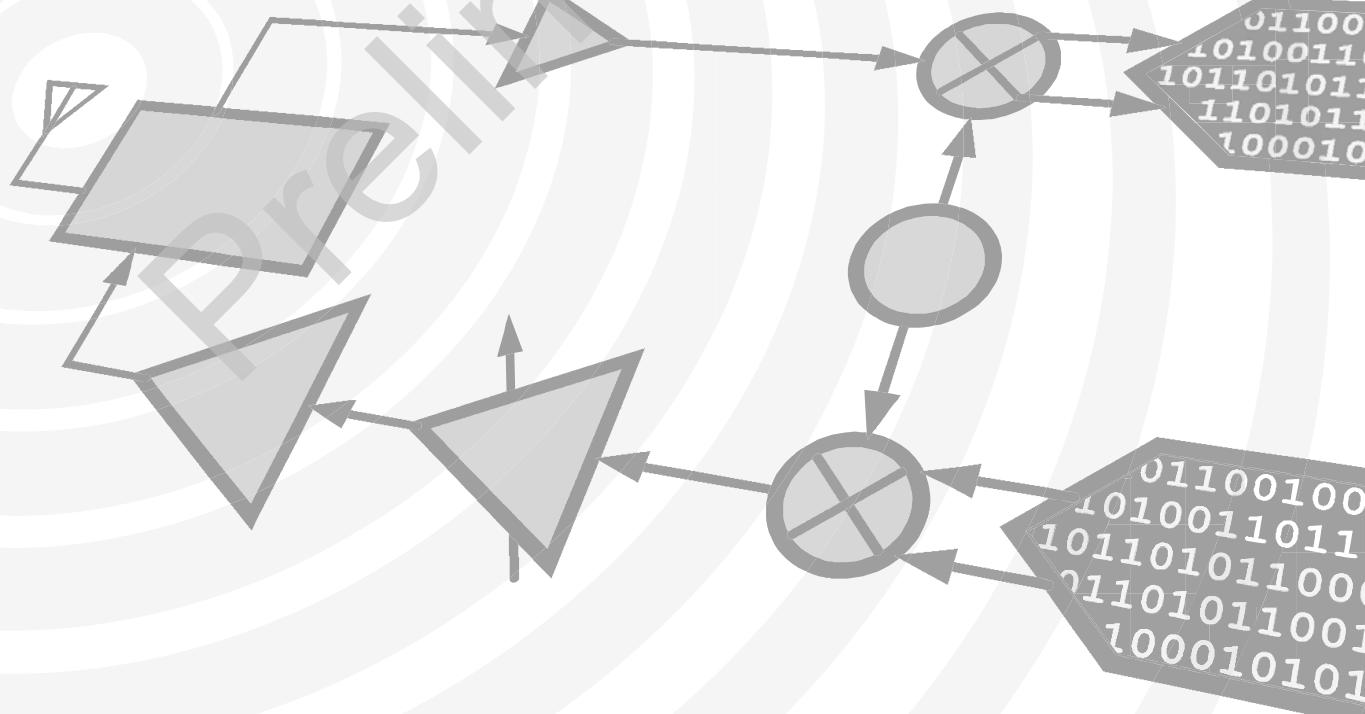


Analog Devices Welcomes Hittite Microwave Corporation



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Preliminary

**GaAs MMIC DOUBLE-BALANCED
MIXER, 25 - 40 GHz****Typical Applications**

The HMC329A is ideal for:

