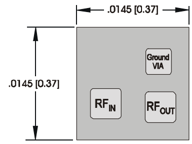
SNA-500

DC-3 GHz, Cascadable GaAs MMIC Amplifier



Product Description

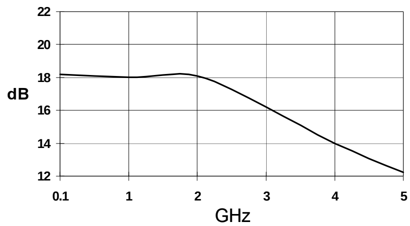
Sirenza Microdevices' SNA-500 is a GaAs monolithic broadband amplifier in die form. This amplifier provides 19dB of gain when biased at 65mA and 5.0V.

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

These unconditionally stable amplifiers are designed for use as general purpose 50 ohm gain blocks. its small size (0.4mm x 0.4mm) and gold metallization make it an ideal choice for use in hybrid circuits.

The SNA-500 is available in gel paks at 100 devices per container. Also available in packaged form (SNA-576 and SNA-586).

Output Power vs. Frequency



Product Features

- **Cascadable 50 Ohm Gain Block**
- **19dB Gain, +18dBm P1dB**
- **1.5:1 Input and Output VSWR**
- **Operates From Single Supply**
- **Chip Back Is Ground**

Applications

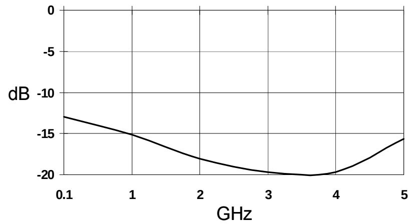
- **PA Driver Amplifier**
- **Cellular, PCS, GSM, UMTS**
- **IF Amplifier**
- **Wireless Data, Satellite**

Symbol	Parameter	Frequency	Units	Min.	Typ.	Max.
P_{1dB}	Output Power at 1dB Compression	850 MHz 1950 MHz 2400 MHz	dBm dBm dBm		17.6 18.4 18.4	
OIP_3	Output Third Order Intercept Point	850 MHz 1950 MHz 2400 MHz	dBm dBm dBm		32.5 31.6 31.6	
S_{21}	Small Signal Gain	850 MHz 1950 MHz 2400 MHz	dB dB dB		19.6 18.1 17.4	
Bandwidth	(Determined by S_{11}, S_{22} Values)		MHz		5000	
$VSWR_{IN}$	Input VSWR	DC-5000 MHz	-		1.4:1	
$VSWR_{OUT}$	Output VSWR	DC-5000 MHz	-		1.4:1	
S_{12}	Reverse Isolation	850 MHz 1950 MHz 2400 MHz	dB dB dB		22.3 21.6 21.3	
NF	Noise Figure	1950 MHz	dB		4.0	
V_D	Device Operating Voltage		V	4.4	4.9	5.4
I_D	Device Operating Current		mA	58	65	72
R_{TH}, j-b	Thermal Resistance (junction -backsided)		° C/W		200	

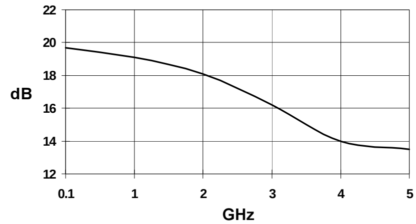
Test Conditions: V_S = 8 V I_D = 65 mA Typ. OIP_3 Tone Spacing = 1 MHz, Pout per tone = 0 dBm
R_{BIAS} = 47 Ohms T_L = 25ºC Z_S = Z_L = 50 Ohms

Typical Performance at 25°C (Vds = 5.0V, Ids = 65mA)

