Preliminary

NGA-489

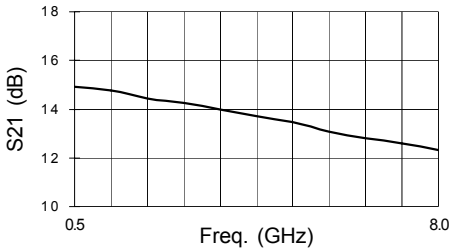
500-8000 MHz, Cascadable GaAs HBT MMIC Amplifier

Product Description

Stanford Microdevices' NGA-489 is a high performance Gallium Arsenide Hetrojunction Bipolar Transistor MMIC Amplifier. A Darlington configuration designed with InGaP process technology provides broadband performance up to 8 GHz with excellent thermal perfomance. The heterojunction increases breakdown voltage and minimizes leakage current between junctions. Cancellation of emitter junction non-linearities results in higher suppression of intermodulation products. Typical output IP3 performance at 65mA is +37.0dBm at 850 MHz.

The NGA-489 provides up to 14.3 dB of gain and +17.0dBm of 1dB compressed power using a single positive voltage supply. Only 2 DC-blocking capacitors, a bias resistor and an optional RF choke are required for operation.

Small Signal Gain vs. Frequency



Product Features

- **High Gain : 14.3 dB at 1900 MHz**
- **Cascadable 50ohm : 1.5:1 VSWR**
- **Patented GaAsHBT Technology**
- **Operates From Single Supply**
- **Low Thermal Resistance Package**

Applications

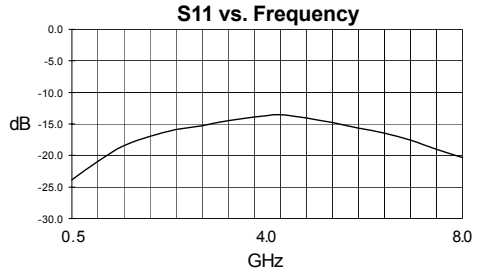
- **Cellular, PCS, CDPD**
- **Wireless Data, SONET**

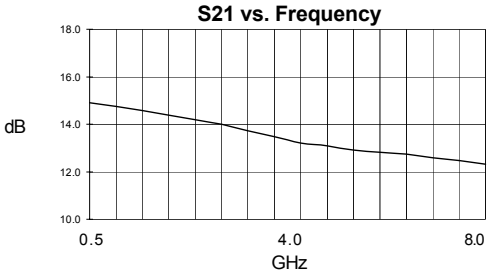
Symbol	Parameters: Test Conditions: Z_0 = 50 Ohms, Id = 65mA, T=25ºC		Units	Min.	Typ.	Max.
S_{21}	Small Signal Gain	f = 850 MHz f = 1950 MHz f = 2400 MHz	dB dB dB		14.8 14.4 14.2	
P1dB	Output Power at 1dB Compression	f = 850 MHz f = 1950 MHz	dBm dBm		16.5 17.0	
IP_3*	Third Order Intercept Point Power out per tone = 0dBm	f = 850 MHz f = 1950 MHz	dBm dBm		37.0 37.0	
Bandwidth	Determined by S11 and S22		Mhz		8000	
S_{11}	Input VSWR	f = 0.5-8.0 GHz	-		1.5:1	
S_{22}	Output VSWR	f = 0.5-8.0 GHz	-		1.5:1	
NF	Noise Figure	f = 2000 Mhz	dB		3.9	
V_D	Device Voltage		V		4.0	
R_{Th}	Thermal Resistance		ºC/W		120	

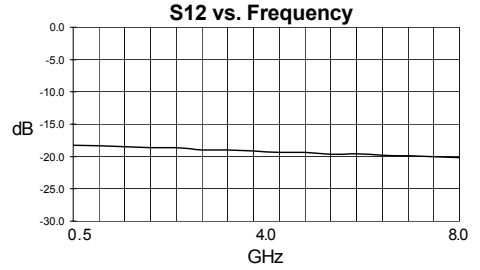
* 38.5dBm IP3 can be achieved by applying an 80mA Bias. This is only recommended at temperatures above +15°C

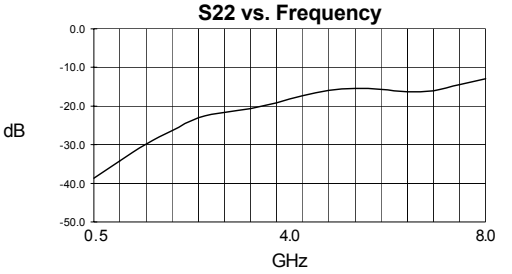
522 Almanor Ave., Sunnyvale, CA 94085 Phone: (800) SMI-MMIC http://www.stanfordmicro.com

