HMC364G8

SMT GaAs HBT MMIC DIVIDE-BY-2, DC - 13.0 GHz

Typical Applications

Prescaler for DC to X Band PLL Applications:

- Point-to-Point / Multi-Point Radios
- VSAT Radios
- Fiber Optic
- Test Equipment
- Space & Military

Features

Ultra Low SSB Phase Noise: -145 dBc/Hz

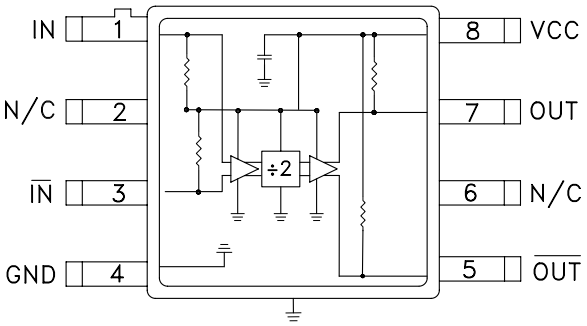
Wide Bandwidth

Output Power: 7 dBm

Single DC Supply: +5V

8 Lead Hermetic SMT Package

Functional Diagram



General Description

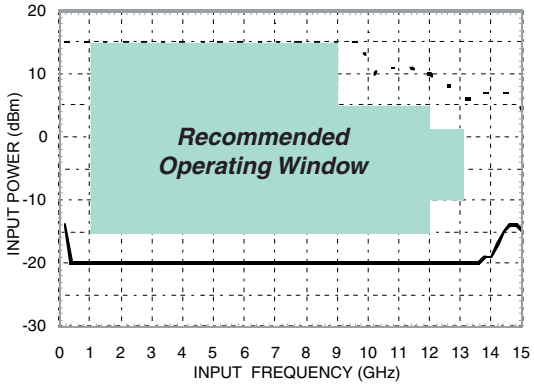
The HMC364G8 is a low noise Divide-by-2 Static Divider with InGaP GaAs HBT technology in an 8 lead glass/metal surface mount (hermetic) package. This device operates from DC (with a square wave input) to 13 GHz input frequency with a single +5.0V DC supply. The low additive SSB phase noise of -145 dBc/Hz at 100 kHz offset helps the user maintain good system noise performance.

Electrical Specifications, T_A = +25° C, 50 Ohm System, Vcc= 5V

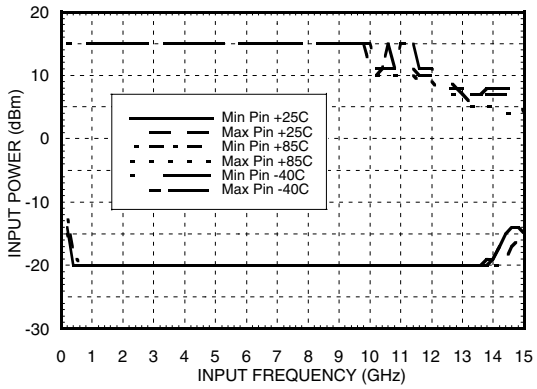
Parameter	Conditions	Min.	Typ.	Max.	Units
Maximum Input Frequency		13	13.5		GHz
Minimum Input Frequency	Sine Wave Input. {1}		0.2	0.5	GHz
Input Power Range	Fin = 1 to 9 GHz	-15	>-20	+10	dBm
	Fin = 9 to 12 GHz	-15	>-20	+5	dBm
	Fin = 12 to 13 GHz	-10	>-15	+2	dBm
Output Power	Fin = 6 GHz	3	7		dBm
	Fin = 9 GHz	1	5		dBm
	Fin = 12 GHz	-2	2		dBm
	Fin = 13 GHz	-3	1		dBm
Reverse Leakage	Both RF Outputs Terminated		40		dB
SSB Phase Noise (100 kHz offset)	Pin = 0 dBm, Fin = 6 GHz		-145		dBc/Hz
Output Transition Time	Pin = 0 dBm, Fout = 882 MHz		100		ps
Supply Current (Icc)			110		mA

