■ Features

- High Voltage Operation : VDS=50V
- High Power : 52.6dBm (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 2.0GHz 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		132	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	$\leq$ 142	mA
Reverse Gate Current	I_{GR}	R_G=5 ohm	$\geq$ -5.2	mA
Channel Temperature	T_{ch}		$\leq$ 200	deg.C
Average Output Power	$P_{ave.}$		$\leq$ 49.5	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}=36mA	-4.0	-	-2.0	V
Saturated Power	Psat *1	V_{DS}=50V	51.8	52.6	-	dBm
Drain Efficiency	ηD *2	$I_{DS(DC)}$=600mA	26	31.5	-	%
Power Gain	Gp *2	f=1.88GHz	15.5	16.5	-	dB
Drain Efficiency at Psat	DE *1	$I_{DS(DC)}$=0mA f=1.88GHz	56	65	-	%
Thermal Resistance	R_{th}	Channel to Case at 78W P_{DC}	-	1.4	1.6	deg.C/W

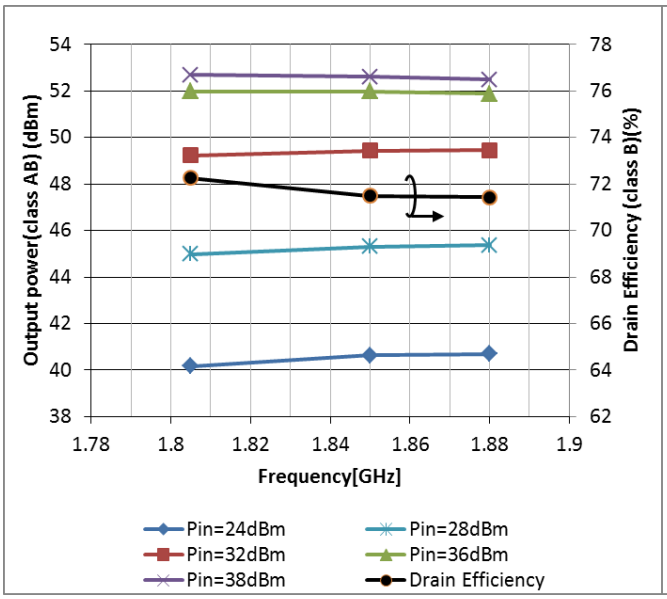
*1 : 10%-duty RF pulse (DC supply constant)

*2 : Pout=44.5dBm, CW modulation Signal (W-CDMA)

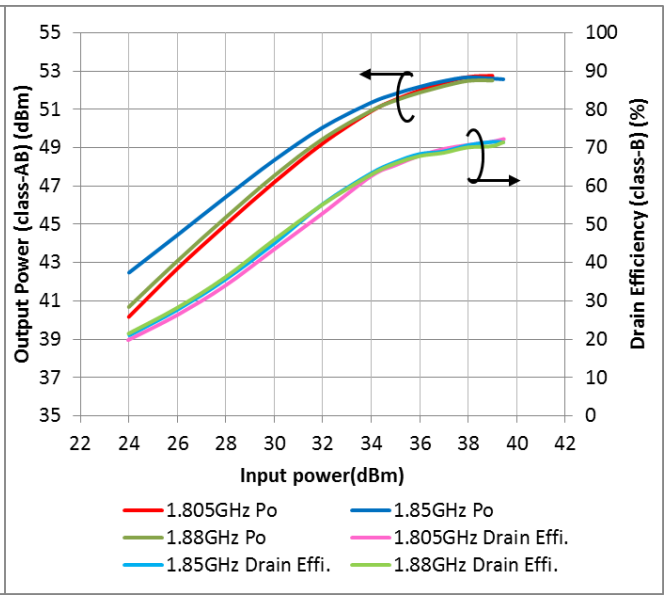
RoHS Compliance	YES

RF characteristics

Output Power vs. Frequency
V_{DS}=50V $I_{DS(DC)}$=600mA(class AB), 5mA(class B)

