



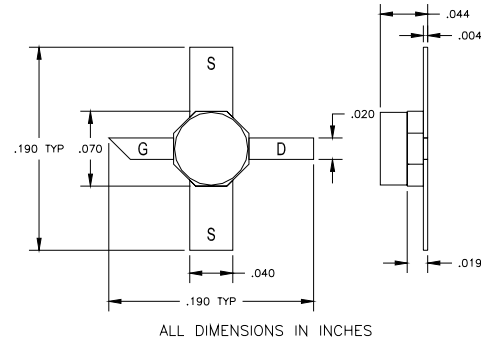
# EPB018B5/B7/B9-70

ISSUED 11/01/2007

## Super Low Noise High Gain Heterojunction FET

### FEATURES

- NON-HERMETIC LOW COST CERAMIC 70 mil PACKAGE
- TYPICAL 0.50~0.90dB NOISE FIGURE AND 11.5~13.0dB ASSOCIATED GAIN AT 12GHz
- 0.3 X 180 MICRON RECESSED “ MUSHROOM” GATE
- Si<sub>3</sub>N<sub>4</sub> PASSIVATION
- ADVANCED EPITAXIAL HETEROJUNCTION PROFILE PROVIDES SUPER LOW NOISE, HIGH GAIN AND HIGH RELIABILITY



Caution! ESD sensitive device.

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

SYMBOL	PARAMETERS/TEST CONDITIONS		MIN	TYP	MAX	UNITS
NF	Noise Figure, f = 12GHz V <sub>DS</sub> = 2 V, I <sub>DS</sub> ≈ 15 mA	EPB018B5-70		0.50	0.60	dB
		EPB018B7-70		0.65	0.80	
		EPB018B9-70		0.95	1.20	
Ga	Associated Gain, f = 12GHz V <sub>DS</sub> = 2 V, I <sub>DS</sub> ≈ 15 mA	EPB018B5-70	11.5	13.0		dB
		EPB018B7-70	11.0	12.5		
		EPB018B9-70	10.5	11.5		
P <sub>1dB</sub>	Output Power at 1dB Compression V <sub>DS</sub> = 3 V, I <sub>DS</sub> = 25 mA	f = 12GHz		15.0		dBm
		f = 18GHz		15.0		
G <sub>1dB</sub>	Gain at 1dB Compression V <sub>DS</sub> = 3 V, I <sub>DS</sub> = 25 mA	f = 12GHz		14.0		dB
		f = 18GHz		11.5		
I <sub>DSS</sub>	Saturated Drain Current	V <sub>DS</sub> = 2 V, V <sub>GS</sub> = 0 V	15	45	80	mA
G <sub>M</sub>	Transconductance	V <sub>DS</sub> = 2 V, V <sub>GS</sub> = 0 V	50	90		mS
V <sub>P</sub>	Pinch-off Voltage	V <sub>DS</sub> = 2 V, I <sub>DS</sub> = 1.0 mA		-0.8	-2.5	V
BV <sub>GD</sub>	Drain Breakdown Voltage	I <sub>GD</sub> = 10 uA	-3	-6		V
BV <sub>GS</sub>	Source Breakdown Voltage	I <sub>GS</sub> = 10 uA	-3	-6		V
R <sub>TH</sub>	Thermal Resistance			480*		°C/W

Notes: \* 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	5V	4V
V <sub>gs</sub>	Gate-Source Voltage	-3V	-2V
I <sub>ds</sub>	Drain Current	I <sub>dss</sub>	60mA
I <sub>gsf</sub>	Forward Gate Current	2mA	0.3mA
P <sub>in</sub>	Input Power	12dBm	@1dB 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	285mW	240mW

Notes: 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.



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**S-PARAMETERS** VDS = 2 V, IDS = 15 mA

