

Eudyna GaN-HEMT 45W

EGN21A045IV

Preliminary

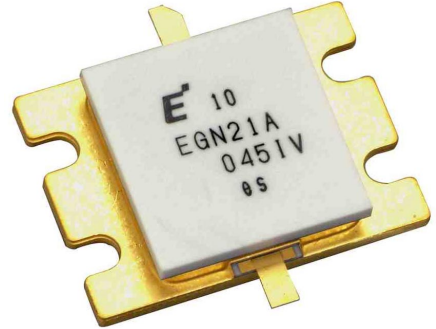
High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Gain: 16dB(typ.) at $P_{out}=39dBm(Avg.)$
- High Efficiency: 35%(typ.) at $P_{out}=39dBm(Avg.)$
- Broad Frequency Range : 2100 to 2200MHz
- Proven Reliability

DESCRIPTION

The EGN21A045IV is a 45 Watt GaN-HEMT that offers high efficiency, high gain, ease of matching, greater consistency and broad bandwidth for high power L-band amplifiers with 50V operation. This device is targeted for high voltage, low current operation in digitally modulated base station applications - ideally suited for W-CDMA base station amplifiers and other HPA designs while offering ease of use.



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Rating	Unit
Drain-Source Voltage	V_{DS}		120	V
Gate-Source Voltage	V_{GS}	$T_c=25^\circ C$	-5	V
Total Power Dissipation	P_t		112	W
Storage Temperature	T_{stg}		-65 to +175	$^\circ C$
Channel Temperature	T_{ch}		250	$^\circ C$

RECOMMENDED OPERATING CONDITION(Case Temperature $T_c= 25^\circ C$)

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	V_{DS}		50	V
Forward Gate Current	I_{GF}	$R_G=10 \Omega$	<9.7	mA
Reverse Gate Current	I_{GR}	$R_G=10 \Omega$	>-3.6	mA
Channel Temperature	T_{ch}		200	$^\circ C$

ELECTRICAL CHARACTERISTICS (Case Temperature $T_c=25^\circ C$)

