

### Typical Applications

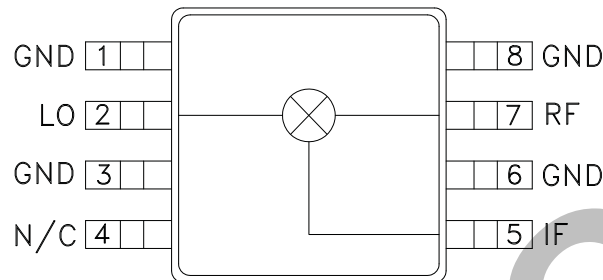
The HMC175MS8 / HMC175MS8E is ideal for:

- Mini-Base Stations
- Portable Wireless
- PCMCIA

### Features

Ultra Small Package: MSOP8  
Conversion Loss: 8 dB  
LO / IF Isolation: 32 dB  
LO / RF Isolation: 30 dB  
Input IP3: +18 dBm

### Functional Diagram



### General Description

The HMC175MS8 & HMC175MS8E are miniature double-balanced mixers in 8-lead plastic surface mount Mini Small Outline Packages (MSOP). The device can be used as an upconverter or downconverter. The mixer provides exceptional isolation and intermodulation performance for applications in high signal density environments. This device can also be used as a biphase modulator or demodulator. The MSOP8 is the smallest footprint available for a complete double-balanced mixer (0.118" x 0.190" x 0.040").

### Electrical Specifications, $T_A = +25^\circ \text{C}$ , LO Drive = +13 dBm

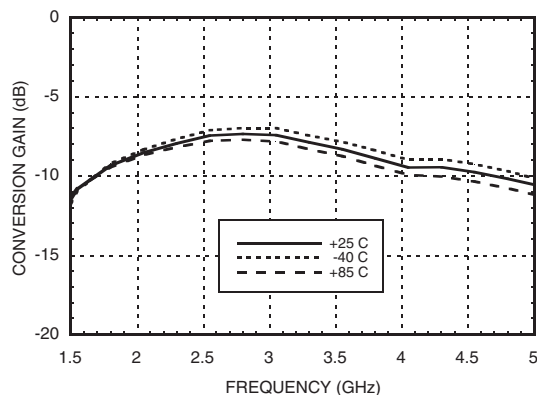
| Parameter                     | Broadband |           |      | PCS Band |           |      | ISM Band |           |      | Units |
|-------------------------------|-----------|-----------|------|----------|-----------|------|----------|-----------|------|-------|
|                               | Min.      | Typ.      | Max. | Min.     | Typ.      | Max. | Min.     | Typ.      | Max. |       |
| Frequency Range, RF & LO      |           | 1.7 - 4.5 |      |          | 1.7 - 2.0 |      |          | 2.2 - 2.6 |      | GHz   |
| Frequency Range, IF           |           | DC - 1.0  |      |          | DC - 1.0  |      |          | DC - 1.0  |      | GHz   |
| Conversion Loss               |           | 8         | 11   |          | 9         | 11   |          | 8         | 10   | dB    |
| Noise Figure (SSB)            |           | 8         | 11   |          | 9         | 11   |          | 8         | 10   | dB    |
| LO to RF Isolation            | 25        | 30        |      | 35       | 40        |      | 30       | 35        |      | dB    |
| LO to IF Isolation            | 27        | 32        |      | 28       | 32        |      | 28       | 32        |      | dB    |
| IP3 (Input)                   | 15        | 20        |      | 15       | 18        |      | 15       | 18        |      | dBm   |
| 1 dB Gain Compression (Input) | 9         | 12        |      | 9        | 11        |      | 9        | 11        |      | dBm   |



