HMC285 / 285E

GaAs MMIC SMT SINGLE BALANCED MIXER, 1.7 - 3.5 GHz

Typical Applications

The HMC285 / HMC285E is ideal for:

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

Features

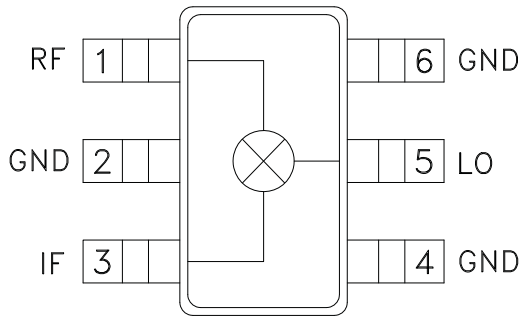
No External Components Required

LO / RF Isolation: 30 dB

Input IP3: +21 dBm

Ultra Small SOT26 Package

Functional Diagram



General Description

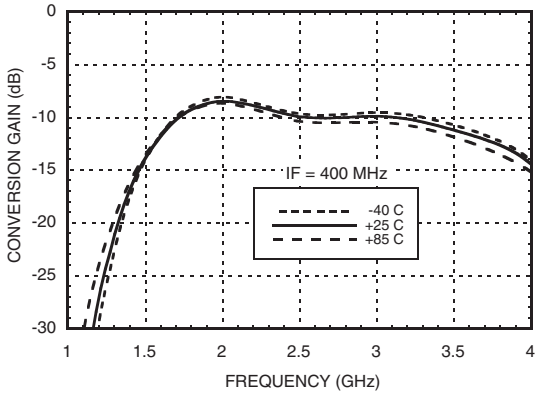
The HMC285 & HMC285E are ultra miniature single balanced mixers in 6 lead plastic surface mount SOT26 packages. This passive MMIC mixer is constructed of GaAs Schottky diodes and a novel planar transformer balun on the chip. The RF port is balanced via the MMIC balun while the LO port is connected directly 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° C, As a Function of IF Frequency

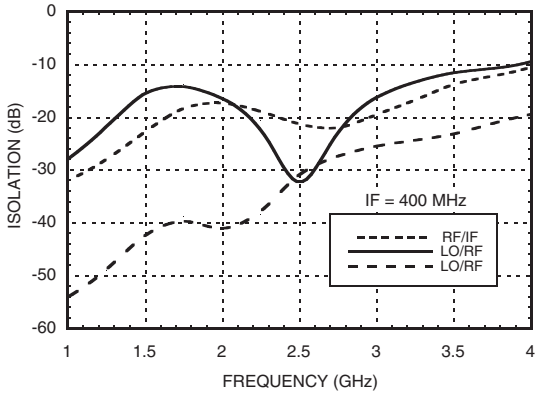
Parameter	LO = +10 dBm IF = 100 MHz			LO = +10 dBm IF = 400 MHz			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range, RF & LO		2 - 3.5			1.7 - 2.8		GHz
Frequency Range, IF		DC - 0.9			DC - 0.9		GHz
Conversion Loss		9	11		9.5	11.5	dB
Noise Figure (SSB)		9	11		9.5	11.5	dB
LO to RF Isolation	20	30		25	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

For price, delivery, and to place orders, please contact Hittite Microwave Corporation:
20 Alpha Road, Chelmsford, MA 01824 Phone: 978-250-3343 Fax: 978-250-3373
Order On-line at www.hittite.com

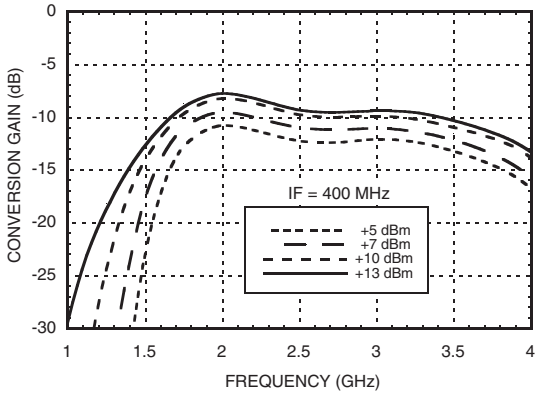
Conversion Gain vs. Temperature @ LO = +10 dBm



