

### Typical Applications

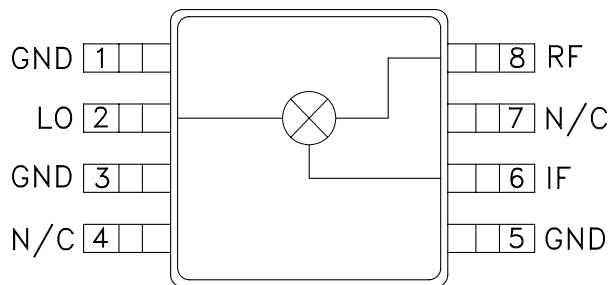
The HMC272AMS8 / HMC272AMS8E is ideal for:

- Up or Down Converter for PCS
- W-CDMA
- 2.4 GHz ISM
- MMDS

### Features

- RoHS Compliant Product
- Ultra Small Package: MSOP8
- LO / RF Isolation: 32 dB
- Input IP3: +20 dBm

### Functional Diagram



### General Description

The HMC272AMS8 & HMC272AMS8E are general purpose ultra miniature single balanced mixers in 8 lead plastic surface mount Mini Small Outline Packages (MSOP). This passive MMIC mixer is constructed of GaAs Schottky diodes and a novel planar transformer balun on the chip. The RF port is balanced via the MMIC balun while the LO port is connected directly to the diodes. The consistent MMIC performance will improve system operation and assure regulatory compliance.

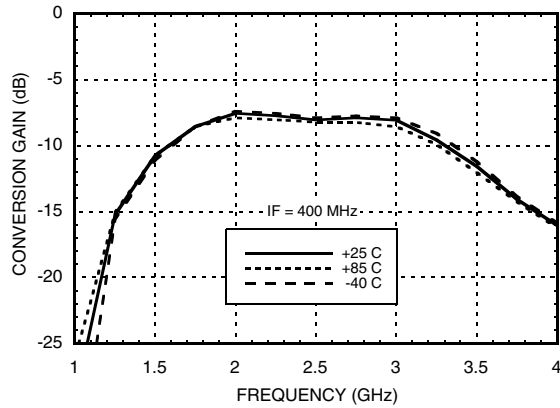
### Electrical Specifications, $T_A = +25^\circ \text{C}$ , As a Function of IF Frequency

| Parameter                | LO = +10 dBm<br>IF = 100 MHz |      |      | LO = +10 dBm<br>IF = 400 MHz |      |      | Units |
|--------------------------|------------------------------|------|------|------------------------------|------|------|-------|
|                          | Min.                         | Typ. | Max. | Min.                         | Typ. | Max. |       |
| Frequency Range, RF & LO | 2 - 3                        |      |      | 1.7 - 2.8                    |      |      | GHz   |
| Frequency Range, IF      | DC - 0.8                     |      |      | DC - 0.8                     |      |      | GHz   |
| Conversion Loss          |                              | 9    | 10.5 |                              | 9    | 11   | dB    |
| Noise Figure (SSB)       |                              | 9    | 10.5 |                              | 9    | 11   | dB    |
| LO to RF Isolation       | 22                           | 30   |      | 24                           | 32   |      | dB    |
| LO to IF Isolation       | 12                           | 20   |      | 11                           | 18   |      | dB    |
| IP3 (Input)              | 17                           | 21   |      | 16                           | 20   |      | dBm   |
| 1 dB Compression (Input) | 8                            | 11   |      | 7                            | 10   |      | dBm   |

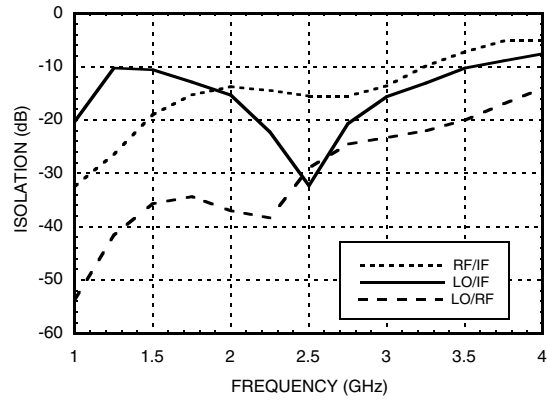


## GaAs MMIC SMT SINGLE BALANCED MIXER, 1.7 - 3.0 GHz

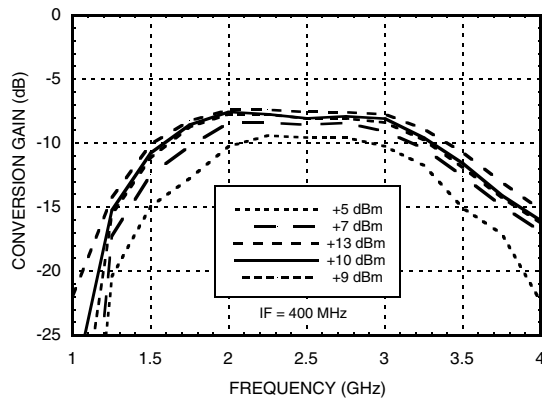
**Conversion Gain vs. Temperature @ LO = +10 dBm**



