



EGNB045MK

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 47.5dBm (typ.) @ P3dB
- High Efficiency: 60%(typ.) @ P3dB
- Linear Gain : 13dB(typ.) @ $f=2.2GHz$
- 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 device target applications are low current and wide band applications for high voltage.

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Rating	Unit
Drain-Source Voltage	V_{DS}		120	V
Gate-Source Voltage	V_{GS}		-5	V
Total Power Dissipation	P_t	$T_c=25^{\circ}C$	125	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}	$R_G=10\ \Omega$	<38.0	mA
Reverse Gate Current	I_{GR}	$R_G=10\ \Omega$	>-3.6	mA

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
3dB Gain Compression Power	P_{3dB}	$V_{DS}=50V$	46.5	47.5	-	dBm
Drain Efficiency	η_d	$I_{DS}(DC)=250mA$	-	60	-	%
Linear Gain	GL	$f=2.2GHz$	12	13	-	dB
Thermal Resistance	R_{th}	Channel to Case at 75W P_{DC}	-	1.4	1.8	$^{\circ}C/W$

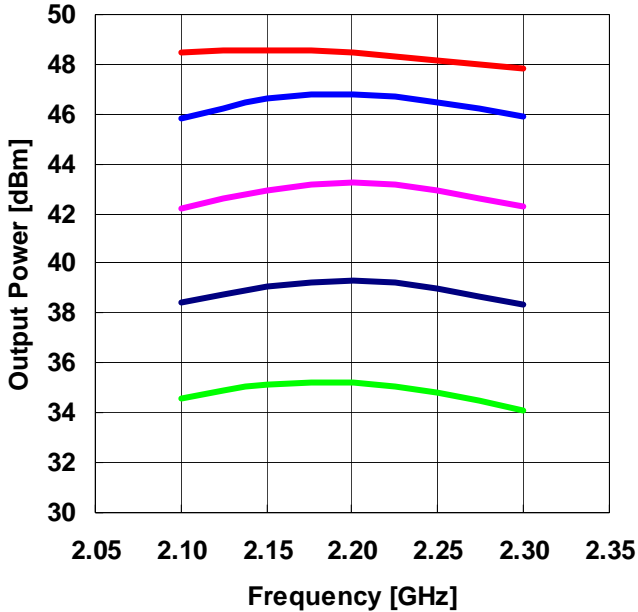


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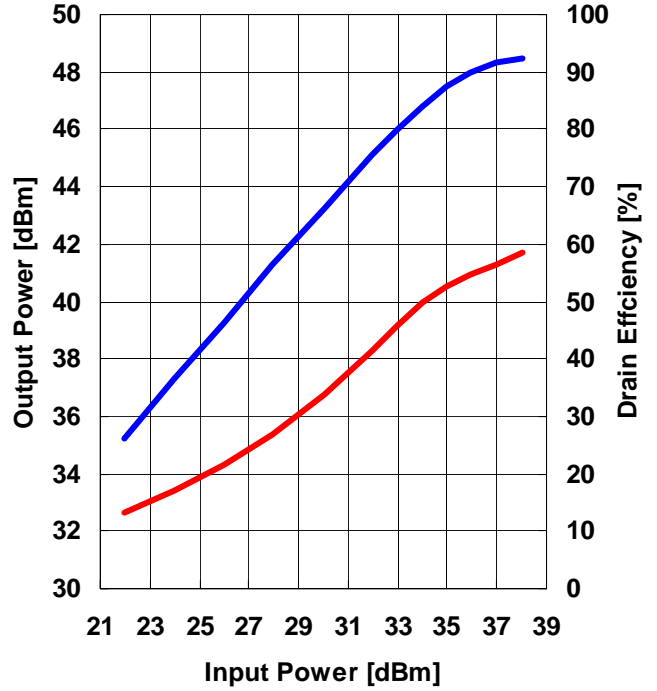
RF Performance @f=2.2GHz fine tuned