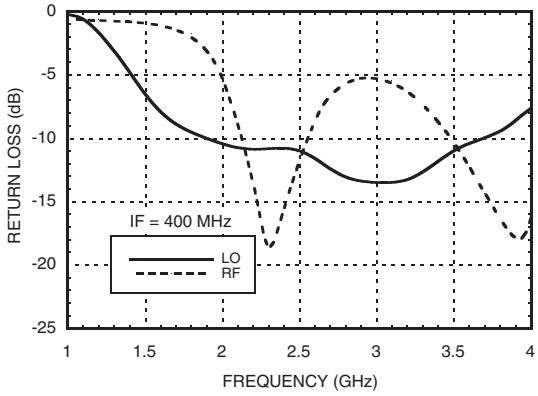
Isolation @ LO = +10 dBm



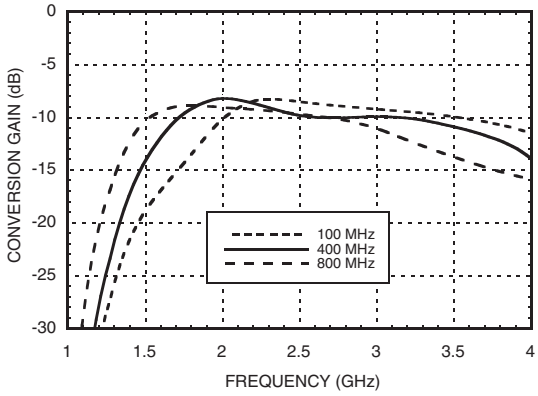
Conversion Gain vs. LO Drive



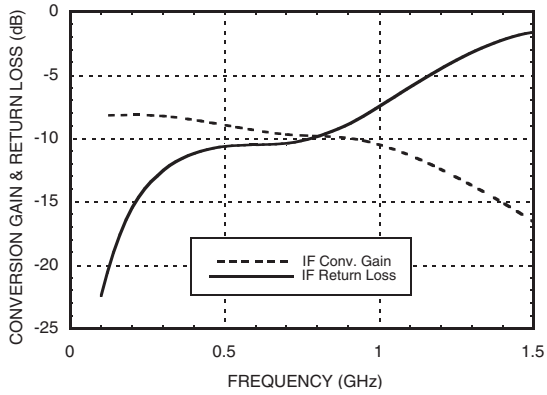
Return Loss @ LO = +10 dBm



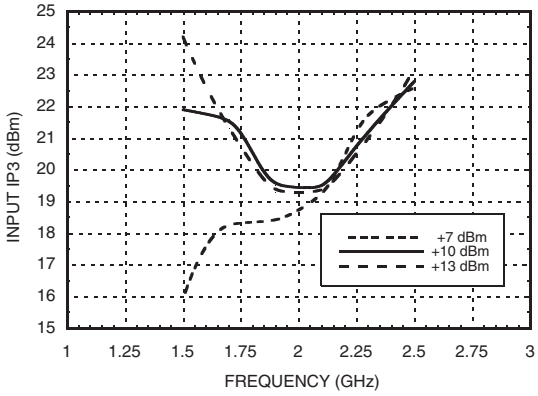
Conversion Gain vs. IF Frequency



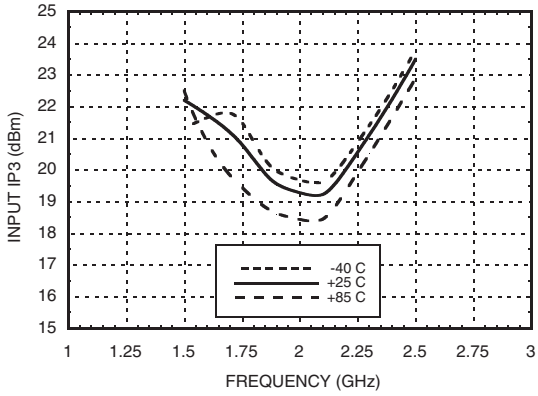
IF Bandwidth @ LO = +10 dBm. Conversion Gain & Return Loss



