■ Features

- High Voltage Operation : VDS=50V
- High Power : 50.8dBm (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 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 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		112.5	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	$\leq$ 95	mA
Reverse Gate Current	I_{GR}	R_G=5 ohm	$\geq$ -3.5	mA
Channel Temperature	T_{ch}		$\leq$ 200	deg.C
Average Output Power	$P_{ave.}$		$\leq$ 47.5	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}=24mA	-4.0	-	-2.0	V
Saturated Power	Psat *1	V_{DS}=50V	49.5	50.8	-	dBm
Drain Eficiency at Psat	DE *1	$I_{DS(DC)}$=0mA f=3.6GHz	45.0	55.0	-	%
Power Gain	Gp *2	$I_{DS(DC)}$=400mA	13.5	15.0	-	dB
Thermal Resistance	R_{th}	Channel to Case at 52.5W P_{DC}	-	1.7	2.0	deg.C/W

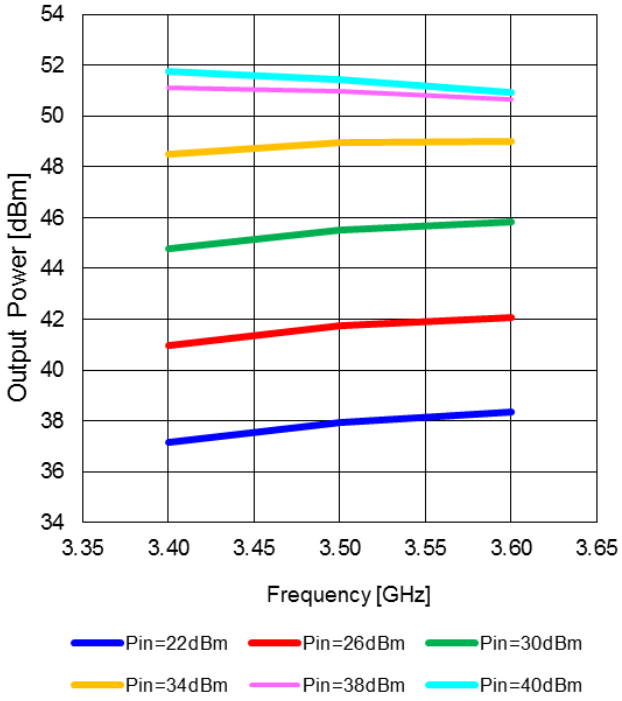
*1 : 10%-duty RF pulse (DC supply constant)

*2 : Pout=43dBm, CW modulation Signal (W-CDMA)

