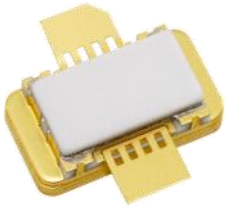
■ Features

- High Voltage Operation : VDS=50V
- High Power : 52.6dBm (typ.) @ Psat
- Proven Reliability
- High impedance with output matched device



■ 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 2.2GHz 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	-	%
Power Gain	Gp *2	f=2.17GHz	15	16	-	dB
Drain Efficiency at Psat	DE *1	$I_{DS(DC)}$=0mA f=2.17GHz	55	62	-	%
Thermal Resistance	R_{th}	Channel to Case at 78W P_{DC}	-	1.4	1.6	deg.C/W

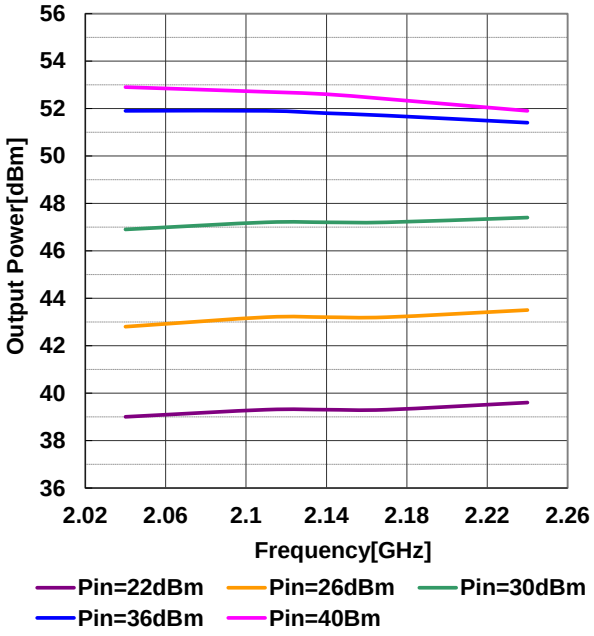
*1 : 10%-duty RF pulse (DC supply constant)

