

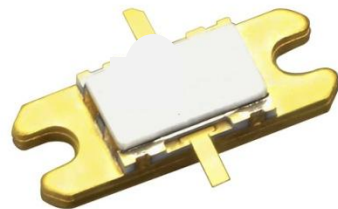
FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 46.5dBm (typ.) @ P_{sat}
- High Efficiency: 55%(typ.) @ P_{sat}
- Linear Gain : 16.0dB(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
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	$T_c=25deg.C$	93.75	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}	$R_G=15\ ohm$	<39.0	mA
Reverse Gate Current	I_{GR}	$R_G=15\ ohm$	>-2.2	mA
Channel Temperature	T_{ch}		≤ 180	deg.C

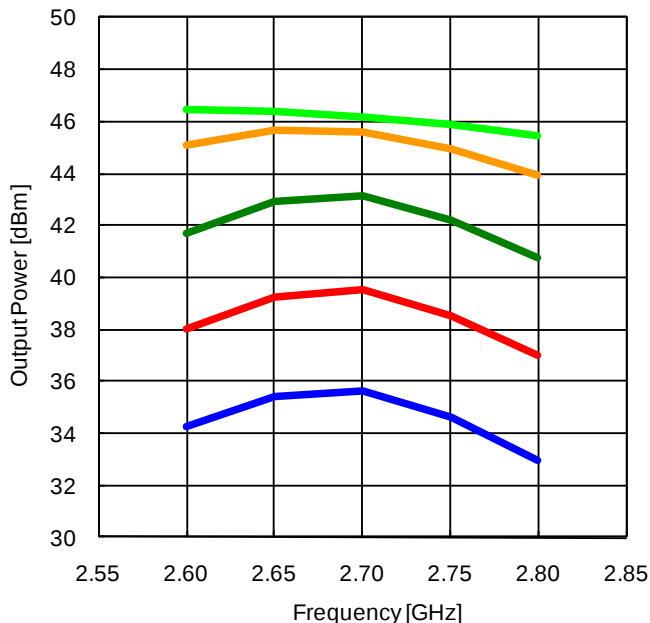
ELECTRICAL CHARACTERISTICS (Case Temperature $T_c=25deg.C$)

Item	Symbol	Condition	Limit			Unit
			min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V\ I_{DS}=11mA$	-1.0	-1.5	-2.0	V
Saturated Power	P_{sat}	$V_{DS}=50V$	45.5	46.5	-	dBm
Drain Efficiency	η_d	$I_{DS}(DC)=200mA$	-	55	-	%
Linear Gain	GL	$f=2.7GHz$	15.0	16.0	-	dB
Thermal Resistance	R_{th}	Channel to Case $P_{DC}=57W$	-	2.0	2.4	deg.C/W

RoHS COMPLIANCE	Yes
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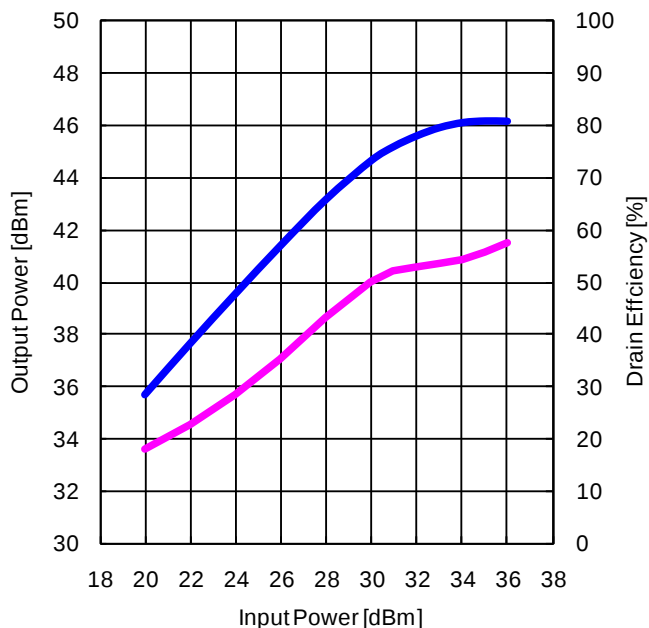
RF Performance @f=2.7GHz fine tuned