Output Power vs. Frequency
V_{DS}=50V I_{DS(DC)}=250mA

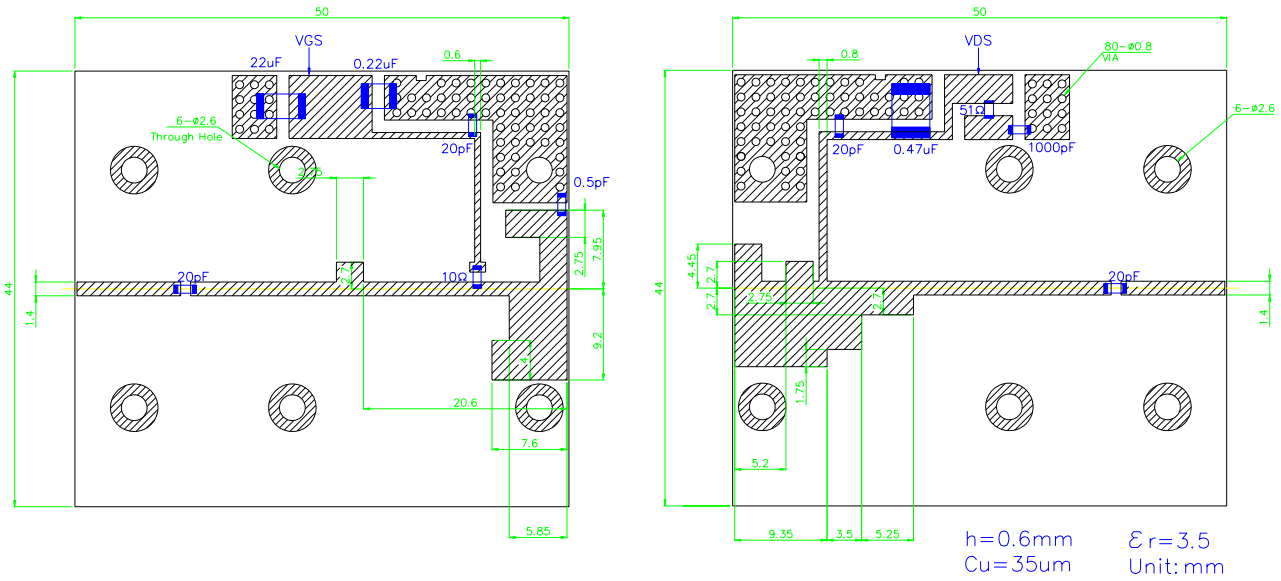


Pin=22dBm Pin=26dBm Pin=30dBm
Pin=34dBm Pin=38dBm

Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V I_{DS(DC)}=250mA f=2.2GHz



Test Fixture

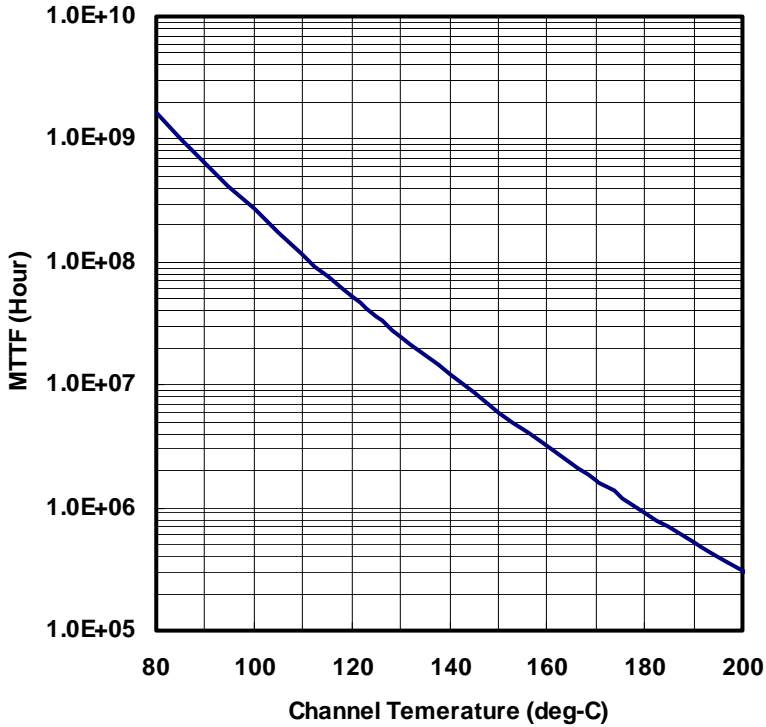




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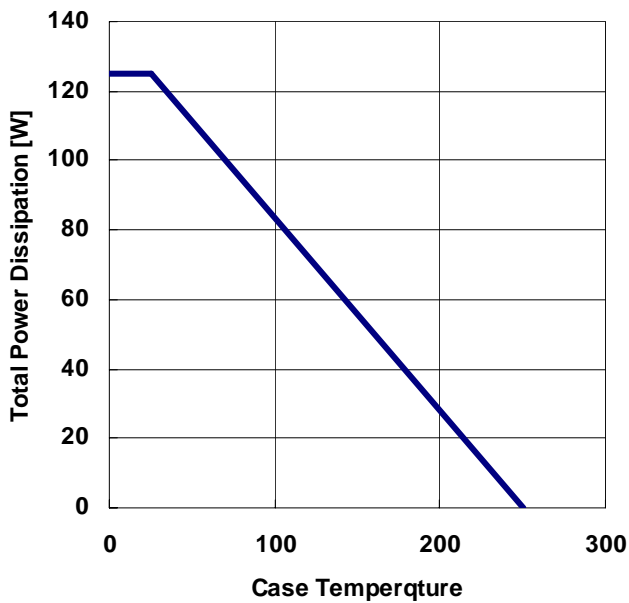
MTTF Calculation
- Estimated MTTF -



Confidence Level=60%

Channel Temp (deg-C)	MTTF (years)
125	3796
150	640
180	98
200	32

Power Derating Curve



ESD characteristic

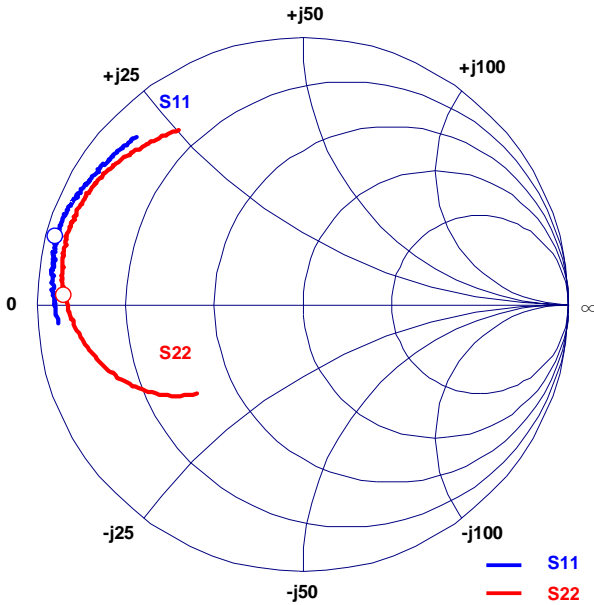
Test Methodology	Class
Human Body Model (per JESD22-A114)	0
Machine Model (per JEIA/ESD22-A115)	A



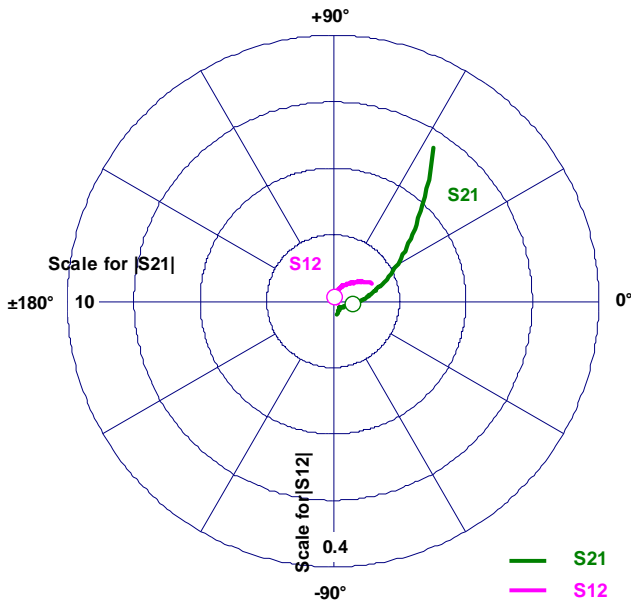
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S-Parameters @V_{DS}=50V I_{DS}=100mA f=0.5 to 5.5 GHz
Z_i = Z_s = 50 ohm Marker : 2.2GHz



Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.92	-175.46	6.92	56.84	0.008	-20.00	0.52	-139.85
0.60	0.93	-177.43	5.52	50.32	0.007	-20.96	0.57	-143.56
0.70	0.93	-179.48	4.49	44.21	0.006	-21.12	0.62	-147.11
0.80	0.93	179.09	3.74	38.62	0.006	-24.30	0.67	-150.57
0.90	0.94	177.89	3.16	33.62	0.005	-20.57	0.70	-153.89
1.00	0.95	176.66	2.70	29.02	0.004	-18.09	0.73	-157.03
1.10	0.95	175.13	2.35	24.21	0.004	-12.15	0.76	-160.27
1.20	0.95	174.02	2.04	20.48	0.004	-2.44	0.78	-162.72
1.30	0.95	173.11	1.80	17.20	0.003	6.92	0.80	-165.32
1.40	0.95	172.15	1.60	13.60	0.003	19.55	0.82	-167.52
1.50	0.95	171.07	1.42	9.74	0.003	30.74	0.83	-169.79
1.60	0.94	169.90	1.29	7.22	0.004	35.94	0.85	-171.80
1.70	0.95	169.07	1.16	4.26	0.004	47.55	0.86	-173.62
1.80	0.96	168.28	1.06	1.10	0.004	48.31	0.87	-175.86
1.90	0.96	167.36	0.97	-1.10	0.005	49.52	0.88	-177.69
2.00	0.96	166.34	0.90	-3.86	0.005	57.55	0.89	-179.50
2.10	0.96	165.89	0.82	-5.57	0.006	58.81	0.89	178.97
2.20	0.96	164.66	0.77	-8.32	0.006	56.65	0.90	177.70
2.30	0.96	163.79	0.71	-10.61	0.007	60.06	0.90	176.14
2.40	0.96	163.14	0.67	-12.49	0.007	62.63	0.91	174.74
2.50	0.96	162.31	0.63	-14.62	0.007	59.52	0.91	173.39
2.60	0.96	161.71	0.59	-16.54	0.008	61.08	0.91	172.06
2.70	0.96	161.22	0.56	-18.36	0.009	61.04	0.92	170.88
2.80	0.96	160.47	0.53	-20.23	0.009	60.48	0.92	169.63
2.90	0.96	159.74	0.51	-22.02	0.010	59.69	0.92	168.40
3.00	0.96	159.36	0.49	-23.78	0.011	61.65	0.92	167.08
3.10	0.95	158.64	0.47	-25.97	0.011	63.91	0.92	166.08
3.20	0.95	157.94	0.45	-27.52	0.012	60.61	0.92	164.99
3.30	0.95	157.26	0.44	-29.30	0.012	64.78	0.93	163.90
3.40	0.95	156.90	0.42	-30.54	0.013	62.35	0.92	162.46
3.50	0.95	156.47	0.41	-32.52	0.014	66.35	0.92	161.34
3.60	0.95	155.29	0.40	-34.16	0.014	65.57	0.92	160.07
3.70	0.94	154.61	0.39	-35.73	0.016	67.94	0.92	158.90
3.80	0.94	154.27	0.38	-37.53	0.017	66.00	0.92	157.62
3.90	0.94	153.59	0.37	-39.61	0.019	67.71	0.92	156.02
4.00	0.94	153.14	0.37	-40.52	0.021	64.39	0.91	154.75
4.10	0.94	152.39	0.37	-41.93	0.022	63.82	0.91	153.58
4.20	0.94	151.45	0.36	-44.43	0.024	61.16	0.91	152.48
4.30	0.93	150.90	0.36	-45.90	0.026	58.96	0.90	150.31
4.40	0.93	150.15	0.36	-46.66	0.028	57.80	0.90	149.01
4.50	0.93	149.23	0.36	-48.52	0.030	53.90	0.90	147.34
4.60	0.92	148.20	0.37	-50.96	0.032	50.73	0.89	145.38
4.70	0.92	147.08	0.37	-51.93	0.035	49.39	0.89	143.99
4.80	0.92	146.00	0.38	-54.65	0.038	46.78	0.87	141.84
4.90	0.91	144.95	0.39	-56.61	0.040	43.46	0.87	140.38
5.00	0.91	143.17	0.40	-58.24	0.044	42.23	0.86	138.36
5.10	0.91	141.92	0.42	-60.30	0.047	38.76	0.85	136.10
5.20	0.90	140.63	0.44	-62.84	0.050	35.39	0.84	134.15
5.30	0.90	138.74	0.46	-65.85	0.055	31.30	0.83	131.17
5.40	0.89	136.56	0.48	-69.78	0.060	28.12	0.82	128.43
5.50	0.89	134.88	0.52	-72.95	0.064	24.19	0.81	125.47





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MK Package Outline Metal-Ceramic Hermetic Package

