



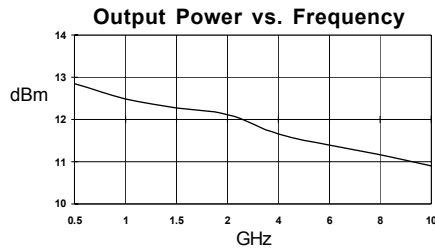
## Product Description

Sirenza Microdevices' SNA-200 is a GaAs monolithic broadband amplifier (MMIC) in die form. At 1950 MHz, this amplifier provides 15.5dB and 13.8dB at 6000 MHz.

These unconditionally stable amplifiers are designed for use as general purpose 50 ohm gain blocks. Its small size (0.350m x 0.345mm) and gold metallization make it an ideal choice for use in hybrid circuits. The SNA-200 is 100% DC tested and sample tested for RF performance.

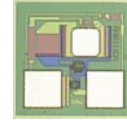
External DC decoupling capacitors determine low frequency response. The use of an external resistor allows for bias flexibility and stability.

The SNA-200 is supplied in gel paks at 100 devices per pak. Also available in packaged form (SNA-276 & SNA-286)



## SNA-200S

### DC-6.5 GHz, Cascadable GaAs HBT MMIC Amplifier



### Product Features

- Cascadable 50 Ohm Gain Block
- 15.5dB Gain, +12dBm P1dB
- 1.5:1 Input and Output VSWR
- Operates From Single Supply
- Through wafer via for ground

### Applications

- Broadband Driver Amplifier
- IF Amplifier or gain stage for VSAT, LMDS, WLAN, and Cellular Systems

Symbol	Parameter	Units	Frequency	Min.	Typ.	Max.
G <sub>p</sub>	Small Signal Power Gain [2]	dB	850 MHz		15.5	
		dB	1950 MHz	13.5	15.0	16.5
		dB	2400 MHz		15.0	
		dB	6000 MHz	12.3	13.8	15.3
G <sub>F</sub>	Gain Ripple	dB	0.1-4.0 GHz		+/- 1.0	
BW <sub>3dB</sub>	3dB Bandwidth	GHz			7	
P <sub>1dB</sub>	Output Power at 1dB Compression [2]	dBm	1950 MHz	10	12.0	
		dBm	6000 MHz	10.2	12.2	
OIP <sub>3</sub>	Output Third Order Intercept Point [2]	dBm	1950 MHz	22	25.0	
		dBm	6000 MHz	21.5	24.5	
NF	Noise Figure	dB	1950 MHz		5.5	
RL	Input / Output Return Loss	dB	1950		12.9	
ISOL	Reverse Isolation	dB	0.1-7.0 GHz		20	
V <sub>D</sub>	Device Operating Voltage [1]	V		3.1	3.6	4.1
I <sub>D</sub>	Device Operating Current [1]	mA		35	40	45
dG/dT	Device Gain Temperature Coefficient	dB/°C			-0.0018	
R <sub>TH, j-b</sub>	Thermal Resistance (junction to backside)	°C/W			270	

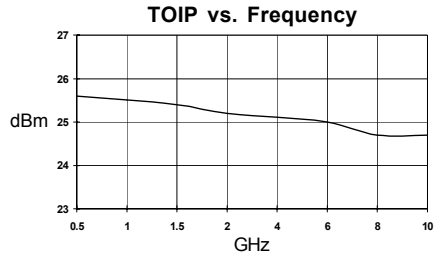
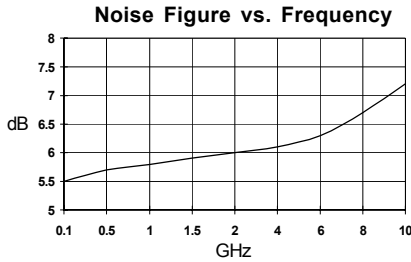
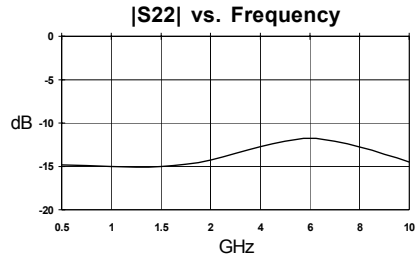
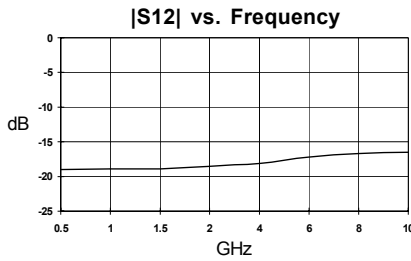
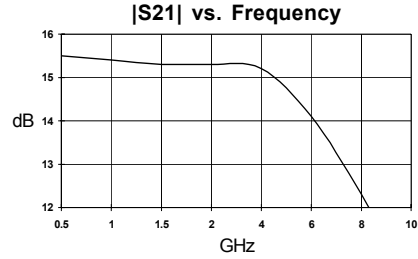
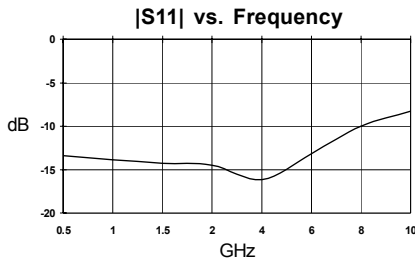
**Test Conditions:** V<sub>S</sub> = 8 V, I<sub>D</sub> = 40 mA Typ., OIP<sub>3</sub> Tone Spacing = 1.2 MHz, Pout per tone = 0 dBm  
R<sub>BIAS</sub> = 110 Ohms, T<sub>L</sub> = 25°C, Z<sub>S</sub> = Z<sub>L</sub> = 50 Ohms, [1] 100% DC Tested, [2] Sample Tested

