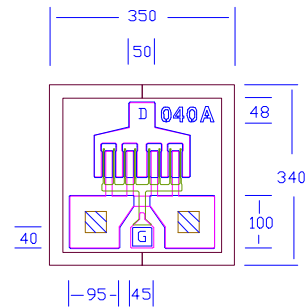


**DATA SHEET**
**High Efficiency Heterojunction Power FET**

- +24.5dBm TYPICAL OUTPUT POWER
- 11.0dB TYPICAL POWER GAIN FOR EPA040A AND 12.0dB FOR EPA040AV AT 18GHz
- 0.3 X 400 MICRON RECESSED “MUSHROOM” GATE
- Si<sub>3</sub>N<sub>4</sub> PASSIVATION
- ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY
- EPA040AV WITH VIA HOLE SOURCE GROUNDING
- Idss SORTED IN 10mA PER BIN RANGE



Chip Thickness: 75 ± 20 microns  
 All Dimensions In Microns  
 ▨ : Via Hole  
**No Via Hole For EPA040A**

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

SYMBOLS	PARAMETERS/TEST CONDITIONS	EPA040A			EPA040AV			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
<b>P<sub>1dB</sub></b>	Output Power at 1dB Compression f=12GHz	22.5	24.5		22.5	24.5		dBm
	V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=18GHz		24.5			24.5		
<b>G<sub>1dB</sub></b>	Gain at 1dB Compression f=12GHz	11.5	13.5		12.0	14.0		dB
	V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=18GHz		11.0			12.0		
<b>PAE</b>	Gain at 1dB Compression V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=12GHz		45			46		%
<b>I<sub>dss</sub></b>	Saturated Drain Current V <sub>ds</sub> =3V, V <sub>gs</sub> =0V	70	120	160	70	120	160	mA
<b>G<sub>m</sub></b>	Transconductance V <sub>ds</sub> =3V, V <sub>gs</sub> =0V	80	130		80	130		mS
<b>V<sub>p</sub></b>	Pinch-off Voltage V <sub>ds</sub> =3V, I <sub>ds</sub> =1.0mA		-1.0	-2.5		-1.0	-2.5	V
<b>BV<sub>gd</sub></b>	Drain Breakdown Voltage I <sub>gd</sub> =1.0mA	-11	-15		-11	-15		V
<b>BV<sub>gs</sub></b>	Source Breakdown Voltage I <sub>gs</sub> =1.0mA	-7	-14		-7	-14		V
<b>R<sub>th</sub></b>	Thermal Resistance (Au-Sn Eutectic Attach)		105			77		°C/W

**MAXIMUM RATINGS AT 25 °C**

SYMBOLS	PARAMETERS	EPA040A		EPA040AV	
		ABSOLUTE <sup>1</sup>	CONTINUOUS <sup>2</sup>	ABSOLUTE <sup>1</sup>	CONTINUOUS <sup>2</sup>
<b>V<sub>ds</sub></b>	Drain-Source Voltage	12V	8V	12V	8V
<b>V<sub>gs</sub></b>	Gate-Source Voltage	-8V	-3V	-8V	-3V
<b>I<sub>ds</sub></b>	Drain Current	I <sub>dss</sub>	135mA	I <sub>dss</sub>	I <sub>dss</sub>
<b>I<sub>gsf</sub></b>	Forward Gate Current	20mA	3mA	20mA	3mA
<b>P<sub>in</sub></b>	Input Power	21dBm	@ 3dB Compression	21dBm	@ 3dB Compression
<b>T<sub>ch</sub></b>	Channel Temperature	175°C	150°C	175°C	150°C
<b>T<sub>stg</sub></b>	Storage Temperature	-65/175°C	-65/150°C	-65/175°C	-65/150°C
<b>P<sub>t</sub></b>	Total Power Dissipation	1.3W	1.1W	1.8W	1.5W

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.

**Excelics Semiconductor, Inc., 2908 Scott Blvd., Santa Clara, CA 95054**

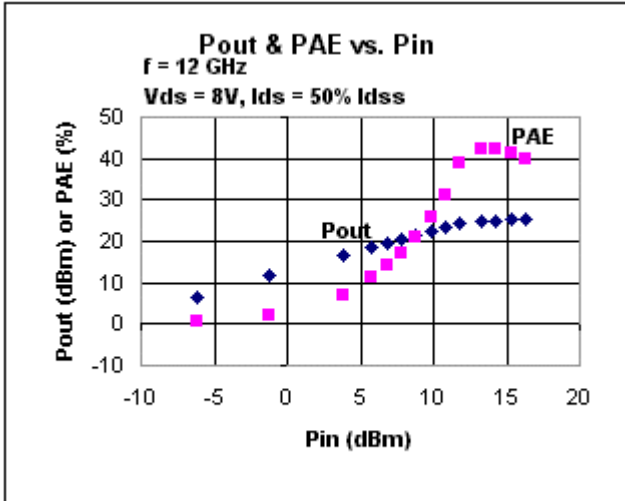
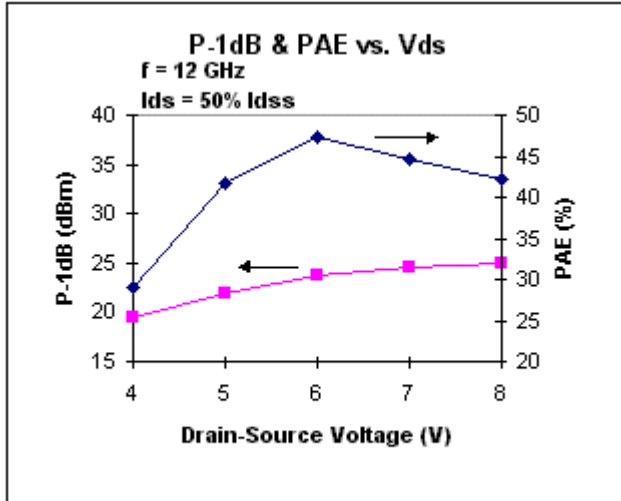
Phone: (408) 970-8664 Fax: (408) 970-8998 Web Site: [www.excelics.com](http://www.excelics.com)

