y2k new!

Hittite MICROWAVE CORPORATION

HMC236QS16G

GaAS MMIC SMT QPSK MODULATOR 2.4 GHz

FEBRUARY 2000 v01.0300

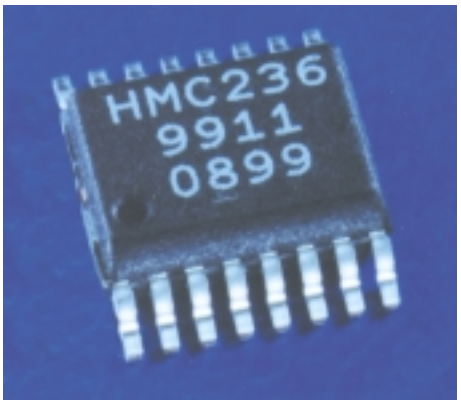
Features

EXCELLENT AMPLITUDE AND PHASE BALANCE

DIRECT MODULATION IN THE 2.4 GHz ISM BAND

30 dB CARRIER SUPPRESSION

USE AS A MODULATOR OR DEMODULATOR



General Description

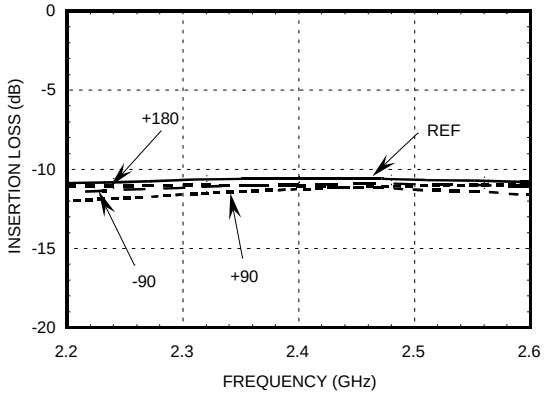
The HMC236QS16G QPSK Modulator is designed to phase-modulate an RF signal into quadrature phase states. Device input is at the RF port and output is at the LO port. The polarity of the bias current at the control ports (I and Q) defines the four phase states. Excellent amplitude and phase balance is provided by closely matched monolithic balun and diode circuits delivering 30 dB of carrier suppression in a 16-lead QSOP package.

The device also functions as an I/Q demodulator with data emerging from the I and Q ports when a QPSK modulated signal at the RF port is compared to a reference signal at the LO 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 ports. The HMC236QS16G replaces the HMC196C12.

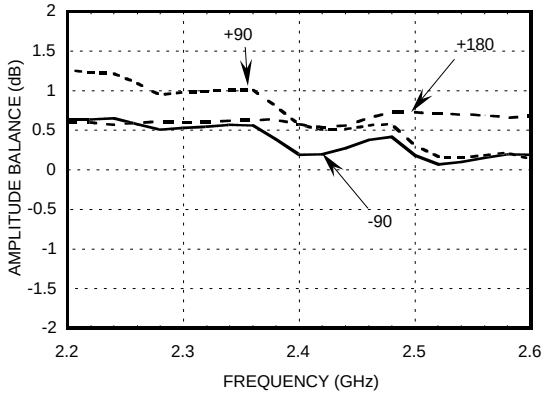
Guaranteed Performance, *For 5mA Bias Current, 50 Ohm System, -40 to +85 deg C*

Parameter	Min.	Typ.	Max.	Units
Frequency Band		2.3 - 2.5		GHz
Insertion Loss		11	13	dB
Input Return Loss (IN Port)	8	12		dB
Output Return Loss (OUT Port)	12	15		dB
Amplitude Balance		0.5	1.5	dB
Phase Balance		1.5	4.0	deg
Carrier Suppression (When driven with a 1 MHz square wave, 1.4 Vp-p)	25	33		dBc
Input Power for 1 dB Compression	3	6		dBm
I &Q Bias Current (Bias current forward biases internal Schottky diodes providing approximately 0.6 V at the control port s I & Q).	3	5	10	mA
I & Q Maximum Data Rate (50 Ohm Source Impedance)	250	275		MHz

