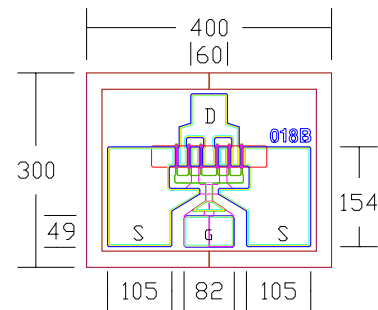


ISSUED 11/01/2007

## High Efficiency Heterojunction Power FET

### FEATURES

- VERY HIGH  $f_{max}$ : 120GHz
- +20.0dBm TYPICAL OUTPUT POWER
- 13.0dB TYPICAL POWER GAIN AT 18 GHz
- TYPICAL 0.75dB NOISE FIGURE AND 12.5dB ASSOCIATED GAIN AT 12GHz
- 0.3 X 180 MICRON RECESSED "MUSHROOM" GATE
- $Si_3N_4$  PASSIVATION
- ADVANCED EPITAXIAL HETEROJUNCTION PROFILE PROVIDES EXTRA HIGH POWER EFFICIENCY, AND HIGH RELIABILITY
- $I_{dss}$  SORTED IN 5 mA PER BIN RANGE



Chip Thickness:  $75 \pm 13$  micron  
All Dimensions in Microns



Caution! ESD sensitive device.

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

SYMBOL	PARAMETERS/TEST CONDITIONS <sup>1</sup>	MIN	TYP	MAX	UNITS
$P_{1dB}$	Output Power at 1dB Compression $V_{DS} = 6 V, I_{DS} \approx 50\% I_{dss}$		$f = 12GHz$ 20.0* $f = 18GHz$ 20.0*		dBm
$G_{1dB}$	Gain at 1dB Compression $V_{DS} = 6 V, I_{DS} \approx 50\% I_{dss}$		$f = 12GHz$ 14.5 $f = 18GHz$ 13.0		dB
PAE	Power Added Efficiency at 1dB Compression $V_{ds}=6V, I_{ds}=50\% I_{dss}$		$f=12Ghz$ 48		%
NF	Noise Figure, $f = 12GHz$ $V_{DS} = 2 V, I_{DS} \approx 15 mA$		0.75		dB
Ga	Associated Gain, $f = 12GHz$ $V_{DS} = 2 V, I_{DS} \approx 15 mA$		12.5		dB
$I_{dss}$	Saturated Drain Current $V_{DS} = 3 V, V_{GS} = 0 V$	30	55	80	mA
$G_M$	Transconductance $V_{DS} = 3 V, V_{GS} = 0 V$	35	60		mS
$V_P$	Pinch-off Voltage $V_{DS} = 3 V, I_{DS} = 1.0 mA$		-1.0	-2.5	V
$BV_{GD}$	Drain Breakdown Voltage $I_{GD} = 0.5mA$	-9	-15		V
$BV_{GS}$	Source Breakdown Voltage $I_{GS} = 0.5mA$	-7	-14		V
$R_{TH}$	Thermal Resistance (Au-Sn Eutectic Attach)		185		$^\circ C/W$

\* $P_{1dB} = 21.5dBm$  can be obtained with 8v/50%  $I_{dss}$  bias. Consult factory for wafer selection.

### MAXIMUM RATINGS AT 25°C

SYMBOL	CHARACTERISTIC	ABSOLUTE <sup>1</sup>	CONTINUOUS <sup>2</sup>
$V_{ds}$	Drain to Source Voltage	12V	6 V
$V_{GS}$	Gate to Source Voltage	-8V	- 3 V
$I_{ds}$	Drain Current	$I_{dss}$	$I_{dss}$
$I_{GSF}$	Forward Gate Current	9mA	1.5 mA
$P_{IN}$	Input Power	16dBm	@ 3dB compression
$T_{CH}$	Channel Temperature	175°C	150°C
$T_{STG}$	Storage Temperature	-65/175°C	-65/150°C
$P_T$	Total Power Dissipation	740mW	625mW

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.



