HITTITE MICROWAVE CORPORATION

GaAs MMIC Bi-Phase Modulator

HMC135

FEBRUARY 1995

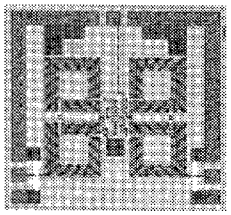
Features

CHIP INTEGRATES DIRECTLY INTO MIC DESIGNS

30 dB OF CARRIER SUPPRESSION

DIRECT MODULATION IN THE 1.8-5.2 GHz BAND

FUNCTIONS ALSO AS A PHASE DETECTOR



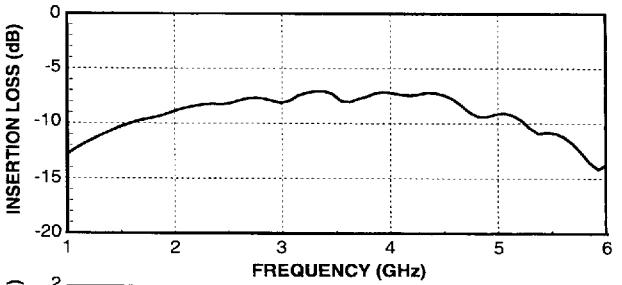
General Description

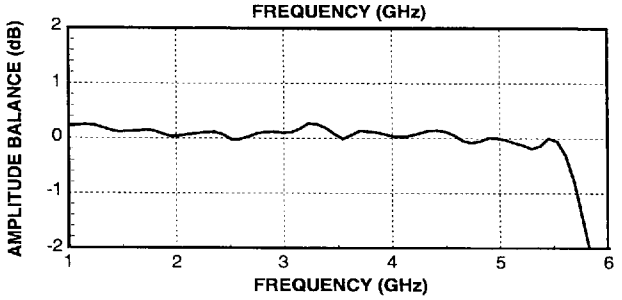
The HMC135 Bi-Phase Modulator is designed to phase-modulate an RF signal into reference and 180 degree states. Device input is at the RF port and output is at the LO port. The polarity of the bias current at the control port (IF port) defines the phase states. Excellent amplitude and phase balance provided by closely matched monolithic balun and diode circuits delivers 30 dB of carrier suppression in a tiny monolithic chip.

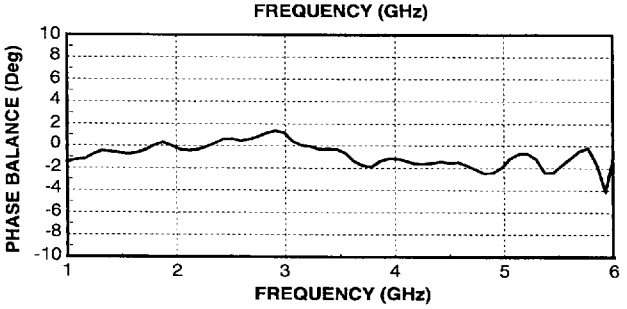
The device also functions as a demodulator or phase comparator. As a demodulator, data emerges at the control port when a modulated signal at the RF port is compared to a reference signal at the LO port. As a phase comparator, the phase angle between two signals applied to the RF and LO ports is represented by an analog voltage at the control port.

Except for carrier suppression, the data presented here was measured under static conditions in which a DC bias current (nominally 5 mA) is applied to the control port.

Typical Performance







Electrical Performance

For 5mA Bias Current

Parameter	Min.	Typ.	Max.	Units
Frequency Band		1.8-5.2		GHz
Insertion Loss		10	12	dB
Return Loss, RF and LO Ports	2.5	3.0		dB
Amplitude Balance		0.2	0.5	dB
Phase Balance		2.5	5.0	deg
Carrier Suppression (When driven with a 1 MHz square wave, 1.4 Vp-p)	25	30		dBc
Input Power for 1 dB Compression	0	8		dBm
Third Order Intercept, Input	5	10		dBm
Second Order Intercept, Input	15	30		dBm
Bias Current (Bias current forward biases internal Schottky diodes providing approximately 0.6 V at the control port).	2	5	10	mA

