



EGNB030MK

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 46.5dBm (typ.) @ P3dB
- High Efficiency: 60%(typ.) @ P3dB
- Linear Gain : 13dB(typ.) @ $f=2.7GHz$
- 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	$T_c=25^{\circ}C$	93.75	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}	$R_G=15\ \Omega$	<23	mA
Reverse Gate Current	I_{GR}	$R_G=15\ \Omega$	>-2.2	mA

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

Item	Symbol	Condition	Limit			Unit
			min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V$ $I_{DS}=11mA$	-1.0	-2.0	-3.5	V
3dB Gain Compression Power	P_{3dB}	$V_{DS}=50V$	45.5	46.5	-	dBm
Drain Efficiency	η_d	$I_{DS}(DC)=200mA$	-	60	-	%
Linear Gain	GL	$f=2.7GHz$	12	13	-	dB
Thermal Resistance	R_{th}	Channel to Case $P_{DC}=57W$	-	2.0	2.4	$^{\circ}C/W$

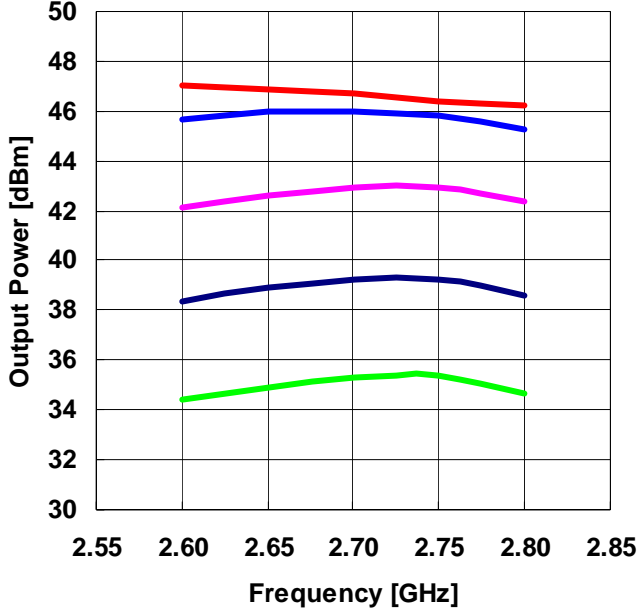


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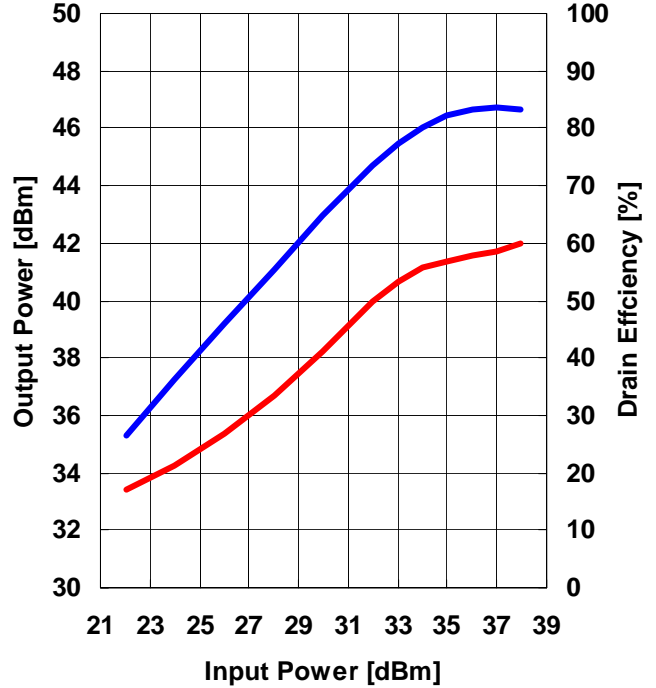
RF Performance @f=2.7GHz fine tuned

