

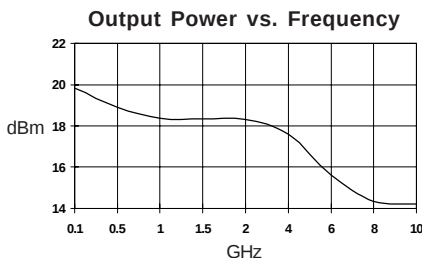
## Product Description

Stanford Microdevices' SNA-476 is a GaAs monolithic broadband amplifier (MMIC) housed in a low-cost surface mountable stripline ceramic package. This amplifier provides 13dB of gain when biased at 70mA 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. Also available in chip form (SNA-400), its small size (0.4mm x 0.4mm) and gold metallization, make it an ideal choice for use in hybrid circuits.

The SNA-476 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, Z0 = 50 Ohms |                                                       | Units          | Min.                | Typ.                 | Max. |
|--------|----------------------------------------------------------|-------------------------------------------------------|----------------|---------------------|----------------------|------|
| GP     | Small Signal Power Gain                                  | f = 0.1-2.0 GHz<br>f = 2.0-6.0 GHz<br>f = 6.0-8.0 GHz | dB<br>dB<br>dB | 11.0<br>10.0<br>9.0 | 13.0<br>12.0<br>11.0 |      |
| GF     | Gain Flatness                                            | f = 0.1-6.0 GHz                                       | dB             |                     | +/- 1.0              |      |
| BW3dB  | 3dB Bandwidth                                            |                                                       | GHz            |                     | 8.0                  |      |
| P1dB   | Output Power at 1dB Compression                          | f = 2.0 GHz                                           | dBm            |                     | 17.0                 |      |
| NF     | Noise Figure                                             | f = 2.0 GHz                                           | dB             |                     | 5.5                  | 6.0  |
| VSWR   | Input / Output                                           | f = 0.1-8.0 GHz                                       |                |                     | 1.5:1                |      |
| IP3    | Third Order Intercept Point                              | f = 2.0 GHz                                           | dBm            |                     | 34.0                 |      |
| TD     | Group Delay                                              | f = 2.0 GHz                                           | psec           |                     | 120                  |      |
| ISOL   | Reverse Isolation                                        | f = 0.1-8.0 GHz                                       | dB             |                     | 18.0                 |      |
| VD     | Device Voltage                                           |                                                       | V              | 4.3                 | 5.0                  | 5.7  |
| dG/dT  | Device Gain Temperature Coefficient                      |                                                       | dB/degC        |                     | -0.0027              |      |
| dV/dT  | Device Voltage Temperature Coefficient                   |                                                       | mV/degC        |                     | -5.0                 |      |

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## SNA-476

### DC-8 GHz, Cascadable GaAs MMIC Amplifier



## Product Features

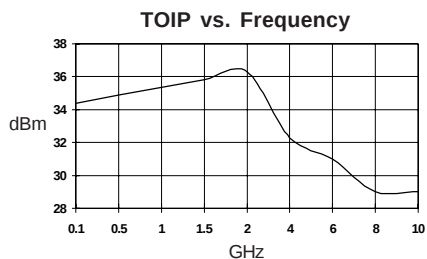
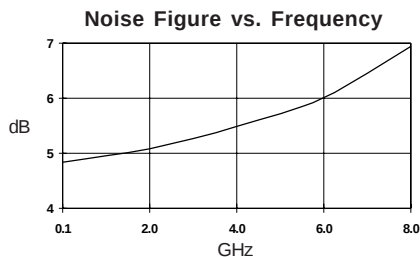
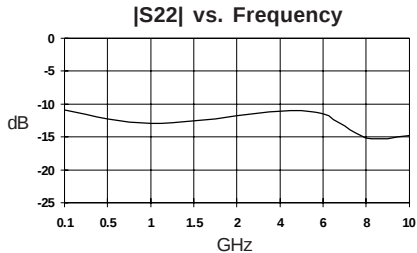
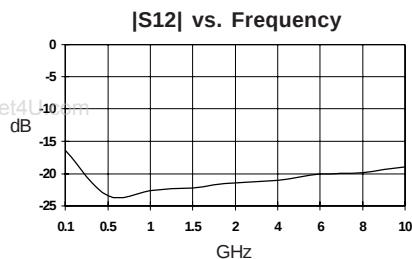
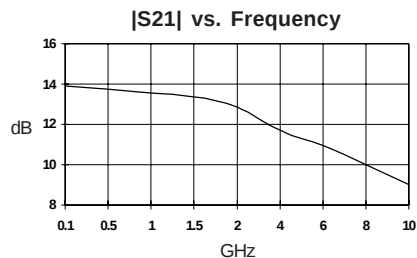
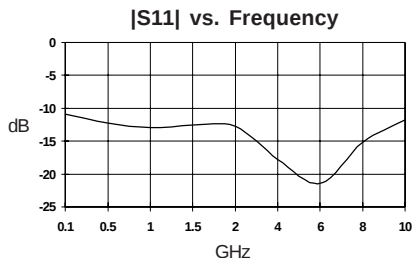
- Cascadable 50 Ohm Gain Block
- 13dB Gain, +17dBm P1dB
- 1.5:1 Input and Output VSWR
- Operates From Single Supply
- Low Cost Stripline Mount Ceramic Package
- Hermetically Sealed

