

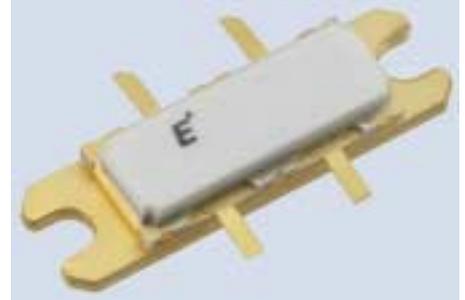


EGNB180M1A

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 53.5dBm (typ.) @ P3dB
- High Efficiency: 65%(typ.) @ P3dB
- Linear Gain : 17.5dB(typ.) @ $f=0.9GHz$
- 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	$T_c=25^{\circ}C$	281	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}	$R_G=2.5 \Omega$	<152	mA
Reverse Gate Current	I_{GR}	$R_G=2.5 \Omega$	>-14.4	mA

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

Item	Symbol	Condition	Limit			Unit
			min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V$ $I_{DS}=72mA$	-1.0	-2.0	-3.5	V
3dB Gain Compression Power	P_{3dB}	$V_{DS}=50V$	52.5	53.5	-	dBm
Drain Efficiency	η_d	$I_{DS}(DC)=1000mA$	-	65	-	%
Linear Gain	GL	$f=0.9GHz$	16.5	17.5	-	dB
Thermal Resistance	R_{th}	Channel to Case	-	0.65	0.8	$^{\circ}C/W$

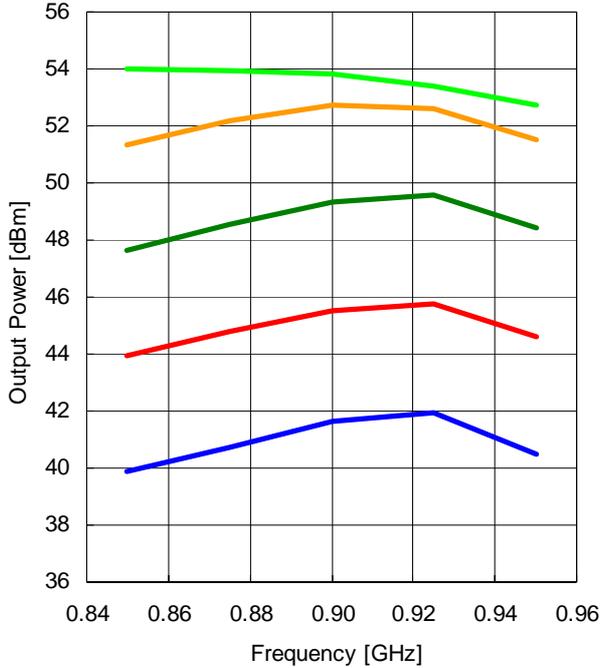


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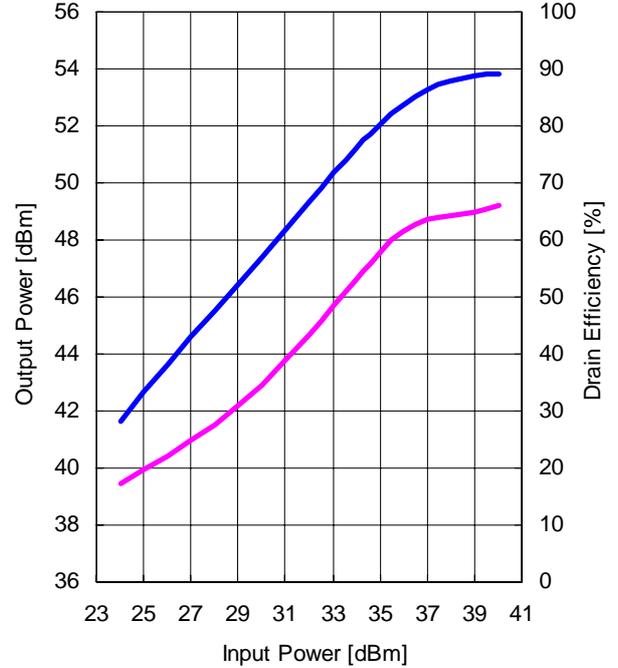
RF Performance @f=0.9GHz fine tuned

Output Power vs. Frequency
V_{ds}=50V I_{ds(DC)}=1000mA



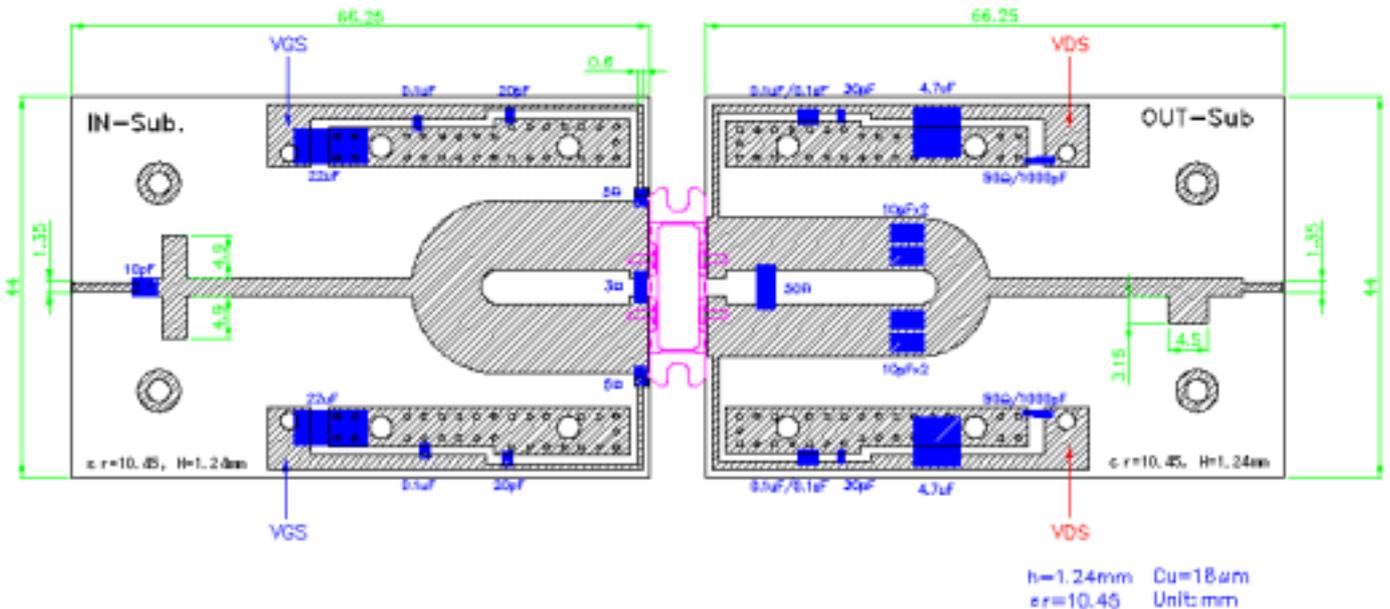
Pin=24dBm Pin=28dBm Pin=32dBm
Pin=36dBm Pin=40dBm

Output Power and Drain Efficiency vs. Input Power
V_{ds}=50V I_{ds(DC)}=1000mA f=0.9GHz



Output Power Drain Efficiency

Test Fixture

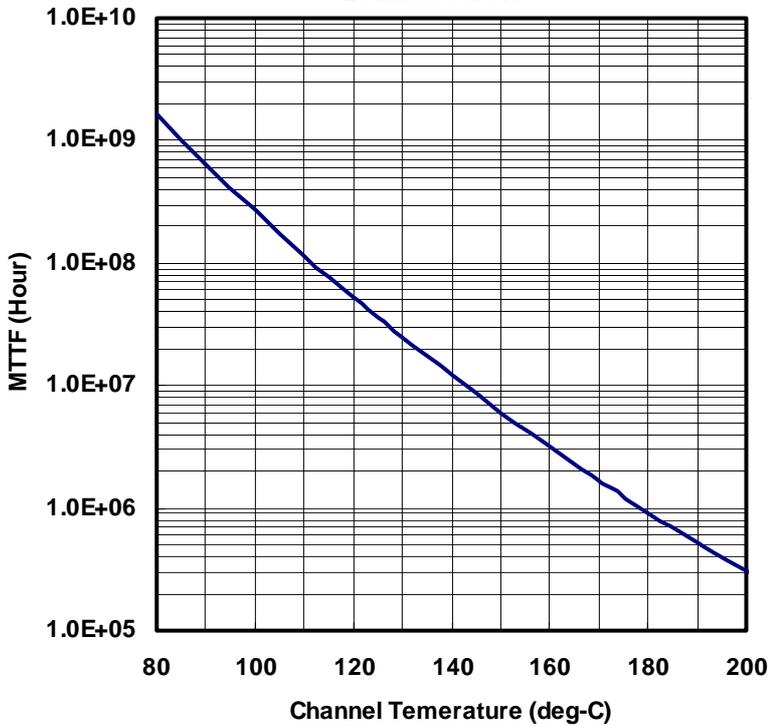




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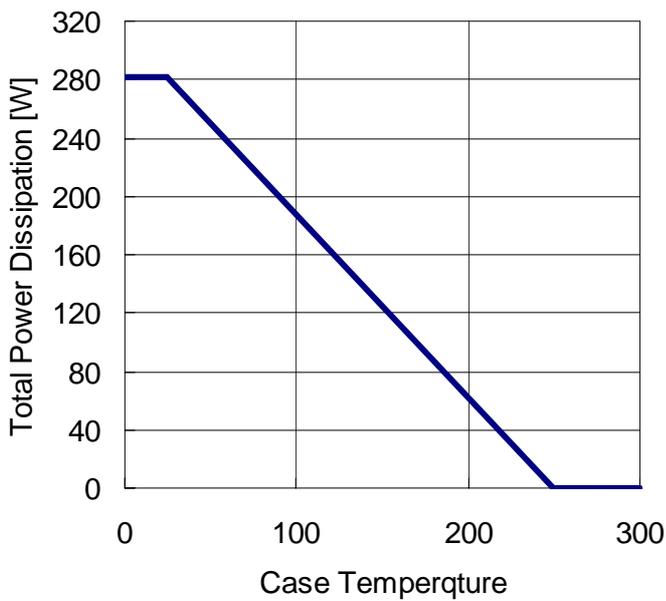
MTTF Calculation
- Estimated MTTF -



Confidence Level=60%

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

Power Derating Curve



ESD characteristic (@1Port)

Test Methodology	Class
Human Body Model (per JESD22-A114)	1B
Machine Model (per JEIA/ESD22-A115)	A



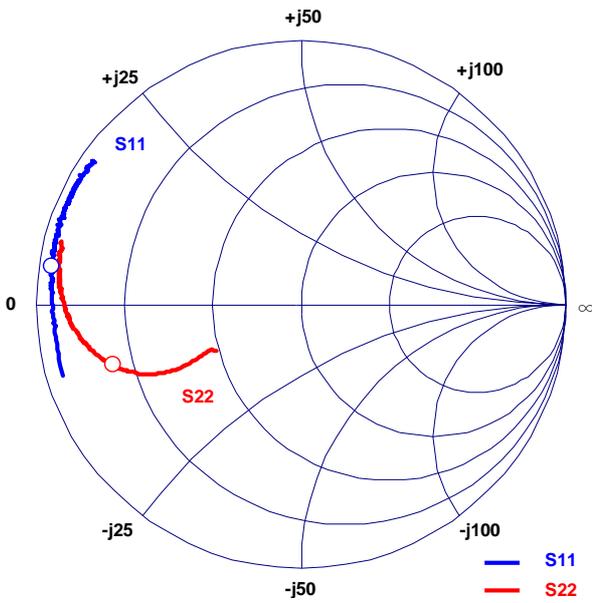
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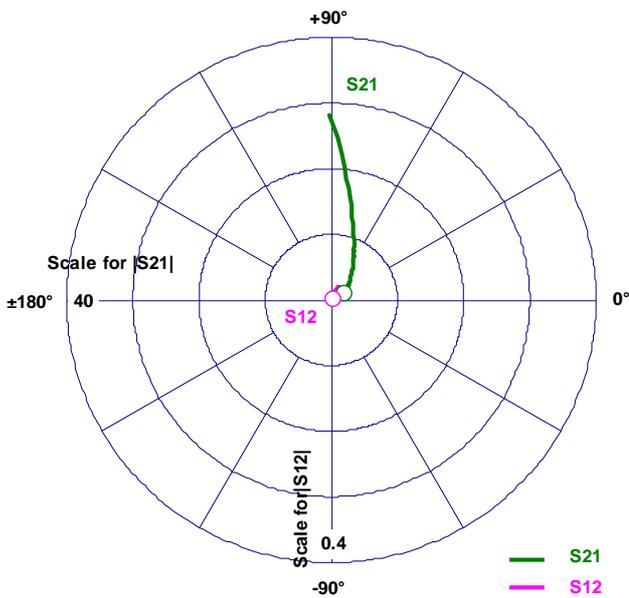
S-Parameters (1Port)

@V_{DS}=50V I_{DS}=500mA f=0.5 to 3.1 GHz

Z_i = Z_s = 50 ohm Marker : 0.9GHz



Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.10	0.94	-163.41	28.11	90.51	0.008	5.96	0.37	-151.24
0.20	0.94	-173.29	13.77	77.13	0.007	0.31	0.41	-153.16
0.30	0.94	-177.24	8.87	67.42	0.007	-2.28	0.47	-152.20
0.40	0.94	-179.74	6.40	59.02	0.006	-4.84	0.53	-152.42
0.50	0.94	178.04	4.86	51.59	0.005	0.24	0.58	-153.54
0.60	0.95	176.33	3.86	45.00	0.005	1.83	0.63	-155.36
0.70	0.94	174.71	3.11	38.48	0.004	7.96	0.68	-157.59
0.80	0.95	173.30	2.59	33.72	0.004	17.00	0.71	-159.66
0.90	0.95	171.30	2.18	27.93	0.004	30.55	0.75	-162.20
1.00	0.96	170.45	1.87	23.71	0.004	36.92	0.77	-164.18
1.10	0.96	168.58	1.61	18.97	0.004	45.64	0.80	-166.29
1.20	0.96	167.23	1.41	14.51	0.005	55.40	0.82	-168.59
1.30	0.96	166.22	1.24	11.21	0.006	58.30	0.84	-170.11
1.40	0.96	164.35	1.10	6.88	0.006	61.18	0.85	-171.92
1.50	0.95	163.74	0.98	4.41	0.007	63.88	0.86	-173.89
1.60	0.96	162.00	0.89	0.58	0.008	62.74	0.87	-175.34
1.70	0.96	160.95	0.81	-2.75	0.009	65.96	0.88	-177.14
1.80	0.96	159.62	0.73	-4.96	0.009	64.76	0.89	-178.23
1.90	0.96	158.41	0.68	-7.67	0.010	64.39	0.89	-179.83
2.00	0.96	157.21	0.62	-10.42	0.011	64.49	0.90	-178.74
2.10	0.97	156.34	0.58	-12.87	0.012	65.37	0.91	-177.57
2.20	0.97	154.65	0.54	-15.48	0.013	65.37	0.91	-176.27
2.30	0.96	153.82	0.51	-18.64	0.014	65.68	0.91	-175.02
2.40	0.96	152.67	0.47	-19.90	0.015	64.12	0.92	-173.50
2.50	0.96	151.54	0.45	-22.01	0.016	62.46	0.92	-172.49
2.60	0.96	150.67	0.42	-25.51	0.017	63.50	0.92	-171.66
2.70	0.96	149.39	0.40	-26.52	0.018	62.95	0.93	-170.24
2.80	0.96	148.38	0.39	-27.27	0.018	62.49	0.93	-169.19
2.90	0.96	147.10	0.36	-32.54	0.020	62.66	0.93	-167.71
3.00	0.96	146.40	0.35	-32.69	0.021	60.44	0.93	-166.67
3.10	0.95	145.37	0.34	-34.46	0.023	60.30	0.94	-165.15

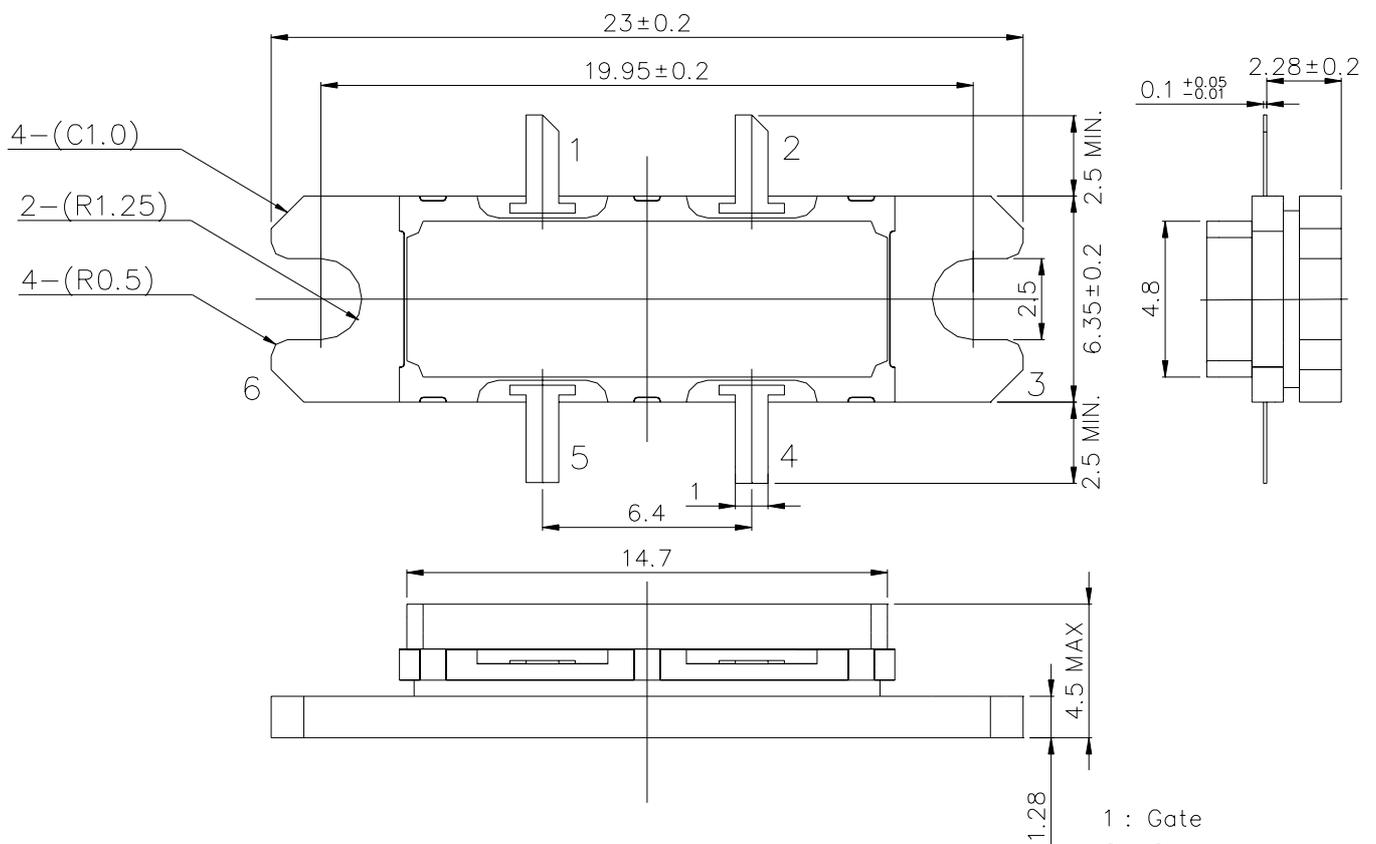




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M1A Package Outline Metal-Ceramic Hermetic Package



- 1 : Gate
 - 2 : Gate
 - 3 : Souce (Flange)
 - 4 : Drain
 - 5 : Drain
 - 6 : Souce (Flange)
- Unit : mm
Tolerance : ± 0.15