

GaAs MMIC SMT PRESCALER 3.0 - 6.5 GHz

FEBRUARY 2000

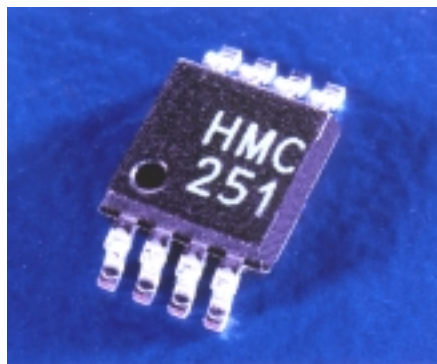
Features

DIVIDE-BY-TWO

LOW PHASE NOISE: -130 dBc/Hz @ 10KHz

SINGLE POSITIVE BIAS VOLTAGE: +5.0V @ 27 mA

MINIATURE SMALL OUTLINE PACKAGE : MSOP8



General Description

The HMC251MS8 is a low noise divide-by-2 GaAs MMIC prescaler in an 8 lead surface mount MSOP plastic package. This device operates from 3.0 to 6.5 GHz (input frequency) with a single +5.0 V DC supply while drawing only 27 mA of current. The low residual phase noise of this prescaler helps the user maintain good system noise performance. The HMC251MS8 is ideal for WLL, UNII, ISM and VSAT applications. This is the smallest divide-by-2 prescaler available.

Guaranteed Performance, $V_{dd} = +5.0\text{ V}$, 50 Ohm System, -40 to +85 deg C

Parameter	Condition	Min	Typical	Max	Units
Input Frequency Range			3.0 - 6.5		GHz
Output Frequency Range			1.5 - 3.25		GHz
Operating Input Power Range	$f_{in} = 3.0 - 4.0\text{ GHz}$	6		10	dBm
	$f_{in} = 4.0 - 5.0\text{ GHz}$	-2		10	dBm
	$f_{in} = 5.0 - 6.0\text{ GHz}$	-8		10	dBm
	$f_{in} = 6.0 - 6.5\text{ GHz}$	-3		7	dBm
Output Power for minimum Input Power level Note 1	$f_{in} = 3.0 - 4.0\text{ GHz}$	-12	-8.0	-3	dBm
	$f_{in} = 4.0 - 5.0\text{ GHz}$	-14	-7.7	-3	dBm
	$f_{in} = 5.0 - 6.0\text{ GHz}$	-16	-8.2	-3	dBm
	$f_{in} = 6.0 - 6.5\text{ GHz}$	-17	-8.5	-3	dBm
Single-Side-Band Phase Noise	$f_{in} = 5.0 - 6.0\text{ GHz}$ Offset from carrier= 10KHz		-130		dBc/Hz
Supply Voltage (Vdd)		4.75	5.0	5.25	Vdc
Supply Current (Idd)	Vdd = +5.0 Vdc		27	33	mA

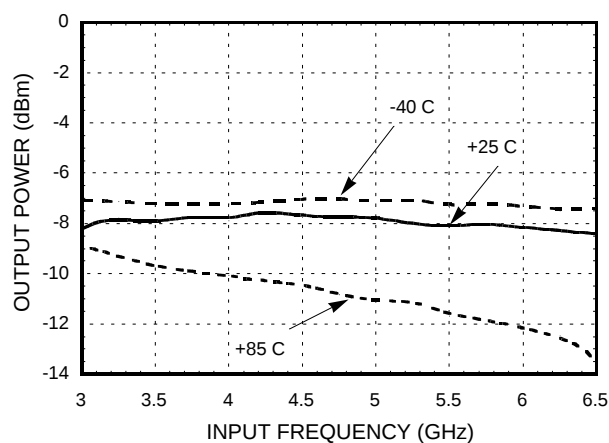
Note 1: Output Power measured at half the Input Frequency.