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



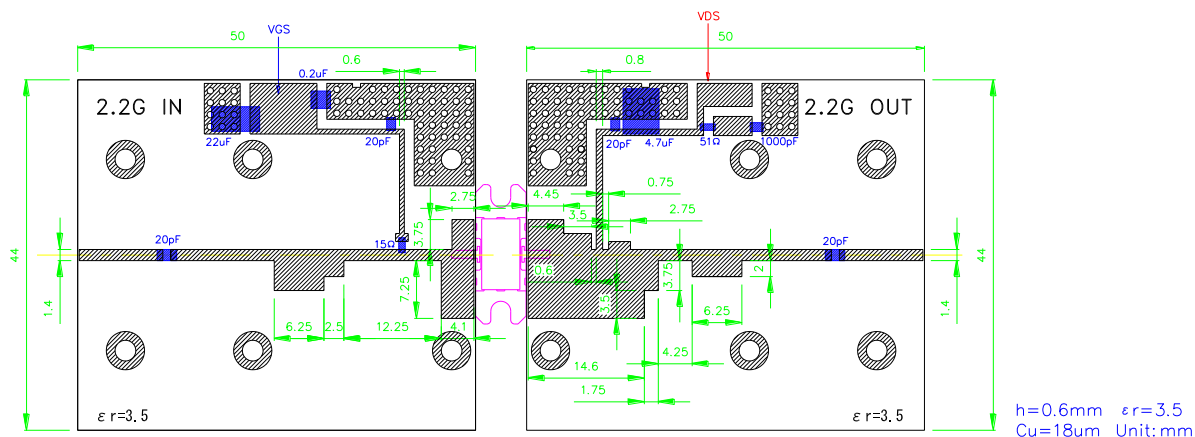
Pin=20dBm Pin=24dBm Pin=28dBm
Pin=32dBm Pin=36dBm

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

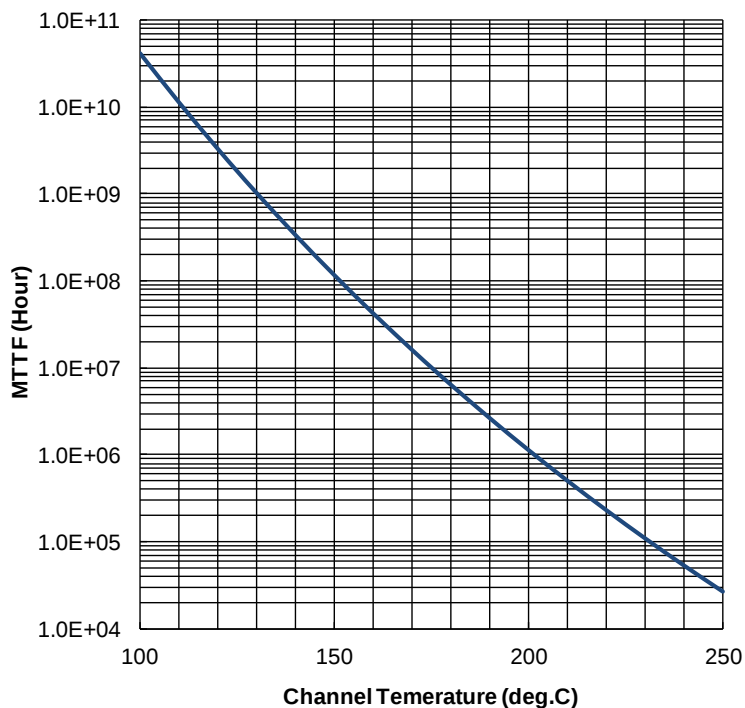


Pout Nd

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)

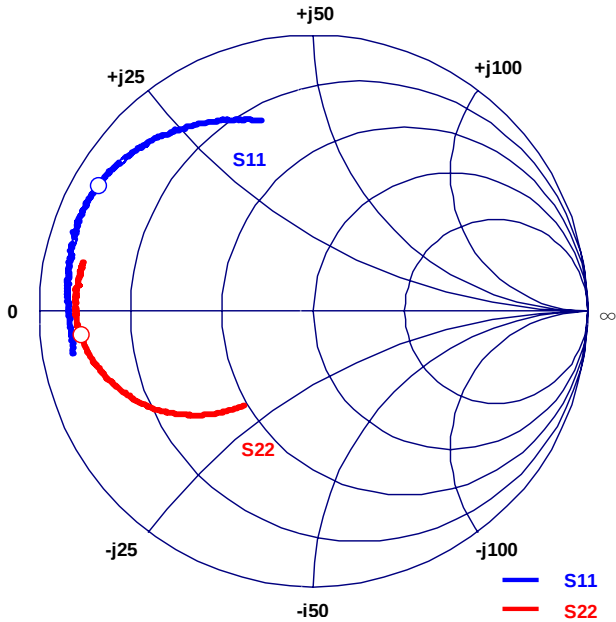
ESD characteristic

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

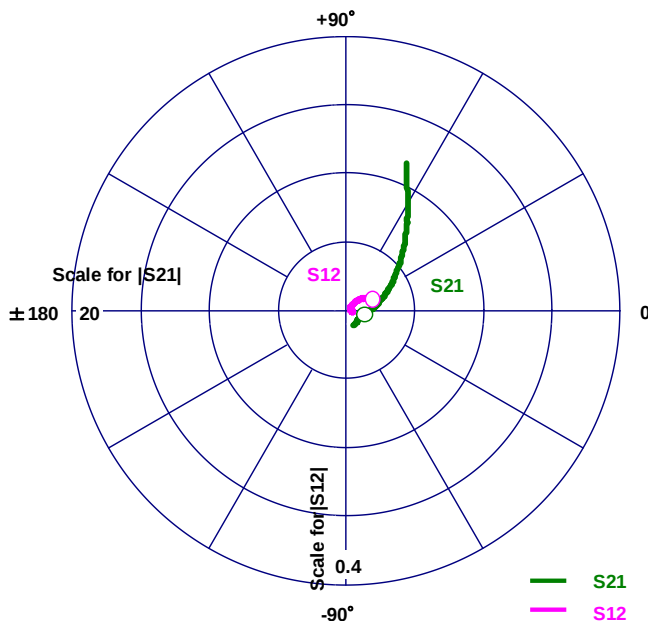
S-Parameters @V_{DS}=50V I_{DS}=200mA f=0.5 to 4.5 GHz

