EGNB010MK

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : V_{DS}=50V
- High Power : 41.0dBm (typ.) @ P3dB
- High Efficiency: 60%(typ.) @ P3dB
- Linear Gain : 13dB(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 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°C	45	W
Storage Temperature	T_{stg}		-65 to +175	°C
Channel Temperature	T_{ch}		250	°C

RECOMMENDED OPERATING CONDITION(Case Temperature Tc= 25°C)

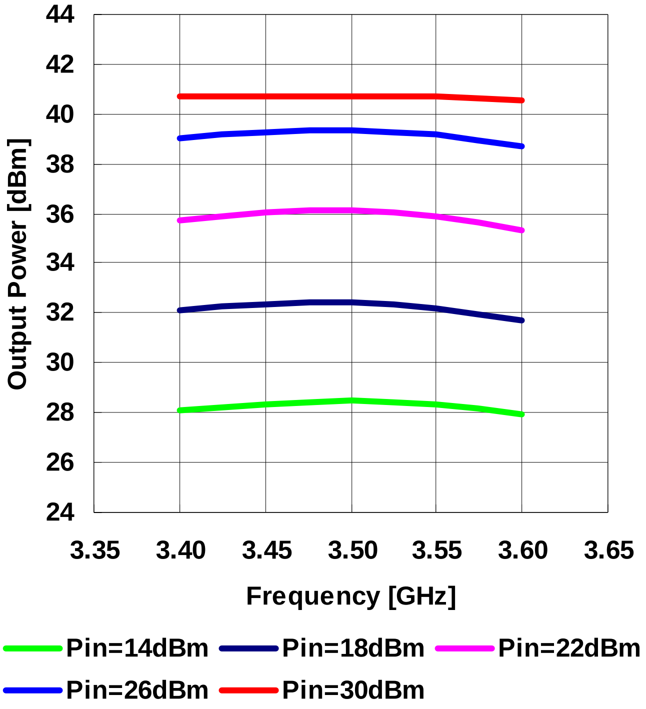
Item	Symbol	Condition	Limit	Unit
DC Input Voltage	V_{DS}		50	V
Forward Gate Current	I_{GF}	R_G=50 Ω	<7.0	mA
Reverse Gate Current	I_{GR}	R_G=50 Ω	>-0.5	mA

ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25°C)

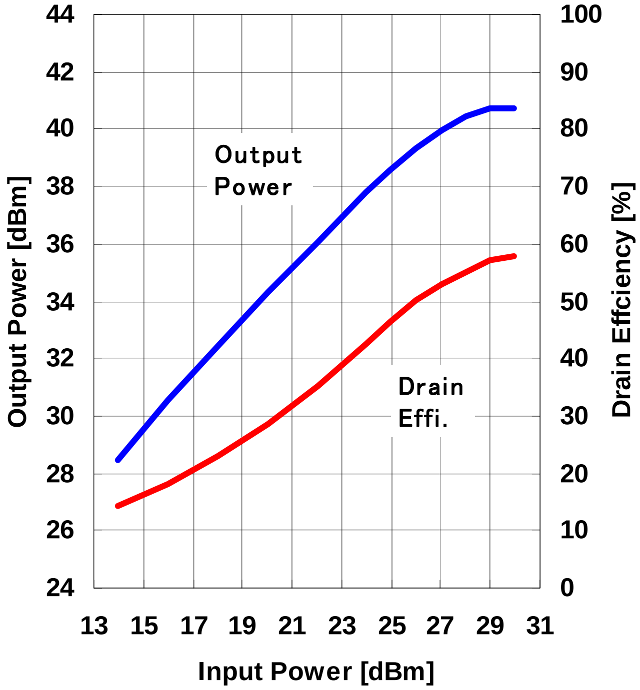
Item	Symbol	Condition	Limit			Unit
			min.	Typ.	Max.	
Pinch-Off Voltage	V_p	V_{DS}=50V I_{DS}=2.6mA	-1.0	-2.0	-3.5	V
3dB Gain Compression Power	P_{3dB}	V_{DS}=50V	40.0	41.0	-	dBm
Drain Efficiency	η_d	$I_{DS(DC)}$=100mA	-	60	-	%
Linear Gain	G_L	f=3.5GHz	12	13	-	dB
Thermal Resistance	R_{th}	Channel to Case at 18W P_{DC}	-	4.5	5.0	°C/W