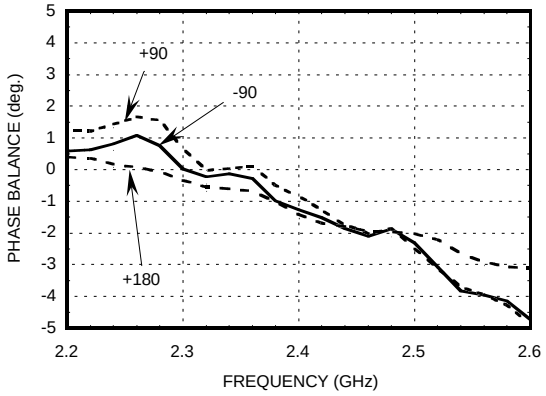
Insertion Loss



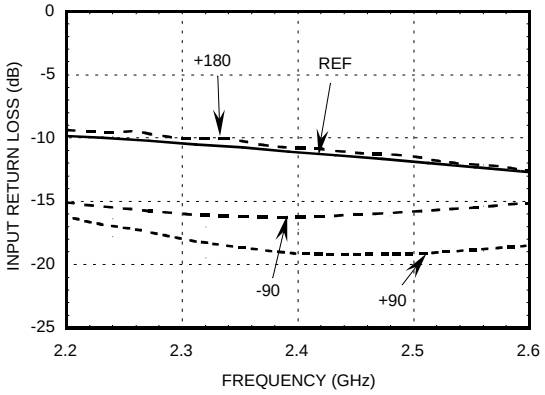
Amplitude Balance



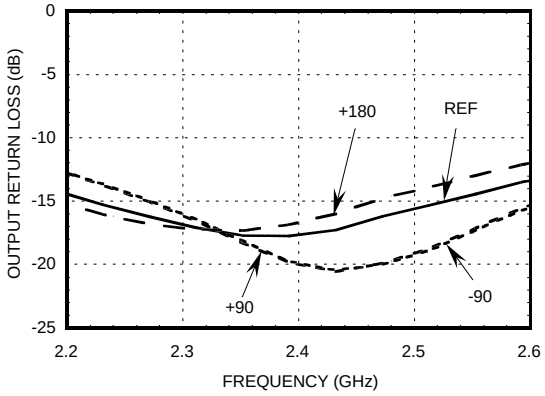
Phase Balance



Input Return Loss



Output Return Loss



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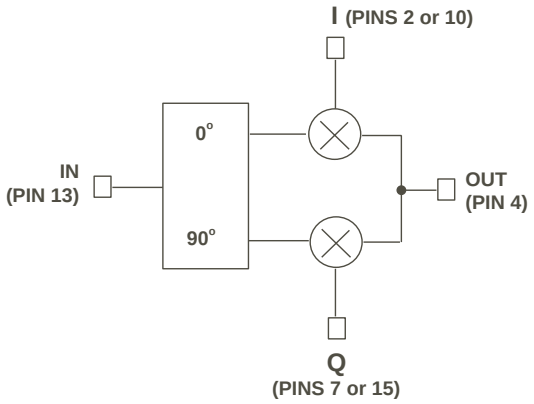
Schematic

