

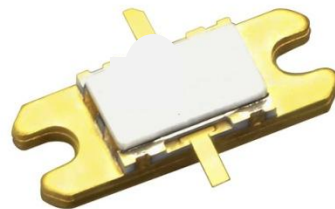
FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 47.5dBm (typ.) @ P_{sat}
- High Efficiency: 55%(typ.) @ P_{sat}
- Linear Gain : 16.0dB(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
Operating-Voltage	V_{DS}		55	V
Drain-Source Voltage	V_{DS}	$V_{GS}=-8V$	200	V
Gate-Source Voltage	V_{GS}		-15	V
Total Power Dissipation	P_t	$T_c=25deg.C$	125	W
Storage Temperature	T_{stg}		-65 to +175	deg.C
Channel Temperature	T_{ch}		250	deg.C

RECOMMENDED OPERATING CONDITION(Case Temperature $T_c=25deg.C$)

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	V_{DS}		50	V
Forward Gate Current	I_{GF}	$R_G=10\ ohm$	<62.0	mA
Reverse Gate Current	I_{GR}	$R_G=10\ ohm$	>-3.6	mA
Channel Temperature	T_{ch}		≤ 180	deg.C

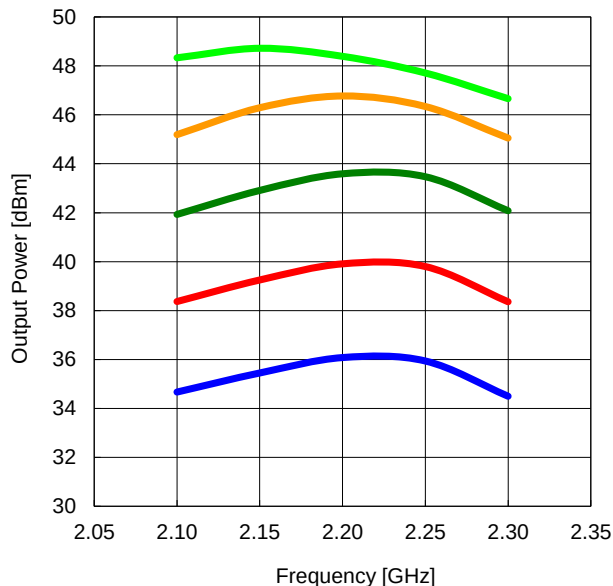
ELECTRICAL CHARACTERISTICS (Case Temperature $T_c=25deg.C$)

Item	Symbol	Condition	Limit			Unit
			min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V\ I_{DS}=18mA$	-1.0	-1.5	-2.0	V
Saturated Power	P_{sat}	$V_{DS}=50V$	46.5	47.5	-	dBm
Drain Efficiency	η_d	$I_{DS}(DC)=250mA$	-	55	-	%
Linear Gain	GL	$f=2.2GHz$	15.0	16.0	-	dB
Thermal Resistance	R_{th}	Channel to Case $P_{DC}=75W$	-	1.4	1.8	deg.C/W

RoHS COMPLIANCE	Yes
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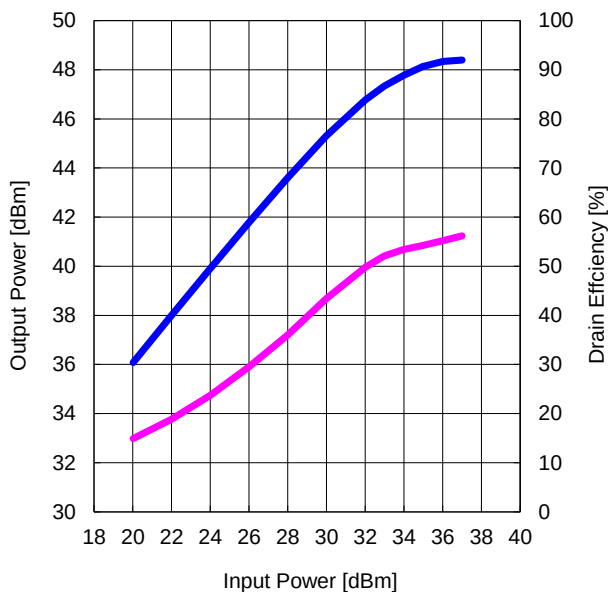
RF Performance @f=2.2GHz fine tuned

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



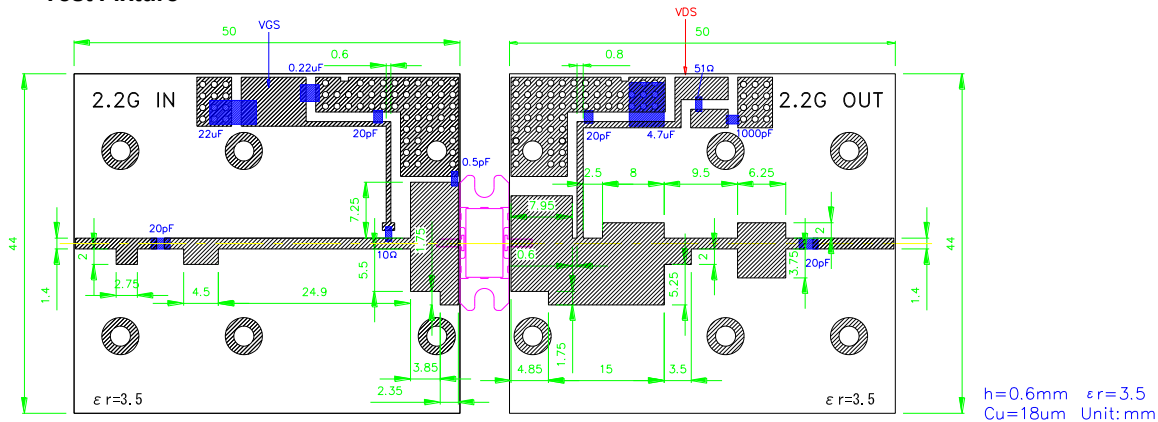
Pin=20dBm Pin=24dBm Pin=28dBm
Pin=32dBm Pin=37dBm

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

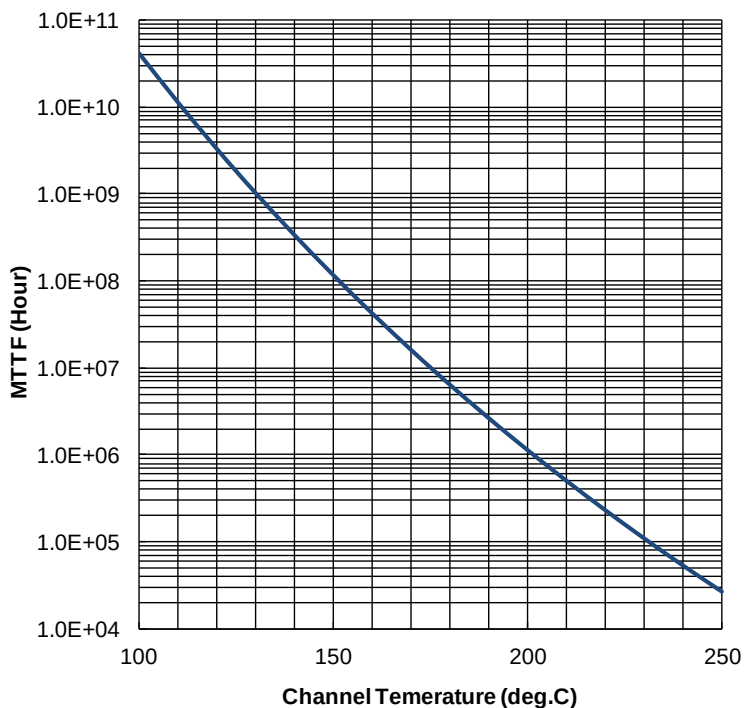


Pout Nd

Test Fixture



MTTF Calculation – Estimated MTTF –



Ea = 1.6eV
Confidence Level = 60%

Channel Temp. (deg.C)	MTTF (Hours)
160	4.25×10^7
180	6.40×10^6
200	1.13×10^6

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

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

Where;

AF : acceleration factor

Ea : activation energy (1.6eV)

k : Boltzman's constant (8.62×10^{-5} eV/K)

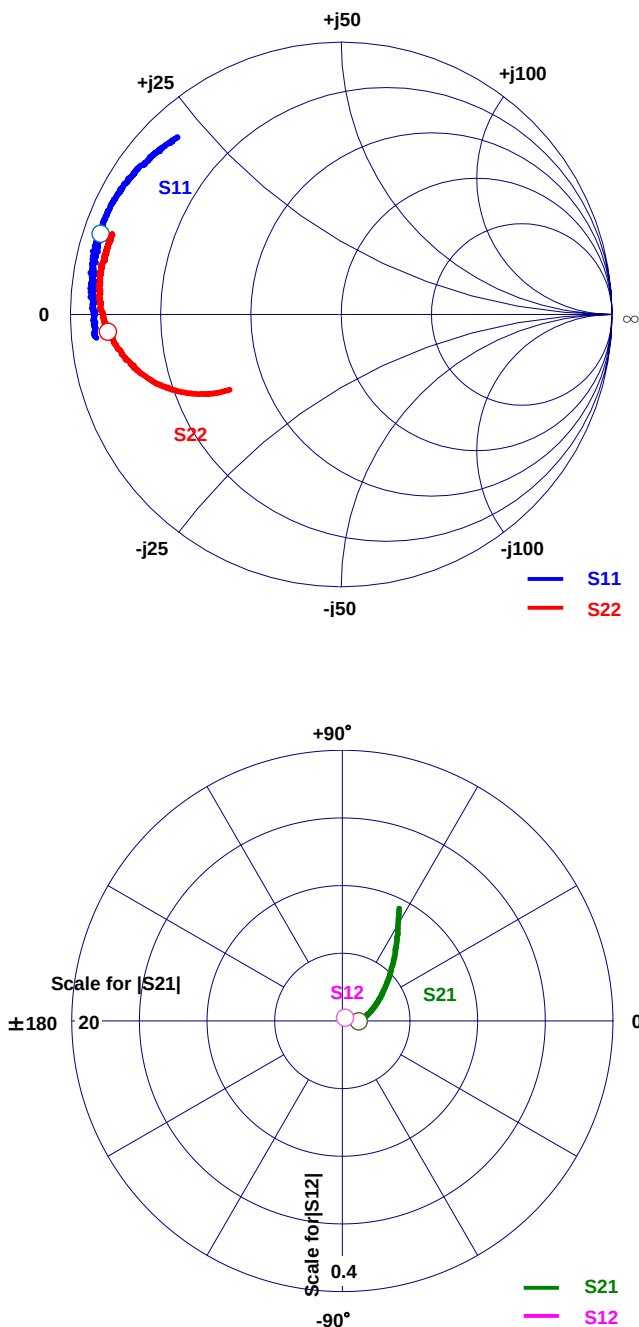
T_{stress} : stress temperature (K)

T_{use} : use tempetarure (K)

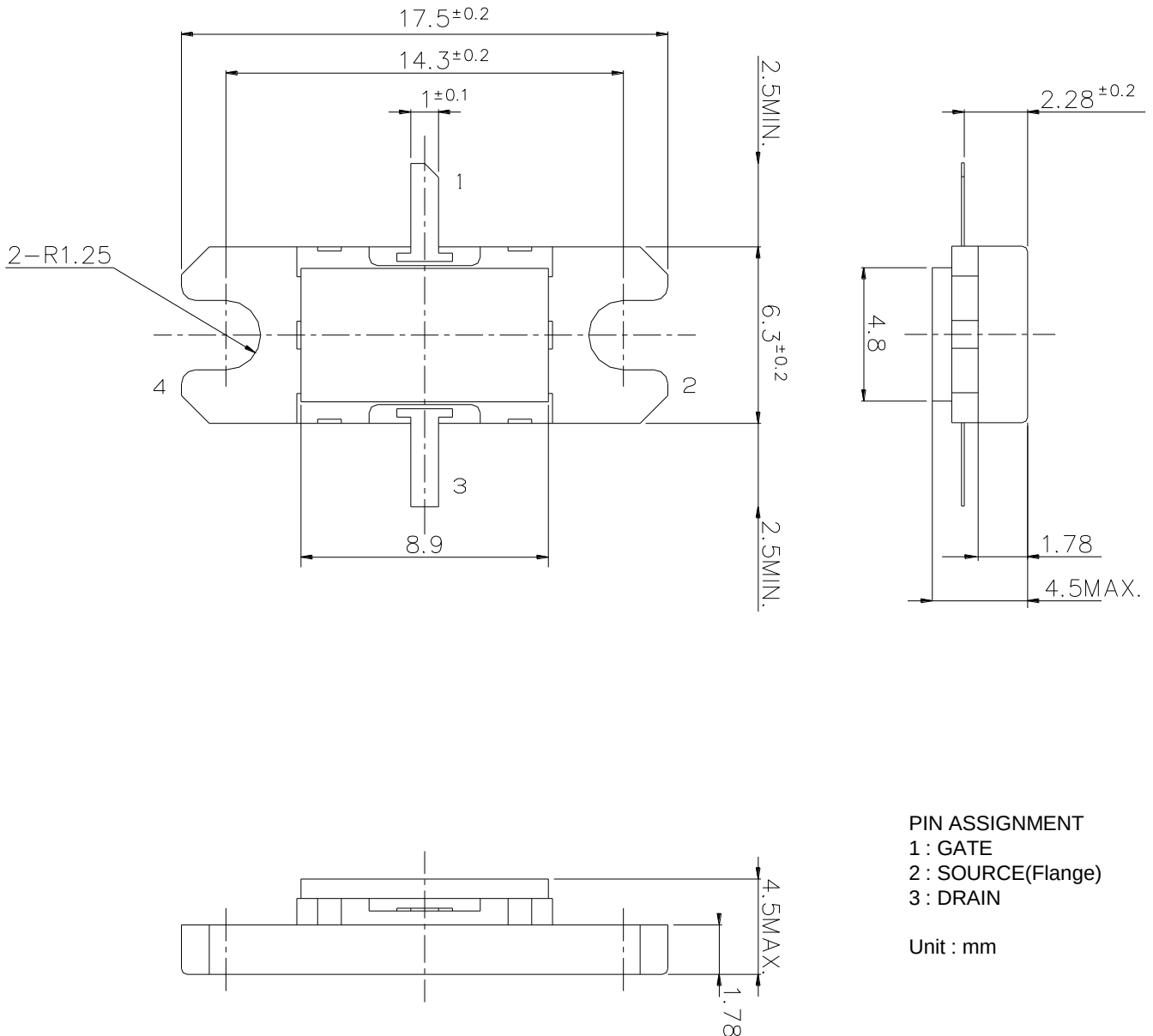
ESD characteristic

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

S-Parameters @V_{DS}=50V I_{DS}=250mA f=0.5 to 4.5GHz
Z_L = Z_S = 50 ohm Marker : 2.2GHz



Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.91	-174.56	9.31	63.11	0.009	-17.03	0.50	-146.16
0.60	0.91	-177.20	7.53	57.10	0.008	-19.04	0.54	-147.71
0.70	0.92	-178.67	6.25	51.47	0.008	-19.94	0.58	-149.66
0.80	0.92	179.13	5.22	46.15	0.007	-19.76	0.61	-151.63
0.90	0.92	177.82	4.49	41.19	0.006	-20.45	0.65	-153.79
1.00	0.91	176.27	3.89	37.08	0.005	-16.63	0.67	-155.71
1.10	0.93	174.78	3.42	32.40	0.005	-15.76	0.70	-157.91
1.20	0.92	173.49	3.01	28.55	0.005	-9.14	0.73	-159.85
1.30	0.93	171.73	2.70	24.93	0.004	-3.14	0.75	-161.67
1.40	0.93	170.88	2.41	21.34	0.004	2.91	0.77	-163.59
1.50	0.93	169.87	2.17	17.89	0.004	9.92	0.78	-165.45
1.60	0.94	168.37	1.97	14.85	0.004	23.05	0.80	-167.32
1.70	0.93	166.93	1.80	11.84	0.004	26.49	0.81	-168.86
1.80	0.93	166.02	1.65	8.88	0.005	32.68	0.82	-170.46
1.90	0.94	164.52	1.52	6.22	0.004	39.16	0.84	-172.05
2.00	0.94	163.68	1.41	2.91	0.005	43.75	0.84	-173.18
2.10	0.93	162.70	1.30	1.21	0.006	49.25	0.85	-174.68
2.20	0.94	161.53	1.21	-1.26	0.006	49.51	0.86	-175.80
2.30	0.94	160.05	1.15	-3.99	0.007	50.86	0.87	-177.25
2.40	0.94	158.85	1.08	-6.44	0.007	57.54	0.87	-178.22
2.50	0.94	157.84	1.02	-9.04	0.008	54.63	0.88	-179.60
2.60	0.94	156.53	0.97	-10.87	0.008	56.95	0.88	179.32
2.70	0.94	155.44	0.91	-12.94	0.009	55.20	0.89	178.39
2.80	0.94	154.06	0.87	-15.41	0.009	54.90	0.89	177.01
2.90	0.94	153.30	0.83	-17.22	0.010	54.99	0.89	176.32
3.00	0.93	152.09	0.80	-19.45	0.010	52.93	0.89	174.99
3.10	0.93	150.86	0.77	-21.42	0.011	57.08	0.90	174.12
3.20	0.93	150.20	0.74	-22.98	0.012	57.01	0.90	173.25
3.30	0.93	148.99	0.72	-24.91	0.012	58.63	0.90	172.08
3.40	0.93	147.66	0.70	-27.18	0.013	57.48	0.90	171.27
3.50	0.93	146.63	0.68	-28.95	0.013	57.03	0.90	170.35
3.60	0.92	145.62	0.66	-30.97	0.014	58.83	0.90	169.18
3.70	0.92	144.19	0.65	-32.90	0.015	57.61	0.90	168.48
3.80	0.91	143.04	0.64	-35.01	0.016	61.51	0.90	167.35
3.90	0.91	142.01	0.63	-36.30	0.017	61.43	0.90	166.55
4.00	0.91	140.96	0.62	-38.27	0.020	60.51	0.90	165.65
4.10	0.91	139.42	0.61	-40.38	0.021	58.49	0.90	164.93
4.20	0.90	137.94	0.61	-42.67	0.024	55.80	0.90	163.53
4.30	0.90	136.49	0.62	-44.42	0.025	53.44	0.89	162.63
4.40	0.89	134.74	0.61	-46.60	0.027	50.06	0.90	161.76
4.50	0.89	132.87	0.62	-49.09	0.029	47.74	0.90	160.72





SGNE045MK

High Voltage - High Power GaN-HEMT

For further information please contact:

<http://global-sei.com/Electro-optic/about/office.html>