Features

- High Voltage Operation : VDS=50V
- High Power : 55.6dBm (typ.) @ Psat
- Proven Reliability
- For peak stage of Doherty amplifier

Description

Sumitomo Electric's GaN-HEMT offers high efficiency, ease of matching, greater consistency and broad bandwidth for high power amplifiers with 50V operation, and gives you higher gain.

This new product is ideally suited for use in 0.9GHz W-CDMA & LTE design requirements as it offers high gain, long term reliability and ease of use.

ABSOLUTE MAXIMUM RATINGS (Case Temperature T_c=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		160.7	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}		$\le$ 55	V
Forward Gate Current	I_{GF}	R_G=10 ohm	$\le$ 355.9	mA
Reverse Gate Current	I_{GR}	R_G=10 ohm	$\ge$ -8.8	mA
Channel Temperature	T_{ch}		$\le$ 200	deg.C
Average Output Power	$P_{ave.}$		$\le$ 52.6	dBm

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

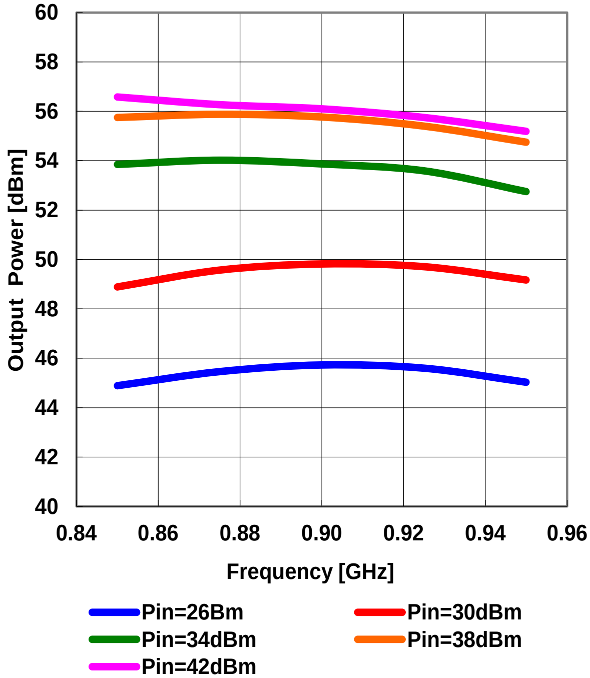
Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V_p	V_{DS}=50V I_{DS}=72mA	-3.3	-	-2.1	V
Saturated Power	Psat *1	V_{DS}=50V $I_{DS(DC)}$=10mA f=0.9GHz	54.6	55.6	-	dBm
Drain Efficiency at Psat	DE *1		63.0	70.0	-	%
Power Gain	Gp *2		17.5	18.5	-	dB
Thermal Resistance	R_{th}	Channel to Case at 105W P_{DC}	-	1.2	1.4	deg.C/W
Load Mismatch Ruggedness *3	-	VSWR 10:1	No failures			

*1 : 10%-duty RF pulse (DC supply constant)
*2 : Pout=51.5dBm, 10%-duty RF pulse (DC supply constant)
*3 : Fixed Pin : Pout=P3dB at RL=50ohm, pulsed CW signal(10% duty)

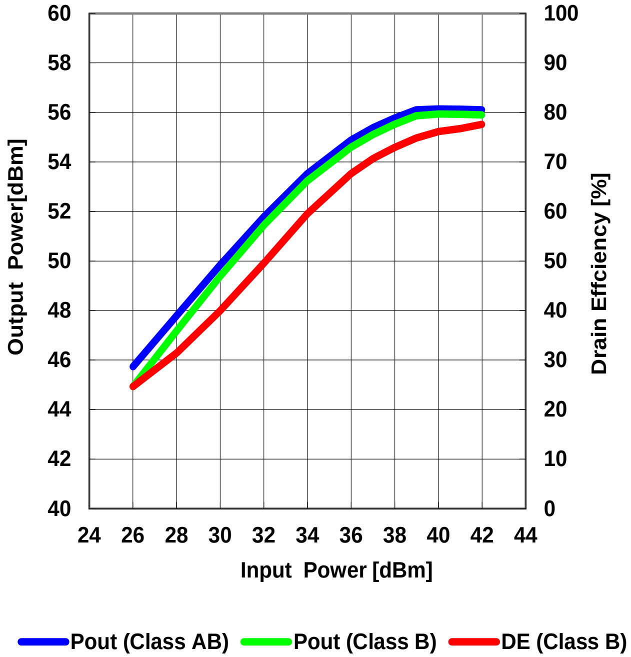
RoHS Compliance	YES

RF characteristics @f=0.9GHz fine tuned

Output Power vs. Frequency
V_{DS}=50V, $I_{DS(DC)}$=800mA

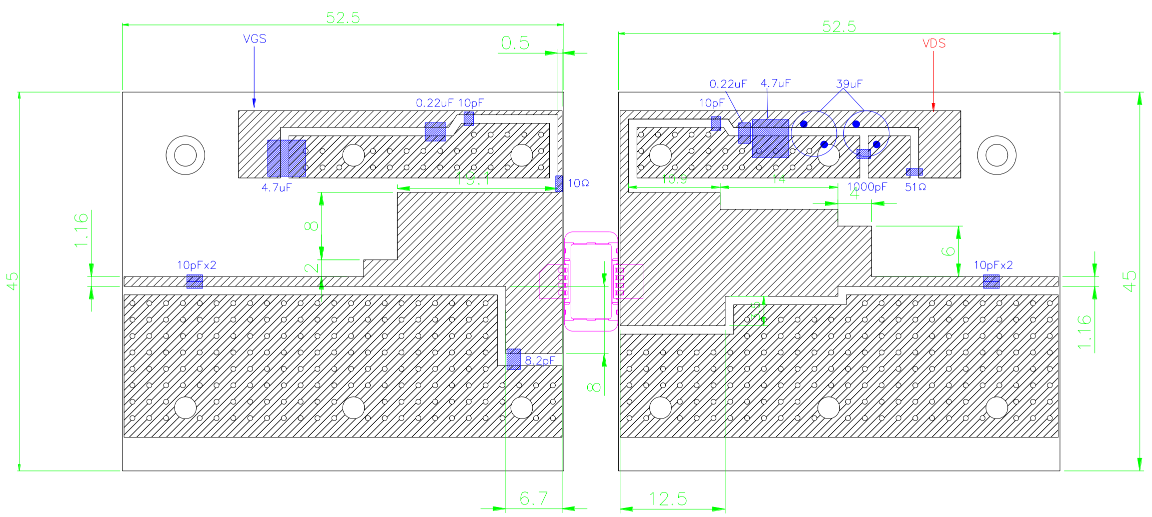


Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V, $I_{DS(DC)}$=800mA, f=0.9GHz



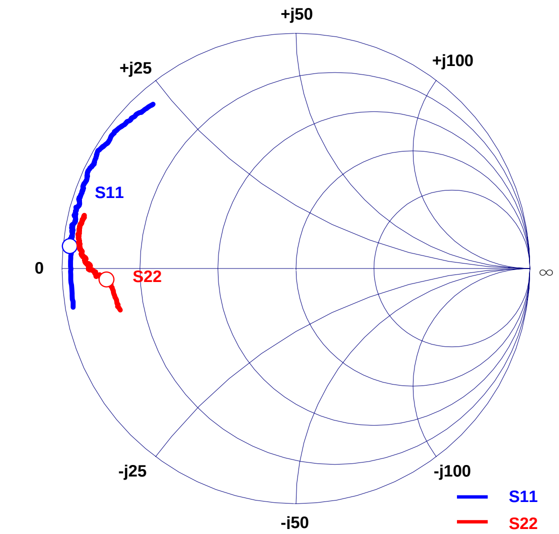
Pulse Signal (10%-duty, DC : constant)

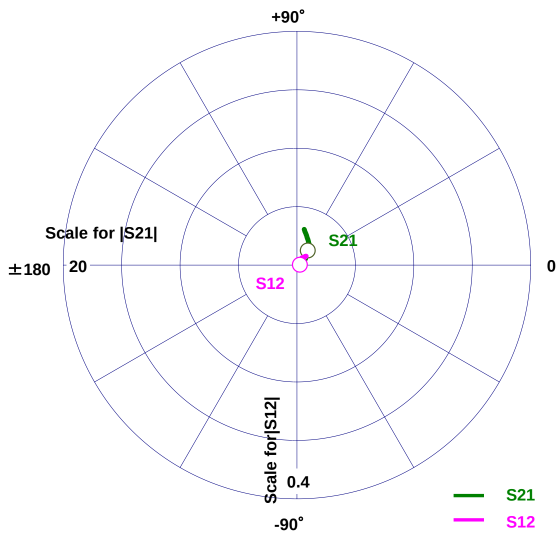
Test Fixture



- Reference DATA -

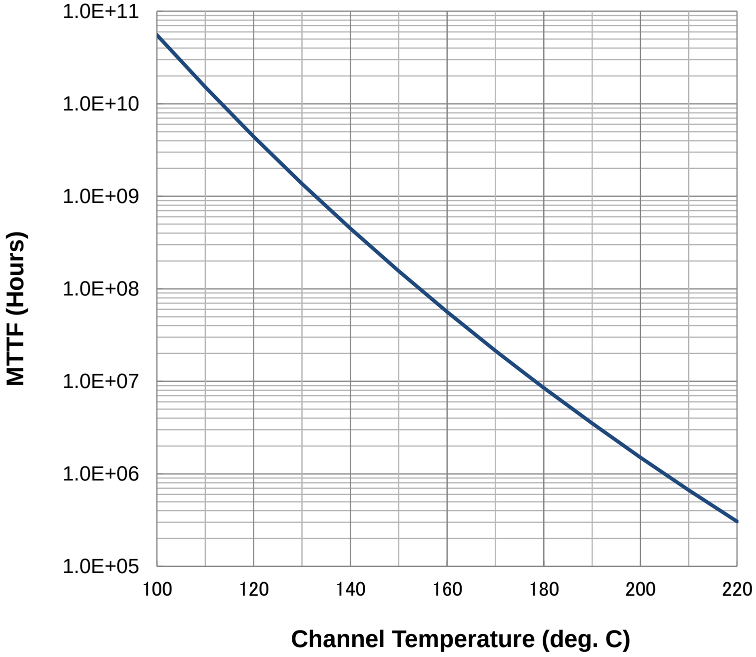
S-Parameters @VDS=50V, IDS(DC)=800mA, f=0.5 to 4.5GHz
Zl = Zs = 50ohm Marker : 0.9GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.5	0.97	-170.18	3.13	78.66	0.005	10.03	0.77	-166.78
0.6	0.96	-177.12	2.51	69.38	0.005	7.79	0.78	-171.60
0.7	0.96	176.18	2.07	59.94	0.005	0.86	0.80	-176.41
0.8	0.97	175.20	1.76	56.85	0.005	3.42	0.81	-176.85
0.9	0.97	174.37	1.56	53.60	0.005	7.53	0.81	-176.71
1.0	0.97	173.37	1.39	49.65	0.005	7.52	0.82	-176.83
1.1	0.97	172.57	1.23	46.73	0.005	8.74	0.83	-177.16
1.2	0.97	171.78	1.09	44.11	0.004	14.85	0.83	-177.75
1.3	0.97	170.69	0.99	41.19	0.004	18.37	0.84	-177.91
1.4	0.97	169.98	0.92	37.86	0.004	19.30	0.85	-177.84
1.5	0.97	169.45	0.83	35.42	0.004	22.49	0.85	-178.17
1.6	0.97	168.47	0.76	33.22	0.004	29.90	0.86	-178.95
1.7	0.97	167.28	0.71	29.81	0.004	31.37	0.87	-179.28
1.8	0.97	166.48	0.66	27.04	0.005	32.89	0.88	-179.68
1.9	0.97	165.97	0.62	24.75	0.005	33.70	0.88	-179.84
2.0	0.97	164.89	0.58	23.34	0.005	38.45	0.88	179.82
2.1	0.97	164.44	0.54	20.32	0.005	45.04	0.88	179.01
2.2	0.97	163.18	0.51	17.82	0.005	44.92	0.89	178.89
2.3	0.97	162.36	0.48	15.97	0.006	46.66	0.90	178.38
2.4	0.97	161.84	0.46	14.26	0.006	46.37	0.90	177.85
2.5	0.97	160.60	0.44	12.07	0.007	51.17	0.90	177.56
2.6	0.97	159.82	0.42	9.86	0.007	51.61	0.90	177.08
2.7	0.98	158.94	0.40	7.97	0.007	50.63	0.92	176.39
2.8	0.97	157.71	0.39	5.93	0.007	54.85	0.92	175.98
2.9	0.97	156.89	0.37	3.99	0.008	56.10	0.92	175.56
3.0	0.98	156.03	0.36	2.63	0.008	55.04	0.92	175.17
3.1	0.98	154.82	0.35	0.96	0.009	55.78	0.93	174.39
3.2	0.97	153.63	0.34	-1.05	0.009	57.96	0.93	173.73
3.3	0.97	152.37	0.33	-3.21	0.010	57.86	0.93	173.25
3.4	0.98	150.97	0.32	-4.72	0.010	57.02	0.93	172.83
3.5	0.98	149.76	0.32	-6.42	0.011	55.64	0.94	172.05
3.6	0.98	148.13	0.32	-8.35	0.012	56.57	0.94	171.15
3.7	0.97	146.79	0.31	-10.38	0.013	55.08	0.94	170.87
3.8	0.97	144.99	0.31	-12.66	0.014	55.97	0.94	170.18
3.9	0.97	143.15	0.31	-14.38	0.015	54.00	0.94	169.45
4.0	0.96	141.24	0.31	-16.61	0.016	51.63	0.94	168.76
4.1	0.95	139.89	0.31	-18.49	0.017	51.68	0.94	168.32
4.2	0.95	137.84	0.31	-20.60	0.018	48.92	0.94	168.02
4.3	0.94	135.43	0.31	-23.27	0.019	46.75	0.94	167.08
4.4	0.93	133.18	0.31	-25.57	0.020	44.63	0.93	166.53
4.5	0.93	131.16	0.32	-27.85	0.022	43.83	0.93	165.97

MTTF Calculation
– Estimated MTTF –



Ea=1.6eV
Confidence Level=90%

Channel Temp (deg.C)	MTTF (Hours)
160	5.98×10^{7}
180	9.02×10^{6}
200	1.60×10^{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)

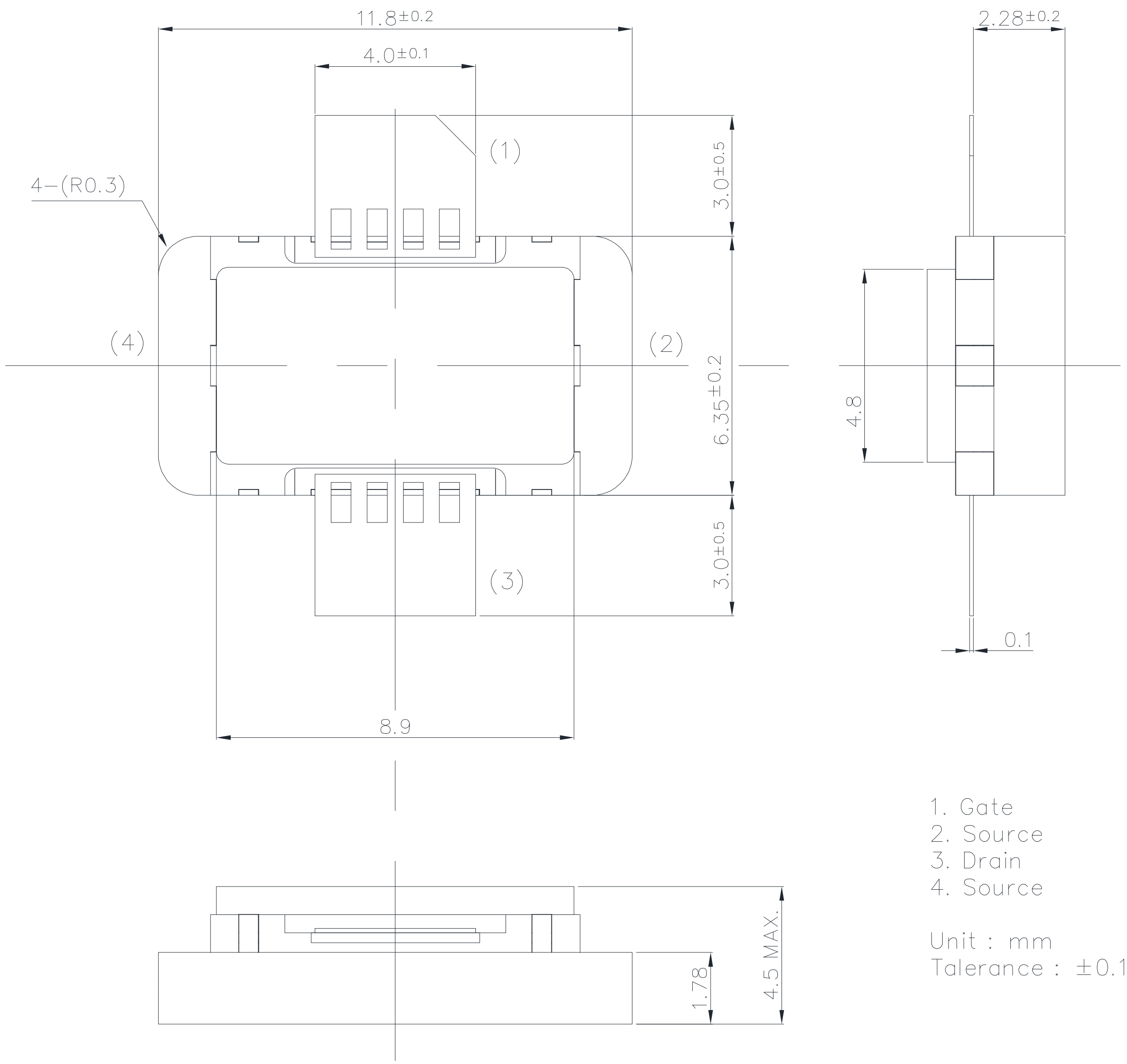
T_{stress}: stress temperature (K)

T_{use}: use temperature (K)

ESD characteristic

Test Methodology	Class
Human Body Model (per JESD22-A114)	2
Machine Model (per JEIA/ESD22-A115)	B
Device Charged Model (per JESD22-C101)	IV

M1H Package Outline
Metal-Ceramic Hermetic Package



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

Unit : mm
Talerance : ±0.15

For Safety, Observe the Following Procedures Environmental Management

- Do not put this product into the mouth.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Respect all applicable laws of the country when discarding this product. This product must be disposed in accordance with methods specified by applicable hazardous waste procedures.

http://www.sedi.co.jp/

ATTENTION
Information in this document is subject to change without notice.