

Typical Applications

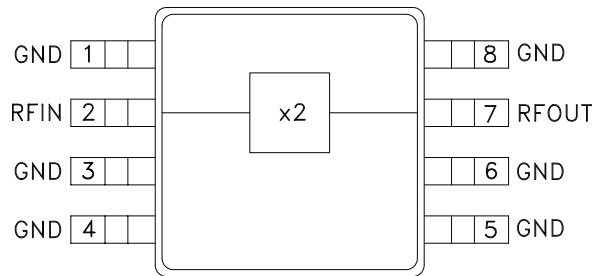
The HMC187MS8 / HMC187MS8E is suitable for:

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

Features

- Conversion Loss: 15 dB
- Fo, 3Fo, 4Fo Isolation: 40 dB
- Input Drive Level: 10 to 20 dBm

Functional Diagram



General Description

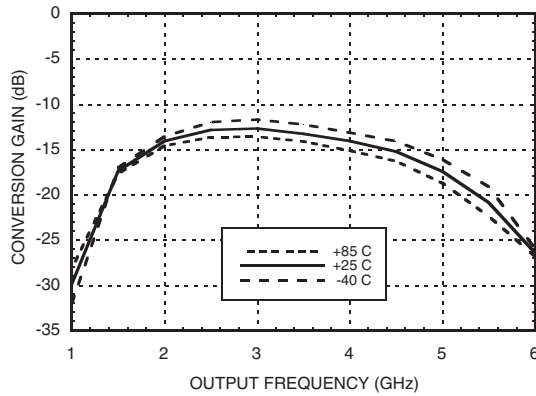
The HMC187MS8 & HMC187MS8E are miniature frequency doubler MMICs in plastic 8-lead MSOP packages. The suppression of undesired fundamental and higher order harmonics is 40 dB typical with respect to input signal levels. The doubler uses the same diode/balun technology used in Hittite MMIC mixers. The doubler is ideal for high volume applications where frequency doubling of a lower frequency is more economical than directly generating a higher frequency. The passive Schottky diode doubler technology contributes no measurable additive phase noise onto the multiplied signal.

Electrical Specifications, $T_A = +25^\circ \text{C}$, As a Function of Drive Level

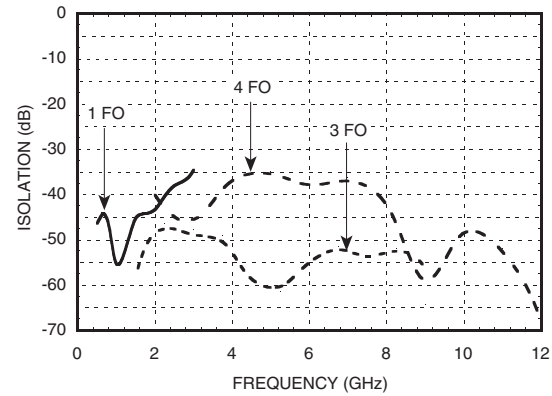
| Parameter | Input = +10 dBm | | | Input = +15 dBm | | | Input = +20 dBm | | | Units |
|--|-----------------|------|------|-----------------|------|------|-----------------|------|------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| Frequency Range, Input | 1.25 - 1.75 | | | 1.0 - 1.75 | | | 0.85 - 2.0 | | | GHz |
| Frequency Range, Output | 2.5 - 3.5 | | | 2.0 - 3.5 | | | 1.7 - 4.0 | | | GHz |
| Conversion Loss | | 18 | 22 | | 14 | 17 | | 15 | 18 | dB |
| FO Isolation (with respect to input level) | | | | 35 | 45 | | | | | dB |
| 3FO Isolation (with respect to input level) | | | | 46 | 52 | | | | | dB |
| 4FO Isolation (with respect to input level) | | | | 33 | 40 | | | | | dB |

GaAs MMIC SMT PASSIVE FREQUENCY DOUBLER, 0.85 - 2.0 GHz INPUT

Conversion Gain @ +15 dBm Drive Level

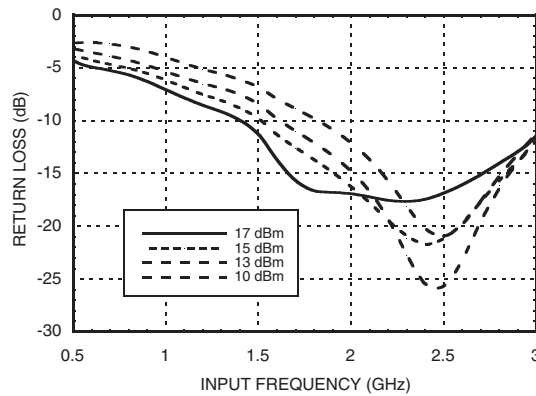


Isolation @ +15 dBm Drive Level*

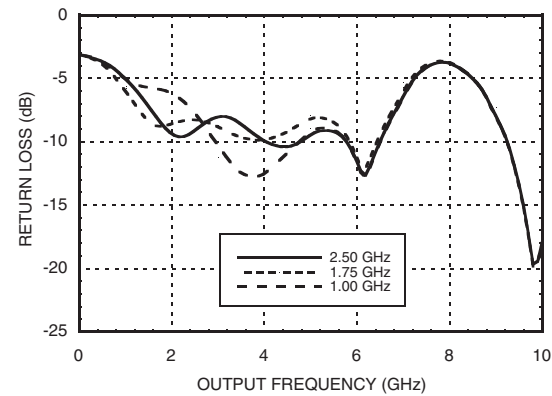


*With respect to input level

Input Return Loss vs. Drive Level



Output Return Loss for Several Input Frequencies

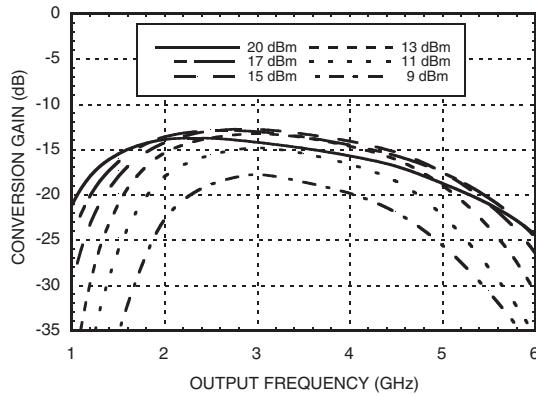


GaAs MMIC SMT PASSIVE FREQUENCY DOUBLER, 0.85 - 2.0 GHz INPUT

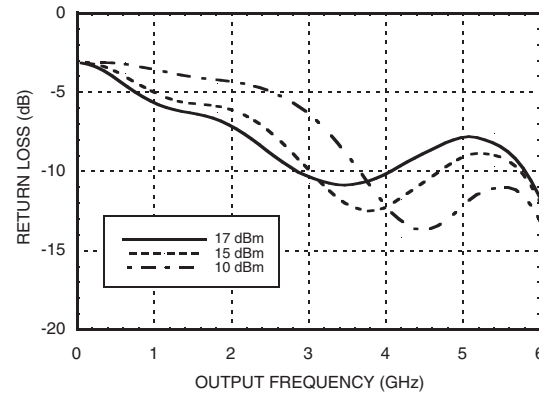
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FREQ. MULTIPLIERS - PASSIVE - SMT

