HMC279MS8G

GaAs MMIC DRIVER AMPLIFIER 2.5 - 4.2 GHz

FEBRUARY 2001

v01.05.00

Features

HIGH GAIN : 36 dB

Psat OUTPUT POWER: +14 dBm

SINGLE SUPPLY: +3V @ 60 mA

ULTRA SMALL PACKAGE : MSOP8

NO EXTERNAL MATCHING REQUIRED

General Description

The HMC279MS8G is a +3V GaAs MMIC driver amplifier covering the 2.5 - 4.2 GHz frequency range. The device is packaged in a low cost, surface mount MSOP plastic package with an exposed base paddle for improved RF ground. The amplifier provides greater than 36dB gain and +14 dBm P1dB while operating from a single +3V supply at only 60mA. This amplifier is ideal for use in MMDS 2.6-2.7GHz, 3.5 GHz WLL, and 3.7 - 4.2 GHz satellite receive and transmit bands. No external components are required and the amplifier occupies less than 0.023 sq. in. (14.6 sq. mm). All data is taken with the amplifier assembled into a 50 ohm test fixture with the exposed ground paddle connected to RF ground.

Guaranteed Performance, *Vdd = +3V, -40 to +85 deg C*

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range	2.5 - 3.7			3.7 - 4.2			GHz
Gain	31	36	42	33	38	42	dB
Gain Flatness		± 1.5			± 0.9		dB
Input Return Loss	5	10		6	11		dB
Output Return Loss	5	9		8	13		dB
Reverse Isolation	44	52		42	48		dB
Output Power for 1dB Compression (P1dB)	8	12		9	12		dBm
Saturated Output Power (Psat)	11	14		11	14		dBm
Output Third Order Intercept (IP3)	17	22		15	20		dBm
Noise Figure		5	8		5	8	dB
Supply Voltage (Vdd)	2.7	3.0	3.3	2.7	3.0	3.3	Vdc
Supply Current (Idd)(Vdd = +3.0 Vdc)		60	95		60	95	mA

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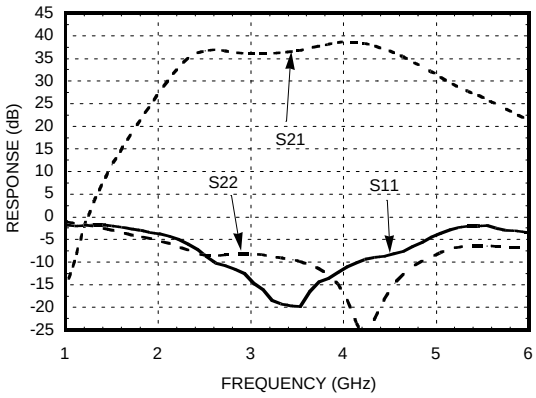
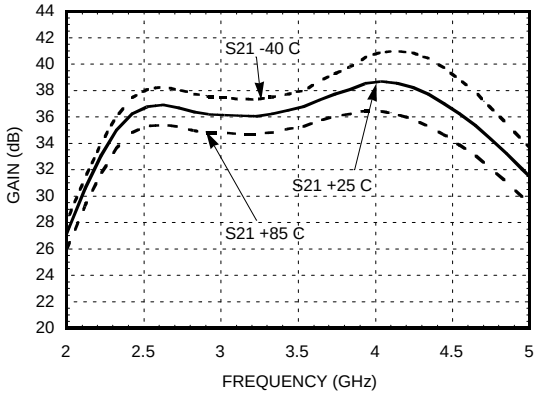
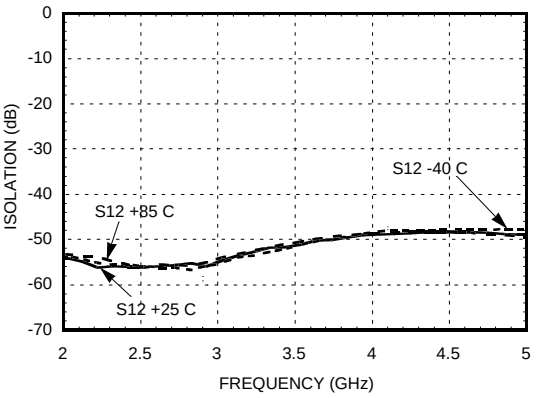
Broadband Gain & Return Loss