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

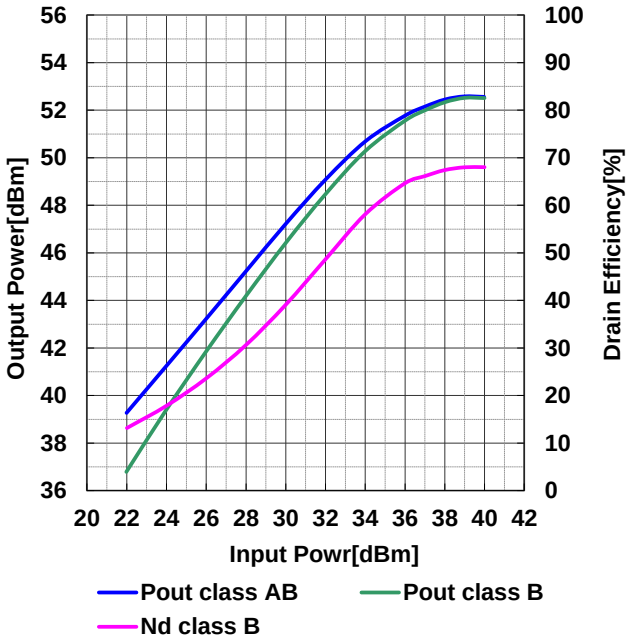
RoHS Compliance	YES

RF characteristics @ f=2.14GHz fine tuned

Output Power vs. Frequency
V_{DS}=50V $I_{DS(DC)}$=600mA

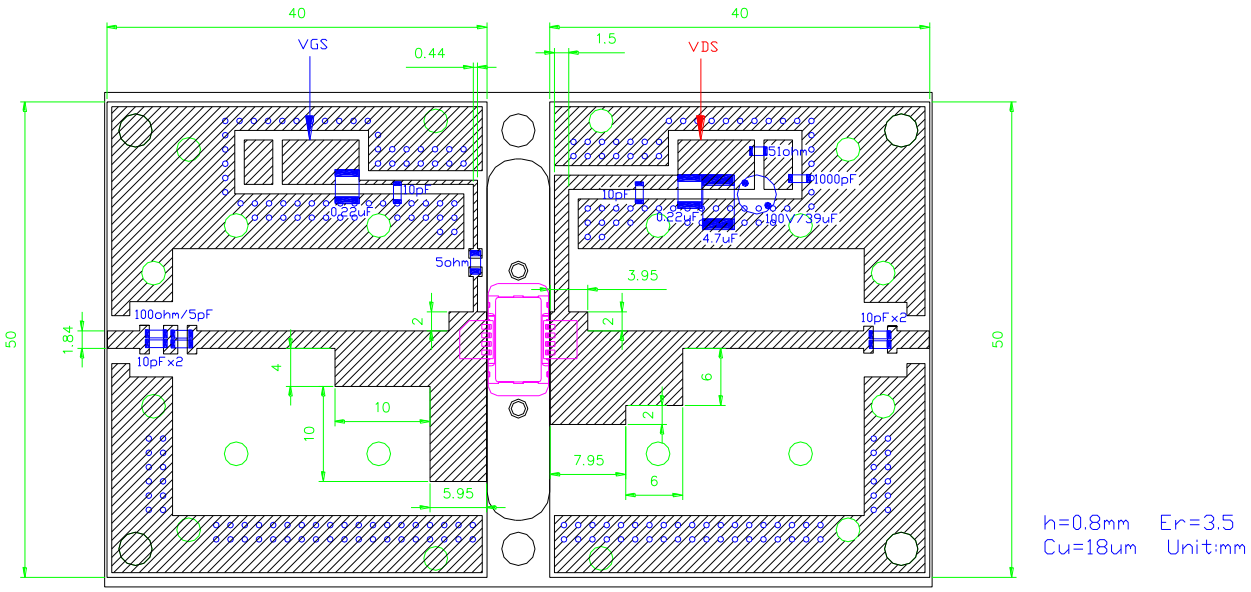


Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V $I_{DS(DC)}$=600mA f=2.14GHz



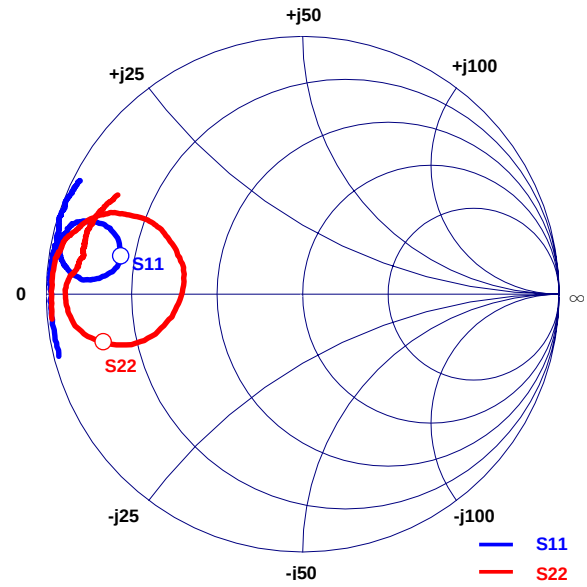
Pulse Signal (10%-duty, DC : constant)