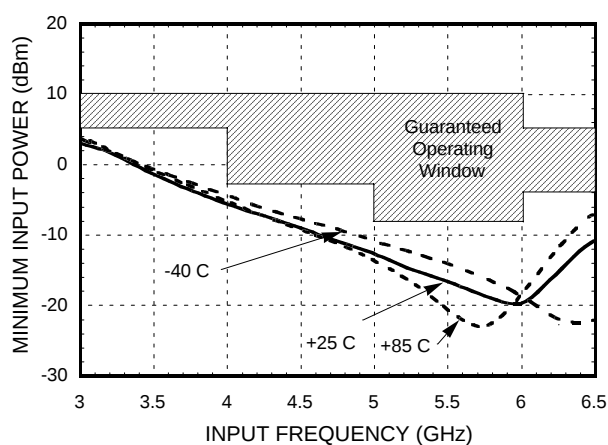
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Output Power Versus Frequency @ Minimum Input Power Level

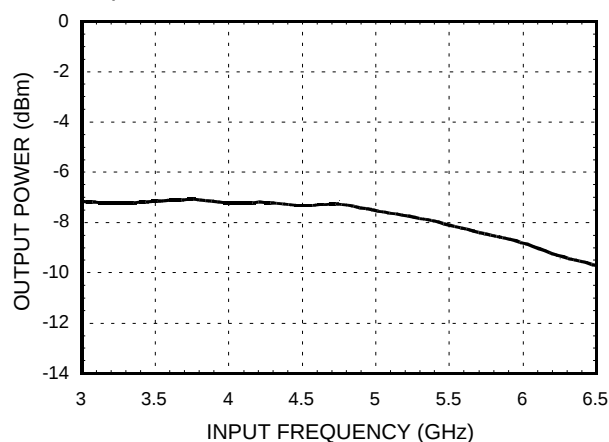


Minimum Input Power Versus Input Frequency

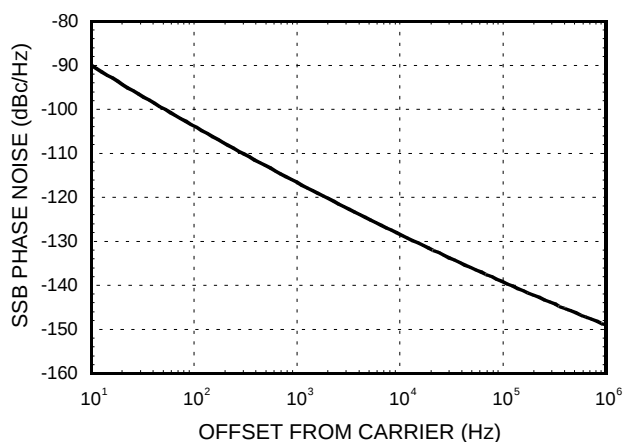


Output Power for Input Power = +10 dBm

Note: Output Power Measured @ $f_{in}/2$



Single-Side-Band Phase Noise Versus Offset from Carrier, f_{in} = 5 to 6 GHz



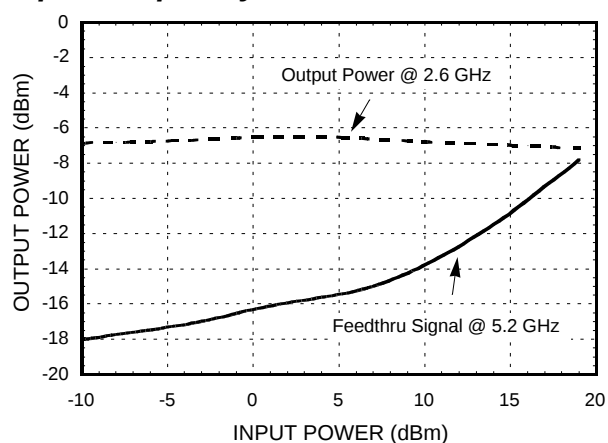
S - Parameter data is available On-Line at www.hittite.com



