

Product Features

- Frequency: 6—18GHz
- High Gain: 14.5dB Typ.
- Output P_{1dB} : 19.0 dBm Typ.
- Input /Output VSWR: <2.0
- Operation from Single Supply: 5V@93mA

Product Description

F502 is a high efficiency two stages broadband MMIC amplifier that can work between 6GHz and 18GHz. It can provide high efficiency and flat gain by using GaAs PHEMT technics. The typical operation state is +5V from single power supply. And the front and back amplifiers are both placed in class A operation condition. It offers good linearity. The output and input are matching in 50Ω system. It can



Chip Size: 920×920 um (36.2×36.2 mils)

Chip Thickness: 100±10 um (4±0.4 mils)

Pad Dimensions: 80×80 um

casadable work. In order to improve mplifier's reliability, the media is used for protecting chip. It is intend to be used in Driver for Mircowave Communication System, Buffer Amplifier, Cascadable Gain Module for ECM System, Phased Array Radar and Transmission Amplifier.

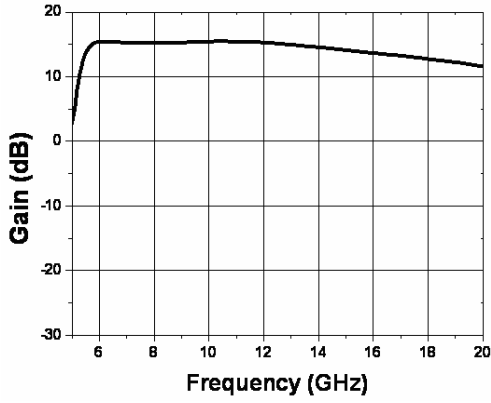
Typical Electrical Characteristic at 25°C

| Symbol | Unit | Test Condition | Min. | Typ. | Max. |
|------------------|-------|-----------------|------|------|------|
| Gain | dB | 6~18GHz | 12.0 | 14.5 | |
| Output P_{1dB} | dBm | $P_{1dB}@18GHz$ | 17.0 | 18.5 | |
| Output P_{sat} | dBm | $P_{sat}@18GHz$ | 18.0 | 19.5 | |
| Input VSWR | Ratio | 6~18GHz | | 1.5 | |
| Output VSWR | Ratio | 6~18GHz | | 1.5 | |
| NF | dB | $NF@18GHz$ | | 5 | 6.5 |
| S12 | dB | 6~18GHz | | -40 | -30 |

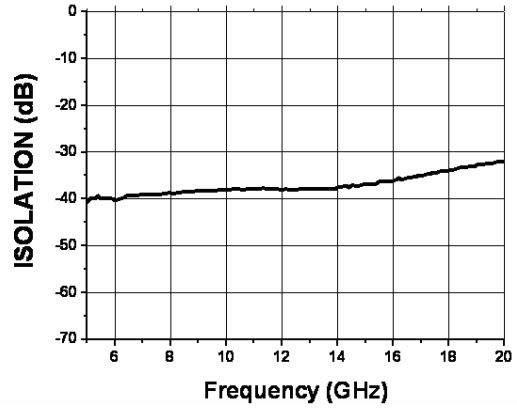
Test the small signal for the IC only. Test power and noise on the whole machine.
($T=25^{\circ}C, V_{DD}=5V, I_{DD}=93mA, Z_0=50\Omega$)

Typical Electrical Characteristics

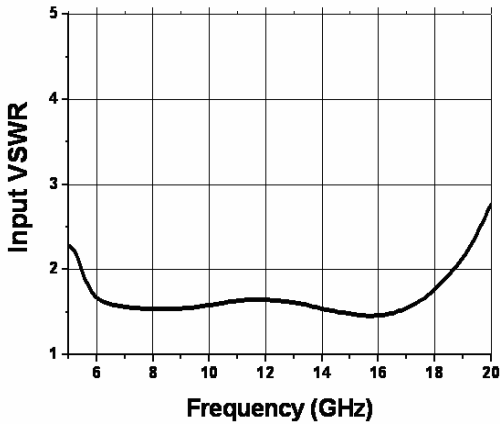
($T=25^{\circ}\text{C}$, $V_{DD}=5\text{V}$, $I_{DD}=93\text{mA}$, $Z_0=50\ \Omega$)



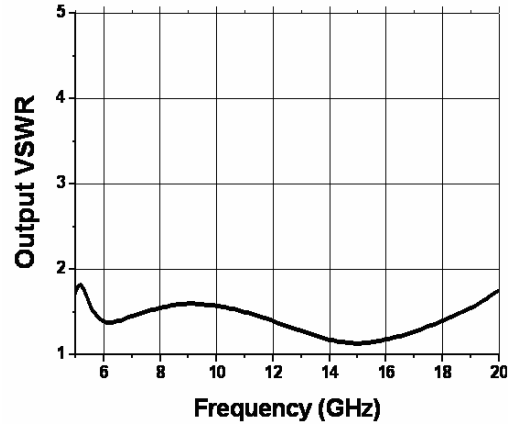
Small Signal Gain



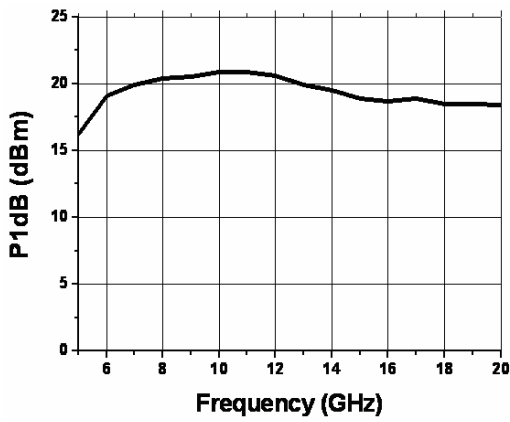
Isolation



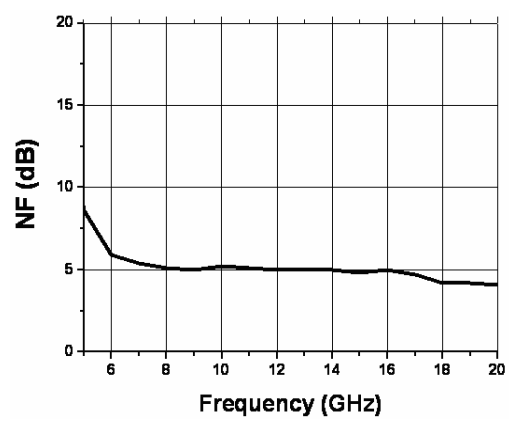
Input VSWR



Output VSWR

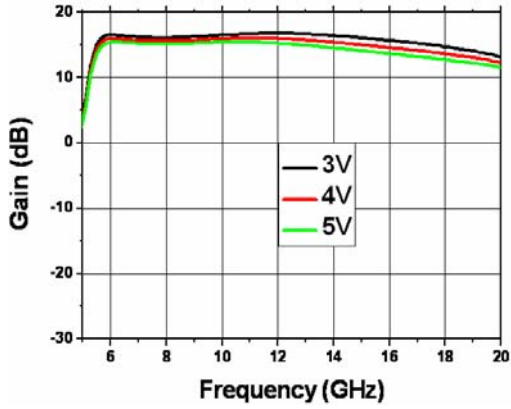


P1dB

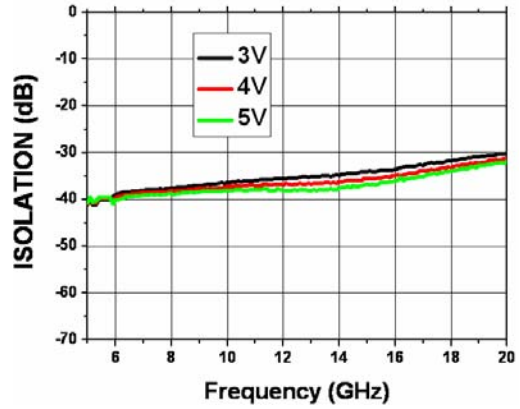


Noise Figure

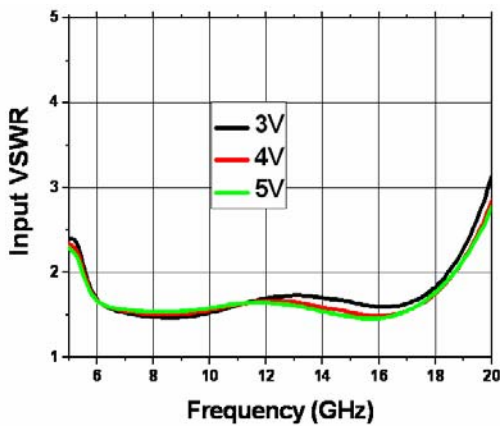
Typical Characteristics Under Different Drive Voltage ($T=25^{\circ}\text{C}$, $Z_0=50\ \Omega$)