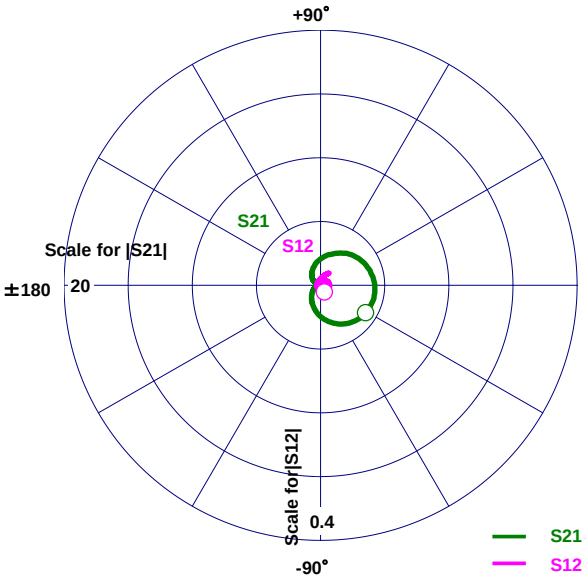
Test Fixture



- Reference DATA -

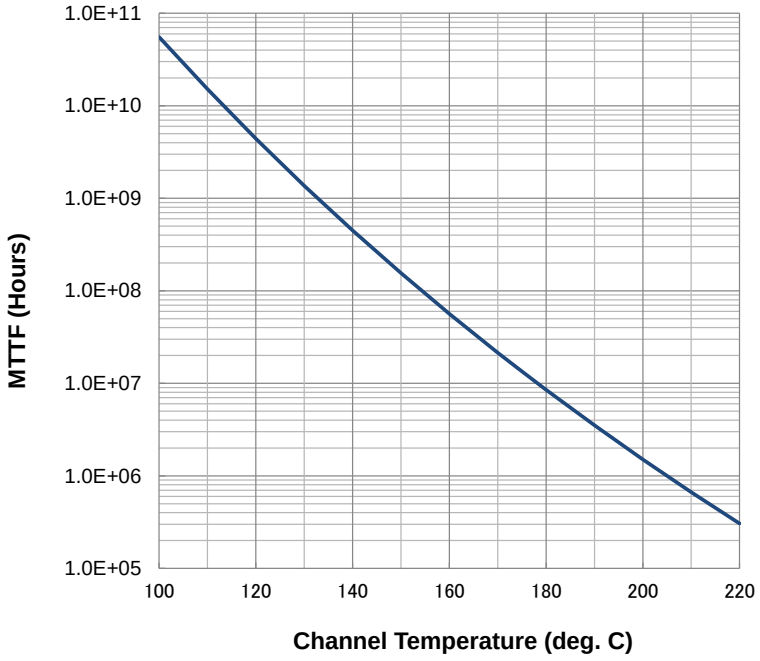
S-Parameters @VDS=50V, IDS(DC)=600mA, f=0.5 to 4.5GHz
Zl = Zs = 50 ohm Marker : 2.14GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.5	0.98	-165.75	0.25	149.51	0.001	97.02	0.98	-174.32
0.6	0.98	-173.20	0.42	155.83	0.002	85.78	0.98	178.71
0.7	0.98	179.32	0.56	149.76	0.002	75.10	0.97	171.68
0.8	0.98	177.89	0.68	146.62	0.003	78.76	0.96	169.59
0.9	0.98	176.58	0.81	141.92	0.004	84.68	0.95	167.32
1.0	0.99	175.52	0.95	135.62	0.005	80.02	0.93	165.27
1.1	0.99	174.46	1.08	129.71	0.005	74.57	0.90	163.14
1.2	0.99	173.13	1.24	122.72	0.006	72.10	0.88	160.79
1.3	0.98	171.59	1.44	114.50	0.007	70.18	0.84	158.51
1.4	0.98	170.27	1.68	104.95	0.008	60.37	0.79	156.50
1.5	0.98	168.97	1.94	94.61	0.009	57.37	0.72	155.28
1.6	0.97	167.38	2.26	83.02	0.010	49.75	0.65	154.66
1.7	0.95	165.16	2.65	68.53	0.012	39.52	0.57	157.33
1.8	0.94	163.11	3.17	52.41	0.013	25.70	0.49	164.83
1.9	0.88	161.52	3.71	32.20	0.014	6.54	0.47	-178.81
2.0	0.81	161.09	4.14	9.18	0.014	-15.42	0.57	-166.51
2.1	0.74	165.41	4.22	-19.77	0.013	-47.15	0.73	-164.39
2.2	0.74	172.03	3.81	-48.62	0.010	-82.81	0.87	-170.51
2.3	0.80	175.65	3.07	-72.86	0.007	-125.70	0.92	-178.01
2.4	0.86	176.31	2.40	-91.67	0.006	-166.18	0.92	177.22
2.5	0.90	174.87	1.84	-106.20	0.006	159.91	0.89	174.63
2.6	0.93	173.54	1.44	-118.51	0.006	135.99	0.88	172.97
2.7	0.95	172.00	1.15	-128.00	0.007	118.79	0.88	172.02
2.8	0.96	170.49	0.93	-136.20	0.008	107.20	0.87	170.87
2.9	0.97	169.44	0.77	-143.20	0.008	101.69	0.87	170.51
3.0	0.98	168.25	0.64	-148.78	0.008	95.95	0.87	169.70
3.1	0.98	167.11	0.55	-154.33	0.010	92.36	0.87	168.69
3.2	0.98	165.83	0.48	-159.52	0.010	88.17	0.87	168.02
3.3	0.98	164.93	0.42	-164.56	0.011	84.97	0.87	167.13
3.4	0.99	163.96	0.37	-168.82	0.012	82.88	0.87	166.44
3.5	0.99	163.15	0.34	-173.34	0.012	79.90	0.88	165.23
3.6	0.99	161.96	0.31	-177.86	0.013	77.88	0.87	163.68
3.7	0.99	160.95	0.28	176.91	0.014	75.12	0.87	162.94
3.8	0.99	159.91	0.26	172.60	0.014	72.73	0.86	161.72
3.9	0.99	159.01	0.25	167.64	0.016	69.85	0.86	160.46
4.0	0.99	157.95	0.23	162.34	0.016	68.71	0.86	158.95
4.1	0.98	157.18	0.22	157.57	0.018	66.76	0.85	157.56
4.2	0.98	156.12	0.21	152.57	0.019	64.47	0.84	156.74
4.3	0.98	154.88	0.19	147.07	0.020	60.81	0.84	155.00
4.4	0.98	153.94	0.18	141.60	0.022	58.53	0.82	153.62
4.5	0.97	153.08	0.18	136.84	0.023	55.26	0.82	151.89