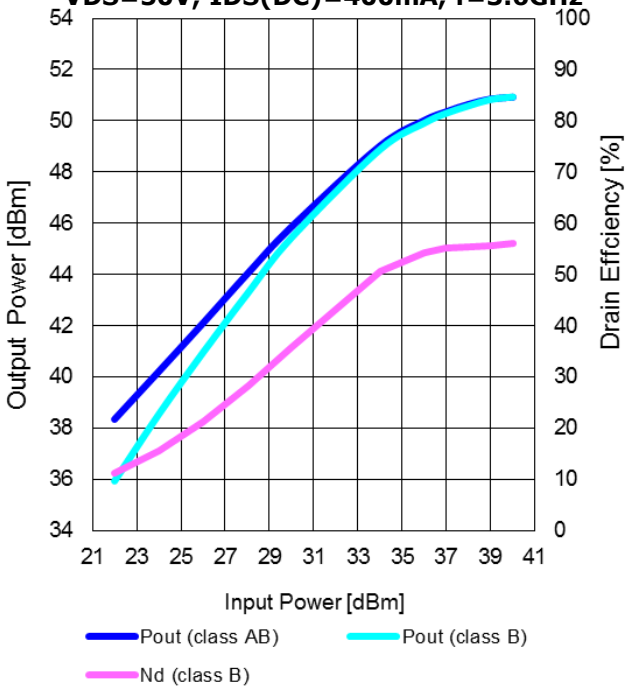
RoHS Compliance	YES

RF characteristics @ f=3.6GHz fine tuned

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

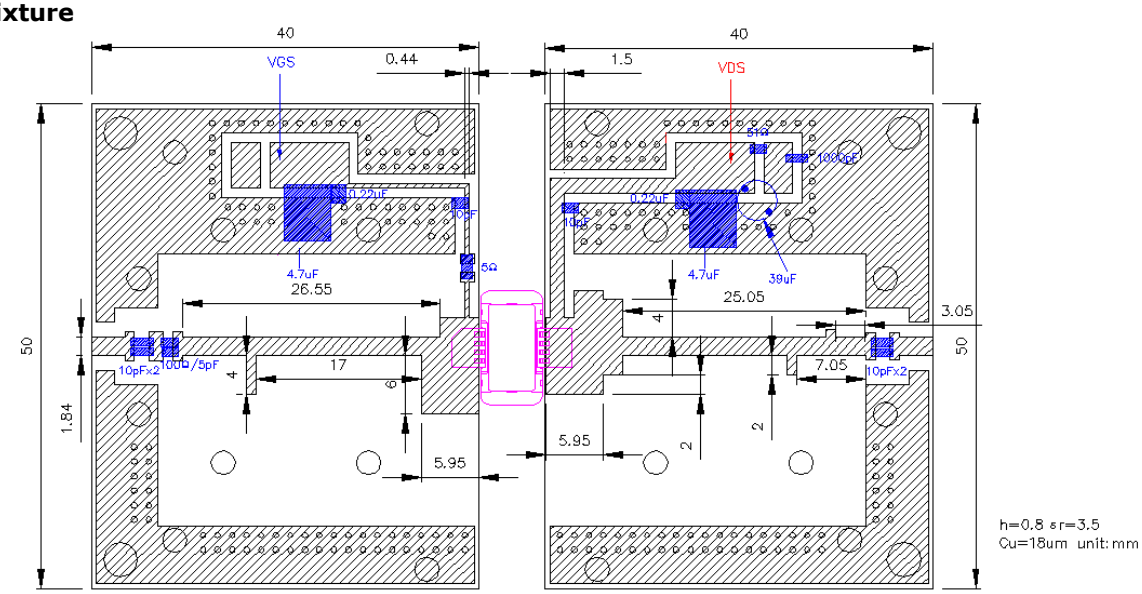


Output Power and Drain Efficiency vs. Input Power
VDS=50V, IDS(DC)=400mA, f=3.6GHz



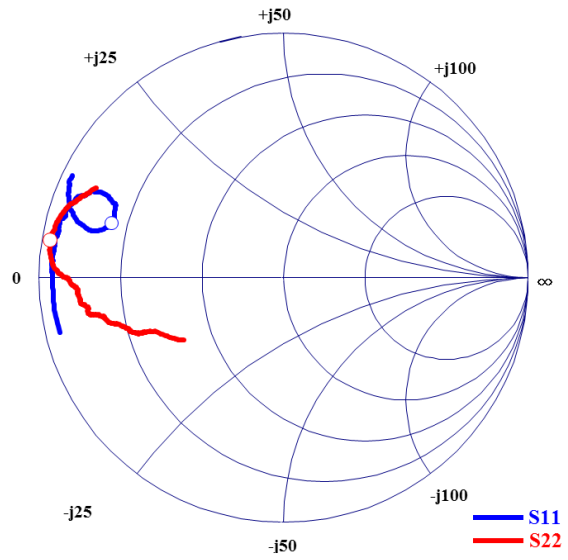
Pulse Signal (10%-duty, DC : constant)