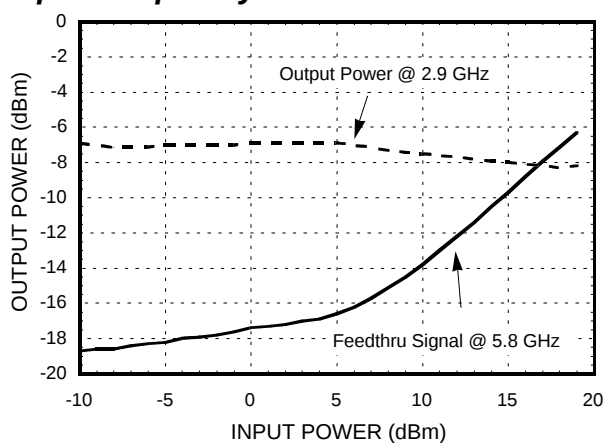
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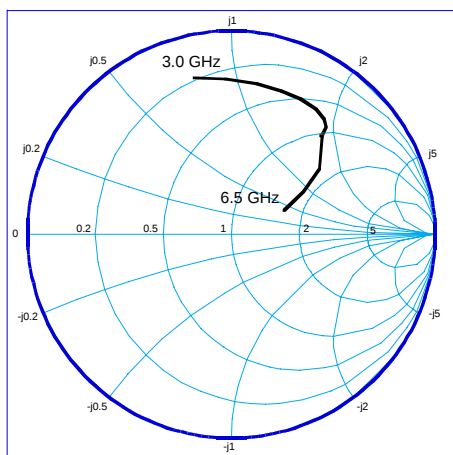
Output Power Versus Input Power
Input Frequency = 5.2 GHz



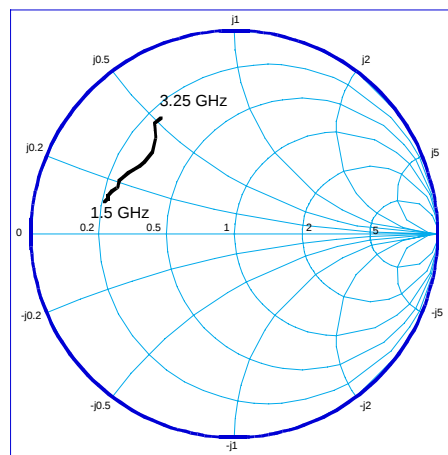
Output Power Versus Input Power
Input Frequency = 5.8 GHz



RF IN S-Parameters



RF OUT S-Parameters



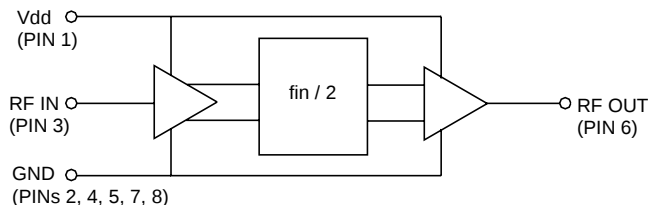
S-Parameter Data is Available @ www.hittite.com



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Functional Diagram



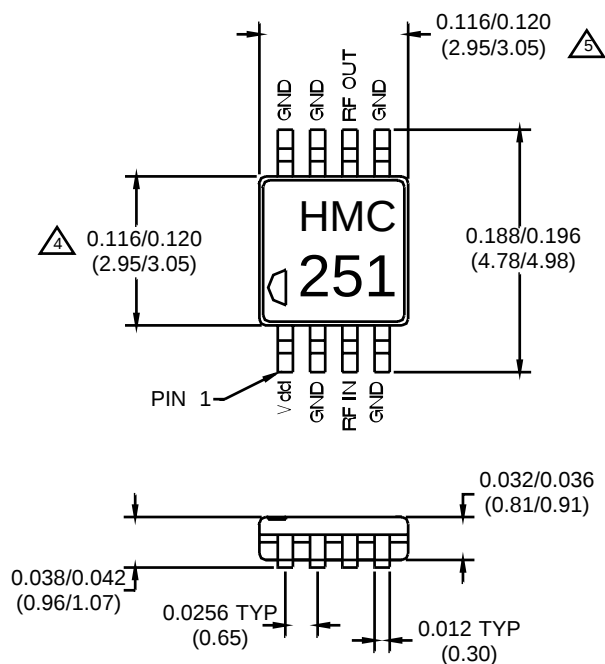
OPERATING NOTES:

1. With no input signal, or input signals below the minimum input power level, the prescaler will self-oscillate.
2. DC blocks on the RF ports are not required but are recommended if DC voltages exceeding 8 volts are present.