EPB018B5-70										EPB018B7-70							
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	0.983	-18.6	6.245	162.2	0.019	78.9	0.530	-13.5	1.0	0.985	-18.9	5.754	162.0	0.021	77.1	0.677	-13.7
2.0	0.944	-37.5	5.964	144.3	0.036	65.2	0.507	-28.8	2.0	0.949	-38.2	5.495	143.9	0.040	63.1	0.650	-28.9
3.0	0.896	-55.5	5.582	127.7	0.050	53.6	0.485	-42.6	3.0	0.903	-56.2	5.137	127.2	0.055	50.5	0.622	-42.7
4.0	0.849	-72.6	5.327	112.4	0.063	43.6	0.464	-54.2	4.0	0.860	-73.6	4.914	111.8	0.067	39.1	0.595	-54.1
5.0	0.797	-89.2	5.111	97.6	0.074	33.1	0.421	-65.4	5.0	0.812	-90.4	4.726	96.9	0.079	28.5	0.549	-65.4
6.0	0.747	-103.7	4.799	83.4	0.081	23.4	0.370	-78.6	6.0	0.765	-104.9	4.461	82.4	0.086	17.8	0.495	-78.6
7.0	0.691	-118.6	4.503	69.9	0.085	13.9	0.344	-90.7	7.0	0.713	-119.9	4.189	68.6	0.092	7.3	0.464	-90.5
8.0	0.642	-132.8	4.277	57.0	0.088	4.7	0.303	-100.7	8.0	0.664	-134.3	3.982	55.4	0.093	-3.6	0.411	-100.6
9.0	0.600	-155.6	4.189	42.7	0.093	-5.1	0.271	-111.2	9.0	0.621	-157.1	3.908	40.9	0.096	-12.9	0.374	-108.6
10.0	0.567	-178.3	4.012	27.8	0.096	-16.3	0.228	-126.9	10.0	0.591	-179.4	3.759	25.7	0.098	-24.5	0.328	-121.7
11.0	0.534	170.3	3.846	15.5	0.094	-26.5	0.193	-145.5	11.0	0.564	169.0	3.644	12.8	0.099	-33.4	0.295	-140.0
12.0	0.515	155.6	3.758	2.9	0.093	-33.1	0.177	-161.2	12.0	0.541	153.2	3.551	-0.8	0.098	-43.3	0.266	-157.6
13.0	0.555	128.7	3.569	-12.5	0.091	-44.2	0.137	176.3	13.0	0.574	126.2	3.360	-16.6	0.096	-54.9	0.210	-174.2
14.0	0.596	106.0	3.317	-27.1	0.088	-55.6	0.114	151.4	14.0	0.609	103.6	3.093	-31.7	0.090	-66.7	0.173	167.6
15.0	0.592	91.3	3.214	-41.3	0.087	-66.9	0.141	123.9	15.0	0.598	88.8	2.985	-46.4	0.090	-78.4	0.187	139.8
16.0	0.597	74.3	3.086	-56.8	0.083	-81.1	0.158	94.5	16.0	0.597	71.4	2.857	-62.2	0.085	-92.9	0.194	109.8
17.0	0.619	59.2	2.756	-69.5	0.071	-90.3	0.134	68.1	17.0	0.612	55.7	2.548	-75.5	0.072	-102.8	0.155	89.8
18.0	0.670	49.9	2.668	-79.4	0.071	-97.3	0.136	64.0	18.0	0.661	46.6	2.472	-85.8	0.076	-105.2	0.183	89.7
19.0	0.668	33.0	2.623	-95.4	0.069	-115.9	0.169	51.0	19.0	0.657	29.0	2.381	-102.1	0.076	-126.2	0.221	68.8
20.0	0.708	17.3	2.551	-111.1	0.064	-131.4	0.172	37.8	20.0	0.697	13.2	2.286	-118.1	0.071	-141.6	0.240	56.1
21.0	0.757	8.2	2.447	-125.1	0.061	-144.1	0.159	18.7	21.0	0.740	4.4	2.173	-131.8	0.068	-155.3	0.221	40.9
22.0	0.743	-2.5	2.325	-139.4	0.063	-159.2	0.135	14.7	22.0	0.728	-5.8	2.067	-145.9	0.070	-167.9	0.210	36.8
23.0	0.726	-21.1	2.224	-158.5	0.065	179.4	0.115	-1.3	23.0	0.717	-24.4	1.958	-164.5	0.071	172.5	0.188	21.8
24.0	0.747	-39.6	2.063	-178.1	0.067	158.8	0.102	-39.6	24.0	0.743	-41.8	1.807	176.3	0.071	151.8	0.154	-5.5
25.0	0.709	-52.6	2.024	167.9	0.072	144.7	0.136	-56.6	25.0	0.710	-53.5	1.757	161.7	0.075	138.3	0.174	-28.1
26.0	0.683	-70.6	2.006	150.2	0.083	132.8	0.117	-71.3	26.0	0.689	-69.1	1.759	145.4	0.084	124.1	0.152	-47.5

**NOISE-PARAMETERS** EPB018B7-70 VDS = 2 V, IDS = 15 mA

FREQ (GHz)	Gamma Opt		Nfmin (dB)	Rn/50
	MAG	ANG		
2	0.76	25	0.37	0.26
4	0.65	56	0.43	0.22
6	0.51	84	0.48	0.16
8	0.41	118	0.55	0.11
10	0.26	159	0.61	0.08
12	0.26	-144	0.68	0.08
14	0.32	-82	0.89	0.18
16	0.40	-46	1.10	0.29
18	0.40	-26	1.30	0.45
20	0.51	8	1.45	0.55
22	0.41	27	1.69	0.61
24	0.48	75	1.83	0.59
26	0.52	108	2.05	0.40

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