

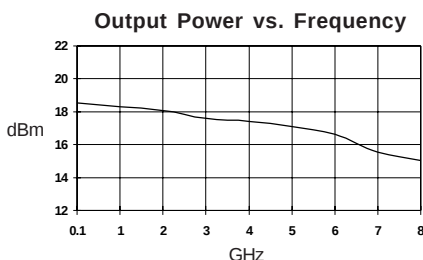
## Product Description

Stanford Microdevices' SNA-676 is a high-performance GaAs Heterojunction Bipolar Transistor (MMIC) housed in a low-cost surface mountable stripline package. 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 5.7V and 70mA. This MMIC requires only a single supply voltage. The use of an external resistor allows for bias flexibility and stability.

Also available in chip form (SNA-600), its small size (0.4mm x 0.4mm) and gold metallization make it an ideal choice for use in hybrid circuits.

The SNA-676 is available in tape and reel at 1000, 3000 and 5000 devices per reel.



## Electrical Specifications at Ta = 25C

| Symbol           | Parameters: Test Conditions:<br>Id = 70 mA, Z <sub>0</sub> = 50 Ohms |                                    | Units    | Min.       | Typ.         | Max. |
|------------------|----------------------------------------------------------------------|------------------------------------|----------|------------|--------------|------|
| G <sub>p</sub>   | Small Signal Gain                                                    | f = 0.1-4.0 GHz<br>f = 4.0-6.5 GHz | dB<br>dB | 9.0<br>8.0 | 11.0<br>9.0  |      |
| BW 3dB           | 3dB Bandwidth                                                        |                                    | GHz      |            | 6.5          |      |
| P <sub>1dB</sub> | Output Power at 1dB Compression                                      | f = 0.1-2.0 GHz<br>f = 2.0-6.5 GHz | dBm      |            | 18.0<br>16.0 |      |
| NF               | Noise Figure                                                         | f = 0.1-4.0 GHz<br>f = 4.0-6.5 GHz | dB       |            | 7.5<br>8.5   |      |
| VSWR             | Input / Output                                                       | f = 0.1-6.5 GHz                    |          |            | 1.5:1        |      |
| IP <sub>3</sub>  | Third Order Intercept Point                                          | f = 0.1-2.0 GHz                    | dBm      |            | 36.0         |      |
| T <sub>0</sub>   | Group Delay                                                          | f = 2.0 GHz                        | psec     |            | 120          |      |
| ISOL             | Reverse Isolation                                                    | f = 0.1-6.5 GHz                    | dB       |            | 17.0         |      |
| VD               | Device Voltage                                                       |                                    | V        | 4.8        | 5.7          | 6.8  |
| dG/dT            | Device Gain Temperature Coefficient                                  |                                    | dB/degC  |            | -0.0023      |      |
| dV/dT            | Device Voltage Temperature Coefficient                               |                                    | mV/degC  |            | -5.0         |      |

The information provided herein is believed to be reliable at press time. Stanford Microdevices assumes no responsibility for inaccuracies or omissions. Stanford Microdevices assumes no responsibility for the use of this information, and all such information shall be entirely at the user's own risk. Prices and specifications are subject to change without notice. No patent rights or licenses to any of the circuits described herein are implied or granted to any third party. Stanford Microdevices does not authorize or warrant any Stanford Microdevices product for use in life-support devices and/or systems. Copyright 1999 Stanford Microdevices, Inc. All worldwide rights reserved.