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**SNA-200S DC-6.5 GHz Cascadable MMIC Amplifier**

**Typical Performance at 25° C (V<sub>ds</sub> = 3.8V, I<sub>ds</sub> = 40mA)**  
 (data includes bond wires)



**Absolute Maximum Ratings**

Parameter	Absolute Limit
Max. Device Current (I <sub>D</sub> )	70 mA
Max. Device Voltage (V <sub>D</sub> )	6 V
Max. RF Input Power	+20 dBm
Max. Junction Temp. (T <sub>J</sub> )	+200°C
Operating Temp. Range (T <sub>L</sub> )	-40°C to +85°C
Max. Storage Temp.	+150°C

Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation, the device voltage and current must not exceed the maximum operating values specified in the table on page one.

Bias Conditions should also satisfy the following expression:  

$$I_D V_D < (T_J - T_L) / R_{TH} j-I$$



## SNA-200S DC-6.5 GHz Cascadable MMIC Amplifier

### Application Circuit Element Values

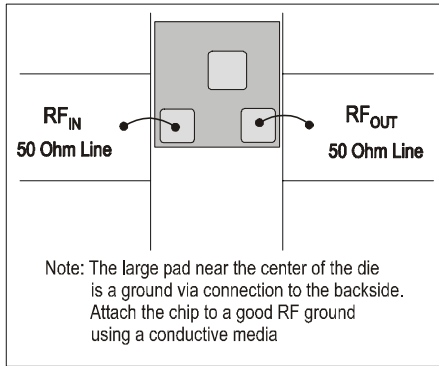
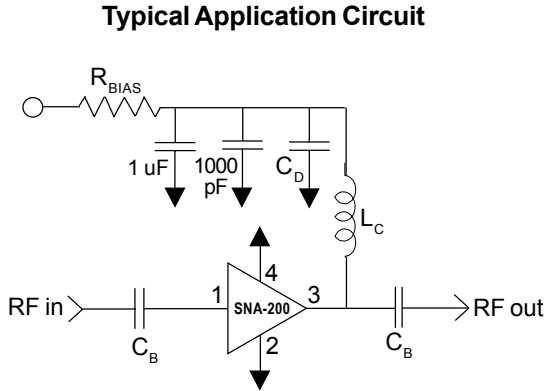
Reference Designator	Frequency (Mhz)				
	500	850	1950	2400	3500
$C_B$	220 pF	100 pF	68 pF	56 pF	39 pF
$C_D$	100 pF	68 pF	22 pF	22 pF	15 pF
$L_C$	68 nH	33 nH	22 nH	18 nH	15 nH

Recommended Bias Resistor Values for  $I_D = 40\text{mA}$

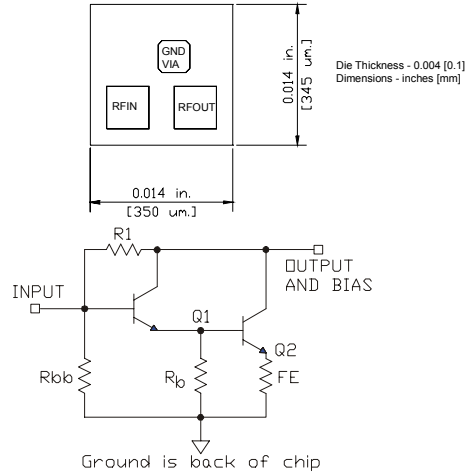
$$R_{BIAS} = (V_S - V_D) / I_D$$

Supply Voltage ( $V_S$ )	6V	8V	10V	12V
$R_{BIAS}$	60Ω	110Ω	160Ω	210Ω

Note:  $R_{BIAS}$  provides DC bias stability over temperature.



**Suggested Bonding Arrangement**  
(above configuration used for S-parameter data)



**Simplified Schematic of MMIC**

For recommended handling, die attach, and bonding methods, see the following application note at [www.sirenza.com](http://www.sirenza.com).

### AN-041 (PDF) Handling of Unpackaged Die



**Caution: ESD sensitive**  
Appropriate precautions in handling, packaging and testing devices must be observed.

### Part Number Ordering Information

Part Number	Gel Pack
SNA-200S	100 pcs. per pack

Die are shipped per Sirenza application note AN-039 Visual Criteria For Unpackaged Die