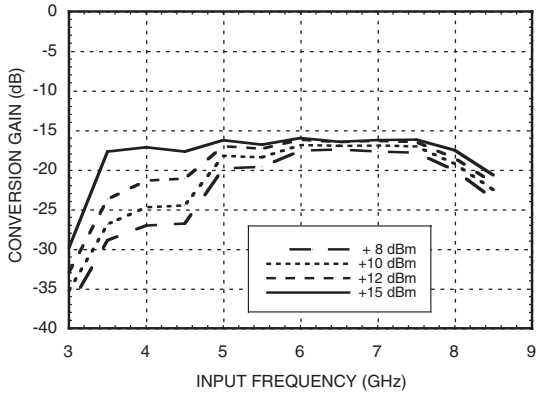
### Electrical Specifications, $T_A$ = +25° C, As a Function of Drive Level

| | Input = +10 dBm | | | Input = +12 dBm | | | Input = +15 dBm | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | Units |
| Frequency Range, Input | 5.5 - 7.5 | | | 5.0 - 8.0 | | | 4.0 - 8.0 | | | GHz |
| Frequency Range, Output | 11.0 - 15.0 | | | 10.0 - 16.0 | | | 8.0 - 16.0 | | | GHz |
| Conversion Loss | | 17 | 21 | | 17 | 22 | | 17 | 21 | dB |
| FO Isolation (with respect to input level) | 37 | 42 | | 37 | 42 | | 39 | 45 | | dB |
| 3FO Isolation (with respect to input level) | 37 | 45 | | 37 | 45 | | 35 | 45 | | dB |
| 4FO Isolation (with respect to input level) | 45 | 55 | | 40 | 50 | | 35 | 45 | | dB |

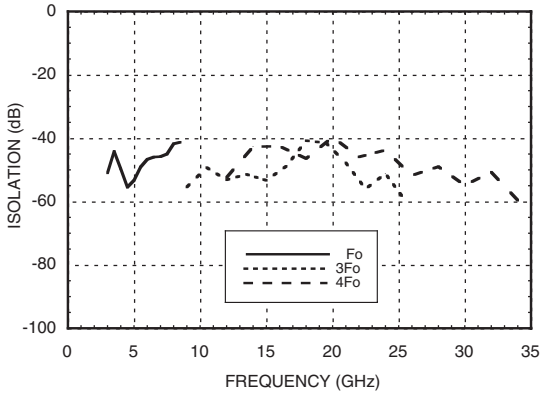
### Conversion Gain vs. Temperature @ +15 dBm Drive Level




