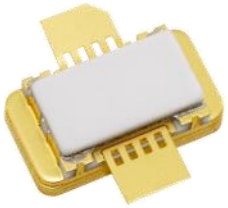
■ Features

- High Voltage Operation : VDS=50V
- High Power : 47dBm (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 3.4GHz to 3.6GHz 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		66.2	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	$\leq$ 50.9	mA
Reverse Gate Current	I_{GR}	R_G=5 ohm	$\geq$ -1.6	mA
Channel Temperature	T_{ch}		$\leq$ 200	deg.C
Average Output Power	$P_{ave.}$		$\leq$ 44.3	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}=10.8mA	-4.0	-	-2.0	V
Saturated Power	Psat *1	V_{DS}=50V	46.0	47.0	-	dBm
Drain Efficiency at Psat	DE *1	$I_{DS(DC)}$=0mA f=3.6GHz	45.0	55.0	-	%
Drain Efficiency	ηD *2	V_{DS}=50V	-	28.0	-	%
Power Gain	Gp *2	$I_{DS(DC)}$=180mA	15.0	17.0	-	dB
Gate-Source Voltage without RF	$V_{GS(DC)}$	f=3.6GHz	-3.0	-	-2.0	V
Thermal Resistance	R_{th}	Channel to Case at 39W P_{DC}	-	2.6	3.4	deg.C/W

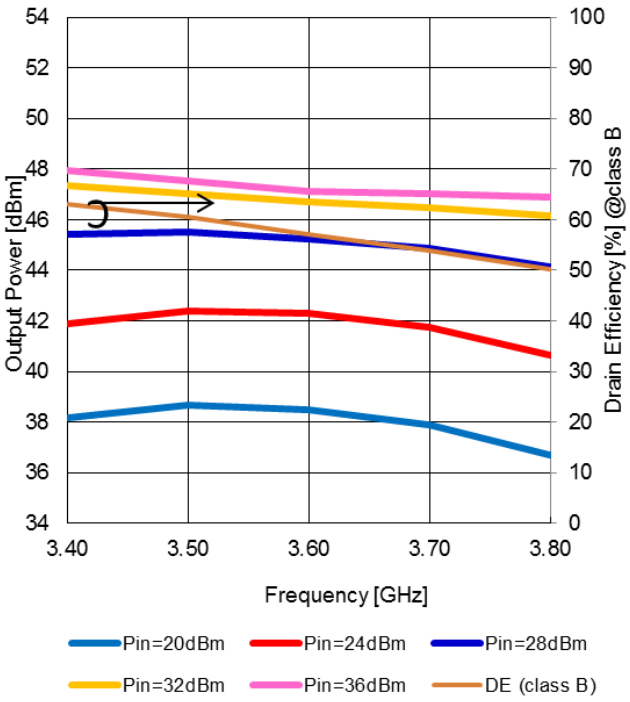
*1 : 10%-duty RF pulse (DC supply constant)

*2 : Pout=39dBm, CW modulation Signal (W-CDMA)