Output Power vs. Frequency
V_{DS}=50V I_{DS(DC)}=200mA

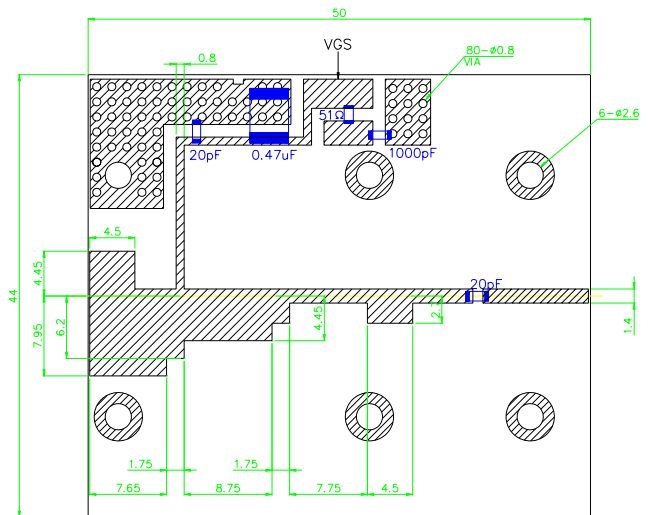
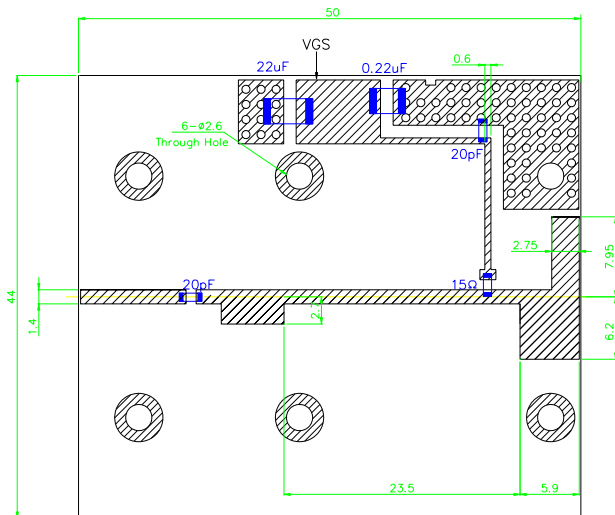


Pin=22dBm Pin=26dBm Pin=30dBm
Pin=34dBm Pin=38dBm

Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V I_{DS(DC)}=200mA f=2.7GHz



Test Fixture



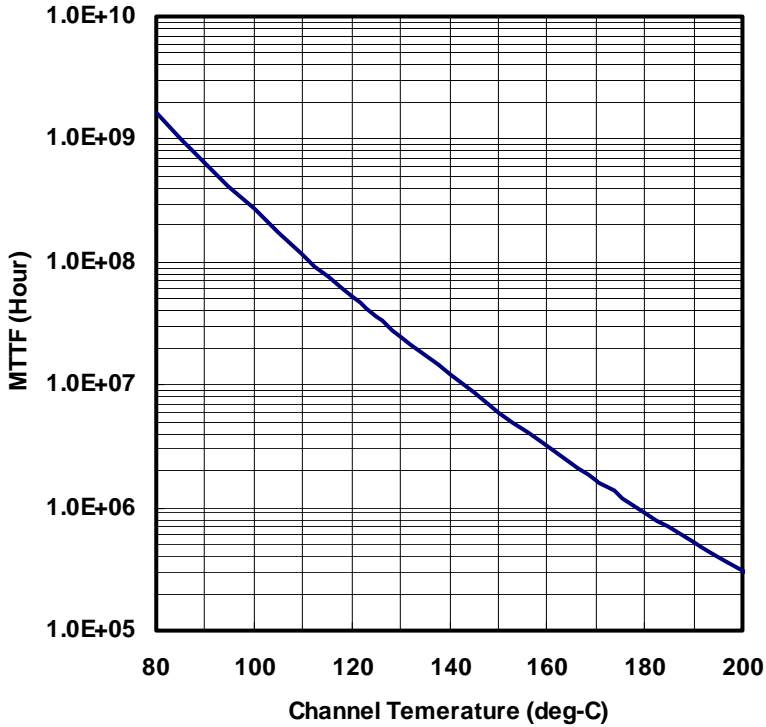
h=0.6mm ε_r=3.5
Cu=35µm Unit:mm



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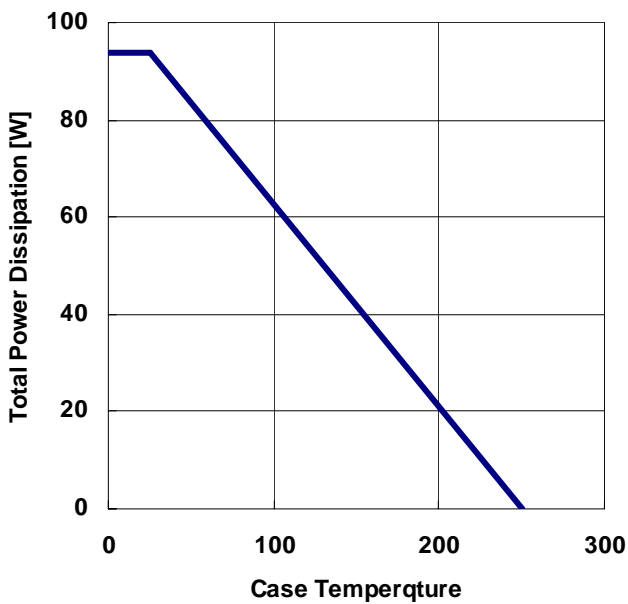
MTTF Calculation
- Estimated MTTF -



Confidence Level=60%

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

Power Derating Curve



ESD characteristic

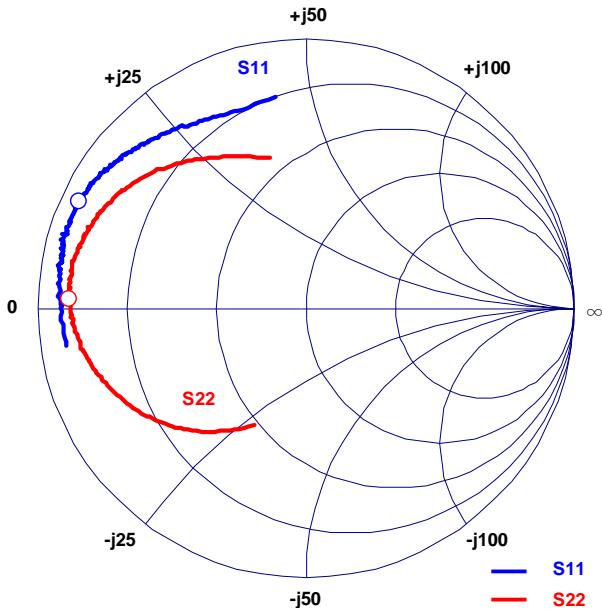
Test Methodology	Class
Human Body Model (per JESD22-A114)	0
Machine Model (per JEIA/ESD22-A115)	A



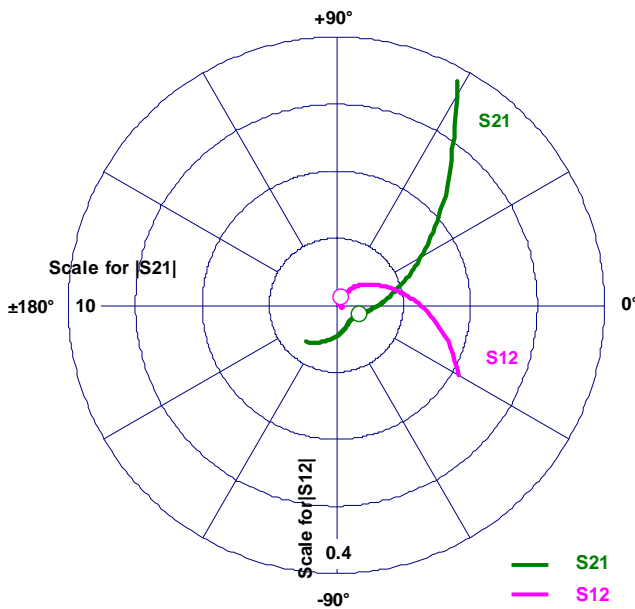
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S-Parameters @V_{DS}=50V I_{DS}=100mA f=0.5 to 5.5 GHz
 Z_I = Z_S = 50 ohm Marker : 2.7GHz



Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.90	-171.13	9.48	61.61	0.009	-14.15	0.47	-114.13
0.60	0.91	-174.31	7.64	54.77	0.008	-15.33	0.52	-120.61
0.70	0.92	-177.28	6.30	48.50	0.008	-16.06	0.57	-126.51
0.80	0.91	-179.32	5.29	42.55	0.007	-17.96	0.61	-131.70
0.90	0.91	179.11	4.52	37.36	0.006	-15.98	0.65	-136.42
1.00	0.93	177.15	3.89	32.36	0.005	-9.58	0.68	-140.96
1.10	0.92	174.88	3.42	27.18	0.005	-7.88	0.71	-145.28
1.20	0.92	173.44	3.00	23.18	0.004	4.98	0.73	-148.79
1.30	0.92	172.07	2.66	19.35	0.004	10.74	0.76	-152.12
1.40	0.93	170.77	2.39	15.44	0.004	21.47	0.78	-155.19
1.50	0.93	169.41	2.15	11.46	0.004	31.12	0.79	-157.99
1.60	0.92	167.59	1.96	8.39	0.005	39.57	0.81	-160.68
1.70	0.93	166.61	1.77	4.96	0.005	46.20	0.82	-163.26
1.80	0.94	165.42	1.64	1.55	0.006	52.75	0.83	-165.79
1.90	0.94	164.07	1.51	-0.95	0.006	48.78	0.84	-168.03
2.00	0.94	163.26	1.40	-4.13	0.007	51.74	0.85	-170.07
2.10	0.94	161.79	1.31	-6.20	0.008	54.78	0.85	-172.12
2.20	0.94	160.57	1.22	-9.12	0.008	57.16	0.86	-173.94
2.30	0.94	159.54	1.15	-11.85	0.009	58.12	0.87	-175.80
2.40	0.94	158.18	1.09	-14.09	0.010	59.18	0.87	-177.57
2.50	0.93	157.35	1.03	-16.44	0.011	58.20	0.88	-179.06
2.60	0.94	156.25	0.99	-19.25	0.012	58.56	0.88	-179.34
2.70	0.94	155.01	0.94	-21.19	0.013	56.39	0.88	-177.72
2.80	0.93	154.27	0.90	-23.43	0.014	58.07	0.88	-176.09
2.90	0.93	152.91	0.88	-25.79	0.015	56.69	0.88	-174.96
3.00	0.92	152.32	0.85	-28.06	0.016	55.58	0.89	-173.20
3.10	0.92	151.39	0.83	-29.96	0.017	55.13	0.88	-171.96
3.20	0.93	150.03	0.81	-32.68	0.018	55.65	0.89	-170.59
3.30	0.92	148.57	0.79	-35.08	0.020	53.46	0.89	-169.30
3.40	0.91	148.00	0.78	-36.91	0.021	52.10	0.89	-167.60
3.50	0.91	146.98	0.77	-39.61	0.023	54.40	0.88	-166.25
3.60	0.91	145.57	0.77	-41.57	0.024	51.97	0.88	-164.62
3.70	0.90	144.02	0.76	-44.20	0.026	50.64	0.87	-162.94
3.80	0.90	143.12	0.77	-46.43	0.029	49.38	0.87	-161.64
3.90	0.89	142.04	0.77	-48.78	0.032	49.83	0.87	-159.75
4.00	0.89	140.72	0.78	-51.68	0.035	46.98	0.86	-158.12
4.10	0.88	139.36	0.80	-54.13	0.039	44.94	0.85	-156.54
4.20	0.88	137.65	0.81	-57.95	0.043	41.71	0.85	-154.85
4.30	0.86	136.16	0.84	-60.54	0.048	38.15	0.84	-152.16
4.40	0.86	134.60	0.86	-63.80	0.053	35.98	0.83	-150.39
4.50	0.85	132.56	0.90	-67.61	0.059	31.51	0.81	-147.90
4.60	0.84	130.39	0.94	-71.59	0.065	28.12	0.80	-145.33
4.70	0.83	127.93	0.99	-75.70	0.073	23.90	0.79	-142.77
4.80	0.82	125.69	1.04	-80.57	0.082	19.23	0.77	-139.75
4.90	0.81	123.16	1.10	-85.84	0.092	14.07	0.75	-136.85
5.00	0.80	119.95	1.17	-91.31	0.105	9.01	0.73	-132.94
5.10	0.79	116.79	1.26	-97.44	0.119	2.88	0.70	-128.69
5.20	0.78	113.32	1.36	-104.06	0.136	-4.21	0.67	-124.46
5.30	0.78	109.14	1.47	-111.54	0.156	-12.04	0.64	-118.79
5.40	0.78	104.20	1.61	-120.11	0.181	-20.25	0.61	-112.24
5.50	0.79	98.39	1.77	-129.69	0.210	-30.07	0.57	-103.64





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MK Package Outline Metal-Ceramic Hermetic Package