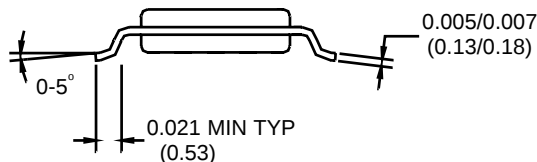
Absolute Maximum Ratings

Vdd	+8 Vdc
Maximum Input Power (Vdd = +5.0Vdc)	20 dBm
Storage Temperature	-65 to +150 deg. C
Operating Temperature	-40 to +85 deg. C

Outline Drawing



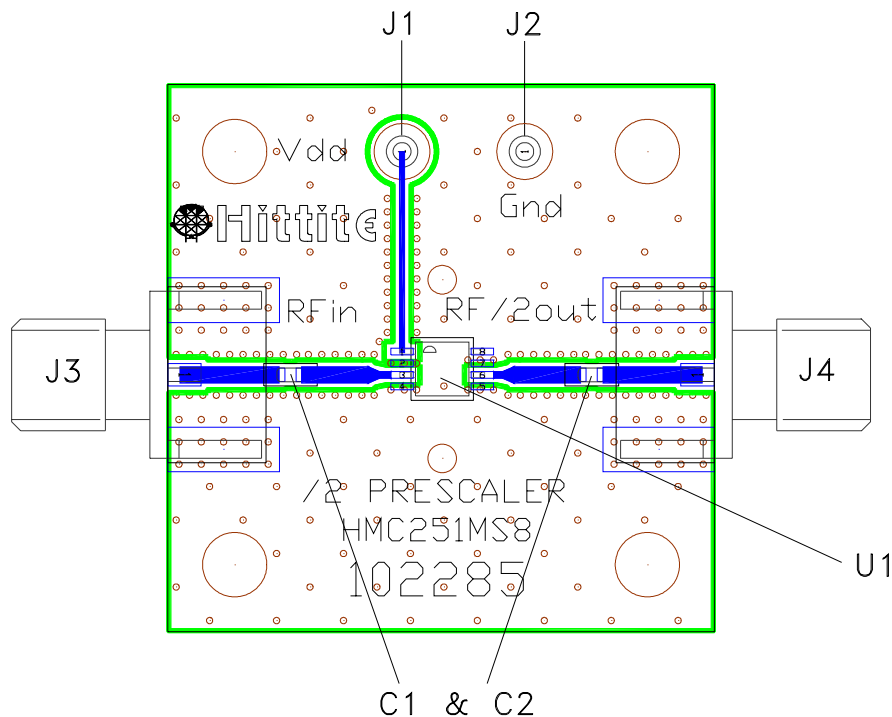
1. MATERIAL:
 - A) PACKAGE BODY - LOW STRESS INJECTION - MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.
 - B) LEADFRAME MATERIAL: COPPER ALLOY
 2. PLATING: LEAD - TIN SOLDER PLATE
 3. DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED TOL. ARE $\pm 0.005 (\pm 0.13)$
- ▲ DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE
 ▲ DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE



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Eval Board Layout (Top View)



The circuit board used in the final application should be generated with proper RF circuit design techniques. Signal lines at RF IN and RF OUT 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 shown above is available from Hittite Microwave Corporation upon request.

List of Material

Item	Description
J1, J2	DC Pin
J3, J4	PC Mount SMA Connector
C1, C2	330 pF Capacitor, 0603 Pkg.
U1	HMC251MS8 Prescaler
PCB*	102285 Eval Board, LM 102286
* Circuit Board Material : 4350	