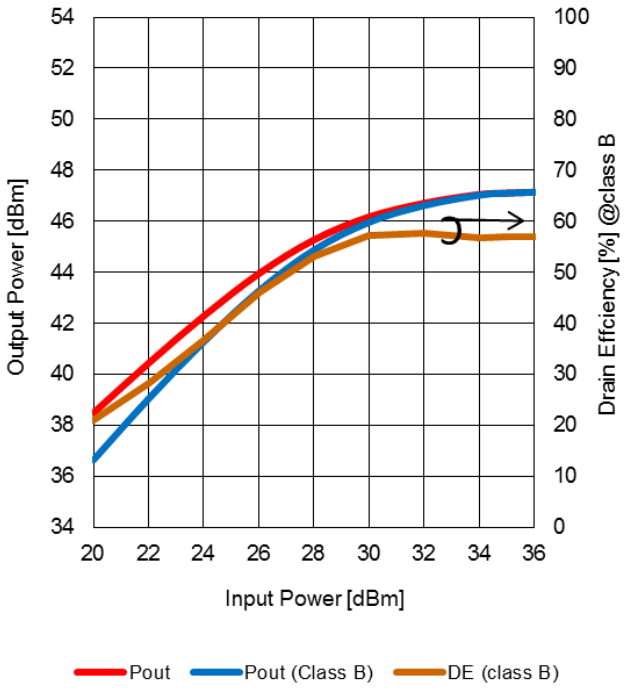
RoHS Compliance	YES

RF characteristics @ f=3.6GHz fine tuned

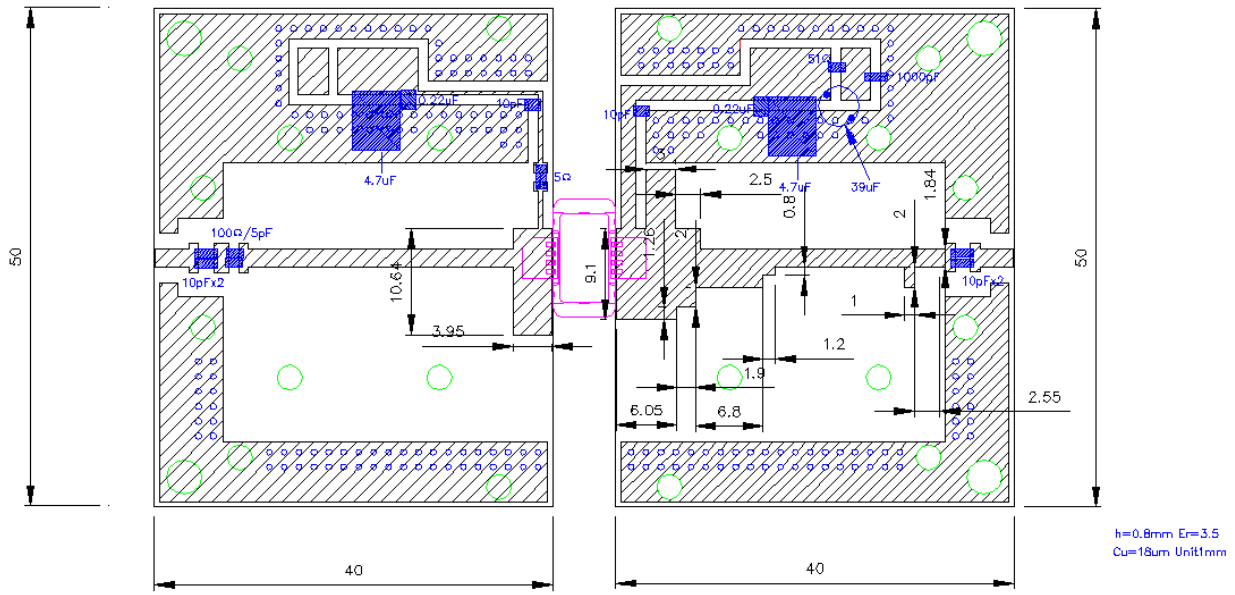
Output Power vs. Frequency
V_{DS}=50V $I_{DS(DC)}$=180mA(class AB), 5mA(class B)



Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V $I_{DS(DC)}$=180mA(class AB), 5mA(class B), f=3.6GHz