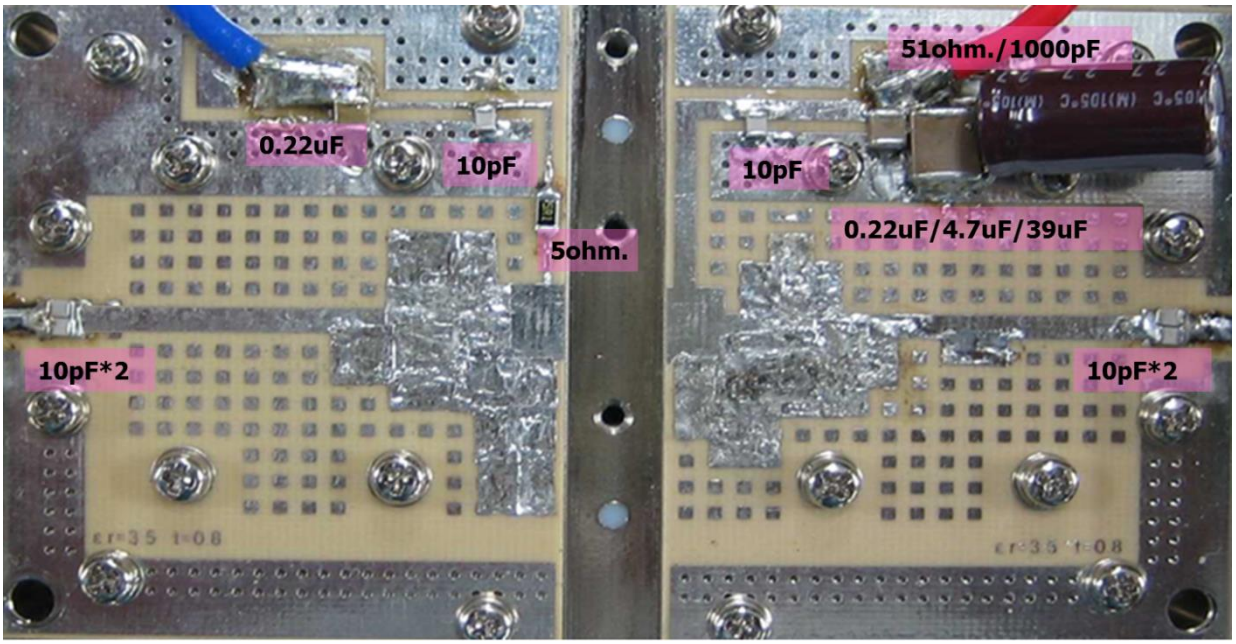


Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V $I_{DS(DC)}$=600mA (class AB), 5mA(class B)



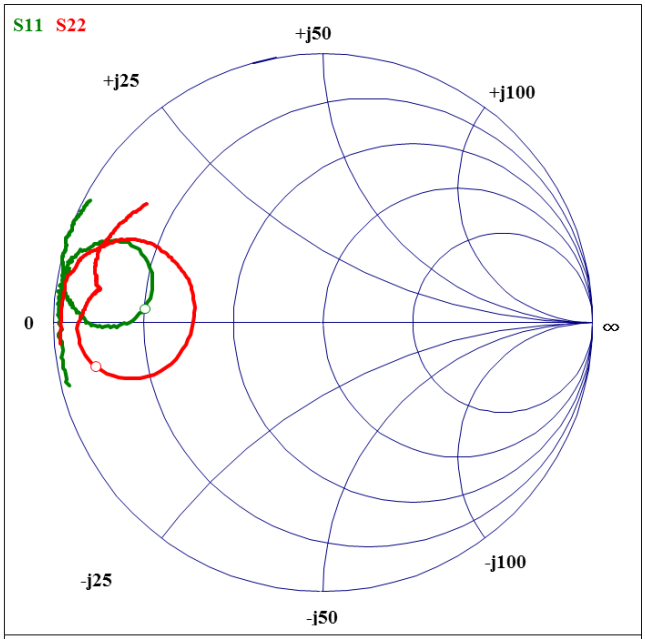
Pulse Signal (10%-duty, DC : constant)

