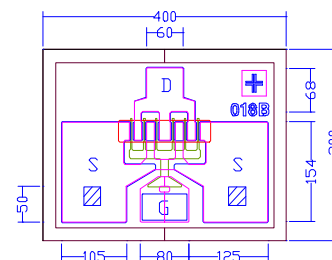



**DATA SHEET**
**High Efficiency Heterojunction Power FET**

- **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 AND VIA HOLE GROUNDING**
- **ADVANCED EPITAXIAL HETEROJUNCTION PROFILE PROVIDES EXTRA HIGH POWER EFFICIENCY, AND HIGH RELIABILITY**
- **$I_{dss}$  SORTED IN 5 mA PER BIN RANGE**



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

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

SYMBOLS	PARAMETERS/TEST CONDITIONS	MIN	TYP	MAX	UNIT
$P_{1dB}$	Output Power at 1dB Compression $V_{ds}=6V, I_{ds}=50\% I_{dss}$		$f=12GHz$ 18.0 $f=18GHz$ 20.0* 20.0*		dBm
$G_{1dB}$	Gain at 1dB Compression $V_{ds}=6V, I_{ds}=50\% I_{dss}$		$f=12GHz$ 13.0 $f=18GHz$ 14.5 13.0		dB
PAE	Power Added Efficiency at 1dB Compression $V_{ds}=6V, I_{ds}=50\% I_{dss}$		$f=12GHz$ 48		%
NF	Noise Figure $V_{ds}=2V, I_{ds}=15mA$		$f=12GHz$ 0.75		dB
$G_a$	Associated Gain $V_{ds}=2V, I_{ds}=15mA$		$f=12GHz$ 12.5		dB
$I_{dss}$	Saturated Drain Current $V_{ds}=3V, V_{gs}=0V$	30	55	80	mA
$G_m$	Transconductance $V_{ds}=3V, V_{gs}=0V$	35	60		mS
$V_p$	Pinch-off Voltage $V_{ds}=3V, I_{ds}=1.0mA$		-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)		140		$^\circ C/W$

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

**MAXIMUM RATINGS AT  $25^\circ C$** 

SYMBOLS	PARAMETERS	ABSOLUTE <sup>1</sup>	CONTINUOUS <sup>2</sup>
$V_{ds}$	Drain-Source Voltage	12V	6V
$V_{gs}$	Gate-Source Voltage	-8V	-3V
$I_{ds}$	Drain Current	$I_{dss}$	$I_{dss}$
$I_{gsf}$	Forward Gate Current	9mA	1.5mA
$P_{in}$	Input Power	16dBm	@ 3dB Compression
$T_{ch}$	Channel Temperature	175 $^\circ C$	150 $^\circ C$
$T_{stg}$	Storage Temperature	-65/175 $^\circ C$	-65/150 $^\circ C$
$P_t$	Total Power Dissipation	950mW	800mW

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.

