SNA-676

DC-6.5 GHz, Cascadable GaAs MMIC Amplifier

Product Description

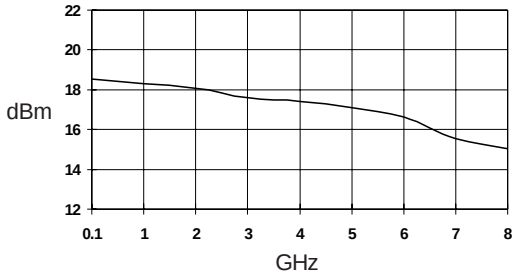
Stanford Microdevices' SNA-676 is a high-performance GaAs Heterojunction Bipolar Transistor (MMIC) housed in a low-cost surface mountable stripline package. A Darlington configuration is utilized for broadband performance to 6.5 GHz.

These unconditionally stable amplifiers provide 11dB of gain and +18dBm of P1dB when biased at 5.7V and 70mA. This MMIC requires only a single suply voltage. The use of an external resistor allows for bias flexibility and stability.

Also available in chip form (SNA-600), its small size (0.4mm x 0.4mm) and gold metallization make it an ideal choice for use in hybrid circuits.

The SNA-676 is available in tape and reel at 1000, 3000 and 5000 devices per reel.

Output Power vs. Frequency



Product Features

- **Cascadable 50 Ohm Gain Block**
- **11dB Gain, +18dBm P1dB**
- **High Linearity, +36dBm TOIP Typ.**
- **1.5:1 Input and Output VSWR**
- **Operates From a Single DC Supply**
- **Low Cost Stripline Mount Ceramic Package**

Applications

- **Narrow and Broadband Linear Amplifiers**
- **Commercial and Industrial Applications**

Electrical Specifications at Ta = 25C

Symbol	Parameters: Test Conditions: Id = 70mA, Z_0 = 50 Ohms		Units	Min.	Typ.	Max.
G_P	Small Signal Gain	f = 0.1-4.0 GHz f = 4.0-6.5 GHz	dB dB	9.0 8.0	11.0 9.0	
BW3dB	3dB Bandwidth		GHz		6.5	
P_{1dB}	Output Power at 1dB Compression	f = 0.1-2.0 GHz f = 2.0-6.5 GHz	dBm		18.0 16.0	
NF	Noise Figure	f = 0.1-4.0 GHz f = 4.0-6.5 GHz	dB		7.5 8.5	
VSWR	Input / Output	f = 0.1-6.5 GHz			1.5:1	
IP_3	Third Order Intercept Point	f = 0.1-2.0 GHz	dBm		36.0	
T_D	Group Delay	f = 2.0 GHz	psec		120	
ISOL	Reverse Isolation	f = 0.1-6.5 GHz	dB		17.0	
VD	Device Voltage		V	4.8	5.7	6.8
dG/dT	Device Gain Temperature Coefficient		dB/degC		-0.0023	
dV/dT	Device Voltage Temperature Coefficient		mV/degC		-5.0	

522 Almanor Ave., Sunnyvale, CA 94086 Phone: (800) SMI-MMIC http://www.stanfordmicro.com

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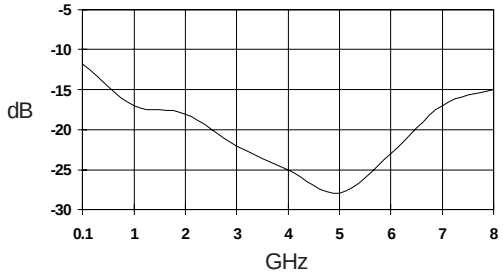
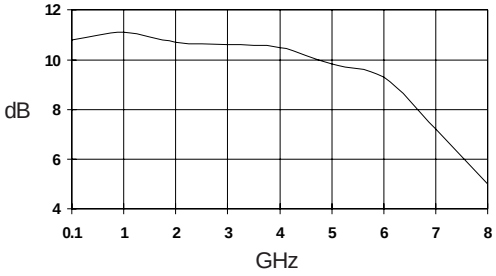
Typical Performance at 25° C (Vds = 5.7V, Ids = 70mA)

