



v00.0700

HMC285

GaAs MMIC SMT SINGLE BALANCED MIXER, 1.7 - 3.5 GHz

Typical Applications

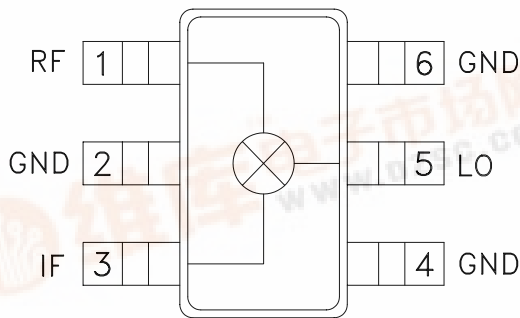
The HMC285 is ideal for:

- PCS
- W-CDMA
- 2.4 GHz ISM
- MMDS

Features

- No External Components Required
- LO / RF Isolation: 30 dB
- Input IP3: +20 dBm
- Ultra Small SOT26 Package

Functional Diagram



General Description

The HMC285 is an ultra miniature single balanced mixer in an 6 lead plastic surface mount SOT26 package. 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 without the need for external components. The SOT26 package is the smallest footprint available for a complete single-balanced mixer, 0.118" x 0.118" (3.0mm x 3.0mm).

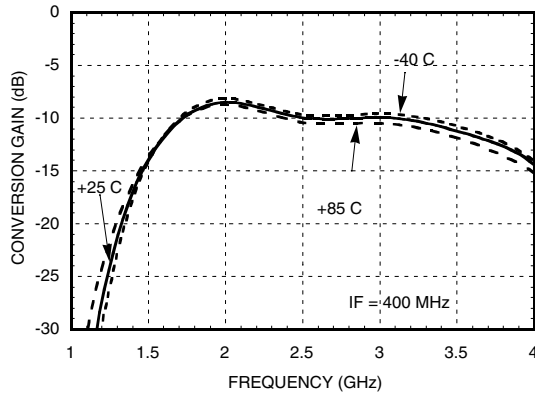
Electrical Specifications, $T_A = +25^\circ C$, As a Function of IF Frequency

| Parameter | LO = +10 dBm IF = 100 MHz | | | LO = +10 dBm IF = 400 MHz | | | Units |
|--------------------------|------------------------------|------|------|------------------------------|------|------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| Frequency Range, RF & LO | 2 - 3.5 | | | 1.7 - 2.8 | | | GHz |
| Frequency Range, IF | DC - 0.9 | | | DC - 0.9 | | | GHz |
| Conversion Loss | | 9 | 11 | | 9.5 | 11.5 | dB |
| Noise Figure (SSB) | | 9 | 11 | | 9.5 | 11.5 | dB |
| LO to RF Isolation | 20 | 30 | | 25 | 35 | | dB |
| LO to IF Isolation | 11 | 20 | | 14 | 20 | | dB |
| IP3 (Input) | 17 | 21 | | 16 | 20 | | dBm |
| 1 dB Compression (Input) | 7 | 11 | | 6 | 10 | | dBm |