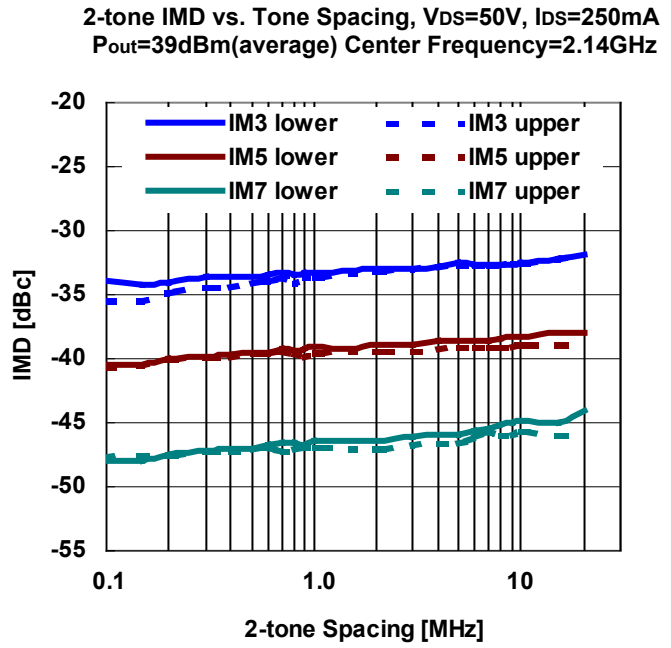
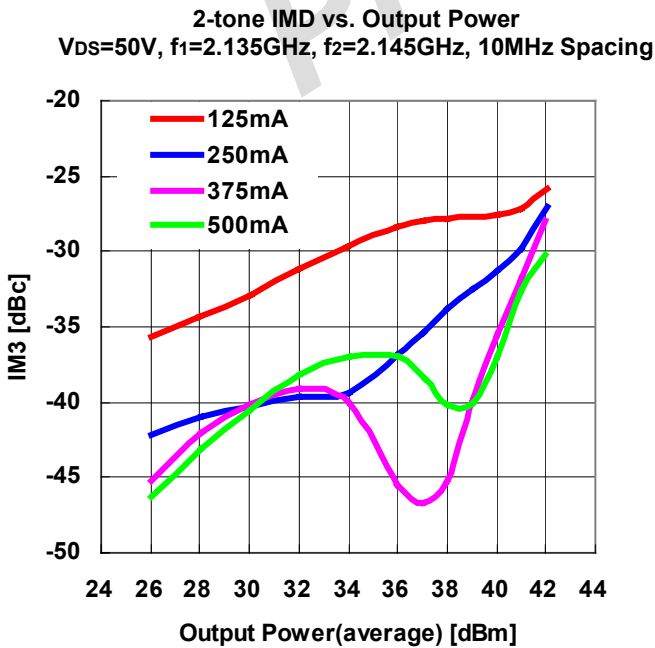
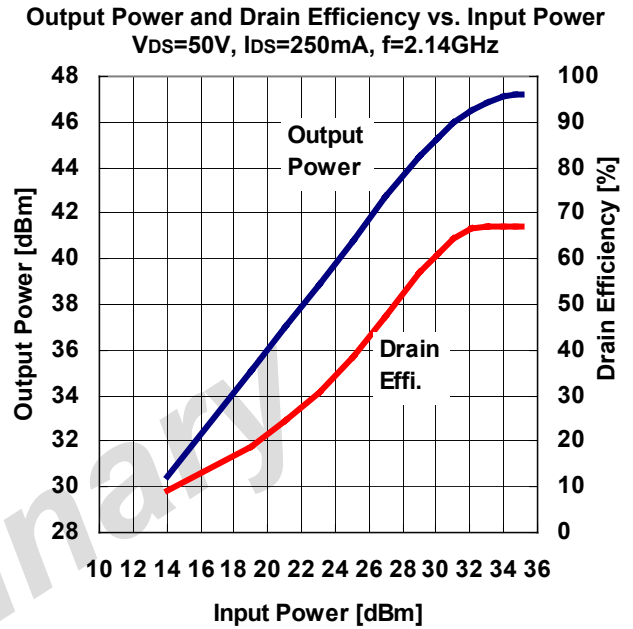
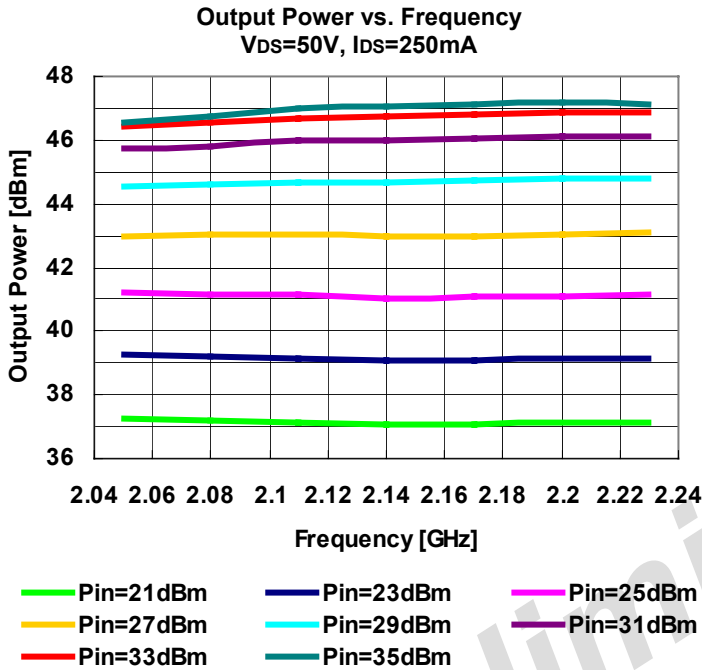
Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V I_{DS}=18mA$	-1.0	-2.0	-3.5	V
Gate-Drain Breakdown Voltage	V_{GDO}	$I_{GS}=-9.0 mA$	-	-350	-	V
3rd Order Inter modulation Distortion	IM_3	$V_{DS}=50V$	-	-32	-	dBc
Power Gain	G_p	$I_{DS(DC)}=250mA$	15.0	16.0	-	dB
Drain Efficiency	η_d	$P_{out}=39dBm(Avg.)$ Note 1	-	35	-	%
Thermal Resistance	R_{th}	Channel to Case	-	1.8	2.0	$^\circ C/W$

Note 1 : IM_3 and Gain test condition as follows:

IM_3 & Gain : $f_0=2.135GHz, f_1=2.145GHz$ W-CDMA(3GPP3.4 12-00) BS-1 64ch
67% clipping modulation(Peak/Avg. = 8.5dB@0.01% Probability(CCDF)) measured
over 3.84MHz at $f_0-10MHz$ and $f_1+10MHz$.

