HMC426MS8

SMT SiGe MMIC
DIVIDE-BY-4, DC - 4.0 GHz

Typical Applications

Prescaler for DC to 4.0 GHz PLL Applications:

- DBS/CATV Tuners
- 802.11x & HiperLAN WLAN
- Fixed Wireless & WLL
- Microwave & VSAT Radios
- Cellular & 3G

Features

Ultra Low SSB Phase Noise: -146 dBc/Hz

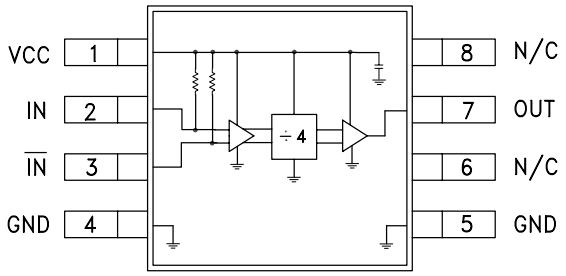
Wide Input Power Range: -15 to +10 dBm

Output Power: +3.5 dBm

Single DC Supply: +3V @ 13 mA

MS8 SMT Package

Functional Diagram



General Description

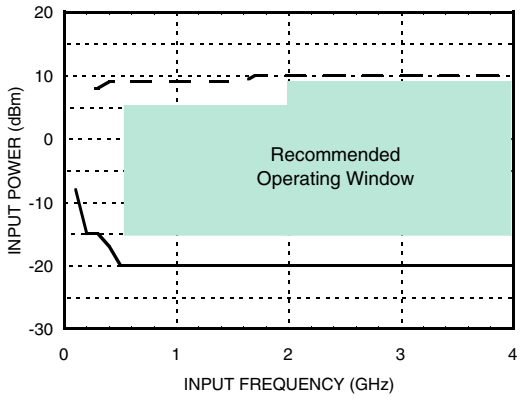
The HMC426MS8 is a low noise Divide-by-4 Static Divider utilizing SiGe technology in an 8 lead surface mount plastic package. This device operates from DC (with a square wave input) to 4.0 GHz input frequency while operating from a single +3V supply at only 13 mA. The low additive SSB phase noise of -146 dBc/Hz at 100 kHz offset helps the user maintain excellent system noise performance.

Electrical Specifications, T_A = +25° C, 50 Ohm System, Vcc= 3V

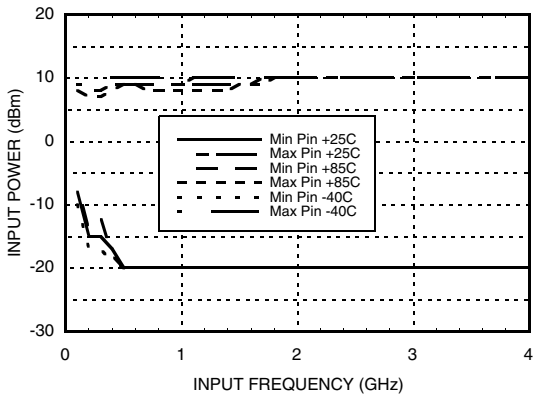
Parameter	Conditions	Min.	Typ.	Max.	Units
Maximum Input Frequency		4.0	4.5		GHz
Minimum Input Frequency	Sine Wave Input. [1]		0.2	0.5	GHz
Input Power Range	Fin = 0.5 to 2 GHz	-15	-20	+5	dBm
	Fin = 2 to 4 GHz	-15	-20	+10	dBm
Output Power	Fin = 1 GHz	+0.5	+3.5		dBm
	Fin = 4 GHz	-3	0		dBm
Reverse Leakage			25		dB
SSB Phase Noise (100 kHz offset)	Pin = 0 dBm, Fin = 3 GHz		-146		dBc/Hz
Output Transition Time	Pin = 0 dBm, Fout = 500 MHz		400		ps
Supply Current (Icc)			13		mA

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

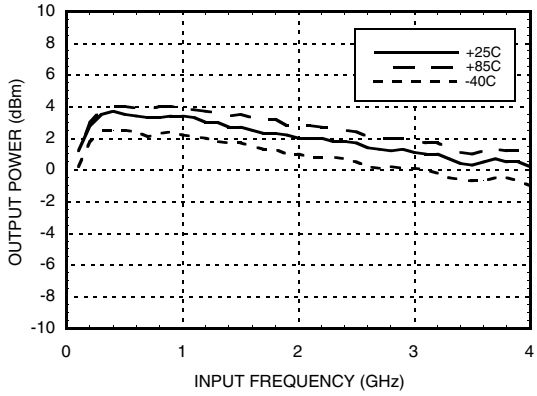
Input Sensitivity Window, T= 25 °C



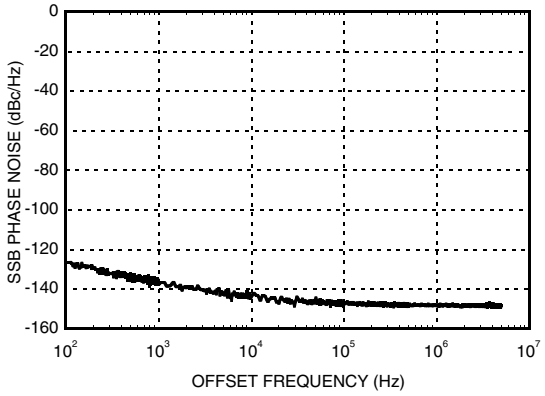
Input Sensitivity Window vs. Temperature