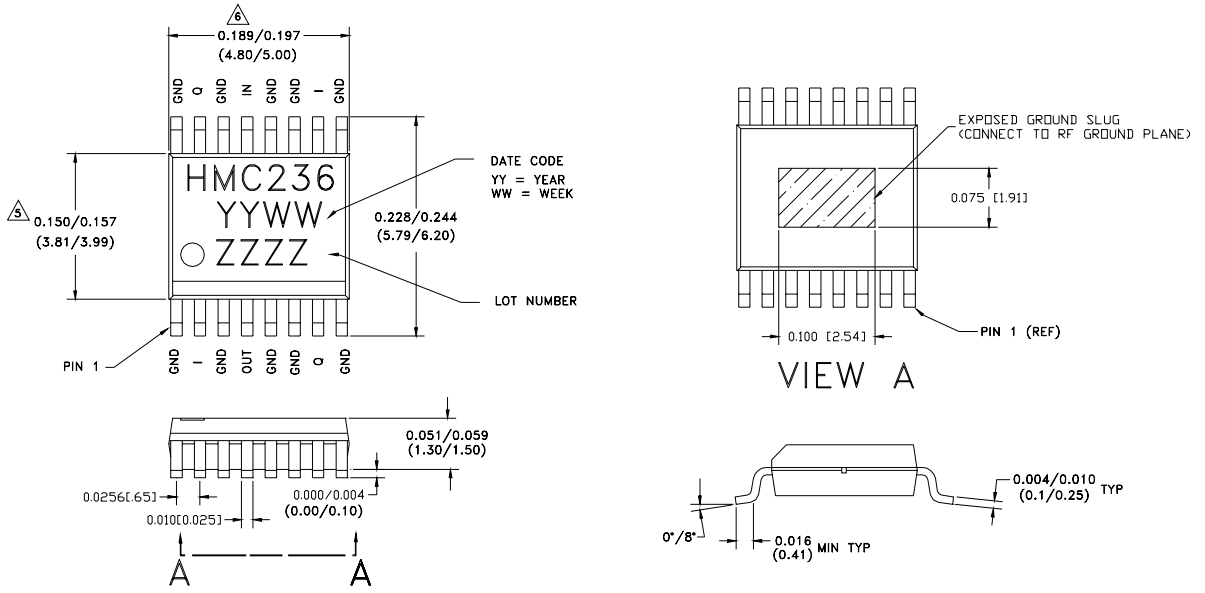


Absolute Maximum Ratings

RF Input (IN)	+20 dBm
I & Q	16 mA
Storage Temperature	-65°C to 150°C
Operating Temperature	-40°C to +85°C

Note the redundant I (Pins 2 or 10) and Q (Pins 7 or 15) ports

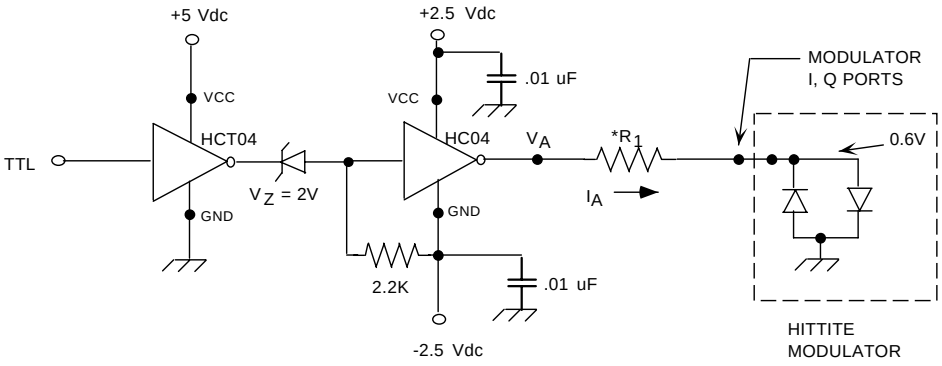
Outline Drawing



1. MATERIAL:
   A) PACKAGE BODY - LOW STRESS INJECTION-MOLDED PLASTIC.
   B) LEADFRAME AND SLUG MATERIAL: COPPER ALLOY
2. PLATING : LEAD - TIN SOLDER PLATE (LEAD AND SLUG)
3. DIMENSIONS ARE IN INCHES (MILLIMETERS).
   UNLESS OTHERWISE SPECIFIED ALL TOL. ARE ±0.005(±0.13).

4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15 MM PER SIDE
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25 MM PER SIDE

Suggested TTL Driver for a QPSK Modulator



NOTES

1) V_A ALTERNATES BETWEEN
$\pm 2.4\ V_{dc}$
$\pm I_A = \frac{2.4 - 0.6}{360\ \Omega} = \pm 5$ mA

2) HCT04 and HC04 are QMOS HEX INVERTERS.
*R_1 = 300 TO 620 ± 2% SELECT R_1 TO SUPPLY
± 3 TO ±6 mA TO THE IF PORT

3) NOTE THAT A SEPARATE DRIVER CIRCUIT IS REQUIRED FOR THE **I** AND **Q** PORTS.

4) NOTE THE REDUNDANT I/Q PORTS.