21 Cabot Road, Woburn, Massachusetts 01801 **Phone: 617-933-7267** **FAX: 617-932-8903**

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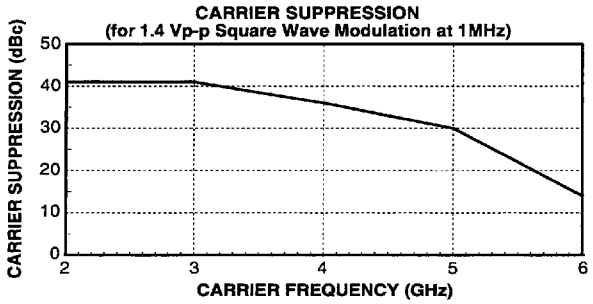
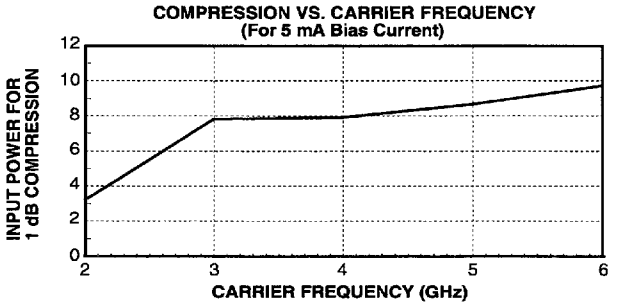
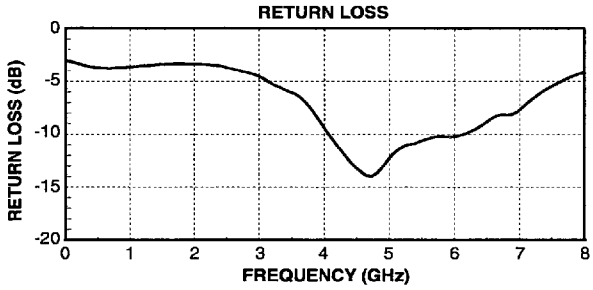
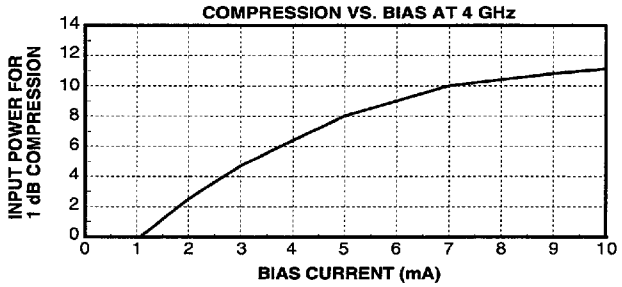
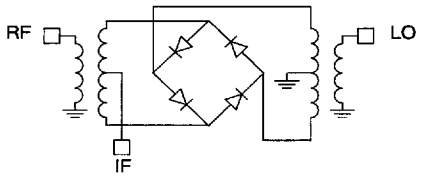




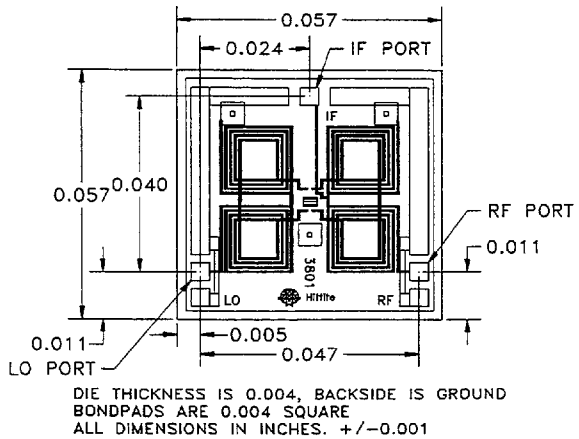




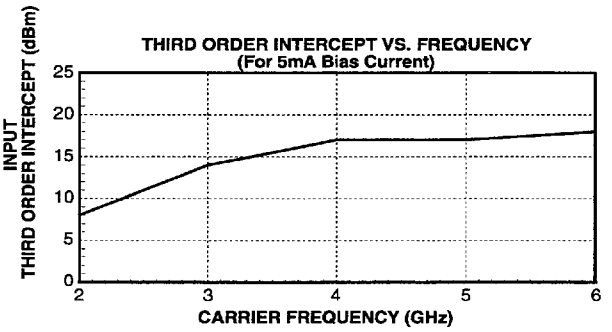
Schematic

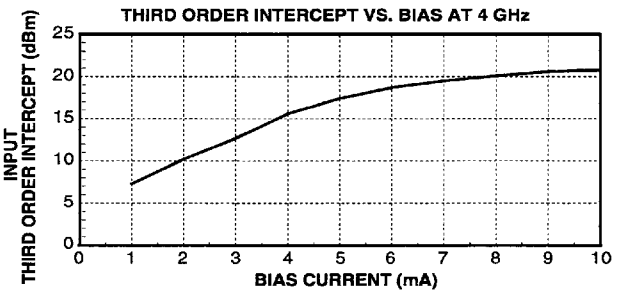


Outline



DIE THICKNESS IS 0.004, BACKSIDE IS GROUND
BONDPADS ARE 0.004 SQUARE
ALL DIMENSIONS IN INCHES. +/-0.001





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