



GaN-HEMT 30W

EGN35C030MK

High Voltage - High Power GaN-HEMT

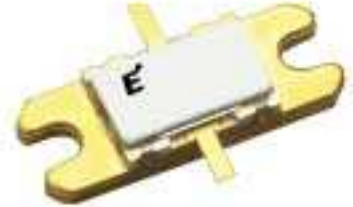
FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 45.0dBm (typ.) @ P_{sat}
- Power Gain : 16.5dB(typ.) @ $f=3.5GHz$
- Proven Reliability

DESCRIPTION

SEDI's GaN-HEMT offers high efficiency, ease of matching, greater consistency and broad bandwidth for high power L-band amplifiers with 50V operation, and gives you higher gain.

This new product is ideally suited for use in 3.5GHz WiMAX design requirements as it offers high gain, long term reliability and ease of use.



ABSOLUTE MAXIMUM RATINGS (Case Temperature $T_c=25^{\circ}C$)

Item	Symbol	Condition	Rating	Unit
Operating-Voltage	V_{DS}		55	V
Drain-Source Voltage	V_{DS}	$V_{GS}=-8V$	160	V
Gate-Source Voltage	V_{GS}		-15	V
Total Power Dissipation	P_t		37.5	W
Storage Temperature	T_{stg}		-65 to +175	$^{\circ}C$
Channel Temperature	T_{ch}		250	$^{\circ}C$

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	V_{DS}		≤ 55	V
Forward Gate Current	I_{GF}	$R_G=15\Omega$	≤ 69	mA
Reverse Gate Current	I_{GR}	$R_G=15\Omega$	≥ -1.1	mA
Channel Temperature	T_{ch}		≤ 180	$^{\circ}C$
Average Output Power	$P_{ave.}$		≤ 42.0	dBm

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

Item	Symbol	Condition	Limit			Unit
			min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V$ $I_{DS}=7.8mA$	-1.0	-1.5	-2.0	V
Saturated Power	$P_{sat} *1$	$V_{DS}=50V$	44.0	45.0	-	dBm
Drain Efficiency	$\eta_d *2$	$I_{DS}(DC)=150mA$	9	11	-	%
Power Gain	$G_p *2$	$f=3.50GHz$	15.5	16.5	-	dB
Thermal Resistance	R_{th}	Channel to Case at 24W P_{DC}	-	5.0	6.0	$^{\circ}C/W$

*1 : 10%-duty RF pulse (DC supply constant)

*2 : $P_{out} = 31.5dBm$, CW



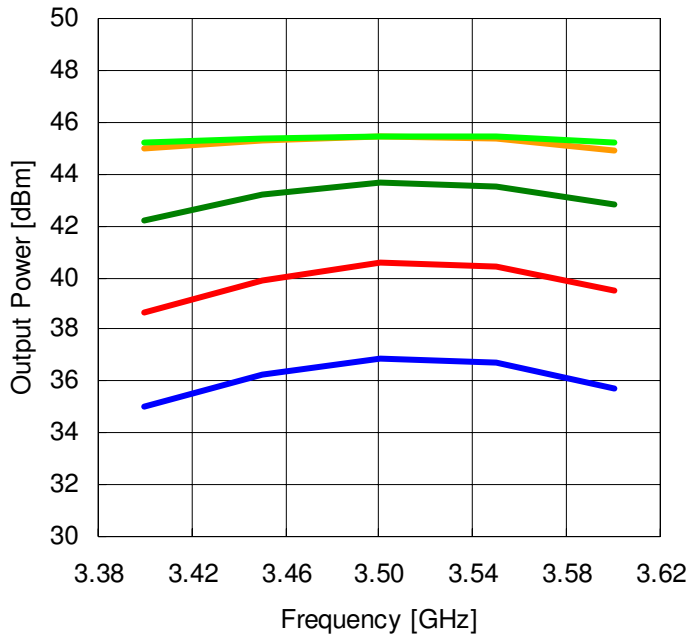
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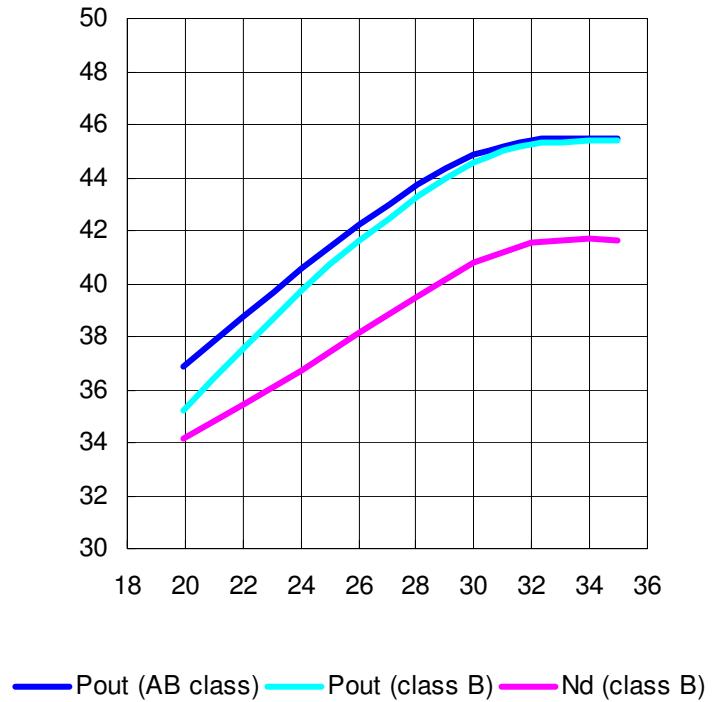
RF characteristics @f=3.5GHz fine tuned