1. Divider will operate down to DC for square-wave input signal.

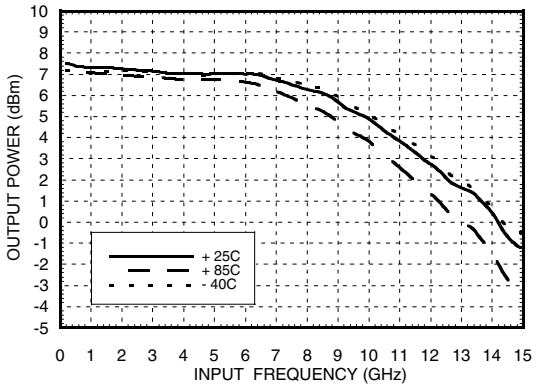
Input Sensitivity Window, T= 25 °C



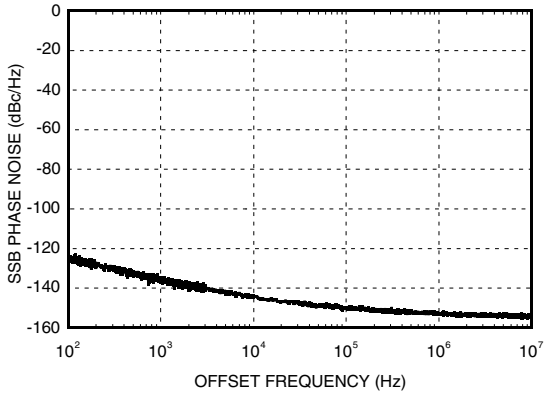
Input Sensitivity Window vs. Temperature



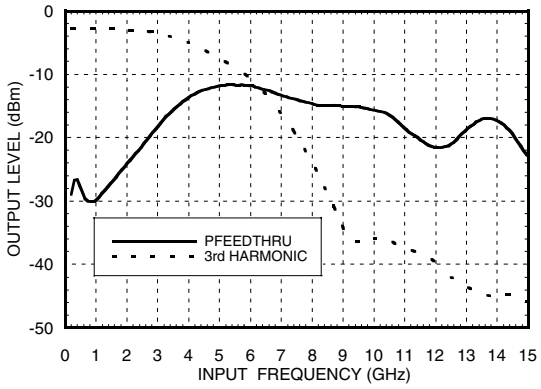
Output Power vs. Temperature



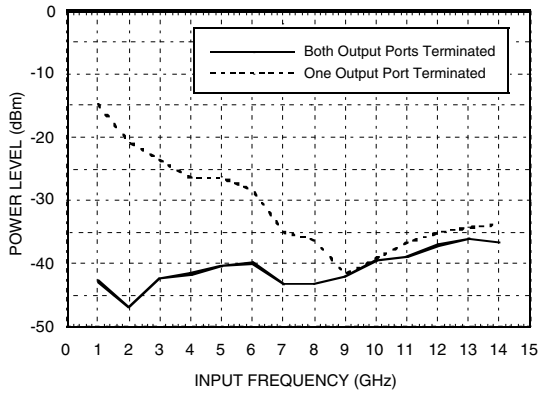
SSB Phase Noise Performance, Pin= 0 dBm, T= 25 °C



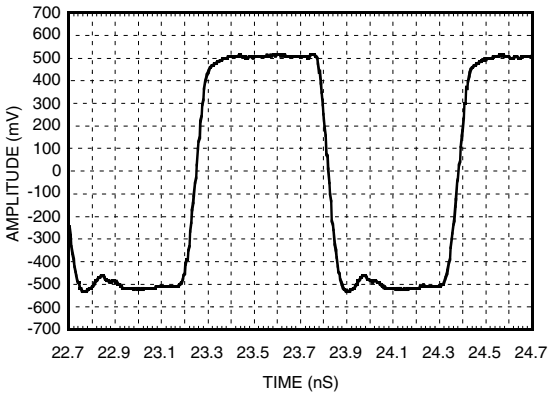
Output Harmonic Content, Pin= 0 dBm, T= 25 °C