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)

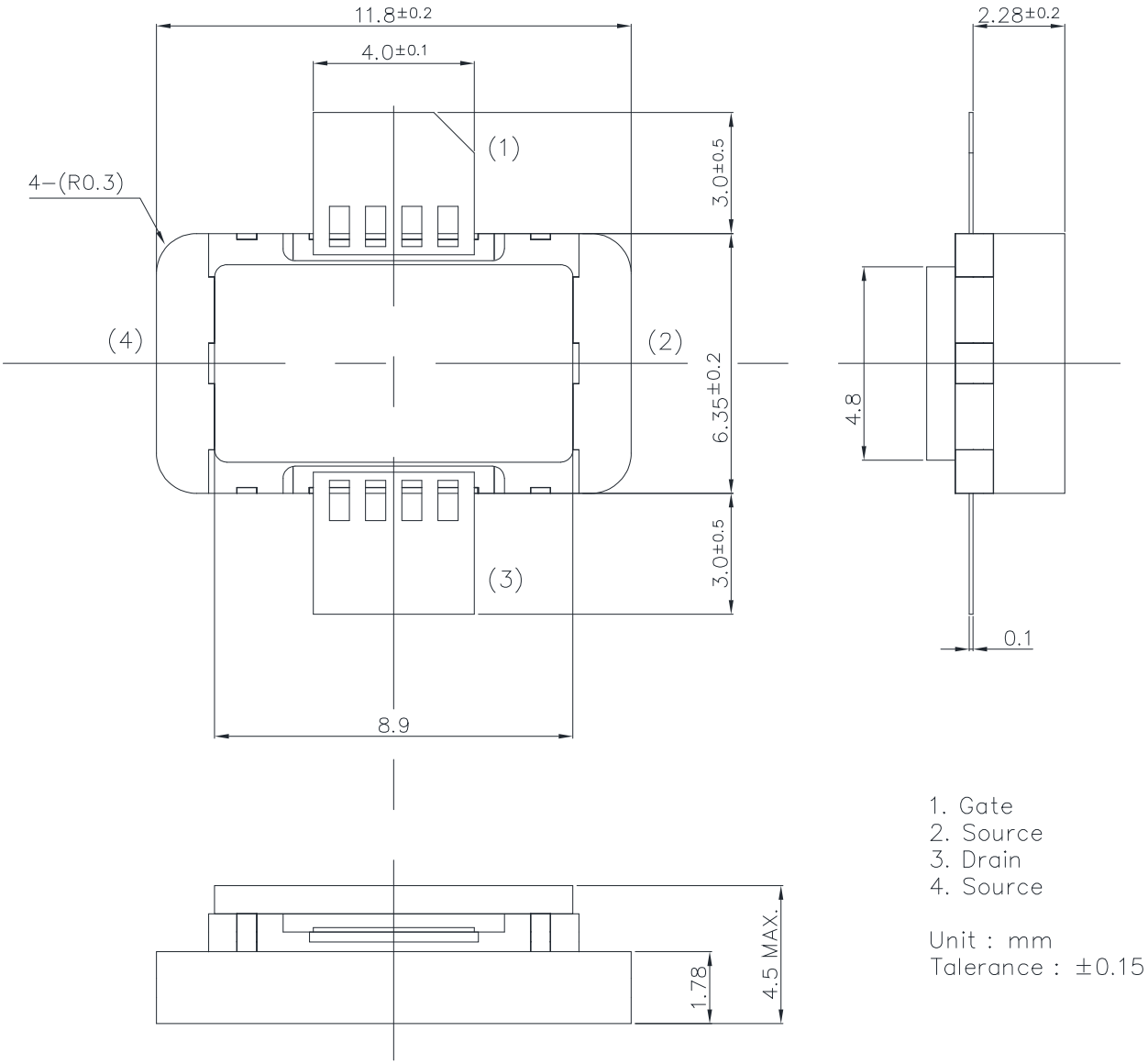
T_{stress}: stress temperature (K)