### Conversion Gain @ +25° vs. Drive Level

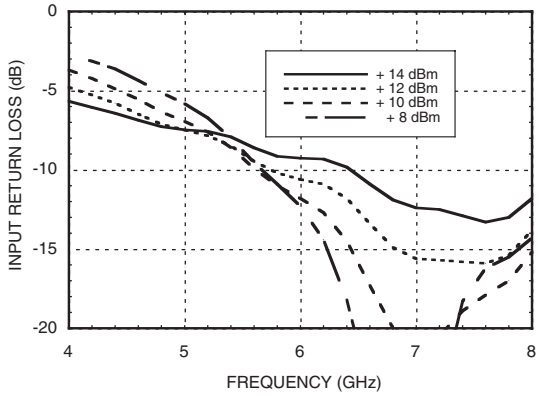



### Isolation @ +15 dBm Drive Level*

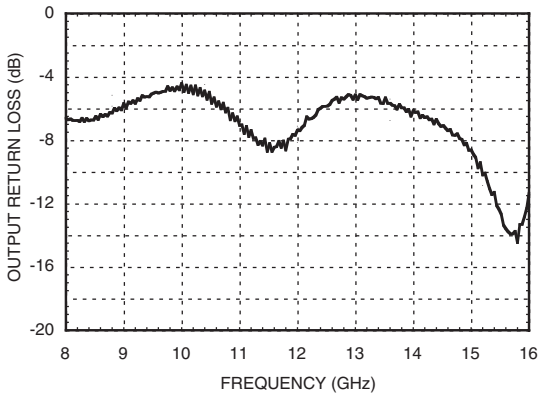



*With respect to input level

### Input Return Loss vs. Drive Level




### Output Return Loss

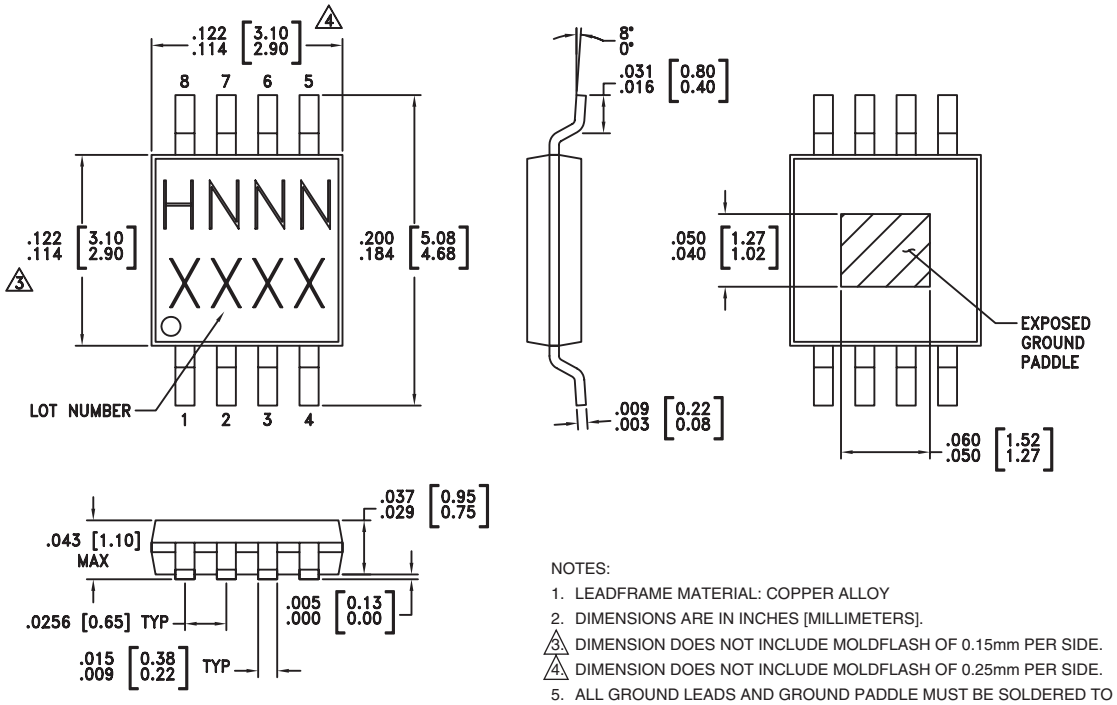


## Absolute Maximum Ratings

| | |
|---|---|
| Input Drive | +27 dBm |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

## Outline Drawing




NOTES:

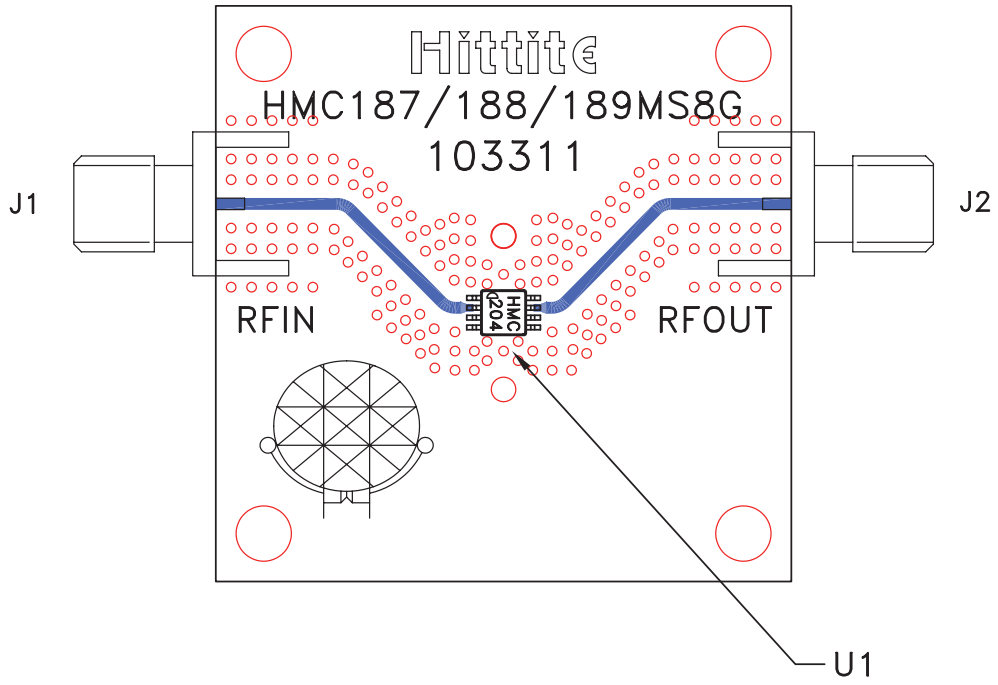
1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS].
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

## Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking [3] |
|---|---|---|---|---|
| HMC204MS8G | Low Stress Injection Molded Plastic | Sn/Pb Solder | MSL1 [1] | H204<br>XXXX |
| HMC204MS8GE | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 [2] | H204<br>XXXX |

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

### Evaluation PCB




### List of Materials for Evaluation PCB 103313 [1]

| Item | Description |
|---|---|
| J1, J2 | PCB Mount SMA Connector |
| U1 | HMC204MS8G / HMC204MS8GE |
| PCB [2] | 103311 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 be generated with proper RF circuit design techniques. Signal lines at the RF port should have 50 ohm impedance and the package ground leads and exposed ground paddle should be connected directly to the ground plane similar to that shown above. The evaluation circuit board shown above is available from Hittite Microwave Corporation upon request.