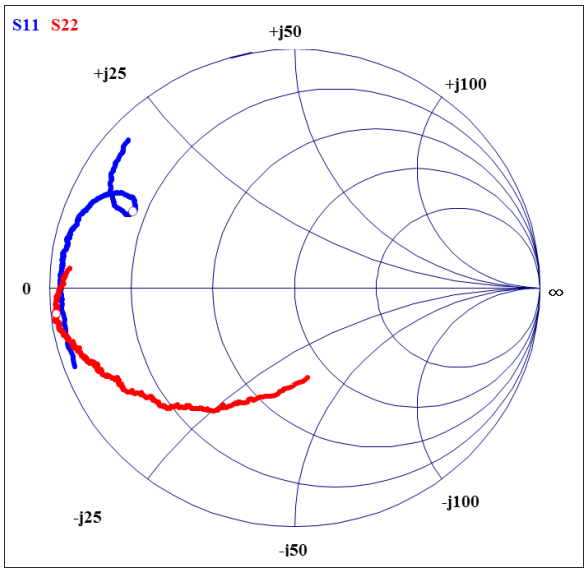


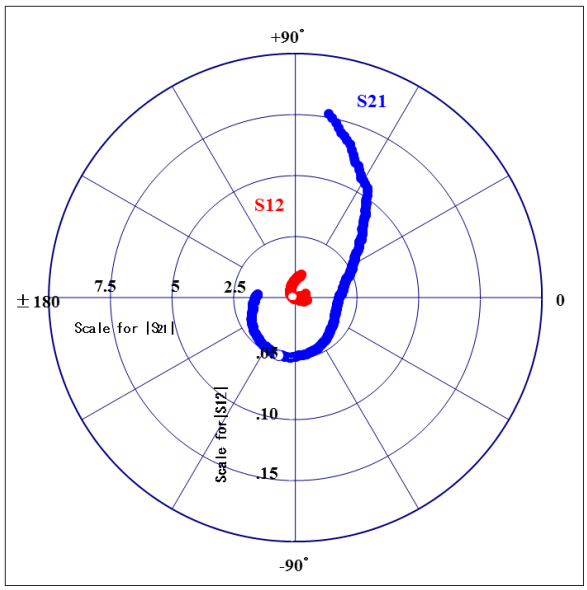
Test Fixture



- Reference DATA -

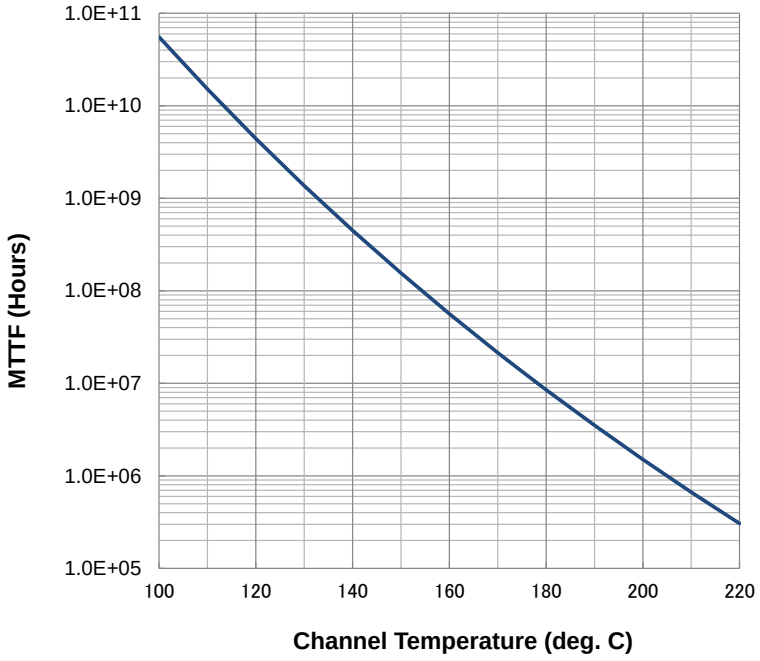
S-Parameters @VDS=50V, IDS(DC)=180mA, f=0.5 to 4.5GHz
Zl = Zs = 50 ohm Marker : 3.6GHz





