



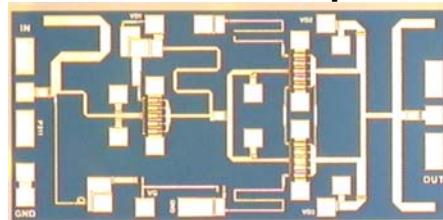
# EMP311

ISSUED DATE: 09-10-04

## 21.0 – 24.0 GHz Power Amplifier MMIC

### FEATURES

- 21.0 – 24.0 GHz Operating Frequency Range
- 26.5dBm Output Power at 1dB Compression
- 14.0 dB Typical Small Signal Gain
- -40dBc OIMD3 @Each Tone Pout 16.5dBm



Dimension: 1130um X 2250um  
Thickness: 75um ± 13um

### APPLICATIONS

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



Caution! ESD sensitive device.

### ELECTRICAL CHARACTERISTICS ( $T_a = 25\text{ }^\circ\text{C}$ , 50 ohm, $V_{DD}=7\text{V}$ , $IDQ=380\text{mA}$ )

| SYMBOL          | PARAMETER/TEST CONDITIONS   | MIN  | TYP  | MAX  | UNITS              |
|-----------------|---|------|------|------|--------------------|
| F               | Operating Frequency Range   | 21.0 |      | 24.0 | GHz                |
| P1dB            | Output Power at 1dB Gain Compression  | 25.0 | 26.5 |      | dBm                |
| Gss             | Small Signal Gain   | 11.0 | 14.0 |      | dB                 |
| OIMD3           | Output 3 <sup>rd</sup> Order Intermodulation Distortion<br>@ $\Delta f=10\text{MHz}$ , Each Tone Pout 16.5dBm |      | -40  | -37  | dBc                |
| Input RL        | Input Return Loss   |      | -10  | -8   | dB                 |
| Output RL       | Output Return Loss  |      | -8   | -6   | dB                 |
| Idss            | Saturate Drain Current $V_{DS}=3\text{V}$ , $V_{GS}=0\text{V}$  | 429  | 536  | 644  | mA                 |
| V <sub>DD</sub> | Power Supply Voltage  |      | 7    | 8    | V                  |
| Rth             | Thermal Resistance (Au-Sn Eutectic Attach)  |      | 18   |      | $^\circ\text{C/W}$ |
| Tb              | Operating Base Plate Temperature  | -35  |      | +85  | $^\circ\text{C}$   |

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

| SYMBOL           | CHARACTERISTIC          | VALUE                    |
|------------------|-------------------------|--------------------------|
| V <sub>DS</sub>  | Drain to Source Voltage | 8 V                      |
| V <sub>GS</sub>  | Gate to Source Voltage  | -4 V                     |
| I <sub>DD</sub>  | Drain Current           | Idss                     |
| I <sub>Gsf</sub> | Forward Gate Current    | 7.5mA                    |
| P <sub>IN</sub>  | Input Power             | @ 3dB compression        |
| T <sub>CH</sub>  | Channel Temperature     | 150 $^\circ\text{C}$     |
| T <sub>STG</sub> | Storage Temperature     | -65/150 $^\circ\text{C}$ |
| P <sub>T</sub>   | Total Power Dissipation | 6.3W                     |

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

Specifications are subject to change without notice.

Excelics Semiconductor, Inc. 310 De Guigne Drive, Sunnyvale, CA 94085  
Phone: 408-737-1711 Fax: 408-737-1868 Web: [www.excelics.com](http://www.excelics.com)

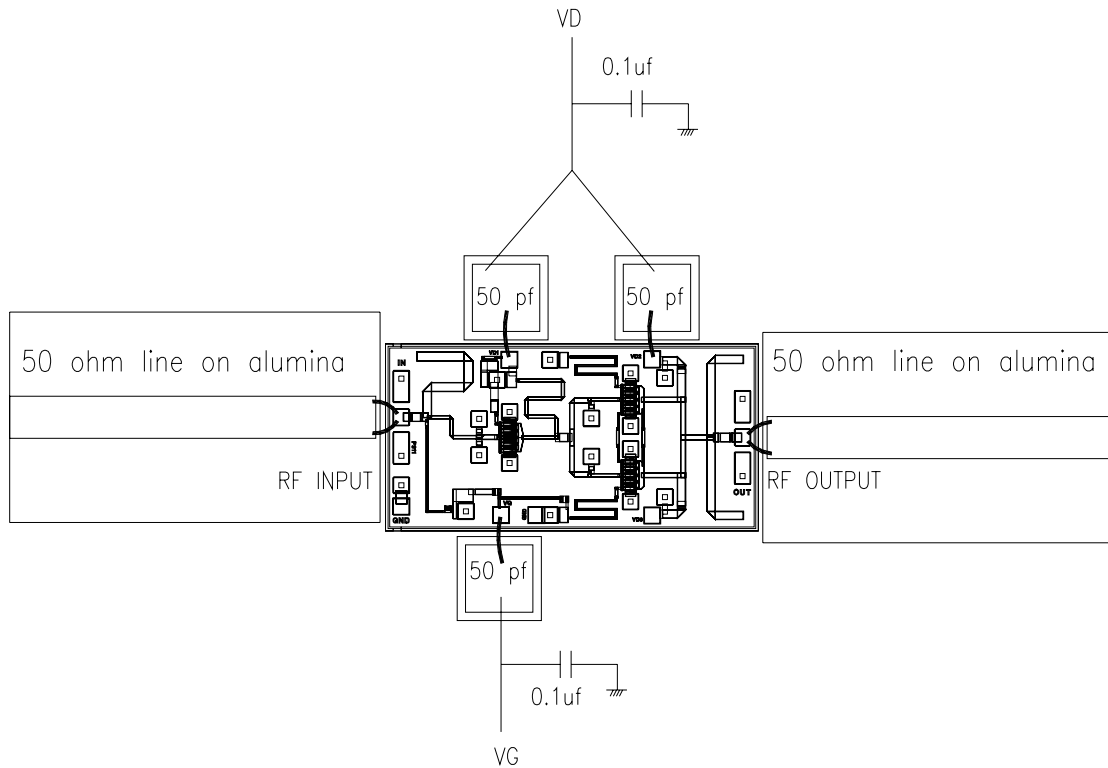
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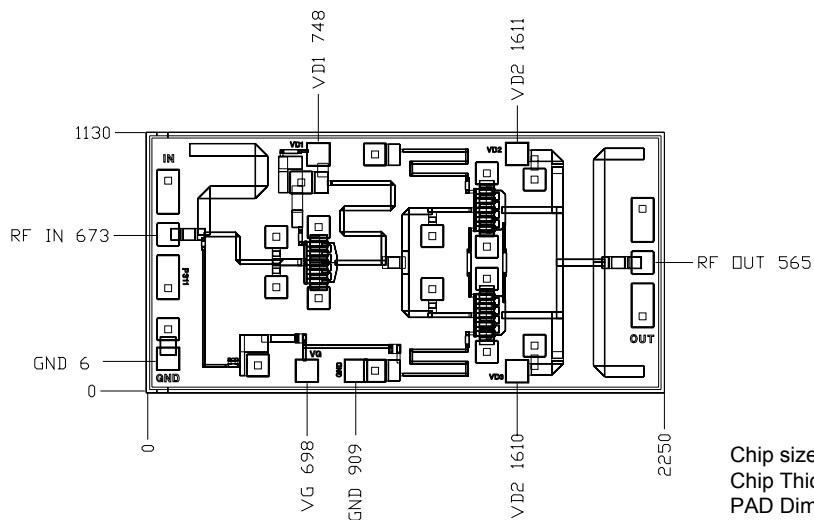
## PRELIMINARY DATA SHEET ASSEMBLY DRAWING

## 21.0 – 24.0 GHz Power Amplifier MMIC



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 1130 X 2250 microns  
Chip Thickness: 75±13 microns  
PAD Dimensions: 100 x 100 microns  
All Dimensions in Microns

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