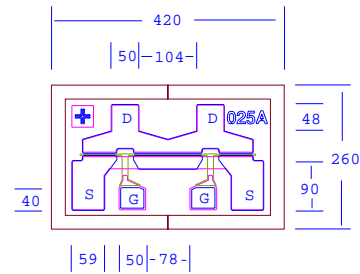


High Efficiency Heterojunction Power FET

- +22.5dBm TYPICAL OUTPUT POWER
- 11.0dB TYPICAL POWER GAIN AT 18 GHz
- TYPICAL 0.85dB NOISE FIGURE AND 11.0dB ASSOCIATED GAIN AT 12GHz
- 0.3 X 250 MICRON RECESSED “MUSHROOM” GATE
- Si₃N₄ PASSIVATION
- ADVANCED EPITAXIAL HETEROJUNCTION PROFILE PROVIDES EXTRA HIGH POWER EFFICIENCY, AND HIGH RELIABILITY



Chip Thickness: 75 ± 13 microns
 All Dimensions In Microns

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

SYMBOLS	PARAMETERS/TEST CONDITIONS		MIN	TYP	MAX	UNIT
P_{1dB}	Output Power at 1dB Compression	f=12GHz V _{ds} =8V, I _{ds} =50% I _{dss}	21.0	22.5		dBm
G_{1dB}	Gain at 1dB Compression	f=12GHz V _{ds} =8V, I _{ds} =50% I _{dss}	12.0	13.5		dB
PAE	Gain at 1dB Compression	f=12GHz V _{ds} =8V, I _{ds} =50% I _{dss}		47		%
NF	Noise Figure	f=12GHz V _{ds} =2V, I _{ds} =15mA		0.85		dB
G_a	Associated Gain	f=12GHz V _{ds} =2V, I _{ds} =15mA		11.0		dB
I_{dss}	Saturated Drain Current	V _{ds} =3V, V _{gs} =0V		75	105	mA
G_m	Transconductance	V _{ds} =3V, V _{gs} =0V	50	80		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} =1.0mA	-11	-15		V
BV_{gs}	Source Breakdown Voltage	I _{gs} =1.0mA	-7	-14		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			155		°C/W

MAXIMUM RATINGS AT 25°C

SYMBOLS	PARAMETERS	ABSOLUTE ¹
V_{ds}	Drain-Source Voltage	12V
V_{gs}	Gate-Source Voltage	-8V
I_{ds}	Drain Current	I _{dss}
I_{gsf}	Forward Gate Current	12mA
P_{in}	Input Power	19dBm
T_{ch}	Channel Temperature	175°C
T_{stg}	Storage Temperature	-65/175°C
P_t	Total Power Dissipation	880mW

Note: 1. Exceeding any of the above ratings may result in permanent damage.

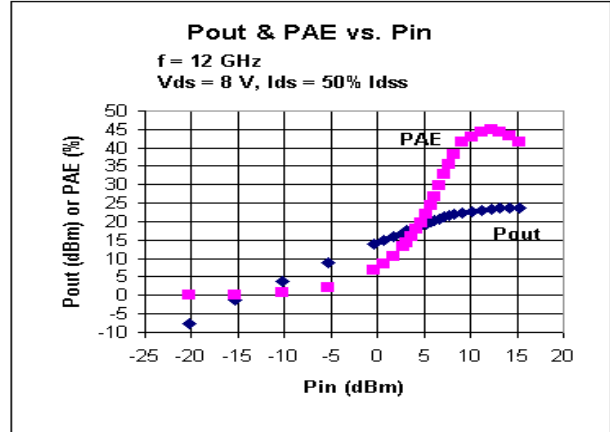
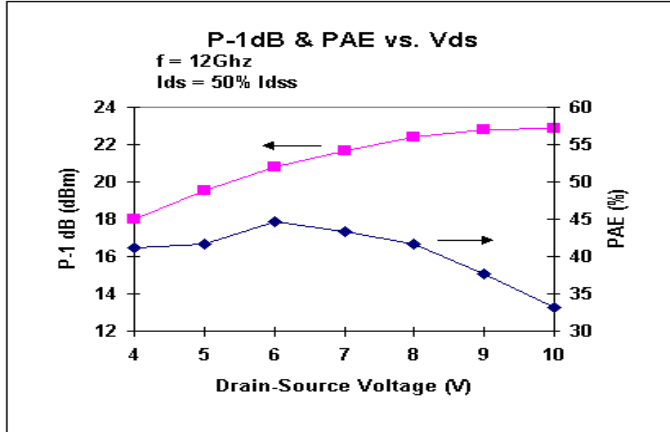
Recommended conditions for reliable operation is V_{ds} of 8V maximum, channel temperature below 150 °C, and input power lower than 3dB gain compression point.

