SGNE030MK

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : V_{DS}=50V
- High Power : 46.5dBm (typ.) @ Psat
- High Efficiency: 55%(typ.) @ Psat
- 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	Tc=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 Tc= 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}		$\leq$180	deg.C

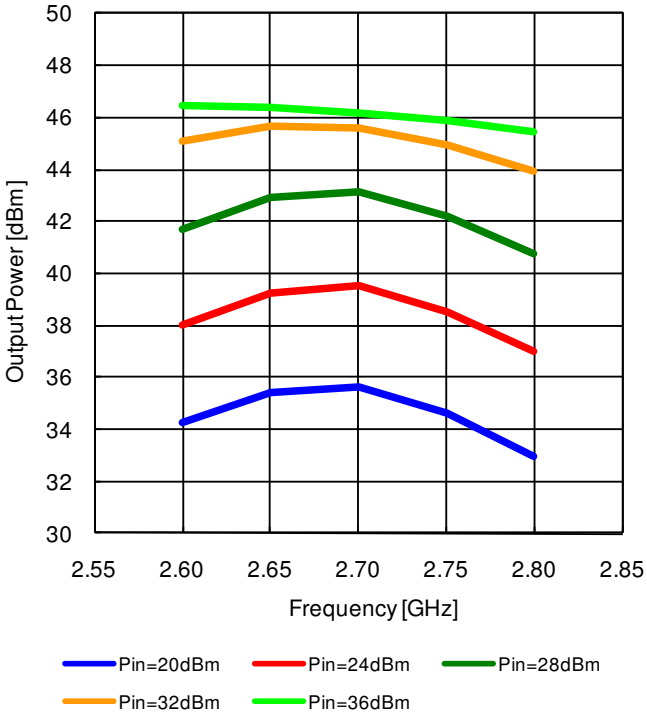
ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25deg.C)

Item	Symbol	Condition	Limit			Unit
			min.	Typ.	Max.	
Pinch-Off Voltage	V_p	VDS=50V IDS=11mA	-1.0	-1.5	-2.0	V
Saturated Power	P_{sat}	VDS=50V	45.5	46.5	-	dBm
Drain Efficiency	η_d	IDS(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

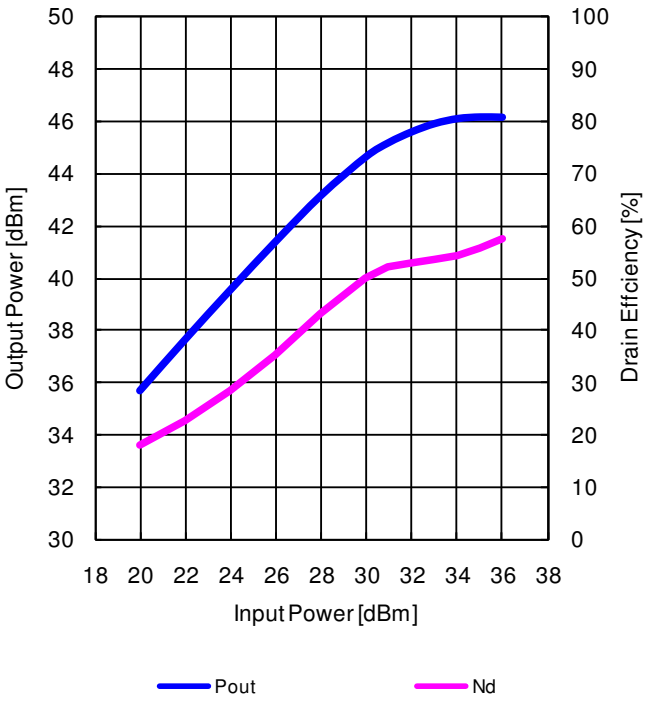
RoHS COMPLIANCE	Yes

RF Performance @f=2.7GHz fine tuned

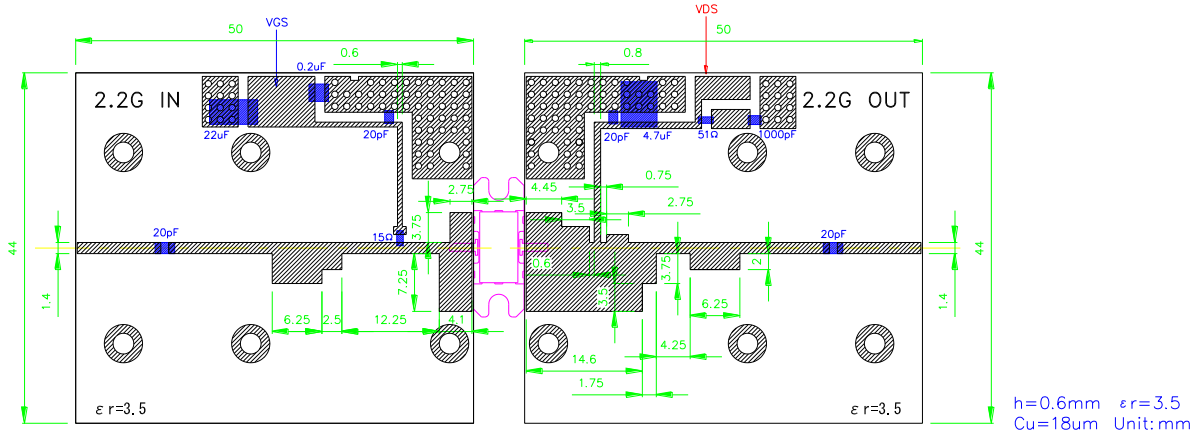
Output Power vs. Frequency
VDS=50V IDS(DC)=200mA



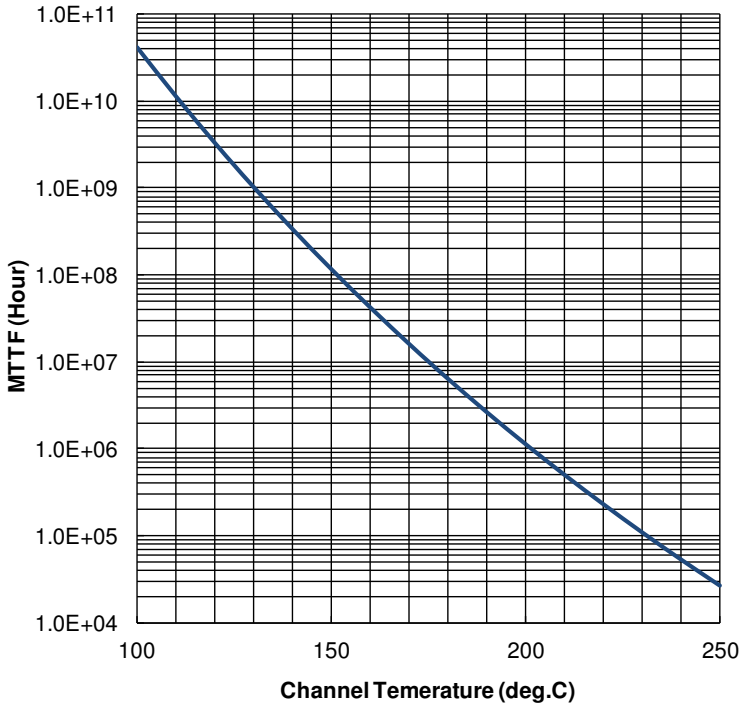
Output Power and Drain Efficiency vs. Input Power
VDS=50V IDS(DC)=200mA f=2.7GHz



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

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

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

Where;

AF : acceleration factor

Ea : activation energy (1.6eV)

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

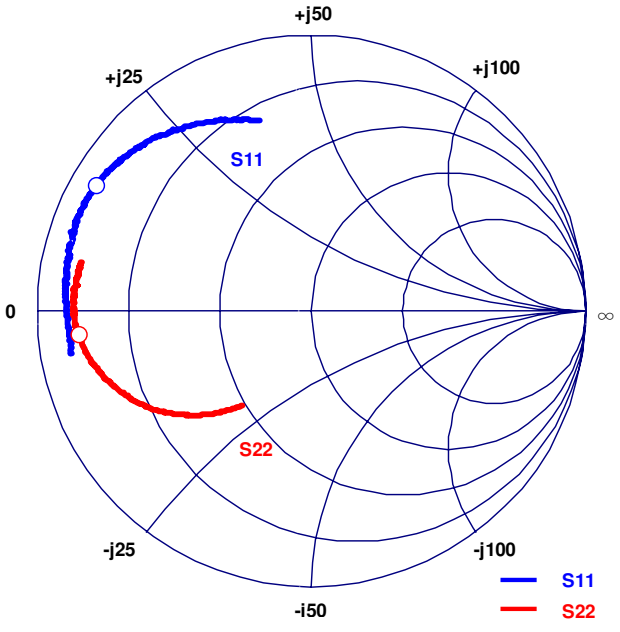
T_{stress} : stress temperature (K)

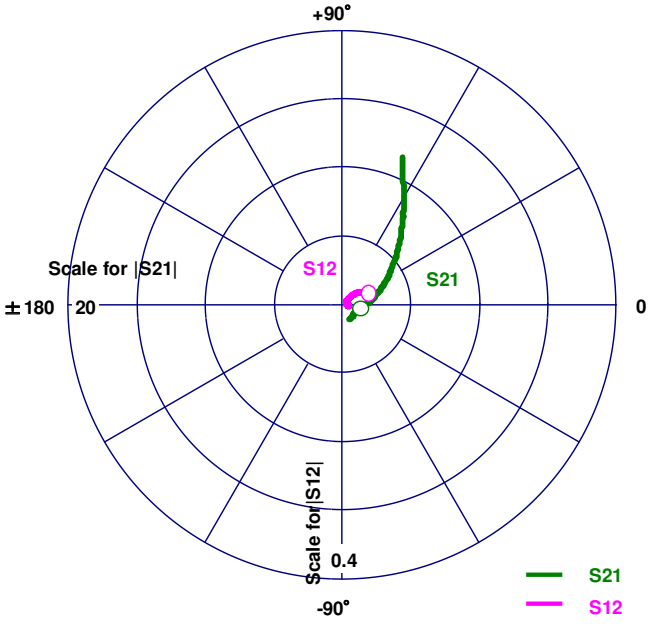
T_{use} : use tempetarure (K)

