■ Features

- High Voltage Operation : VDS=50V
- High Power : 52.8dBm (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 0.7GHz to 2.3GHz 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		140.6	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	$P_{ave.}$		$\leq$ 49.8	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 $I_{DS(DC)}$=0mA f=2.14GHz	51.8	52.8	-	dBm
Drain Eficiency at Psat	DE *1		55.0	62.0	-	%
Power Gain	Gp *2	V_{DS}=50V $I_{DS(DC)}$=600mA f=2.14GHz	15.5	16.5	-	dB
Thermal Resistance	R_{th}	Channel to Case at 78W P_{DC}	-	1.4	1.6	deg.C/W

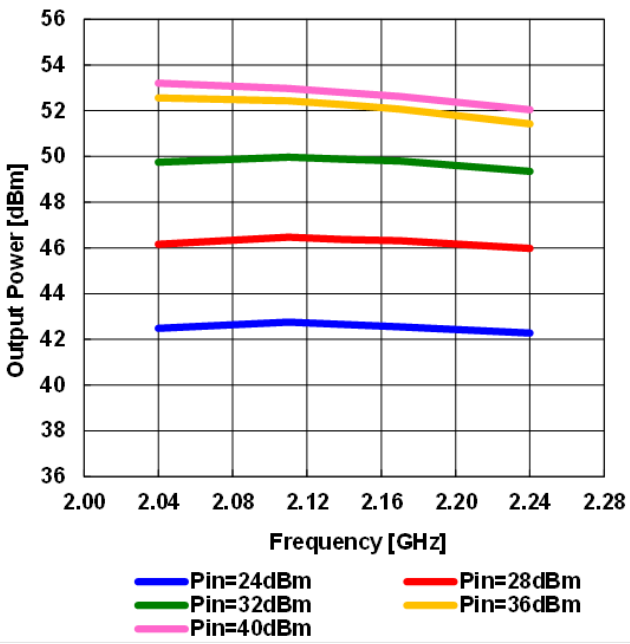
*1 : 10%-duty RF pulse (DC supply constant), Fixed Pin=39dBm

