EGNC105MK

High Voltage - High Power GaN-HEMT

FEATURES

・High Voltage Operation : VDS=50V
・High Power : 51dBm (typ.) @ Psat
・High Efficiency : 70%(typ.) @ Psat
・Power Gain : 20dB (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 W-CDMA and 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		97.8	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	≤ 102	mA
Reverse Gate Current	IGR	RG=10ohm	≥ -3.9	mA
Channel Temperature	Tch		≤ 180	deg.C
Average Output Power	Pave.		≤ 48.0	dBm

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

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	Vp	VDS=50V, IDS=27mA	-1.0	-1.5	-2.0	V
Saturated Power	Psat *1	VDS=50V	50.0	51.0	-	dBm
Drain Efficiency	ηd *2	IDS(DC)=400mA	-	35.0	-	%
Power Gain	Gp *2	f=0.9GHz	19.0	20.0	-	dB
Thermal Resistance	Rth	Channel to Case at 52.5W PDC	-	2.0	2.3	deg.C/W

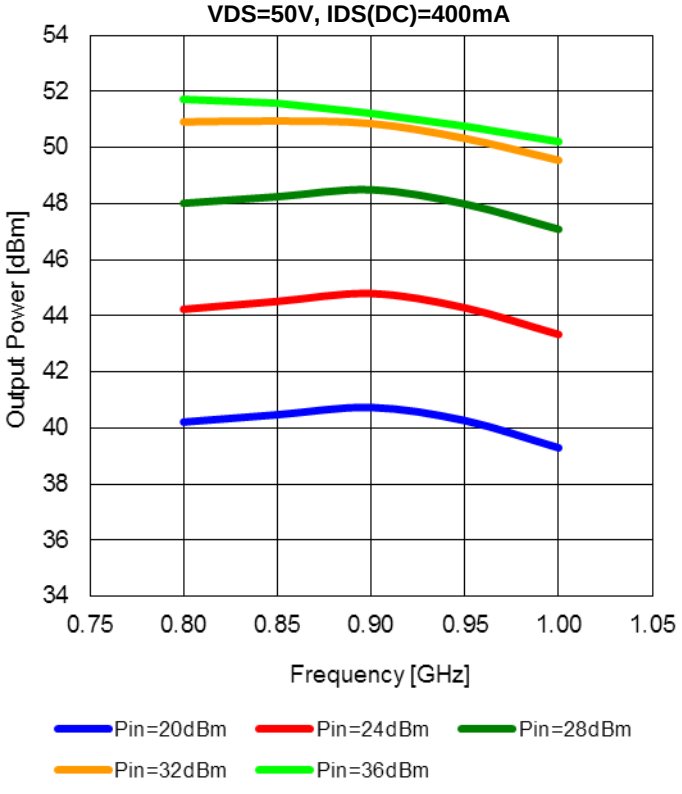
*1 : 10%-duty RF pulse (DC supply constant)
*2 : Pout=43dBm, CW modulation Signal (W-CDMA)

RoHS COMPLIANCE	Yes

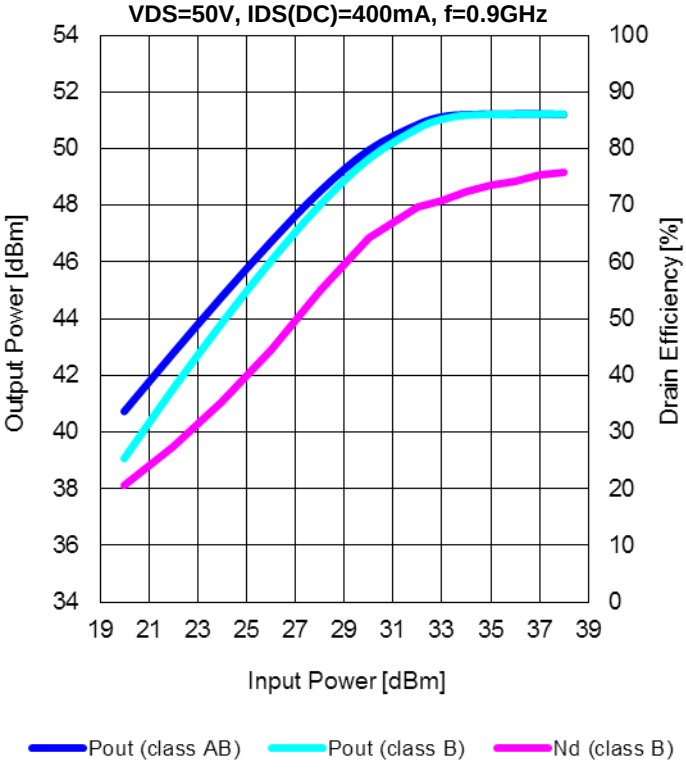
SUMITOMO ELECTRIC

RF characteristics @f=0.9GHz fine tuned

Output Power vs. Frequency
VDS=50V, IDS(DC)=400mA

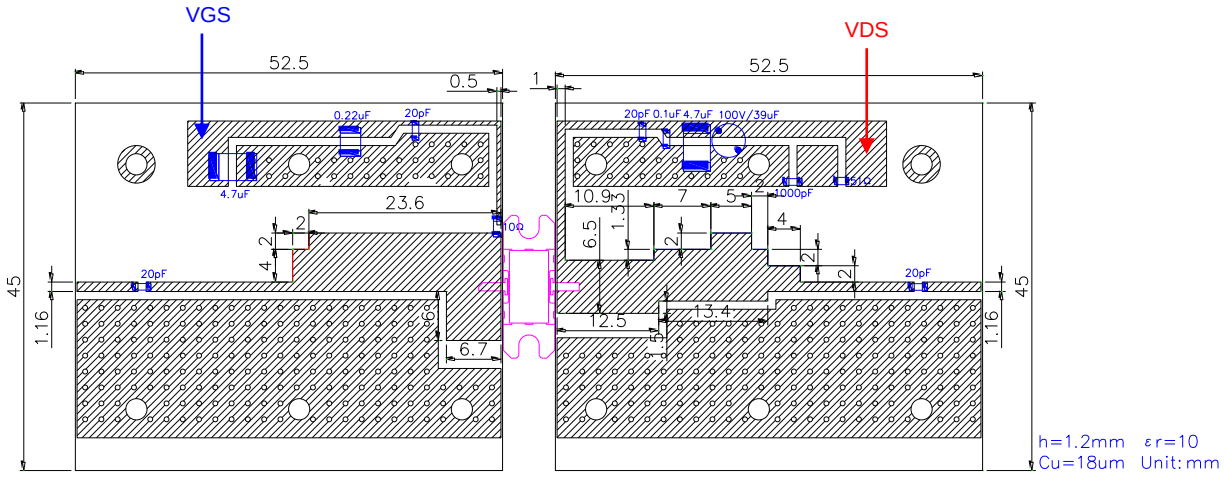


Output Power and Drain Efficiency vs. Input Power
VDS=50V, IDS(DC)=400mA, f=0.9GHz



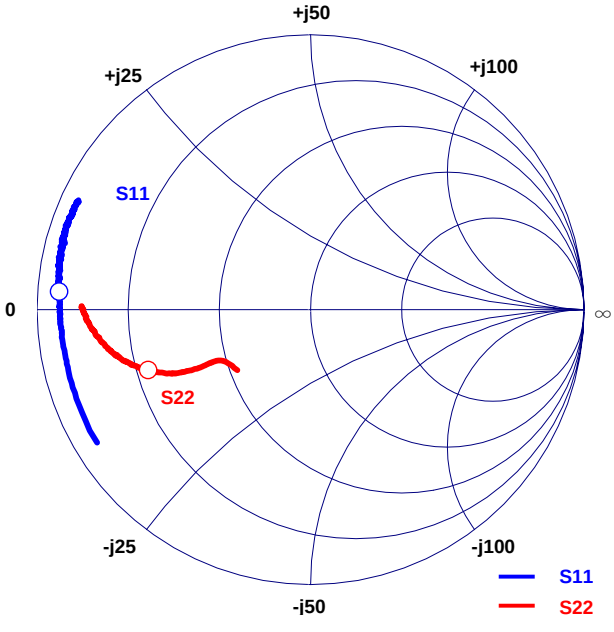
Pulse Signal (10%-duty, DC : constant)

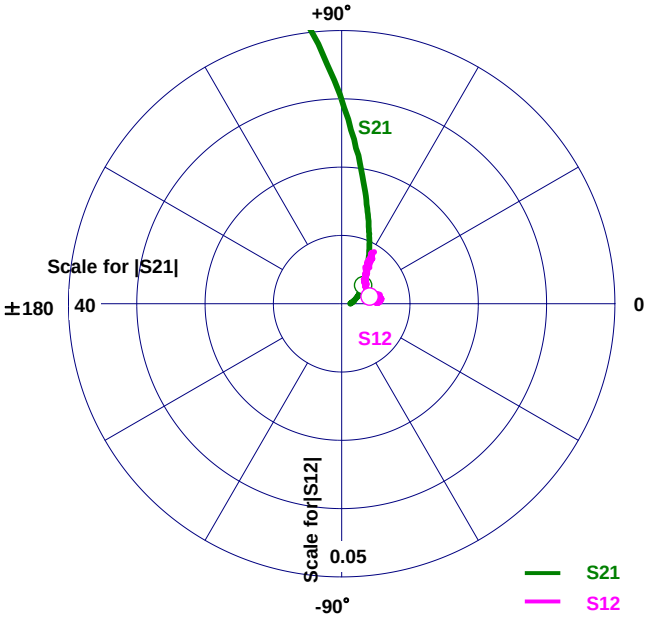
Test Fixture



- Reference DATA -

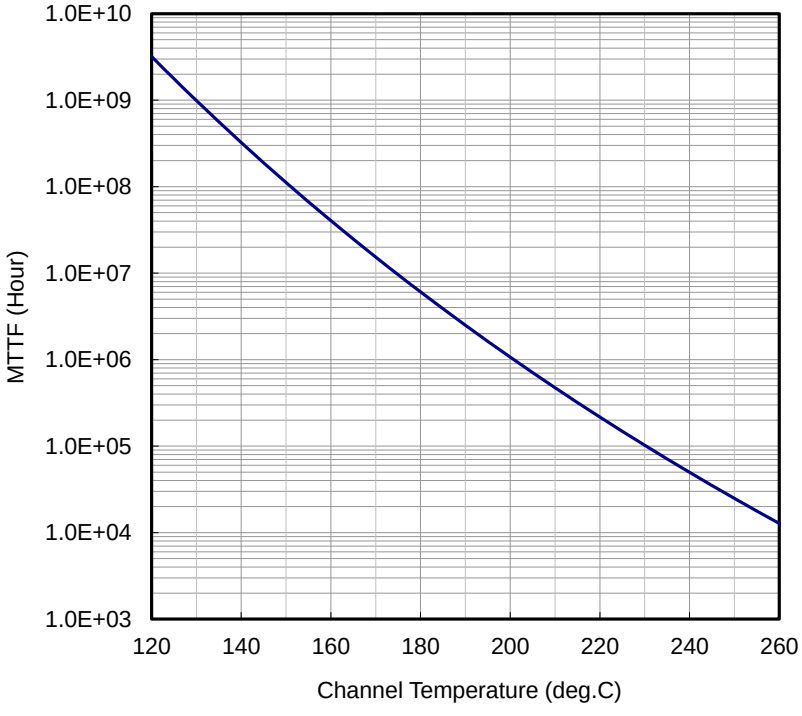
S-Parameters @VDS=50V, IDS(DC)=400mA, f=0.1 to 3.1GHz
Zl = Zs = 50ohm Marker : 0.9GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.10	0.92	-148.22	45.34	99.41	0.01	15.81	0.35	-140.53
0.20	0.91	-165.24	22.86	84.79	0.01	5.81	0.38	-150.52
0.30	0.91	-171.57	15.02	75.99	0.01	1.07	0.41	-151.91
0.25	0.91	-168.81	18.17	79.96	0.01	3.40	0.39	-151.66
0.40	0.91	-175.16	11.00	68.42	0.01	4.90	0.45	-152.34
0.50	0.92	-177.74	8.55	61.93	0.01	1.50	0.49	-153.14
0.60	0.92	-179.67	6.92	56.29	0.01	4.83	0.53	-154.35
0.70	0.92	178.72	5.72	50.53	0.01	8.84	0.57	-155.92
0.80	0.92	177.08	4.84	45.60	0.01	10.34	0.60	-157.68
0.90	0.92	175.91	4.14	40.76	0.01	14.42	0.63	-159.71
1.00	0.92	174.65	3.59	36.33	0.01	21.99	0.66	-161.40
1.10	0.93	173.52	3.17	32.02	0.01	29.88	0.69	-163.42
1.20	0.93	172.31	2.80	27.93	0.01	36.73	0.71	-165.20
1.30	0.93	170.92	2.50	24.22	0.01	42.38	0.73	-167.14
1.40	0.93	170.03	2.24	20.52	0.01	47.11	0.75	-168.98
1.50	0.93	169.35	2.04	17.12	0.01	49.54	0.77	-170.99
1.60	0.93	168.05	1.86	14.00	0.01	51.80	0.78	-172.73
1.70	0.94	167.19	1.72	11.02	0.01	55.96	0.80	-174.59
1.80	0.94	166.33	1.57	8.03	0.01	55.63	0.81	-176.29
1.90	0.94	165.40	1.44	5.48	0.01	55.97	0.82	-177.89
2.00	0.95	164.36	1.34	2.41	0.01	57.40	0.83	-179.54
2.10	0.94	163.58	1.25	0.05	0.01	57.83	0.84	179.10
2.20	0.94	162.72	1.18	-2.54	0.01	59.61	0.85	177.76
2.30	0.94	162.38	1.11	-4.56	0.01	59.84	0.85	176.14
2.40	0.94	160.97	1.06	-7.49	0.01	60.46	0.86	175.03
2.50	0.94	160.46	1.00	-10.00	0.01	60.04	0.86	173.33
2.60	0.94	159.16	0.95	-11.74	0.02	59.43	0.87	172.24
2.70	0.94	158.42	0.91	-13.93	0.02	57.40	0.87	170.88
2.80	0.94	157.69	0.87	-16.65	0.02	58.60	0.87	169.64
2.90	0.94	156.91	0.85	-18.29	0.02	55.56	0.87	168.31
3.00	0.94	155.85	0.82	-20.77	0.02	56.57	0.87	166.96
3.10	0.93	155.32	0.79	-22.77	0.02	56.80	0.87	165.79

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)

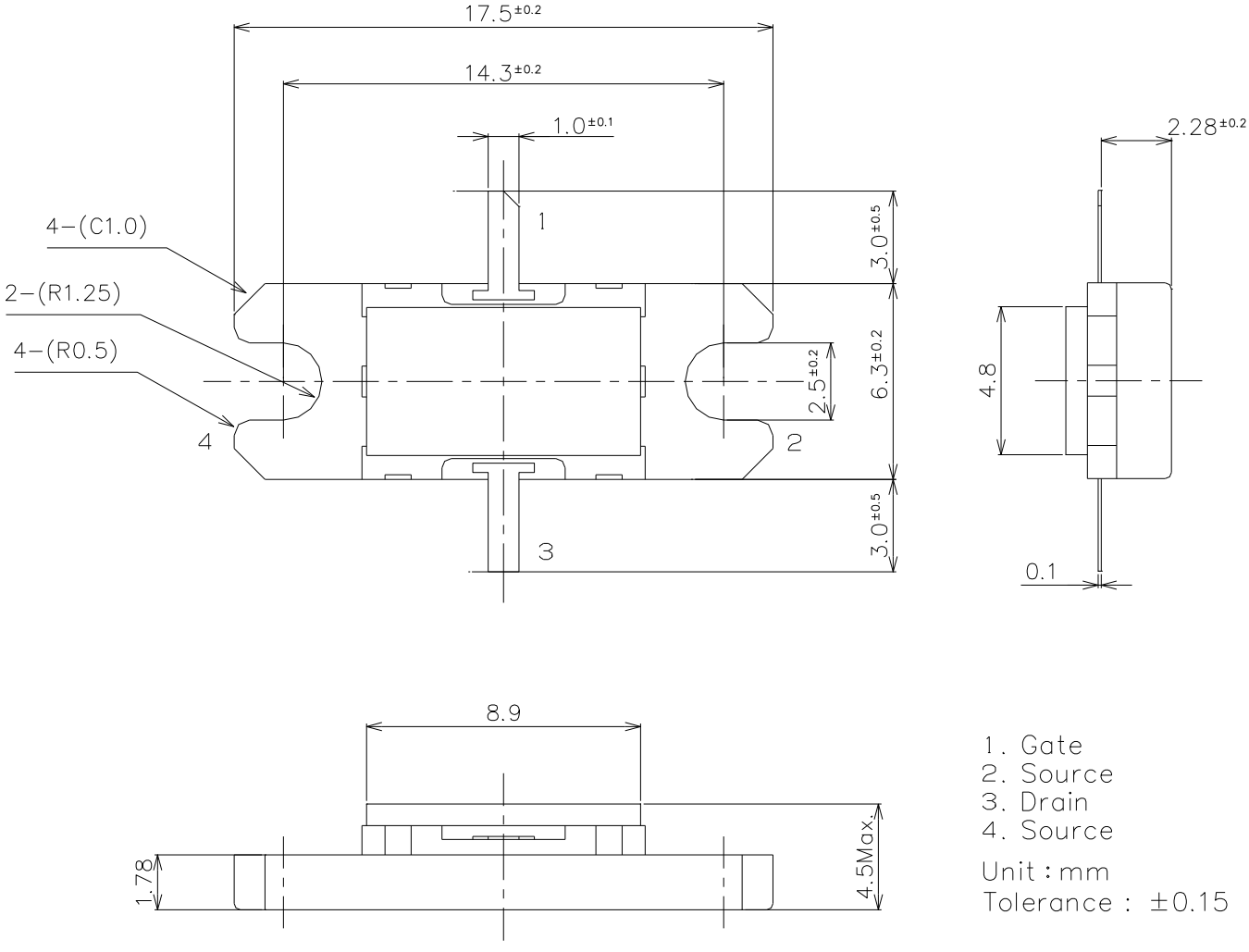
T_{stress} : stress temperature (K)

T_{use} : use temperature (K)

ESD characteristic

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

MK Package Outline
Metal-Ceramic Hermetic Package



1. Gate
2. Source
3. Drain
4. Source

Unit : mm
Tolerance : ±0.15

For further information please contact:

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