



# EPA060B-70

## DATA SHEET

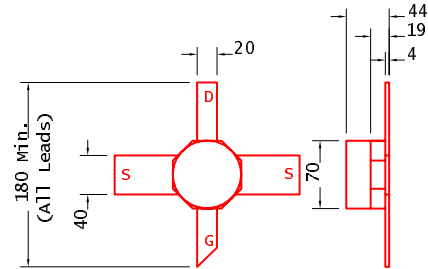
### High Efficiency Heterojunction Power FET

#### Features

- NON-HERMETIC LOW COST CERAMIC 70mil PACKAGE
- +26dBm TYPICAL OUTPUT POWER
- 9.0dB TYPICAL POWER GAIN AT 12 GHz
- 0.4 dB TYPICAL NOISE FIGURE AT 2GHz
- 20 dB TYPICAL ASSOCIATED GAIN AT 2 GHz
- 0.3 X 600 MICRON RECESSED "MUSHROOM" GATE
- Si<sub>3</sub>N<sub>4</sub> PASSIVATION
- ADVANCED EPITAXIAL HETEROJUNCTION PROFILE PROVIDES EXTRA HIGH POWER EFFICIENCY, AND HIGH RELIABILITY

#### Applications

- High Dynamic Range LNA
- DC to 18 GHz



All Dimensions In mils.

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

SYMBOLS	PARAMETERS/TEST CONDITIONS	MIN	TYP	MAX	UNIT
P <sub>1dB</sub>	Output Power at 1dB Compression V <sub>ds</sub> =6V, I <sub>ds</sub> =50% I <sub>ds</sub>	f=2GHz 24.0	f=12GHz 26.0 25.5		dBm
G <sub>1dB</sub>	Gain at 1dB Compression V <sub>ds</sub> =6V, I <sub>ds</sub> =50% I <sub>ds</sub>	f=2GHz 17.0	f=12GHz 19.0 9.0		dB
PAE	Power Added Efficiency at 1dB Compression V <sub>ds</sub> =6V, I <sub>ds</sub> =50% I <sub>ds</sub>	f=2GHz	f=12GHz 55 45		%
IP3	+5dBm P <sub>OUT</sub> /Tone (5V/50mA) (5V/90mA)	f=2GHz	28 31		dBm
NF	Noise Figure (5V/50mA) (5V/90mA)	f=2GHz	0.4 0.6		dB
G <sub>A</sub>	Associated Gain (5V/50mA) (5V/90mA)	f=2GHz	20.0 20.0		dB
I <sub>ds</sub>	Saturated Drain Current V <sub>ds</sub> =3V, V <sub>gs</sub> =0V	110	180	250	mA
G <sub>m</sub>	Transconductance V <sub>ds</sub> =3V, V <sub>gs</sub> =0V	120	190		mS
V <sub>p</sub>	Pinch-off Voltage V <sub>ds</sub> =3V, I <sub>ds</sub> =2.0mA		-1.0	-2.5	V
BV <sub>gd</sub>	Drain Breakdown Voltage I <sub>gd</sub> =1.0mA	-10	-15		V
BV <sub>gs</sub>	Source Breakdown Voltage I <sub>gs</sub> =1.0mA	-6	-14		V
R <sub>th</sub>	Thermal Resistance		175*		°C/W

\* Overall R<sub>th</sub> depends on case mounting.

#### MAXIMUM RATINGS AT 25°C

SYMBOLS	PARAMETERS	ABSOLUTE <sup>1</sup>	CONTINUOUS <sup>2</sup>
V <sub>ds</sub>	Drain-Source Voltage	10V	6V
V <sub>gs</sub>	Gate-Source Voltage	-6V	-3V
I <sub>ds</sub>	Drain Current	I <sub>ds</sub>	110mA
I <sub>gsf</sub>	Forward Gate Current	30mA	5mA
P <sub>in</sub>	Input Power	23dBm	@ 3dB Compression
T <sub>ch</sub>	Channel Temperature	175°C	150°C
T <sub>stg</sub>	Storage Temperature	-65/175°C	-65/150°C
P <sub>t</sub>	Total Power Dissipation	780mW	650mW

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.