## Applications

- Narrow and Broadband Linear Amplifiers
- Commercial and Industrial Applications

## SNA-476 DC-8 GHz Cascadable MMIC Amplifier

Typical Performance at 25° C ( $V_{ds} = 5.0V$ ,  $I_{ds} = 70mA$ )



Typical S-Parameters  $V_{ds} = 5.0V$ ,  $I_d = 70mA$

| Freq GHz | S11   | S11 Ang | S21   | S21 Ang | S12   | S12 Ang | S22   | S22 Ang |
|----------|-------|---------|-------|---------|-------|---------|-------|---------|
| .100     | 0.205 | 148     | 5.268 | 176     | 0.112 | 0       | 0.141 | 160     |
| .250     | 0.233 | 136     | 5.124 | 166     | 0.111 | 9       | 0.157 | 150     |
| .500     | 0.282 | 120     | 4.891 | 139     | 0.119 | -29     | 0.185 | 121     |
| 1.00     | 0.295 | 64      | 4.793 | 101     | 0.118 | -55     | 0.207 | 68      |
| 1.50     | 0.302 | 6       | 4.746 | 60      | 0.117 | -87     | 0.227 | 13      |
| 2.00     | 0.290 | -46     | 4.774 | 21      | 0.117 | -113    | 0.231 | -37     |
| 4.00     | 0.150 | 74      | 3.740 | 57      | 0.104 | 7       | 0.222 | -90     |
| 6.00     | 0.164 | -52     | 3.331 | 61      | 0.151 | -2      | 0.130 | 1       |
| 8.00     | 0.275 | 161     | 2.973 | -109    | 0.100 | -115    | 0.190 | 147     |

(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        | 100mA            |
| Power Dissipation     | 560mW            |
| 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-476-TR1 | 1000             | 7"        |
| SNA-476-TR2 | 3000             | 13"       |
| SNA-476-TR3 | 5000             | 13"       |

## Recommended Bias Resistor Values

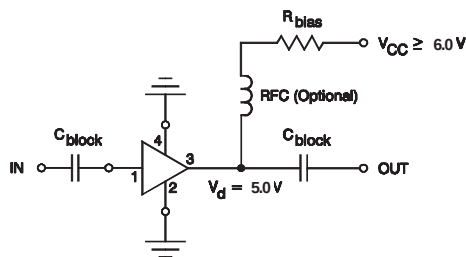
| Supply Voltage (Vs) | 5V | 7.5V | 9V | 12V | 15V | 20V |
|---------------------|----|------|----|-----|-----|-----|
| Rbias (Ohms)        | *  | 36   | 57 | 100 | 143 | 214 |

\* Needs active biasing for constant current source

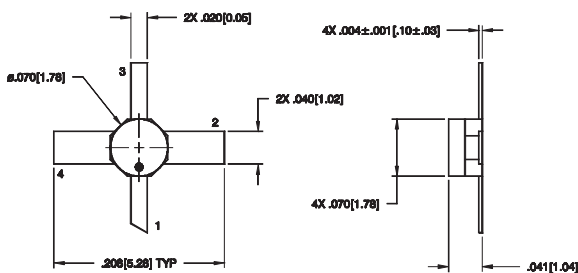
## MTTF vs Temperature @ Id = 70mA

| Lead Temperature | Junction Temperature | MTTF (hrs) |
|------------------|----------------------|------------|
| +45C             | +155C                | 1000000    |
| +80C             | +190C                | 100000     |
| +110C            | +220C                | 10000      |

Thermal Resistance (Lead-Junction): 315° C/W



Typical Biasing Configuration



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

## Typical Performance at 25° C

