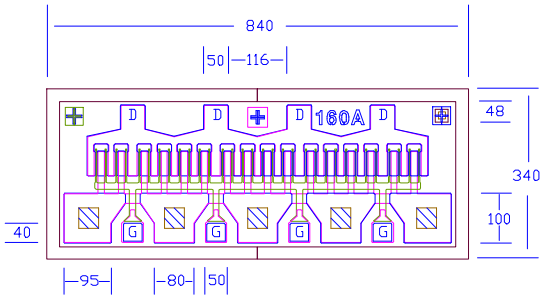
Excelics EPA160A/EPA160AV

DATA SHEET
High Efficiency Heterojunction Power FET

- **+31.0dBm TYPICAL OUTPUT POWER**
- **8.5dB TYPICAL POWER GAIN FOR EPA160A AND 10.0dB FOR EPA160AV AT 18GHz**
- **0.3 X 1600 MICRON RECESSED "MUSHROOM" GATE**
- **Si_3N_4 PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **EPA160AV WITH VIA HOLE SOURCE GROUNDING**
- **Idss SORTED IN 40mA PER BIN RANGE**



Chip Thickness: 75 ± 20 microns
All Dimensions In Microns
▨ : Via Hole
No Via Hole For EPA160A

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

SYMBOLS	PARAMETERS/TEST CONDITIONS		EPA160A			EPA160AV			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
P_{1dB}	Output Power at 1dB Compression	f=12GHz	29.0	31.0		29.0	31.0		dBm
	Vds=8V, Ids=50% Idss	f=18GHz		31.0			31.0		
G_{1dB}	Gain at 1dB Compression	f=12GHz	9.5	11.5		10.0	12.0		dB
	Vds=8V, Ids=50% Idss	f=18GHz		8.5			10.0		
PAE	Gain at 1dB Compression								%
	Vds=8V, Ids=50% Idss	f=12GHz		45			46		
Idss	Saturated Drain Current	Vds=3V, Vgs=0V	290	480	660	290	480	660	mA
Gm	Transconductance	Vds=3V, Vgs=0V	320	500		320	500		mS
Vp	Pinch-off Voltage	Vds=3V, Ids=4.5mA		-1.0	-2.5		-1.0	-2.5	V
BVgd	Drain Breakdown Voltage	Igd=1.6mA	-11	-15		-11	-15		V
BVgs	Source Breakdown Voltage	Igs=1.6mA	-7	-14		-7	-14		V
Rth	Thermal Resistance (Au-Sn Eutectic Attach)			30			22		°C/W

MAXIMUM RATINGS AT 25°C

SYMBOLS	PARAMETERS	EPA160A		EPA160AV	
		ABSOLUTE[1]	CONTINUOUS[2]	ABSOLUTE[1]	CONTINUOUS[2]
Vds	Drain-Source Voltage	12V	8V	12V	8V
Vgs	Gate-Source Voltage	-8V	-3V	-8V	-3V
Ids	Drain Current	Idss	475mA	Idss	625mA
Igsf	Forward Gate Current	80mA	14mA	80mA	14mA
Pin	Input Power	28dBm	@ 3dB Compression	28dBm	@ 3dB Compression
Tch	Channel Temperature	175°C	150°C	175°C	150°C
Tstg	Storage Temperature	-65/175°C	-65/150°C	-65/175°C	-65/150°C
Pt	Total Power Dissipation	4.5W	3.8W	6.0W	5.0W

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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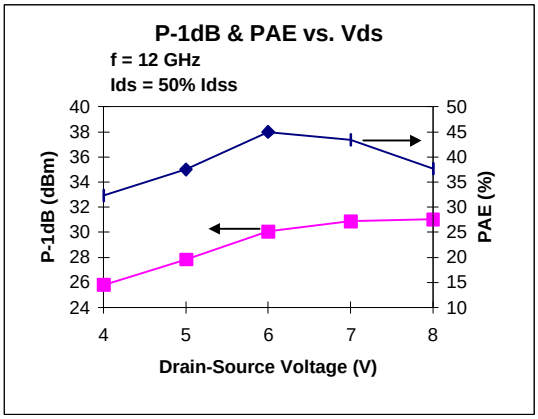
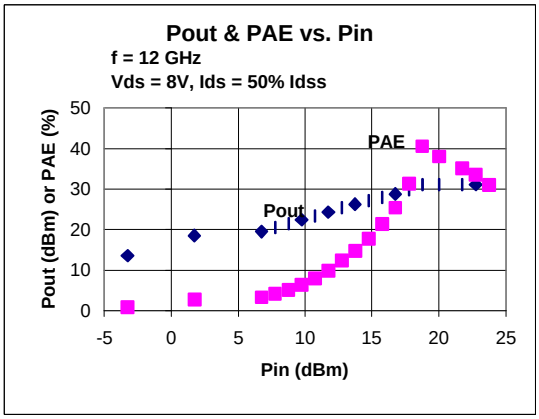
DATA SHEET
High Efficiency Heterojunction Power FET

EPA160A





S-PARAMETERS
EPA160A 8V, 1/2 Idss

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	0.915	-119.9	14.906	114.4	0.027	31.0	0.302	-128.9	21.0	0.932	155.6	0.642	-5.2	0.035	25.7	0.744	-175.4
2.0	0.907	-149.2	8.322	96.0	0.029	19.1	0.331	-146.1	22.0	0.932	150.8	0.601	-8.9	0.035	26.0	0.747	-174.5
4.0	0.907	-168.1	4.370	77.6	0.031	14.5	0.362	-151.0	24.0	0.932	143.6	0.526	-16.4	0.040	27.1	0.778	-175.2
6.0	0.908	-180.0	2.898	63.8	0.030	14.2	0.411	-150.0	26.0	0.928	139.3	0.460	-23.2	0.043	28.0	0.783	-179.1
8.0	0.912	174.7	2.172	52.5	0.030	16.0	0.448	-152.1	28.0	0.917	135.6	0.403	-31.9	0.049	25.7	0.820	170.8
10.0	0.918	170.0	1.693	41.7	0.028	17.0	0.498	-155.7	30.0	0.917	133.4	0.350	-39.1	0.051	20.1	0.834	164.0
12.0	0.923	165.9	1.349	31.4	0.028	21.7	0.549	-160.3	32.0	0.912	128.2	0.294	-46.1	0.048	19.9	0.865	162.3
14.0	0.931	162.9	1.084	22.4	0.028	23.4	0.601	-162.8	34.0	0.915	123.6	0.255	-50.3	0.048	23.0	0.876	163.9
16.0	0.936	160.3	0.896	13.7	0.028	25.0	0.658	-166.7	36.0	0.942	126.8	0.223	-52.3	0.048	22.2	0.869	162.9
18.0	0.941	159.3	0.761	5.9	0.029	25.3	0.697	-170.4	38.0	0.957	129.8	0.212	-53.8	0.055	17.0	0.872	158.9
20.0	0.936	158.5	0.675	-2.0	0.031	25.6	0.725	-175.6	40.0	0.952	138.3	0.205	-60.1	0.055	4.9	0.843	147.4

EPA160AV 8V, 1/2 Idss

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	0.922	-115.7	13.969	116.1	0.027	30.9	0.271	-114.5	21.0	0.957	163.3	0.582	-11.9	0.023	5.0	0.766	-179.4
2.0	0.914	-146.8	7.872	96.1	0.031	17.2	0.299	-134.2	22.0	0.956	162.5	0.536	-15.4	0.024	4.2	0.786	179.1
4.0	0.917	-165.9	4.057	76.9	0.030	7.9	0.341	-140.5	24.0	0.954	159.0	0.452	-22.5	0.024	8.6	0.821	176.3
6.0	0.923	-176.7	2.690	63.0	0.029	4.3	0.393	-140.1	26.0	0.953	158.6	0.384	-30.1	0.026	10.9	0.844	169.1
8.0	0.929	-177.6	2.027	51.5	0.027	4.6	0.430	-148.0	28.0	0.932	153.0	0.335	-37.8	0.026	11.9	0.880	165.4
10.0	0.930	-178.2	1.596	40.1	0.025	4.2	0.485	-157.8	30.0	0.918	146.4	0.295	-46.5	0.028	9.1	0.899	161.7
12.0	0.936	175.2	1.273	28.3	0.023	1.8	0.556	-161.5	32.0	0.877	145.0	0.262	-56.0	0.027	-0.3	0.949	153.2
14.0	0.941	171.3	1.025	17.7	0.021	1.5	0.626	-167.2	34.0	0.934	144.2	0.229	-63.9	0.024	-3.7	0.896	146.3
16.0	0.950	167.4	0.833	8.1	0.021	2.2	0.688	-170.1	36.0	0.968	144.4	0.214	-69.5	0.025	-6.0	0.916	141.6
18.0	0.953	168.3	0.695	0.3	0.022	3.2	0.732	-176.3	38.0	0.985	146.4	0.201	-74.3	0.028	-22.8	0.952	137.4
20.0	0.955	165.1	0.597	-7.2	0.022	3.0	0.768	-177.8	40.0	0.986	146.4	0.189	-77.5	0.035	-40.3	0.952	137.2

Note: The data included 0.7 mils diameter Au bonding wires; 3 gate wires, 15 mils each; 3 drain wires, 20 mils each;
10 source wires, 7 mils each; no source wires for EPA160AV.