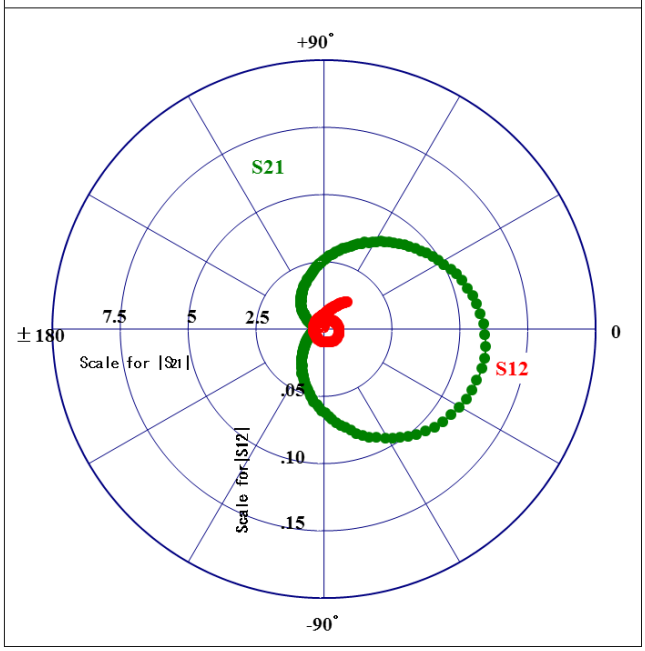
Test Fixture



- Reference DATA -

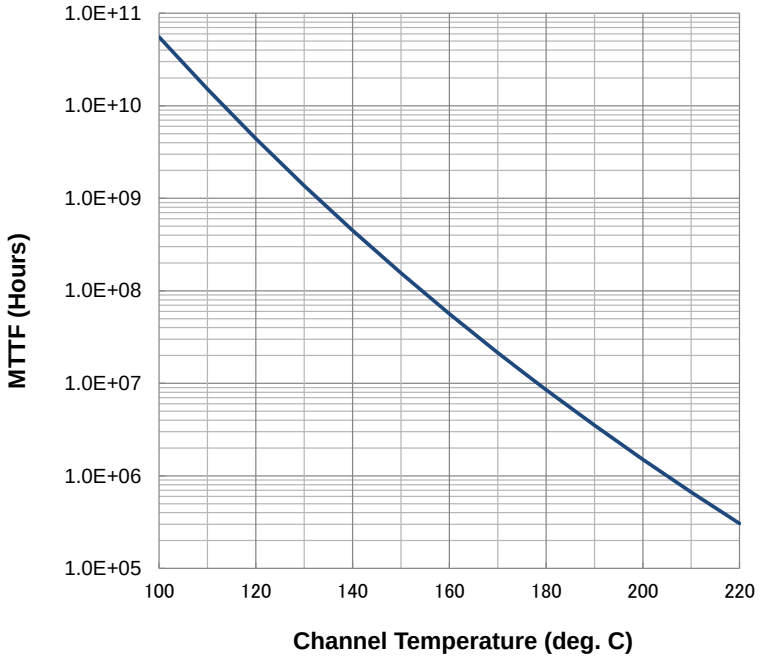
S-Parameters @V_{DS}=50V, $I_{DS(DC)}$=600mA, f=0.5 to 4.5GHz
Zl = Zs = 50 ohm Marker : 1.9GHz





