



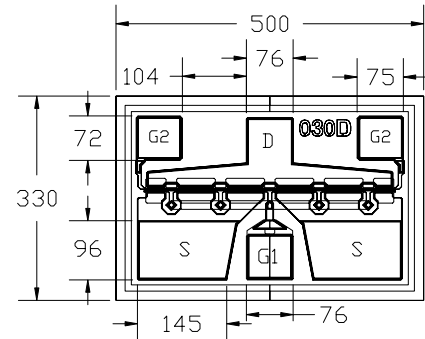
# EPA030D

UPDATED 11/30/2004

## High Performance Heterojunction Dual-Gate FET

### FEATURES

- +18.0 dBm OUTPUT POWER AT 1dB COMPRESSION
- 19.5 dB POWER GAIN AT 12GHz
- 0.3 x 300 MICRON RECESSED "MUSHROOM" DUAL GATE
- Si<sub>3</sub>N<sub>4</sub> PASSIVATION
- ADVANCED EPITAXIAL DOPING PROFILE PROVIDES EXTRA HIGH PERFORMANCE AND HIGH RELIABILITY
- MIXER, SWITCH, AGC AND TEMPERATURE COMPENSATION APPLICATIONS
- Idss SORTED IN 5mA PER BIN RANGE



Chip Thickness:  $75 \pm 13$  microns  
All Dimensions In Microns

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



Caution! ESD sensitive device.

SYMBOL	PARAMETERS/TEST CONDITIONS <sup>1</sup>	MIN	TYP	MAX	UNITS
$P_{1dB}$	Output Power at 1dB Compression $V_{DS} = 6V, I_{DS} \approx 50\% I_{DSS}, V_{G2S} = 0V$ $f = 12\text{GHz}$	15.0	18.0		dBm
$G_{1dB}$	Gain at 1dB Compression $V_{DS} = 6V, I_{DS} \approx 50\% I_{DSS}, V_{G2S} = 0V$ $f = 12\text{GHz}$	17.5	19.5		dB
NF	Noise Figure $V_{DS} = 3V, I_{DS} \approx 15\text{mA}, V_{G2S} = 0V$ $f = 12\text{GHz}$		1.2		dB
Ga	Associated Gain $V_{DS} = 3V, I_{DS} \approx 15\text{mA}, V_{G2S} = 0V$ $f = 12\text{GHz}$		17.5		dB
$I_{DSS}$	Saturated Drain Current $V_{DS} = 3V, V_{G1S} = V_{G2S} = 0V$	30	80	115	mA
$G_M$	Transconductance $V_{DS} = 3V, V_{G1S} = -0.5V, V_{G2S} = 0V$	40	70		mS
$V_{P1}$	Pinch-off Voltage $V_{DS} = 3V, I_{DS} = 1.0\text{mA}, V_{G2S} = 0V$		-1.5	-3.5	V
$V_{P2}$	Pinch-off Voltage $V_{DS} = 3V, I_{DS} = 1.0\text{mA}, V_{G1S} = 0V$		-1.5	-3.5	V
$BV_{G2D}$	Gate 2 to Drain Breakdown Voltage $I_{G2D} = 1.0\text{mA}, \text{Gate 1 Open}$	-10	-14		V
$BV_{G1S}$	Gate 1 to Source Breakdown Voltage $I_{G1S} = 1.0\text{mA}, \text{Gate 2 Open}$	-6	-12		V
$R_{TH}$	Thermal Resistance		125		$^\circ\text{C/W}$

Specifications are subject to change without notice.

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Revised December 2004



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### MAXIMUM RATINGS AT 25°C

SYMBOL	PARAMETERS	ABSOLUTE <sup>1</sup>	CONTINUOUS <sup>2</sup>
V <sub>DS</sub>	Drain to Source Voltage	10 V	7 V
V <sub>GS</sub>	Gate to Source Voltage	-6 V	-3.5 V
I <sub>DS</sub>	Drain Current	I <sub>dss</sub>	I <sub>dss</sub>
I <sub>GSF</sub>	Forward Gate Current	15 mA	2.5 mA
P <sub>IN</sub>	Input Power	15 dBm	@ 3dB compression
P <sub>T</sub>	Total Power Dissipation	1.1 W	900 mW
T <sub>CH</sub>	Channel Temperature	175°C	150°C
T <sub>STG</sub>	Storage Temperature	-65/+175°C	-65/+150°C

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.