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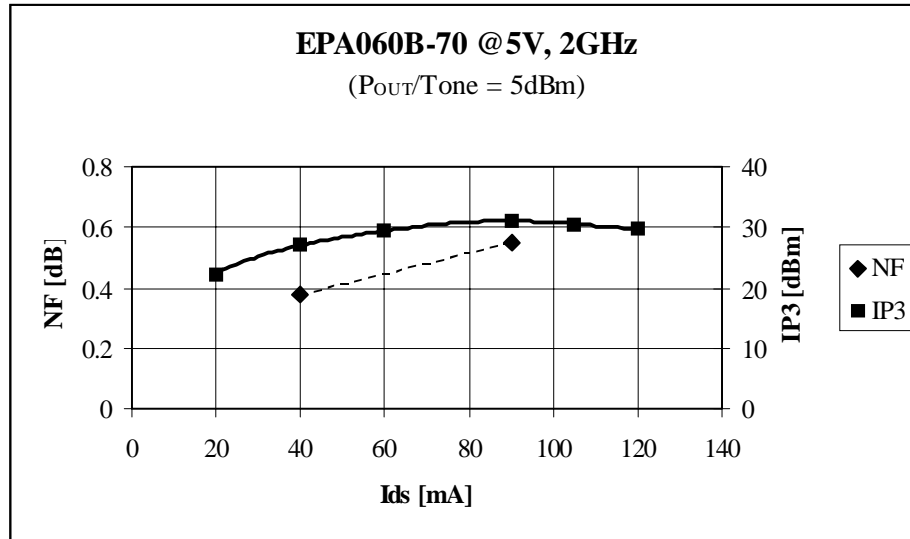
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### High Efficiency Heterojunction Power FET

#### Typical Performance

#### Noise Figure & IP3



#### S-PARAMETERS

FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.0	0.863	-58.2	12.375	135.5	0.026	63.8	0.523	-24.4
2.0	0.696	-101.1	9.063	104.4	0.039	49.7	0.433	-41.0
3.0	0.604	-132.0	6.850	82.3	0.049	43.5	0.388	-51.9
4.0	0.555	-159.5	5.508	63.6	0.055	39.1	0.360	-60.8
5.0	0.538	177.3	4.614	47.0	0.065	35.5	0.322	-70.3
6.0	0.534	160.5	4.002	31.8	0.074	30.5	0.288	-84.5
7.0	0.533	141.8	3.532	16.7	0.083	25.3	0.281	-98.4
8.0	0.540	125.9	3.168	2.3	0.092	19.2	0.254	-111.5
9.0	0.582	105.0	2.817	-12.9	0.101	11.6	0.235	-125.6
10.0	0.622	88.1	2.532	-28.1	0.108	2.7	0.220	-148.1
11.0	0.642	74.5	2.370	-43.9	0.119	-8.1	0.225	-176.6
12.0	0.674	60.3	2.195	-60.1	0.129	-19.3	0.238	155.7
13.0	0.727	47.7	1.970	-74.8	0.132	-30.2	0.244	130.0
14.0	0.764	36.4	1.758	-88.3	0.133	-40.6	0.263	110.6
15.0	0.776	22.6	1.618	-104.8	0.137	-54.2	0.316	90.1
16.0	0.790	8.5	1.441	-122.5	0.134	-69.5	0.358	66.2
17.0	0.781	-1.1	1.285	-135.3	0.133	-78.3	0.363	51.0
18.0	0.792	-9.8	1.221	-147.7	0.144	-91.0	0.396	41.9
19.0	0.811	-22.2	1.106	-163.8	0.142	-106.2	0.418	23.9
20.0	0.836	-32.5	1.016	-179.0	0.144	-121.0	0.445	6.7
21.0	0.800	-41.8	0.975	166.9	0.157	-134.6	0.461	-8.4
22.0	0.761	-54.5	0.941	152.3	0.176	-148.9	0.426	-22.5
23.0	0.800	-68.3	0.861	134.7	0.190	-167.5	0.399	-50.3
24.0	0.799	-80.2	0.764	117.1	0.204	173.5	0.417	-78.5
25.0	0.719	-98.1	0.751	103.1	0.239	157.7	0.451	-87.9
26.0	0.718	-119.4	0.750	85.7	0.291	137.6	0.450	-110.4