## SNA-676

### DC-6.5 GHz, Cascadable GaAs MMIC Amplifier



## Product Features

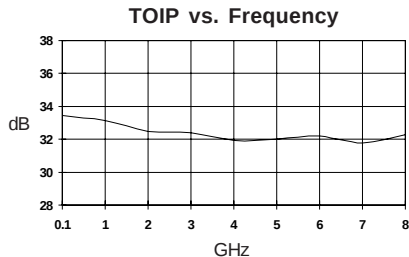
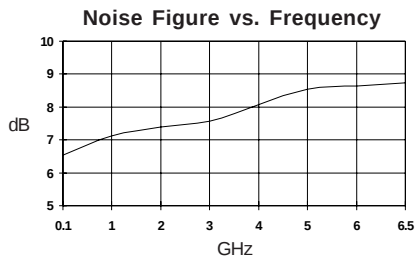
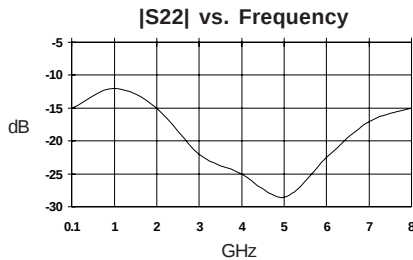
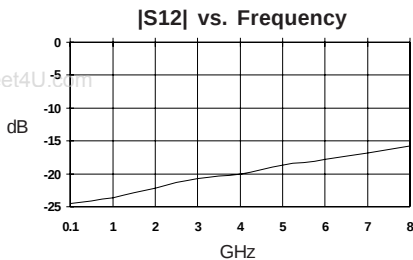
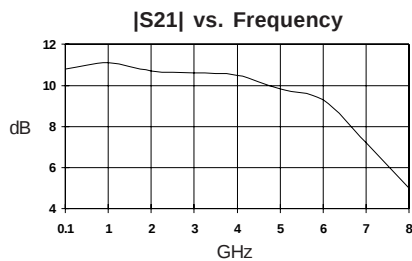
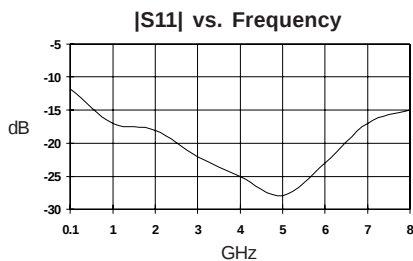
- Cascadable 50 Ohm Gain Block
- 11dB Gain, +18dBm P1dB
- High Linearity, +36dBm TOIP Typ.
- 1.5:1 Input and Output VSWR
- Operates From a Single DC Supply
- Low Cost Stripline Mount Ceramic Package

## Applications

- Narrow and Broadband Linear Amplifiers
- Commercial and Industrial Applications

## SNA-676 DC-6.5 GHz Cascadable MMIC Amplifier

Typical Performance at 25° C ( $V_{ds} = 5.7V$ ,  $I_{ds} = 70mA$ )



Typical S-Parameters  $V_{ds} = 5.7V$ ,  $I_{ds} = 70mA$

| Freq GHz | S11   | S11 Ang | S21   | S21 Ang | S12   | S12 Ang | S22   | S22 Ang |
|----------|-------|---------|-------|---------|-------|---------|-------|---------|
| .100     | 0.152 | -14     | 3.624 | 152     | 0.095 | -4      | 0.198 | -4      |
| .250     | 0.146 | -25     | 3.602 | 145     | 0.139 | -10     | 0.205 | -26     |
| .500     | 0.131 | -42     | 3.549 | 140     | 0.149 | -30     | 0.247 | -56     |
| 1.00     | 0.110 | -83     | 3.583 | 102     | 0.148 | -59     | 0.222 | -112    |
| 1.50     | 0.085 | -130    | 3.567 | 59      | 0.146 | -90     | 0.198 | -179    |
| 2.00     | 0.072 | 178     | 3.541 | 21      | 0.145 | -120    | 0.193 | 120     |
| 2.50     | 0.077 | 109     | 3.512 | -22     | 0.141 | -152    | 0.203 | 54      |
| 3.00     | 0.107 | 52      | 3.427 | -64     | 0.136 | 180     | 0.222 | 1       |
| 3.50     | 0.143 | 0       | 3.401 | -106    | 0.132 | 147     | 0.248 | -60     |
| 4.00     | 0.168 | -44     | 3.290 | -144    | 0.128 | 118     | 0.270 | -117    |
| 4.50     | 0.173 | -90     | 3.280 | 175     | 0.124 | 88      | 0.288 | 177     |
| 5.00     | 0.141 | -142    | 3.104 | 128     | 0.124 | 60      | 0.285 | 117     |
| 5.50     | 0.079 | 169     | 2.929 | 87      | 0.123 | 29      | 0.276 | 51      |
| 6.00     | 0.038 | 62      | 2.658 | 47      | 0.121 | 0       | 0.259 | -10     |
| 6.50     | 0.079 | -57     | 2.359 | 1       | 0.119 | -35     | 0.322 | -76     |

