

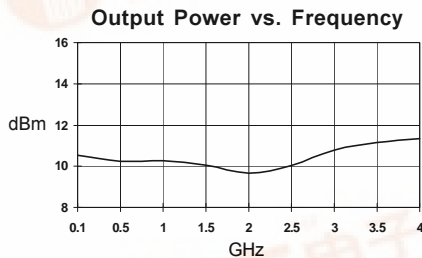


Product Description

Sirenza Microdevices' SNA-386 is a GaAs monolithic broadband amplifier (MMIC) housed in a low-cost surface-mountable plastic package. At 1950 MHz, this amplifier provides 20dB of gain when biased at 35mA.

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.

Also available in chip form (SNA-300), its small size (0.3mm x 0.3mm) and gold metallization make it an ideal choice for use in hybrid circuits.



SNA-386

DC-3 GHz, Cascadable GaAs MMIC Amplifier



Product Features

- Patented GaAs HBT Technology
- Cascadable 50 Ohm Gain Block
- 21dB Gain, +23dBm TOIP
- Operates From Single Supply
- Low Cost Surface Mount Plastic Package

Applications

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

Symbol	Parameter	Units	Frequency	Min.	Typ.	Max.
G_P	Small Signal Power Gain	dB dB dB	850 MHz 1950 MHz 2400 MHz	19.0	21.0 20.0 19.5	
G_F	Gain Flatness	dB	0.1-3 GHz		+/- 1.5	
BW3dB	3dB Bandwidth	GHz			3.0	
P_{1dB}	Output Power at 1dB Compression	dBm	1950 MHz		10.0	
OIP_3	Output Third Order Intercept Point	dBm	1950 MHz		23.0	
NF	Noise Figure	dB	1950 MHz		4.0	
VSWR	Input / Output	-	0.1-3 GHz		1.5:1	
ISOL	Reverse Isolation	dB	0.1-3 GHz		22.0	
V_D	Device Operating Voltage	V		3.2	3.7	4.1
I_D	Device Operating Current	mA		30	35	40
dG/dT	Device Gain Temperature Coefficient	dB/°C			-0.003	
R_{JA}	Thermal Resistance (junction to lead)	°C/W			330	

$V_S = 8\text{ V}$

$I_D = 35\text{ mA Typ.}$

OIP_3 Tone Spacing = 1 MHz, P_{out} per tone = 0 dBm

$R_{BIAS} = 120\text{ Ohms}$

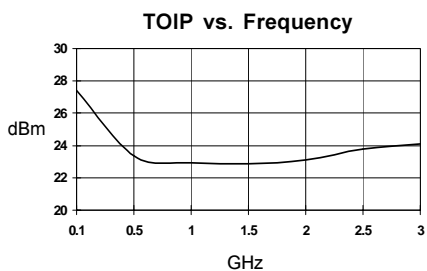
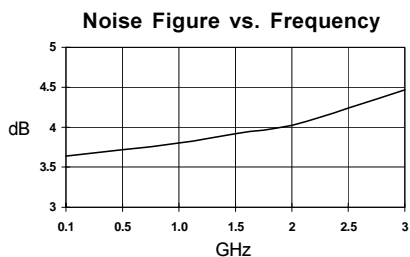
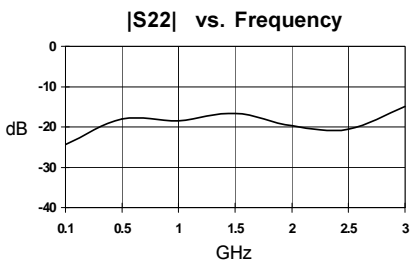
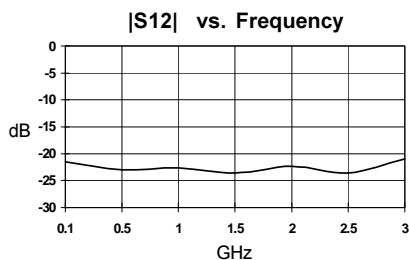
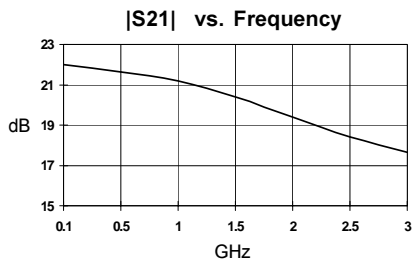
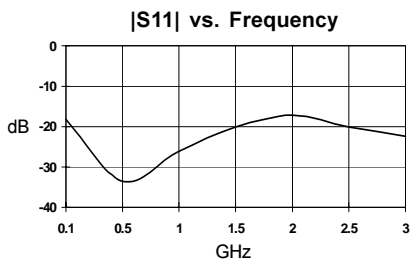
$T_L = 25^\circ\text{C}$

$Z_S = Z_L = 50\text{ Ohms}$



SNA-386 DC-3 GHz Cascadable MMIC Amplifier

Typical Performance at 25 °C ($V_{ds} = 3.7V$, $I_{ds} = 35mA$)