RF Performance @f=3.5GHz fine tuned

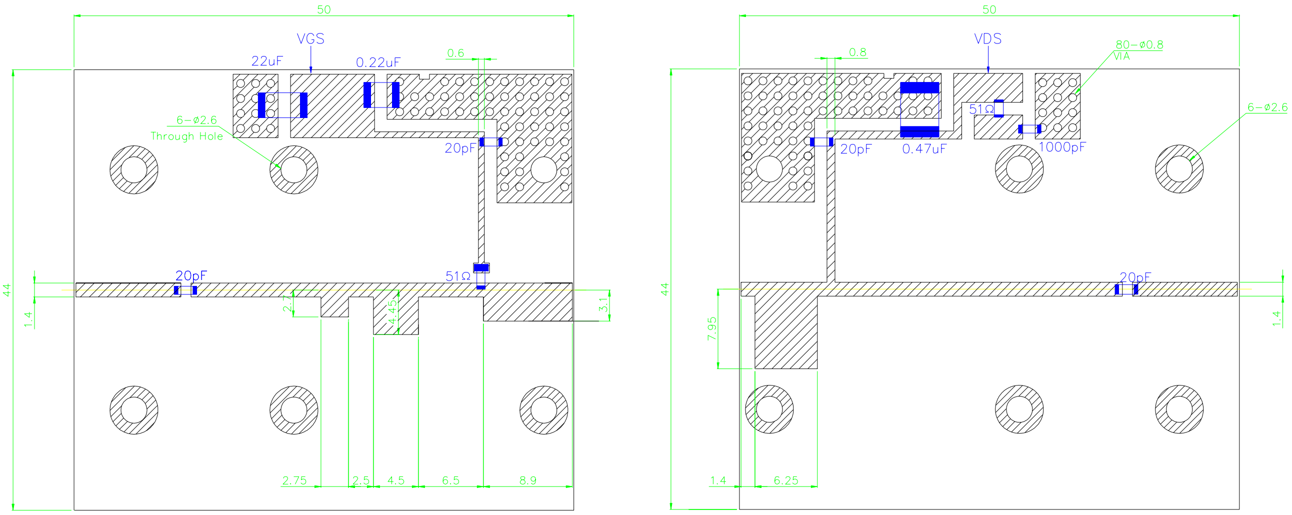
Output Power vs. Frequency
V_{DS}=50V $I_{DS(DC)}$=100mA



Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V $I_{DS(DC)}$=100mA f=3.5GHz