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

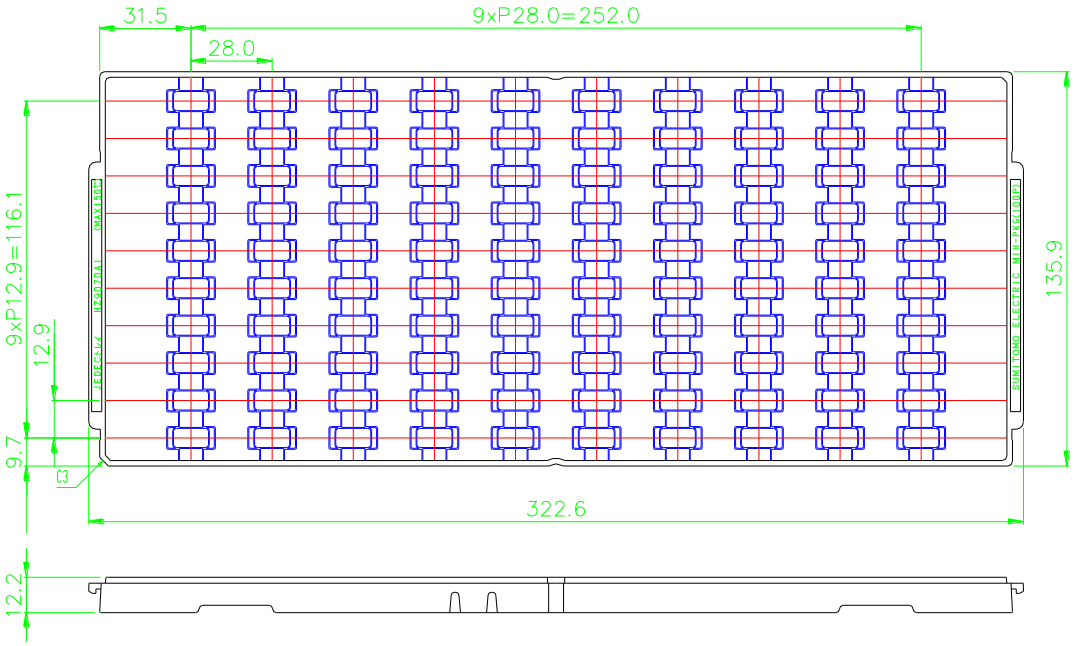
M1H Package Outline
Metal-Ceramic Hermetic Package



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

Unit : mm
Talerance : ±0.15

TRAY SIZE : M1H



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- 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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