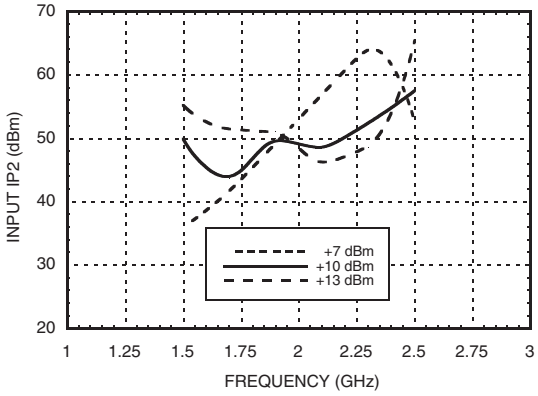
Input IP3 vs. LO Drive



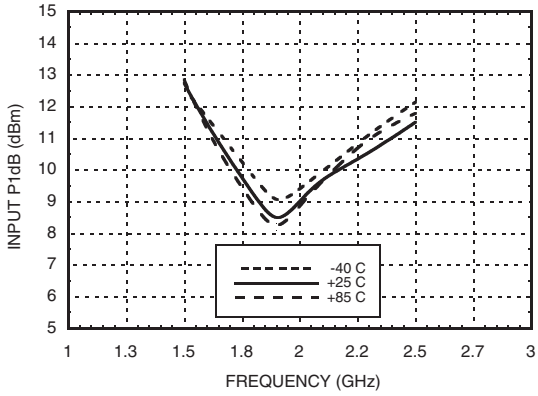
Input IP3 vs. Temperature @ LO = +10 dBm



Input IP2 vs. LO Drive



P1dB vs. Temperature @ LO = +10 dBm



MxN Spurious Outputs

	nLO				
mRF	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

	nLO Spur at RF Port			
LO Frequency (GHz)	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

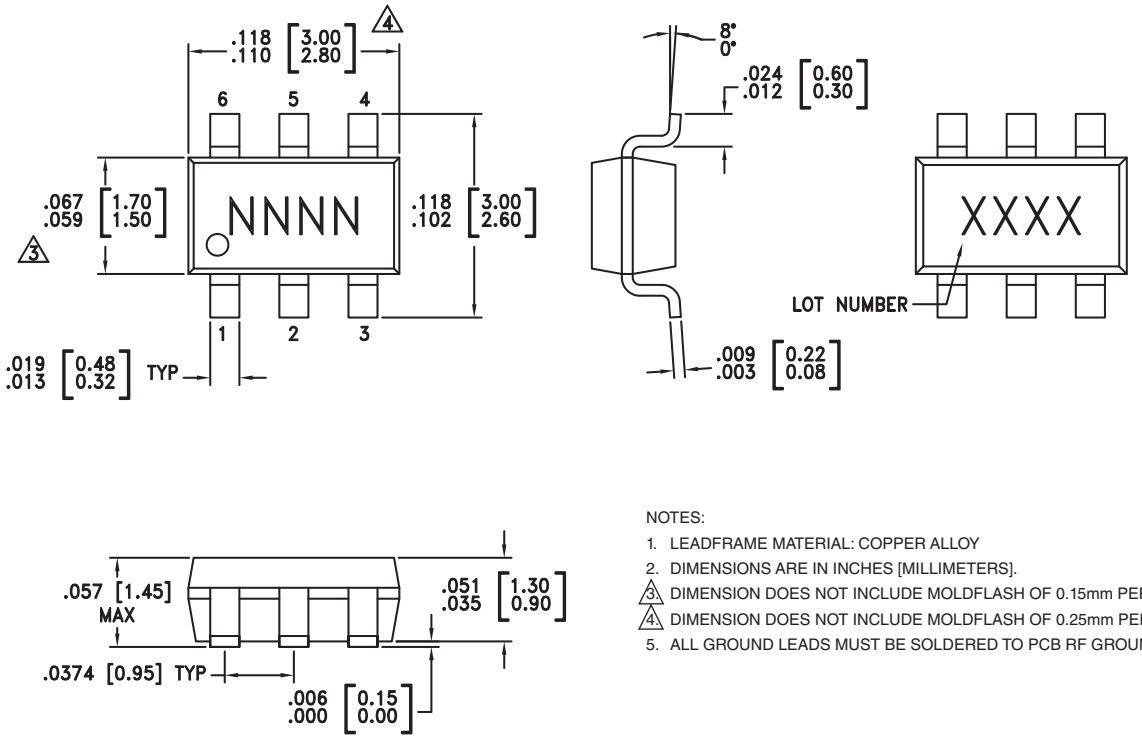
LO = +10 dBm
Values in dBc below input LO level measured at the RF port

