

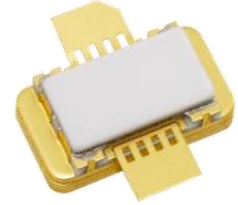
**■ Features**

- High Voltage Operation :  $V_{DS}=50V$
- High Power : 49.1dBm (typ.) @  $P_{sat}$
- 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 3.8GHz W-CDMA and LTE design requirements as it offers high gain, long term reliability and ease of use.


**ABSOLUTE MAXIMUM RATINGS ( Case Temperature  $T_c=25\text{deg.C}$  )**

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	$P_t$		90	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	$I_{GF}$	$R_G=5\text{ ohm}$	$\leq 63$	mA
Reverse Gate Current	$I_{GR}$	$R_G=5\text{ ohm}$	$\geq -2.3$	mA
Channel Temperature	$T_{ch}$		$\leq 200$	deg.C
Average Output Power	$P_{ave.}$		$\leq 46$	dBm

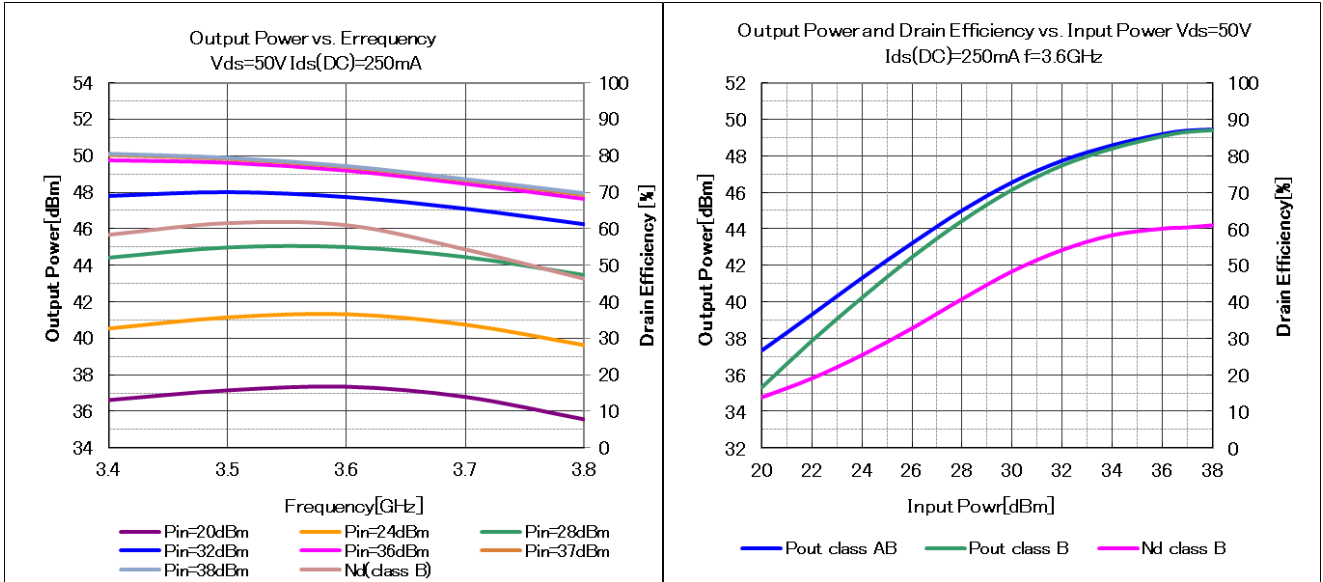
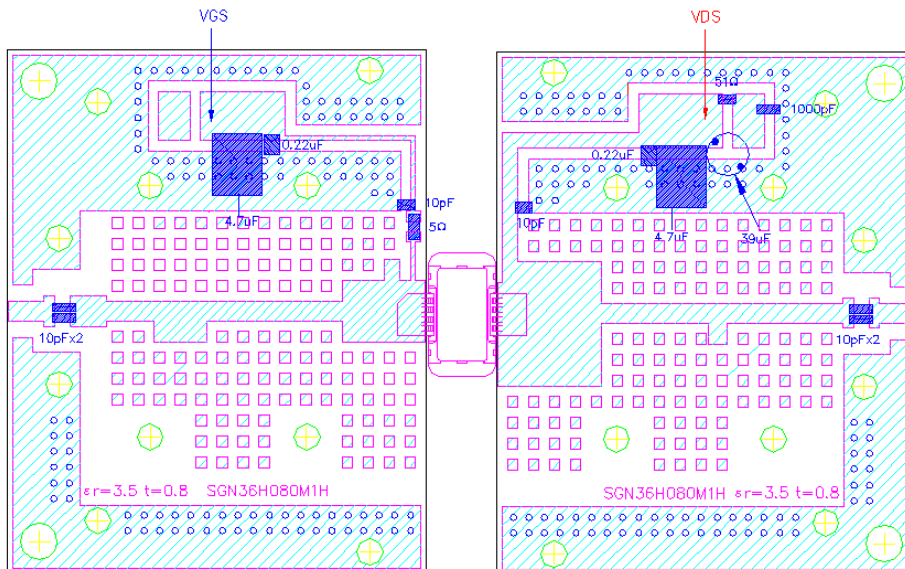
**ELECTRICAL CHARACTERISTICS ( Case Temperature  $T_c=25\text{deg.C}$  )**

