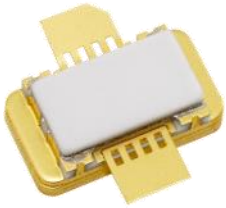
■ Features

- High Voltage Operation : VDS=50V
- High Power : 53.8dBm (typ.) @ Psat
- Proven Reliability



■ Description

Sumitomo Electric'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 from 1.8GHz to 2.0GH W-CDMA and 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}		$\leq$ 55	V
Forward Gate Current	I_{GF}	R_G=5 ohm	$\leq$ 406	mA
Reverse Gate Current	I_{GR}	R_G=5 ohm	$\geq$ -13.8	mA
Channel Temperature	T_{ch}		$\leq$ 200	deg.C
Average Output Power	$P_{ave.}$		$\leq$ 51.0	dBm

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

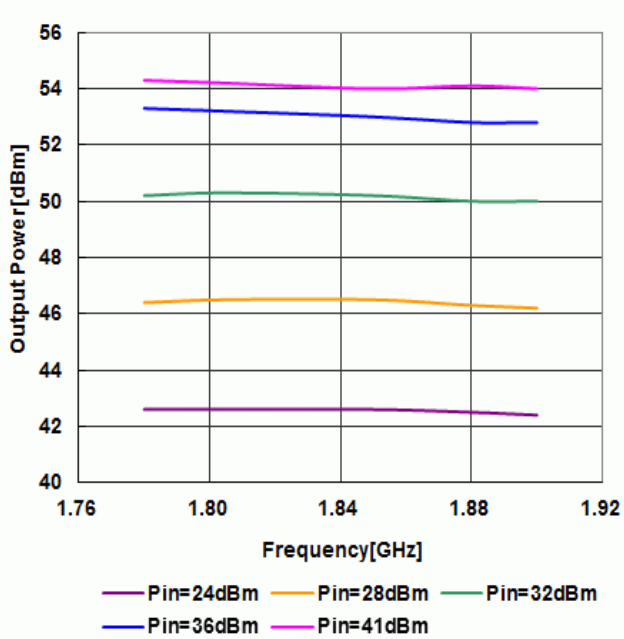
Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V_p	V_{DS}=50V I_{DS}=48mA	-4.0	-	-2.0	V
Saturated Power	Psat *1	V_{DS}=50V $I_{DS(DC)}$=0mA f=1.88GHz	53.2	53.8	-	dBm
Drain Eficiency at Psat	DE *1		50.0	60.0	-	%
Power Gain	Gp *2	V_{DS}=50V $I_{DS(DC)}$=800mA f=1.88GHz	15.5	16.5	-	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=46dBm, CW modulation Signal (W-CDMA)
*3 : Fixed Pin : Pout=P3dB at RL=50ohm, pulsed CW signal(10% duty)

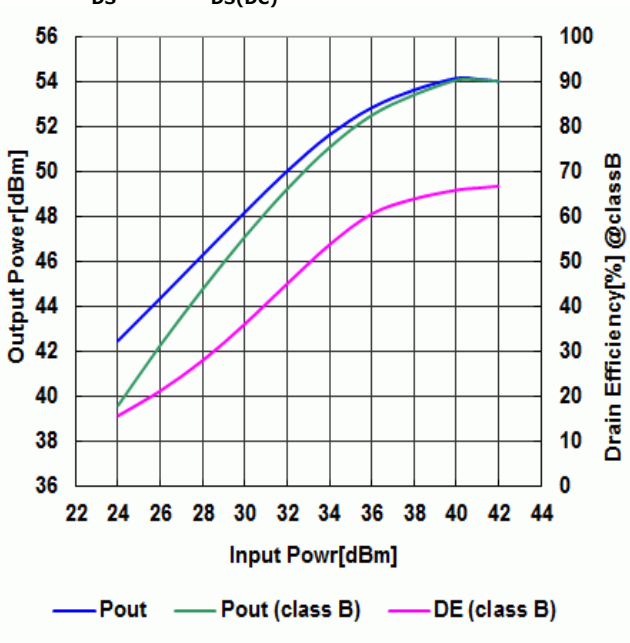
RoHS Compliance	YES

RF characteristics @ f=1.88GHz fine tuned

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

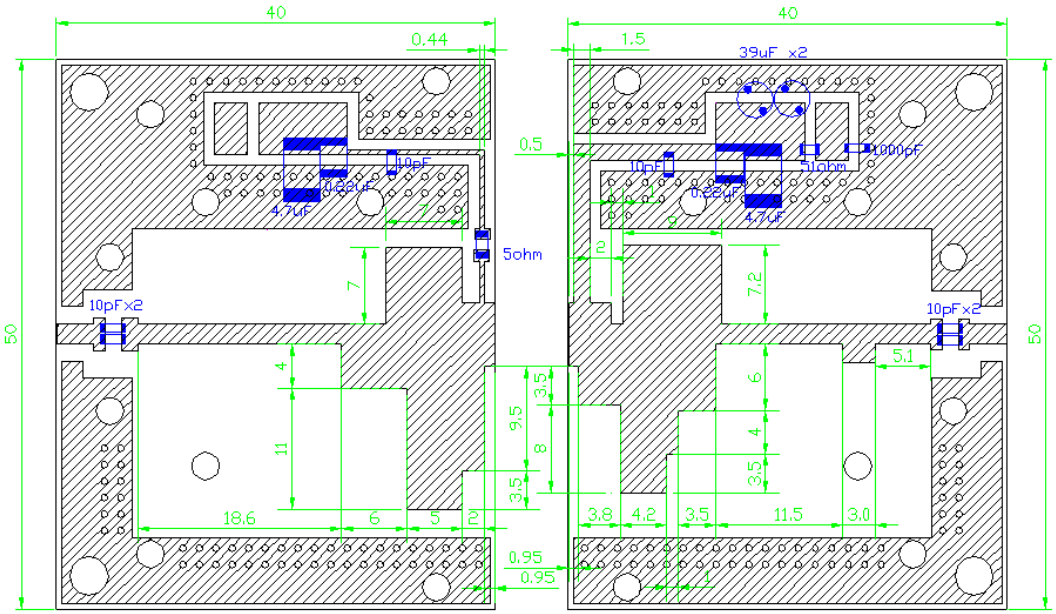


Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V $I_{DS(DC)}$=800mA f=1.88GHz



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

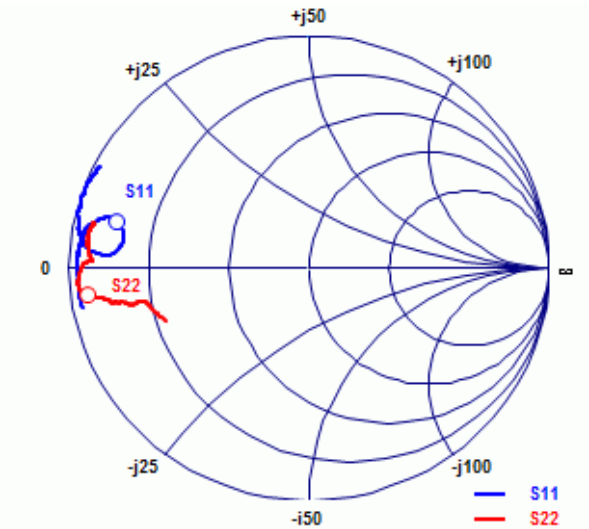
Test Fixture

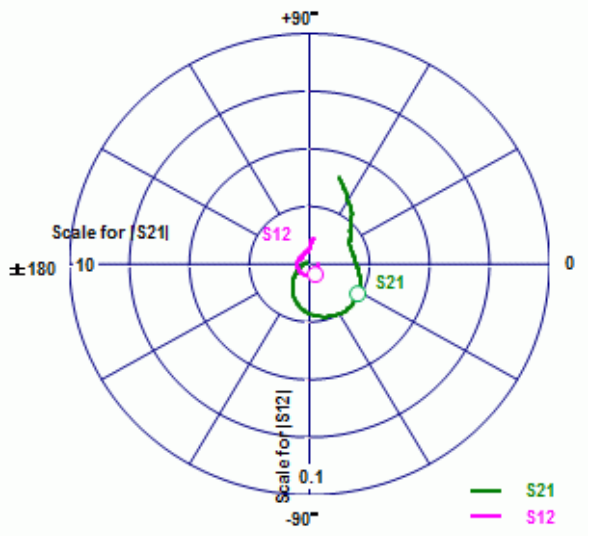


h=0.8mm εr=3.5
Cu=18μm Unit : mm

- Reference DATA -

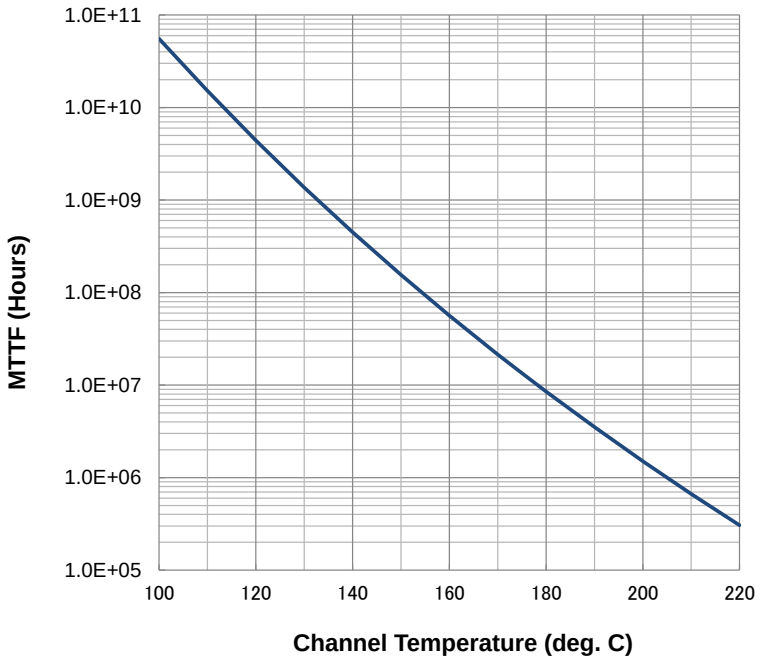
S-Parameters @VDS=50V, IDS(DC)=800mA, f=0.5 to 4.5GHz
Zl = Zs = 50 ohm Marker : 1.84GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.5	0.96	-169.66	4.00	72.07	0.004	7.35	0.64	-159.28
0.6	0.97	-176.75	3.29	61.16	0.004	1.50	0.67	-163.45
0.7	0.97	176.66	2.80	50.41	0.004	-4.67	0.70	-167.99
0.8	0.96	175.44	2.45	45.52	0.004	-5.10	0.72	-168.23
0.9	0.96	174.43	2.24	41.00	0.004	-5.38	0.74	-168.15
1.0	0.96	173.59	2.10	35.76	0.004	-4.31	0.75	-168.02
1.1	0.96	172.65	1.97	30.92	0.004	-3.99	0.77	-168.45
1.2	0.96	171.63	1.87	25.83	0.004	-6.67	0.79	-169.36
1.3	0.95	170.18	1.85	19.92	0.004	-9.23	0.81	-169.37
1.4	0.94	169.34	1.87	13.57	0.004	-12.54	0.83	-169.67
1.5	0.94	168.31	1.90	7.37	0.004	-17.61	0.84	-170.22
1.6	0.91	167.17	1.97	-0.66	0.004	-23.50	0.86	-171.14
1.7	0.88	165.64	2.12	-11.45	0.004	-33.41	0.88	-171.59
1.8	0.85	165.45	2.35	-25.59	0.005	-52.68	0.91	-172.15
1.9	0.80	167.22	2.49	-44.42	0.005	-80.91	0.96	-173.74
2.0	0.78	171.28	2.46	-65.97	0.005	-116.10	0.97	-176.45
2.1	0.82	175.47	2.14	-90.12	0.005	-152.81	0.95	-179.43
2.2	0.87	176.04	1.70	-109.48	0.005	172.92	0.94	179.10
2.3	0.92	175.11	1.31	-122.84	0.005	148.83	0.93	178.32
2.4	0.94	173.93	1.02	-132.89	0.005	132.99	0.92	177.95
2.5	0.96	172.22	0.80	-140.53	0.005	120.98	0.91	177.89
2.6	0.97	170.95	0.64	-147.14	0.005	112.07	0.91	177.62
2.7	0.98	169.83	0.53	-152.17	0.005	106.65	0.91	177.25
2.8	0.98	168.65	0.45	-156.55	0.005	102.53	0.91	176.87
2.9	0.98	167.86	0.38	-160.95	0.005	99.08	0.91	176.61
3.0	0.99	166.90	0.33	-164.13	0.005	98.34	0.92	176.28
3.1	0.99	166.05	0.29	-167.23	0.006	94.50	0.92	175.59
3.2	0.99	165.13	0.26	-170.31	0.006	94.16	0.92	175.07
3.3	0.99	164.27	0.24	-173.64	0.006	92.20	0.93	174.77
3.4	1.00	163.39	0.22	-176.56	0.006	92.47	0.93	174.39
3.5	1.00	162.70	0.20	-179.22	0.007	91.23	0.93	173.59
3.6	1.00	161.61	0.19	177.83	0.007	90.84	0.93	172.72
3.7	0.99	160.82	0.18	174.07	0.007	88.08	0.93	172.47
3.8	0.99	159.83	0.17	170.69	0.008	88.05	0.93	171.75
3.9	1.00	158.81	0.17	167.38	0.008	87.81	0.93	171.09
4.0	0.99	157.91	0.16	163.88	0.009	85.34	0.93	170.37
4.1	0.99	157.31	0.16	160.34	0.009	85.23	0.93	169.93
4.2	0.99	156.30	0.16	156.83	0.009	84.21	0.93	169.54
4.3	0.99	155.07	0.16	152.74	0.010	84.43	0.93	168.62
4.4	0.98	154.14	0.16	148.53	0.011	84.02	0.92	168.12
4.5	0.98	153.32	0.17	144.44	0.011	81.51	0.92	167.60

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)

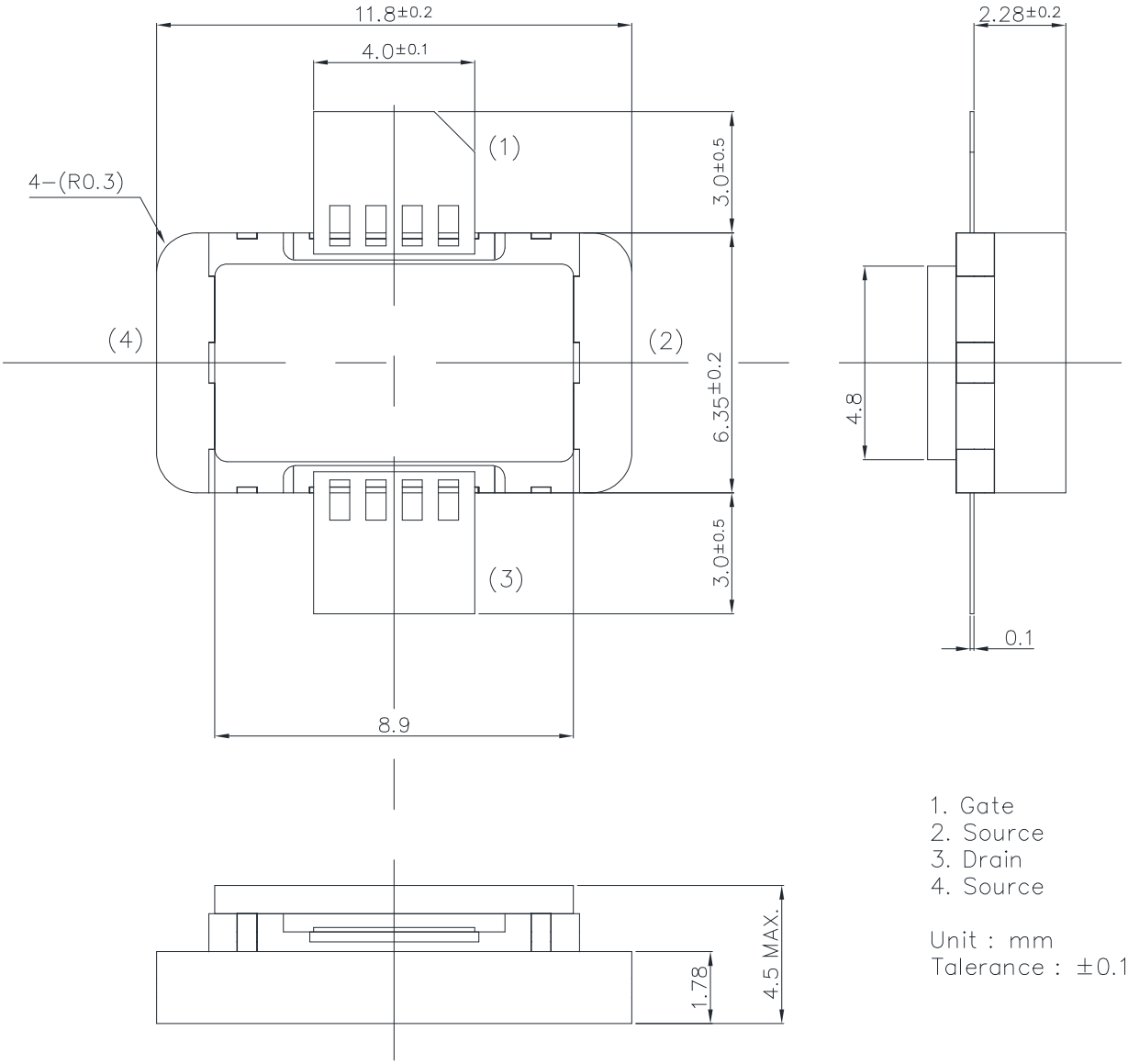
ESD characteristic

Test Methodology	Class
Human Body Model (per JESD22-A114)	1B
Machine Model (per JEIA/ESD22-A115)	A
Device Charged Model (per JESD22-C101)	IV

Ordering Information

Part Number	MOQ / MOU	Tray Style
SGN19H240M1H	No Limitation	30pcs Tray (30 pockets)
SGN19H240M1H/001	No Limitation	JEDEC Tray (100 pockets)

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.

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