EGNC210MK

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : V_{DS}=50V
- High Power : 53.5dBm (typ.) @ Psat
- High Efficiency: 70%(typ.) @ Psat
- Linear Gain : 17.5dB(typ.) @ f=0.9GHz
- Proven Reliability

DESCRIPTION

SEI'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 new product is ideally suited for use in 0.9GHz LTE design requirements as it offers high gain, long term reliability and ease of use.

ABSOLUTE MAXIMUM RATINGS (Case Temperature Tc=25deg.C)

Item	Symbol	Condition	Rating	Unit
Operating-Voltage	V_{DS}		55	V
Drain-Source Voltage	V_{DS}	V_{GS}=-8V	160	V
Gate-Source Voltage	V_{GS}		-15	V
Total Power Dissipation	P_t		173	W
Storage Temperature	T_{stg}		-65 to +175	deg.C
Channel Temperature	T_{ch}		250	deg.C

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	V_{DS}		$\leq$ 55	V
Forward Gate Current	I_{GF}	R_G=10ohm	$\leq$ 204	mA
Reverse Gate Current	I_{GR}	R_G=10ohm	$\geq$ -7.8	mA
Channel Temperature	T_{ch}		$\leq$ 180	deg.C
Average Output Power	Pave.		$\leq$ 50.5	dBm

ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25deg.C

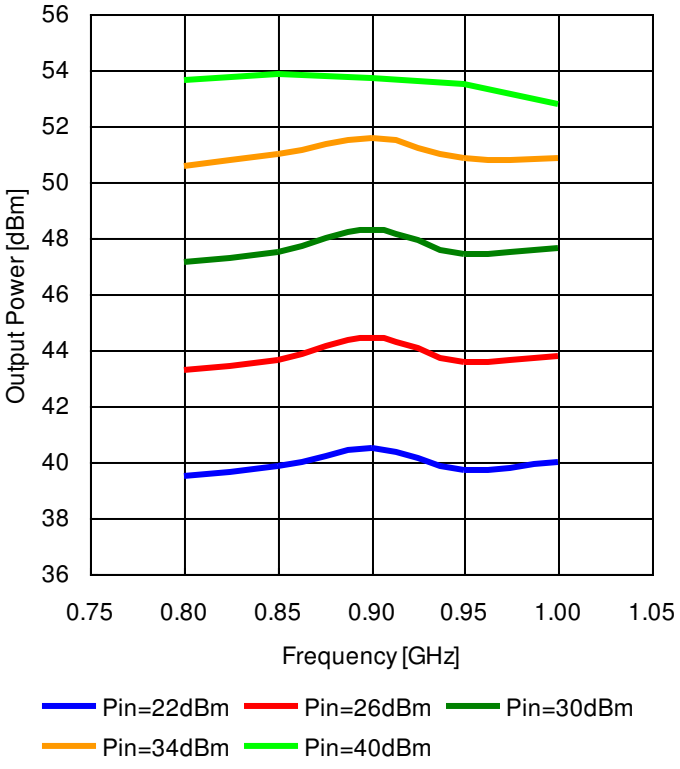
Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V_p	VDS=50V IDS=54.4mA	-1.0	-1.5	-2.0	V
Saturated Power	Psat *1	VDS=50V	52.5	53.5	-	dBm
Drain Efficiency	η_d *2	IDS(DC)=750mA	30	35	-	%
Power Gain	Gp *2	f=0.9GHz	16.5	17.5	-	dB
Thermal Resistance	R_{th}	Channel to Case at 105W P_{DC}	-	1.1	1.3	deg.C/W

*1 : 10%-duty RF pulse (DC supply constant)
*2 : Pout = 45.5dBm, CWmodulation Signal (W-CDMA)

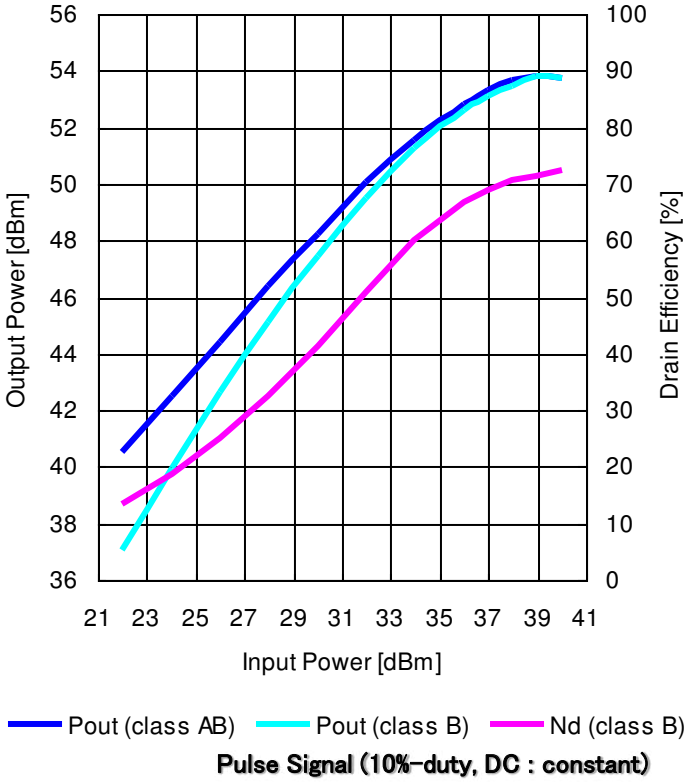
RoHS COMPLIANCE	Yes

RF characteristics @f=0.9GHz fine tuned

Output Power vs. Frequency
VDS=50V, IDS(DC)=750mA

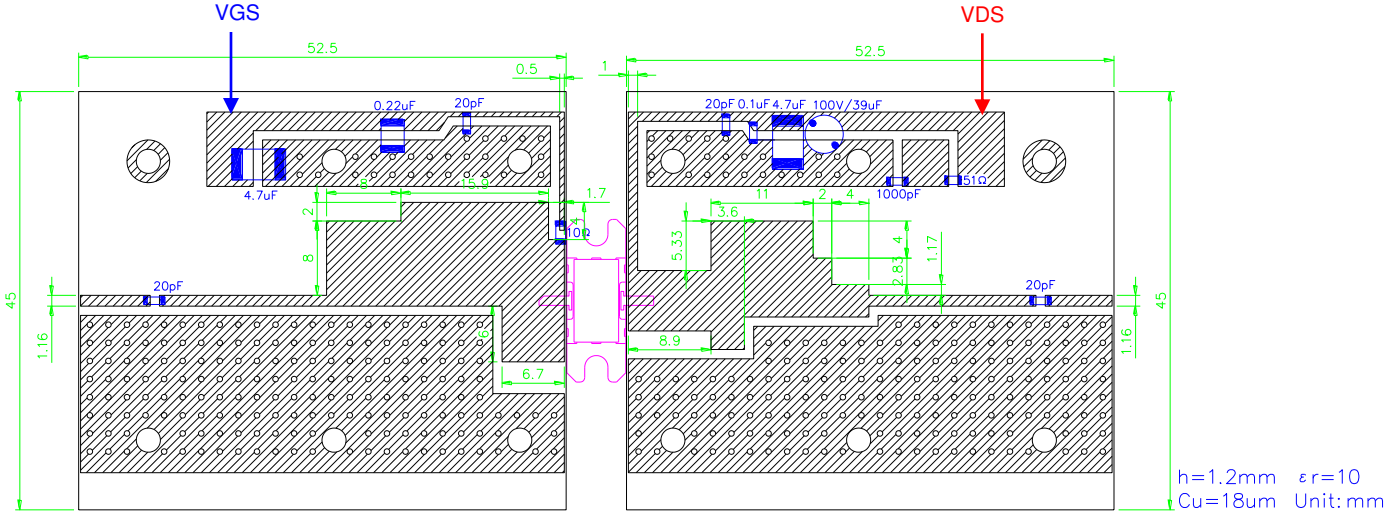


Output Power and Drain Efficiency vs. Input Power
VDS=50V, IDS(DC)=750mA, f=0.9GHz

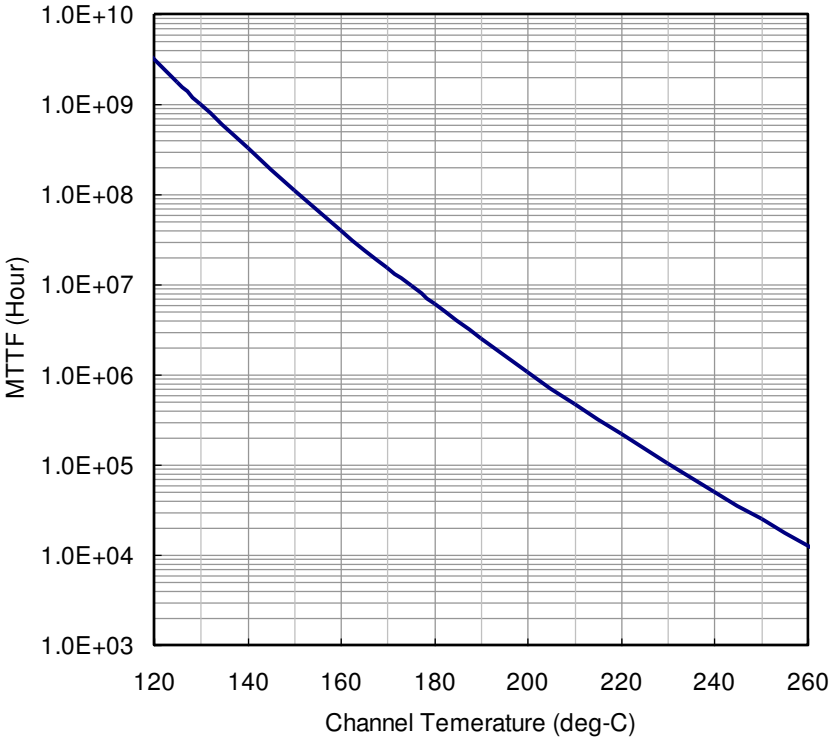


Pulse Signal (10%-duty, DC : constant)

Test Fixture



MTTF Calculation
– Estimated MTTF –



Ea=1.6eV
Confidence Level=90%

Channel Temp (deg-C)	MTTF (Hours)
160	4.05×10^7
180	6.07×10^6
200	1.07×10^6

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

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

Where;

AF: acceleration factor

Ea: activation energy (1.6 eV)

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

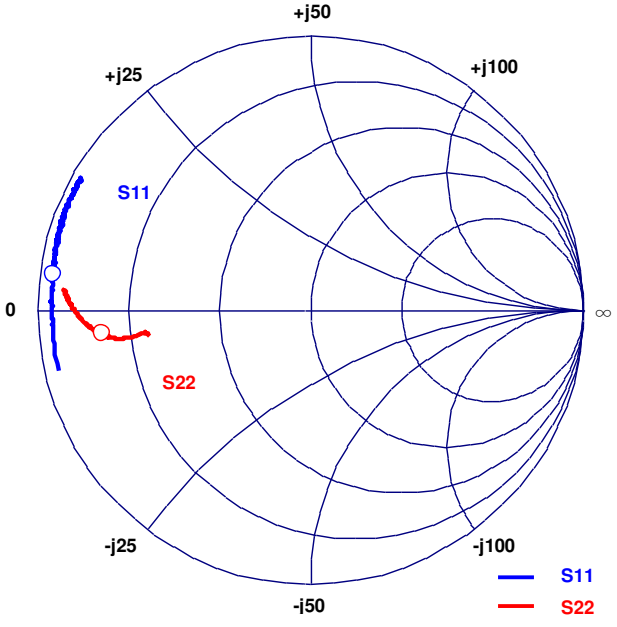
T_{stress}: stress temperature (K)

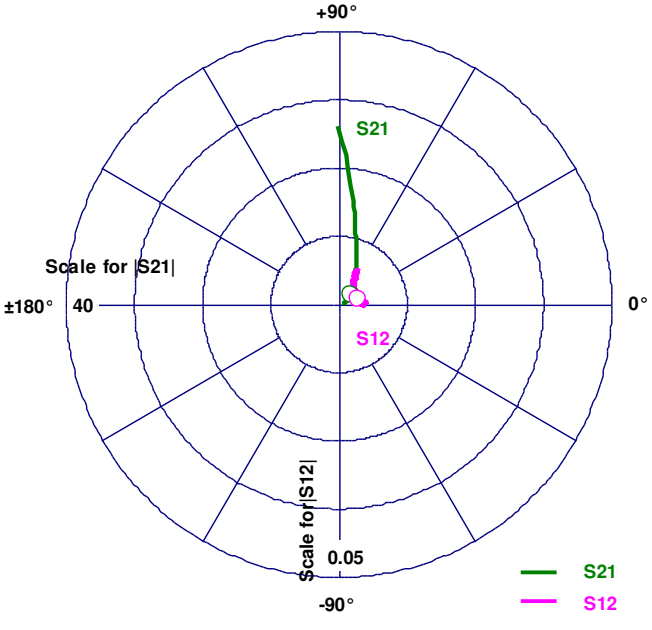
T_{use}: use temperature (K)

ESD characteristic

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

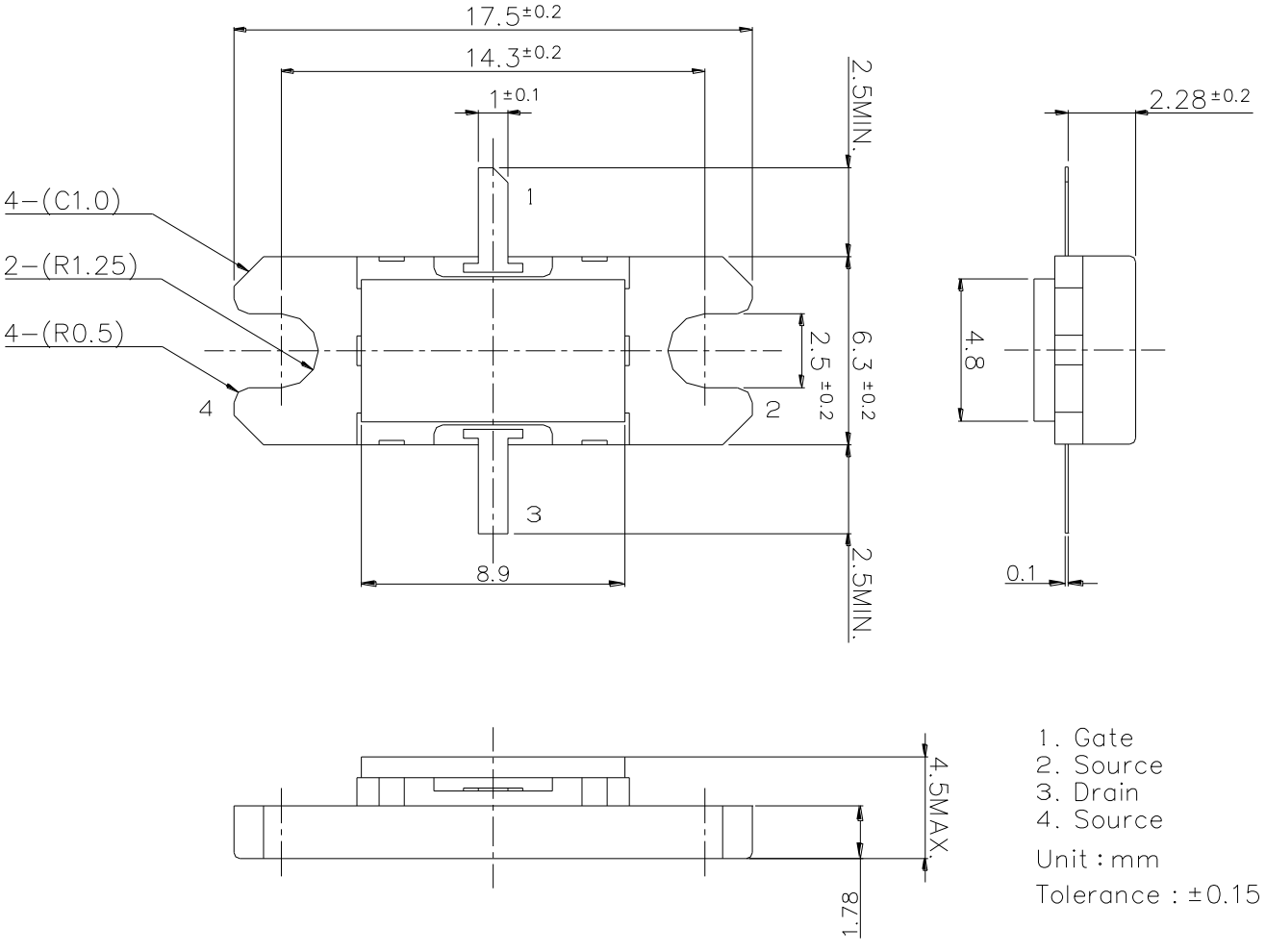
S-Parameters @V_{DS}=50V, $I_{DS(DC)}$=750mA, f=0.1 to 3.1GHz
$Z_l = Z_s$ = 50 ohm Marker : 0.9GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.10	0.95	-166.25	26.13	90.06	0.005	8.04	0.60	-170.68
0.20	0.95	-174.87	12.83	79.54	0.005	1.70	0.61	-172.09
0.30	0.95	-178.43	8.37	71.98	0.005	-3.78	0.63	-171.79
0.25	0.95	-176.75	10.16	75.53	0.005	1.09	0.62	-172.04
0.40	0.94	179.26	6.09	65.00	0.005	2.97	0.65	-171.27
0.50	0.95	177.74	4.69	58.95	0.004	0.83	0.68	-171.15
0.60	0.95	176.19	3.77	53.60	0.004	3.77	0.70	-171.19
0.70	0.95	174.77	3.10	47.97	0.004	7.41	0.73	-171.74
0.80	0.95	173.36	2.62	43.45	0.004	9.08	0.75	-172.32
0.90	0.95	172.24	2.22	39.08	0.004	13.17	0.77	-173.35
1.00	0.95	171.07	1.93	34.59	0.004	23.42	0.79	-174.11
1.10	0.95	169.96	1.69	30.38	0.004	33.31	0.80	-175.03
1.20	0.96	168.74	1.49	26.67	0.004	41.79	0.82	-176.12
1.30	0.96	167.53	1.32	23.31	0.004	46.56	0.83	-177.10
1.40	0.96	166.52	1.17	19.84	0.004	47.02	0.85	-177.98
1.50	0.96	165.79	1.06	16.98	0.005	51.22	0.86	-179.16
1.60	0.96	164.63	0.97	13.59	0.005	54.38	0.87	179.85
1.70	0.97	163.86	0.89	10.86	0.005	57.67	0.88	178.76
1.80	0.96	162.62	0.80	8.19	0.006	58.39	0.89	177.85
1.90	0.96	161.81	0.74	5.81	0.006	58.24	0.90	176.99
2.00	0.97	160.73	0.68	3.10	0.007	58.48	0.90	176.04
2.10	0.97	159.74	0.63	1.39	0.007	59.15	0.91	175.26
2.20	0.97	158.91	0.59	-1.42	0.007	62.51	0.91	174.43
2.30	0.97	158.23	0.55	-3.01	0.008	60.55	0.91	173.51
2.40	0.97	157.05	0.52	-5.63	0.008	64.19	0.92	172.92
2.50	0.97	156.47	0.49	-7.02	0.009	62.21	0.92	171.85
2.60	0.96	155.13	0.46	-8.75	0.009	63.44	0.93	171.42
2.70	0.97	154.08	0.44	-10.43	0.009	62.18	0.93	170.60
2.80	0.97	153.15	0.42	-12.80	0.010	64.83	0.93	169.95
2.90	0.97	152.50	0.40	-13.65	0.011	63.31	0.94	169.28
3.00	0.97	151.20	0.38	-16.58	0.011	63.94	0.94	168.54
3.10	0.97	150.54	0.37	-18.81	0.011	65.28	0.94	168.10

MK Package Outline
Metal-Ceramic Hermetic Package



For further information please contact:

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