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Output Power vs. Frequency
V_{DS}=50V, I_{DS(DC)}=150mA

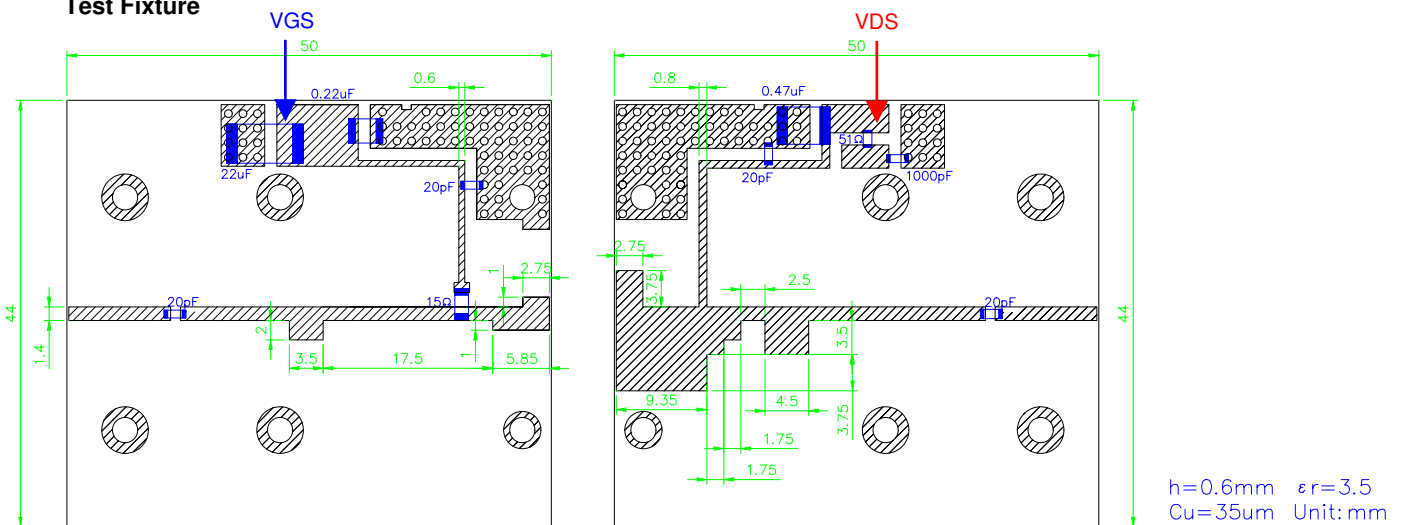


Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V, I_{DS(DC)}=150mA, f=3.50GHz



Pulse Signal (10%-duty, DC : constant)

