

Eudyna GaN-HEMT 90W

EGN21A090IV

Preliminary

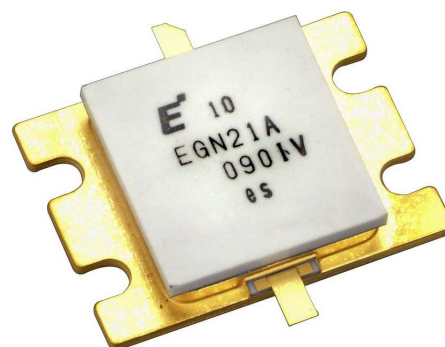
High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Gain: 15dB(typ.) at $P_{out}=42dBm(Avg.)$
- High Efficiency: 35%(typ.) at $P_{out}=42dBm(Avg.)$
- Broad Frequency Range : 2100 to 2200MHz
- Proven Reliability

DESCRIPTION

The EGN21A090IV is a 90 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}	$T_c=25^{\circ}C$	120	V
Gate-Source Voltage	V_{GS}		-5	V
Total Power Dissipation	P_t		160	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}	$R_G=5\ \Omega$	<19.4	mA
Reverse Gate Current	I_{GR}	$R_G=5\ \Omega$	>-7.2	mA
Channel Temperature	T_{ch}		200	$^{\circ}C$