FREQ.	S11		S21		S12		S22	
(GHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.97	-166.11	0.38	156.24	0.00	81.27	0.98	-175.38
0.60	0.97	-174.04	0.60	155.26	0.00	87.40	0.97	177.62
0.70	0.98	178.38	0.78	146.51	0.00	88.19	0.97	170.30
0.80	0.98	177.27	0.94	142.44	0.00	88.63	0.94	167.91
0.90	0.98	175.93	1.13	136.17	0.00	84.43	0.93	165.43
1.00	0.98	174.66	1.34	128.29	0.00	80.58	0.90	162.70
1.10	0.99	173.12	1.58	120.16	0.00	77.31	0.86	160.47
1.20	0.98	171.52	1.83	110.88	0.01	69.83	0.82	158.04
1.30	0.98	169.49	2.18	99.82	0.01	65.18	0.75	156.07
1.40	0.97	167.96	2.65	87.16	0.01	56.57	0.68	155.34
1.50	0.97	165.43	3.20	71.96	0.01	45.13	0.59	157.91
1.60	0.92	162.95	3.94	55.24	0.01	28.33	0.51	164.60
1.70	0.84	158.81	4.94	31.07	0.01	5.30	0.48	-178.87
1.80	0.70	159.87	5.95	-2.20	0.01	-35.72	0.63	-163.34
1.90	0.66	175.49	5.49	-41.79	0.01	-93.23	0.86	-169.11
2.00	0.78	-179.21	4.07	-72.90	0.01	-148.07	0.91	-178.78
2.10	0.86	-179.76	2.84	-95.02	0.01	171.88	0.88	175.84
2.20	0.92	177.27	2.03	-110.76	0.01	141.57	0.87	174.09
2.30	0.94	175.56	1.52	-121.87	0.01	124.56	0.86	172.69
2.40	0.96	173.89	1.16	-130.79	0.01	112.54	0.85	171.90
2.50	0.97	172.26	0.92	-138.29	0.01	104.75	0.84	171.69
2.60	0.98	171.08	0.74	-145.15	0.01	98.60	0.84	171.03
2.70	0.98	169.73	0.62	-151.03	0.01	93.91	0.85	170.41
2.80	0.98	168.38	0.52	-156.41	0.01	87.98	0.86	169.31
2.90	0.99	167.63	0.44	-161.57	0.01	86.59	0.86	168.62
3.00	1.00	166.71	0.38	-165.87	0.01	83.09	0.86	168.00
3.10	1.00	165.86	0.33	-170.27	0.01	81.27	0.87	166.78
3.20	0.99	164.57	0.30	-174.69	0.01	79.58	0.87	165.92
3.30	1.00	163.63	0.27	-178.93	0.01	77.15	0.87	164.92
3.40	1.00	162.77	0.25	176.62	0.01	74.62	0.87	164.21
3.50	1.00	162.02	0.23	172.73	0.01	73.82	0.88	162.88
3.60	1.00	160.87	0.21	167.65	0.02	71.25	0.87	161.04
3.70	1.00	159.98	0.20	162.66	0.02	67.21	0.86	160.13
3.80	1.00	159.00	0.19	158.06	0.02	67.73	0.86	158.68
3.90	1.00	158.06	0.18	152.96	0.02	63.97	0.85	156.96
4.00	0.99	157.12	0.17	147.63	0.02	61.54	0.84	155.00
4.10	0.99	156.36	0.16	142.58	0.02	60.31	0.83	153.27
4.20	0.99	155.34	0.16	137.86	0.02	58.40	0.83	152.12
4.30	0.99	154.08	0.15	132.87	0.02	56.33	0.82	149.99
4.40	0.98	153.29	0.14	126.72	0.02	52.52	0.80	148.19
4.50	0.98	152.29	0.14	122.35	0.03	48.92	0.79	145.94

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)

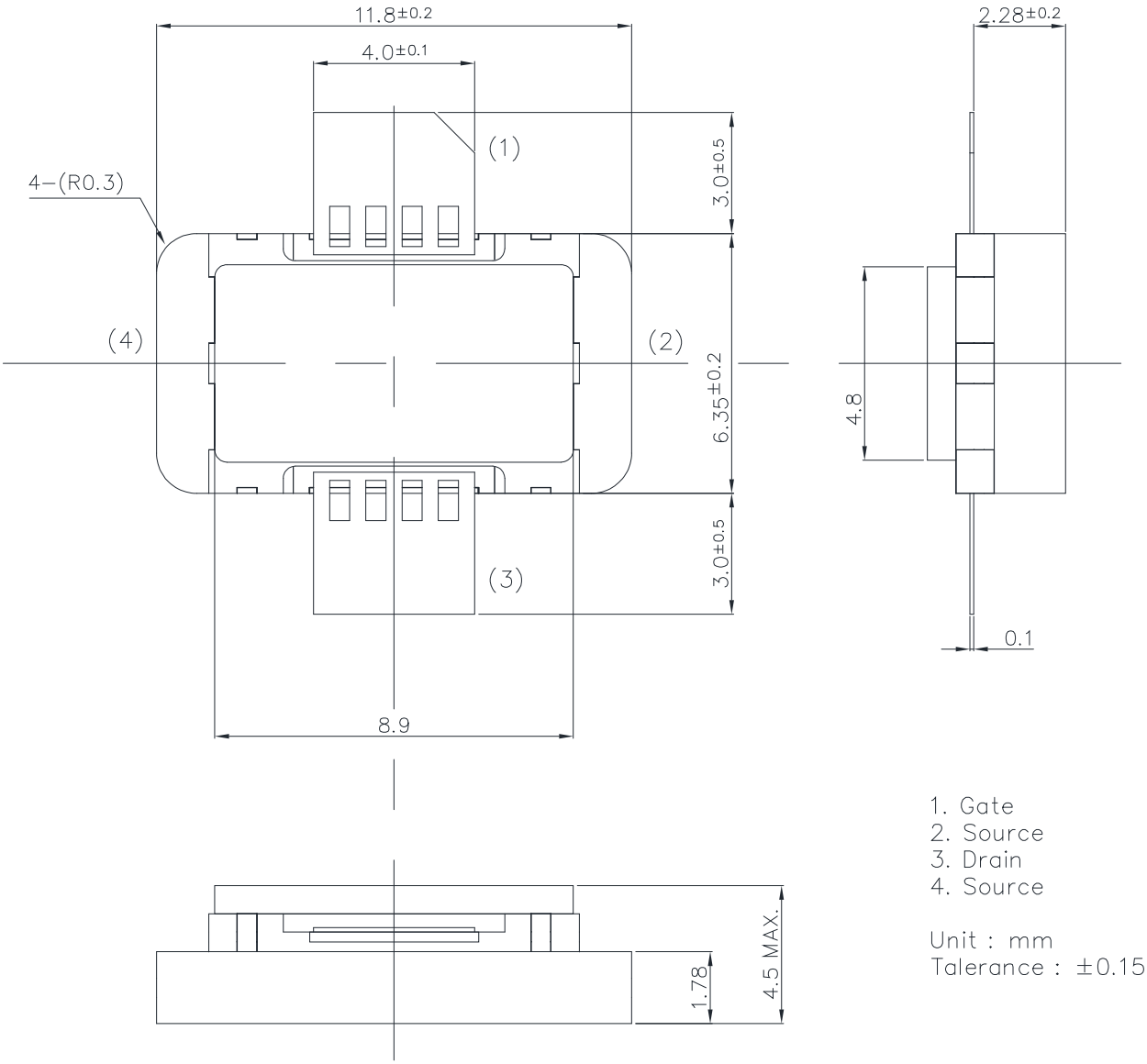
T_{stress}: stress temperature (K)