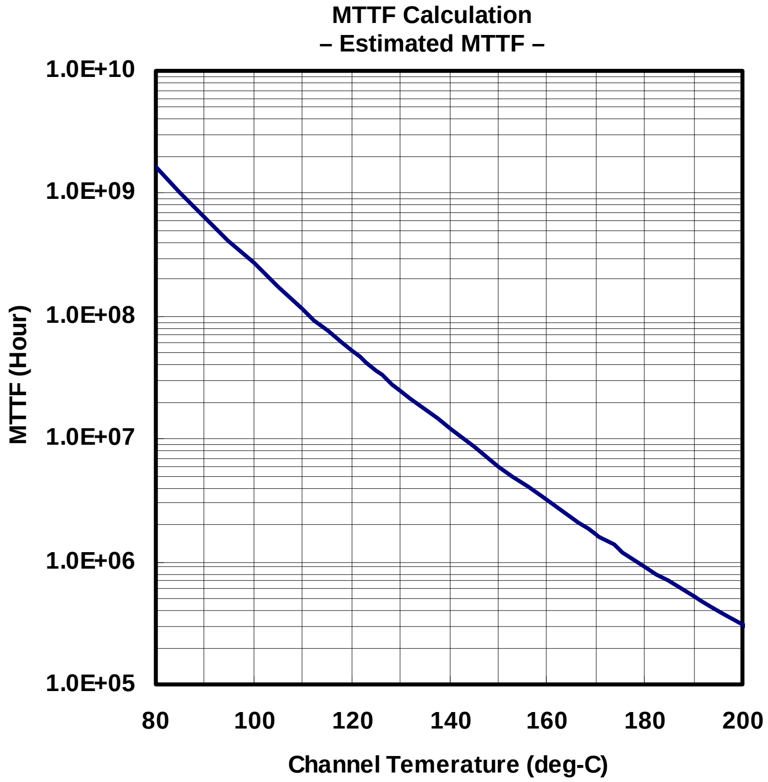


Test Fixture



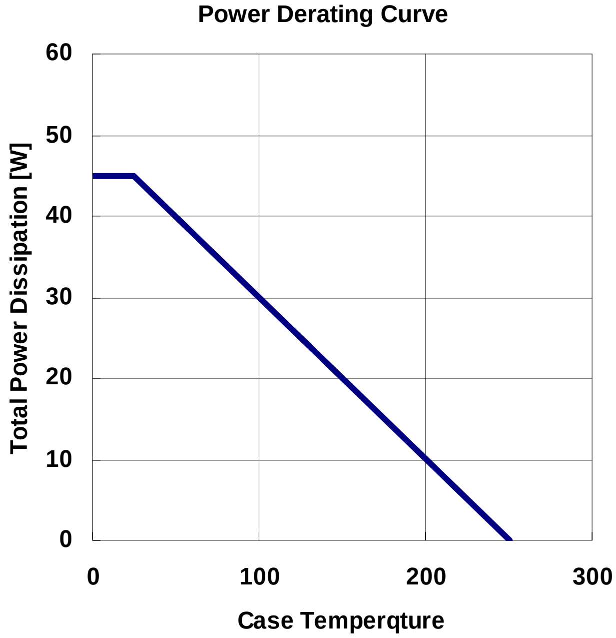
h=0.6mm
Cu=35um

εr=3.5
Unit: mm



Confidence Level=60%

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

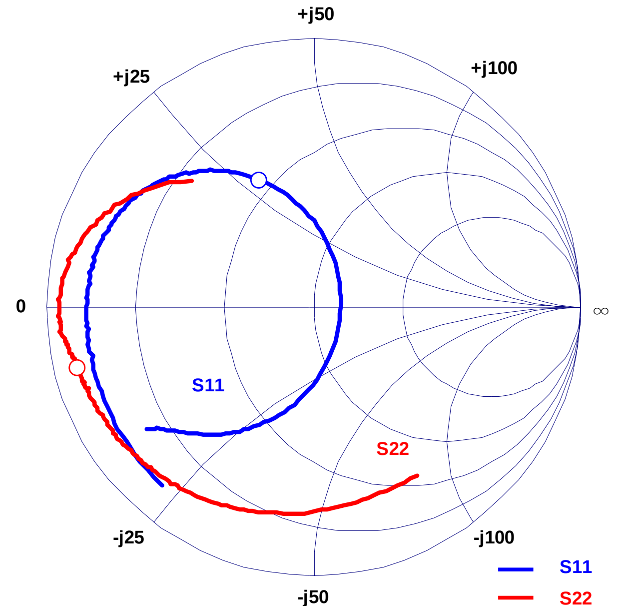


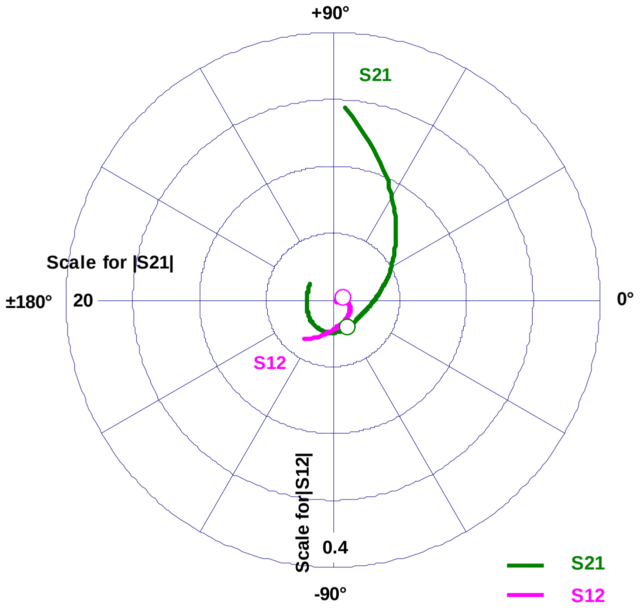
ESD characteristic

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

S-Parameters @V_{DS}=50V I_{DS}=100mA f=0.5 to 5.5 GHz

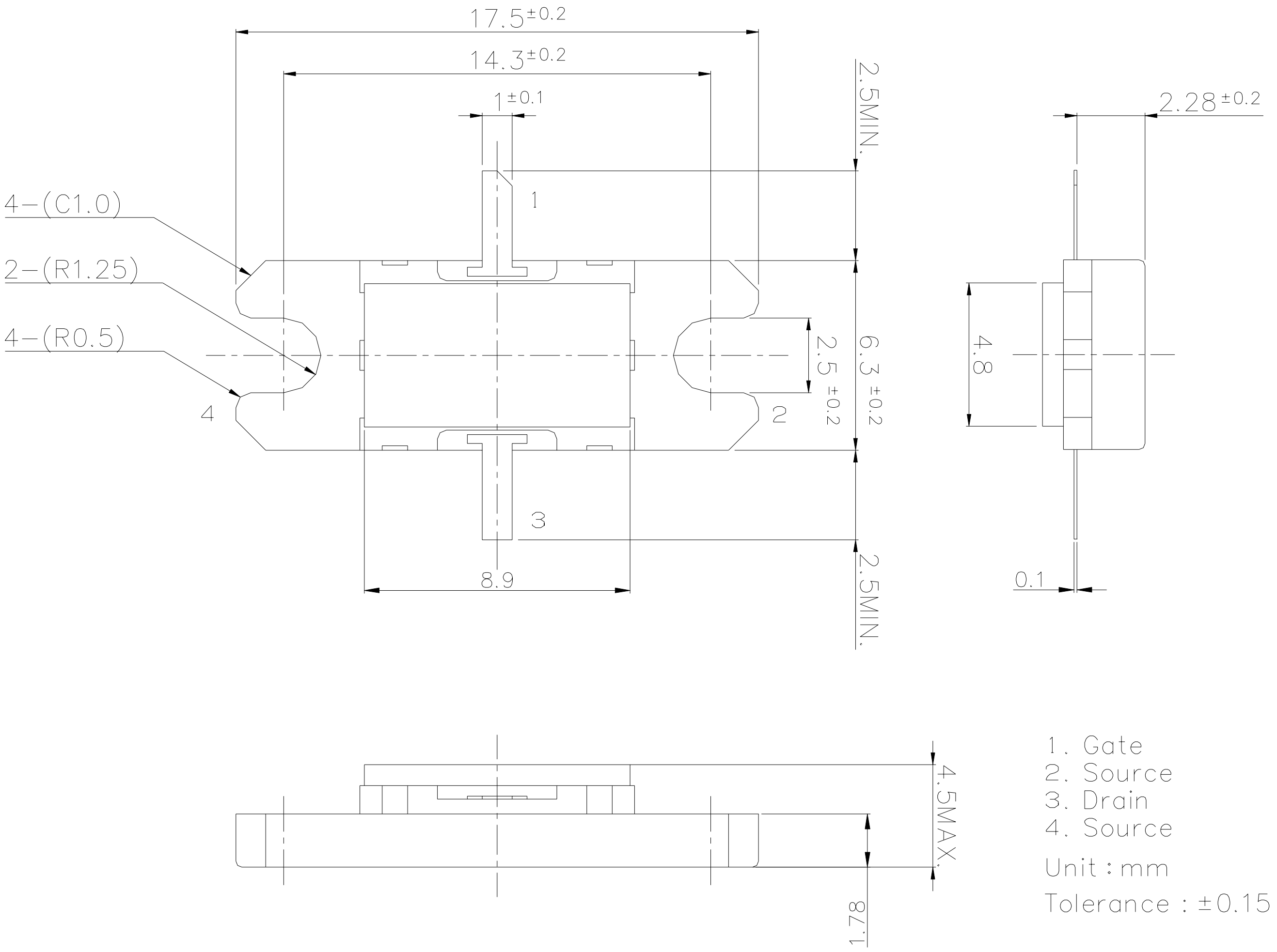
$Z_l = Z_s = 50$ ohm   Marker : 3.5GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.87	-130.59	14.46	86.39	0.011	5.47	0.74	-58.52
0.60	0.87	-140.40	12.23	77.24	0.011	0.26	0.74	-66.68
0.70	0.87	-148.26	10.50	69.13	0.011	-5.94	0.74	-73.95
0.80	0.86	-154.52	9.12	61.53	0.010	-10.22	0.75	-81.09
0.90	0.86	-159.67	8.03	54.95	0.010	-15.26	0.76	-87.71
1.00	0.86	-164.28	7.11	48.81	0.009	-18.55	0.77	-94.05
1.10	0.86	-168.74	6.40	42.31	0.009	-20.55	0.78	-100.18
1.20	0.85	-172.47	5.75	37.16	0.008	-21.60	0.79	-105.43
1.30	0.85	-175.85	5.21	32.23	0.007	-24.10	0.80	-110.37
1.40	0.85	-179.00	4.77	27.11	0.007	-26.89	0.81	-115.08
1.50	0.85	177.65	4.39	22.04	0.006	-23.09	0.82	-119.49
1.60	0.84	174.64	4.06	17.72	0.006	-18.74	0.83	-123.60
1.70	0.85	172.05	3.77	13.34	0.005	-19.43	0.84	-127.49
1.80	0.84	169.29	3.52	8.64	0.005	-11.78	0.85	-131.08
1.90	0.84	166.76	3.32	5.01	0.005	-9.10	0.85	-134.30
2.00	0.84	163.98	3.14	0.62	0.005	-1.73	0.86	-137.14
2.10	0.83	161.43	2.97	-2.72	0.005	-0.37	0.86	-140.11
2.20	0.82	158.76	2.84	-6.91	0.005	3.70	0.87	-142.62
2.30	0.81	155.95	2.71	-10.79	0.005	13.73	0.88	-145.38
2.40	0.80	153.37	2.62	-14.40	0.005	16.35	0.88	-147.54
2.50	0.79	150.79	2.53	-18.32	0.006	16.81	0.89	-149.38
2.60	0.78	147.95	2.47	-22.29	0.007	21.03	0.89	-151.40
2.70	0.77	145.22	2.41	-25.95	0.008	22.36	0.89	-153.47
2.80	0.75	142.27	2.36	-29.90	0.008	22.72	0.89	-155.15
2.90	0.73	139.02	2.34	-33.91	0.009	21.12	0.90	-156.96
3.00	0.71	135.87	2.32	-38.49	0.010	22.24	0.90	-158.70
3.10	0.68	132.07	2.31	-42.75	0.011	20.43	0.90	-160.18
3.20	0.65	128.18	2.31	-47.53	0.012	19.80	0.91	-161.72
3.30	0.61	123.62	2.32	-52.32	0.013	15.76	0.91	-162.68
3.40	0.56	118.75	2.32	-57.56	0.015	12.57	0.91	-164.30
3.50	0.51	113.39	2.35	-63.17	0.017	11.87	0.91	-165.44
3.60	0.46	106.80	2.38	-69.19	0.018	4.45	0.92	-166.90
