



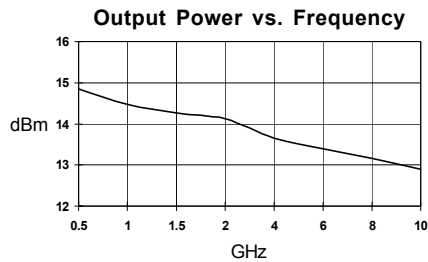
## Product Description

Sirenza Microdevices' SNA-200 is a GaAs monolithic broadband amplifier (MMIC) in die form. At 1950 MHz, this amplifier provides 16dB of gain when biased at 50mA.

These unconditionally stable amplifiers are designed for use as general purpose 50 ohm gain blocks. Its small size (0.33mm x 0.33mm) and gold metallization make it an ideal choice for use in hybrid circuits.

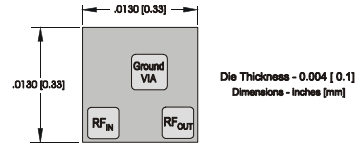
External DC decoupling capacitors determine low frequency response. The use of an external resistor allows for bias flexibility and stability.

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



## SNA-200

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



**Not Recommended for New Designs, Use SNA-200S**

### Product Features

- Cascadable 50 Ohm Gain Block
- 16dB Gain, +14dBm P1dB
- 1.5:1 Input and Output VSWR
- Operates From Single Supply
- Chip Back Is Ground

Symbol	Parameter	Units	Frequency	Min.	Typ.	Max.
G <sub>P</sub>	Small Signal Power Gain	dB	850 MHz		16.0	
		dB	1950 MHz		15.5	
		dB	2400 MHz		15.3	
G <sub>F</sub>	Gain Flatness	dB	0.1-4.0 GHz		+/- 1.0	
BW <sub>3dB</sub>	3dB Bandwidth	GHz			6.5	
P <sub>1dB</sub>	Output Power at 1dB Compression	dBm	1950 MHz		14.0	
NF	Noise Figure	dB	1950 MHz		5.5	
VSWR	Input / Output	-	0.1-6.5 GHz		1.5:1	
OIP <sub>3</sub>	Output Third Order Intercept Point	dBm	1950 MHz		27.0	
ISOL	Reverse Isolation	dB	0.1-6.5 GHz		20	
V <sub>D</sub>	Device Operating Voltage	V		3.3	3.8	4.3
I <sub>D</sub>	Device Operating Current	mA		45	50	55
dG/dT	Device Gain Temperature Coefficient	dB/°C			-0.0018	
R <sub>TH, j-b</sub>	Thermal Resistance (junction to backside)	°C/W			270	

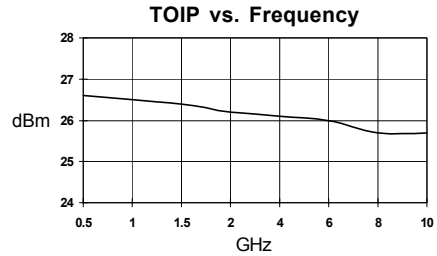
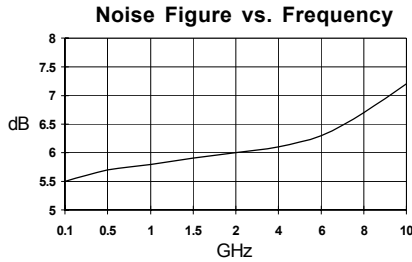
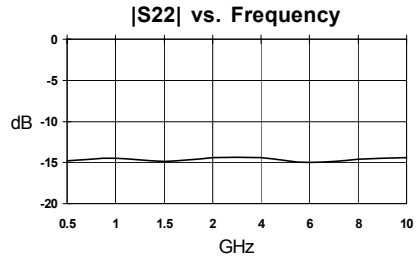
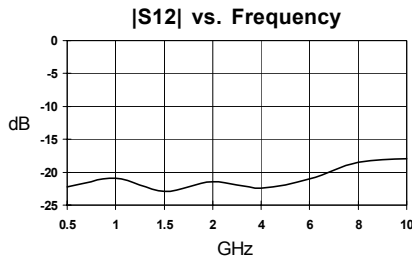
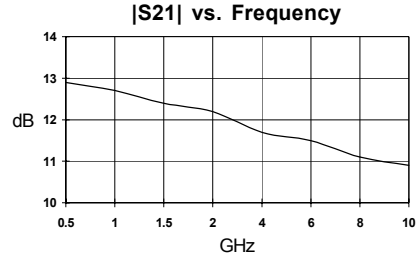
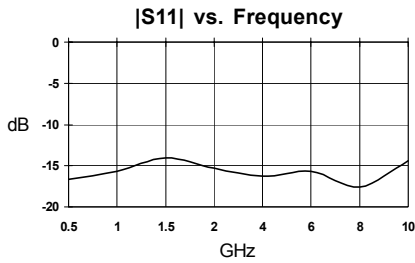
**Test Conditions:** V<sub>S</sub> = 8 V, I<sub>D</sub> = 50 mA Typ., OIP<sub>3</sub> Tone Spacing = 1 MHz, P<sub>out</sub> per tone = 0 dBm  
R<sub>BIAS</sub> = 82 Ohms, T<sub>L</sub> = 25°C, Z<sub>S</sub> = Z<sub>L</sub> = 50 Ohms