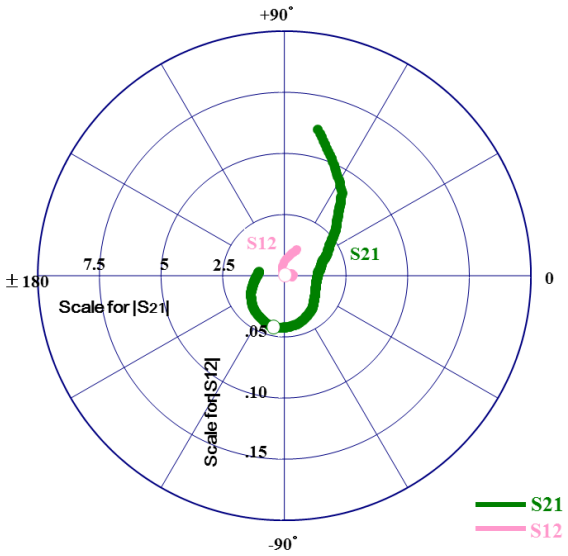
Test Fixture



- Reference DATA -

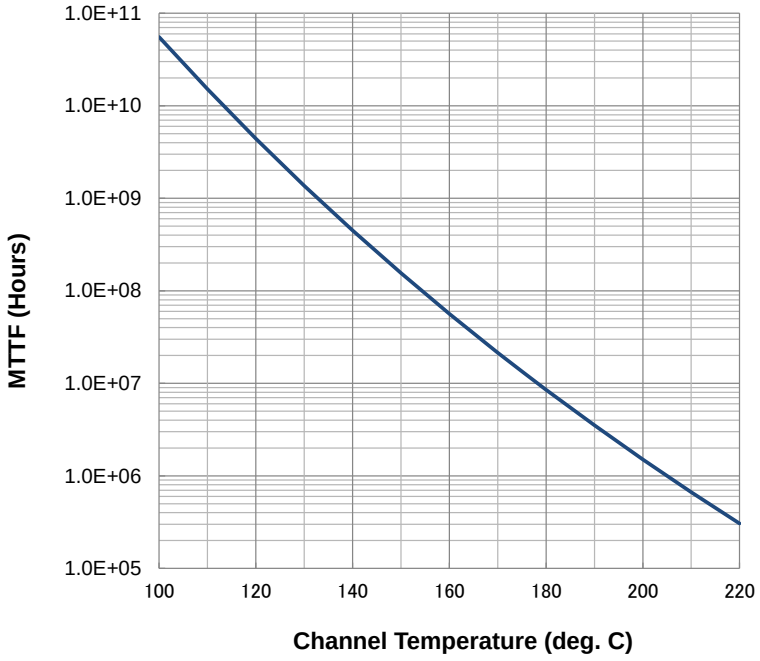
S-Parameters @VDS=50V, IDS(DC)=400mA, f=0.5 to 4.5GHz
Zl = Zs = 50ohm Marker : 3.60GHz





FREQ.	S11		S21		S12		S22	
(GHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.94	-166.30	6.12	77.09	0.01	5.68	0.48	-147.95
0.60	0.95	-174.06	4.94	65.78	0.01	-2.54	0.53	-152.45
0.70	0.94	178.79	4.10	54.77	0.01	-8.54	0.57	-157.29
0.80	0.95	177.52	3.52	50.48	0.01	-9.31	0.59	-158.24
0.90	0.95	176.29	3.11	46.06	0.01	-8.45	0.62	-158.66
1.00	0.95	175.04	2.79	41.30	0.01	-9.52	0.64	-159.37
1.10	0.95	174.16	2.48	37.43	0.01	-6.17	0.66	-161.13
1.20	0.95	173.19	2.23	33.57	0.01	-6.91	0.68	-162.97
1.30	0.94	171.98	2.05	29.57	0.01	-3.22	0.70	-164.36
1.40	0.95	171.20	1.91	25.57	0.00	-2.03	0.72	-165.08
1.50	0.95	170.69	1.76	22.46	0.00	0.35	0.74	-166.55
1.60	0.94	169.77	1.65	19.43	0.00	5.69	0.75	-167.94
1.70	0.94	168.28	1.57	15.52	0.00	8.77	0.77	-168.54
1.80	0.95	167.55	1.52	12.02	0.01	10.12	0.79	-168.93
1.90	0.94	166.68	1.46	8.44	0.00	16.78	0.81	-169.52
2.00	0.94	165.77	1.41	6.11	0.01	17.04	0.81	-170.57
2.10	0.94	165.09	1.39	1.98	0.01	20.42	0.81	-171.60
2.20	0.93	163.70	1.37	-2.02	0.01	19.13	0.83	-172.44
2.30	0.93	162.78	1.34	-5.42	0.01	19.83	0.84	-174.05
2.40	0.93	162.00	1.35	-9.00	0.01	19.15	0.84	-175.20
2.50	0.92	160.85	1.34	-13.16	0.01	21.93	0.84	-176.46
2.60	0.91	160.11	1.36	-17.59	0.01	21.89	0.85	-177.45
2.70	0.91	158.94	1.39	-21.87	0.01	19.64	0.87	-178.53
2.80	0.90	158.16	1.43	-26.82	0.01	19.31	0.88	-179.50
2.90	0.88	157.38	1.49	-32.14	0.01	17.29	0.88	-179.95
3.00	0.87	156.04	1.57	-37.96	0.01	11.86	0.90	179.75
3.10	0.85	155.52	1.68	-45.02	0.01	9.23	0.91	179.05
3.20	0.81	154.86	1.82	-53.62	0.01	4.96	0.92	178.41
3.30	0.78	155.42	1.94	-63.77	0.01	-0.50	0.94	177.35
3.40	0.75	156.52	2.07	-75.08	0.00	-8.97	0.95	176.04
3.50	0.74	159.33	2.13	-88.15	0.00	-13.11	0.96	173.61
3.60	0.74	162.33	2.13	-101.94	0.00	39.79	0.97	170.80
3.70	0.77	164.98	2.01	-116.15	0.00	110.09	0.96	168.44
3.80	0.81	166.28	1.87	-129.24	0.01	109.09	0.95	165.83
3.90	0.85	165.30	1.69	-140.66	0.01	101.50	0.94	163.78
4.00	0.88	164.05	1.52	-150.91	0.01	93.72	0.93	161.87
4.10	0.91	162.34	1.36	-159.79	0.01	86.43	0.92	160.59
4.20	0.93	160.43	1.24	-167.48	0.02	81.61	0.90	159.68
4.30	0.95	158.27	1.14	-174.87	0.02	74.50	0.89	157.96
4.40	0.96	156.36	1.06	178.45	0.02	68.60	0.87	156.50
4.50	0.96	154.10	1.01	172.04	0.02	64.20	0.85	154.33

