SGN19C210I2D

High Voltage - High Power GaN-HEMT

FEATURES

-High Voltage Operation : V_{DS}=50V
-High Power : 53.0dBm (typ.) @ Psat
-High Efficiency: 68%(typ.) @ Psat
-Power Gain : 18.5dB(typ.) @ f=1.9GHz
-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 1.9GHz 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}		≤ 55	V
Forward Gate Current	I_{GF}	R_G=5 ohm	≤ 204	mA
Reverse Gate Current	I_{GR}	R_G=5 ohm	≥ -7.8	mA
Channel Temperature	T_{ch}		≤ 180	deg.C
Average Output Power	Pave.		≤ 50.0	dBm

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

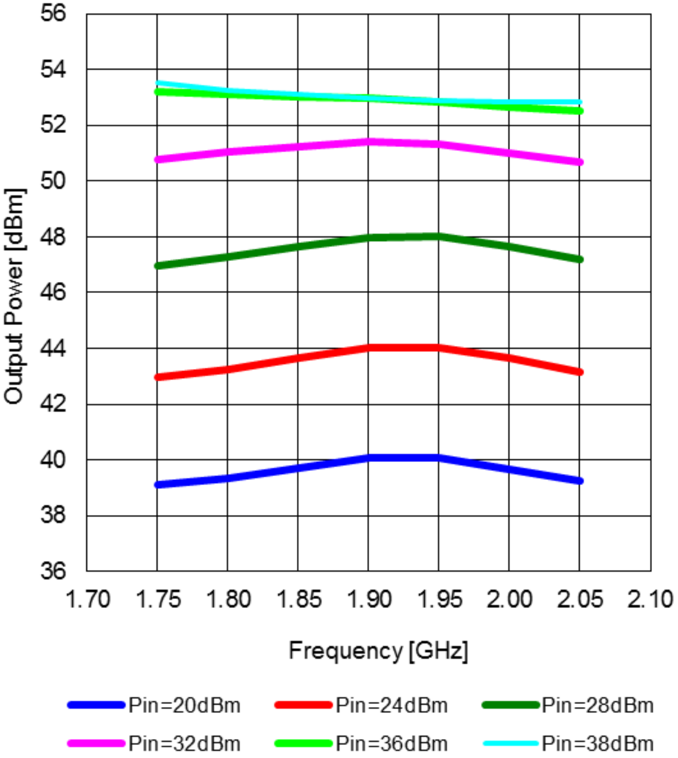
Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V_p	V_{DS}=50V I_{DS}=54.4mA	-1.0	-1.5	-2.0	V
Saturated Power	Psat *1	V_{DS}=50V	52.2	53.0	-	dBm
Drain Efficiency	η_d *2	$I_{DS(DC)}$=750mA	28	32.0	-	%
Power Gain	Gp *2	f=1.9GHz	17.5	18.5	-	dB
Thermal Resistance	R_{th}	Channel to Case at 105W P_{DC}	-	1.1	1.3	deg.C/W

*1 : 10%-duty RF pulse (DC supply constant), f=1.9GHz
*2 : Pout = 45dBm, CW modulation Signal (W-CDMA)

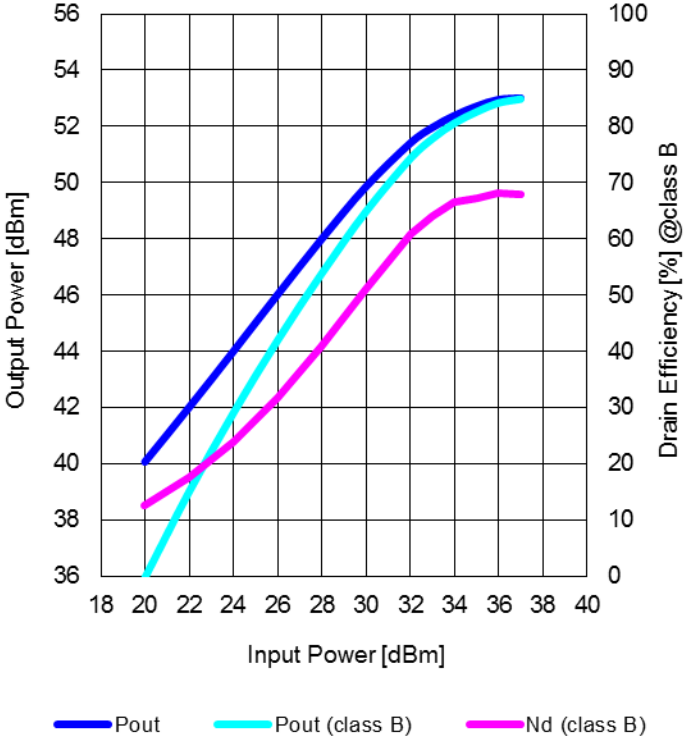
RoHS COMPLIANCE	Yes

RF characteristics @ f=1.9GHz fine tuned

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

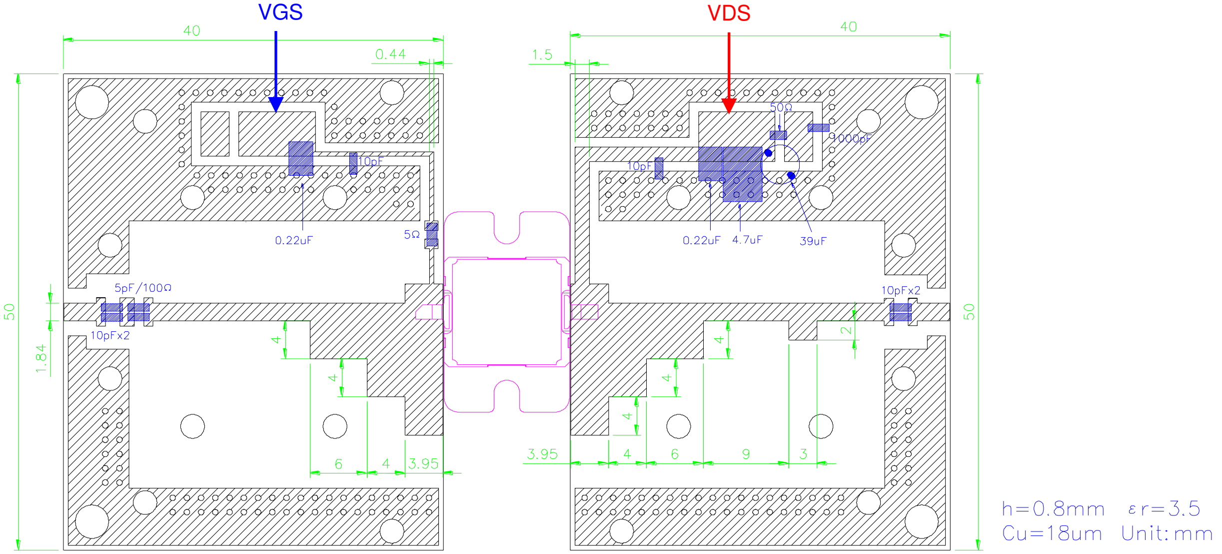


Output Power and Drain Efficiency vs. Input Power
VDS=50V IDS(DC)=750mA f=1.9GHz

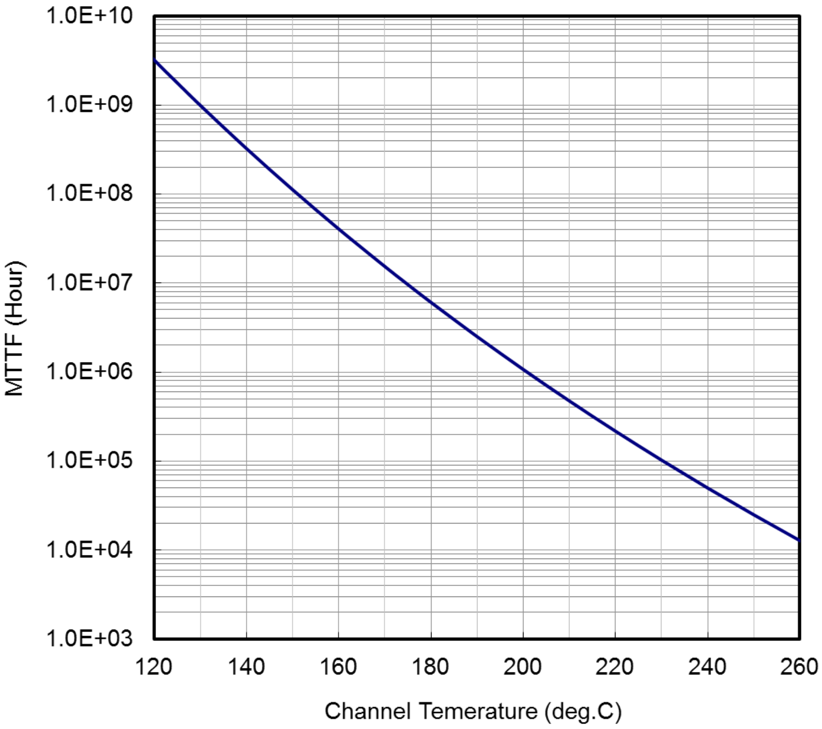


Pulse Signal (10%-duty, DC : constant)

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)

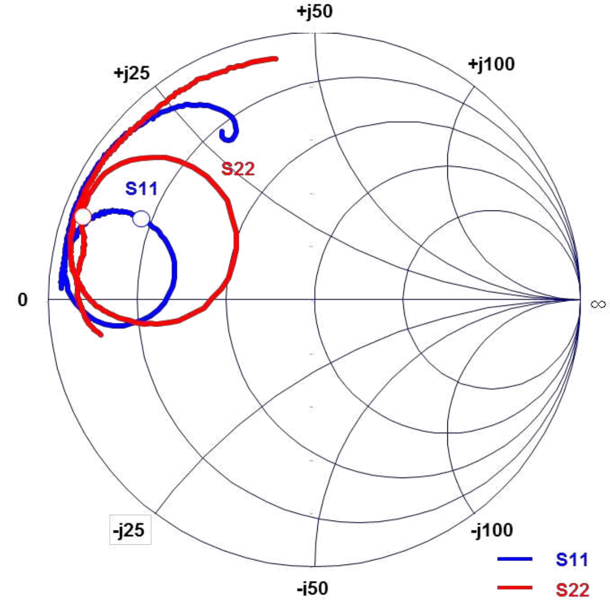
T_{stress}: stress temperature (K)

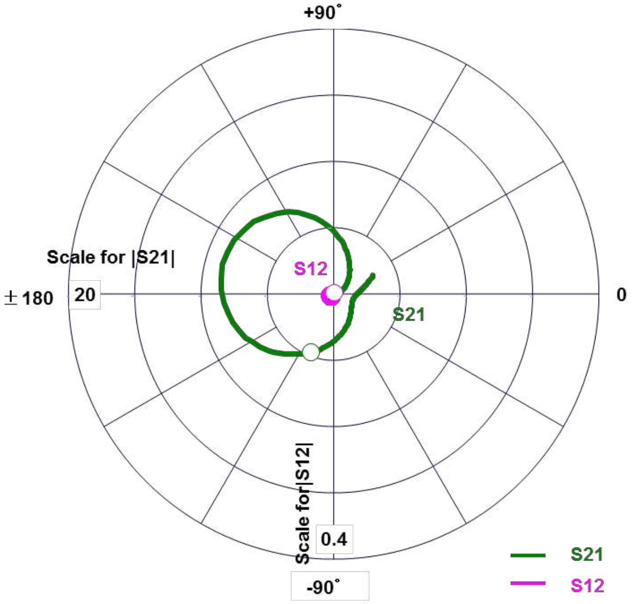
T_{use}: use temperature (K)

ESD Characteristics

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

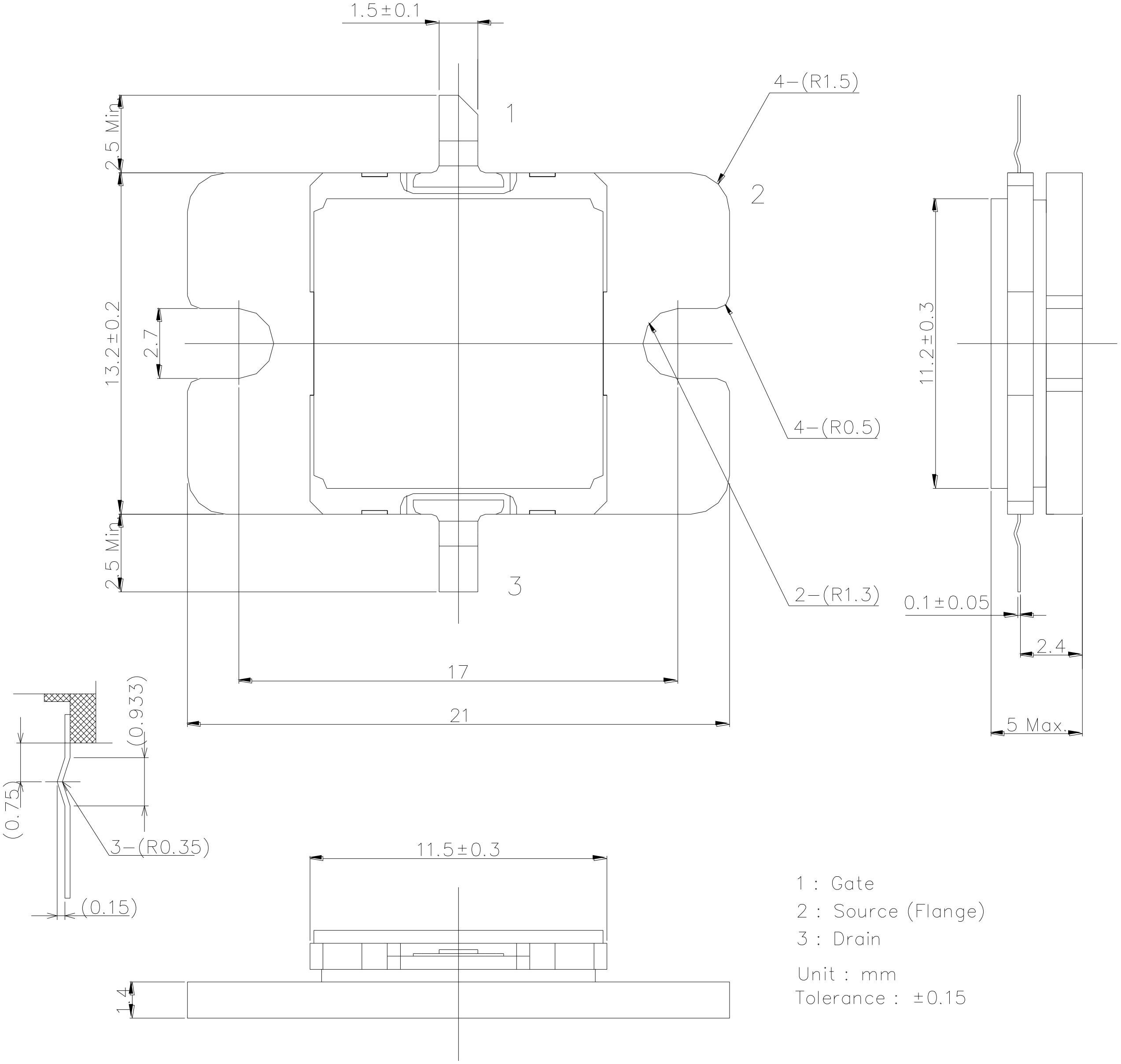
S-Parameters @VDS=50V, IDS(DC)=750mA, f=0.5 to 4.5 GHz
Zl = Zs = 50 ohm Marker : 1.9GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.95	177.22	3.28	24.96	0.002	-28.99	0.82	-170.62
0.60	0.95	175.54	2.60	16.68	0.002	-22.85	0.84	-173.09
0.70	0.96	174.07	2.15	9.26	0.002	-9.32	0.87	-175.78
0.80	0.95	172.50	1.87	2.75	0.002	8.82	0.88	-178.05
0.90	0.95	171.19	1.68	-3.49	0.002	11.00	0.89	179.65
1.00	0.95	169.79	1.56	-9.93	0.002	21.56	0.89	177.74
1.10	0.95	168.06	1.52	-16.00	0.002	25.17	0.90	175.90
1.20	0.94	166.82	1.53	-22.77	0.003	15.52	0.90	174.31
1.30	0.93	165.06	1.57	-29.76	0.003	18.67	0.89	172.71
1.40	0.92	163.26	1.70	-37.30	0.004	14.76	0.89	170.89
1.50	0.91	161.41	1.90	-47.04	0.005	7.06	0.89	169.57
1.60	0.88	159.14	2.22	-57.65	0.005	-3.04	0.89	168.27
1.70	0.85	157.47	2.74	-71.29	0.006	-15.95	0.89	166.73
1.80	0.80	155.45	3.49	-88.61	0.008	-33.43	0.90	164.75
1.90	0.72	155.05	4.74	-111.22	0.010	-57.00	0.93	160.35
2.00	0.59	159.29	6.85	-144.08	0.013	-94.04	0.92	149.10
2.10	0.62	-174.21	8.59	158.25	0.016	-157.54	0.56	130.98
2.20	0.90	-179.18	5.53	99.14	0.010	134.79	0.45	-173.95
2.30	0.95	173.00	2.99	68.56	0.006	91.76	0.70	-173.45
2.40	0.96	169.08	1.82	49.88	0.004	71.77	0.81	-177.93
2.50	0.96	166.56	1.20	36.22	0.002	64.55	0.87	177.76
2.60	0.96	164.48	0.84	26.29	0.002	60.31	0.90	174.50
2.70	0.96	162.89	0.61	18.55	0.002	45.81	0.92	171.57
2.80	0.96	161.21	0.47	12.09	0.001	33.67	0.93	168.87
2.90	0.96	159.82	0.38	6.41	0.001	51.88	0.94	166.51
3.00	0.97	158.37	0.32	1.01	0.001	64.61	0.94	164.07
3.10	0.96	156.89	0.27	-3.76	0.001	82.60	0.95	161.80
3.20	0.96	155.56	0.24	-8.05	0.002	88.90	0.95	159.74
3.30	0.96	153.93	0.21	-12.16	0.002	93.16	0.95	157.43
3.40	0.96	152.28	0.19	-15.70	0.003	103.45	0.95	155.18
3.50	0.96	150.63	0.18	-20.13	0.003	89.83	0.95	152.71
3.60	0.95	148.89	0.17	-23.50	0.004	86.61	0.95	150.02
3.70	0.95	146.73	0.17	-26.91	0.004	90.11	0.95	146.84
3.80	0.95	144.38	0.17	-29.88	0.005	83.70	0.94	143.47
3.90	0.95	141.81	0.18	-29.52	0.007	69.89	0.94	139.98
4.00	0.94	138.66	0.21	-29.12	0.006	55.56	0.93	135.94
4.10	0.92	134.59	0.28	-36.51	0.006	49.66	0.93	131.69
4.20	0.91	130.25	0.35	-48.86	0.006	44.76	0.93	126.04
4.30	0.88	123.67	0.46	-62.63	0.007	34.73	0.93	118.80
4.40	0.77	115.17	0.65	-84.59	0.007	28.23	0.92	110.25
4.50	0.72	119.07	0.58	-123.29	0.010	16.40	0.91	99.06

I2D Package Outline
Metal-Ceramic Hermetic Package



1 : Gate
2 : Source (Flange)
3 : Drain

Unit : mm
Tolerance : ±0.15

For further information please contact:

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