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High Efficiency Heterojunction Power FET



S-PARAMETERS 8V, 1/2 Idss

FREQ (GHz)	S11 MAG	S11 ANG	S21 MAG	S21 ANG	S12 MAG	S12 ANG	S22 MAG	S22 ANG
1.0	0.977	-18.0	5.880	165.4	0.013	76.4	0.824	-5.7
2.0	0.956	-35.4	5.651	153.1	0.024	69.4	0.811	-11.6
3.0	0.920	-51.6	5.344	141.0	0.033	62.0	0.780	-16.7
4.0	0.890	-67.1	4.998	129.8	0.040	53.8	0.752	-22.2
5.0	0.860	-81.1	4.600	119.2	0.046	48.5	0.721	-27.3
6.0	0.837	-93.0	4.216	109.7	0.048	43.0	0.701	-32.5
7.0	0.820	-103.5	3.858	101.0	0.050	38.3	0.684	-38.0
8.0	0.808	-112.4	3.521	93.0	0.051	34.3	0.672	-43.4
9.0	0.798	-119.7	3.208	85.7	0.050	30.0	0.660	-48.9
10.0	0.790	-125.1	2.942	79.7	0.047	27.3	0.658	-53.7
11.0	0.788	-130.0	2.717	73.5	0.046	26.3	0.660	-58.6
12.0	0.784	-134.0	2.525	68.0	0.045	25.8	0.663	-63.4
13.0	0.781	-137.6	2.362	62.8	0.044	24.4	0.665	-67.7
14.0	0.779	-140.9	2.239	58.1	0.043	25.2	0.665	-71.4
15.0	0.781	-144.5	2.153	52.9	0.043	25.7	0.669	-75.3
16.0	0.780	-148.3	2.088	47.9	0.044	28.7	0.675	-79.2
17.0	0.776	-153.2	2.022	42.2	0.048	27.3	0.669	-84.2
18.0	0.776	-158.1	1.975	36.6	0.053	26.8	0.662	-88.9
19.0	0.776	-163.2	1.943	30.3	0.057	26.4	0.654	-94.8
20.0	0.773	-169.1	1.902	23.6	0.062	23.9	0.651	-101.7
21.0	0.778	-176.3	1.773	15.8	0.064	21.3	0.640	-112.8
22.0	0.782	-179.5	1.687	8.8	0.068	18.9	0.650	-122.9
23.0	0.788	-175.3	1.592	1.5	0.071	16.5	0.667	-132.8
24.0	0.792	-172.1	1.488	-5.4	0.074	15.5	0.689	-142.0
25.0	0.805	-170.2	1.390	-11.8	0.075	15.4	0.715	-150.5
26.0	0.800	-169.2	1.272	-17.1	0.078	17.5	0.751	-156.8
27.0	0.806	-168.2	1.179	-21.7	0.080	18.7	0.763	-162.7
28.0	0.818	-168.3	1.103	-25.2	0.085	20.1	0.789	-166.0
29.0	0.828	-168.0	1.033	-28.4	0.092	23.5	0.800	-169.2
30.0	0.820	-167.7	0.974	-31.4	0.098	23.1	0.808	-171.5
31.0	0.824	-167.4	0.927	-34.1	0.104	23.6	0.809	-173.9
32.0	0.819	-166.8	0.903	-36.6	0.106	22.6	0.811	-176.6
33.0	0.809	-165.5	0.873	-39.9	0.109	21.1	0.813	-179.6
34.0	0.803	-163.0	0.869	-44.4	0.110	19.2	0.809	-174.9
35.0	0.799	-159.4	0.865	-49.8	0.111	17.2	0.820	-167.7
36.0	0.800	-155.1	0.858	-56.9	0.113	16.4	0.837	-158.4
37.0	0.810	-149.3	0.856	-65.2	0.118	10.1	0.864	-146.7
38.0	0.823	-142.4	0.832	-74.5	0.120	0.4	0.875	-134.4
39.0	0.832	-132.4	0.787	-85.9	0.121	-12.8	0.895	-122.9
40.0	0.822	-125.1	0.716	-96.2	0.111	-27.3	0.899	-113.0

Note: The data included 0.7 mils diameter Au bonding wires
2 gate wires, 15 mils each; 2 drain wires, 20 mils each; 4 source wires, 7 mils each.