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#### S-PARAMETERS

5V,50ma

FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.0	0.948	-57.7	14.366	129.2	0.032	54.0	0.439	-48.4
2.0	0.739	-100.4	9.162	106.8	0.042	45.1	0.438	-44.9
3.0	0.656	-132.4	7.008	84.9	0.050	36.7	0.392	-56.7
4.0	0.619	-155.0	5.629	67.5	0.056	31.8	0.352	-64.7
5.0	0.597	-176.9	4.740	51.0	0.062	26.9	0.298	-74.4
6.0	0.577	162.1	4.086	35.5	0.069	22.1	0.284	-90.6
7.0	0.580	141.7	3.546	21.4	0.075	18.2	0.287	-96.4
8.0	0.616	122.1	3.145	6.6	0.081	11.3	0.264	-103.5
9.0	0.618	117.3	2.918	-7.4	0.088	4.0	0.148	-131.4
10.0	0.633	99.5	2.657	-22.4	0.097	-1.1	0.185	-169.4
11.0	0.673	76.6	2.345	-36.9	0.101	-10.0	0.208	-168.3
12.0	0.718	63.1	2.142	-50.5	0.108	-18.0	0.156	179.2
13.0	0.761	59.0	1.999	-65.3	0.117	-27.9	0.223	117.8
14.0	0.777	44.3	1.767	-81.5	0.118	-40.9	0.321	97.0
15.0	0.779	30.7	1.543	-91.8	0.115	-46.4	0.287	96.4
16.0	0.816	14.8	1.418	-107.4	0.117	-59.0	0.265	77.7
17.0	0.827	11.9	1.307	-123.3	0.121	-70.7	0.445	49.2
18.0	0.822	2.7	1.114	-132.8	0.114	-77.5	0.460	49.8
19.0	0.852	-9.8	1.090	-144.6	0.123	-87.1	0.424	38.2
20.0	0.868	-19.9	1.001	-158.4	0.122	-99.4	0.442	21.5
21.0	0.846	-31.4	0.911	-174.9	0.120	-114.7	0.576	9.4
22.0	0.838	-32.7	0.856	176.8	0.125	-121.6	0.515	9.9
23.0	0.860	-47.9	0.832	160.7	0.130	-137.4	0.446	-22.9
24.0	0.835	-66.2	0.763	141.8	0.128	-156.0	0.536	-40.8
25.0	0.819	-80.1	0.710	126.8	0.130	-170.6	0.536	-41.4
26.0	0.868	-78.4	0.699	111.8	0.145	174.2	0.383	-78.0

#### EPA060B-70 Noise Parameters

V<sub>ds</sub>=5V, I<sub>ds</sub>=50mA

Freq. (GHz)	Gamma Opt		Nfmin (dB)	Rn/50
	(MAG)	(ANG)		
2	0.46	44	0.45	0.11
4	0.35	96	0.55	0.08
6	0.23	165	0.75	0.06
8	0.27	-145	0.92	0.08
10	0.35	-85	1.37	0.23
12	0.46	-58	1.47	0.44
14	0.58	-33	1.92	0.89
16	0.68	-6	2.47	1.3
18	0.63	7	3.03	1.78
20	0.68	33	3.24	1.87
22	0.63	50	3.43	1.81
24	0.67	92	3.65	1.56
26	0.72	120	3.86	1.16

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