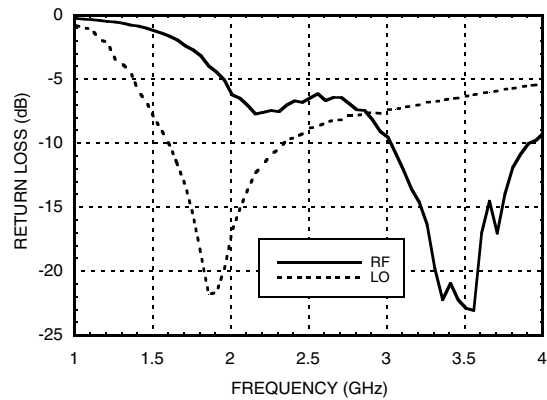
**Isolation @ LO = +10 dBm**



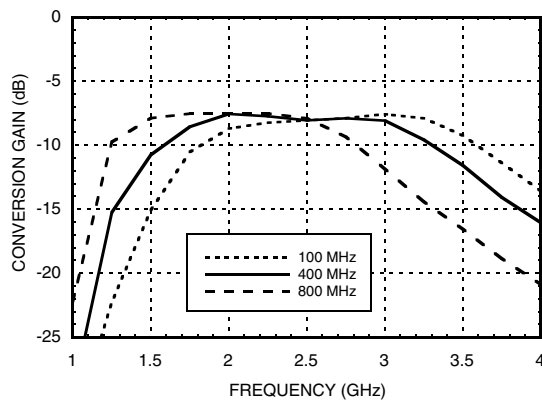
**Conversion Gain vs. LO Drive**



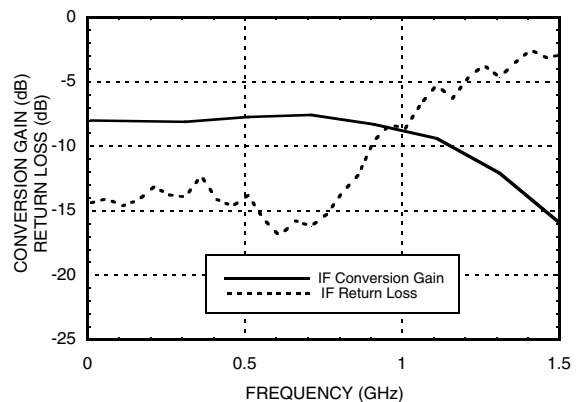
**Return Loss @ LO = +10 dBm**



**Conversion Gain vs. IF Frequency**



**IF Bandwidth @ LO = +10 dBm vs. Conversion Gain & Return Loss**



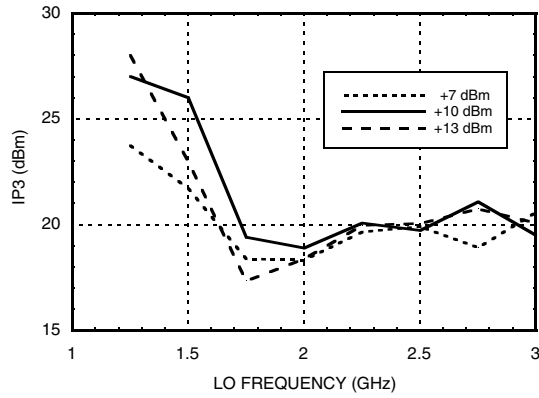
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MIXERS - SINGLE & DOUBLE BALANCED - SMT