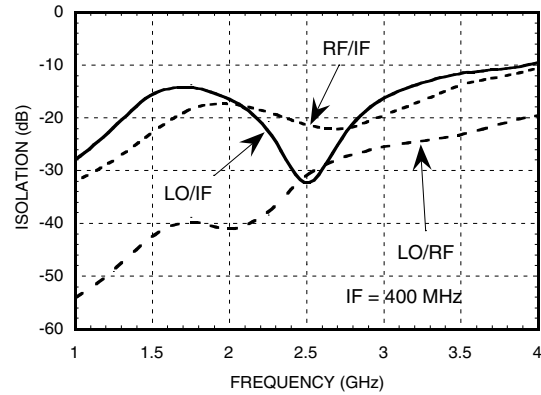


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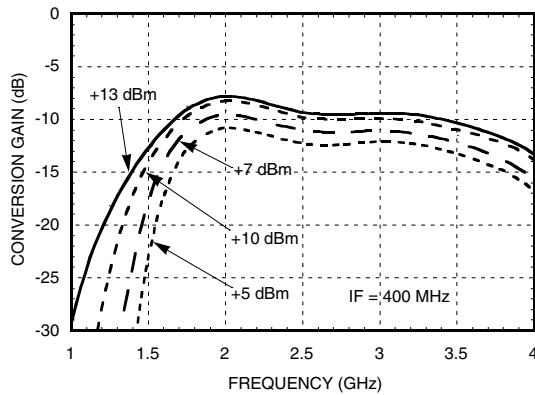
**Conversion Gain vs.
Temperature @ LO = +10 dBm**