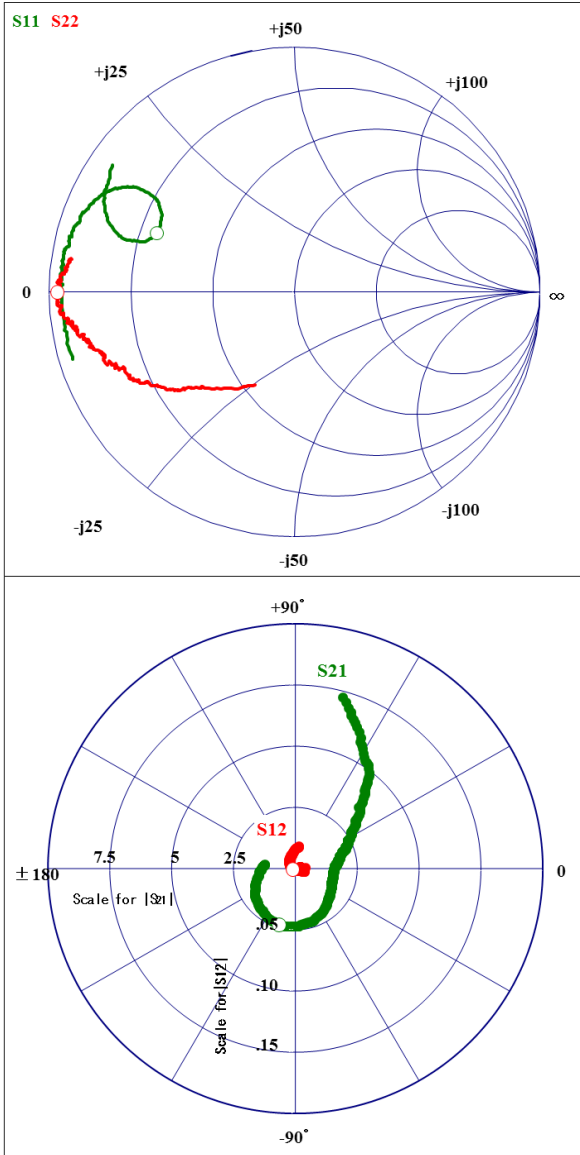
Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	$V_p$	$V_{DS}=50V$ $I_{DS}=16.0\text{mA}$	-4.0	-	-2.0	V
Saturated Power	$P_{sat} *1$	$V_{DS}=50V$	48.1	49.1	-	dBm
Drain Efficiency at $P_{sat}$	$DE *1$	$I_{DS(DC)}=0\text{mA}$ $f=3.6\text{GHz}$	45.0	55.0	-	%
Power Gain	$G_p *2$	$V_{DS}=50V$ $I_{DS(DC)}=250\text{mA}$ $f=3.6\text{GHz}$	14.5	16.0	-	dB
Thermal Resistance	$R_{th}$	Channel to Case at 45W $P_{DC}$	-	2.0	2.5	deg.C/W

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

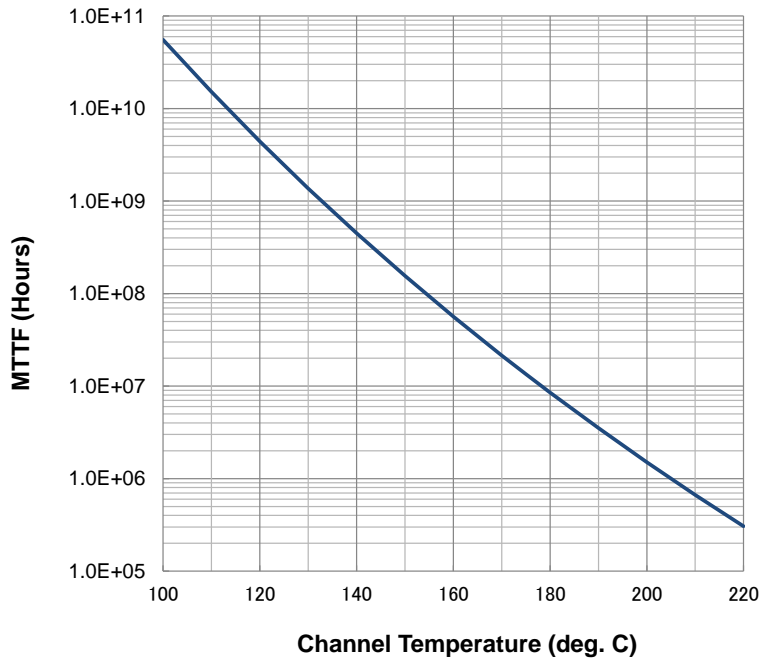
\*2 :  $P_{out}=41\text{dBm}$ , CW modulation Signal ( W-CDMA )