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

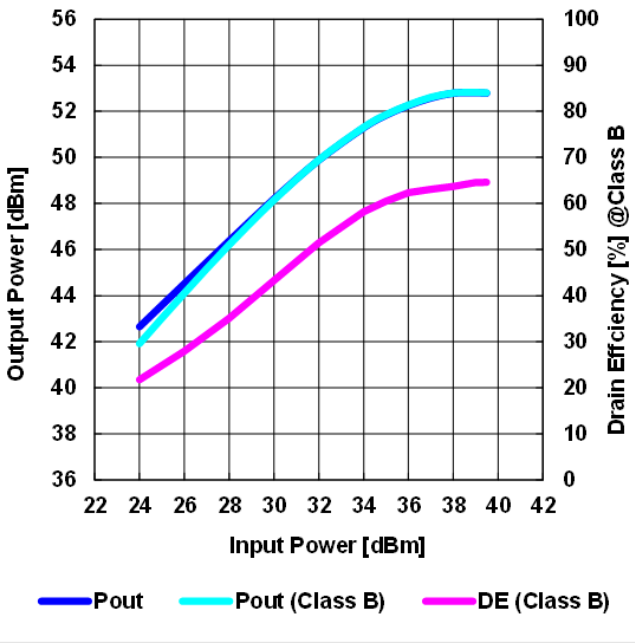
RoHS Compliance	YES

RF characteristics @f=2.14GHz fine tuned

Output Power vs. Frequency
V_{DS}=50V $I_{DS(DC)}$=900mA

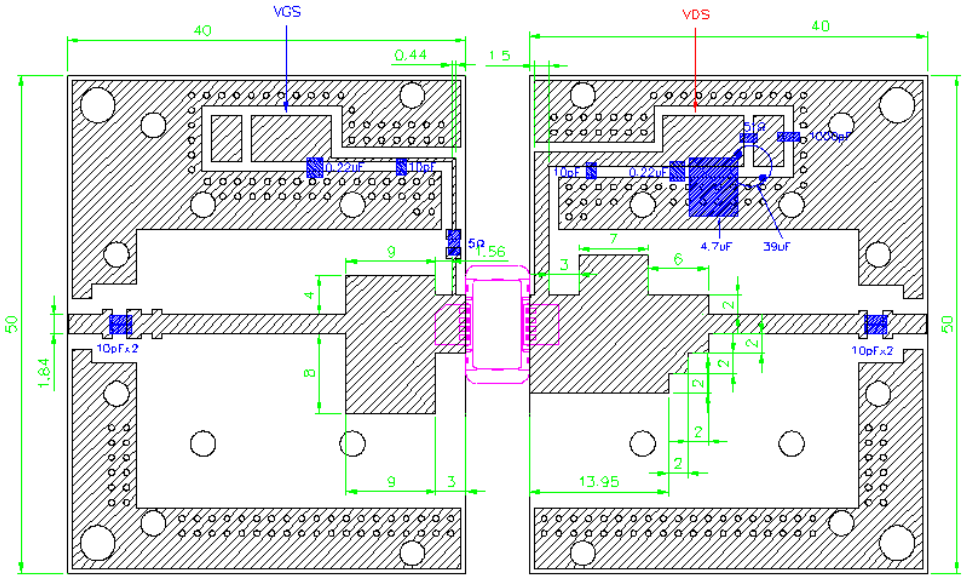


Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V $I_{DS(DC)}$=900mA f=2.14GHz