Test Fixture



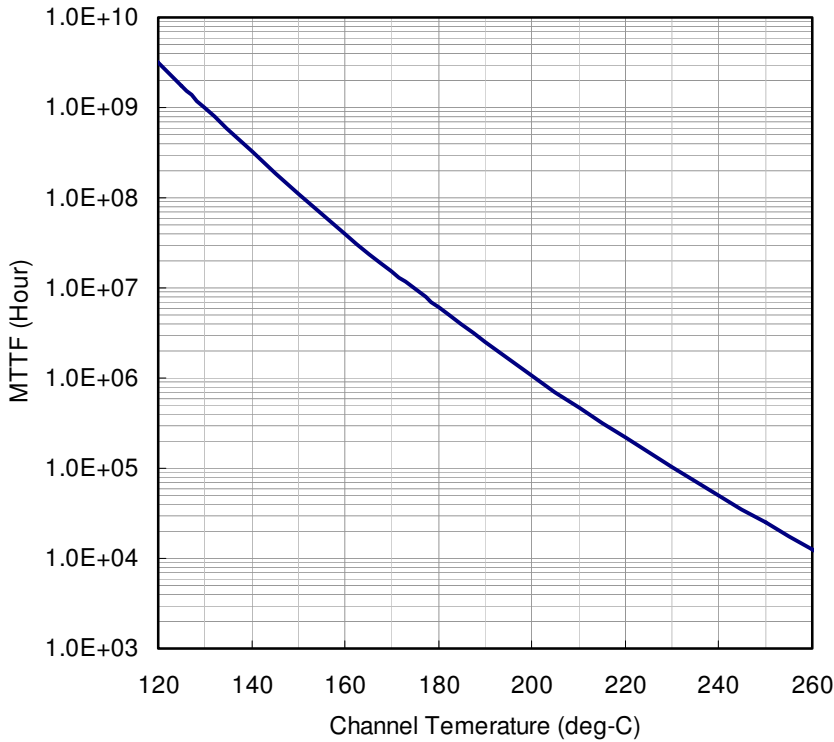


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MTTF Calculation
- Estimated MTTF -



Ea= 1.6eV
Confidence Level= 90%

Channel Temp (deg-C)	MTTF (Hours)
160	4.05 x 10 ⁷
180	6.07 x 10 ⁶
200	1.07 x 10 ⁶

$$AF = \exp\left[-\frac{Ea}{k}\left(\frac{1}{T_{stress}} - \frac{1}{T_{use}}\right)\right]$$

$$MTTF_{use} = MTTF_{stress} * AF$$

Where;

AF: acceleration factor

Ea: activation energy (1.6 eV)

k: Boltzman's constant (8.62 x 10⁻⁵ eV/K)

T_{stress}: stress temperature (K)

T_{use}: use temperature (K)

ESD characteristic

Test Methodology	Class
Human Body Model (per JESD22-A114)	0
Machine Model (per JEIA/ESD22-A115)	A



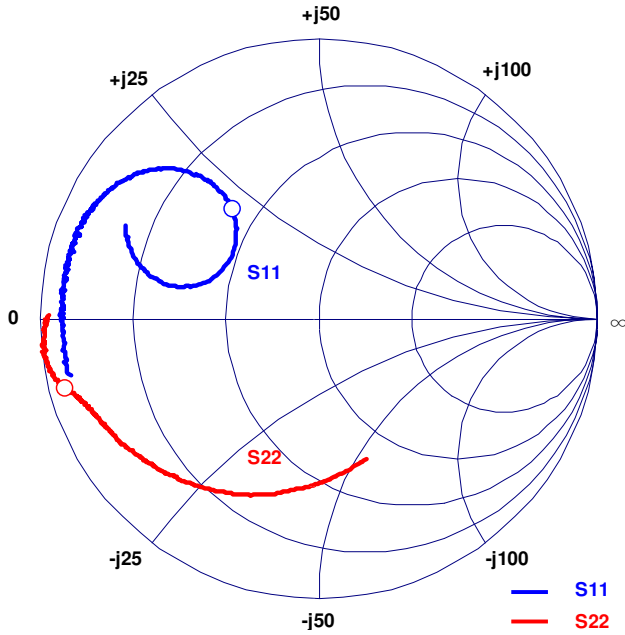
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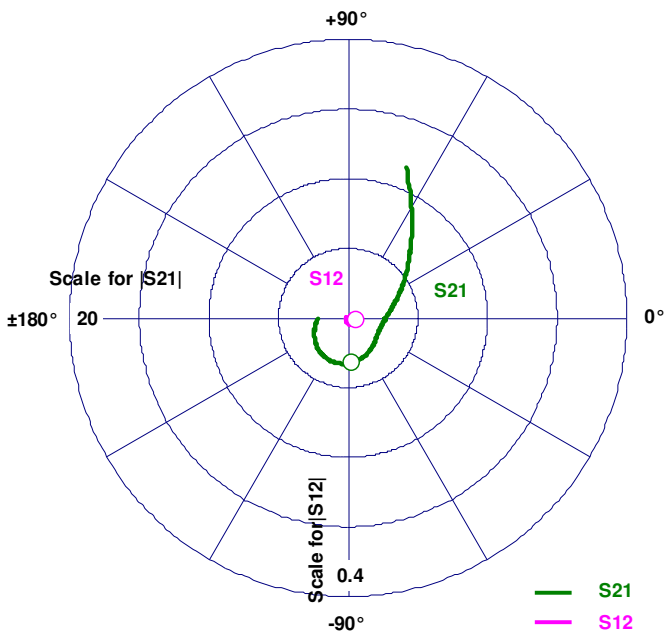
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- Reference DATA -