### S-PARAMETERS 6V, 1/2 I<sub>dss</sub>, V<sub>g2s</sub>=0V

FREQ (GHz)	--- S11 --- MAG ANG	--- S21 --- MAG ANG	--- S12 --- MAG ANG	--- S22 --- MAG ANG	FREQ (GHz)	--- S11 --- MAG ANG	--- S21 --- MAG ANG	--- S12 --- MAG ANG	--- S22 --- MAG ANG
1	0.991 -15.1	9.329 165.6	0.006 80.8	0.943 -5.5	21	0.758 144.0	4.807 -38.8	0.014 65.7	1.161 -107.6
2	0.965 -30.1	9.120 152.7	0.010 74.8	0.932 -11.2	22	0.786 138.7	4.797 -49.7	0.019 65.4	1.233 -114.5
3	0.937 -45.3	8.850 139.8	0.015 62.0	0.912 -16.4	23	0.809 134.2	4.809 -61.7	0.024 80.1	1.339 -122.8
4	0.897 -59.8	8.553 127.4	0.019 55.7	0.891 -21.6	24	0.838 130.0	4.793 -75.3	0.029 82.1	1.437 -133.4
5	0.854 -74.1	8.208 115.3	0.021 47.7	0.868 -26.5	25	0.875 126.4	4.749 -90.2	0.038 83.2	1.520 -144.3
6	0.818 -86.2	7.758 104.8	0.022 43.8	0.854 -30.7	26	0.907 123.2	4.604 -106.9	0.049 77.8	1.664 -158.3
7	0.786 -97.4	7.369 94.9	0.024 37.6	0.840 -34.5	27	0.932 119.3	4.423 -125.2	0.061 71.4	1.720 -173.9
8	0.753 -109.1	7.016 84.8	0.024 31.8	0.828 -38.7	28	0.960 114.9	4.008 -144.6	0.067 62.3	1.688 171.4
9	0.726 -119.9	6.697 75.2	0.024 26.7	0.817 -42.8	29	0.968 111.1	3.527 -163.4	0.071 53.8	1.638 158.6
10	0.699 -130.5	6.409 65.5	0.021 24.0	0.814 -47.2	30	0.952 107.2	3.016 179.0	0.072 45.5	1.555 147.2
11	0.688 -141.1	6.173 56.1	0.020 16.5	0.820 -52.1	31	0.947 103.2	2.587 162.1	0.072 39.9	1.433 137.9
12	0.687 -150.3	5.952 46.6	0.019 11.4	0.823 -58.0	32	0.944 99.6	2.198 145.5	0.074 35.2	1.317 129.4
13	0.684 -160.2	5.720 36.8	0.019 6.6	0.840 -64.0	33	0.951 95.6	1.920 129.5	0.077 32.7	1.227 123.7
14	0.687 -169.4	5.499 27.0	0.015 4.7	0.860 -70.1	34	0.942 92.4	1.619 114.1	0.073 24.8	1.123 117.7
15	0.688 -176.6	5.298 18.1	0.013 15.1	0.879 -76.8	35	0.959 87.8	1.412 98.9	0.075 19.7	1.033 113.6
16	0.715 176.6	5.189 8.0	0.012 13.4	0.923 -82.9	36	0.968 83.2	1.235 85.2	0.076 10.5	0.966 111.9
17	0.731 169.4	4.994 -2.0	0.012 14.7	0.960 -89.6	37	0.976 79.3	1.067 72.1	0.076 2.2	0.893 109.9
18	0.745 163.5	4.850 -11.6	0.012 20.0	0.995 -95.5	38	0.989 76.4	0.936 61.0	0.069 -6.3	0.851 109.1
19	0.774 156.6	4.705 -21.7	0.011 35.6	1.025 -101.1	39	0.985 72.6	0.829 49.0	0.066 -15.8	0.803 108.9
20	0.764 151.0	4.571 -31.0	0.012 42.3	1.093 -106.3	40	0.991 71.5	0.714 38.8	0.056 -21.3	0.785 108.4

Note: The data included 0.7 mils diameter Au bonding wires:

1 gate wires, 15 mils each; 1 drain wires, 20 mils each; 4 source wires, 7 mils each., 2 gate2 wires(to ground), 7 mils each

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