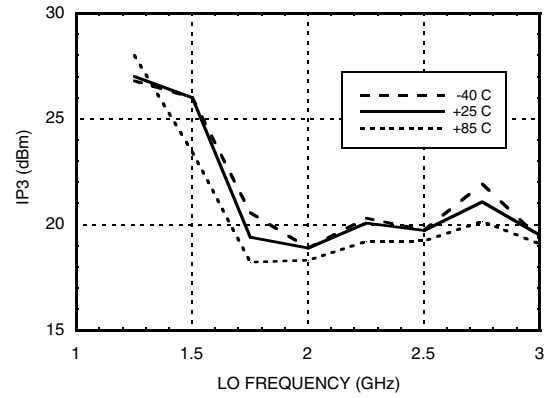


## GaAs MMIC SMT SINGLE BALANCED MIXER, 1.7 - 3.0 GHz

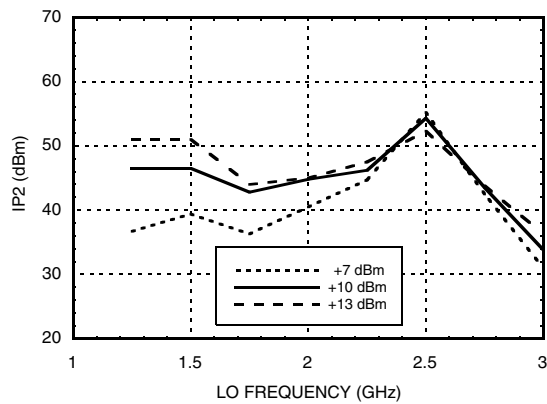
**Input IP3 vs. LO Drive**



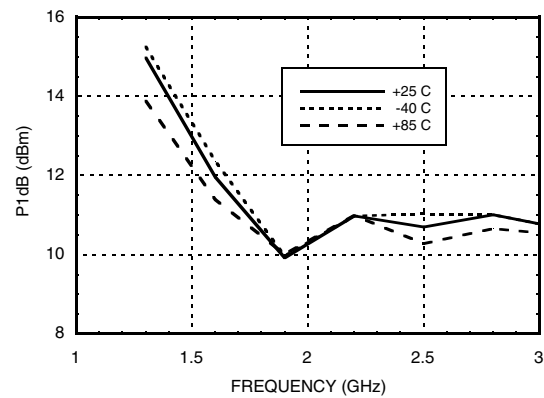
**Input IP3 vs. Temperature @ LO = +10 dBm**



**Input IP2 vs. LO Drive**



**P1dB vs. Temperature @ LO = +10 dBm**





# HMC272AMS8 / 272AMS8E

## GaAs MMIC SMT SINGLE BALANCED MIXER, 1.7 - 3.0 GHz

### MxN Spurious Outputs

| mRF | nLO |     |     |     |     |
|-----|-----|-----|-----|-----|-----|
|     | 0   | 1   | 2   | 3   | 4   |
| 0   | xx  | -11 | -6  | 5   | 19  |
| 1   | 7   | 0   | 37  | 27  | 38  |
| 2   | 53  | 64  | 62  | 46  | 72  |
| 3   | 83  | >85 | >85 | >85 | >85 |
| 4   | >85 | >85 | >85 | >85 | >85 |

RF = 2.6 GHz @ -10 dBm  
 LO = 2.2 GHz @ +13 dBm  
 All values in dBc relative to the IF

### Harmonics of LO

| LO Frequency (GHz) | nLO Spur at RF Port |    |    |    |
|--------------------|---------------------|----|----|----|
|                    | 1                   | 2  | 3  | 4  |
| 1.5                | 37                  | 14 | 36 | 41 |
| 1.7                | 35                  | 12 | 37 | 48 |
| 1.9                | 35                  | 13 | 43 | 49 |
| 2.1                | 43                  | 16 | 42 | 49 |
| 2.3                | 36                  | 19 | 37 | 49 |
| 2.5                | 29                  | 23 | 36 | 50 |

LO = +10 dBm  
 Values in dBc below input LO level measured at the RF port.