Reverse Leakage, Pin= 0 dBm, T= 25 °C



Output Voltage Waveform,
Pin= 0 dBm, Fout= 882 MHz, T= 25 °C



Absolute Maximum Ratings

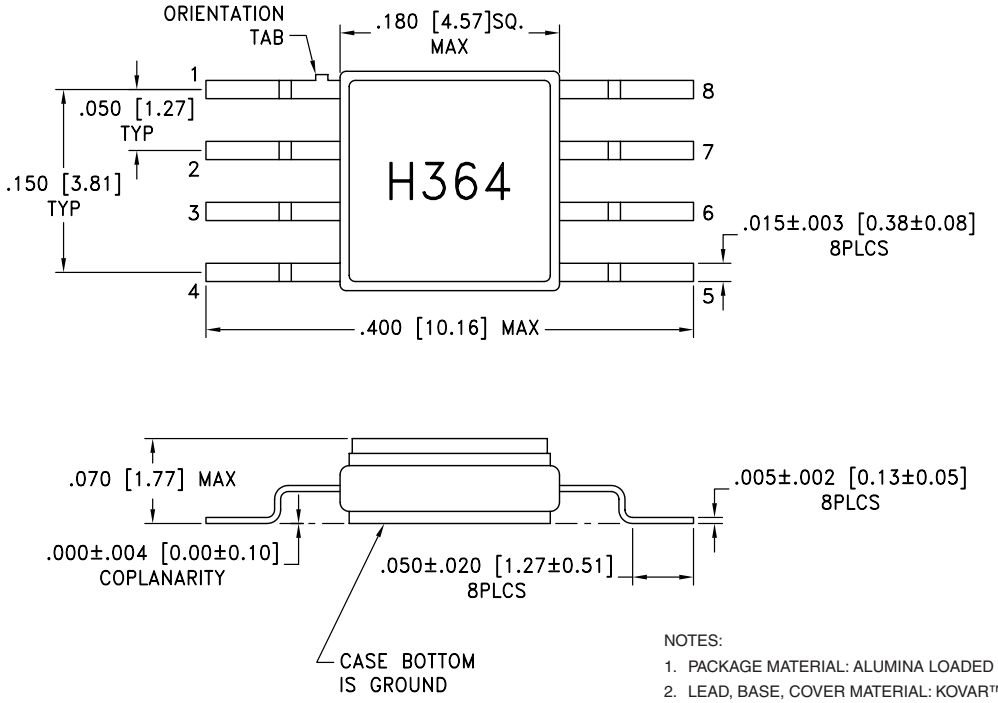
RF Input (Vcc = +5V)	+13 dBm
Vcc	+5.5V
Channel Temperature (Tc)	135 °C
Continuous Pdiss (T = 85 °C) (derate 11.9 mW/° C above 85 °C)	593 mW
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Typical Supply Current vs. Vcc

Vcc (V)	Icc (mA)
4.75	100
5.0	110
5.25	120

Note: Divider will operate over full voltage range shown above

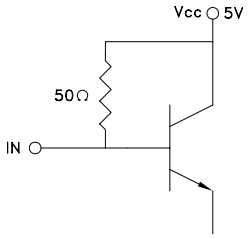
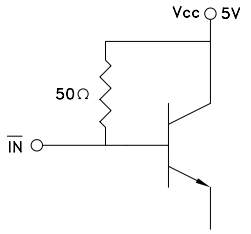
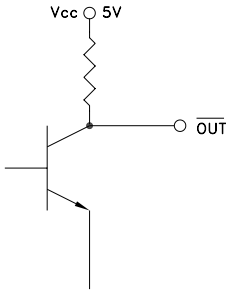
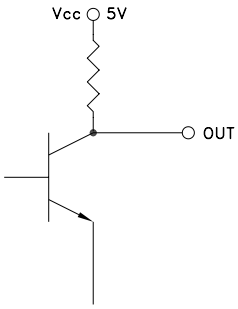
Outline Drawing