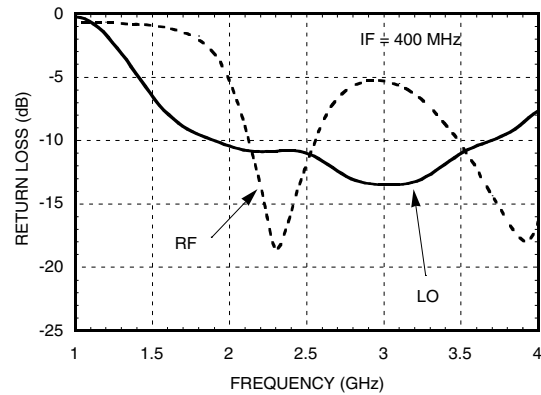
Isolation @ LO = +10 dBm



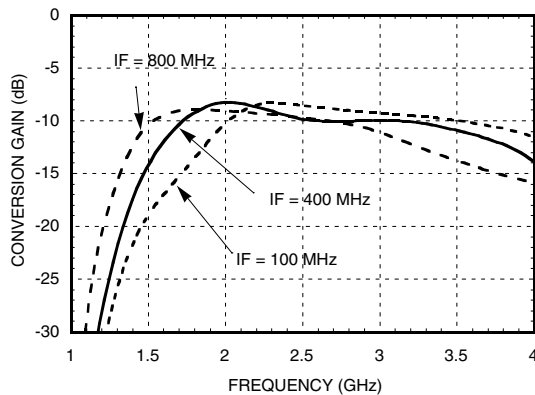
Conversion Gain vs. LO Drive



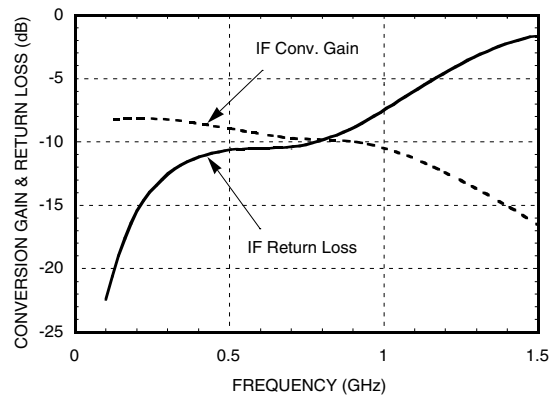
Return Loss @ LO = +10 dBm



Conversion Gain vs. IF Frequency

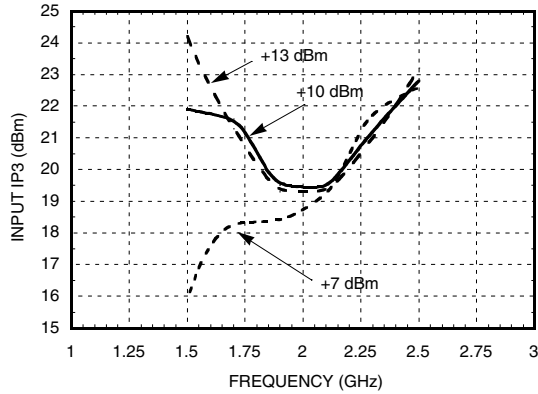


**IF Bandwidth @ LO = +10 dBm.
Conversion Gain & Return Loss**

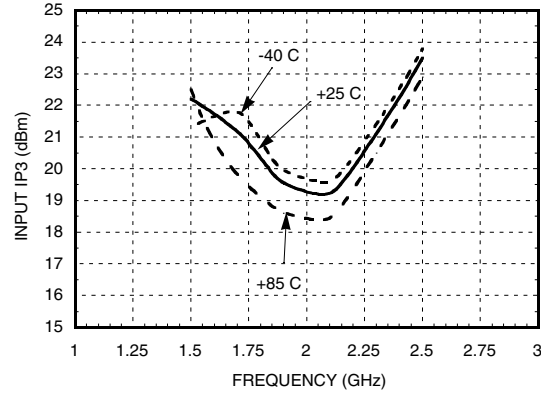


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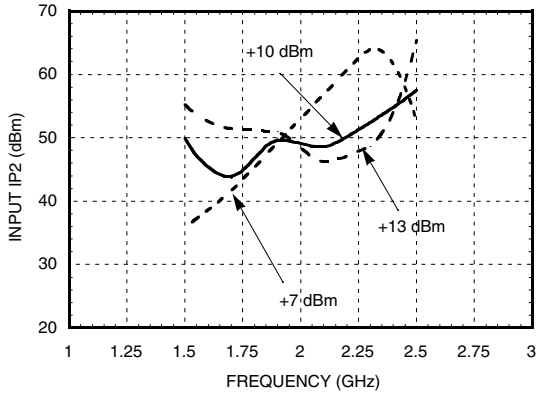
Input IP3 vs. LO Drive



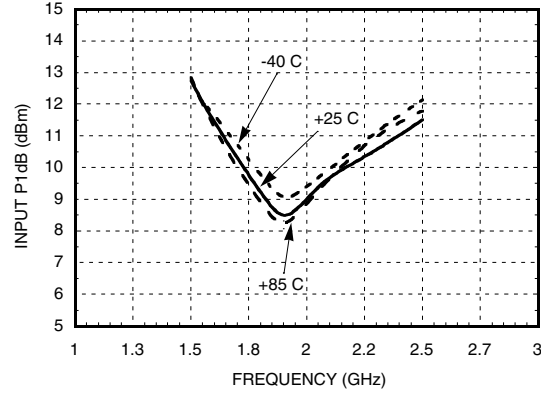
Input IP3 vs. Temperature @ LO = +10 dBm



Input IP2 vs. LO Drive



P1dB vs. Temperature @ LO = +10 dBm



MxN Spurious Outputs

| mRF | nLO | | | | |
|-----|------|-------|------|------|------|
| | 0 | 1 | 2 | 3 | 4 |
| 0 | xx | -12.4 | 1 | 1 | 33 |
| 1 | 10 | 0 | 38 | 23 | 43 |
| 2 | 59 | 60 | 61 | 43 | 62 |
| 3 | >110 | 87 | 90 | 80 | 88 |
| 4 | >110 | >110 | >110 | >110 | >110 |

RF = 2.6 GHz @ -10 dBm
 LO = 2.2 GHz @ +10 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 | 42 | 17 | 47 | 47 |
| 1.7 | 39 | 16 | 41 | 44 |
| 1.9 | 39 | 15 | 37 | 44 |
| 2.1 | 47 | 16 | 35 | 45 |
| 2.3 | 36 | 18 | 32 | 48 |
| 2.5 | 30 | 21 | 32 | 50 |