3.70	0.39	99.35	2.39	-75.18	0.020	0.08	0.92	-167.96
3.80	0.32	89.96	2.43	-82.07	0.022	-5.30	0.92	-169.01
3.90	0.24	78.06	2.45	-89.29	0.023	-10.68	0.93	-170.67
4.00	0.17	58.24	2.46	-96.92	0.027	-17.58	0.94	-172.07
4.10	0.11	17.74	2.44	-104.79	0.028	-26.42	0.95	-173.57
4.20	0.12	-39.61	2.42	-112.67	0.030	-33.95	0.95	-175.19
4.30	0.19	-70.88	2.38	-120.96	0.032	-40.85	0.95	-177.73
4.40	0.27	-87.48	2.31	-128.78	0.033	-48.74	0.95	-179.37
4.50	0.35	-98.80	2.25	-136.95	0.036	-55.11	0.96	178.16
4.60	0.42	-107.90	2.18	-144.32	0.037	-63.20	0.95	175.71
4.70	0.49	-115.06	2.13	-151.48	0.038	-70.14	0.95	173.44
4.80	0.54	-121.16	2.07	-158.88	0.039	-76.45	0.93	170.63
4.90	0.59	-126.19	2.01	-166.35	0.043	-82.67	0.92	167.84
5.00	0.62	-130.84	1.98	-173.26	0.044	-89.05	0.91	164.74
5.10	0.66	-134.57	1.95	179.88	0.048	-95.65	0.88	160.57
5.20	0.69	-137.20	1.95	172.50	0.052	-102.42	0.86	156.05
5.30	0.71	-140.10	1.99	164.11	0.057	-108.79	0.81	150.18
5.40	0.74	-142.67	2.06	154.89	0.063	-117.02	0.75	143.60
5.50	0.77	-143.90	2.11	144.02	0.073	-126.51	0.65	134.45

MK Package Outline
Metal-Ceramic Hermetic Package



1. Gate
2. Source
3. Drain
4. Source

Unit : mm

Tolerance : ±0.15