- LMDS
- Microwave Point-to-Point Radios
- SATCOM

1

MIXERS - DOUBLE-BALANCED - CHIP

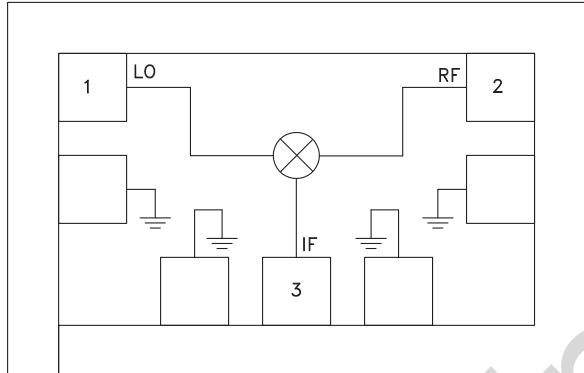
Features

Passive: No DC Bias Required

Input IP3: +19 dBm

LO/RF Isolation: 42 dB

Small Size: 0.85 x 0.55 x 0.1 mm

Functional Diagram**General Description**

The HMC329A chip is a miniature passive double balanced mixer which can be used as an upconverter or downconverter from 25-40 GHz in a small chip area of 0.85 x 0.55 mm. Excellent isolations are provided by on-chip baluns, and the chip requires no external components and no DC bias. Measurements were made with the chip mounted and ribbon bonded into in a 50-ohm microstrip test fixture that contains 5-mil alumina substrates between the chip and K-connectors. Measured data includes the parasitic effects of the assembly. RF connections to the chip were made with 0.076 mm (3-mil) ribbon bond with minimal length <0.31mm (<12 mil).

Electrical Specifications, $T_A = +25^\circ C$

| Parameter | LO = +13 dBm, IF = 1 GHz | | | Units |
|--------------------------|--------------------------|------|---------|-------|
| | Min. | Typ. | Max. | |
| Frequency Range, RF & LO | | | 25 - 40 | GHz |
| Frequency Range, IF | | | DC - 8 | GHz |
| Conversion Loss | | 9.5 | 11.5 | dB |
| Noise Figure (SSB) | | 9.5 | 11.5 | dB |
| LO to RF Isolation | 38 | 42 | | dB |
| LO to IF Isolation | 25 | 35 | | dB |
| RF to IF Isolation | 21 | 28 | | dB |
| IP3 (Input) | 16 | 19 | | dBm |
| IP2 (Input) | 45 | 55 | | dBm |
| 1 dB Compression (Input) | 8 | 11 | | dBm |

* Unless otherwise noted, all measurements performed as downconverter, IF= 1 GHz.

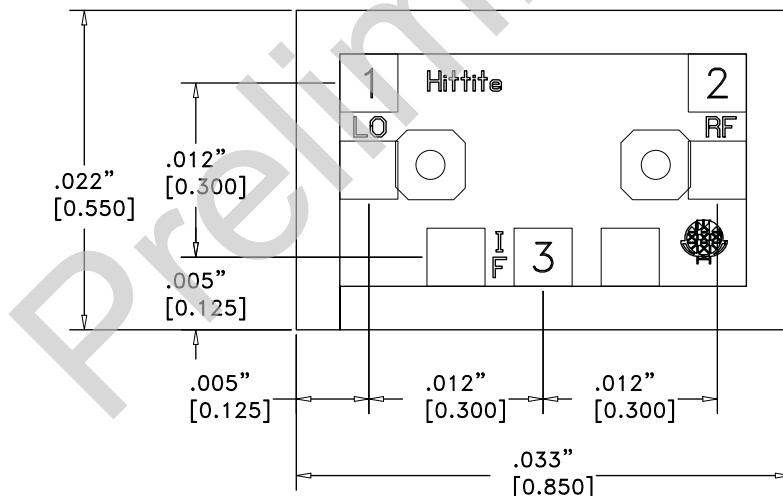
**GaAs MMIC DOUBLE-BALANCED
MIXER, 25 - 40 GHz**
Absolute Maximum Ratings

| | |
|-----------------------|----------------|
| RF / IF Input | +13 dBm |
| LO Drive | +27 dBm |
| IF DC Current | ±2 mA |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -55 to +85 °C |
| ESD Sensitivity (HBM) | Class 1B |


**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**
**M_xN Spurious Outputs
as a Down Converter**

| mRF | nLO | | | | |
|-----|-----|----|----|----|----|
| | 0 | 1 | 2 | 3 | 4 |
| 0 | xx | 7 | | | |
| 1 | 19 | 0 | 41 | | |
| 2 | | 69 | 57 | 67 | |
| 3 | | | 74 | 69 | 71 |
| 4 | | | | 74 | 74 |

RF = 31 GHz @ -10 dBm
LO = 32 GHz @ +13 dBm
All values in dBc below IF output power level.

Outline Drawing

NOTES:

1. ALL DIMENSIONS ARE IN INCHES [MM].
2. DIE THICKNESS IS .004".
3. TYPICAL BOND PAD IS .004" SQUARE.
4. BACKSIDE METALLIZATION: GOLD.
5. BOND PAD METALLIZATION: GOLD.
6. BACKSIDE METAL IS GROUND.
7. CONNECTION NOT REQUIRED FOR UNLABELED BOND PADS.