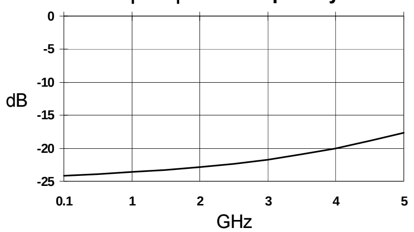
|S11| vs. Frequency



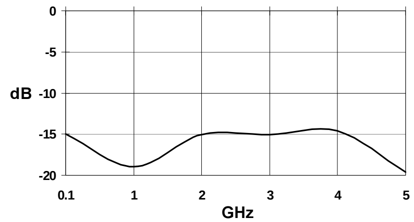
|S21| vs. Frequency



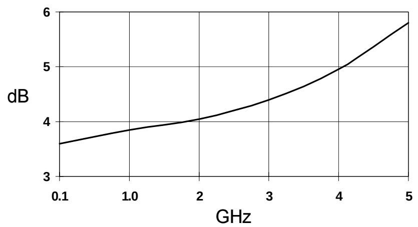
|S12| vs. Frequency



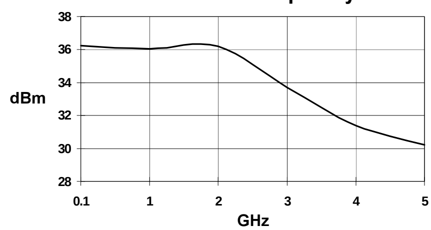
|S22| vs. Frequency



Noise Figure vs. Frequency



TOIP vs. Frequency



Absolute Maximum Ratings

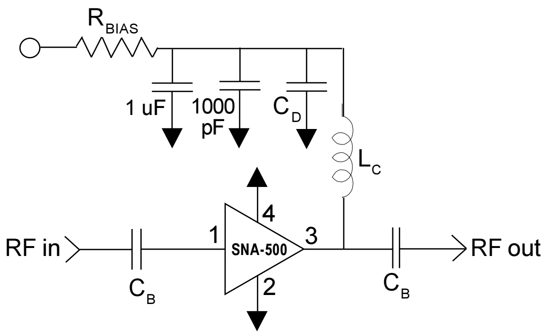
Parameter	Absolute Limit
Max. Device Current (I_D)	130 mA
Max. Device Voltage (V_D)	6 V
Max. RF Input Power	+23 dBm
Max. Junction Temp. (T_J)	+200°C
Operating Temp. Range (T_L)	-40°C to +85°C
Max. Storage Temp.	+150°C

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:

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

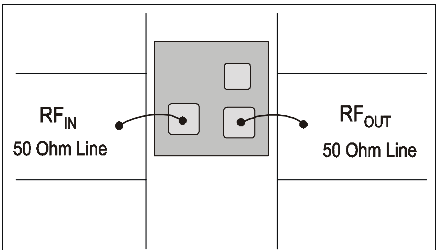
Typical Application Circuit



Application Circuit Element Values

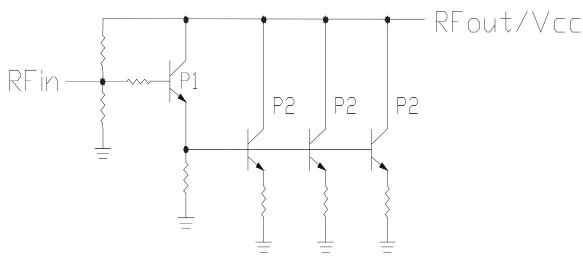
Reference Designator	Frequency (Mhz) 500	850	1950	2400	3500
C_B	220 pF	100 pF	68 pF	56 pF	39 pF
C_D	100 pF	68 pF	22 pF	22 pF	15 pF
L_C	68 nH	33 nH	22 nH	18 nH	15 nH

Recommended Bias Resistor Values for I_D=65mA R_{BIAS}=(V_S-V_D) / I_D				
Supply Voltage(V_S)	8 V	9 V	10 V	12 V
R_{BIAS}	47 Ω	62 Ω	82 Ω	110 Ω
Note: R_{BIAS} provides DC bias stability over temperature.				



Note: The large pad near the center of the die is a ground via connection to the backside. Attach the chip to a good RF ground using a conductive media

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.***

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-500	100 pcs. per pack

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