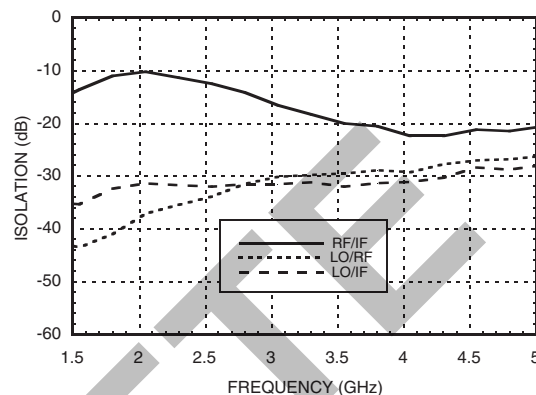
# HMC175MS8 / 175MS8E

## GaAs MMIC SMT DOUBLE-BALANCED MIXER, 1.7 - 4.5 GHz

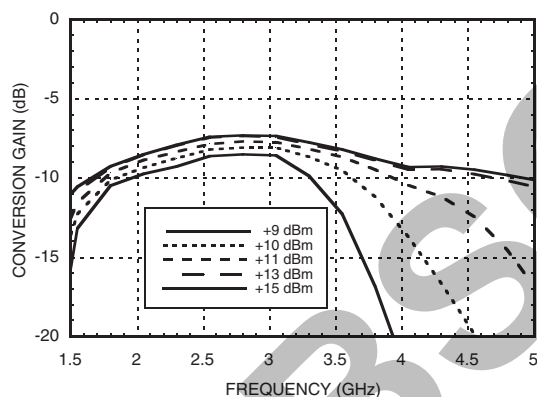
**Conversion Gain vs  
Temperature @ LO = +13 dBm**