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

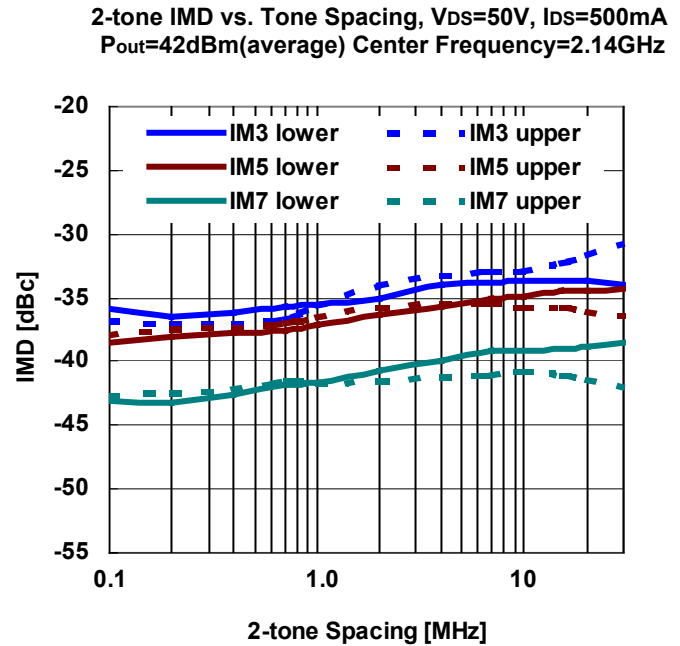
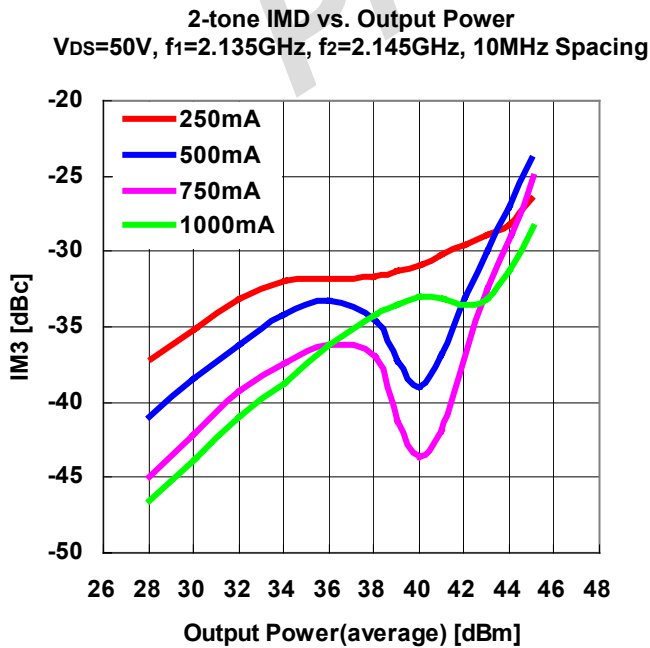
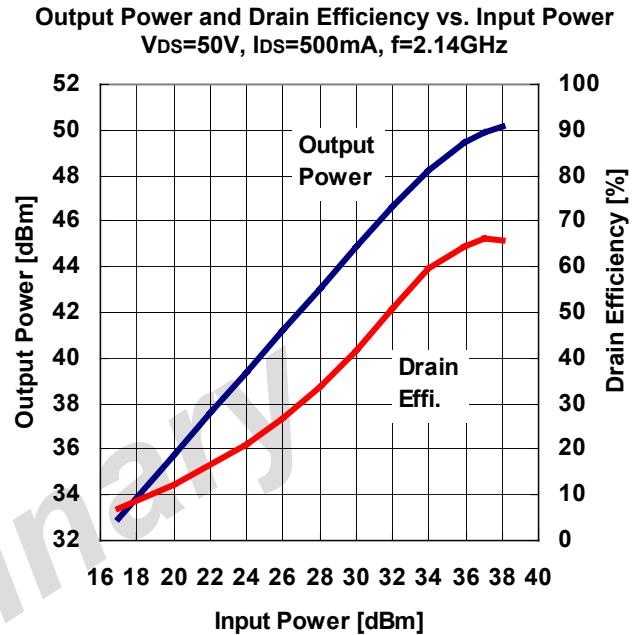
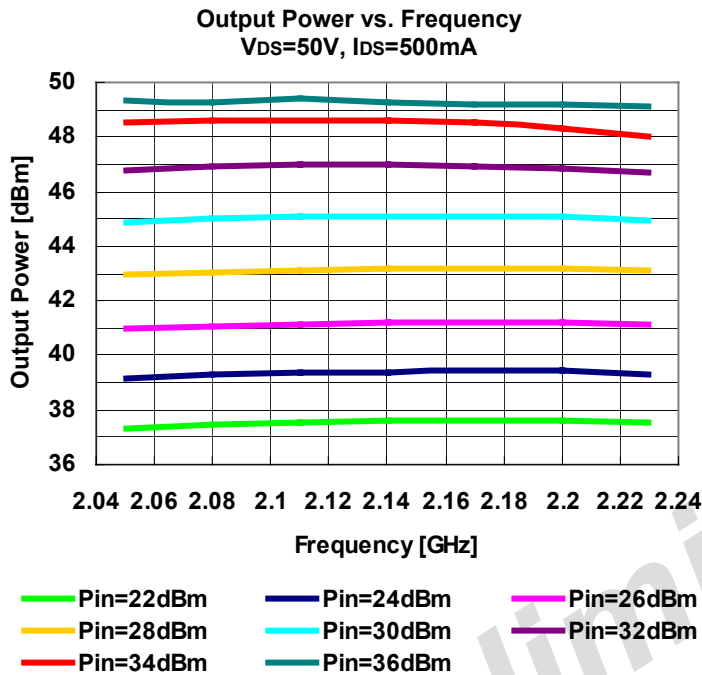
Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V$ $I_{DS}=36mA$	-1.0	-2.0	-3.5	V
Gate-Drain Breakdown Voltage	V_{GDO}	$I_{GS}= -18\ mA$	-	-350	-	V
3rd Order Inter modulation Distortion	IM_3	$V_{DS}=50V$	-	-32	-	dBc
Power Gain	G_p	$I_{DS}(DC)=500mA$	14.0	15.0	-	dB
Drain Efficiency	η_d	$P_{out}=42dBm(Avg.)$ Note 1	-	35	-	%
Thermal Resistance	R_{th}	Channel to Case	-	1.2	1.4	$^{\circ}C/W$

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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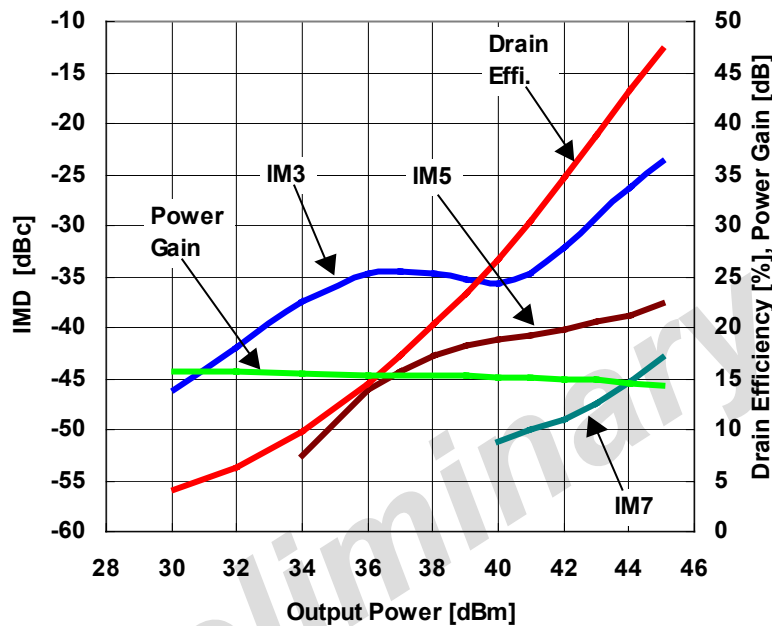


