SNA-200S

DC-6.5 GHz, Cascadable GaAs HBT MMIC Amplifier

OBSOLETE
Last Time Buy Date: 6-May-2007
Final Shipment Date: 6-Nov-2007

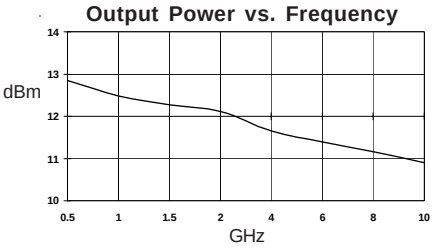
Product Description

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



Product Features

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

Applications

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

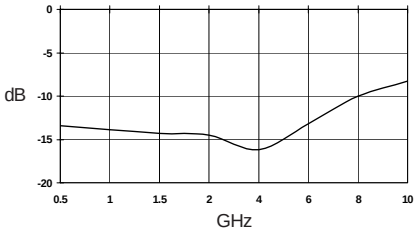
Symbol	Parameter	Units	Frequency	Min.	Typ.	Max.
G_p	Small Signal Power Gain [2]	dB	850 MHz		15.5	
		dB	1950 MHz	13.5	15.0	16.5
		dB	2400 MHz		15.0	
		dB	6000 MHz	12.3	13.8	15.3
G_F	Gain Ripple	dB	0.1-4.0 GHz		+/- 1.0	
BW3dB	3dB Bandwidth	GHz			7	
P_{1dB}	Output Power at 1dB Compression [2]	dBm	1950 MHz	10	12.0	
		dBm	6000 MHz	10.2	12.2	
OIP_3	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_D	Device Operating Voltage [1]	V		3.1	3.6	4.1
I_D	Device Operating Current [1]	mA		35	40	45
dG/dT	Device Gain Temperature Coefficient	dB/°C			-0.0018	
R_{TH}, j-b	Thermal Resistance (junction to backside)	°C/W			270	

Test Conditions: V_S = 8 V, I_D = 40 mA Typ., OIP_3 Tone Spacing = 1.2 MHz, Pout per tone = 0 dBm
R_{BIAS} = 110 Ohms, T_L = 25ºC, Z_S = Z_L = 50 Ohms, [1] 100% DC Tested, [2] Sample Tested

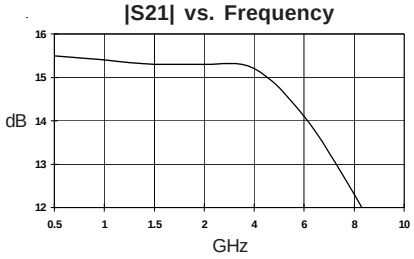
303 South Technology Court
Broomfield, CO 80021
Phone: (800) SMI-MMIC
http://www.sirenza.com

Typical Performance at 25° C (Vds =3.8V, Ids = 40mA)
(data includes bond wires)

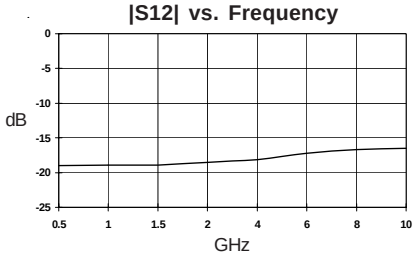
|S11| vs. Frequency



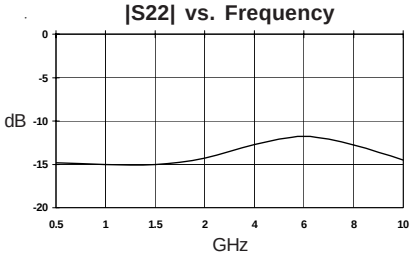
|S21| vs. Frequency



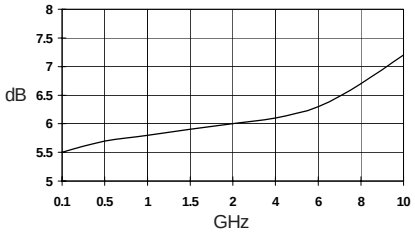
|S12| vs. Frequency



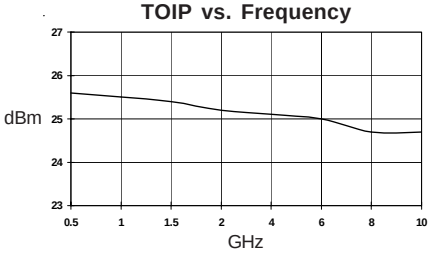
|S22| vs. Frequency



Noise Figure vs. Frequency



TOIP vs. Frequency



Absolute Maximum Ratings

Parameter	Absolute Limit
Max. Device Current (I_D)	70 mA
Max. Device Voltage (V_D)	6 V
Max. RF Input Power	+20 dBm
Max. Junction Temp. (T_J)	+200°C
Operating Temp. Range (T_L)	-40°C to +85°C
Max. Storage Temp.	+150°C

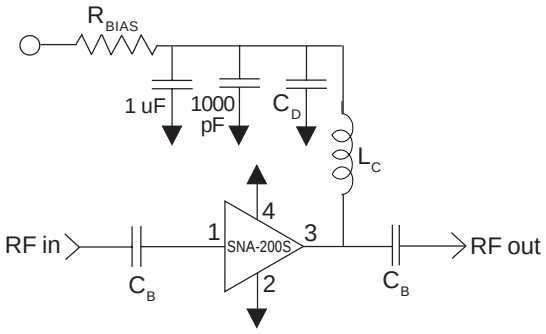
Operation of this device beyond any one of these limits may cause permanent damage. For reliable continous operation, the device voltage and current must not exceed the maximum operating values specified in the table on page one.

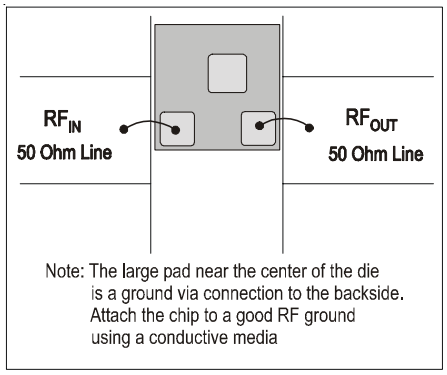
Bias Conditions should also satisfy the following expression:

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

SNA-200S DC-6.5 GHz Cascadable MMIC Amplifier

Typical Application Circuit



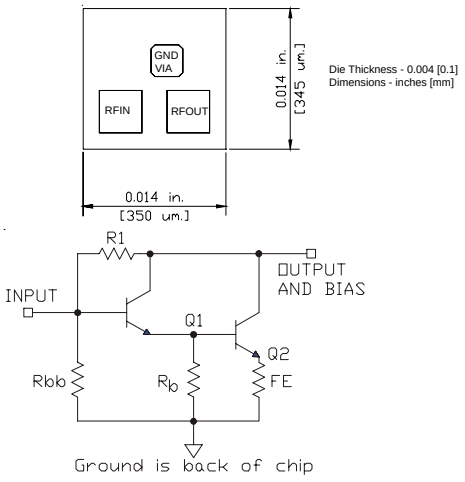


Suggested Bonding Arrangement
(above configuration used for S-parameter data)

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 = 40mA $R_{BIAS} = (V_S - V_D) / I_D$				
Supply Voltage (V_S)	6V	8V	10V	12V
R_{BIAS}	60Ω	110Ω	160Ω	210Ω
Note: R_{BIAS} provides DC bias stability over temperature.				



Simplified Schematic of MMIC

For recommended handling, die attach, and bonding methods, see the following application note at ***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