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High Efficiency Heterojunction Power FET S-PARAMETERS 2V, 15mA

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	0.990	-16.2	6.768	167.3	0.020	80.0	0.615	-10.6	21.0	0.711	179.5	2.038	33.0	0.116	-6.7	0.353	-136.9
2.0	0.961	-32.3	6.535	155.4	0.039	70.1	0.597	-20.8	22.0	0.722	174.6	1.933	27.9	0.114	-8.8	0.343	-146.9
3.0	0.933	-48.0	6.261	144.1	0.055	61.5	0.561	-31.3	23.0	0.723	171.1	1.838	23.1	0.113	-10.9	0.361	-156.4
4.0	0.897	-63.8	5.880	133.0	0.069	53.2	0.523	-41.8	24.0	0.724	166.4	1.713	18.0	0.111	-12.5	0.390	-165.8
5.0	0.866	-76.5	5.414	123.7	0.078	46.3	0.503	-50.0	25.0	0.739	163.2	1.600	14.2	0.108	-13.3	0.418	-168.9
6.0	0.833	-88.2	4.964	115.0	0.086	40.0	0.468	-57.7	26.0	0.739	161.9	1.487	10.8	0.104	-13.4	0.458	-172.1
7.0	0.810	-98.6	4.585	107.0	0.091	34.6	0.441	-66.2	27.0	0.740	161.8	1.405	9.1	0.104	-12.2	0.482	-169.3
8.0	0.789	-108.0	4.215	99.9	0.095	29.8	0.419	-73.2	28.0	0.730	161.3	1.356	6.6	0.103	-11.3	0.519	-168.9
9.0	0.769	-115.9	3.893	93.4	0.098	25.3	0.406	-80.1	29.0	0.715	159.4	1.333	4.5	0.106	-10.4	0.521	-166.2
10.0	0.753	-122.8	3.614	87.6	0.099	21.1	0.390	-86.4	30.0	0.709	155.1	1.307	0.7	0.107	-10.6	0.530	-166.6
11.0	0.738	-129.6	3.371	81.6	0.101	18.0	0.388	-93.0	31.0	0.710	151.4	1.292	-2.3	0.111	-12.3	0.508	-166.0
12.0	0.728	-136.3	3.141	76.0	0.101	14.3	0.378	-99.2	32.0	0.691	149.3	1.273	-6.0	0.113	-13.2	0.511	-169.7
13.0	0.722	-141.0	2.925	71.2	0.102	11.9	0.390	-105.0	33.0	0.685	143.3	1.280	-11.0	0.115	-16.8	0.493	-174.4
14.0	0.711	-144.8	2.754	67.0	0.102	9.2	0.407	-106.6	34.0	0.678	137.2	1.238	-15.8	0.115	-19.8	0.492	179.1
15.0	0.700	-149.3	2.635	62.5	0.104	7.6	0.408	-106.9	35.0	0.692	132.2	1.211	-19.7	0.116	-23.0	0.490	171.5
16.0	0.696	-156.8	2.550	57.2	0.107	5.0	0.396	-110.5	36.0	0.702	129.0	1.182	-24.3	0.115	-26.4	0.490	167.3
17.0	0.698	-164.6	2.430	51.6	0.108	1.8	0.389	-115.8	37.0	0.709	122.3	1.173	-29.7	0.117	-30.7	0.469	156.7
18.0	0.704	-170.3	2.298	46.7	0.109	-0.6	0.377	-119.9	38.0	0.740	114.8	1.112	-37.4	0.118	-39.7	0.494	140.6
19.0	0.710	-174.8	2.201	41.9	0.111	-2.9	0.369	-125.2	39.0	0.776	113.3	1.009	-41.2	0.112	-43.4	0.553	135.6
20.0	0.709	-179.4	2.117	36.8	0.112	-5.4	0.373	-131.6	40.0	0.793	118.4	0.919	-40.8	0.108	-42.6	0.547	142.6

EPA025A Noise Parameters Vds=2V, Ids=15mA				
Freq	Gamma Opt		Nfmin	Rn/50
(GHz)	(MAG)	(ANG)	(dB)	
2	0.82	17	0.37	0.57
4	0.8	36	0.46	0.51
6	0.78	49	0.56	0.49
8	0.76	63	0.64	0.44
10	0.73	79	0.76	0.39
12	0.71	94	0.88	0.35
14	0.69	103	1.08	0.31
16	0.68	118	1.31	0.26
18	0.68	131	1.51	0.19
20	0.67	142	1.65	0.14
22	0.66	149	1.88	0.12
24	0.64	162	2.05	0.076
26	0.62	172	2.29	0.064

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High Efficiency Heterojunction Power FET

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