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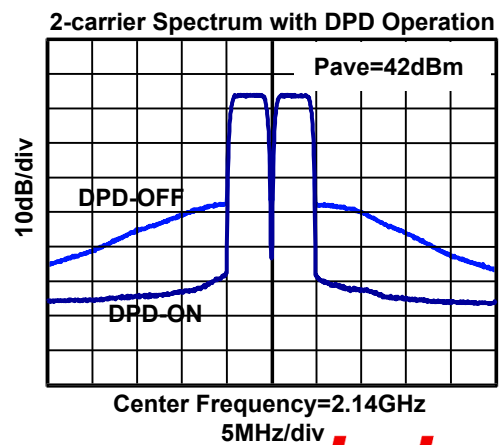
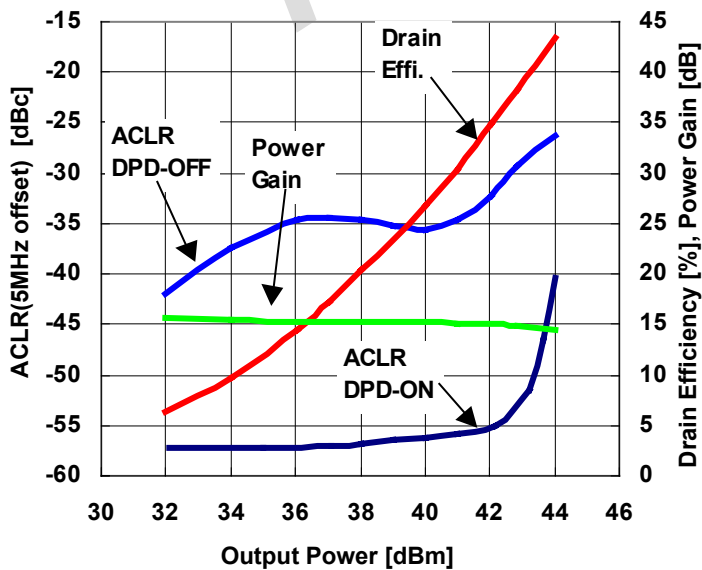
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2-Carrier IMD, Drain Efficiency and Power Gain vs. Output Power
 $V_{DS}=50V$, $I_{DS}=500mA$, $f_1=2.135GHz$, $f_2=2.145GHz$ (10MHz Spacing)
Peak/Avg. = 8.5dB@0.01% Probability(CCDF)



