

GaAs MMIC SMT DOUBLE-BALANCED MIXER, 4 - 8 GHz



Typical Applications

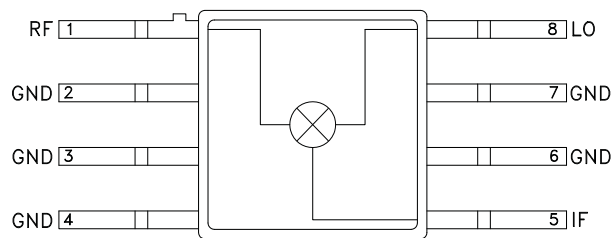
The HMC129G8 is ideal for:

- UNII & HiperLAN
- Military & Space
- Test Equipment

Features

- Conversion Loss: 8 dB
- LO to RF and IF Isolation: 30 dB
- Small Size, No DC Bias Required

Functional Diagram



General Description

The HMC129G8 is a miniature double-balanced mixer in a hermetic surface mount package that can be used as an upconverter or downconverter. The device is a passive diode/balun type mixer with high dynamic range. Noise figure is essentially equal to the conversion loss. The mixer can handle larger signal levels than most active mixers due to the high third order intercept. MMIC implementation provides exceptional balance in the circuit resulting in high LO/RF and LO/IF isolations.

Electrical Specifications, $T_A = +25^\circ \text{C}$, LO Drive = +15 dBm

| Parameter | Min. | Typ. | Max. | Units |
|-------------------------------|-----------|------|------|-------|
| Frequency Range, RF & LO | 4.0 - 8.0 | | | GHz |
| Frequency Range, IF | DC - 3 | | | GHz |
| Conversion Loss | | 8 | 10 | dB |
| Noise Figure (SSB) | | 8 | 10 | dB |
| LO to RF Isolation | 20 | 30 | | dB |
| LO to IF Isolation | 20 | 30 | | dB |
| IP3 (Input) | 13 | 18 | | dBm |
| IP2 (Input) | 35 | 40 | | dBm |
| 1 dB Gain Compression (Input) | 5 | 10 | | dBm |

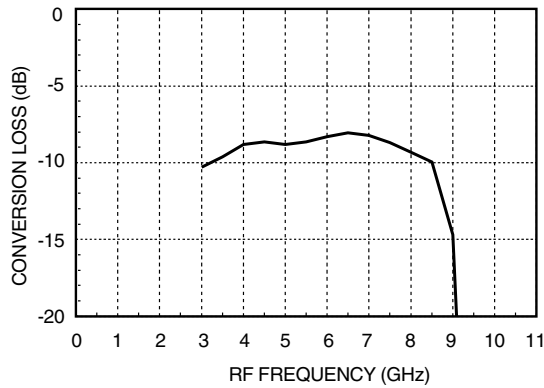
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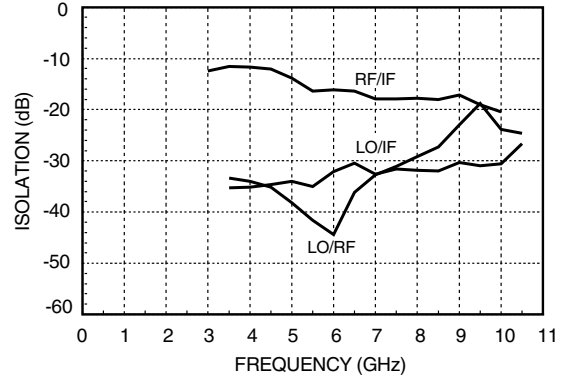


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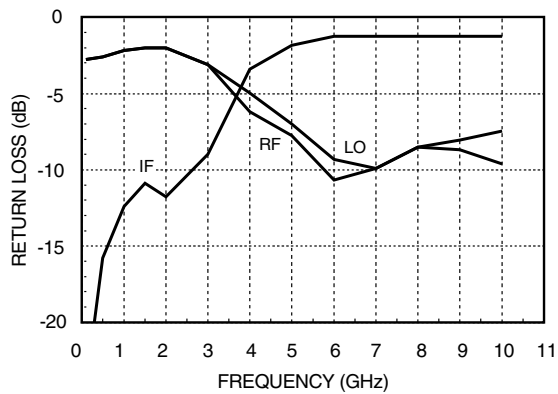
Conversion Loss



Isolation



Return Loss



Distortion and 1dB Compression versus LO Drive Level

| LO Drive (dBm) | Distortion | | 1 dB Compression P1dB (dBm) |
|----------------|------------|-----------|-----------------------------|
| | IP3 (dBm) | IP2 (dBm) | |
| +7 | 14 | 59 | 8.5 |
| +10 | 16 | 62 | 10 |
| +13 | 18 | 65 | 11 |
| +15 | 19 | 65 | 11 |

RF (f1) = 6.01 GHz
RF (f2) = 6.00 GHz
LO = 6.5 GHz
RF Level = 0 dBm

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Absolute Maximum Ratings

| | |
|-----------------------|----------------|
| LO Drive | +27 dBm |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -55 to +125 °C |