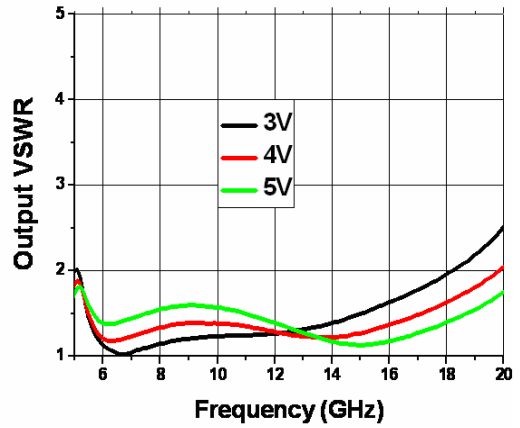
Gain vs Supply Voltage



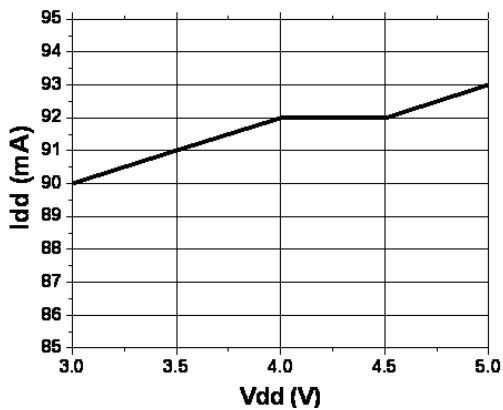
Isolation vs Supply Voltage



Input VSWR vs Supply Voltage



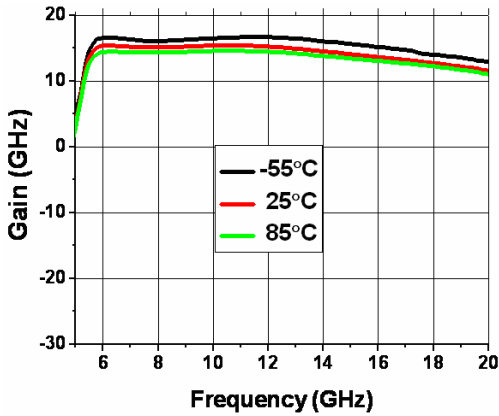
Output VSWR vs Supply Voltage



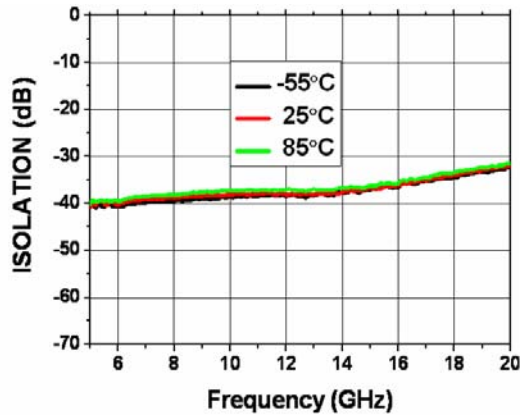
Idd vs Supply Voltage

Typical Characteristics Under Different Temperature

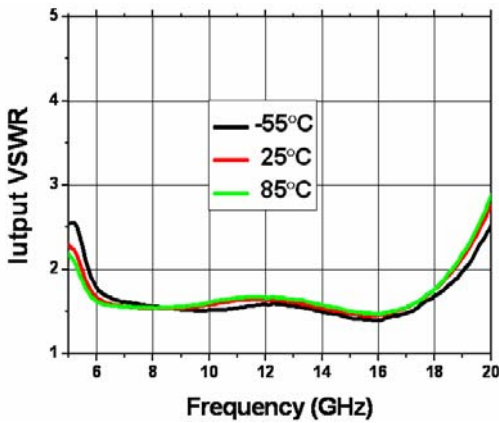
($V_{DD}=5V, I_{DD}=93mA, Z_0=50\Omega$)



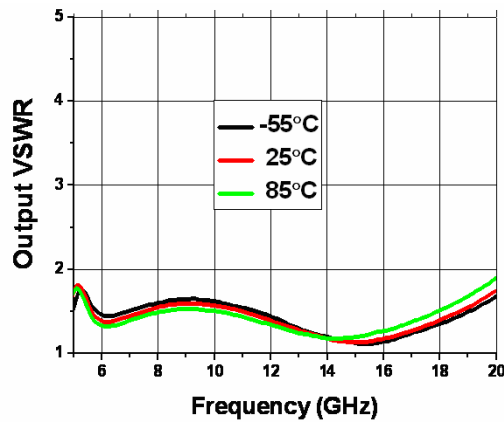
Gain vs Temp.