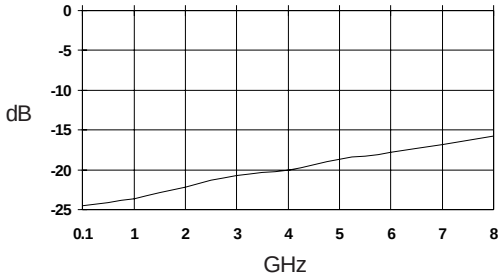
|S11| vs. Frequency



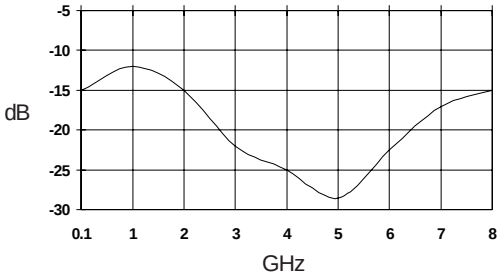
|S21| vs. Frequency



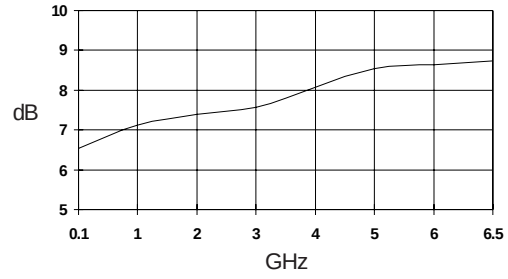
|S12| vs. Frequency



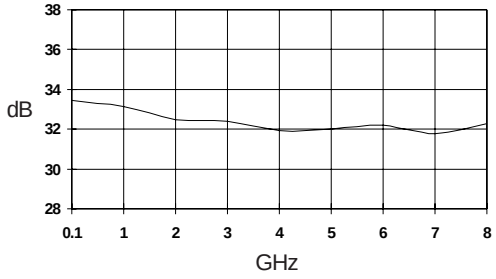
|S22| vs. Frequency



Noise Figure vs. Frequency



TOIP vs. Frequency



Typical S-Parameters Vds = 5.7V, Ids = 70mA

Freq GHz	|S11|	S11 Ang	|S21|	S21 Ang	|S12|	S12 Ang	|S22|	S22 Ang
.100	0.152	-14	3.624	152	0.095	-4	0.198	-4
.250	0.146	-25	3.602	145	0.139	-10	0.205	-26
.500	0.131	-42	3.549	140	0.149	-30	0.247	-56
1.00	0.110	-83	3.583	102	0.148	-59	0.222	-112
1.50	0.085	-130	3.567	59	0.146	-90	0.198	-179
2.00	0.072	178	3.541	21	0.145	-120	0.193	120
2.50	0.077	109	3.512	-22	0.141	-152	0.203	54
3.00	0.107	52	3.427	-64	0.136	180	0.222	1
3.50	0.143	0	3.401	-106	0.132	147	0.248	-60
4.00	0.168	-44	3.290	-144	0.128	118	0.270	-117
4.50	0.173	-90	3.280	175	0.124	88	0.288	177
5.00	0.141	-142	3.104	128	0.124	60	0.285	117
5.50	0.079	169	2.929	87	0.123	29	0.276	51
6.00	0.038	62	2.658	47	0.121	0	0.259	-10
6.50	0.079	-57	2.359	1	0.119	-35	0.322	-76

(S-Parameters include the effects of two 1.0 mil diameter bond wires, each 20 mils long, connected to the gate and drain pads on the die)

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Absolute Maximum Ratings

Parameter	Absolute Maximum
Device Current	110mA
Power Dissipation	700mW
RF Input Power	200mW
Junction Temperature	+200C
Operating Temperature	-45C to +85C
Storage Temperature	-65C to +150C

Notes:

1. Operation of this device above any one of these parameters may cause permanent damage.

Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
SNA-676-TR1	1000	7"
SNA-676-TR2	3000	13"
SNA-676-TR3	5000	13"

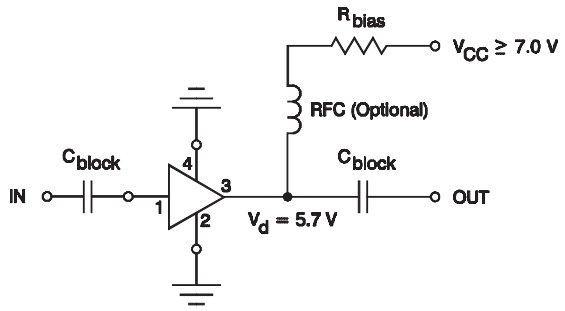
Recommended Bias Resistor Values						
Supply Voltage(Vs)	5V	7.5V	9V	12V	15V	20V
Rbias (Ohms)	*	24	46	89	131	203

** Not Recommended

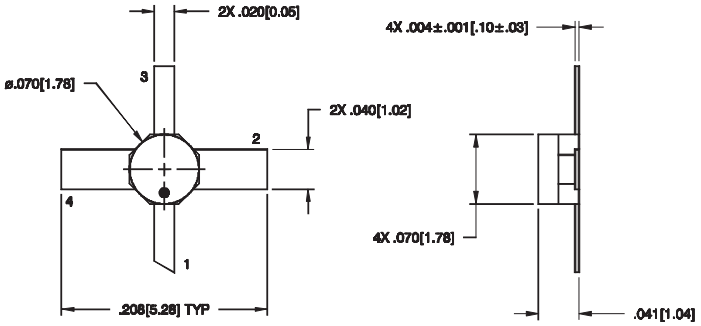
MTTF vs. Temperature @ Id = 70mA

Lead Temperature	Junction Temperature	MTTF (hrs)
+55C	+155C	1000000
+90C	+190C	100000
+120C	+220C	10000

Thermal Resistance (Lead-Junction): 250° C/W



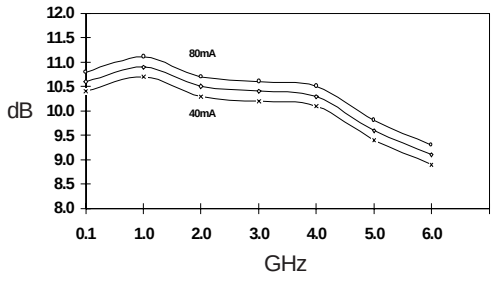
Typical Biasing Configuration



Pin Designation	
1	RF in
2	GND
3	RF out and Bias
4	GND

Typical Performance at 25° C

Power Gain vs. Device Current 20mA Steps



Device Voltage vs. Id