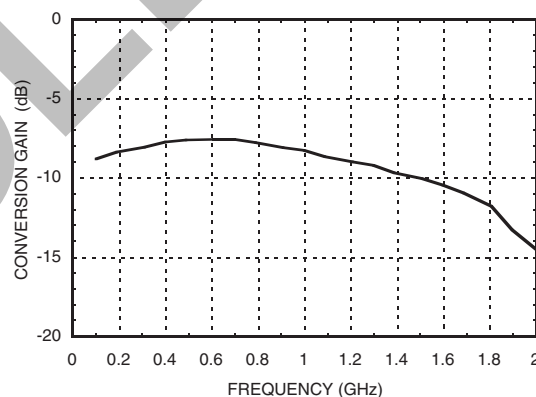
**Isolation @ LO = +13 dBm**



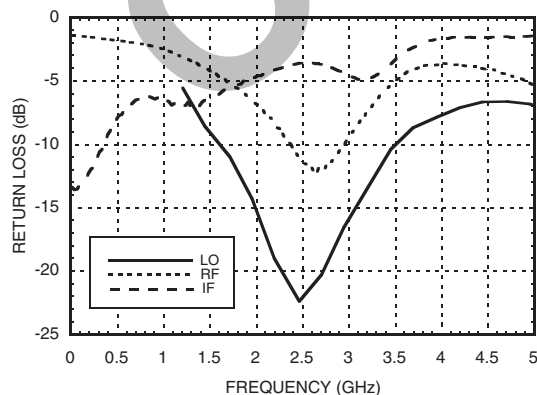
**Conversion Gain vs LO Power**



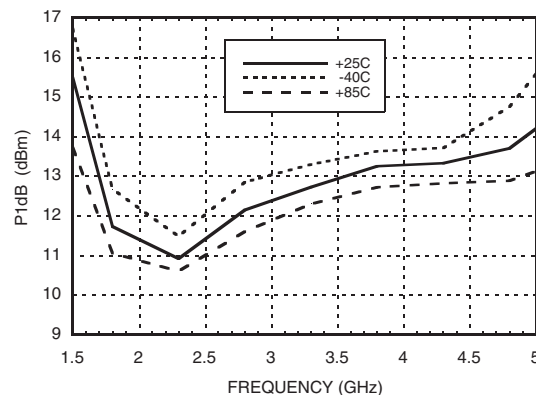
**IF Bandwidth @ LO = +13 dBm**



**Return Loss @ LO = +13 dBm**



**P1dB vs  
Temperature @ LO = +13 dBm**

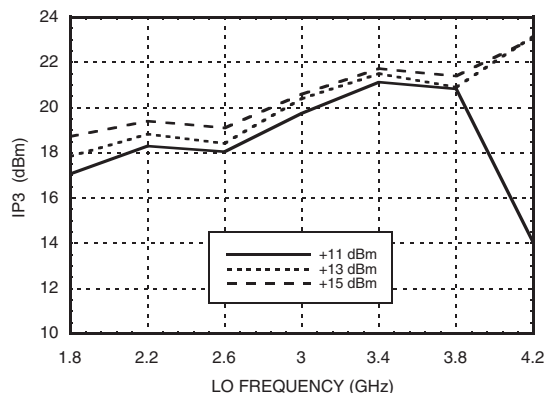




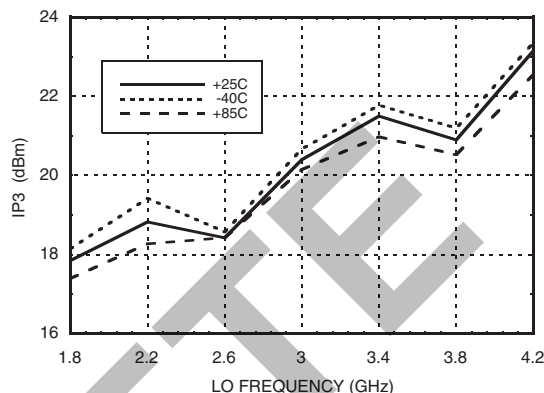
# HMC175MS8 / 175MS8E

## GaAs MMIC SMT DOUBLE-BALANCED MIXER, 1.7 - 4.5 GHz

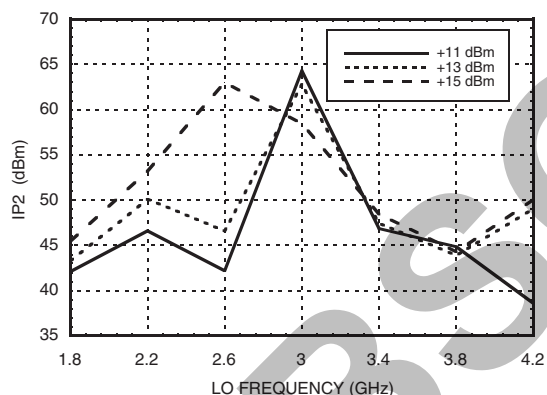
### Input IP3 vs. LO Drive



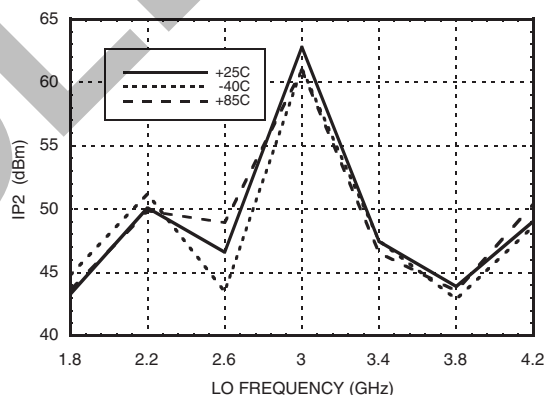
### Input IP3 vs. Temperature @ LO = +13 dBm



### Input IP2 vs. LO Drive



### Input IP2 vs. Temperature @ LO = +13 dBm



### MxN Spurious Outputs

| RF Frequency = 2.3 GHz @ -10 dBm |      |      |      |      |      |
|----------------------------------|------|------|------|------|------|
| LO Frequency = 2.4 GHz @ 13 dBm  |      |      |      |      |      |
|                                  | nLO  |      |      |      |      |
| mRF                              | 0    | 1    | 2    | 3    | 4    |
| 0                                | xx   | 1    | 12   | 12   | 37   |
| 1                                | 4    | 0    | 27   | 39   | 38   |
| 2                                | 74   | 53   | 56   | 60   | 67   |
| 3                                | 78   | >105 | 73   | 72   | 79   |
| 4                                | >105 | >105 | >105 | >105 | >105 |

All values in dBc below IF power level.

### Harmonics of LO

| LO Freq. (GHz) | nLO Spur at RF Port |    |    |    |
|----------------|---------------------|----|----|----|
|                | 1                   | 2  | 3  | 4  |
| 1.8            | 37                  | 32 | 63 | 53 |
| 2.2            | 35                  | 30 | 37 | 63 |
| 2.6            | 32                  | 28 | 33 | 55 |
| 3              | 30                  | 29 | 53 | 52 |
| 3.1            | 29                  | 30 | 56 | 51 |
| 3.6            | 29                  | 39 | 52 | 53 |
| 4.2            | 27                  | 46 | 48 | 61 |

LO = +13 dBm

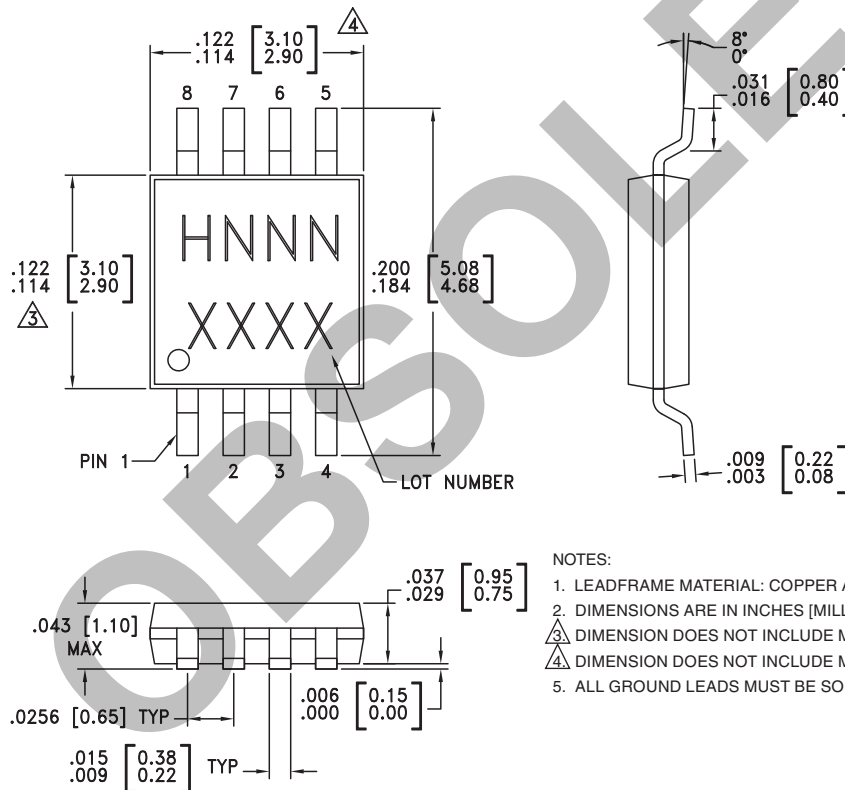
Values in dBc below input LO level measured at RF Port.


**GaAs MMIC SMT DOUBLE-  
BALANCED MIXER, 1.7 - 4.5 GHz**
**Absolute Maximum Ratings**

|                       |                |
|-----------------------|----------------|
| RF / IF Input         | +13 dBm        |
| LO Drive              | +27 dBm        |
| Storage Temperature   | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C  |
| ESD Sensitivity (HBM) | Class 1A       |



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Outline Drawing**

**Package Information**

| Part Number | Package Body Material                              | Lead Finish   | MSL Rating          | Package Marking <sup>[3]</sup> |
|-------------|----------------------------------------------------|---------------|---------------------|--------------------------------|
| HMC175MS8   | Low Stress Injection Molded Plastic                | Sn/Pb Solder  | MSL1 <sup>[1]</sup> | H175<br>XXXX                   |
| HMC175MS8E  | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 <sup>[2]</sup> | <u>H175</u><br>XXXX            |

[1] Max peak reflow temperature of 235 °C

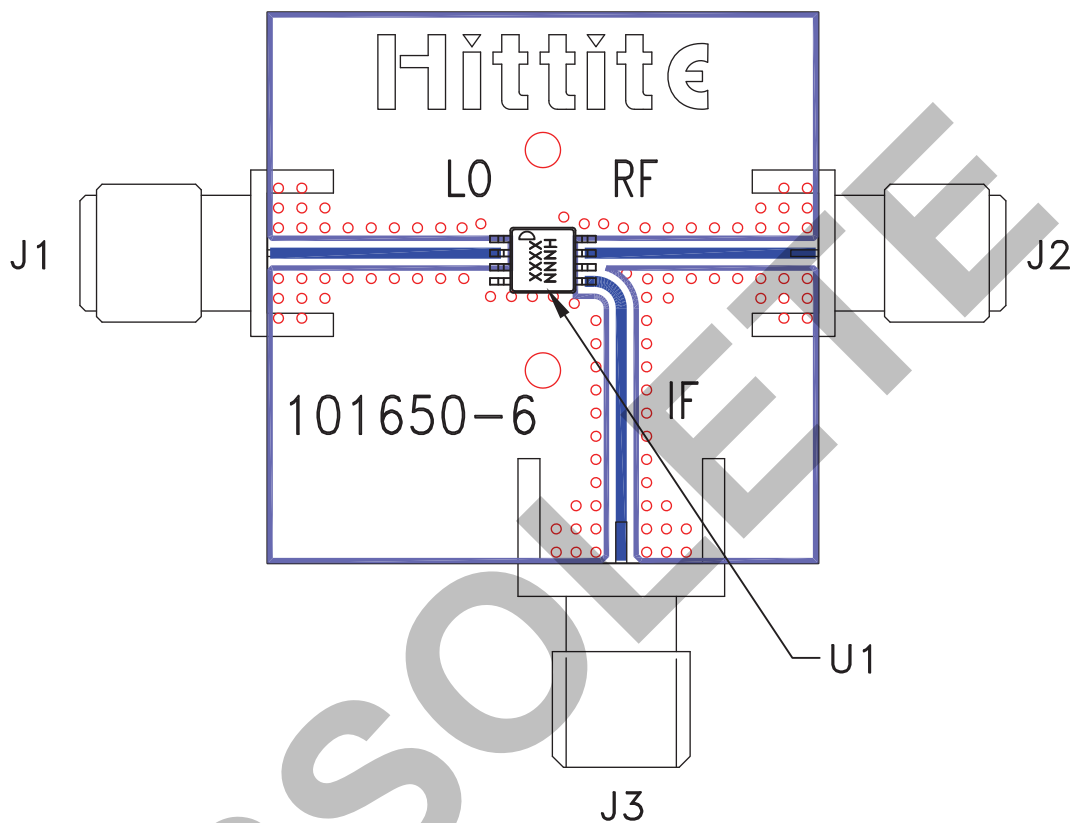
[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

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**Evaluation Circuit Board**



**List of Materials for Evaluation PCB 103350 <sup>[1]</sup>**

| Item               | Description                  |
|--------------------|------------------------------|
| J1 - J3            | PCB Mount SMA RF Connector   |
| U1                 | HMC175MS8 / HMC175MS8E Mixer |
| PCB <sup>[2]</sup> | 101650 Evaluation 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 exposed 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.

**Notes:**

OBSOLETE

# Mouser Electronics

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[HMC175MS8E](#) [HMC175MS8](#) [103350-HMC175MS8](#) [HMC175MS8ETR](#) [HMC175MS8TR](#)