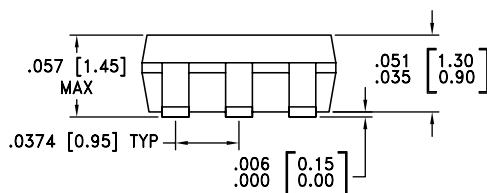
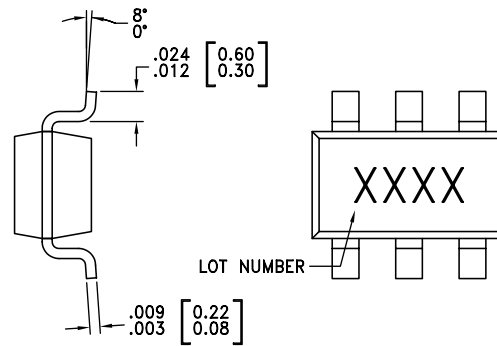
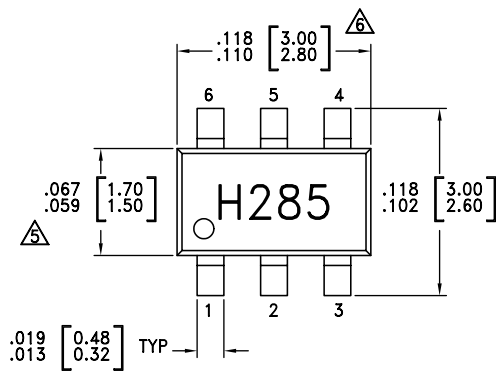
LO = +10 dBm
 Values in dBc below input LO level measured at the RF port

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Absolute Maximum Ratings

| | |
|-----------------------|----------------|
| RF / IF Input | +13 dBm |
| LO Drive | +27 dBm |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |

Outline Drawing

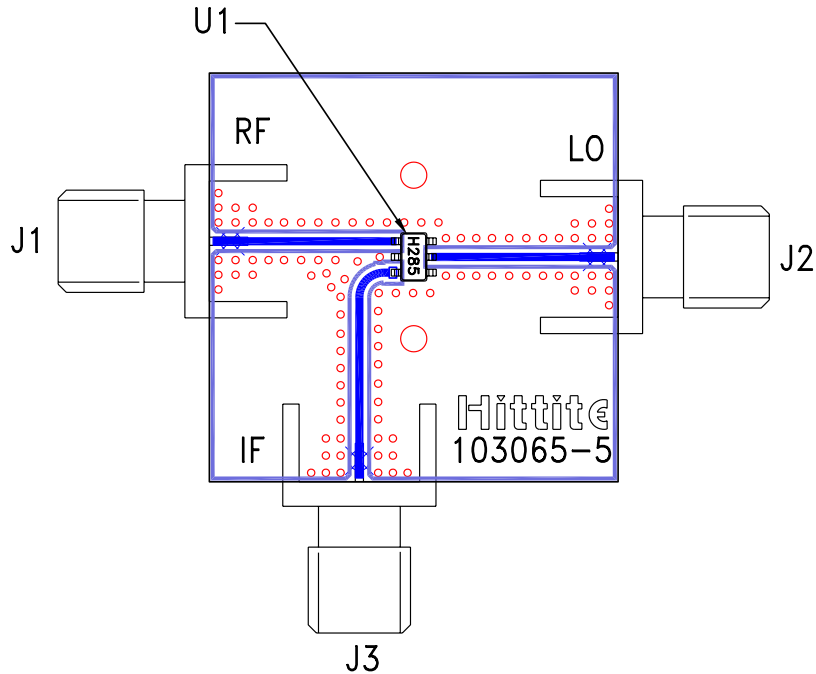


NOTES:

1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEADFRAME MATERIAL: COPPER ALLOY
3. LEADFRAME PLATING: Sn/Pb SOLDER
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
6. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
7. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

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Evaluation Board Layout



List of Materials

| | |
|--------------------------------|------------------------|
| J1 - J3 | PC Mount SMA Connector |
| U1 | HMC285 Mixer |
| PCB | 103065 Eval Board |
| * Circuit Board Material: 4350 | |

The circuit board used in the final application should be generated with proper RF circuit design techniques. Signal lines should have 50 ohm impedance and the package ground leads should be connected directly to the ground plane similar to that shown above. The evaluation circuit board as shown is available from Hittite upon request.



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Notes:

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MIXERS - SMT