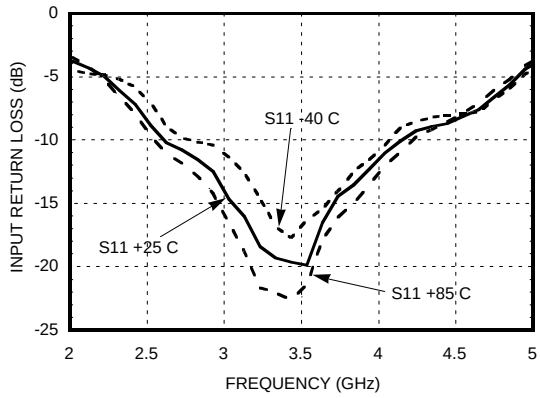
Gain vs. Temperature



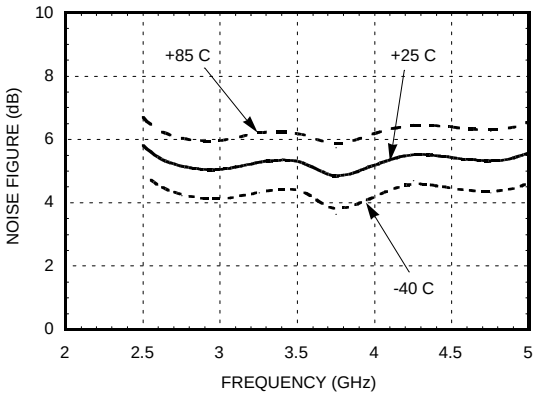
Reverse Isolation vs Temperature



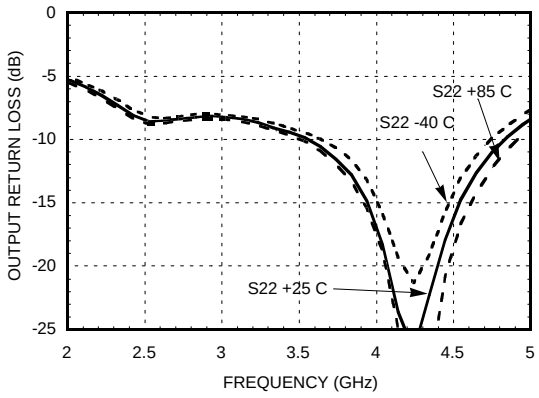
Input Match vs Temperature



Noise Figure vs Temperature



Output Match vs Temperature



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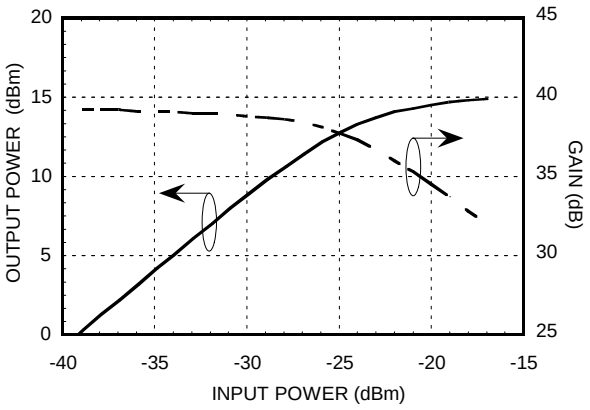
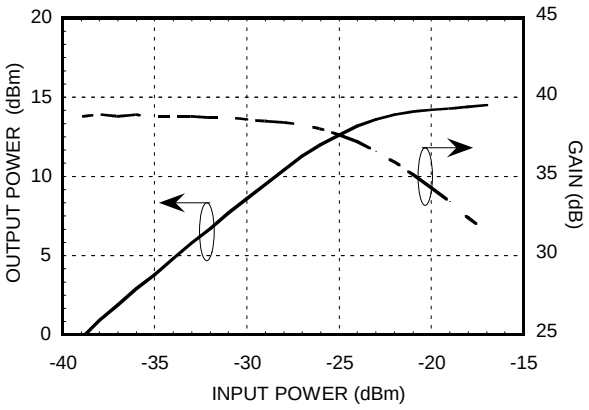
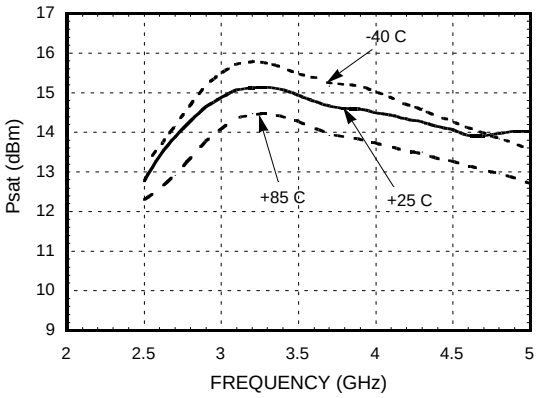
Power Compression @ 3.5 GHz



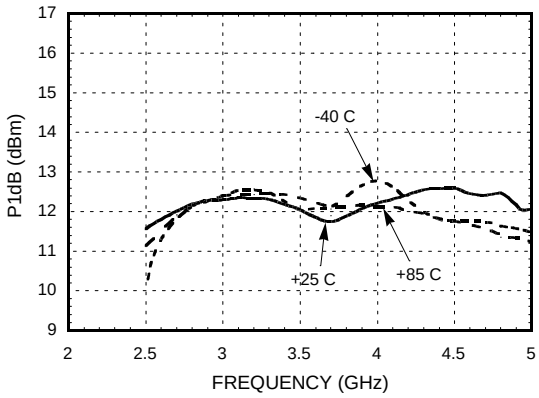
Power Compression @ 4 GHz



Psat vs. Temperature



P1dB vs. Temperature



Output IP3 vs. Temperature

Frequency (GHz)			
Temperature	3.4	3.8	4.2
-40 °C	23.80	22.13	23.92
+25 °C	24.00	23.42	20.82
+85 °C	25.58	24.83	22.23
All levels in dBm			

Spur Data @ P1dB Output (3.8 GHz)

Spur Data at P1dB				
2FO	3FO	4FO	5FO	6FO
-31	-46.5	-56.5	-92.3	-102.33
All power levels are in dBc with respect to the output power (F0)				

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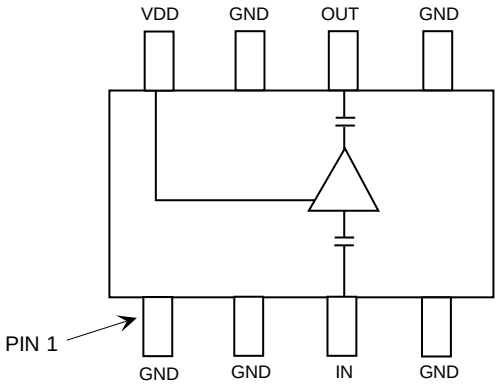
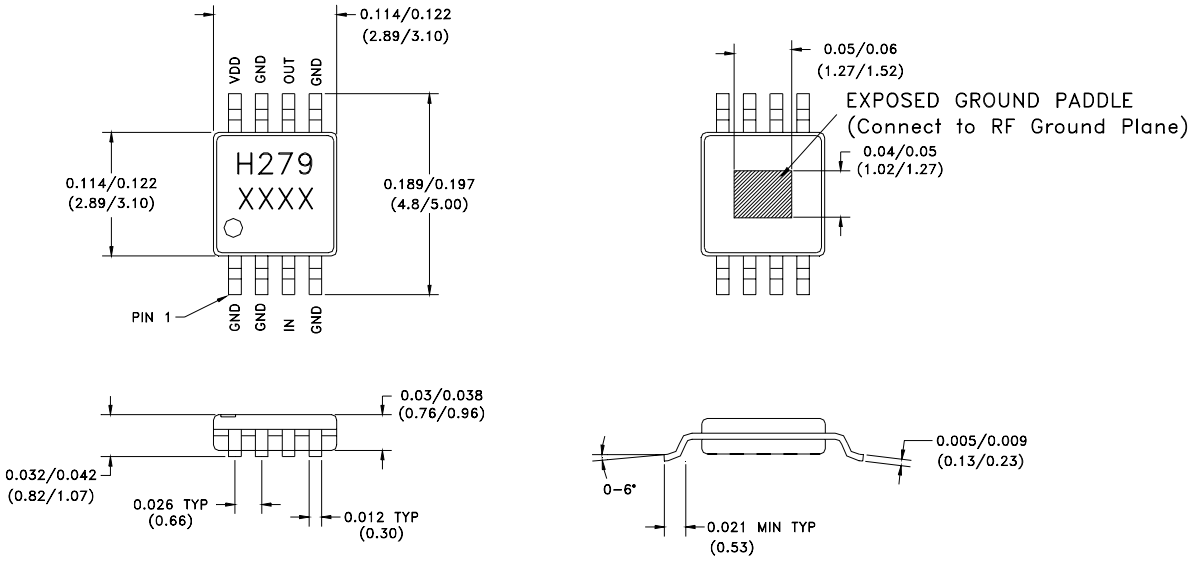
Schematic



Absolute Maximum Ratings

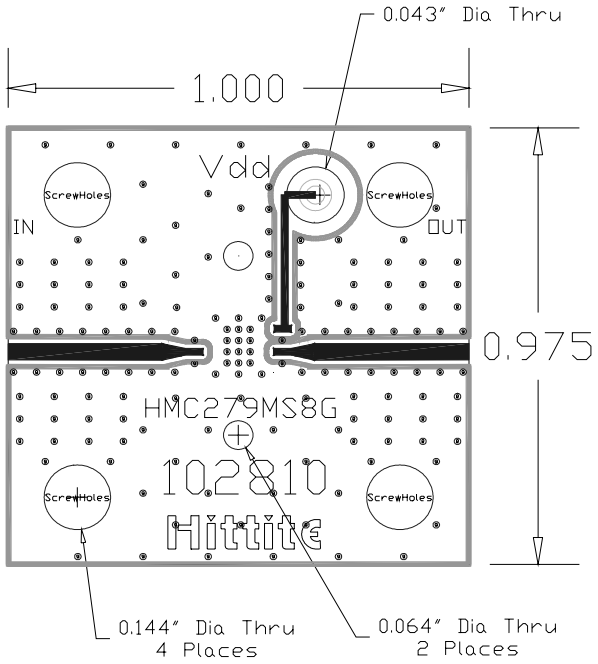
Supply Voltage (Vdd)	+8 Vdc
Control Voltage Range (CTL)	-0.2 to Vdd
Input Power @ ANT (LNA "ON", Vdd = +3V)	-10 dBm
Input Power @ Tx (Switch "ON", Vdd = +3V)	+ 34 dBm
Channel Temperature (Tc)	175 °C
Thermal Resistance (⊖jc) (Channel Backside)	32 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

Outline



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 ±0.005 (±0.13)
4. ALL UNLABELED LEADS ARE GROUND

Recommended PCB Layout for HMC279MS8G



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 exposed paddle should be connected directly to the ground plane similar to that shown above. A sufficient number of VIA holes should be used to connect the top and bottom ground planes. The evaluation circuit board as shown is available from Hittite upon request.

Evaluation Circuit Board Layout Design Details

Layout Technique	Grounded Co-Planar Waveguide (GCPW)
Material	Rogers 4350
Dielectric Thickness	0.020" (0.51 mm)
50 Ohm Line Width	0.034" (0.86 mm)
Gap to Ground Edge	0.010" (0.25 mm)
Ground VIA Hole Diameter	0.014" (0.36 mm)
Connectors	SMA-F (EF - Johnson P/N 142-0701-806)

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NOTES: