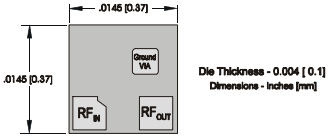
SNA-600

DC-6.5 GHz, Cascadable GaAs MMIC Amplifier



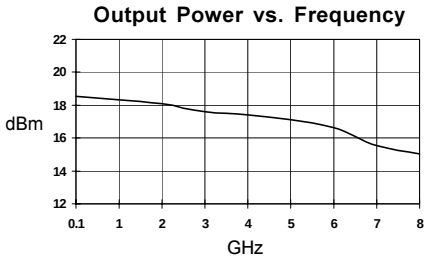
Product Description

Sirenza Microdevices' SNA-600 is a high-performance GaAs Heterojunction Bipolar Transistor (MMIC) in die form. A Darlington configuration is utilized for broadband performance to 6.5 GHz.

These unconditionally stable amplifiers provide 11dB of gain and +18dBm of P1dB when biased at 65mA.

This MMIC requires only a single supply voltage. The use of an external resistor allows for bias flexibility and stability. Its small size (0.4mm x 0.4mm) and gold metallization make it an ideal choice for use in hybrid circuits.

The SNA-600 is available in gel paks at 100 devices per container. Also available in packaged form (SNA-676 & SNA-686).



Product Features

- Cascadable 50 Ohm Gain Block
- 11dB Gain, +18dBm P1dB
- High Linearity, +36dBm TOIP Typ.
- 1.5:1 Input and Output VSWR
- 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 17.7 17.4	
IP_3	Third Order Intercept Point	850 MHz 1950 MHz 2400 MHz	dBm dBm dBm		34.0 32.1 30.0	
S_{21}	Small Signal Gain	850 MHz 1950 MHz 2400 MHz	dB dB dB		11.1 11.2 11.3	
Bandwidth	(Determined by S_{11}, S_{22} Values)		MHz		6000	
$VSWR_{IN}$	Input VSWR	DC-6000 MHz	-		1.3:1	
$VSWR_{OUT}$	Output VSWR	DC-6000 MHz	-		1.4:1	
S_{12}	Reverse Isolation	850 MHz 1950 MHz 2400 MHz	dB dB dB		16.3 16.5 16.6	
NF	Noise Figure	1950 MHz	dB		7.3	
V_D	Device Operating Voltage		V	4.8	5.3	5.8
I_D	Device Operating Current		mA	58	65	72
R_{TH}, j-b	Thermal Resistance (junction -backside)		° C/W		200	

Test Conditions: V_S = 8 V, R_{BIAS} = 43 Ohms; I_D = 65 mA Typ., T_L = 25ºC; OIP_3 Tone Spacing = 1 MHz, Pout per tone = 0 dBm, $Z_S = Z_L$ = 50 Ohms

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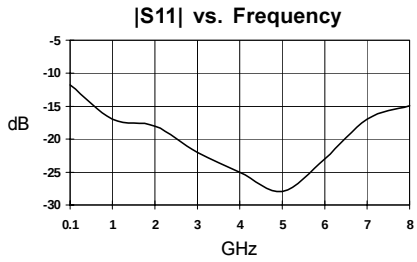
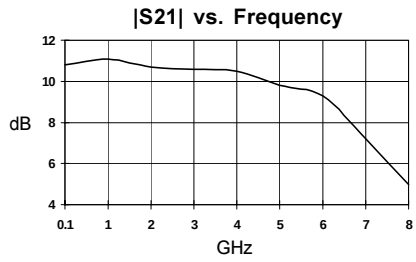
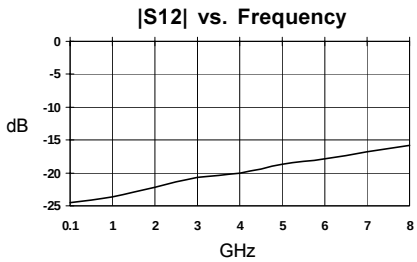
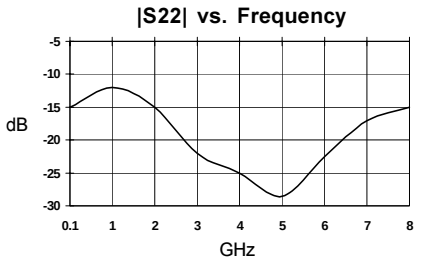
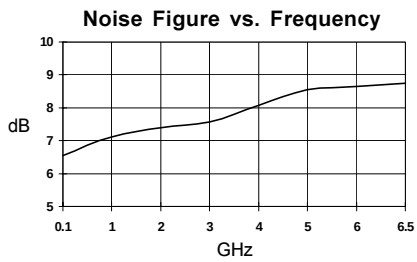
Typical Performance at 25°C (Vds = 5.3V, Ids = 65mA)

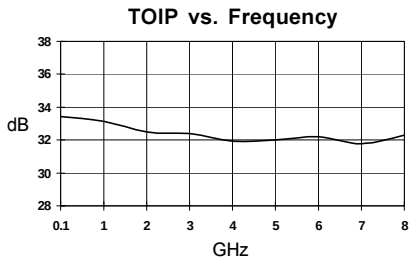












Absolute Maximum Ratings

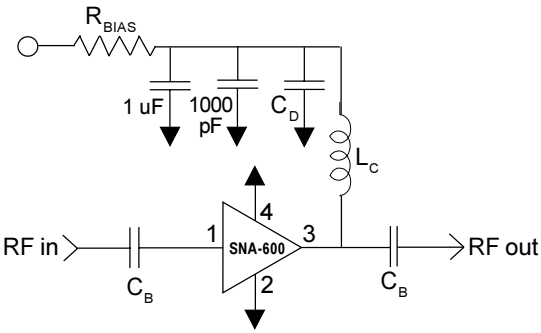
Parameter	Absolute Limit
Max. Device Current (I_D)	150 mA
Max. Device Voltage (V_D)	7 V
Max. RF Input Power	+23 dBm
Max. Junction Temp. (T_J)	+200°C
Operating Temp. Range (T_L)	-40°C to +85°C
Max. Storage Temp.	+150°C

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

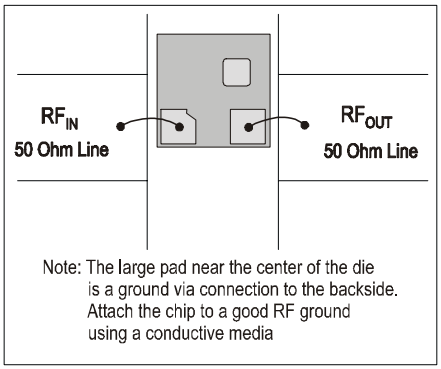
Typical Application Circuit



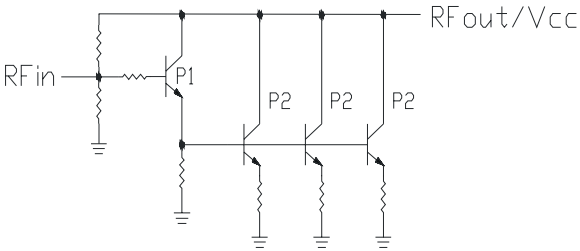
Application Circuit Element Values

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}	43 Ω	56 Ω	82 Ω	100 Ω
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.***

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-600	100 pcs. per pack

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