



# EMP201

## 17.5 – 21.0 GHz Power Amplifier MMIC

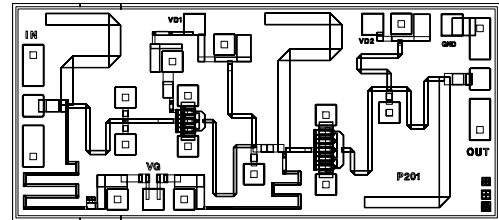
Issued Date: 12-18-03

### FEATURES

- 17.5 – 21.0 GHz Bandwidth
- 24.5dBm Output Power at 1dB Compression
- 18.0 dB Typical Power Gain

### APPLICATIONS

- Point-to-point and point-to-multipoint radio
- Military Radar Systems



Dimension: 2250um X 1000um

### ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

| SYMBOL          | PARAMETER/TEST CONDITIONS                                                                | MIN  | TYP  | MAX  | UNITS              |
|-----------------|------------------------------------------------------------------------------------------|------|------|------|--------------------|
| F               | Operating Frequency Range                                                                | 17.5 |      | 21.0 | GHz                |
| $P_{1dB}$       | Output Power at 1dB Compression<br>$V_{DS} = 8\text{ V}$ , $I_{DSQ} \approx 1/2 I_{DSS}$ | 23.5 | 24.5 |      | dBm                |
| G <sub>SS</sub> | Small Signal Gain                                                                        | 16   | 18   |      | dB                 |
| IP3             | Third Order Interception Point                                                           |      | 31   |      | dBm                |
| Input RL        | Input Return Loss                                                                        | 8    | 10   |      | dB                 |
| Output RL       | Output Return Loss                                                                       | 6    | 8    |      | dB                 |
| I <sub>DD</sub> | Power Supply Current                                                                     |      | 150  | 210  | mA                 |
| V <sub>DD</sub> | Power Supply Voltage                                                                     |      | 7    | 8    | V                  |
| R <sub>th</sub> | Thermal Resistance (Au-Sn Eutectic Attach)                                               |      | 50   |      | $^\circ\text{C/W}$ |

### ABSOLUTE MAXIMUM RATINGS FOR CONTINUOUS OPERATION<sup>1,2</sup>

| SYMBOL    | CHARACTERISTIC          | VALUE                    |
|-----------|-------------------------|--------------------------|
| $V_{DS}$  | Drain to Source Voltage | 8 V                      |
| $V_{GS}$  | Gate to Source Voltage  | -3 V                     |
| $I_{DD}$  | Drain Current           | 300mA                    |
| $I_{GSF}$ | Forward Gate Current    | 8mA                      |
| $P_{IN}$  | Input Power             | @ 3dB compression        |
| $T_{CH}$  | Channel Temperature     | 150 $^\circ\text{C}$     |
| $T_{STG}$ | Storage Temperature     | -65/150 $^\circ\text{C}$ |
| $P_T$     | Total Power Dissipation | 3.4W                     |

1. Operating the device beyond any of the above rating may result in permanent damage.

2. Bias conditions must also satisfy the following equation  $V_{DS} \cdot I_{DS} < (T_{CH} - T_{HS})/R_{TH}$ ;  
where  $T_{HS}$  = ambient temperature



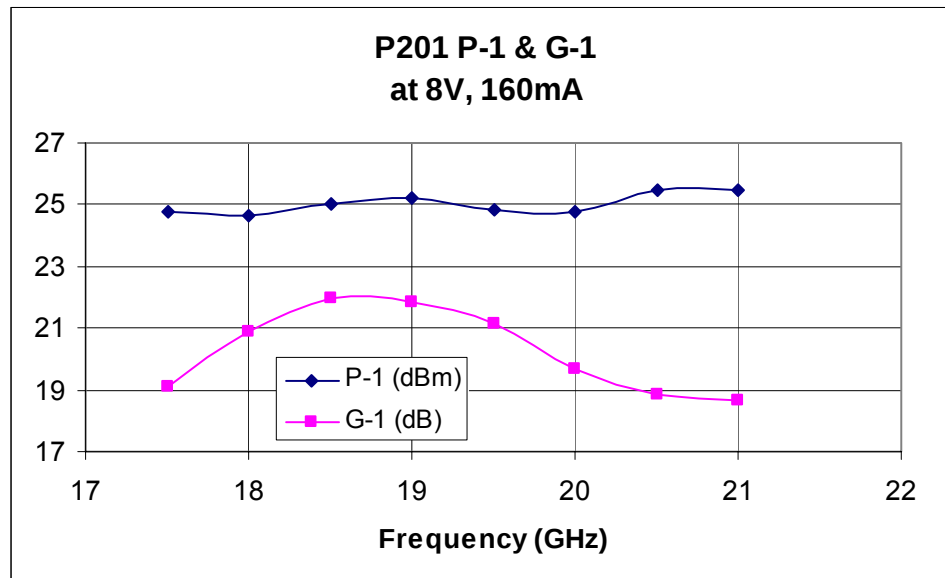
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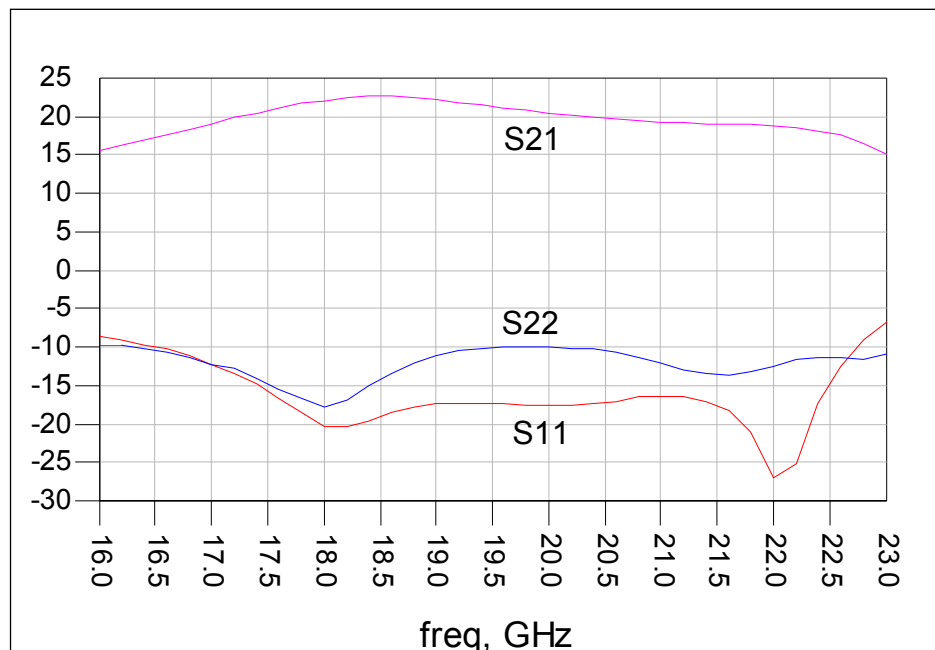
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### Typical Performance:

#### 1. P-1 and G-1



#### 2. Linear Gain and Return Loss Versus Frequency



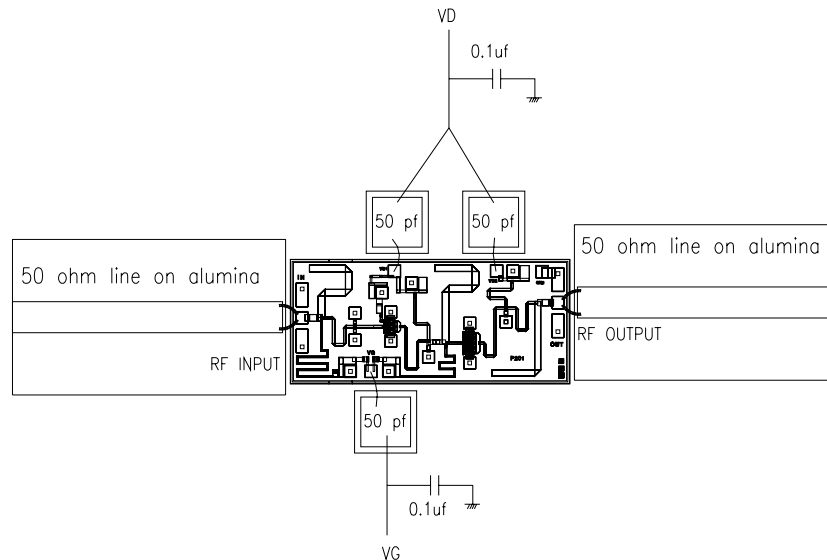


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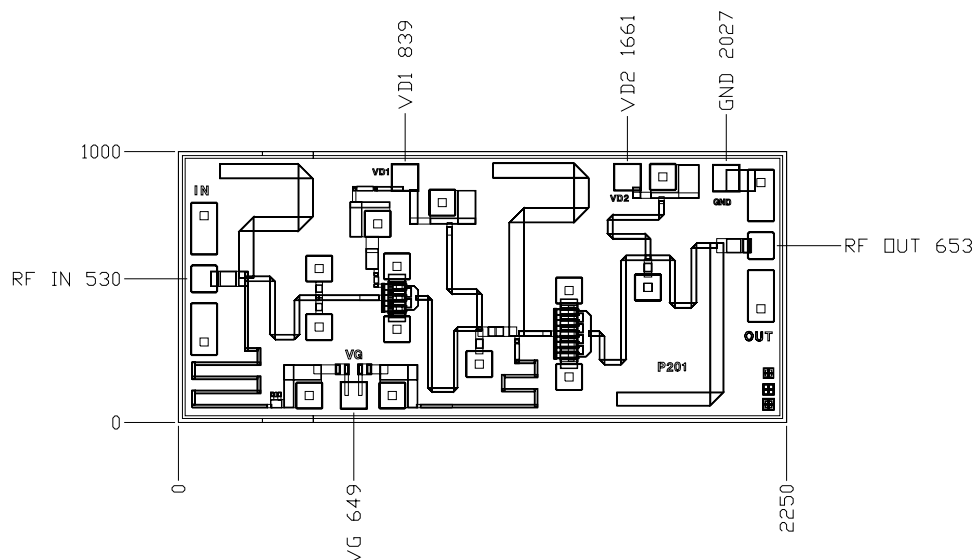
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### ASSEMBLY DRAWING



The length of RF wires should be as short as possible. Use at least two wires between RF pad and 50 ohm line and separate the wires to minimize the mutual inductance.

### CHIP OUTLINE



Chip Size 1000 x 2250 microns  
Chip Thickness: 75 ± 13 microns  
PAD Dimensions: 100 x 100 microns  
All Dimensions in Microns