EGNC160MK

High Voltage - High Power GaN-HEMT

FEATURES

・High Voltage Operation : VDS=50V
・High Power : 52.5dBm (typ.) @ Psat
・High Efficiency : 70%(typ.) @ Psat
・Power Gain : 18dB (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	VDS		55	V
Drain-Source Voltage	VDS	VGS=-8V	160	V
Gate-Source Voltage	VGS		-15	V
Total Power Dissipation	Pt		132	W
Storage Temperature	Tstg		-65 to +175	deg.C
Channel Temperature	Tch		250	deg.C

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	VDS		≤ 55	V
Forward Gate Current	IGF	RG=10ohm	≤ 153	mA
Reverse Gate Current	IGR	RG=10ohm	≥ -5.8	mA
Channel Temperature	Tch		≤ 180	deg.C
Average Output Power	Pave.		≤ 49.5	dBm

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

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	Vp	VDS=50V, IDS=40.8mA	-1.0	-1.5	-2.0	V
Saturated Power	Psat *1	VDS=50V	51.5	52.5	-	dBm
Drain Efficiency	ηd *2	IDS(DC)=600mA	30.0	35.0	-	%
Power Gain	Gp *2	f=0.9GHz	17.0	18.0	-	dB
Thermal Resistance	Rth	Channel to Case at 78W PDC	-	1.4	1.6	deg.C/W

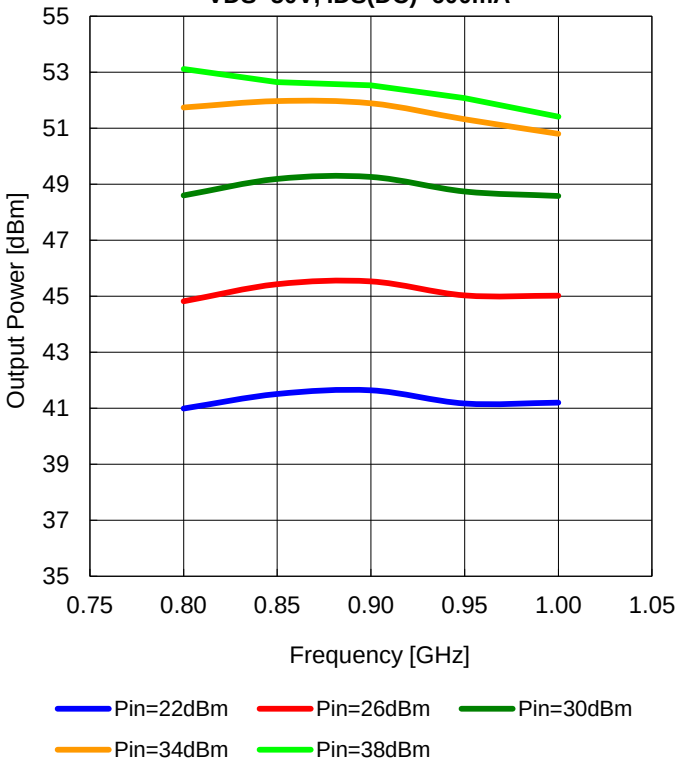
*1 : 10%-duty RF pulse (DC supply constant)
*2 : Pout=44.5dBm, CW modulation Signal (W-CDMA)

RoHS COMPLIANCE	Yes

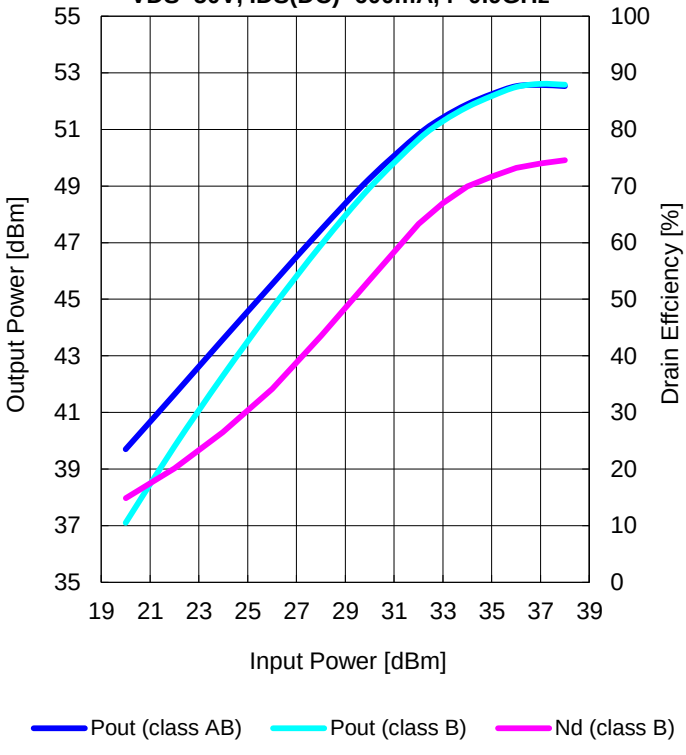
SUMITOMO ELECTRIC

RF characteristics @f=0.9GHz fine tuned

Output Power vs. Frequency
VDS=50V, IDS(DC)=600mA

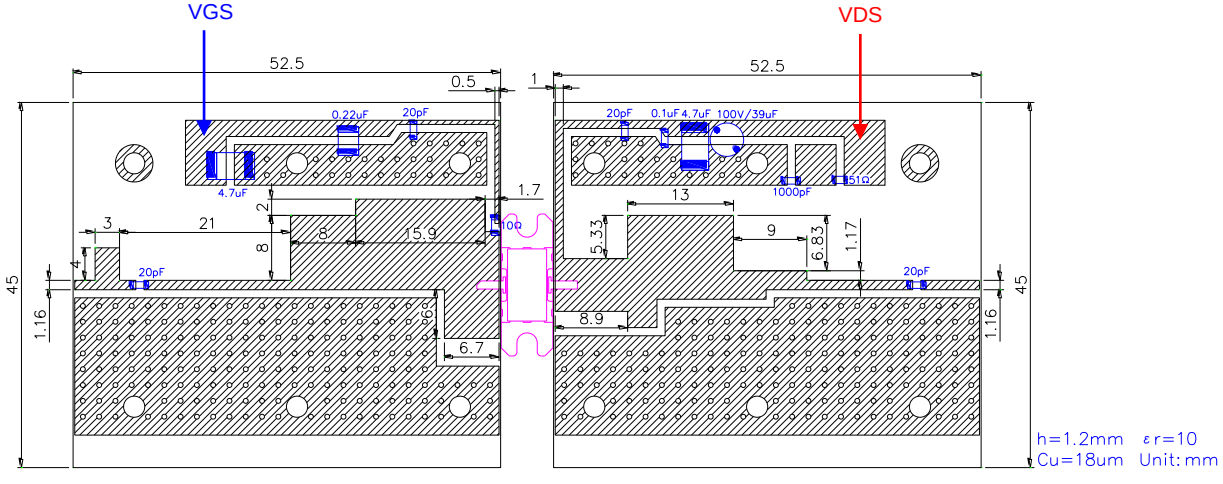


Output Power and Drain Efficiency vs. Input Power
VDS=50V, IDS(DC)=600mA, f=0.9GHz



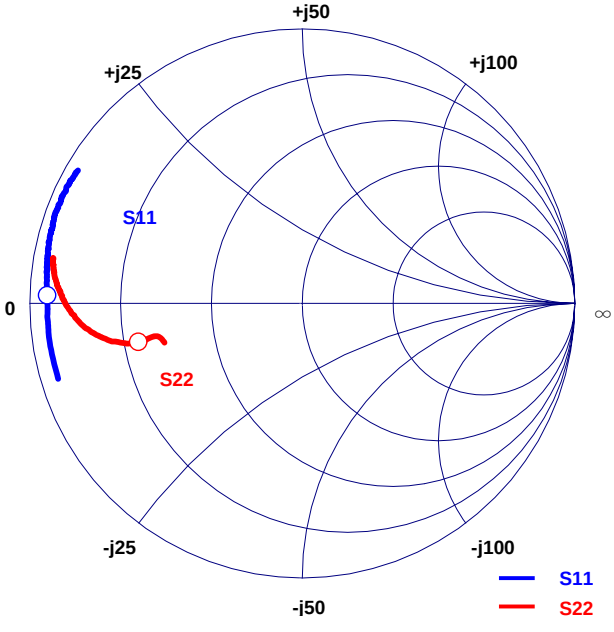
Pulse Signal (10%-duty, DC : constant)

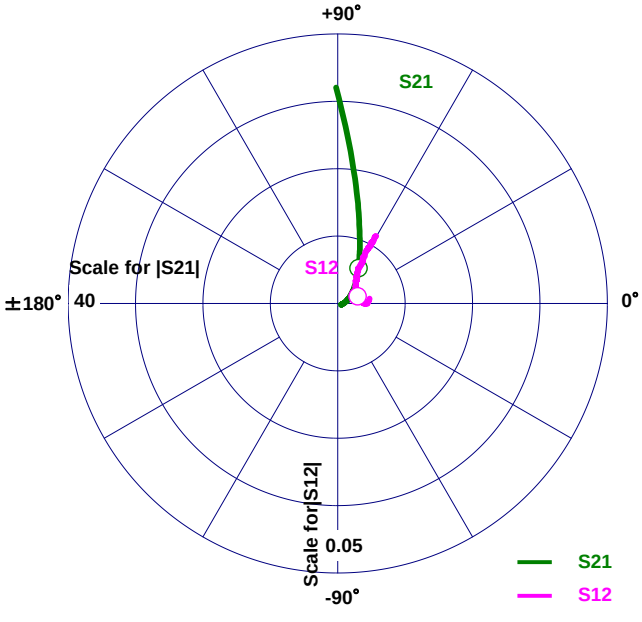
Test Fixture



- Reference DATA -

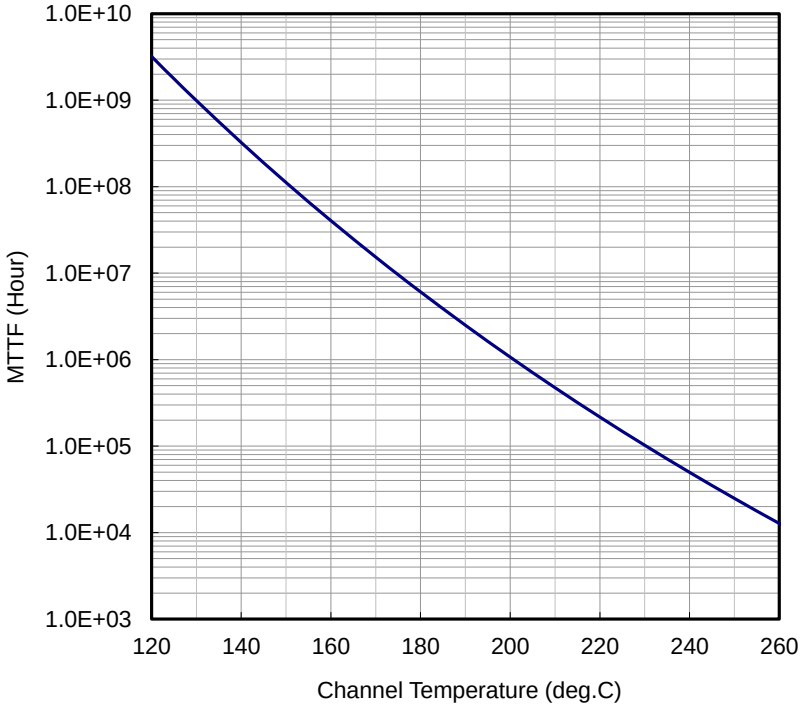
S-Parameters @VDS=50V, IDS(DC)=600mA, f=0.1 to 3.1GHz
Zl = Zs = 50ohm Marker : 0.9GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.10	0.94	-162.94	32.06	90.42	0.006	8.57	0.53	-164.19
0.20	0.94	-172.50	16.75	80.36	0.006	2.15	0.54	-167.32
0.30	0.94	-176.96	10.86	72.55	0.005	0.42	0.57	-167.51
0.40	0.94	-179.69	7.88	65.86	0.005	-0.60	0.59	-166.93
0.50	0.94	178.14	6.09	59.63	0.00	0.94	0.62	-166.99
0.60	0.94	176.52	4.88	54.02	0.00	4.65	0.65	-167.04
0.70	0.94	175.01	4.02	48.67	0.00	8.39	0.68	-167.74
0.80	0.94	173.73	3.37	43.95	0.00	13.35	0.70	-168.60
0.90	0.94	172.35	2.87	39.14	0.00	19.61	0.73	-169.50
1.00	0.95	171.32	2.48	35.01	0.00	25.20	0.75	-170.64
1.10	0.95	170.02	2.16	30.70	0.00	32.98	0.77	-171.68
1.20	0.95	169.01	1.91	26.75	0.00	38.35	0.79	-172.90
1.30	0.95	167.83	1.69	22.92	0.00	44.06	0.81	-173.89
1.40	0.96	166.70	1.51	19.48	0.01	48.18	0.82	-175.20
1.50	0.96	165.76	1.35	15.93	0.01	51.83	0.83	-176.27
1.60	0.96	164.60	1.23	12.97	0.01	51.94	0.84	-177.36
1.70	0.96	163.62	1.11	9.54	0.01	55.70	0.86	-178.48
1.80	0.96	162.66	1.02	6.61	0.01	56.91	0.87	-179.53
1.90	0.96	161.83	0.93	3.82	0.01	58.14	0.87	179.40
2.00	0.96	160.75	0.87	1.24	0.01	58.46	0.88	178.23
2.10	0.96	159.81	0.81	-1.61	0.01	58.80	0.89	177.31
2.20	0.96	158.75	0.74	-4.07	0.01	58.90	0.90	176.46
2.30	0.96	157.91	0.70	-6.82	0.01	59.79	0.90	175.73
2.40	0.96	156.89	0.66	-9.67	0.01	61.46	0.91	174.89
2.50	0.96	155.91	0.63	-11.92	0.01	61.32	0.91	174.07
2.60	0.96	154.93	0.59	-14.23	0.01	61.39	0.92	173.35
2.70	0.96	153.79	0.56	-16.62	0.01	61.48	0.92	172.56
2.80	0.96	152.75	0.54	-18.80	0.01	60.88	0.92	171.89
2.90	0.96	151.87	0.52	-20.97	0.01	60.34	0.93	171.07
3.00	0.96	150.65	0.50	-23.08	0.01	60.60	0.93	170.39
3.10	0.96	149.53	0.48	-25.64	0.01	60.29	0.93	169.67

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

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

$$MTTF_{use} = MTTF_{stress} \times AF$$

Where;

AF : acceleration factor

Ea : activation energy (1.6eV)

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

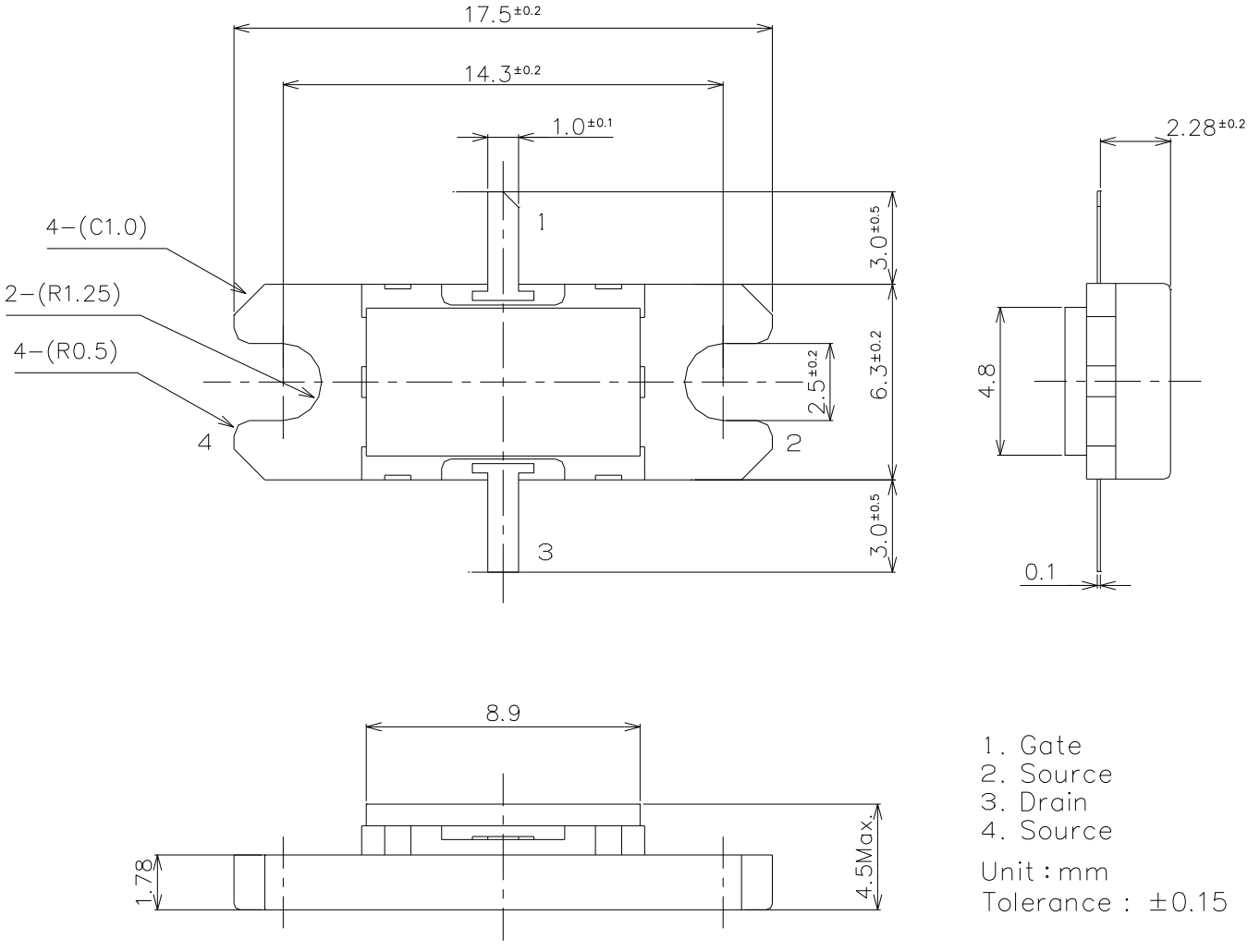
T_{stress} : stress temperature (K)

T_{use} : use temperature (K)

ESD characteristic

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

MK Package Outline
Metal-Ceramic Hermetic Package



For further information please contact:

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