ESD characteristic

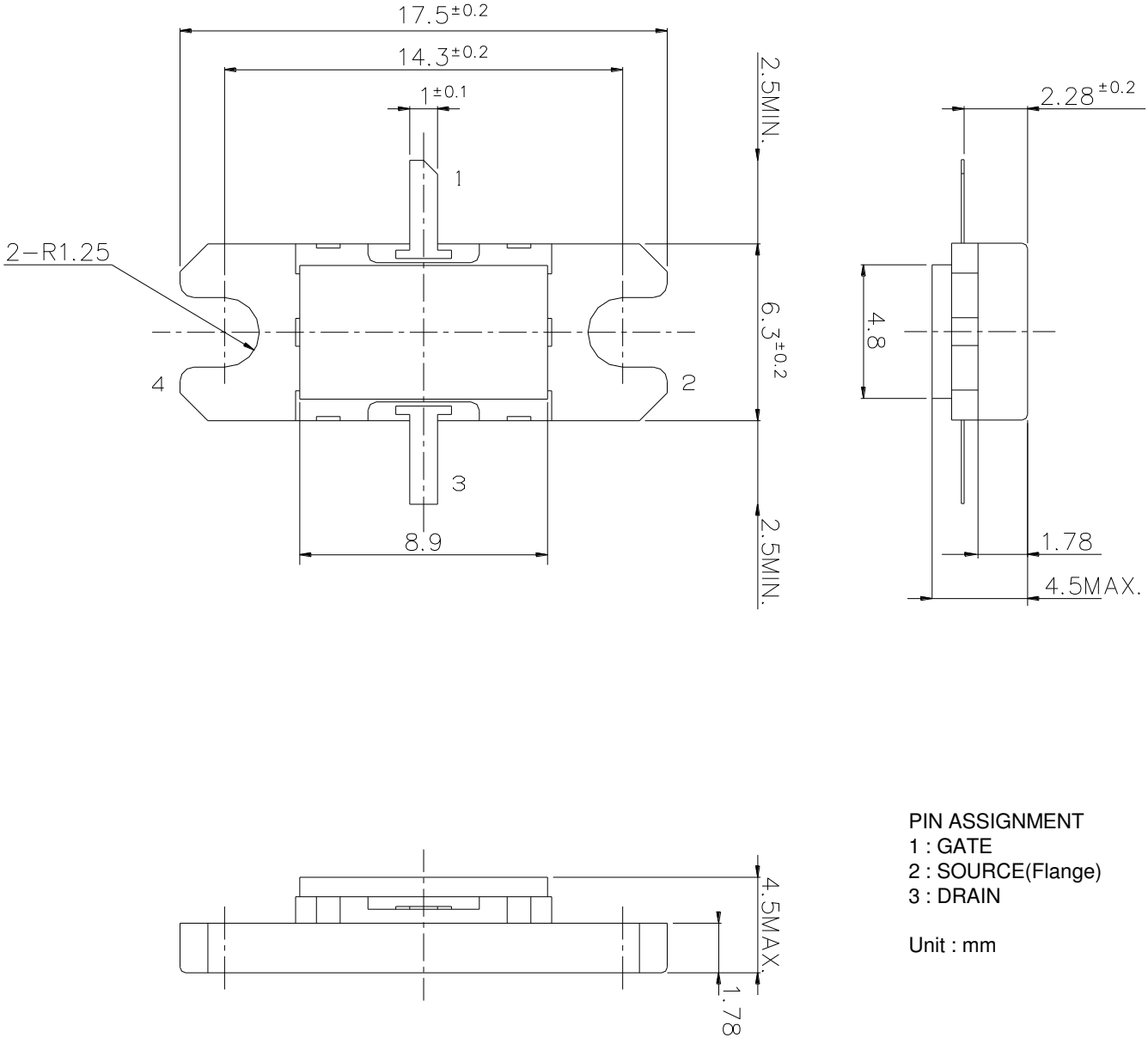
Test Methodology	Class
Human Body Model (per JESD22-A114)	1A
Machine Model (per JEIA/ESD22-A115)	A

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.	S11		S21		S12		S22	
GHz	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



PIN ASSIGNMENT
1 : GATE
2 : SOURCE(Flange)
3 : DRAIN

Unit : mm

For further information please contact:

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