# EPA018B

ISSUED 11/01/2007

## High Efficiency Heterojunction Power FET

### S-PARAMETERS

6V, 1/2 IDSS										2V, 15mA							
FREQ (GHz)	- S11 -		- S21 -		- S12 -		- S22 -		FREQ (GHz)	- S11 -		- S21 -		- S12 -		- S22 -	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.0	0.980	-13.0	4.681	169.2	0.010	77.2	0.837	-3.5	1.0	1.000	-11.0	5.013	170.5	0.017	79.9	0.631	-6.1
2.0	0.969	-25.7	4.581	160.2	0.020	71.8	0.830	-7.2	2.0	0.990	-21.5	4.947	162.8	0.032	73.8	0.622	-12.6
3.0	0.953	-38.3	4.476	151.2	0.030	67.3	0.819	-10.8	3.0	0.976	-32.1	4.862	154.8	0.047	69.2	0.609	-19.0
4.0	0.933	-50.7	4.339	142.0	0.037	61.9	0.803	-14.8	4.0	0.962	-42.6	4.759	146.8	0.061	62.5	0.590	-25.7
5.0	0.908	-63.2	4.206	132.9	0.044	54.3	0.783	-18.9	5.0	0.941	-53.4	4.643	138.3	0.073	56.0	0.558	-33.1
6.0	0.888	-74.6	4.017	124.3	0.050	48.5	0.765	-22.7	6.0	0.922	-63.6	4.479	130.6	0.084	49.9	0.535	-39.9
7.0	0.868	-84.9	3.825	116.2	0.054	42.9	0.748	-26.8	7.0	0.905	-73.1	4.298	123.1	0.094	43.9	0.511	-46.9
8.0	0.850	-94.8	3.635	108.5	0.058	37.9	0.734	-30.6	8.0	0.883	-82.0	4.112	116.0	0.103	38.2	0.490	-53.5
9.0	0.833	-103.7	3.440	101.2	0.061	32.3	0.720	-34.4	9.0	0.864	-90.4	3.938	109.3	0.108	32.9	0.469	-60.0
10.0	0.815	-111.8	3.260	94.4	0.062	28.2	0.708	-37.7	10.0	0.846	-97.9	3.753	103.1	0.114	27.6	0.450	-65.4
11.0	0.807	-119.7	3.108	87.9	0.065	23.9	0.700	-41.1	11.0	0.829	-105.3	3.615	97.0	0.120	23.1	0.436	-70.8
12.0	0.793	-127.2	2.963	81.8	0.066	20.3	0.691	-43.8	12.0	0.819	-112.4	3.472	91.3	0.124	18.8	0.422	-75.4
13.0	0.785	-135.1	2.852	75.6	0.067	16.4	0.683	-46.4	13.0	0.804	-120.0	3.360	85.4	0.130	14.1	0.400	-80.2
14.0	0.775	-143.2	2.749	69.6	0.069	12.9	0.676	-48.4	14.0	0.792	-128.0	3.274	79.7	0.134	9.6	0.379	-84.5
15.0	0.768	-151.8	2.663	63.4	0.070	9.5	0.664	-50.6	15.0	0.784	-136.3	3.181	74.0	0.139	5.0	0.357	-89.3
16.0	0.763	-161.0	2.585	57.1	0.071	6.7	0.655	-52.6	16.0	0.777	-145.0	3.116	67.7	0.144	0.6	0.330	-95.2
17.0	0.762	-170.3	2.515	50.6	0.074	3.4	0.641	-54.7	17.0	0.770	-155.2	3.019	61.0	0.148	-4.3	0.297	-102.0
18.0	0.757	180.0	2.423	44.1	0.076	0.2	0.626	-56.7	18.0	0.773	-165.3	2.932	54.4	0.153	-9.5	0.260	-111.1
19.0	0.765	170.4	2.341	37.4	0.079	-2.4	0.604	-59.5	19.0	0.770	-175.2	2.813	47.7	0.155	-14.3	0.226	-121.2
20.0	0.767	162.2	2.254	30.8	0.081	-6.3	0.587	-63.0	20.0	0.771	175.3	2.696	41.0	0.156	-18.8	0.201	-135.4