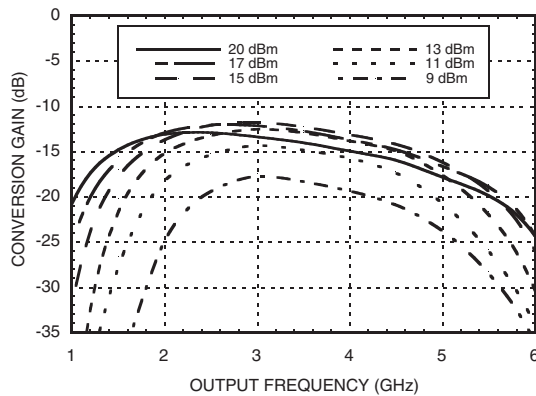
Conversion Gain @ 25°C vs. Drive Level



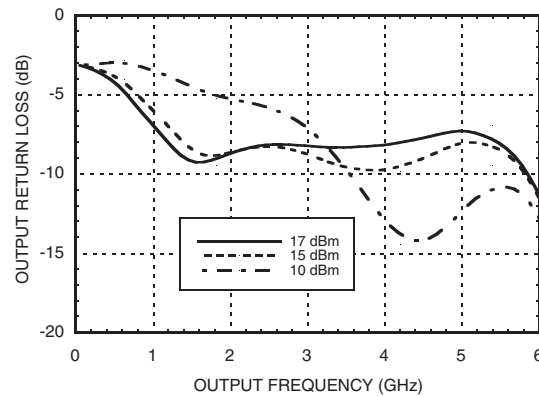
Output Return Loss with 1 GHz Input



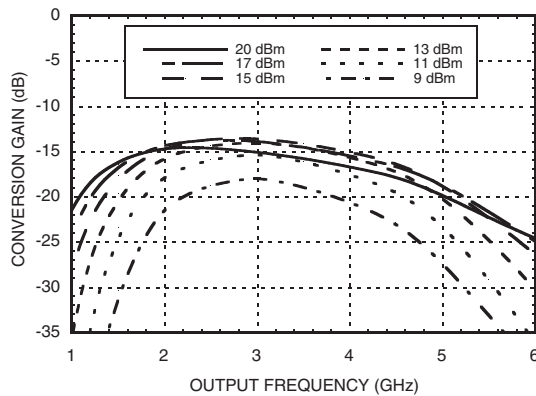
Conversion Gain @ -40°C vs. Drive Level



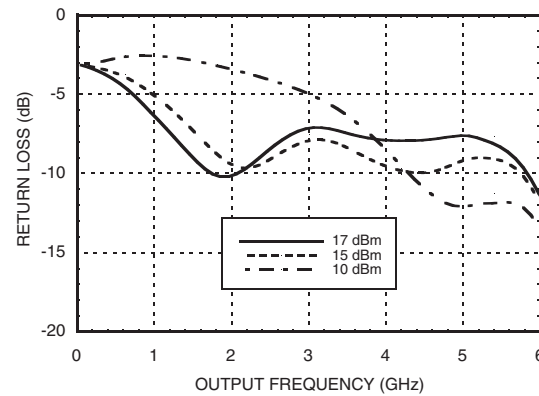
Output Return Loss with 1.75 GHz Input



Conversion Gain @ +85°C vs. Drive Level



Output Return Loss with 2.5 GHz Input



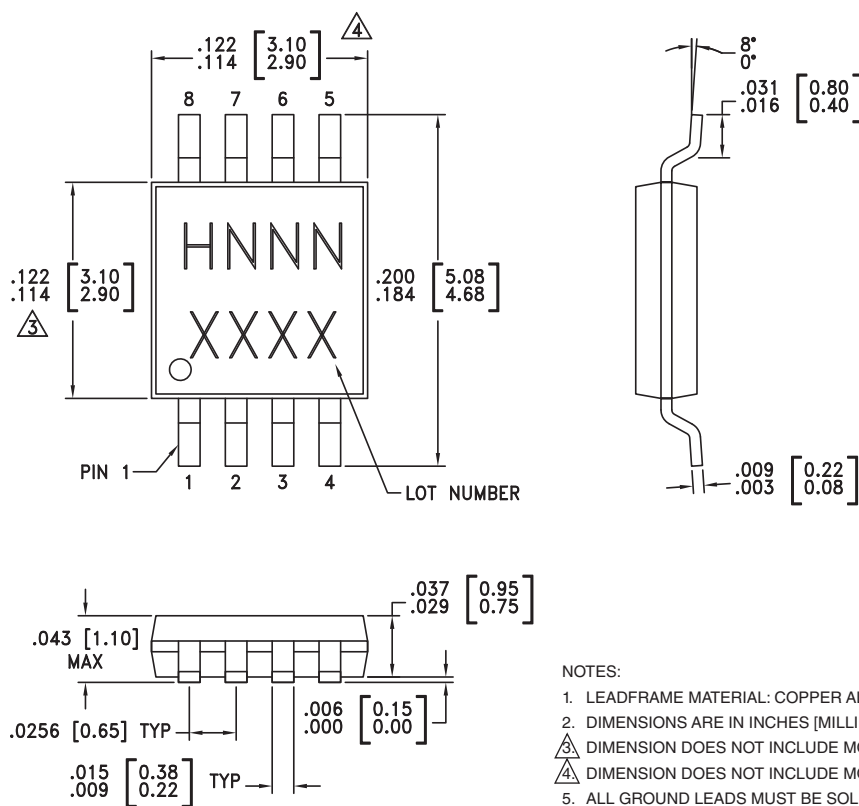
Absolute Maximum Ratings

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



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking ^[3] |
|-------------|--|---------------|---------------------|--------------------------------|
| HMC187MS8 | Low Stress Injection Molded Plastic | Sn/Pb Solder | MSL1 ^[1] | H187 XXXX |
| HMC187MS8E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 ^[2] | H187 XXXX |

[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

For price, delivery, and to place orders, please contact Hittite Microwave Corporation:
20 Alpha Road, Chelmsford, MA 01824 Phone: 978-250-3343 Fax: 978-250-3373
Order On-line at www.hittite.com



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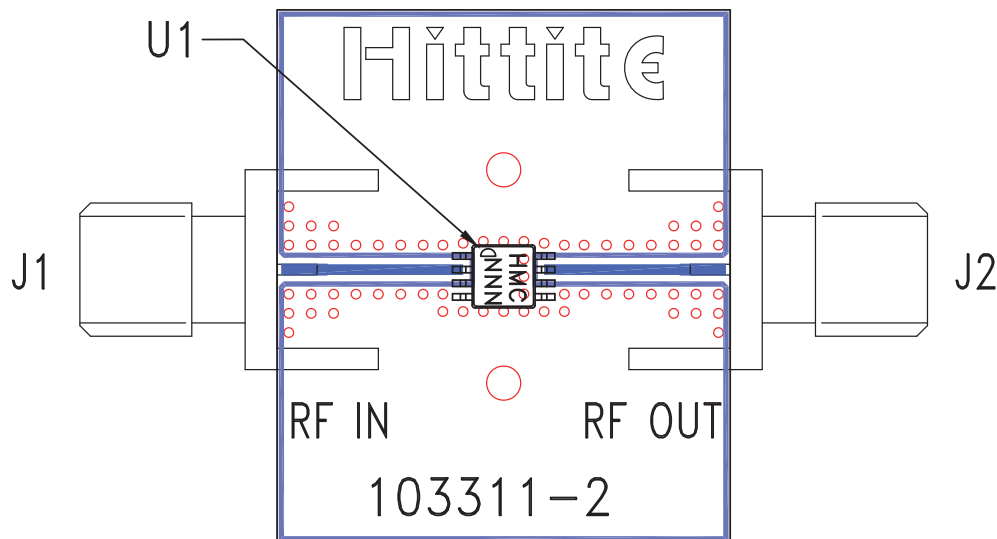
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HMC187MS8 / 187MS8E

GaAs MMIC SMT PASSIVE FREQUENCY DOUBLER, 0.85 - 2.0 GHz INPUT

Evaluation PCB



List of Materials for Evaluation PCB 103313 ^[1]

| Item | Description |
|---------|--------------------------------|
| J1, J2 | PCB Mount SMA Connector |
| U1 | HMC187MS8 / HMC187MS8E Doubler |
| 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 should have 50 ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. The evaluation circuit board shown is available from Hittite upon request.



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v04.0505



HMC187MS8 / 187MS8E

**GaAs MMIC SMT PASSIVE FREQUENCY
DOUBLER, 0.85 - 2.0 GHz INPUT**

Notes:

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FREQ. MULTIPLIERS - PASSIVE - SMT