Isolation vs Temp.



Input VSWR vs Temp.

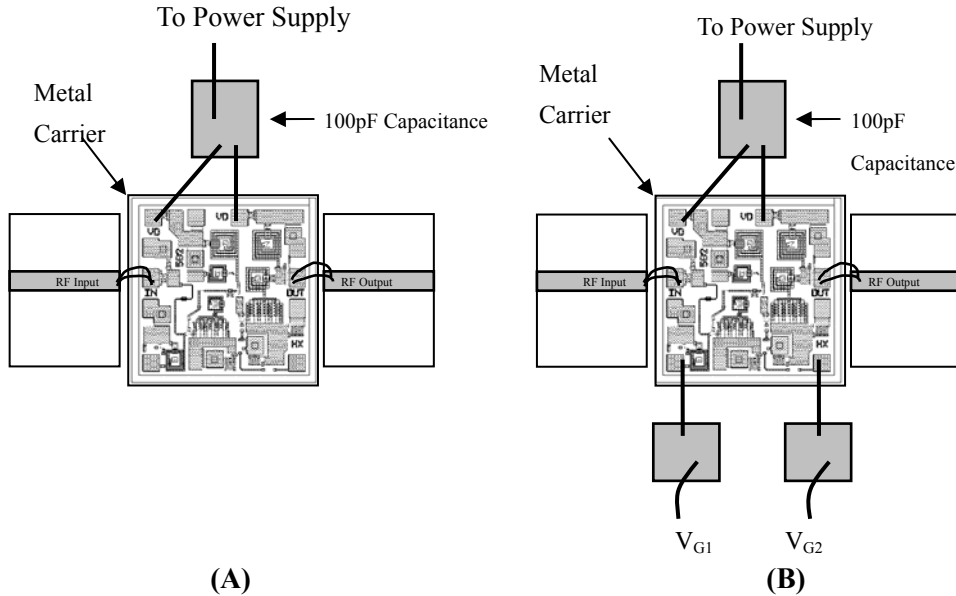


Output VSWR vs Temp.

Operating Ranges

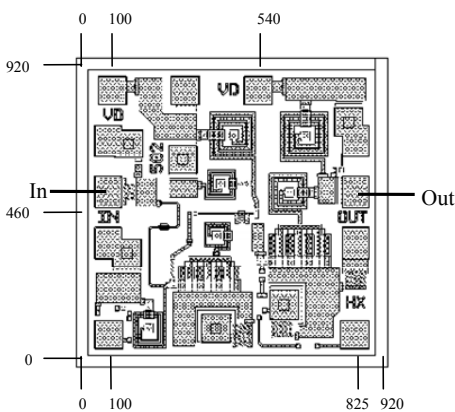
| Symbol | Parameters | Unit | Min. | Max. |
|------------------|-----------------------|------|------|------------|
| V_{D1}, V_{D2} | Device Voltage | V | | 7 |
| V_{G1}, V_{G2} | Grid Voltage | V | -5 | 2 |
| I_{DD} | Device Current | mA | | 150 |
| P_{in} | Input Power | dBm | | 20 |
| T_{ch} | Channel Temperature | °C | | +150 |
| T_L | Operating Temp. range | °C | | -55 到 +100 |
| T_{max} | Assembling Temp. | °C | | +300 |

Bias and Operating Stage



F502 is adopting the bias method of connecting V_{D1} and V_{D2} as picture (A) shown. The recommended operating voltage is 3~5V. All the ground are through the back hole of F502. Use a large ground pad area with many plated through-holes as shown. If needed, you can adjust the gain, output power and efficiency by adjusting bias voltage V_{G1} and V_{G2} as picture (B) shown. If using the single leakage bias method, it does not need to connect the bias press point. The negative grid bias voltage will decrease leakage current, gain and output power. The positive grid bias voltage will increase leakage current, gain and power.

Assemble Suggestion



Pad Dimension(Unit: um)

Use 0.7mil diameter's spun gold for input, output and power on. F502 must precaution in handling, testing and packaging. The spun gold press point is as the above picture shown.