Absolute Maximum Ratings

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

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



NOTES:

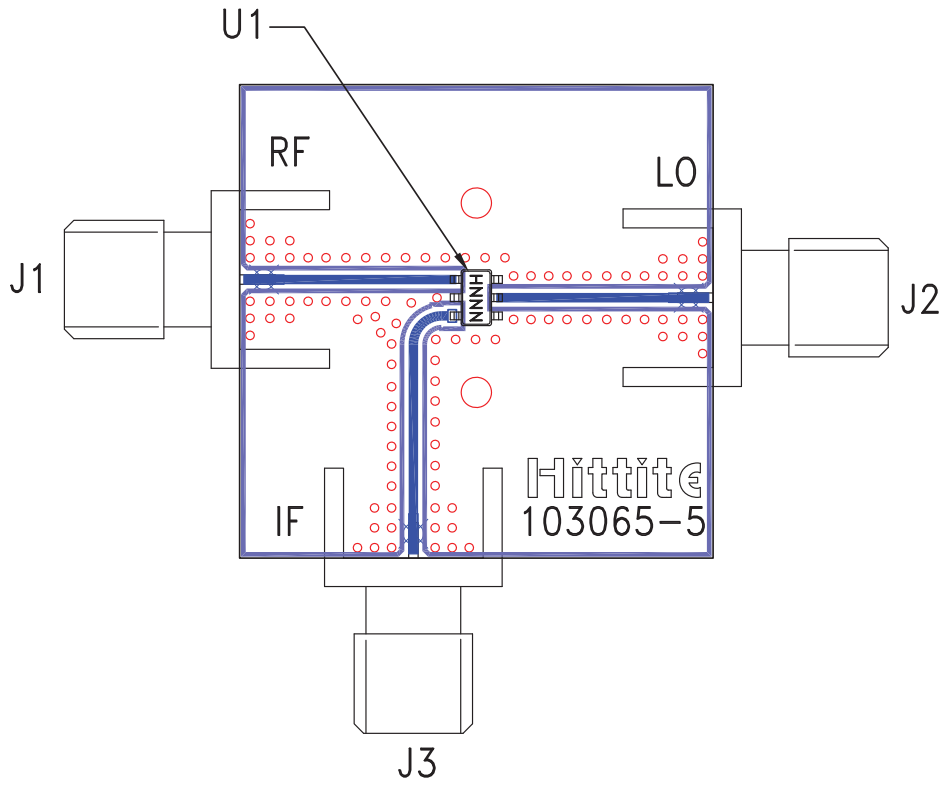
1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS].
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC285	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H285 XXXX
HMC285E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	285E XXXX

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX

Evaluation Board Layout



List of Materials for Evaluation PCB 103240 [1]

Item	Description
J1 - J3	PC Mount SMA Connector
U1	HMC285 / HMC285E Mixer
PCB [2]	103065 Eval 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 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.

Notes: