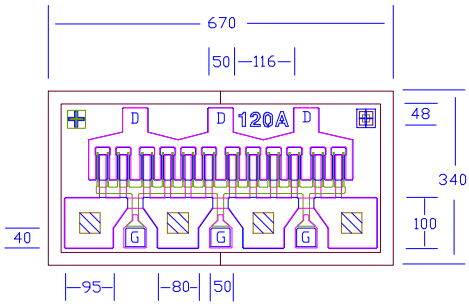
Excelics EPA120A/EPA120AV

DATA SHEET
High Efficiency Heterojunction Power FET

- **+29.5dBm TYPICAL OUTPUT POWER**
- **9.5dB TYPICAL POWER GAIN FOR EPA120A AND 10.5dB FOR EPA120AV AT 18GHz**
- **0.3 X 1200 MICRON RECESSED "MUSHROOM" GATE**
- **Si_3N_4 PASSIVATION**
- **ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY, LINEARITY AND RELIABILITY**
- **EPA120AV WITH VIA HOLE SOURCE GROUNDING**
- **Idss SORTED IN 30mA PER BIN RANGE**



Chip Thickness: 75 ± 20 microns
All Dimensions In Microns
▨ : Via Hole
No Via Hole For EPA120A

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

SYMBOLS	PARAMETERS/TEST CONDITIONS		EPA120A			EPA120AV			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
P_{1dB}	Output Power at 1dB Compression	f=12GHz	28.0	29.5		28.0	29.5		dBm
	Vds=8V, Ids=50% Idss	f=18GHz		29.5			29.5		
G_{1dB}	Gain at 1dB Compression	f=12GHz	10.0	12.0		10.5	12.5		dB
	Vds=8V, Ids=50% Idss	f=18GHz		9.5			10.5		
PAE	Gain at 1dB Compression								%
	Vds=8V, Ids=50% Idss	f=12GHz		45			46		
Idss	Saturated Drain Current	Vds=3V, Vgs=0V	220	360	500	220	360	500	mA
Gm	Transconductance	Vds=3V, Vgs=0V	240	380		240	380		mS
Vp	Pinch-off Voltage	Vds=3V, Ids=3.5mA		-1.0	-2.5		-1.0	-2.5	V
BVgd	Drain Breakdown Voltage	Igd=1.2mA	-11	-15		-11	-15		V
BVgs	Source Breakdown Voltage	Igs=1.2mA	-7	-14		-7	-14		V
Rth	Thermal Resistance (Au-Sn Eutectic Attach)			37			27		°C/W

MAXIMUM RATINGS AT 25°C

SYMBOLS	PARAMETERS	EPA120A		EPA120AV	
		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	385mA	Idss	Idss
Igsf	Forward Gate Current	60mA	10mA	60mA	10mA
Pin	Input Power	27dBm	@ 3dB Compression	27dBm	@ 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	3.7W	3.1W	5.0W	4.2W

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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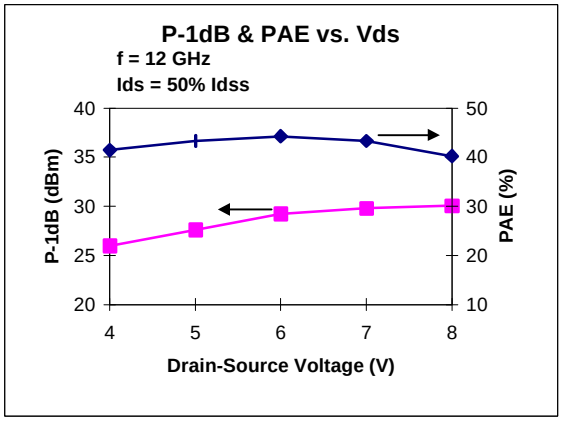
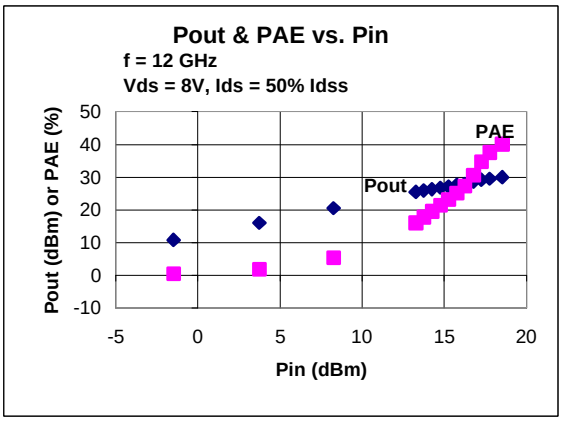
EPA120A





S-PARAMETERS
EPA120A 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	0.902	-95.7	15.160	125.3	0.030	41.8	0.305	-68.3	21.0	0.898	157.5	0.776	-8.5	0.041	21.0	0.674	-170.7
2.0	0.891	-131.8	9.261	103.2	0.036	25.7	0.252	-96.8	22.0	0.899	157.6	0.727	-12.2	0.042	22.3	0.691	-174.7
4.0	0.879	-157.0	4.926	81.5	0.038	14.7	0.254	-116.2	24.0	0.897	151.5	0.634	-20.6	0.045	23.3	0.721	-179.0
6.0	0.882	-166.8	3.290	67.5	0.037	11.8	0.290	-126.9	26.0	0.909	148.8	0.557	-29.2	0.051	24.6	0.741	172.1
8.0	0.882	-176.2	2.498	54.3	0.036	12.3	0.351	-132.3	28.0	0.918	151.8	0.484	-36.6	0.056	23.4	0.756	158.7
10.0	0.883	175.0	1.984	42.0	0.035	12.1	0.424	-138.9	30.0	0.915	148.1	0.424	-44.0	0.059	21.5	0.787	152.2
12.0	0.892	171.6	1.603	31.3	0.034	13.6	0.479	-147.5	32.0	0.913	143.6	0.365	-51.2	0.060	17.6	0.807	148.1
14.0	0.900	168.9	1.302	21.7	0.033	16.2	0.534	-154.8	34.0	0.911	140.5	0.318	-56.9	0.058	18.3	0.822	146.3
16.0	0.906	166.1	1.075	12.8	0.033	18.1	0.590	-159.7	36.0	0.918	136.7	0.287	-60.3	0.063	18.2	0.841	145.6
18.0	0.907	161.8	0.903	4.7	0.034	20.3	0.629	-161.4	38.0	0.929	135.7	0.270	-64.3	0.069	9.9	0.842	142.7
20.0	0.900	159.5	0.806	-4.3	0.038	20.1	0.668	-168.0	40.0	0.899	134.0	0.254	-70.4	0.070	-1.9	0.843	138.4

EPA120AV 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	0.921	-97.5	14.598	125.1	0.028	40.3	0.279	-75.6	21.0	0.947	155.6	0.730	-11.5	0.030	2.4	0.716	-174.0
2.0	0.905	-134.6	8.894	102.7	0.035	23.0	0.263	-104.4	22.0	0.945	154.3	0.675	-15.4	0.030	1.1	0.738	-176.1
4.0	0.901	-160.6	4.739	81.1	0.035	10.5	0.284	-120.1	24.0	0.942	149.6	0.576	-23.2	0.030	4.1	0.785	-179.7
6.0	0.906	-175.2	3.186	66.3	0.035	6.3	0.334	-124.0	26.0	0.939	147.1	0.492	-31.5	0.030	7.2	0.817	172.9
8.0	0.912	-179.0	2.421	54.2	0.033	4.2	0.364	-133.1	28.0	0.916	139.4	0.425	-40.2	0.032	6.7	0.858	169.6
10.0	0.915	178.0	1.919	42.5	0.031	0.3	0.413	-144.1	30.0	0.905	131.1	0.370	-49.5	0.033	3.2	0.878	166.2
12.0	0.925	169.8	1.536	30.3	0.029	0.1	0.484	-149.4	32.0	0.871	128.7	0.325	-58.7	0.031	-5.4	0.924	157.1
14.0	0.933	165.1	1.244	19.7	0.027	-2.0	0.553	-156.5	34.0	0.928	128.0	0.284	-66.9	0.027	-7.7	0.878	149.3
16.0	0.943	160.9	1.019	9.9	0.026	2.3	0.618	-161.3	36.0	0.976	129.5	0.263	-72.8	0.028	-5.3	0.898	142.6
18.0	0.946	161.7	0.862	1.8	0.027	1.0	0.666	-169.4	38.0	1.002	131.8	0.252	-77.5	0.038	-24.8	0.937	136.5
20.0	0.947	158.2	0.749	-6.3	0.027	0.5	0.712	-172.2	40.0	1.001	131.2	0.240	-83.0	0.047	-52.6	0.944	135.4

Note: The data included 0.7 mils diameter Au bonding wires; 3 gate wires, 15 mils each; 3 drain wires, 20 mils each; 8 source wires, 7 mils each; no source wires for EPA120AV.