S-Parameters @V_{DS}=50V, I_{DS(DC)}=150mA, f=0.5 to 4.5GHz
Z_I = Z_s = 50 ohm Marker : 3.50GHz



Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.91	-167.14	11.61	68.89	0.008	-6.03	0.53	-71.18
0.60	0.92	-171.60	9.57	61.82	0.007	-9.26	0.55	-79.90
0.70	0.92	-175.48	8.03	55.27	0.007	-10.66	0.58	-87.59
0.80	0.92	-178.48	6.94	49.43	0.006	-15.34	0.60	-94.62
0.90	0.93	179.06	6.08	43.95	0.006	-13.78	0.63	-101.09
1.00	0.93	176.26	5.36	38.67	0.005	-18.00	0.65	-106.85
1.10	0.92	173.62	4.85	33.48	0.005	-14.38	0.68	-112.27
1.20	0.93	171.84	4.36	28.74	0.005	-16.58	0.70	-117.26
1.30	0.92	169.49	3.97	24.07	0.004	-12.14	0.72	-121.63
1.40	0.92	167.77	3.64	20.28	0.004	-6.47	0.74	-125.38
1.50	0.93	165.81	3.39	15.94	0.004	1.59	0.75	-129.24
1.60	0.92	164.45	3.16	11.67	0.004	5.47	0.77	-132.66
1.70	0.91	162.88	2.97	8.03	0.004	10.46	0.78	-135.94
1.80	0.91	161.08	2.83	4.37	0.004	10.89	0.79	-138.72
1.90	0.91	158.93	2.70	0.56	0.004	22.66	0.81	-141.31
2.00	0.92	157.55	2.59	-3.12	0.004	24.96	0.82	-143.70
2.10	0.91	155.70	2.53	-7.36	0.005	29.67	0.83	-145.62
2.20	0.91	154.01	2.47	-10.88	0.004	28.85	0.84	-147.70
2.30	0.90	152.08	2.42	-15.06	0.005	33.51	0.84	-149.88
2.40	0.89	150.19	2.40	-18.43	0.006	30.33	0.85	-151.97
2.50	0.88	148.17	2.39	-22.44	0.006	32.26	0.86	-153.36
2.60	0.87	146.19	2.40	-26.84	0.007	32.03	0.86	-154.78
2.70	0.85	143.82	2.43	-31.18	0.007	27.75	0.87	-156.43
2.80	0.83	141.42	2.48	-35.91	0.008	30.27	0.88	-157.56
2.90	0.81	139.07	2.54	-40.98	0.009	27.38	0.88	-158.62
3.00	0.78	136.35	2.63	-46.57	0.009	24.42	0.89	-159.89
3.10	0.74	133.70	2.73	-52.99	0.010	16.37	0.90	-161.16
3.20	0.70	131.34	2.85	-59.74	0.011	11.69	0.90	-161.94
3.30	0.64	128.79	2.98	-67.53	0.011	5.10	0.92	-162.63
3.40	0.57	127.71	3.11	-75.94	0.012	-0.22	0.93	-163.88
3.50	0.50	128.41	3.23	-85.76	0.013	-9.93	0.94	-164.79
3.60	0.43	133.72	3.31	-96.03	0.013	-23.25	0.96	-166.05
3.70	0.39	142.80	3.33	-106.86	0.012	-32.19	0.97	-167.37
3.80	0.39	155.13	3.27	-118.49	0.011	-46.00	0.98	-169.22
3.90	0.44	163.56	3.16	-129.43	0.010	-61.37	0.99	-171.01
4.00	0.51	167.26	3.02	-140.07	0.008	-73.73	0.99	-172.70
4.10	0.58	166.67	2.80	-149.74	0.007	-90.41	0.99	-174.73
4.20	0.65	164.91	2.63	-158.13	0.006	-120.14	0.99	-176.13
4.30	0.70	161.90	2.45	-166.16	0.005	-136.89	0.99	-177.84
4.40	0.74	158.14	2.29	-173.45	0.004	-165.04	0.98	-179.35
4.50	0.77	154.26	2.16	-179.91	0.004	171.95	0.97	179.16





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MK Package Outline Metal-Ceramic Hermetic Package