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

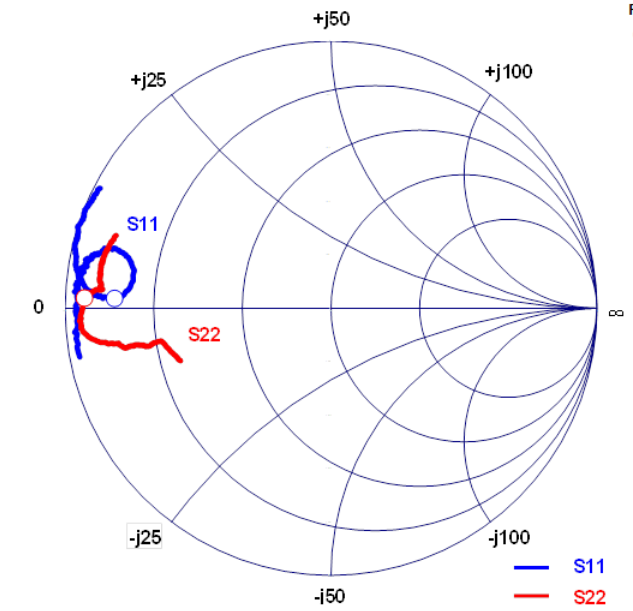
Test Fixture

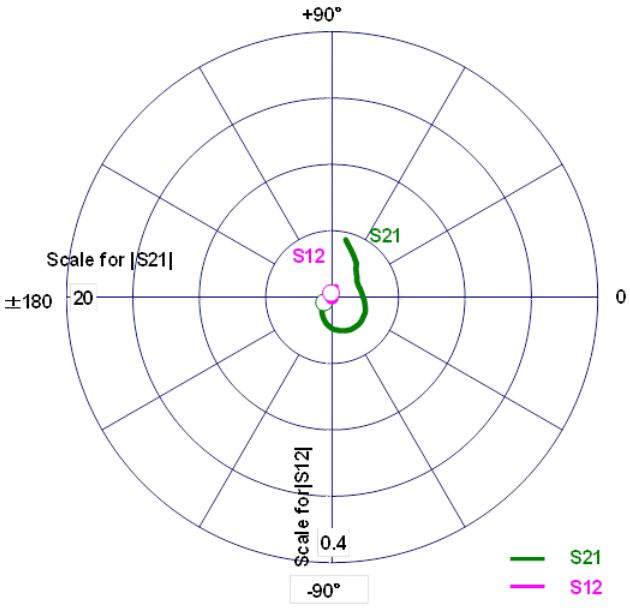


h=0.8mm εr=3.5
Cu=18um Unit: mm

- Reference DATA -

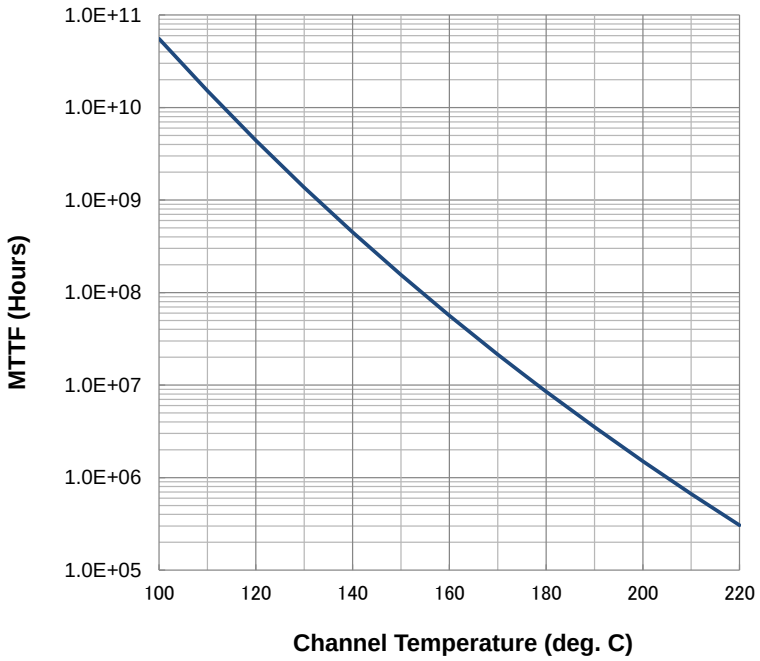
S-Parameters @VDS=50V, IDS(DC)=900mA, f=0.5 to 4.5GHz
Zl = Zs = 50ohm Marker : 2.14GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.5	0.96	-169.05	4.44	76.62	0.005	4.82	0.60	-160.84
0.6	0.95	-176.23	3.68	65.74	0.005	2.39	0.62	-164.66
0.7	0.95	176.90	3.15	54.47	0.005	-2.17	0.65	-168.77
0.8	0.96	175.81	2.80	49.96	0.005	-4.62	0.66	-169.08
0.9	0.95	174.49	2.56	44.92	0.005	-1.92	0.68	-168.85
1.0	0.95	173.40	2.42	39.33	0.005	-8.66	0.70	-168.32
1.1	0.95	172.55	2.26	34.24	0.005	-10.86	0.72	-168.73
1.2	0.95	170.73	2.18	29.23	0.005	-9.50	0.73	-169.24
1.3	0.93	169.93	2.17	23.32	0.005	-14.22	0.75	-169.18
1.4	0.93	168.67	2.20	16.91	0.005	-18.30	0.78	-169.17
1.5	0.92	167.84	2.24	10.08	0.006	-22.61	0.80	-169.60
1.6	0.89	166.45	2.31	1.99	0.006	-28.89	0.81	-170.65
1.7	0.86	164.76	2.48	-9.11	0.006	-45.37	0.85	-170.88
1.8	0.82	165.05	2.72	-22.82	0.007	-62.42	0.88	-171.86
1.9	0.77	167.27	2.85	-40.61	0.006	-88.35	0.93	-174.02
2.0	0.75	171.96	2.82	-60.63	0.007	-119.61	0.95	-177.12
2.1	0.79	176.73	2.48	-83.56	0.006	-155.28	0.93	179.11
