

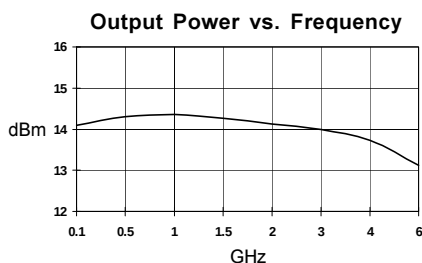


## Product Description

Sirenza Microdevices SNA-286 is a GaAs monolithic broad-band amplifier (MMIC) housed in a low-cost surface-mountable plastic package. At 1950 MHz, this amplifier provides 15.5dB of gain and +14dBm of P1dB power when biased at 50mA.

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-200), its small size (0.33mm x 0.33mm) and gold metallization make it an ideal choice for use in hybrid circuits.



## SNA-286

### DC-6.0 GHz, Cascadable GaAs MMIC Amplifier



## Product Features

- Patented, Reliable GaAsHBT Technology
- Cascadable 50 Ohm Gain Block
- 15dB Gain, +14dBm P1dB
- 1.5:1 Input and Output VSWR
- Operates From Single Supply
- Low Cost Surface Mount Plastic Package

## Applications

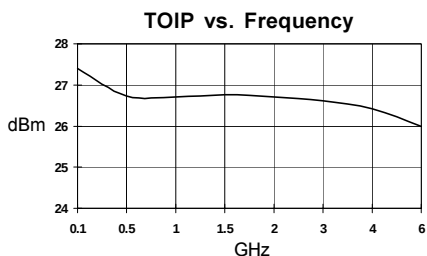
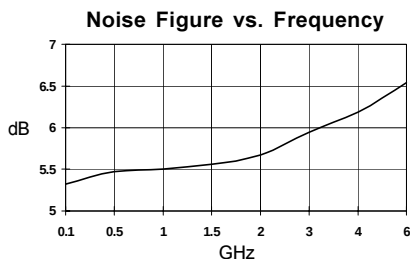
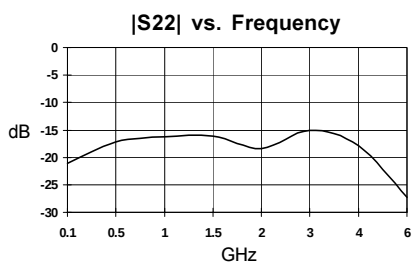
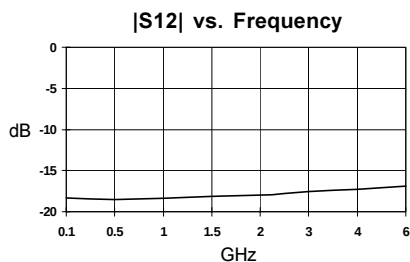
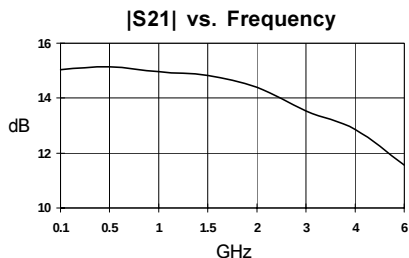
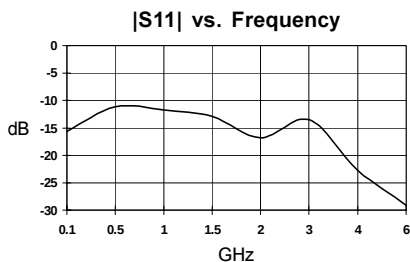
- PA Driver Amplifier
- Cellular, PCS, GSM, UMTS
- IF Amplifier
- Wireless Data, Satellite