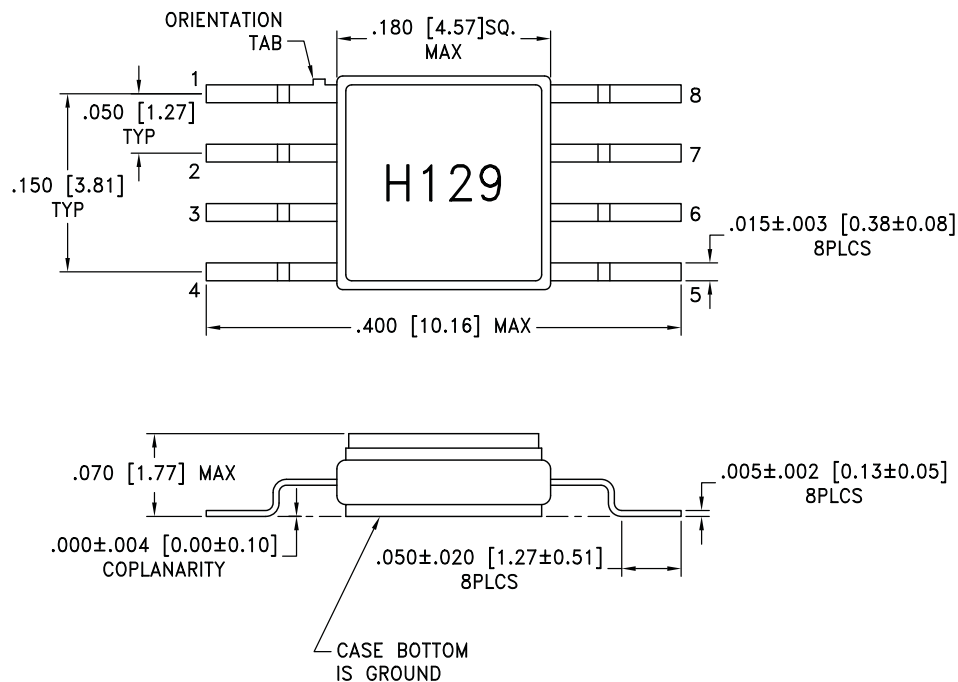


ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

9

MIXERS - DBL-BAL - SMT

Outline Drawing



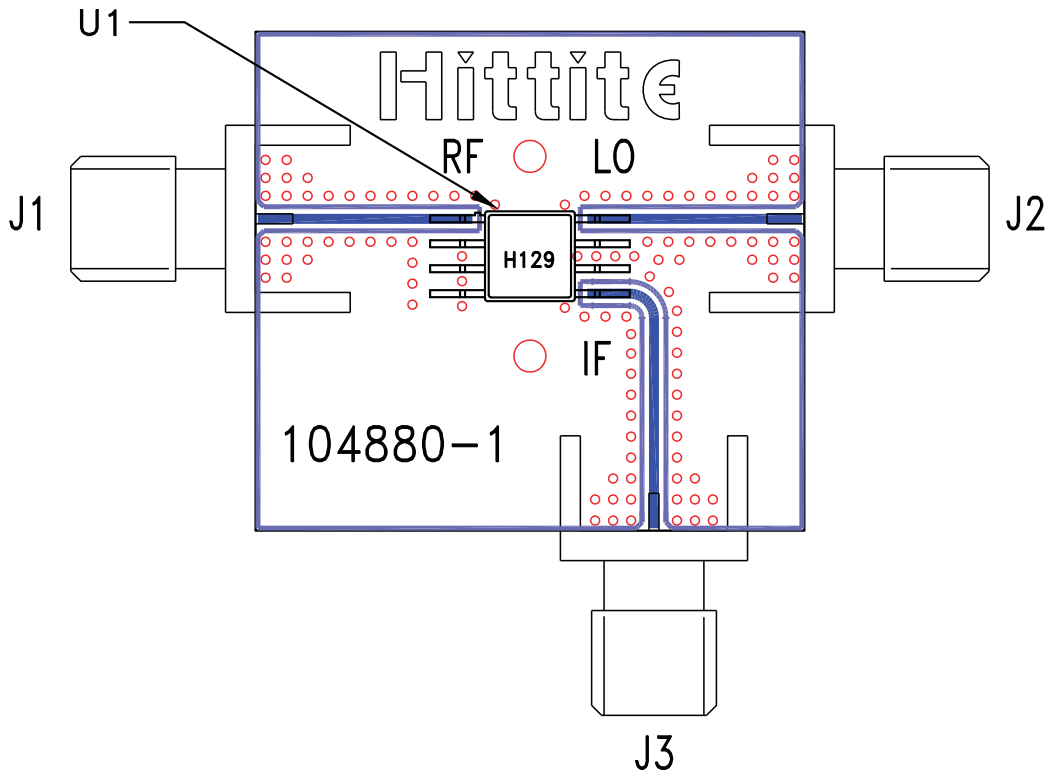
NOTES:

1. PACKAGE MATERIAL: ALUMINA LOADED BOROSILICATE GLASS.
2. LEAD, BASE, COVER MATERIAL: KOVAR™ (#7052 CORNING).
3. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MIN., OVER ELECTROLYTIC NICKEL 50 MICROINCHES MIN.
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. TOLERANCES: ±.005 [0.13] UNLESS OTHERWISE SPECIFIED.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

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BALANCED MIXER, 4 - 8 GHz**



Evaluation PCB



List of Materials for Evaluation PCB 104882 [1]

| Item | Description |
|---------|----------------------------|
| J1 - J3 | PCB Mount SMA RF Connector |
| U1 | HMC129G8 Mixer |
| PCB [2] | 104880 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.