2.2	0.84	177.26	2.01	-103.13	0.006	177.91	0.92	177.16
2.3	0.90	176.32	1.58	-117.02	0.006	152.46	0.90	175.97
2.4	0.93	175.06	1.25	-127.84	0.006	137.53	0.88	175.55
2.5	0.95	173.29	0.99	-136.03	0.006	122.98	0.87	175.62
2.6	0.96	171.86	0.81	-143.49	0.006	108.46	0.87	175.25
2.7	0.97	170.39	0.67	-148.89	0.006	105.39	0.87	175.03
2.8	0.98	169.16	0.57	-153.60	0.007	99.68	0.87	174.45
2.9	0.98	168.11	0.48	-158.55	0.007	94.74	0.87	174.21
3.0	0.99	167.16	0.42	-162.01	0.007	90.13	0.87	173.80
3.1	0.99	166.11	0.37	-165.48	0.007	90.53	0.88	172.95
3.2	0.99	164.98	0.33	-169.22	0.008	88.37	0.88	172.41
3.3	0.99	164.11	0.30	-172.34	0.008	85.41	0.88	171.75
3.4	0.99	163.17	0.27	-175.94	0.008	84.22	0.88	171.36
3.5	1.00	162.37	0.25	-178.80	0.009	81.59	0.88	170.34
3.6	0.99	161.22	0.24	178.31	0.009	82.25	0.88	169.31
3.7	0.99	160.43	0.22	174.57	0.009	80.91	0.88	168.89
3.8	0.99	159.35	0.21	171.21	0.010	78.99	0.88	167.91
3.9	1.00	158.32	0.20	167.69	0.010	78.95	0.87	167.05
4.0	0.99	157.35	0.20	163.97	0.011	78.84	0.87	166.06
4.1	0.99	156.74	0.19	160.91	0.012	78.49	0.87	165.31
4.2	0.99	155.65	0.19	156.75	0.013	77.09	0.87	164.63
4.3	0.98	154.39	0.19	152.52	0.014	73.46	0.86	163.40
4.4	0.98	153.50	0.19	148.23	0.015	71.41	0.86	162.50
4.5	0.98	152.63	0.19	143.98	0.017	69.30	0.85	161.35