# EPA040A/EPA040AV

## DATA SHEET

### High Efficiency Heterojunction Power FET

#### EPA040A



#### S-PARAMETERS

##### EPA040A 8V, 1/2 Idss

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	0.972	-32.9	10.341	157.6	0.021	72.5	0.666	-12.8	21.0	0.856	132.6	1.642	-6.5	0.065	-8.2	0.341	-155.6
2.0	0.933	-62.1	9.244	139.3	0.036	57.7	0.611	-24.0	22.0	0.862	128.5	1.512	-12.2	0.064	-7.9	0.382	-165.1
4.0	0.863	-105.4	6.944	110.9	0.053	36.4	0.493	-40.6	24.0	0.865	122.5	1.295	-22.5	0.063	-8.1	0.481	-177.0
6.0	0.812	-135.8	5.262	89.9	0.059	24.0	0.425	-54.7	26.0	0.870	119.4	1.140	-30.9	0.065	-6.1	0.563	177.6
8.0	0.801	-153.8	4.162	74.6	0.060	15.8	0.405	-66.4	28.0	0.873	117.6	1.038	-37.9	0.071	-1.3	0.616	174.5
10.0	0.800	-166.7	3.415	61.7	0.060	10.9	0.405	-75.8	30.0	0.869	114.9	1.002	-45.6	0.078	-3.2	0.634	170.8
12.0	0.803	-177.9	2.903	49.7	0.059	7.4	0.411	-83.9	32.0	0.872	109.8	0.979	-56.0	0.084	-7.8	0.611	161.4
14.0	0.813	170.4	2.546	38.2	0.060	4.5	0.403	-90.6	34.0	0.888	101.7	0.933	-68.8	0.089	-15.1	0.586	142.2
16.0	0.820	157.9	2.259	25.5	0.060	0.7	0.379	-99.0	36.0	0.944	92.3	0.834	-82.9	0.091	-29.9	0.612	116.3
18.0	0.835	144.8	2.007	12.6	0.063	-2.3	0.340	-113.4	38.0	0.989	82.3	0.699	-97.4	0.082	-49.1	0.712	95.1
20.0	0.847	133.3	1.780	-1.0	0.065	-6.1	0.319	-137.0	40.0	0.988	76.1	0.552	-107.6	0.068	-67.3	0.786	88.5

##### EPA040AV 8V, 1/2 Idss

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	0.972	-34.1	9.390	157.2	0.018	71.3	0.696	-12.0	21.0	0.870	129.5	1.474	-16.6	0.055	-26.7	0.431	-147.2
2.0	0.938	-64.1	8.386	138.2	0.032	56.5	0.654	-22.6	22.0	0.871	126.5	1.372	-22.3	0.054	-29.6	0.456	-155.7
4.0	0.876	-108.4	6.273	109.1	0.047	33.4	0.565	-35.9	24.0	0.871	119.5	1.183	-34.0	0.052	-30.2	0.523	-170.4
6.0	0.844	-140.6	4.801	87.8	0.052	19.6	0.509	-43.6	26.0	0.877	115.9	1.009	-45.3	0.049	-29.9	0.583	174.3
8.0	0.844	-158.1	3.868	72.4	0.054	11.0	0.467	-49.6	28.0	0.869	107.2	0.865	-56.6	0.048	-35.3	0.648	164.0
10.0	0.842	-172.0	3.222	57.9	0.053	3.7	0.425	-59.2	30.0	0.865	97.7	0.748	-68.9	0.046	-40.1	0.691	154.3
12.0	0.847	170.9	2.703	42.2	0.052	-5.1	0.410	-72.7	32.0	0.838	94.2	0.638	-81.3	0.042	-49.1	0.758	138.7
14.0	0.860	159.0	2.302	28.5	0.052	-10.9	0.391	-88.1	34.0	0.908	92.4	0.551	-92.6	0.036	-57.6	0.749	124.1
16.0	0.873	148.9	1.967	15.0	0.050	-16.3	0.400	-105.4	36.0	0.956	91.7	0.499	-102.2	0.044	-66.9	0.810	111.5
18.0	0.875	144.1	1.734	3.2	0.052	-20.3	0.401	-125.7	38.0	0.982	91.8	0.466	-113.1	0.057	-89.9	0.877	100.0
20.0	0.874	135.6	1.532	-9.2	0.053	-25.5	0.432	-141.3	40.0	0.973	89.1	0.423	-122.7	0.063	-111.8	0.904	95.4

Note: The data included 0.7 mils diameter Au bonding wires; 1 gate wires, 15 mils each; 1 drain wires, 20 mils each; 4 source wires, 7 mils each; no source wires for EPA040AV.