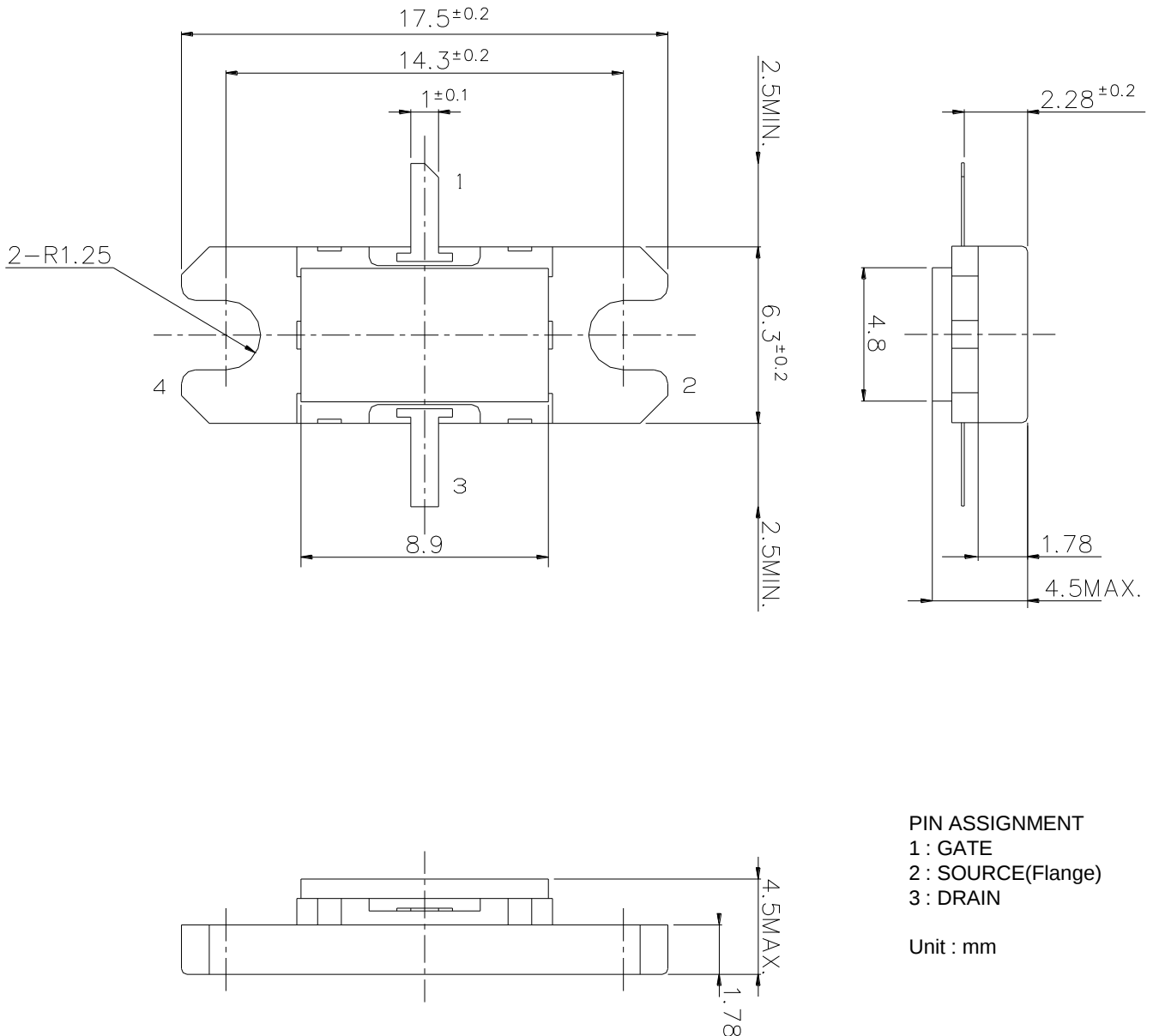
Z_l = Z_s = 50 ohm

Marker : 2.7GHz



Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.89	-169.87	11.58	67.96	0.011	-6.29	0.43	-126.68
0.60	0.89	-172.89	9.82	62.98	0.01	-11.06	0.46	-129.38
0.70	0.89	-176.23	7.89	55.94	0.009	-14.83	0.51	-133.31
0.80	0.90	-178.97	6.72	50.52	0.009	-14.13	0.54	-136.44
0.90	0.89	178.36	5.81	45.46	0.008	-15.86	0.58	-139.51
1.00	0.90	176.61	5.06	40.89	0.008	-14.62	0.61	-142.28
1.10	0.90	174.70	4.49	36.13	0.007	-14.50	0.64	-144.76
1.20	0.90	172.47	3.99	31.84	0.007	-12.70	0.67	-147.42
1.30	0.91	170.54	3.57	27.68	0.006	-11.43	0.69	-149.95
1.40	0.90	169.27	3.22	24.07	0.006	-3.86	0.71	-152.36
1.50	0.90	167.53	2.92	20.43	0.005	-0.52	0.73	-154.34
1.60	0.91	165.80	2.68	16.81	0.005	9.84	0.75	-156.57
1.70	0.91	164.37	2.46	13.67	0.005	7.83	0.76	-158.48
1.80	0.91	163.17	2.27	10.52	0.005	24.03	0.78	-160.62
1.90	0.91	161.34	2.11	7.55	0.006	19.70	0.79	-162.39
2.00	0.91	160.22	1.97	4.73	0.006	28.91	0.80	-163.98
2.10	0.92	158.71	1.84	2.06	0.006	28.79	0.81	-165.61
2.20	0.91	157.10	1.73	-1.15	0.006	34.48	0.82	-167.02
2.30	0.91	155.66	1.64	-3.87	0.007	40.41	0.83	-168.76
2.40	0.92	154.29	1.56	-6.49	0.008	42.67	0.84	-170.22
2.50	0.91	152.94	1.47	-8.54	0.009	41.80	0.84	-171.54
2.60	0.91	151.56	1.41	-11.44	0.009	41.79	0.85	-172.86
2.70	0.91	149.82	1.35	-13.78	0.010	43.46	0.85	-174.16
2.80	0.91	148.49	1.30	-16.31	0.011	45.87	0.86	-175.43
2.90	0.90	147.18	1.26	-18.50	0.011	43.82	0.86	-176.27
3.00	0.90	145.65	1.23	-21.12	0.012	42.15	0.86	-177.80
3.10	0.89	144.09	1.19	-23.34	0.012	44.56	0.87	-179.11
3.20	0.89	142.39	1.16	-26.05	0.013	43.60	0.86	-179.98
3.30	0.88	140.83	1.14	-28.42	0.014	44.21	0.87	178.95
3.40	0.88	139.00	1.13	-30.54	0.015	44.10	0.87	177.91
3.50	0.87	137.19	1.12	-33.35	0.016	44.41	0.87	176.89
3.60	0.86	135.03	1.10	-36.07	0.017	43.39	0.87	175.99
3.70	0.85	132.87	1.10	-38.87	0.019	40.86	0.87	175.11
3.80	0.84	130.01	1.11	-41.84	0.020	42.07	0.86	173.95
3.90	0.83	128.22	1.11	-44.03	0.022	40.48	0.86	173.30
4.00	0.81	125.29	1.12	-47.56	0.025	39.50	0.86	172.50
4.10	0.80	122.31	1.14	-50.50	0.028	37.79	0.86	171.56
4.20	0.78	118.84	1.16	-54.12	0.031	35.06	0.86	170.60
4.30	0.76	114.93	1.19	-57.89	0.034	30.08	0.86	169.77
4.40	0.74	110.57	1.22	-61.60	0.038	27.15	0.86	168.92
4.50	0.72	105.42	1.26	-66.31	0.041	22.22	0.86	168.21







SGNE030MK

High Voltage - High Power GaN-HEMT

For further information please contact:

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