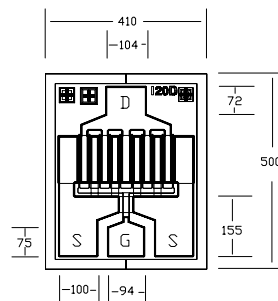


## High Efficiency Heterojunction Power FET

### FEATURES

- +29.5dBm TYPICAL OUTPUT POWER
- 19.5dB TYPICAL POWER GAIN AT 2GHz
- 0.5 X 1200 MICRON RECESSED "MUSHROOM" GATE
- Si<sub>3</sub>N<sub>4</sub> PASSIVATION AND PLATED HEAT SINK
- ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY
- Idss SORTED IN 30mA PER BIN RANGE



Chip Thickness: 75 ± 20 microns  
All Dimensions In Microns

### ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)



Caution! ESD sensitive device.

| SYMBOLS          | PARAMETERS/TEST CONDITIONS  | MIN  | TYP          | MAX  | UNIT |
|------------------|---|------|--------------|------|------|
| P <sub>1dB</sub> | Output Power at 1dB Compression<br>V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub>           | 28.0 | 29.5<br>29.5 |      | dBm  |
| G <sub>1dB</sub> | Gain at 1dB Compression<br>V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub>                   | 18.0 | 19.5<br>14.5 |      | dB   |
| PAE              | Power Added Efficiency at 1dB Compression<br>V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> |      | 50           |      | %    |
| I <sub>dss</sub> | Saturated Drain Current<br>V <sub>ds</sub> =3V, V <sub>gs</sub> =0V                                     | 210  | 360          | 510  | mA   |
| G <sub>m</sub>   | Transconductance<br>V <sub>ds</sub> =3V, V <sub>gs</sub> =0V  | 240  | 380          |      | mS   |
| V <sub>p</sub>   | Pinch-off Voltage<br>V <sub>ds</sub> =3V, I <sub>ds</sub> =3.6mA  |      | -1.0         | -2.5 | V    |
| BV <sub>gd</sub> | Drain Breakdown Voltage<br>I <sub>gd</sub> =1.2mA   | -13  | -15          |      | V    |
| BV <sub>gs</sub> | Source Breakdown Voltage<br>I <sub>gs</sub> =1.2mA  | -7   | -14          |      | V    |
| R <sub>th</sub>  | Thermal Resistance (Au-Sn Eutectic Attach)  |      | 40           | 45   | °C/W |

### MAXIMUM RATINGS AT 25°C

| SYMBOLS          | PARAMETERS              | ABSOLUTE <sup>1</sup> | CONTINUOUS <sup>2</sup> |
|------------------|-------------------------|-----------------------|-------------------------|
| V <sub>ds</sub>  | Drain-Source Voltage    | 12V                   | 8V                      |
| V <sub>gs</sub>  | Gate-Source Voltage     | -5V                   | -3V                     |
| I <sub>gsf</sub> | Forward Gate Current    | 5.4 mA                | 1.8 mA                  |
| I <sub>gsr</sub> | Reverse Gate Current    | 0.9 mA                | 0.3 mA                  |
| P <sub>in</sub>  | Input Power             | 26 dBm                | @ 3dB Compression       |
| T <sub>ch</sub>  | Channel Temperature     | 175°C                 | 175°C                   |
| T <sub>stg</sub> | Storage Temperature     | -65/175°C             | -65/175°C               |
| P <sub>t</sub>   | Total Power Dissipation | 3.3 W                 | 3.3 W                   |

Note: 1. Exceeding any of the above ratings may result in permanent damage.  
2. Exceeding any of the above ratings may reduce MTTF below design goals.

Specifications are subject to change without notice.



# EPA120D

UPDATED 01/13/2006

## High Efficiency Heterojunction Power FET

### S-PARAMETERS

8V, 1/2 Idss

| FREQ<br>(GHz) | --- S11 --- |        | --- S21 --- |       | --- S12 --- |      | --- S22 --- |        |
|---------------|-------------|--------|-------------|-------|-------------|------|-------------|--------|
|               | MAG         | ANG    | MAG         | ANG   | MAG         | ANG  | MAG         | ANG    |
| 1             | 0.891       | -106.9 | 15.439      | 119.2 | 0.029       | 40.8 | 0.290       | -64.3  |
| 2             | 0.858       | -143.2 | 9.009       | 97.3  | 0.034       | 27.9 | 0.219       | -86.7  |
| 3             | 0.854       | -159.9 | 6.233       | 84.9  | 0.036       | 26.8 | 0.207       | -97.0  |
| 4             | 0.850       | -170.6 | 4.775       | 75.1  | 0.037       | 25.2 | 0.212       | -103.1 |
| 5             | 0.856       | -178.8 | 3.800       | 66.3  | 0.039       | 29.6 | 0.228       | -112.6 |
| 6             | 0.856       | 174.1  | 3.195       | 58.6  | 0.041       | 31.4 | 0.245       | -117.0 |
| 7             | 0.858       | 168.5  | 2.766       | 51.0  | 0.044       | 34.1 | 0.258       | -121.6 |
| 8             | 0.863       | 162.7  | 2.424       | 43.9  | 0.046       | 35.9 | 0.279       | -127.2 |
| 9             | 0.870       | 157.6  | 2.140       | 36.7  | 0.048       | 36.0 | 0.298       | -133.0 |
| 10            | 0.872       | 153.1  | 1.926       | 30.2  | 0.054       | 37.5 | 0.324       | -139.4 |
| 11            | 0.880       | 148.6  | 1.738       | 23.4  | 0.056       | 38.3 | 0.352       | -146.3 |
| 12            | 0.889       | 145.4  | 1.565       | 17.0  | 0.059       | 40.9 | 0.383       | -152.7 |
| 13            | 0.890       | 142.4  | 1.412       | 10.7  | 0.065       | 37.4 | 0.413       | -160.3 |
| 14            | 0.898       | 140.3  | 1.289       | 5.2   | 0.070       | 36.2 | 0.459       | -165.7 |
| 15            | 0.910       | 138.5  | 1.176       | 0.0   | 0.075       | 38.6 | 0.487       | -170.9 |
| 16            | 0.905       | 136.4  | 1.080       | -5.4  | 0.080       | 36.8 | 0.529       | -175.5 |
| 17            | 0.909       | 135.0  | 0.991       | -9.9  | 0.083       | 36.9 | 0.557       | -179.2 |
| 18            | 0.903       | 133.4  | 0.922       | -14.9 | 0.092       | 35.4 | 0.581       | 177.8  |
| 19            | 0.901       | 130.8  | 0.874       | -19.6 | 0.100       | 33.4 | 0.607       | 173.1  |
| 20            | 0.909       | 127.3  | 0.821       | -24.3 | 0.109       | 32.7 | 0.614       | 168.7  |

Note: The data included 0.7 mils diameter Au bonding wires:  
1 gate wires, 20 mils each; 1 drain wires, 12 mils each; 4 source wires, 7 mils each.

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Revised January 2006