Typical Performance at 25° C (Vcc = 4.0V, Icc = 65mA)







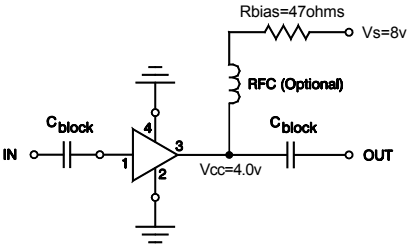


Typical S-Parameters Vcc = 4.0V, Icc = 65mA

Freq GHz	|S11|	S11 Ang	|S21|	S21 Ang	|S12|	S12 Ang	|S22|	S22 Ang
.500	0.064	135	5.57	165	0.122	-18	0.012	132
.900	0.085	108	5.48	152	0.121	-18	0.019	110
1.00	0.090	104	5.47	149	0.121	-18	0.019	111
1.50	0.119	88	5.35	134	0.120	-18	0.032	112
2.00	0.142	78	5.23	121	0.118	-19	0.048	114
2.50	0.162	65	5.04	104	0.114	-19	0.072	105
3.00	0.172	54	5.01	92	0.112	-19	0.082	93
3.50	0.188	44	4.85	77	0.112	-19	0.093	80
4.00	0.203	34	4.69	63	0.109	-19	0.113	71
4.50	0.210	27	4.58	49	0.108	-19	0.141	64
5.00	0.198	23	4.51	37	0.108	-19	0.160	59
5.50	0.183	15	4.42	23	0.104	-20	0.170	51
6.00	0.162	0	4.38	9	0.104	-20	0.160	43
6.50	0.151	-17	4.34	3	0.103	-20	0.153	32
7.00	0.132	-31	4.26	-18	0.101	-20	0.158	20
7.50	0.112	-28	4.20	-33	0.100	-20	0.191	13
8.00	0.096	-22	4.13	-45	0.098	-20	0.225	8

NGA-489 0.5-8 GHz Cascadable MMIC Amplifier

Recommended Bias Resistor Values				
Supply Voltage (Vs)	6V	8V	10V	12V
Rbias (Ohms) @ 80mA	30	62	91	120

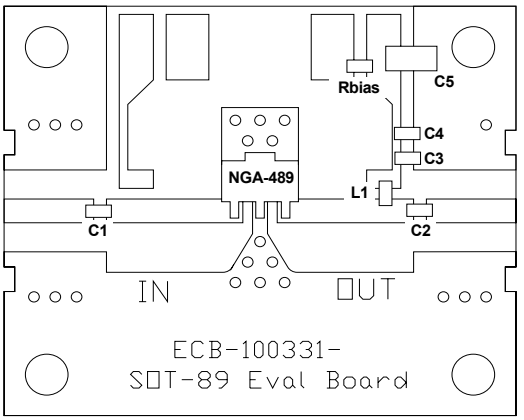


Typical Biasing Configuration
Vcc=4.0V, Icc=65mA

Mounting Instructions

The data shown was taken on a 31mil thick FR-4 board with 1 ounce of copper on both sides.

1. Use 1 or 2 ounce copper, if possible.
2. Solder the copper pad on the backside of the device package to the ground plane.
3. Use a large ground pad area with many plated through-holes as shown.



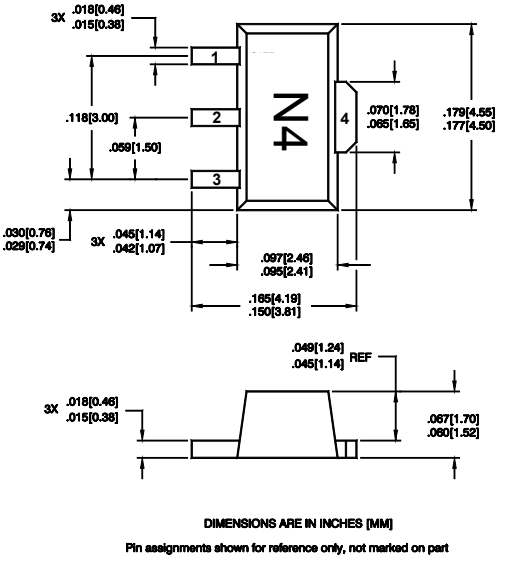
Absolute Maximum Ratings

Parameter	Absolute Maximum
Device Current	120mA
Power Dissipation	660mW
RF Input Power	30mW
Junction Temperature	+150C
Operating Temperature	-40C to +85C
Storage Temperature	-65C to +150C

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

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

Outline Drawing



DIMENSIONS ARE IN INCHES [MM]

Pin assignments shown for reference only, not marked on part