| Symbol         | Parameter                             | Units          | Frequency                       | Min. | Typ.                 | Max. |
|----------------|---------------------------------------|----------------|---------------------------------|------|----------------------|------|
| $G_P$          | Small Signal Power Gain               | dB<br>dB<br>dB | 850 MHz<br>1950 MHz<br>2400 MHz | 14.4 | 16.0<br>15.5<br>15.0 | 17.6 |
| $G_F$          | Gain Flatness                         | dB             | 0.1-6 GHz                       |      | +/- 1.3              |      |
| BW3dB          | 3dB Bandwidth                         | GHz            |                                 |      | 4.5                  |      |
| $P_{1dB}$      | Output Power at 1dB Compression       | dBm            | 1950 MHz                        |      | 14.0                 |      |
| $OIP_3$        | Output Third Order Intercept Point    | dBm            | 1950 MHz                        |      | 29.0                 |      |
| NF             | Noise Figure                          | dB             | 1950 MHz                        |      | 5.7                  |      |
| VSWR           | Input / Output                        | -              | 0.1-6 GHz                       |      | 1.5:1                |      |
| ISOL           | Reverse Isolation                     | dB             | 0.1-6 GHz                       |      | 20                   |      |
| $V_D$          | Device Operating Voltage              | V              |                                 | 3.3  | 3.8                  | 4.3  |
| $I_D$          | Device Operating Current              | mA             |                                 | 45   | 50                   | 55   |
| dG/dT          | Device Gain Temperature Coefficient   | dB/°C          |                                 |      | -0.0018              |      |
| $R_{TH}$ , j-l | Thermal Resistance (junction to lead) | °C/W           |                                 |      | 340                  |      |

**Test Conditions:**  $V_S = 8\text{ V}$   $I_D = 50\text{ mA Typ.}$   $OIP_3$  Tone Spacing = 1 MHz, Pout per tone = 0 dBm  
 $R_{BIAS} = 82\text{ Ohms}$   $T_L = 25^\circ\text{C}$   $Z_S = Z_L = 50\text{ Ohms}$

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



## Absolute Maximum Ratings

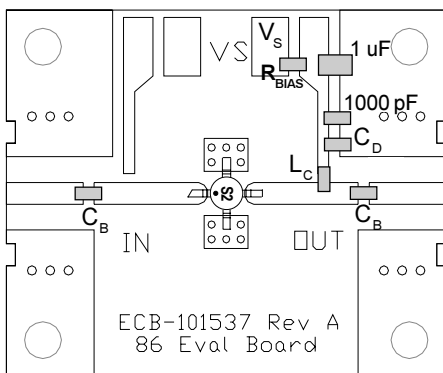
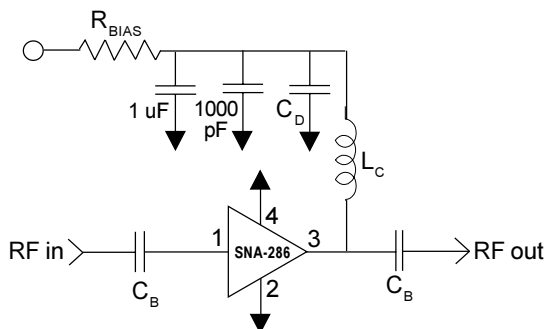
| Parameter                               | Absolute Limit |
|-----------------------------------------|----------------|
| Max. Device Current (I <sub>D</sub> )   | 75 mA          |
| Max. Device Voltage (V <sub>D</sub> )   | 6 V            |
| Max. RF Input Power                     | +10 dBm        |
| Max. Junction Temp. (T <sub>J</sub> )   | +150°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:

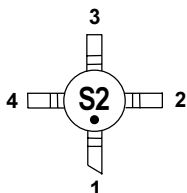
$$I_D V_D < (T_J - T_L) / R_{TH} \quad j-l$$

## Typical Application Circuit



## Part Identification Marking

The part will be marked with an "S2" 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 $I_D=50\text{mA}$

| 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.

