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GaAs MMIC SMT DOUBLE-BALANCED MIXER, 1.5 - 4.5 GHz



Typical Applications

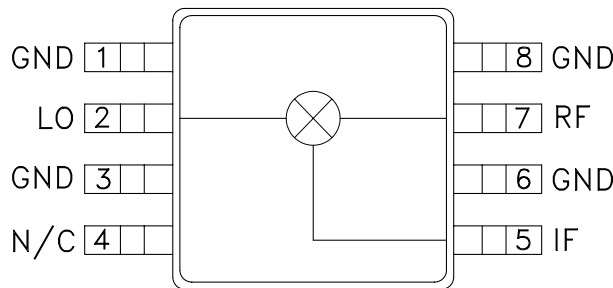
The HMC213AMS8(E) is ideal for:

- Base Stations
- PCMCIA Transceivers
- Wireless Local Loop

Features

- Ultra Small Package: MSOP8
- Conversion Loss: 8.5 dB
- LO / RF Isolation: 40 dB

Functional Diagram



General Description

The HMC213AMS8(E) is a ultra miniature double-balanced mixer in 8 lead plastic surface mount package (MSOP). This passive MMIC mixer is constructed of GaAs Schottky diodes and novel planar transformer baluns on the chip. The device can be used as an upconverter, downconverter, biphase (de)modulator, or phase comparator. The consistent MMIC performance will improve system operation and assure regulatory compliance.

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

| Parameter | LO = +13 dBm IF = 100 MHz | | | LO = +10 dBm IF = 100 MHz | | | Units |
|-------------------------------|------------------------------|------|------|------------------------------|------|------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| Frequency Range, RF & LO | 1.5 - 4.5 | | | 1.7 - 3.6 | | | GHz |
| Frequency Range, IF | DC - 1.5 | | | DC - 1.5 | | | GHz |
| Conversion Loss | | 8.5 | 10 | | 9 | 10.5 | dB |
| Noise Figure (SSB) | | 8.5 | 10 | | 9 | 10.5 | dB |
| LO to RF Isolation | 29 | 40 | | 32 | 40 | | dB |
| LO to IF Isolation | 27 | 35 | | 26 | 35 | | dB |
| IP3 (Input) | 16 | 19 | | 14 | 18 | | dBm |
| 1 dB Gain Compression (Input) | 7 | 10 | | 5 | 8 | | dBm |

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HMC213A* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

COMPARABLE PARTS

View a parametric search of comparable parts.

EVALUATION KITS

- HMC213AMS8 Evaluation Board

DOCUMENTATION

Data Sheet

- HMC213A Data Sheet

TOOLS AND SIMULATIONS

- HMC213A S-Parameters

REFERENCE MATERIALS

Quality Documentation

- Package/Assembly Qualification Test Report: MS8G (QTR: 2014-00393)
- PCN: MS, QS, SOT, SOIC packages - Sn/Pb plating vendor change
- Semiconductor Qualification Test Report: MESFET-F (QTR: 2013-00247)

DESIGN RESOURCES

- HMC213A Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC213A EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

TECHNICAL SUPPORT

Submit a technical question or find your regional support number.

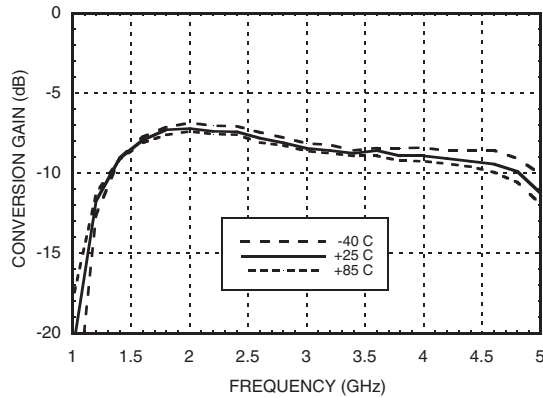
DOCUMENT FEEDBACK

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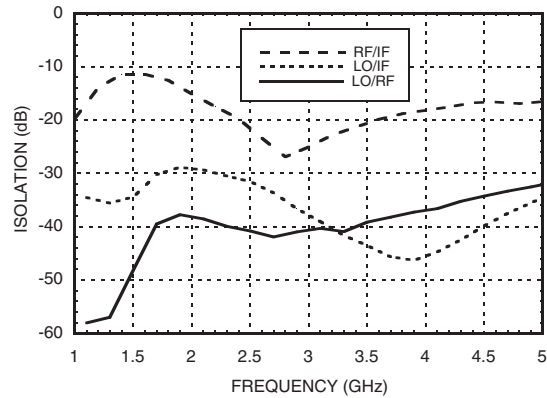


