



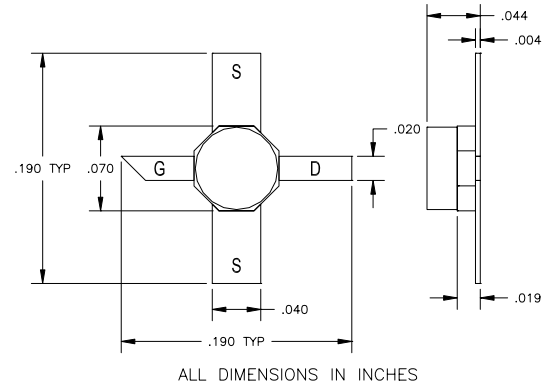
# EFA025A-70

UPDATED 04/28/2006

## Low Distortion GaAs Power FET

### FEATURES

- None-Hermetic Low Cost Ceramic 70mil Package
- +20.0 dBm Output Power at 1dB Compression
- 10.0 dB Power Gain at 12GHz
- 7.0 dB Power Gain at 18GHz
- Typical 1.50 dB Noise Figure and 10.0 dB Associated Gain at 12GHz
- 0.3 x 250 Micron Recessed "Mushroom" Gate
- Si<sub>3</sub>N<sub>4</sub> Passivation
- Advanced Epitaxial Heterojunction Profile Provides High Power Efficiency, Linearity and Reliability



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



Caution! ESD sensitive device.

SYMBOL	PARAMETERS/TEST CONDITIONS <sup>1</sup>	MIN	TYP	MAX	UNITS
P <sub>1dB</sub>	Output Power at 1dB Compression V <sub>DS</sub> = 6V, I <sub>DS</sub> ≈ 50% I <sub>DSS</sub>	17.0	20.0 20.0		dBm
G <sub>1dB</sub>	Gain at 1dB Compression V <sub>DS</sub> = 6V, I <sub>DS</sub> ≈ 50% I <sub>DSS</sub>	8.5	10.0 7.0		dB
PAE	Power Added Efficiency at 1dB Compression V <sub>DS</sub> = 6V, I <sub>DS</sub> ≈ 50% I <sub>DSS</sub>		35		%
NF	Noise Figure V <sub>DS</sub> = 3V, I <sub>DS</sub> = 15mA		1.5		dB
GA	Associate Gain V <sub>DS</sub> = 3V, I <sub>DS</sub> = 15mA		10		dB
I <sub>DSS</sub>	Saturated Drain Current V <sub>DS</sub> = 3 V, V <sub>GS</sub> = 0 V	35	65	105	mA
G <sub>M</sub>	Transconductance V <sub>DS</sub> = 3 V, V <sub>GS</sub> = 0 V	30	40		mS
V <sub>P</sub>	Pinch-off Voltage V <sub>DS</sub> = 3 V, I <sub>DS</sub> = 1.0 mA		-2.0	-3.5	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		370*		°C/W

Notes: \* Overall Rth depends on case mounting.

### MAXIMUM RATINGS AT 25°C

SYMBOL	CHARACTERISTIC	VALUE
V <sub>DS</sub>	Drain to Source Voltage	6 V
V <sub>GS</sub>	Gate to Source Voltage	-4 V
I <sub>DS</sub>	Drain Current	52 mA
I <sub>Gsf</sub>	Forward Gate Current	1 mA
P <sub>IN</sub>	Input Power	@ 3dB compression
P <sub>T</sub>	Total Power Dissipation	310 mW
T <sub>CH</sub>	Channel Temperature	150°C
T <sub>STG</sub>	Storage Temperature	-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.

Specifications are subject to change without notice.

Excelics Semiconductor, Inc. 310 De Guigne Drive, Sunnyvale, CA 94085  
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Revised May 2006



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## Low Distortion GaAs Power FET

### S-PARAMETERS

$V_{DS} = 3V$ ,  $I_{DS} \approx 15mA$

FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.0	1.020	-17.0	4.385	159.6	0.030	75.6	0.549	-22.5
2.0	0.956	-37.8	3.291	142.6	0.043	64.4	0.611	-28.0
3.0	0.911	-56.4	3.114	125.5	0.060	52.4	0.601	-41.2
4.0	0.867	-73.0	2.944	109.6	0.072	42.4	0.577	-52.4
5.0	0.814	-89.2	2.856	93.8	0.084	32.3	0.535	-63.9
6.0	0.748	-105.5	2.697	78.2	0.089	22.3	0.514	-78.5
7.0	0.689	-124.2	2.523	64.0	0.092	14.6	0.511	-85.8
8.0	0.656	-144.7	2.424	49.6	0.096	6.5	0.489	-92.9
9.0	0.636	-151.0	2.334	36.0	0.098	-2.9	0.384	-111.2
10.0	0.584	-166.5	2.283	21.7	0.096	-4.4	0.390	-131.4
11.0	0.545	164.8	2.150	7.2	0.095	-10.8	0.432	-132.6
12.0	0.552	142.3	2.040	-5.8	0.095	-15.2	0.409	-133.6
13.0	0.589	134.6	1.982	-20.5	0.102	-21.4	0.351	-168.6
14.0	0.563	120.6	1.877	-36.0	0.100	-31.0	0.371	162.5
15.0	0.571	96.0	1.672	-50.1	0.096	-35.6	0.387	166.7
16.0	0.607	73.2	1.625	-63.4	0.098	-41.9	0.374	168.3
17.0	0.625	77.3	1.617	-78.1	0.108	-49.6	0.392	116.3
18.0	0.618	58.5	1.411	-92.5	0.105	-58.9	0.476	108.4
19.0	0.643	42.1	1.361	-102.2	0.109	-68.8	0.428	110.5
20.0	0.691	26.8	1.329	-116.0	0.103	-80.6	0.411	101.9
21.0	0.653	22.4	1.294	-135.8	0.105	-95.7	0.539	62.8
22.0	0.634	13.4	1.160	-146.5	0.103	-105.5	0.620	64.2
23.0	0.655	-8.1	1.172	-161.2	0.110	-120.8	0.479	61.0
24.0	0.646	-25.3	1.170	178.6	0.119	-141.1	0.478	34.5
25.0	0.563	-39.9	1.074	160.7	0.118	-159.4	0.624	17.3
26.0	0.596	-47.4	1.048	149.8	0.132	-169.1	0.562	15.8

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### S-PARAMETERS

VDS = 3V, IDS ≈ ½ Idss

FREQ (GHz)	--- S11 ---		--- S21 ---		--- S12 ---		--- S22 ---	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.0	0.985	-18.8	3.482	161.4	0.013	76.6	0.803	-11.3
2.0	0.953	-38	3.329	142.7	0.025	65.9	0.786	-24.1
3.0	0.913	-56	3.108	125.5	0.031	54.2	0.768	-36
4.0	0.872	-73.2	2.97	109.5	0.037	46.2	0.755	-45.6
5.0	0.825	-89.3	2.867	94.3	0.04	38.8	0.731	-54.5
6.0	0.779	-102.7	2.713	79.7	0.04	34.4	0.703	-66.2
7.0	0.734	-117.1	2.559	65.3	0.039	30.9	0.685	-76.8
8.0	0.688	-130.5	2.448	52.1	0.033	33.5	0.66	-85.6
9.0	0.642	-152.3	2.42	37.6	0.037	44.6	0.661	-91.4
10.0	0.614	-173.2	2.355	21.8	0.044	48.1	0.654	-102.2
11.0	0.591	177.4	2.312	8.6	0.054	50.4	0.642	-117.7
12.0	0.572	163.7	2.282	-5.4	0.071	50.2	0.641	-131.9
13.0	0.598	138.2	2.188	-22	0.086	40.5	0.638	-144.4
14.0	0.631	115.4	2.036	-38.8	0.097	29.4	0.642	-158.9
15.0	0.631	102.2	1.97	-54.9	0.112	18.3	0.667	179.8
16.0	0.634	87.3	1.909	-72.4	0.126	5.6	0.685	158.4
17.0	0.658	70.3	1.685	-87.7	0.128	-2.1	0.665	145.1
18.0	0.694	59	1.58	-99.5	0.15	-17.2	0.731	132.5
19.0	0.672	42	1.467	-116.1	0.137	-30.5	0.761	113.1
20.0	0.707	25.5	1.399	-132.9	0.143	-43.3	0.836	96.6
21.0	0.761	14.9	1.29	-148.4	0.143	-56.3	0.826	84.7
22.0	0.736	3.9	1.184	-161.3	0.138	-68.7	0.83	76
23.0	0.703	-15.3	1.103	-178.5	0.134	-84.6	0.824	58.8
24.0	0.723	-33.5	1.043	162.6	0.134	-101.6	0.841	41.2
25.0	0.705	-44.7	1.017	146.3	0.14	-117.8	0.843	28.4
26.0	0.676	-59.8	1.017	131.8	0.156	-131	0.831	16.6

### NOISE-PARAMETERS

VDS = 3V, IDS ≈ 15mA

FREQ (GHz)	Gamma Opt		Nfmin (dB)	Rn/50
	MAG	ANG		
2	0.83	28	0.53	0.58
4	0.75	59	0.65	0.48
6	0.65	85	0.85	0.33
8	0.58	128	1.05	0.21
10	0.45	147	1.35	0.11
12	0.40	-170	1.55	0.10
14	0.41	-111	1.90	0.27
16	0.47	-69	2.25	0.58
18	0.53	-44	2.60	1.00
20	0.62	-14	2.90	1.38
22	0.57	1	3.20	1.68
24	0.59	39	3.50	1.77
26	0.57	66	3.80	1.10

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