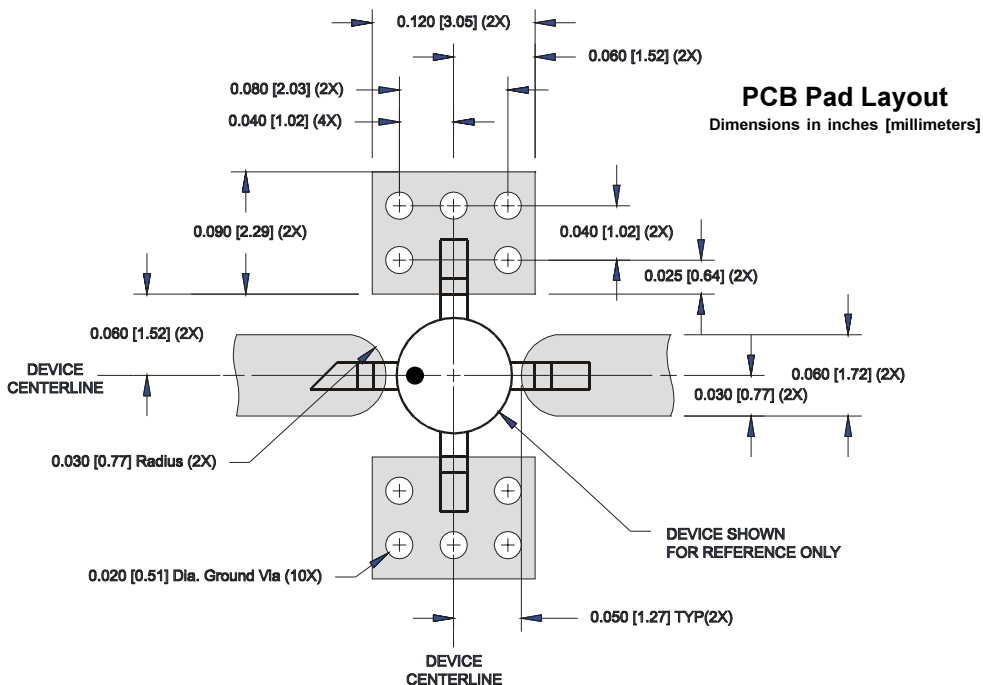
## Mounting Instructions

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

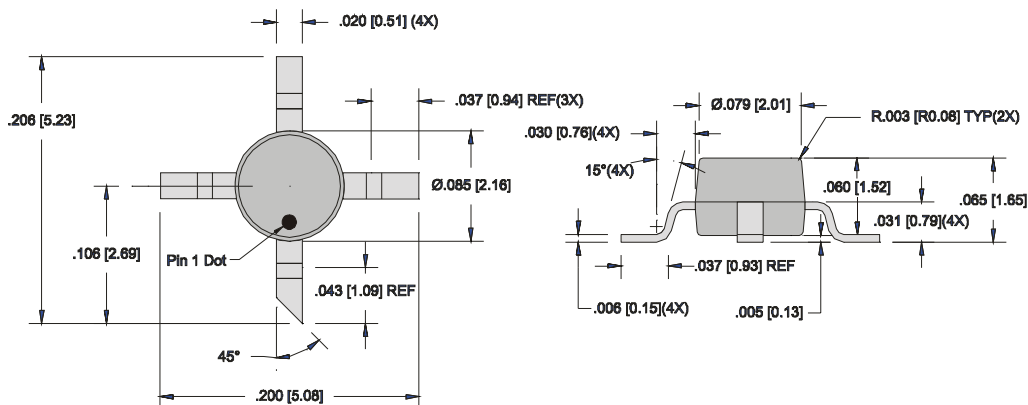
| Part Number | Reel Size | Devices/Reel |
|-------------|-----------|--------------|
| SNA-286-TR1 | 7"        | 1000         |
| SNA-286-TR2 | 13"       | 3000         |
| SNA-286-TR3 | 13"       | 5000         |



## Nominal Package Dimensions

Dimensions in inches [millimeters]

Refer to drawing posted at [www.sirenza.com](http://www.sirenza.com) for tolerances.





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Электрон  
Связь**

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