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)

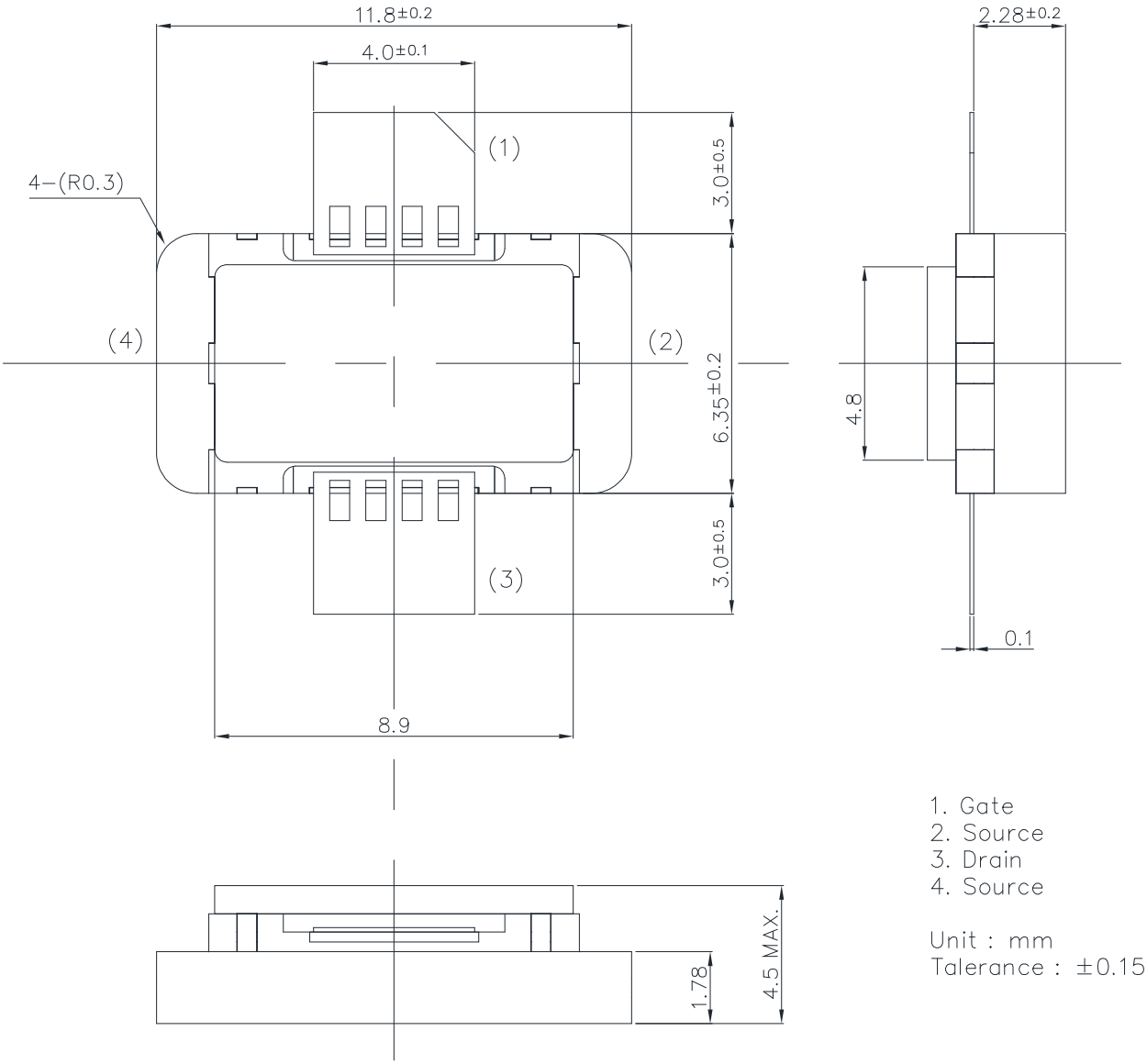
ESD characteristic

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

Ordering Information

Part Number	MOQ / MOU	Tray Style
SGN21H180M1H	No Limitation	30pcs Tray (30 pockets)
SGN21H180M1H/001	No Limitation	JEDEC Tray (100 pockets)

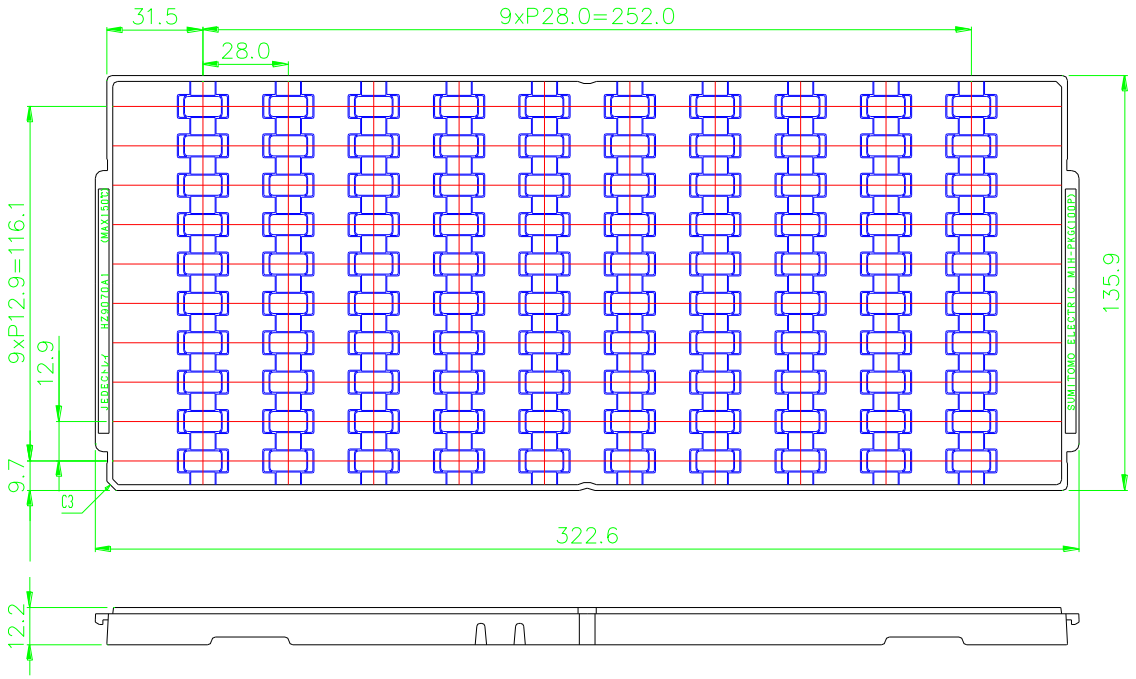
M1H Package Outline
Metal-Ceramic Hermetic Package



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

Unit : mm
Talerance : ±0.15

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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