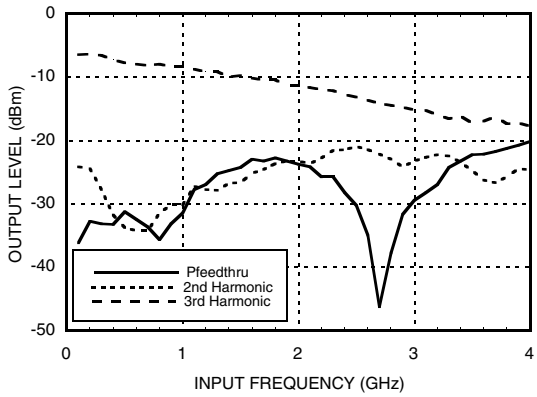
Output Power vs. Temperature



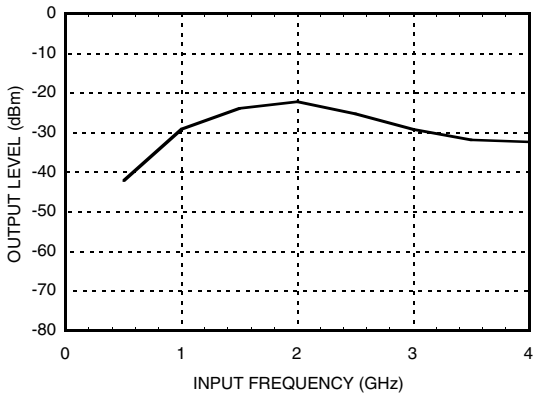
SSB Phase Noise Performance @ Fin= 3 GHz Pin= 0 dBm, T= 25 °C



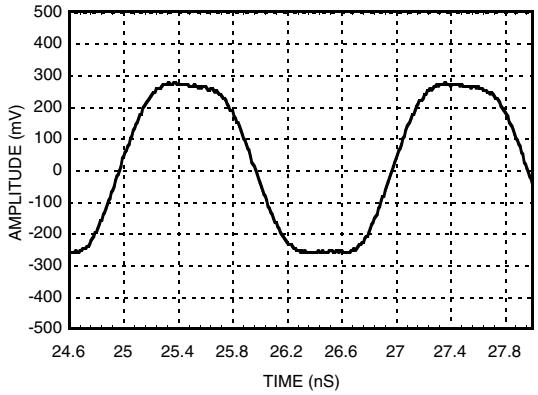
Output Harmonic Content, Pin= 0 dBm, T= 25 °C



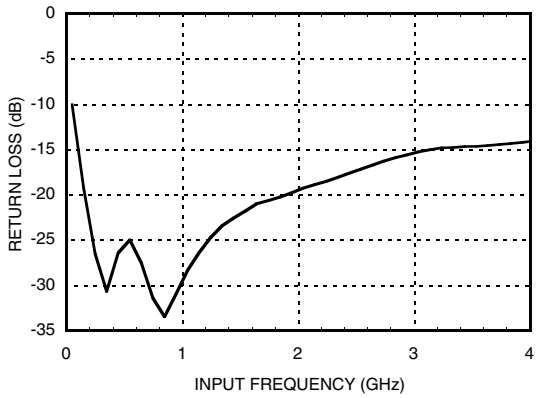
Reverse Leakage, Pin= 0 dBm, T= 25 °C



Output Voltage Waveform, Pin= 0 dBm, Fout= 500 MHz, T= 25 °C



Input Return Loss



Absolute Maximum Ratings

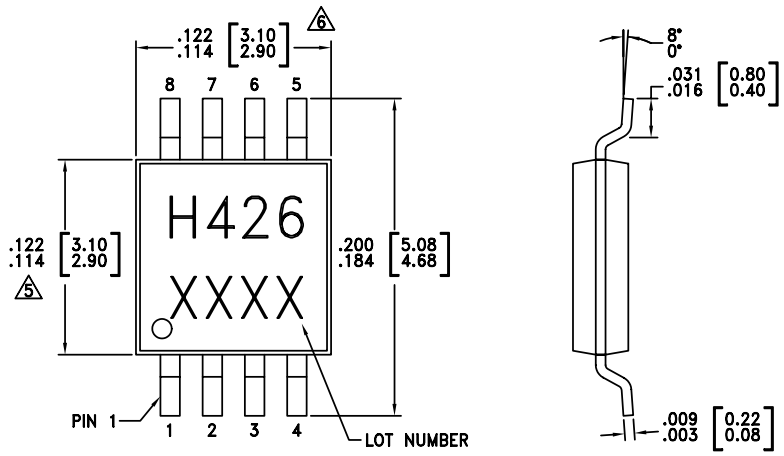
RF Input (Vcc = +3V)	+13 dBm
Vcc	+3.5V
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate 7 mW/ °C above 85 °C)	460 mW
Thermal Resistance (R_{TH}) (junction to lead)	142 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Typical Supply Current vs. Vcc