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

Typical Performance at 25°C (V<sub>ds</sub> = 3.8V, I<sub>ds</sub> = 50mA)



### Absolute Maximum Ratings

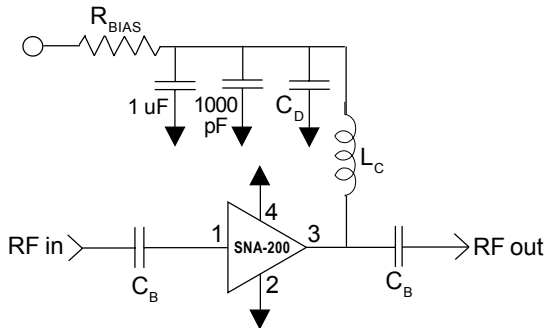
Parameter	Absolute Limit
Max. Device Current (I <sub>D</sub> )	70 mA
Max. Device Voltage (V <sub>D</sub> )	6 V
Max. RF Input Power	+20 dBm
Max. Junction Temp. (T <sub>J</sub> )	+200°C
Operating Temp. Range (T <sub>L</sub> )	-40°C to +85°C
Max. Storage Temp.	+150°C

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:

$$I_D V_D < (T_J - T_L) / R_{TH} \quad j-l$$

### Typical Application Circuit



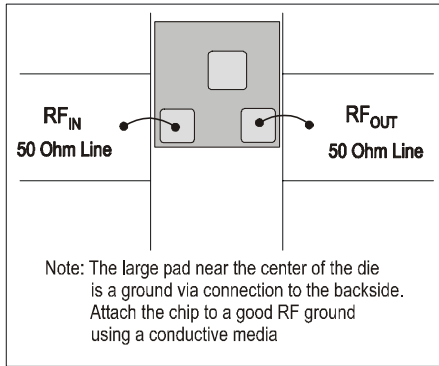
### Application Circuit Element Values

Reference Designator	Frequency (Mhz)				
	500	850	1950	2400	3500
$C_b$	220 pF	100 pF	68 pF	56 pF	39 pF
$C_o$	100 pF	68 pF	22 pF	22 pF	15 pF
$L_c$	68 nH	33 nH	22 nH	18 nH	15 nH

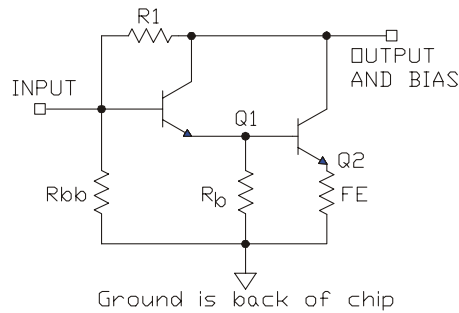
### Recommended Bias Resistor Values for $I_D=50mA$

Supply Voltage( $V_s$ )	6 V	8 V	10 V	12 V
$R_{BIAS}$	43 $\Omega$	82 $\Omega$	120 $\Omega$	160 $\Omega$

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-200	100 pcs. per pack

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