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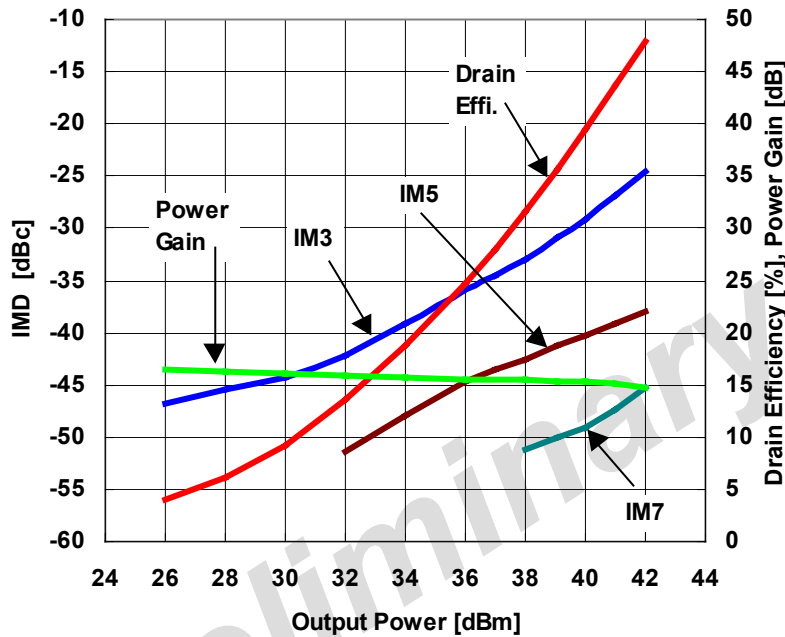
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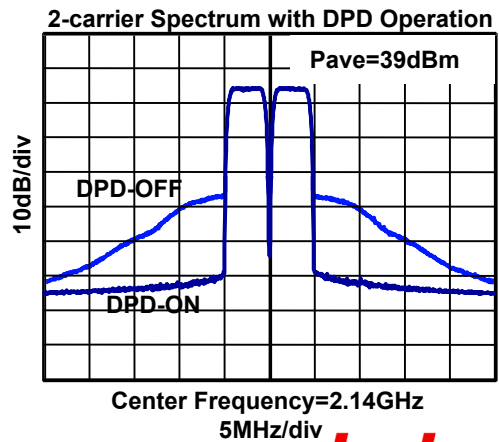
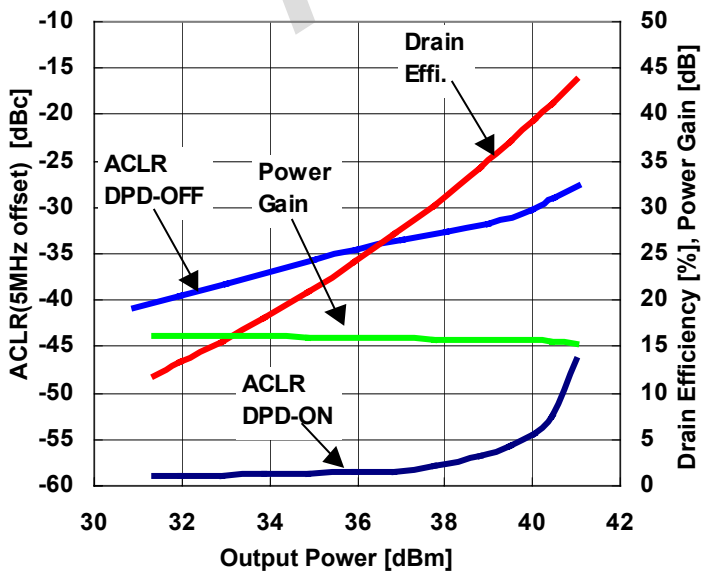
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2-Carrier IMD, Drain Efficiency and Power Gain vs. Output Power
 $V_{DS}=50V$, $I_{DS}=250mA$, $f_1=2.135GHz$, $f_2=2.145GHz$ (10MHz Spacing)
 Peak/Avg. = 8.5dB@0.01% Probability(CCDF)