21.0	0.780	155.3	2.138	24.4	0.080	-8.7	0.563	-69.3	21.0	0.780	169.2	2.466	35.3	0.150	-22.9	0.204	-156.1
22.0	0.791	148.7	2.031	18.3	0.081	-12.2	0.547	-74.8	22.0	0.777	163.2	2.327	30.2	0.149	-26.0	0.209	-168.6
23.0	0.795	143.4	1.918	12.1	0.080	-14.7	0.541	-81.1	23.0	0.793	157.9	2.206	25.0	0.147	-29.1	0.225	-177.7
24.0	0.804	138.9	1.824	6.4	0.079	-15.9	0.543	-87.9	24.0	0.789	154.9	2.096	20.6	0.145	-31.6	0.240	176.0
25.0	0.811	136.3	1.743	1.5	0.078	-16.3	0.553	-94.0	25.0	0.796	151.5	2.025	16.6	0.144	-34.3	0.260	172.7
26.0	0.807	134.9	1.676	-3.1	0.077	-17.8	0.564	-100.7	26.0	0.804	149.6	1.928	12.1	0.145	-36.0	0.272	169.4
27.0	0.817	133.7	1.603	-7.8	0.076	-17.2	0.580	-106.7	27.0	0.786	147.6	1.868	8.6	0.142	-37.7	0.282	168.5
28.0	0.816	131.8	1.544	-12.8	0.078	-16.7	0.592	-113.0	28.0	0.788	146.0	1.811	5.0	0.143	-39.3	0.287	166.7
29.0	0.806	130.5	1.520	-17.2	0.078	-16.7	0.611	-117.6	29.0	0.779	144.4	1.790	1.1	0.143	-41.4	0.293	164.7
30.0	0.804	128.8	1.494	-22.0	0.079	-17.3	0.618	-123.0	30.0	0.777	140.9	1.758	-3.4	0.145	-44.5	0.294	162.2
31.0	0.797	125.3	1.461	-27.2	0.081	-20.4	0.622	-127.6	31.0	0.769	137.1	1.723	-7.6	0.145	-46.8	0.292	157.2
32.0	0.795	121.1	1.435	-32.1	0.081	-20.9	0.615	-133.0	32.0	0.770	131.7	1.683	-12.6	0.145	-51.5	0.290	151.7
33.0	0.785	115.8	1.388	-38.3	0.080	-25.9	0.609	-138.5	33.0	0.758	126.2	1.606	-17.8	0.142	-55.4	0.287	143.1
34.0	0.787	110.2	1.351	-44.9	0.077	-27.8	0.592	-145.1	34.0	0.764	120.0	1.541	-22.6	0.140	-61.1	0.293	134.7
35.0	0.813	103.3	1.322	-51.4	0.077	-29.9	0.585	-152.5	35.0	0.777	114.3	1.497	-27.1	0.136	-64.6	0.311	122.2
36.0	0.830	97.4	1.263	-58.0	0.078	-34.9	0.578	-160.7	36.0	0.799	107.4	1.414	-31.6	0.134	-70.1	0.345	114.2
37.0	0.865	88.9	1.218	-65.3	0.076	-38.4	0.587	-170.1	37.0	0.824	101.9	1.339	-37.1	0.134	-75.6	0.384	104.6
38.0	0.886	84.5	1.144	-72.1	0.079	-43.6	0.599	-178.7	38.0	0.856	97.2	1.277	-41.9	0.130	-82.7	0.431	98.0
39.0	0.897	78.4	1.064	-79.8	0.079	-51.9	0.625	172.4	39.0	0.877	92.4	1.196	-47.5	0.126	-87.6	0.478	93.3
40.0	0.905	74.8	0.975	-86.4	0.078	-60.4	0.651	165.4	40.0	0.884	89.0	1.100	-52.6	0.123	-92.6	0.517	91.0

Note: The data included 0.7 mils diameter Au bonding wires: 1 gate wire, 15 mils each; 1 drain wire, 20 mils each; 6 source wires, 8 mils each.

Specifications are subject to change without notice.

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