FREQ.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.95	-159.73	7.62	79.74	0.01	19.97	0.38	-81.84
0.60	0.95	-168.38	6.13	66.92	0.01	3.29	0.43	-96.34
0.70	0.95	-176.54	5.11	54.71	0.01	-5.61	0.50	-109.80
0.80	0.95	-178.44	4.43	49.51	0.01	-22.12	0.53	-115.79
0.90	0.95	179.62	3.88	45.59	0.01	-14.45	0.57	-119.08
1.00	0.96	178.36	3.47	40.90	0.00	-10.55	0.61	-122.26
1.10	0.95	176.96	3.09	36.11	0.00	-6.32	0.64	-127.55
1.20	0.95	175.11	2.81	31.33	0.01	-16.10	0.67	-131.65
1.30	0.95	173.71	2.63	27.32	0.00	-13.11	0.69	-134.11
1.40	0.95	172.73	2.43	23.76	0.01	-21.43	0.72	-136.53
1.50	0.95	171.31	2.23	19.82	0.01	-15.59	0.74	-139.76
1.60	0.94	170.14	2.09	15.69	0.00	-17.22	0.75	-142.57
1.70	0.94	168.95	2.01	11.65	0.00	-28.04	0.76	-144.49
1.80	0.95	167.58	1.98	7.75	0.00	-11.00	0.79	-146.99
1.90	0.94	167.05	1.89	4.63	0.00	-14.70	0.82	-148.66
2.00	0.94	165.75	1.81	1.37	0.00	-3.43	0.82	-151.03
2.10	0.93	164.29	1.77	-3.49	0.00	-4.16	0.83	-152.87
2.20	0.93	162.73	1.76	-7.80	0.00	-3.48	0.85	-154.58
2.30	0.93	161.50	1.75	-11.25	0.00	-7.73	0.86	-156.18
2.40	0.92	160.31	1.75	-15.25	0.00	-8.93	0.87	-157.32
2.50	0.91	158.91	1.76	-19.72	0.00	-4.58	0.88	-158.76
2.60	0.90	157.37	1.79	-24.86	0.00	0.74	0.89	-159.37
2.70	0.90	156.12	1.84	-29.70	0.00	4.79	0.90	-161.51
2.80	0.88	154.32	1.91	-35.27	0.00	-14.05	0.91	-162.36
2.90	0.86	152.99	1.95	-41.22	0.00	-9.49	0.91	-163.96
3.00	0.84	152.26	2.05	-48.24	0.00	-21.06	0.94	-164.74
3.10	0.82	150.98	2.16	-55.10	0.00	-18.25	0.94	-166.07
3.20	0.79	150.50	2.26	-64.15	0.00	-43.55	0.96	-167.62
3.30	0.76	150.19	2.34	-73.46	0.00	-55.70	0.96	-168.84
3.40	0.74	151.40	2.41	-84.96	0.00	-78.78	0.97	-170.38
3.50	0.73	152.87	2.48	-95.04	0.00	-105.95	0.99	-171.77
3.60	0.73	154.12	2.46	-105.81	0.00	154.06	0.98	-173.68
3.70	0.75	155.60	2.36	-117.95	0.00	138.15	0.97	-175.00
3.80	0.78	155.33	2.26	-129.55	0.01	133.47	0.97	-176.55
3.90	0.81	154.74	2.17	-140.52	0.01	117.89	0.97	-178.07
4.00	0.84	152.48	2.04	-148.50	0.01	111.91	0.96	-179.23
4.10	0.86	150.57	1.90	-156.53	0.01	101.02	0.95	179.88
4.20	0.89	147.71	1.76	-164.30	0.01	93.83	0.95	178.61
4.30	0.90	144.34	1.66	-173.53	0.01	84.26	0.94	177.19
4.40	0.90	140.67	1.60	179.88	0.02	78.99	0.93	175.91
4.50	0.92	137.47	1.52	175.10	0.02	73.46	0.92	174.87

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)