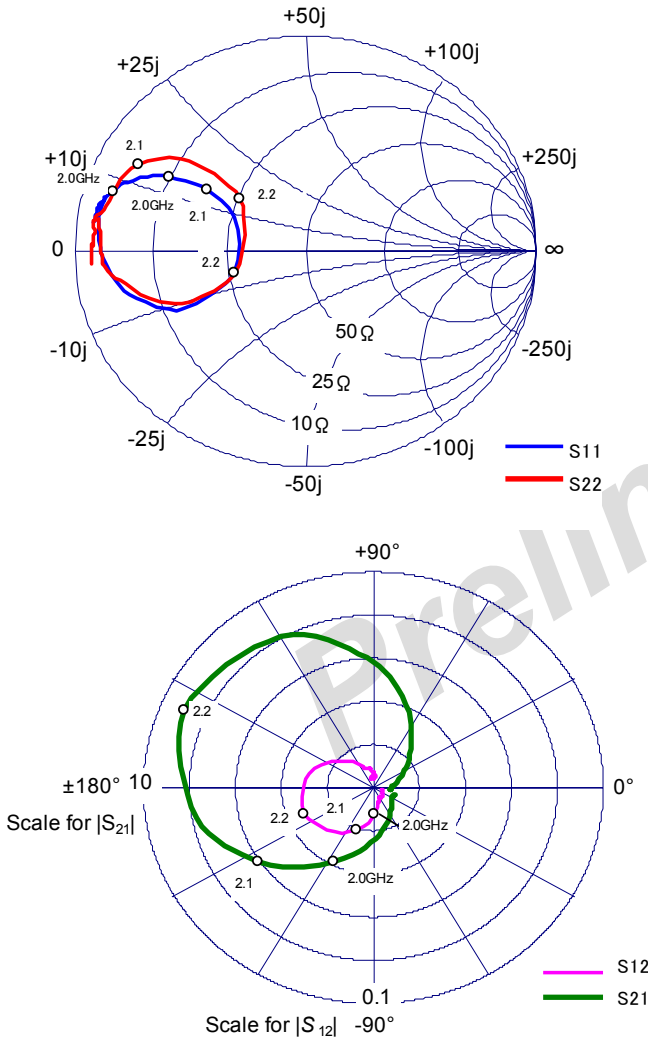
2-Carrier ACLR, Drain Efficiency and Power Gain vs. Output Power with DPD Operation (note $V_{DS}=50V$, $I_{DS}=250mA$, $f_1=2.1375GHz$, $f_2=2.1425GHz$ (5MHz Spacing) Peak/Avg. = 6.5dB@0.01% Probability(CCDF); Single Carrier Signal Note) Digital Predistortion evaluation test system: PMC-Sierra PALADIN-15 DPD chip-set



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S-Parameters @V_{DS}=50V, I_{DS}=250mA, f=1 to 3 GHz,
Z_I = Z_s = 50 ohm



Freq [GHz]	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.00	0.927	171.5	0.983	-17.9	0.004	-8.8	0.931	-176.4
1.10	0.924	170.3	0.935	-22.5	0.004	-14.5	0.929	-178.8
1.20	0.923	168.9	0.940	-27.3	0.005	-32.1	0.926	179.6
1.30	0.920	167.2	0.989	-33.9	0.006	-44.4	0.924	178.1
1.40	0.913	165.6	1.068	-40.1	0.006	-55.5	0.921	177.6
1.50	0.898	163.6	1.180	-48.1	0.005	-54.8	0.923	175.5
1.60	0.880	161.5	1.361	-56.3	0.005	-56.3	0.922	173.4
1.70	0.856	158.7	1.667	-66.7	0.006	-67.2	0.932	171.7
1.80	0.814	156.0	2.104	-80.1	0.007	-67.8	0.921	170.2
1.90	0.764	152.9	2.768	-96.5	0.009	-78.3	0.892	167.3
2.00	0.679	149.8	3.870	-116.5	0.012	-88.6	0.876	161.9
2.10	0.514	145.9	6.067	-145.7	0.021	-111.2	0.825	150.9
2.11	0.483	146.0	6.396	-150.0	0.022	-113.1	0.807	149.3
2.12	0.453	145.9	6.745	-154.5	0.024	-116.2	0.786	147.3
2.13	0.419	147.2	7.107	-159.1	0.025	-120.8	0.760	145.4
2.14	0.384	149.0	7.474	-164.3	0.026	-123.0	0.726	143.1
2.15	0.351	152.4	7.806	-169.8	0.027	-129.0	0.689	141.2
2.16	0.313	158.7	8.140	-175.9	0.029	-134.5	0.638	139.3
2.17	0.287	166.2	8.462	177.6	0.030	-138.7	0.584	137.3
2.18	0.278	176.7	8.725	170.9	0.031	-145.7	0.518	136.3
2.19	0.291	-171.0	8.900	163.8	0.032	-152.0	0.449	137.0
2.20	0.324	-161.4	9.010	156.4	0.032	-158.3	0.378	139.5
2.30	0.766	-163.2	6.045	92.4	0.023	150.9	0.546	-154.6
2.40	0.861	-174.9	3.348	61.2	0.015	126.5	0.742	-164.3
2.50	0.889	179.1	2.168	44.2	0.011	111.2	0.830	-171.5
2.60	0.895	175.0	1.566	30.9	0.009	99.1	0.877	-175.4
2.70	0.905	171.6	1.210	19.5	0.007	86.9	0.882	-178.7
2.80	0.905	168.7	0.962	10.6	0.006	81.6	0.888	177.9
2.90	0.910	166.1	0.812	3.6	0.005	80.9	0.896	173.9
3.00	0.911	164.0	0.741	-3.4	0.004	101.7	0.906	170.5