GaAs MMIC SMT DOUBLE-BALANCED MIXER, 1.5 - 4.5 GHz

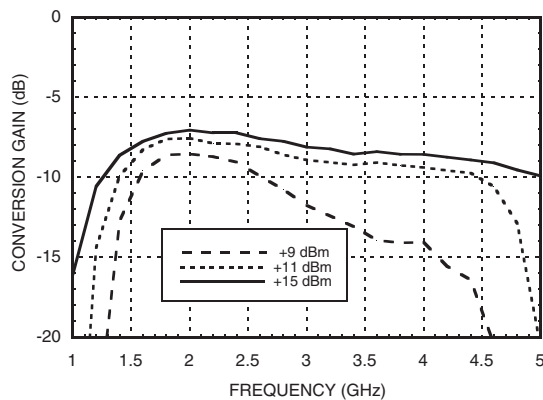
Conversion Gain vs. Temperature @ LO = +13 dBm



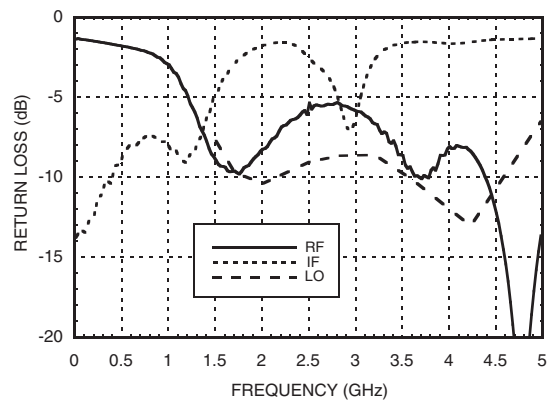
Isolation @ LO = +13 dBm



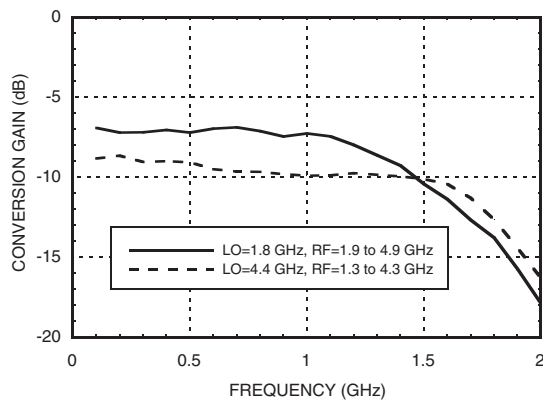
Conversion Gain vs. LO Drive



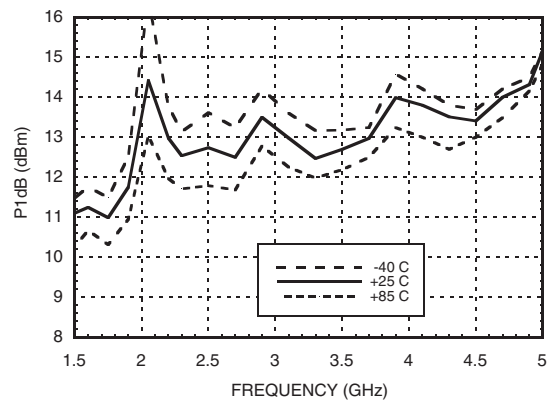
Return Loss @ LO = +13 dBm



IF Bandwidth @ LO = +13 dBm



P1dB vs. Temperature @ LO = +13 dBm



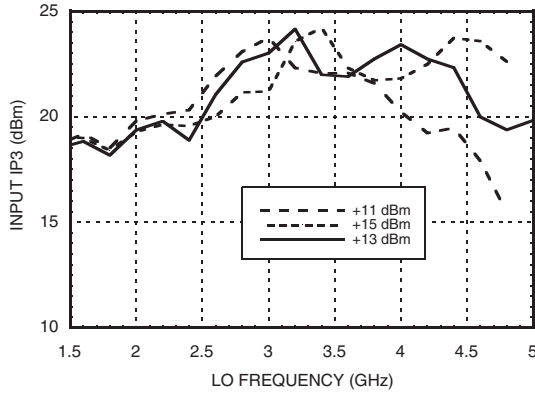
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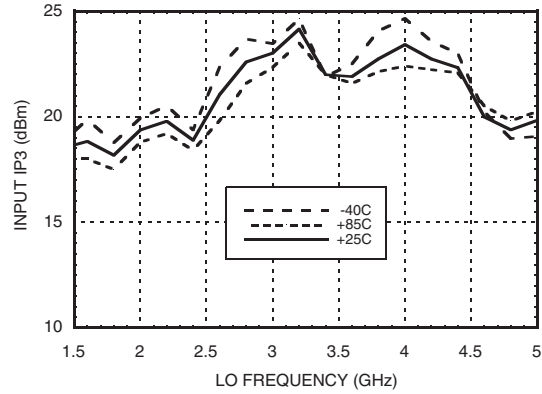