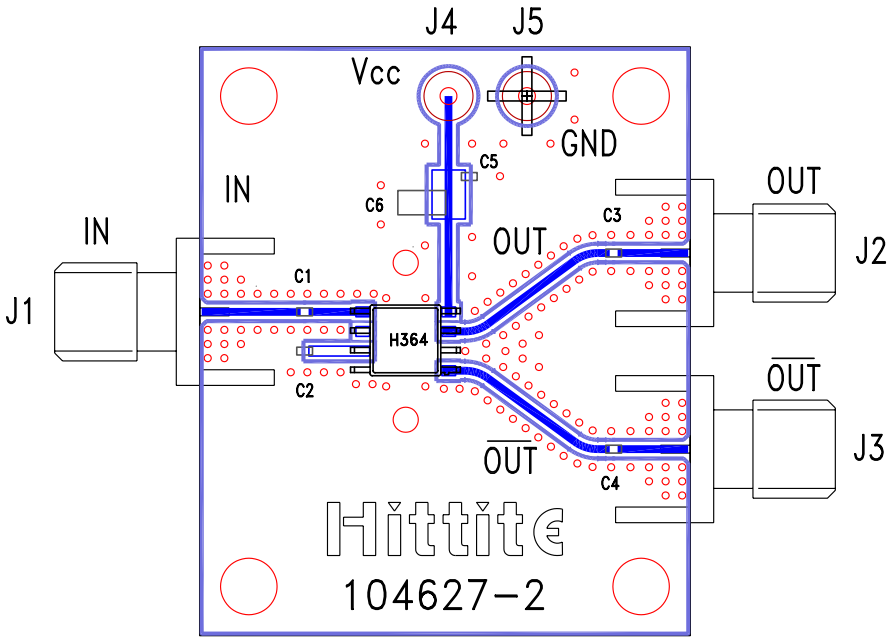
NOTES:

1. PACKAGE MATERIAL: ALUMINA LOADED BOROSILICATE GLASS.
2. LEAD, BASE, COVER MATERIAL: KOVAR™ (#7052 CORNING).
3. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MIN., OVER ELECTROLYTIC NICKEL 50 MICROINCHES MIN.
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. TOLERANCES: ±.005 [0.13] UNLESS OTHERWISE SPECIFIED.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

Pin Description

Pin Number	Function	Description	Interface Schematic
1	IN	RF Input must be DC blocked.	
2, 6	N/C	No connection.	
3	$\overline{IN}$	RF Input 180° out of phase with pin 1 for differential operation. AC ground for single ended operation.	
4	GND	Ground: Backside of package has exposed metal ground which must be connected to a RF/DC ground.	
5	$\overline{OUT}$	Divided output 180° out of phase with pin 7.	
7	OUT	Divided Output.	
8	VCC	Supply voltage 5V ± 0.25V.	

Evaluation PCB



List of Materials

Item	Description
J1 - J3	PC Mount SMA RF Connector
C1 - C4	100 pF Capacitor, 0402 Pkg.
C5	1000 pF Capacitor, 0603 Pkg.
C6	10 uF Tantalum Capacitor
U1	HMC364G8 Divide-by-2
PCB*	104627 Eval Board
* Circuit Board Material: Rogers 4350	

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads and backside ground slug should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available from Hittite upon request. This evaluation board is designed for single ended input testing. J2 and J3 provide differential output signals.

Application Circuit