Absolute Maximum Ratings

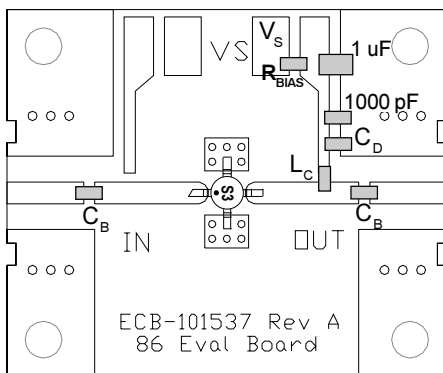
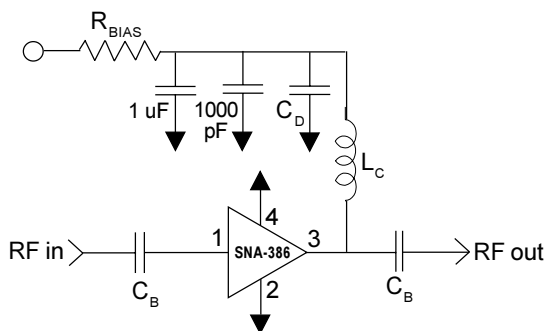
Parameter	Absolute Limit
Max. Device Current (I_D)	70 mA
Max. Device Voltage (V_D)	6 V
Max. RF Input Power	+10 dBm
Max. Junction Temp. (T_J)	+150°C
Operating Temp. Range (T_L)	-40°C to +85°C
Max. Storage Temp.	+150°C

Operation of this device beyond any one of these limits may cause permanent damage. For reliable 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:

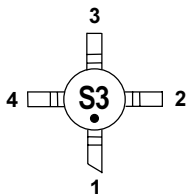
$$I_D V_D < (T_J - T_L) / R_{TH} \text{ } ^\circ\text{C/W}$$

Typical Application Circuit



Part Identification Marking

The part will be marked with an "S3" designator on the top surface of the package.



Caution: ESD sensitive

Appropriate precautions in handling, packaging and testing devices must be observed.

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_b=35mA

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

Supply Voltage(V _S)	5 V	6 V	8 V	10 V
R _{BIAS}	36 Ω	68 Ω	120 Ω	180 Ω

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

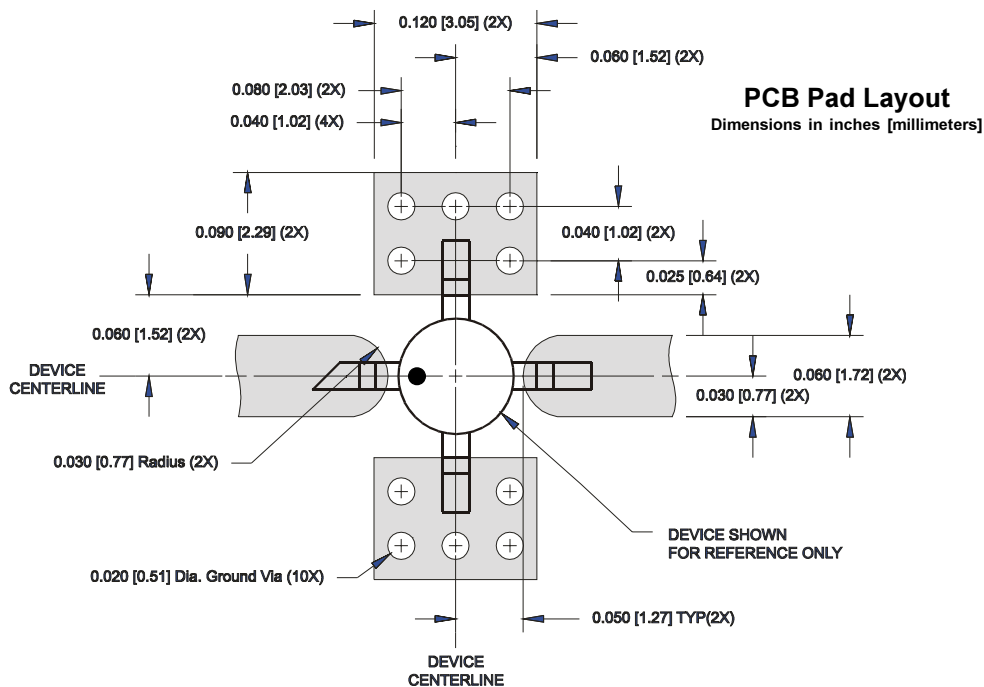
Mounting Instructions

1. Use a large ground pad area under device pins 2 and 4 with many plated through-holes as shown.
2. We recommend 1 or 2 ounce copper. Measurements for this data sheet were made on a 31 mil thick FR-4 board with 1 ounce copper on both sides.

Pin #	Function	Description
1	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.
2, 4	GND	Connection to ground. For optimum RF performance, use via holes as close to ground leads as possible to reduce lead inductance.
3	RF OUT/BIAS	RF output and bias pin. DC voltage is present on this pin, therefore a DC blocking capacitor is necessary for proper operation.

Part Number Ordering Information

Part Number	Reel Size	Devices/Reel
SNA-386-TR1	7"	1000
SNA-386-TR2	13"	3000
SNA-386-TR3	13"	5000



Nominal Package Dimensions

Dimensions in inches [millimeters]

Refer to drawing posted at www.sirenza.com for tolerances.