GaAs MMIC SMT DOUBLE-BALANCED MIXER, 1.5 - 4.5 GHz

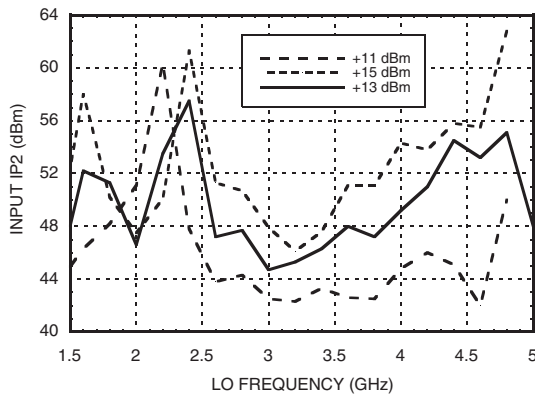
Input IP3 vs. LO Drive



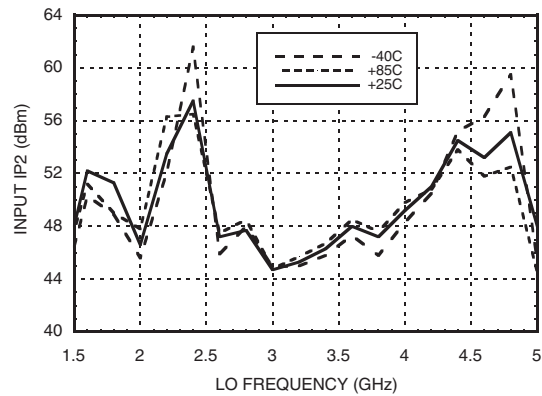
Input IP3 vs. Temperature @ LO = +13 dBm



Input IP2 vs. LO Drive



Input IP2 vs. Temperature @ LO = +13 dBm





GaAs MMIC SMT DOUBLE-BALANCED MIXER, 1.5 - 4.5 GHz

MxN Spurious Outputs

| mRF | nLO | | | | |
|-----|------|------|------|------|------|
| | 0 | 1 | 2 | 3 | 4 |
| 0 | xx | 12.7 | 20.8 | 19.8 | 76.2 |
| 1 | 13.4 | 0 | 39.8 | 38.9 | 56.2 |
| 2 | 73.8 | 78.2 | 66.5 | 82.2 | 68.8 |
| 3 | 93.8 | 89.2 | 92.2 | 82.4 | 89.0 |
| 4 | >105 | >105 | >105 | >105 | >105 |

RF = 3.5 GHz @ -10 dBm
 LO = 3.6 GHz @ +13 dBm
 All values in dBc below IF power level (-1RF + 1LO)

Harmonics of LO @ RF Port

| LO Freq. (GHz) | nLO Spur | | | |
|----------------|----------|----|----|----|
| | 1 | 2 | 3 | 4 |
| 1.5 | 40 | 30 | 62 | 57 |
| 2.0 | 38 | 25 | 55 | 58 |
| 2.5 | 41 | 28 | 34 | 61 |
| 3.0 | 41 | 35 | 36 | 61 |
| 3.5 | 38 | 45 | 52 | 62 |
| 4.0 | 35 | 47 | 55 | 62 |
| 4.5 | 33 | 50 | 65 | 73 |
| 5.0 | 32 | 52 | 68 | 82 |

LO = +13 dBm
 Values in dBc below input LO level measured at RF Port.

Absolute Maximum Ratings

| | |
|---|----------------|
| RF / IF Input | +13 dBm |
| LO Drive | +27 dBm |
| Continuous P _{diss} (T = 85 °C) (derate 10.6 mW/°C above 85 °C) | 0.69 W |
| Thermal Resistance (Channel to package lead) | 93.7 °C/W |
| Junction Temperature | 150 °C |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |

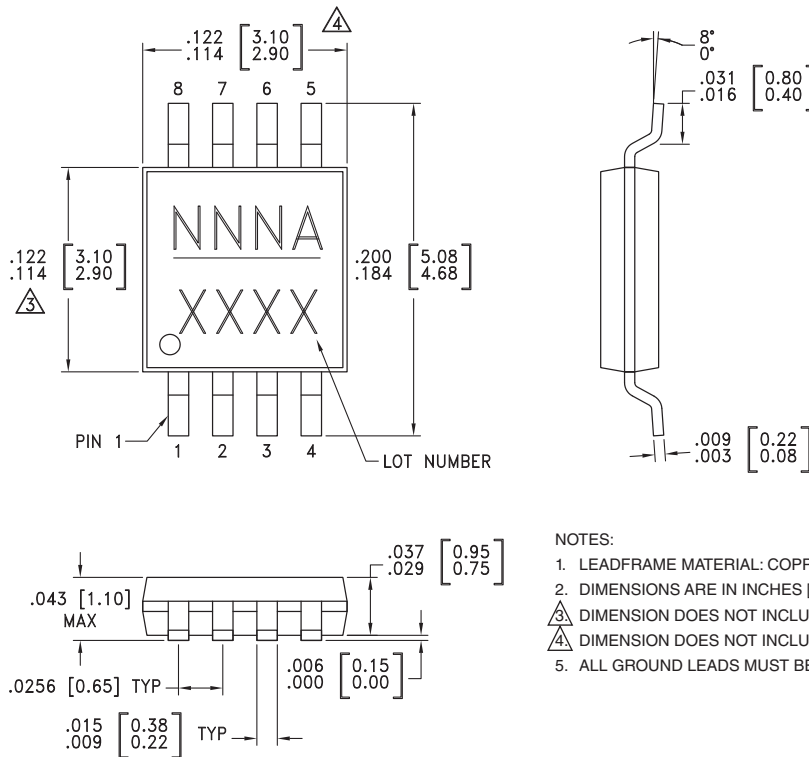


ELECTROSTATIC SENSITIVE DEVICE
 OBSERVE HANDLING PRECAUTIONS



GaAs MMIC SMT DOUBLE-BALANCED MIXER, 1.5 - 4.5 GHz

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.

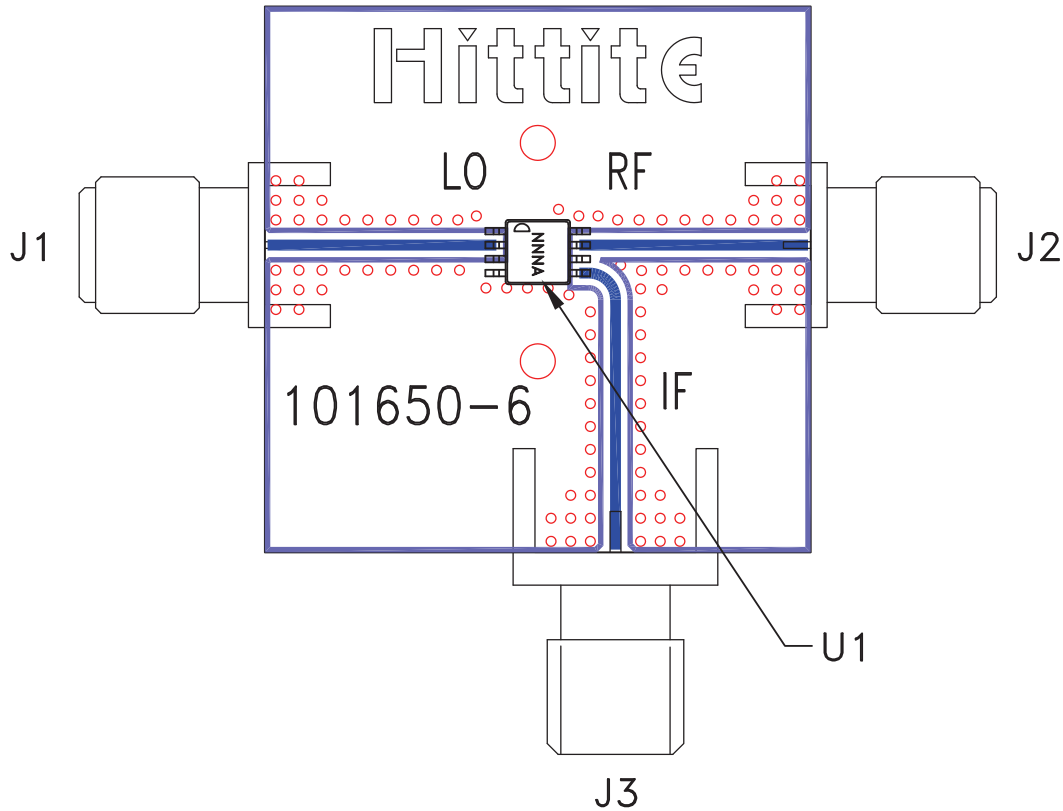
Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking ^[3] |
|-------------|---|---------------|---------------------|--------------------------------|
| HMC213AMS8 | Low Stress Injection Molding Plastic | Sn/Pb Solder | MSL1 ^[1] | 213A XXXX |
| HMC213AMS8E | RoHS-compliant Low Stress Injection Molding Plastic | 100% matte Sn | MSL1 ^[2] | 213A 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 103350 [1]

| Item | Description |
|---------|----------------------------|
| J1 - J3 | PCB Mount SMA RF Connector |
| U1 | HMC213AMS8(E) Mixer |
| PCB [2] | 101650 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.