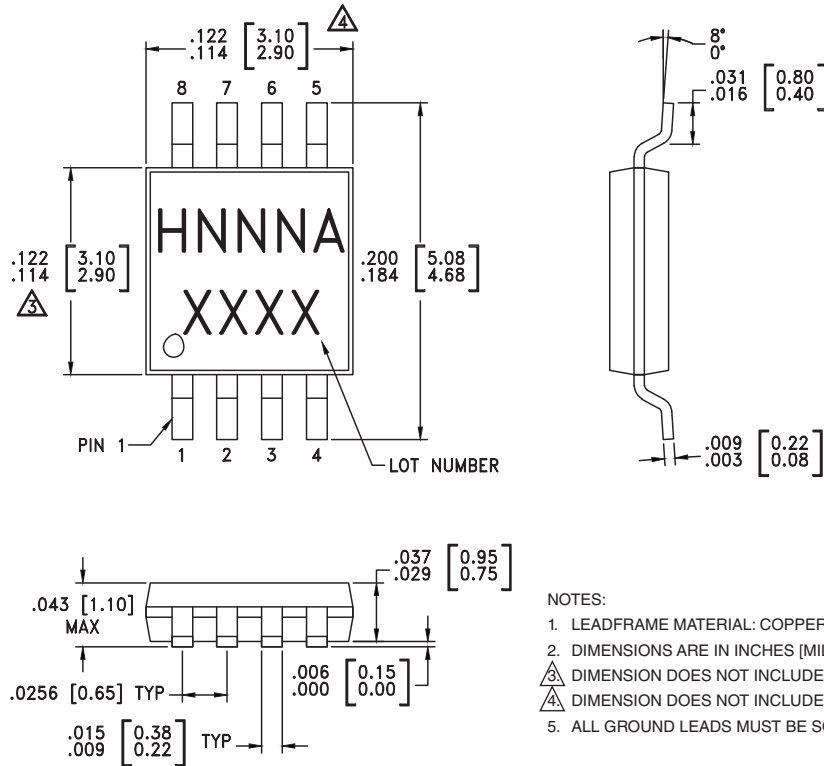
### Absolute Maximum Ratings

|                       |                |
|-----------------------|----------------|
| 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

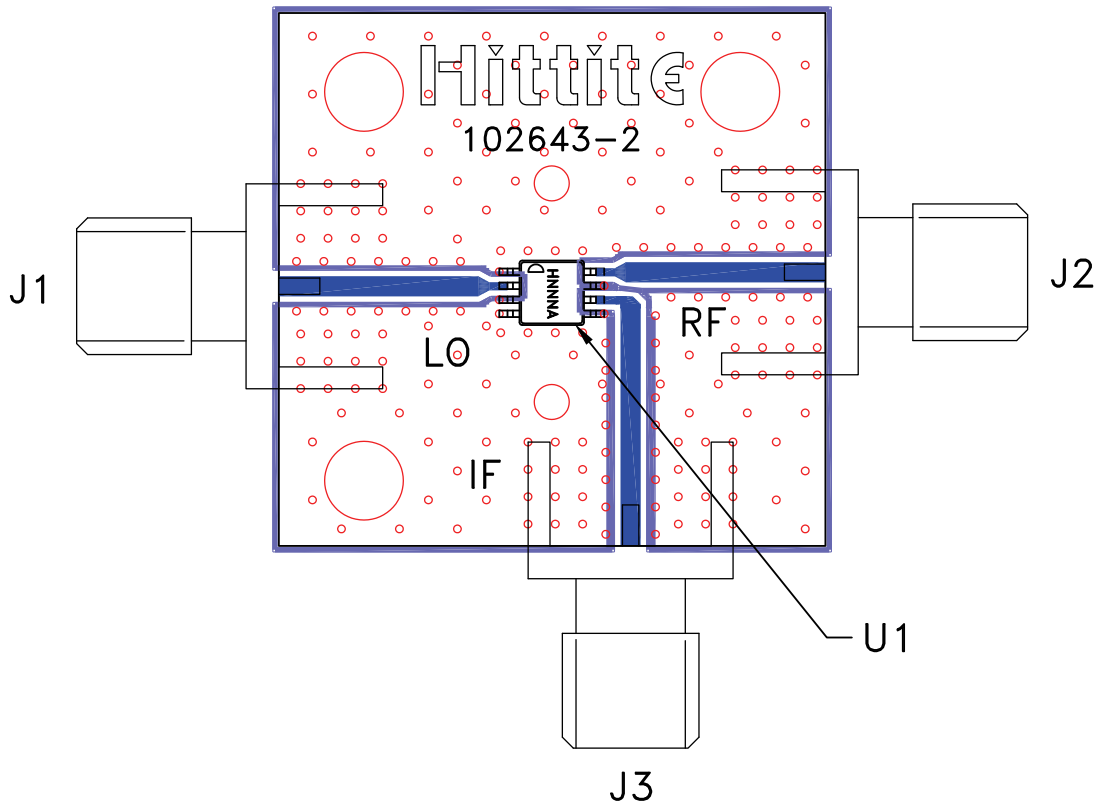


- NOTES:
1. LEADFRAME MATERIAL: COPPER ALLOY
  2. DIMENSIONS ARE IN INCHES [MILLIMETERS].
  3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
  4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
  5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

### Package Information

| Part Number | Package Body Material                              | Lead Finish   | MSL Rating          | Package Marking <sup>[3]</sup> |
|-------------|--|---------------|---------------------|--------------------------------|
| HMC272AMS8  | Low Stress Injection Molded Plastic                | Sn/Pb Solder  | MSL1 <sup>[1]</sup> | H272A<br>XXXX                  |
| HMC272AMS8E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 <sup>[2]</sup> | H272A<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 Circuit Board**

**List of Materials for Evaluation PCB 102781 [1]**

| Item    | Description                    |
|---------|--------------------------------|
| J1 - J3 | PCB Mount SMA RF Connector     |
| U1      | HMC272AMS8 / HMC272AMS8E Mixer |
| PCB [2] | 102643 Evaluation Board        |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the 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.