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)

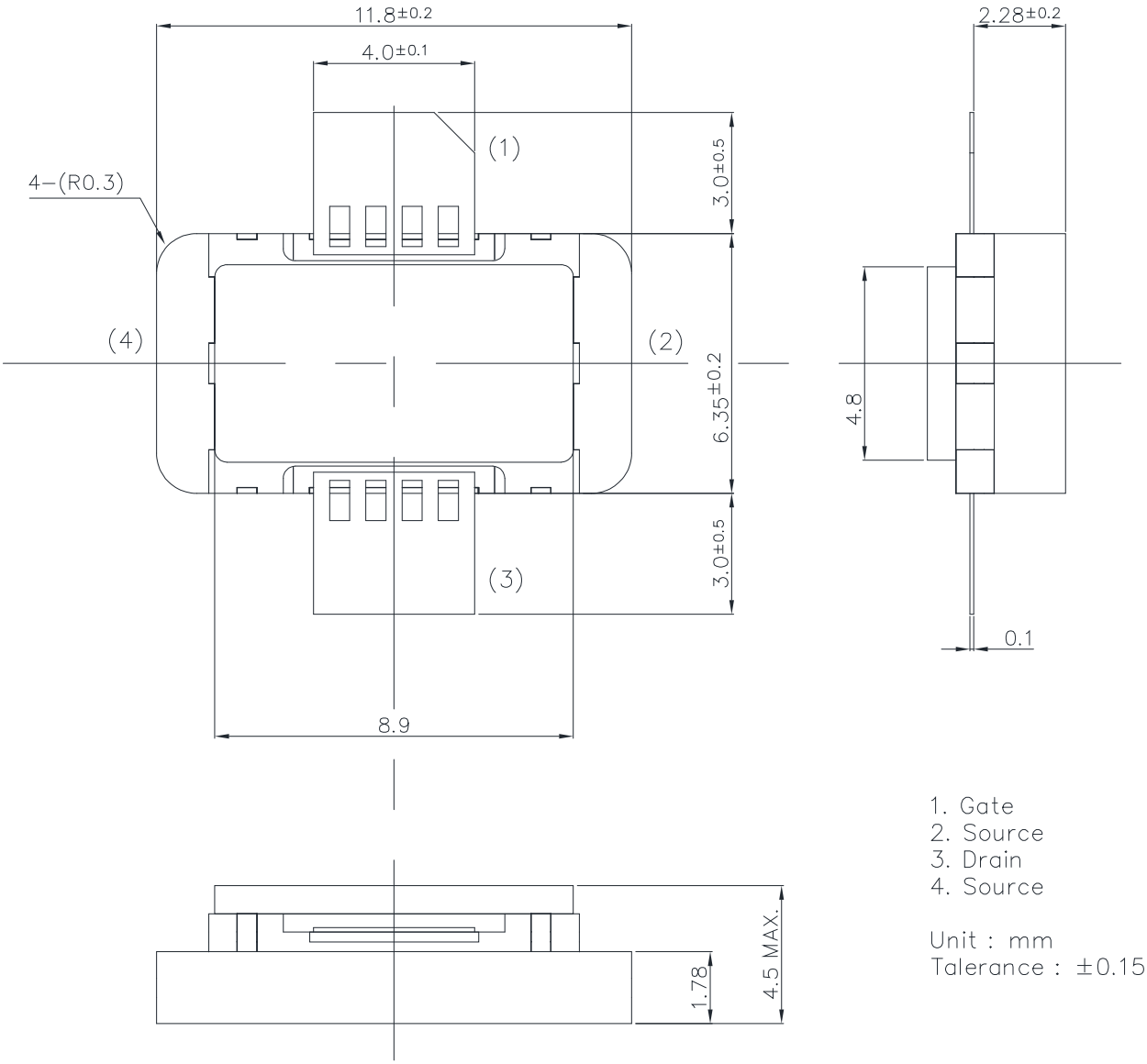
T_{stress}: stress temperature (K)

T_{use}: use temperature (K)

ESD characteristic

Test Methodology	Class
Human Body Model (per JESD22-A114)	1A
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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