Vcc (V)	Icc (mA)
2.7	10
3.0	13
3.3	16

Note: Divider will operate over full voltage range shown above

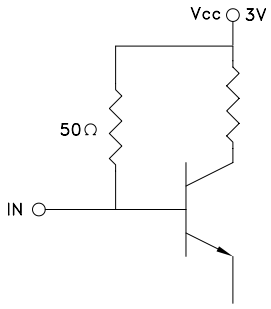
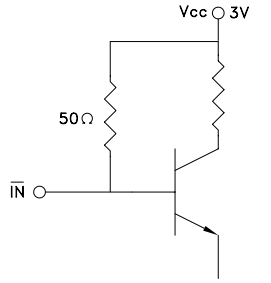
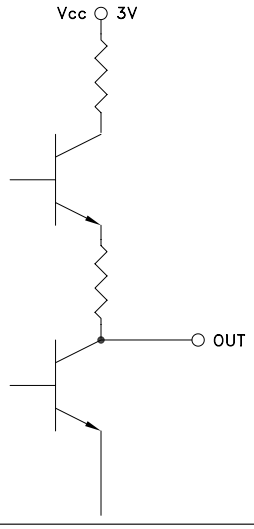
Outline Drawing



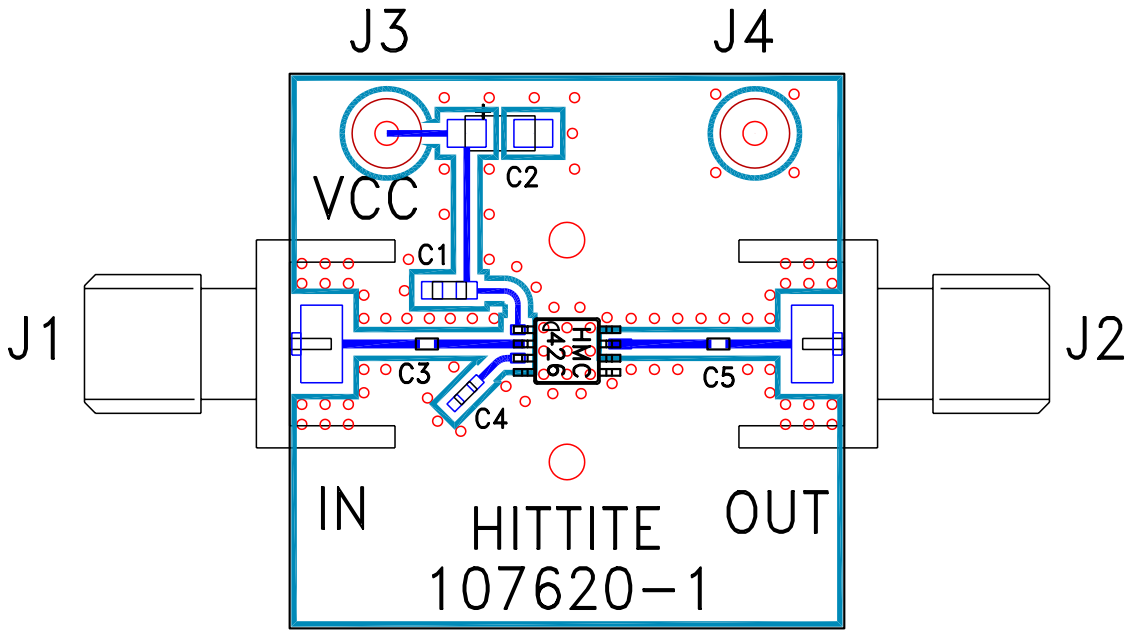
NOTES:

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. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Pin Description

Pin Number	Function	Description	Interface Schematic
1	VCC	Supply voltage 3V ± 0.3V.	
2	IN	RF Input must be DC blocked.	
3	$\overline{IN}$	RF Input 180° out of phase with pin 2 for differential operation. AC ground for single ended operation.	
4, 5	GND	RF/DC Ground	
6, 8	N/C	No connection.	
7	OUT	Divided output.	

Evaluation PCB



List of Materials

Item	Description
J1 - J2	PC Mount SMA RF Connector
J3 - J4	DC Pin
C1	1000 pF Capacitor, 0603 Pkg.
C2	4.7 uF Tantalum Capacitor
C3 - C4	100 pF Capacitor, 0402 Pkg.
C5	1000 pF Capacitor, 0402 Pkg.
U1	HMC426MS8 Divide-by-4
PCB*	107620 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 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 and output testing.

Application Circuit