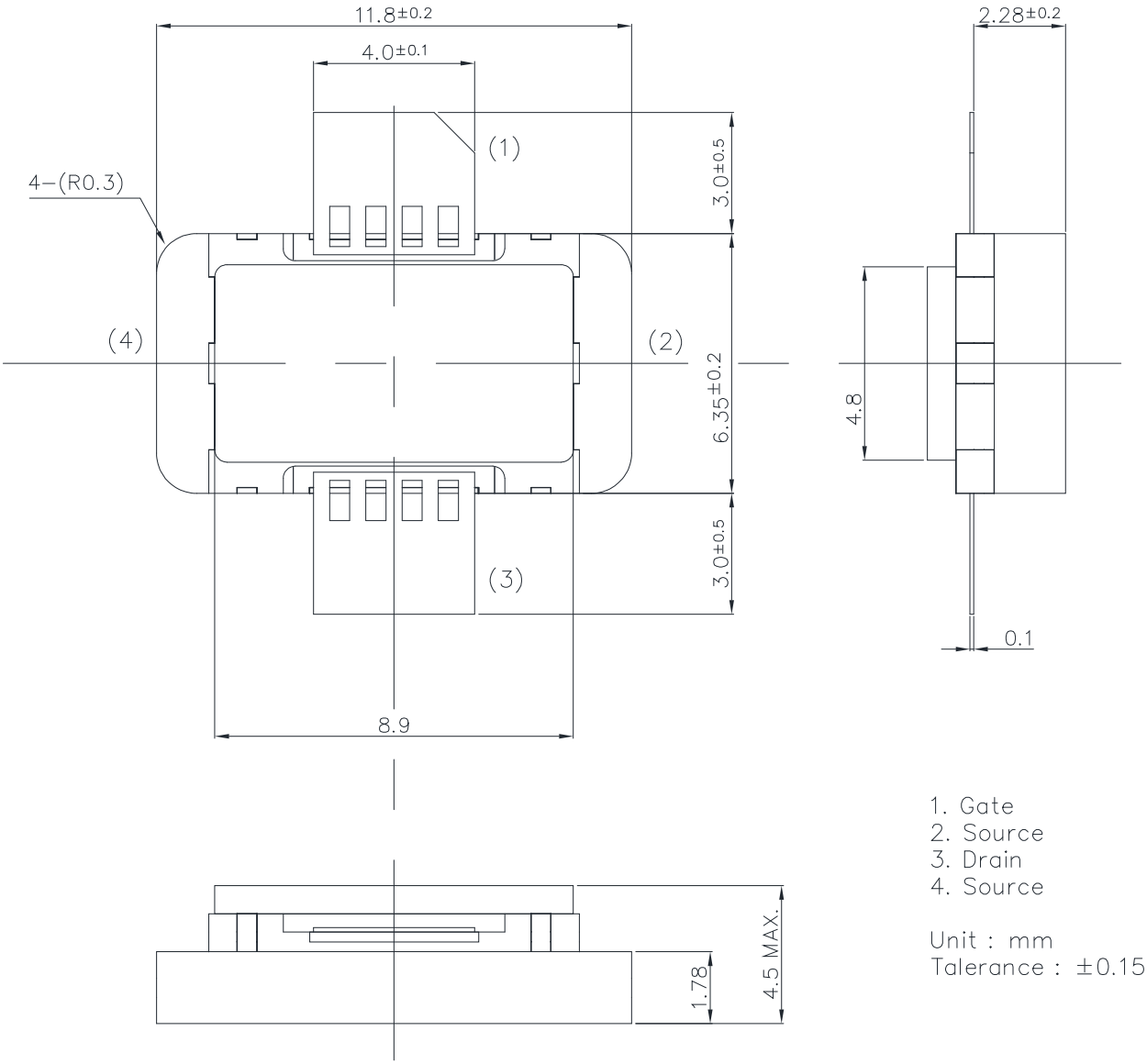
T_{stress}: stress temperature (K)

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

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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