(S-Parameters include the effects of two 1.0 mil diameter bond wires, each 20 mils long, connected to the gate and drain pads on the die)

## Absolute Maximum Ratings

| Parameter             | Absolute Maximum |
|-----------------------|------------------|
| Device Current        | 110mA            |
| Power Dissipation     | 700mW            |
| RF Input Power        | 200mW            |
| Junction Temperature  | +200C            |
| Operating Temperature | -45C to +85C     |
| Storage Temperature   | -65C to +150C    |

### Notes:

- Operation of this device above any one of these parameters may cause permanent damage.

## Part Number Ordering Information

| Part Number | Devices Per Reel | Reel Size |
|-------------|------------------|-----------|
| SNA-676-TR1 | 1000             | 7"        |
| SNA-676-TR2 | 3000             | 13"       |
| SNA-676-TR3 | 5000             | 13"       |

### Recommended Bias Resistor Values

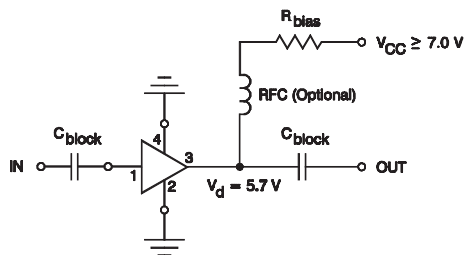
| Supply Voltage(Vs) | 5V | 7.5V | 9V | 12V | 15V | 20V |
|--------------------|----|------|----|-----|-----|-----|
| Rbias (Ohms)       | *  | 24   | 46 | 89  | 131 | 203 |

\*\* Not Recommended

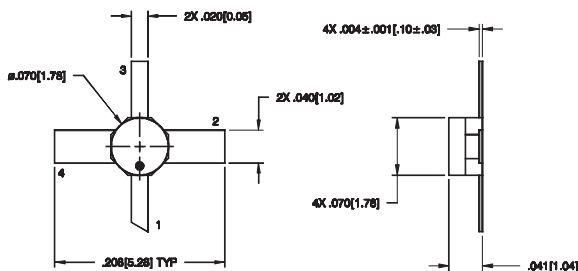
## MTTF vs. Temperature @ Id = 70mA

| Lead Temperature | Junction Temperature | MTTF (hrs) |
|------------------|----------------------|------------|
| +55C             | +155C                | 1000000    |
| +90C             | +190C                | 100000     |
| +120C            | +220C                | 10000      |

Thermal Resistance (Lead-Junction): 250° C/W



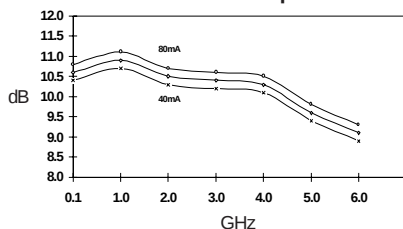
Typical Biasing Configuration



| Pin Designation |                 |
|-----------------|-----------------|
| 1               | RF in           |
| 2               | GND             |
| 3               | RF out and Bias |
| 4               | GND             |

## Typical Performance at 25° C

### Power Gain vs. Device Current 20mA Steps



### Device Voltage vs. Id