## DATA SHEET

### High Efficiency Heterojunction Power FET

#### S-PARAMETERS

2V, 15mA

#### S-PARAMETERS

6V, 1/2 Idss

2V, 15mA									6V, 1/2 Idss								
FREQ	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---		FREQ	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
(GHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	(GHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.0	0.985	-12.3	5.362	169.7	0.017	82.3	0.710	-5.8	1	0.984	-14.6	5.256	168.2	0.012	78.66	0.836	-3.94
2.0	0.979	-24.4	5.277	161.4	0.034	75.5	0.702	-11.8	2	0.975	-28.9	5.134	158.5	0.021	74.5	0.828	-7.92
3.0	0.964	-36.4	5.158	152.7	0.048	67.6	0.683	-17.8	3	0.952	-42.8	4.956	148.7	0.031	66.46	0.813	-11.8
4.0	0.957	-48.5	5.038	144.1	0.063	60.7	0.661	-23.8	4	0.938	-56.6	4.783	139	0.039	59.32	0.795	-15.5
5.0	0.933	-60.2	4.943	136.1	0.076	54.2	0.644	-30.3	5	0.911	-70.2	4.638	129.8	0.047	52.76	0.777	-19.5
6.0	0.920	-69.9	4.746	128.3	0.087	47.8	0.613	-36.1	6	0.891	-80.8	4.374	121.6	0.053	46.88	0.755	-23
7.0	0.915	-79.1	4.563	120.7	0.097	41.7	0.573	-41.5	7	0.882	-90.5	4.142	113.8	0.057	41.16	0.731	-26.3
8.0	0.902	-87.1	4.374	113.6	0.105	35.9	0.527	-47.8	8	0.866	-98.7	3.931	106.7	0.061	35.57	0.702	-30.2
9.0	0.892	-95.4	4.198	106.2	0.112	29.3	0.478	-54.7	9	0.856	-107	3.751	99.4	0.065	30.97	0.671	-34.3
10.0	0.864	-104.9	4.040	98.6	0.119	22.8	0.430	-63.5	10	0.831	-116	3.596	91.83	0.068	24.54	0.638	-39.1
11.0	0.843	-115.7	3.858	90.8	0.123	16.3	0.391	-72.2	11	0.817	-127	3.428	83.74	0.07	18.87	0.613	-43.8
12.0	0.825	-127.6	3.643	83.1	0.126	9.6	0.354	-79.8	12	0.806	-138	3.214	75.82	0.07	13.05	0.589	-47.8
13.0	0.822	-138.3	3.408	75.7	0.128	3.8	0.318	-86.2	13	0.81	-148	2.992	68.49	0.07	8.4	0.57	-51.2
14.0	0.808	-147.8	3.179	68.9	0.127	-2.5	0.288	-93.9	14	0.802	-157	2.794	61.66	0.069	2.96	0.551	-55.3
15.0	0.806	-158.2	2.984	62.4	0.127	-7.5	0.273	-99.4	15	0.807	-167	2.614	55.19	0.069	-0.85	0.544	-58.5
16.0	0.808	-168.9	2.805	56.0	0.125	-12.4	0.263	-102.7	16	0.81	-177	2.439	48.26	0.068	-3.99	0.543	-60.5
17.0	0.814	-178.1	2.619	50.2	0.125	-16.3	0.248	-102.3	17	0.818	174.2	2.264	42.45	0.067	-6.76	0.547	-60.9
18.0	0.823	175.9	2.490	44.9	0.126	-20.0	0.221	-105.1	18	0.823	168.7	2.144	37.22	0.069	-9.38	0.536	-62
19.0	0.809	170.2	2.415	40.0	0.129	-23.5	0.202	-108.8	19	0.809	163.2	2.082	32.49	0.072	-11.2	0.533	-63.7
20.0	0.806	162.6	2.375	33.9	0.134	-27.8	0.183	-115.1	20	0.805	155.7	2.052	26.57	0.075	-13.6	0.525	-65.5
21.0	0.792	169.1	2.314	31.0	0.138	-29.0	0.137	-146.1	21	0.791	163	2.07	24.17	0.081	-13.6	0.471	-74.5
22.0	0.813	163.4	2.207	25.5	0.137	-33.0	0.131	-169.8	22	0.818	158	2.01	18.33	0.082	-17.4	0.439	-80.4
23.0	0.788	160.3	2.085	20.2	0.136	-36.6	0.153	171.0	23	0.796	155.5	1.933	12.63	0.083	-19.6	0.415	-90.3
24.0	0.787	153.7	1.994	14.3	0.135	-40.8	0.192	156.4	24	0.804	149	1.883	5.46	0.085	-22.8	0.392	-102
25.0	0.774	147.2	1.877	8.4	0.131	-44.9	0.227	151.5	25	0.789	143	1.777	-1.34	0.083	-26.6	0.393	-113
26.0	0.789	139.7	1.749	3.0	0.126	-49.3	0.240	144.9	26	0.817	136	1.665	-7.64	0.083	-30.4	0.387	-121
27.0	0.798	138.7	1.635	-1.5	0.121	-51.6	0.251	137.6	27	0.831	135	1.578	-12.8	0.078	-30.7	0.381	-129
28.0	0.817	136.4	1.524	-6.3	0.117	-54.5	0.272	128.0	28	0.842	133.2	1.477	-18.7	0.077	-32.9	0.369	-141
29.0	0.823	136.5	1.447	-11.0	0.113	-57.6	0.308	121.7	29	0.854	133.3	1.417	-24.7	0.075	-36.3	0.379	-155
30.0	0.814	133.7	1.363	-15.6	0.110	-62.0	0.335	116.4	30	0.845	130.6	1.342	-30.7	0.072	-38.4	0.394	-167
31.0	0.819	131.4	1.279	-19.6	0.104	-65.3	0.359	114.8	31	0.844	128.2	1.256	-36.4	0.071	-41.7	0.424	-176
32.0	0.807	128.7	1.206	-23.7	0.100	-68.4	0.375	113.1	32	0.836	125.4	1.176	-41.5	0.067	-46.1	0.441	177.8
33.0	0.817	126.1	1.153	-27.3	0.099	-71.5	0.390	113.0	33	0.847	123.2	1.115	-46.2	0.065	-50.1	0.465	172.9
34.0	0.815	122.9	1.096	-30.3	0.098	-74.7	0.402	111.5	34	0.844	120.1	1.06	-50.5	0.063	-53.6	0.483	168.6
35.0	0.838	120.4	1.054	-33.2	0.095	-79.5	0.423	112.2	35	0.87	117.6	1.011	-54.7	0.062	-55.9	0.51	165.4
36.0	0.828	118.5	1.026	-36.7	0.099	-82.1	0.437	109.7	36	0.862	115.5	0.981	-58.9	0.063	-60.3	0.521	161
37.0	0.854	113.2	1.016	-40.4	0.103	-88.7	0.463	107.9	37	0.889	110	0.97	-64	0.066	-64.1	0.547	157.5
38.0	0.843	111.0	0.983	-44.8	0.108	-93.4	0.474	102.8	38	0.872	107.6	0.937	-69	0.07	-70.2	0.557	151.7
39.0	0.861	109.2	0.958	-49.2	0.113	-99.1	0.497	98.0	39	0.886	105.5	0.917	-74.7	0.075	-75.9	0.576	143.4
40.0	0.848	109.9	0.921	-54.1	0.114	-105.4	0.527	89.5	40	0.876	106.2	0.892	-81.4	0.084	-86.4	0.592	131.2

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