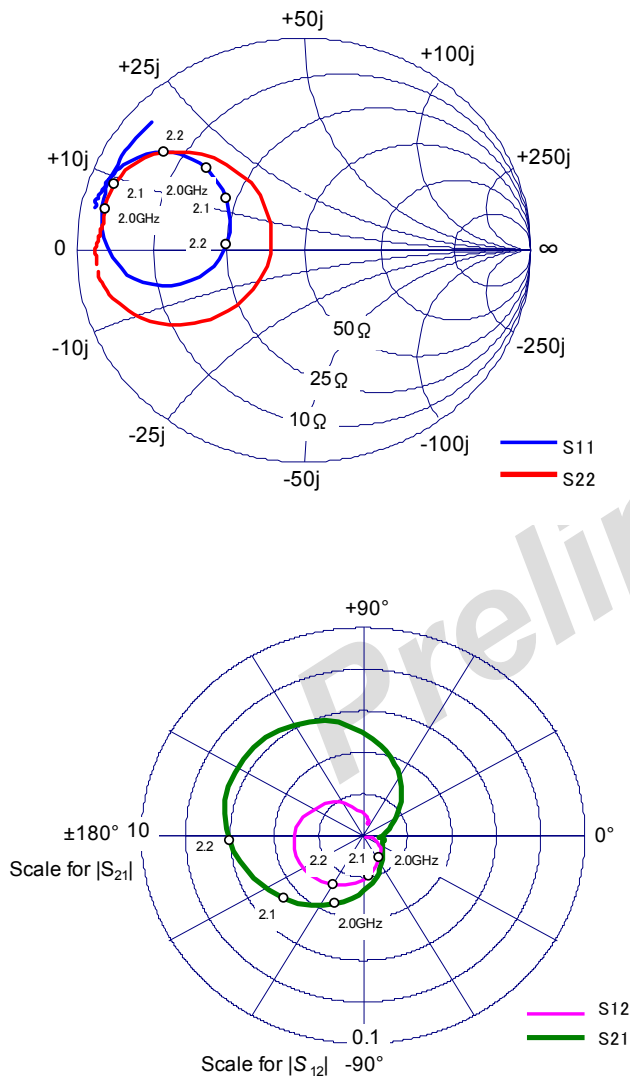
2-Carrier ACLR, Drain Efficiency and Power Gain vs. Output Power with DPD Operation (note $V_{DS}=50V$, $I_{DS}=500mA$, $f_1=2.1375GHz$, $f_2=2.1425GHz$ (5MHz Spacing), Peak/Avg. = 6.5dB@0.01% Probability(CCDF); Single Carrier Signal
Note) Digital Predistortion evaluation test system: PMC-Sierra PALADIN-15 DPD chip-set



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S-Parameters @V_{DS}=50V, I_{DS}=500mA, 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	0.939	167.7	0.960	-10.5	0.002	-36.3	0.910	-175.8
1.10	0.944	165.7	0.927	-15.6	0.002	-30.4	0.915	-177.3
1.20	0.938	163.8	0.927	-20.8	0.001	-27.5	0.915	-178.8
1.30	0.932	161.9	0.966	-26.4	0.002	-18.0	0.915	-179.9
1.40	0.921	159.4	1.034	-32.6	0.002	-15.1	0.911	-178.3
1.50	0.905	156.3	1.149	-39.6	0.003	-12.9	0.907	-177.2
1.60	0.888	152.8	1.333	-48.4	0.003	-11.3	0.900	-175.7
1.70	0.853	149.1	1.614	-58.9	0.004	-12.9	0.898	-174.2
1.80	0.800	145.1	2.025	-72.0	0.006	-22.3	0.892	-172.7
1.90	0.707	140.5	2.649	-89.3	0.009	-35.9	0.889	-171.0
2.00	0.573	138.0	3.506	-111.5	0.013	-55.8	0.895	-167.8
2.10	0.415	144.1	4.661	-140.3	0.020	-82.5	0.887	-159.6
2.11	0.400	145.8	4.792	-143.4	0.020	-85.4	0.881	-158.4
2.12	0.386	147.9	4.921	-146.8	0.021	-88.5	0.877	-157.2
2.13	0.373	150.2	5.043	-150.2	0.022	-92.1	0.871	-155.7
2.14	0.361	153.1	5.178	-153.7	0.022	-95.9	0.863	-154.3
2.15	0.353	156.1	5.327	-157.4	0.023	-98.7	0.854	-152.7
2.16	0.343	159.3	5.452	-160.9	0.024	-102.9	0.844	-151.0
2.17	0.339	163.0	5.598	-164.8	0.025	-106.1	0.830	-149.3
2.18	0.335	167.3	5.741	-168.9	0.026	-110.2	0.810	-147.2
2.19	0.337	171.6	5.888	-173.0	0.026	-114.2	0.792	-145.2
2.20	0.341	176.1	6.022	-177.4	0.027	-118.8	0.769	-143.2
2.30	0.604	-163.9	6.500	132.8	0.032	-167.5	0.321	-126.1
2.40	0.843	-177.7	4.706	85.1	0.025	147.6	0.345	-138.6
2.50	0.901	170.6	2.943	54.4	0.017	118.4	0.646	-146.8
2.60	0.915	163.1	1.950	35.3	0.013	100.5	0.781	-155.9
2.70	0.912	156.9	1.399	21.7	0.010	84.4	0.848	-162.4
2.80	0.916	150.7	1.068	10.2	0.008	74.9	0.884	-167.2
2.90	0.907	144.2	0.852	0.4	0.007	70.5	0.903	-170.3
3.00	0.901	138.0	0.717	-8.2	0.006	72.0	0.910	-173.4