T_{use}: use temperature (K)

ESD characteristic

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

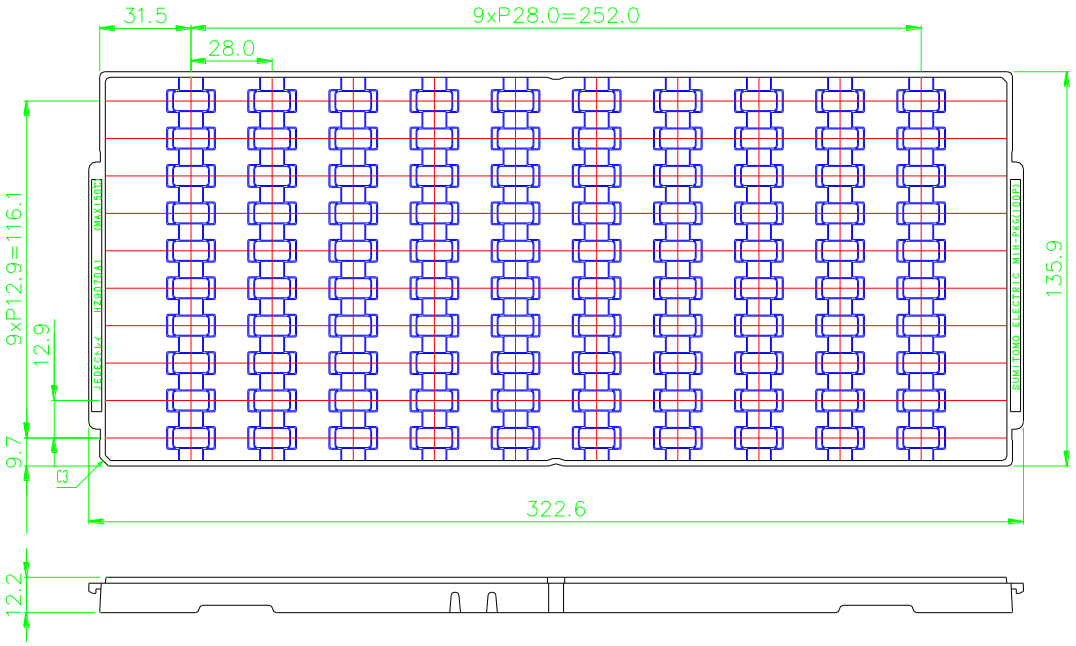
M1H Package Outline
Metal-Ceramic Hermetic Package



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

Unit : mm
Talerance : ±0.15

TRAY SIZE : M1H



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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