RoHS Compliance	YES
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**RF characteristics @f=3.6GHz fine tuned**

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


**- Reference DATA -**
**S-Parameters @VDS=50V, IDS(DC)=250mA, f=0.5 to 4.5GHz**  
**ZI = Zs = 50ohm      Marker : 3.60GHz**


FREQUENCY (GHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.94	-163.14	7.25	74.56	0.01	3.46	0.41	-113.22
0.60	0.95	-171.34	5.80	62.71	0.01	-12.54	0.47	-123.72
0.70	0.95	-179.01	4.82	51.30	0.01	-20.19	0.53	-132.38
0.80	0.95	179.35	4.14	46.85	0.01	-20.23	0.57	-136.38
0.90	0.95	177.95	3.57	43.95	0.01	-18.00	0.60	-138.43
1.00	0.95	176.98	3.21	38.53	0.01	-18.61	0.63	-140.70
1.10	0.95	175.79	2.87	34.19	0.00	-22.16	0.66	-143.99
1.20	0.96	174.00	2.62	30.15	0.01	-20.12	0.70	-146.79
1.30	0.95	172.51	2.43	26.53	0.00	-17.95	0.72	-148.56
1.40	0.95	171.71	2.23	22.78	0.00	-16.59	0.73	-150.50
1.50	0.95	170.11	2.04	19.33	0.00	-19.33	0.75	-153.06
1.60	0.95	168.78	1.90	15.20	0.00	-5.61	0.76	-156.36
1.70	0.94	167.51	1.85	11.30	0.00	-10.20	0.79	-157.07
1.80	0.95	166.17	1.78	8.20	0.00	-2.90	0.80	-158.28
1.90	0.94	165.71	1.69	5.91	0.00	-5.76	0.81	-158.97
2.00	0.94	164.34	1.61	2.59	0.00	1.15	0.82	-162.10
2.10	0.93	162.76	1.59	-1.98	0.00	0.31	0.83	-162.71
2.20	0.92	161.28	1.58	-6.15	0.00	6.37	0.85	-164.15
2.30	0.93	160.17	1.59	-9.18	0.00	4.60	0.86	-164.99
2.40	0.92	159.19	1.57	-12.02	0.00	5.95	0.86	-166.52
2.50	0.91	157.20	1.58	-16.66	0.00	4.33	0.86	-167.03
2.60	0.90	155.65	1.60	-21.73	0.00	13.04	0.87	-168.51
2.70	0.89	154.07	1.68	-25.99	0.00	2.38	0.90	-169.02
2.80	0.87	151.93	1.74	-31.41	0.00	-2.82	0.91	-170.14
2.90	0.85	150.28	1.78	-37.75	0.00	-7.74	0.90	-170.76
3.00	0.83	148.73	1.86	-43.64	0.00	0.05	0.92	-172.39
3.10	0.79	147.00	2.01	-50.79	0.00	-17.97	0.93	-172.90
3.20	0.74	146.05	2.15	-60.20	0.00	-29.89	0.95	-174.21
3.30	0.69	145.76	2.27	-70.48	0.00	-38.87	0.96	-174.39
3.40	0.65	147.56	2.32	-81.53	0.00	-62.47	0.95	-176.65
3.50	0.62	151.35	2.40	-92.91	0.00	-90.67	0.97	-177.70
3.60	0.61	156.74	2.39	-105.87	0.00	-156.75	0.97	-179.95
3.70	0.64	161.01	2.30	-119.15	0.00	158.94	0.97	-179.38
3.80	0.70	162.41	2.13	-131.35	0.00	143.98	0.96	-178.03
3.90	0.74	162.20	2.00	-142.53	0.01	130.10	0.95	-176.91
4.00	0.79	160.31	1.80	-151.61	0.01	115.51	0.95	-175.41
4.10	0.83	158.00	1.67	-159.75	0.01	107.73	0.94	-174.97
4.20	0.86	154.86	1.50	-167.23	0.01	101.09	0.94	-174.11
4.30	0.88	151.67	1.41	-175.48	0.01	92.96	0.93	-173.41
4.40	0.89	147.97	1.31	-178.90	0.02	85.64	0.92	-172.35
4.50	0.90	145.03	1.22	-173.54	0.02	79.47	0.92	-171.50

**MTTF Calculation  
- Estimated MTTF -**


Ea=1.6eV  
Confidence Level=90%

Channel Temp (deg.C)	MTTF (Hours)
160	5.98 x 10 <sup>7</sup>
180	9.02 x 10 <sup>6</sup>
200	1.60 x 10 <sup>6</sup>

$$AF = \exp\left[-\frac{Ea}{k}\left(\frac{1}{T_{stress}} - \frac{1}{T_{use}}\right)\right]$$

$$MTTF_{use} = MTTF_{stress} * AF$$

Where;

AF: acceleration factor

Ea: activation energy (1.6 eV)

k: Boltzman's constant (8.62 x 10<sup>-5</sup> eV/K)

T<sub>stress</sub>: stress temperature (K)

T<sub>use</sub>: use temperature (K)

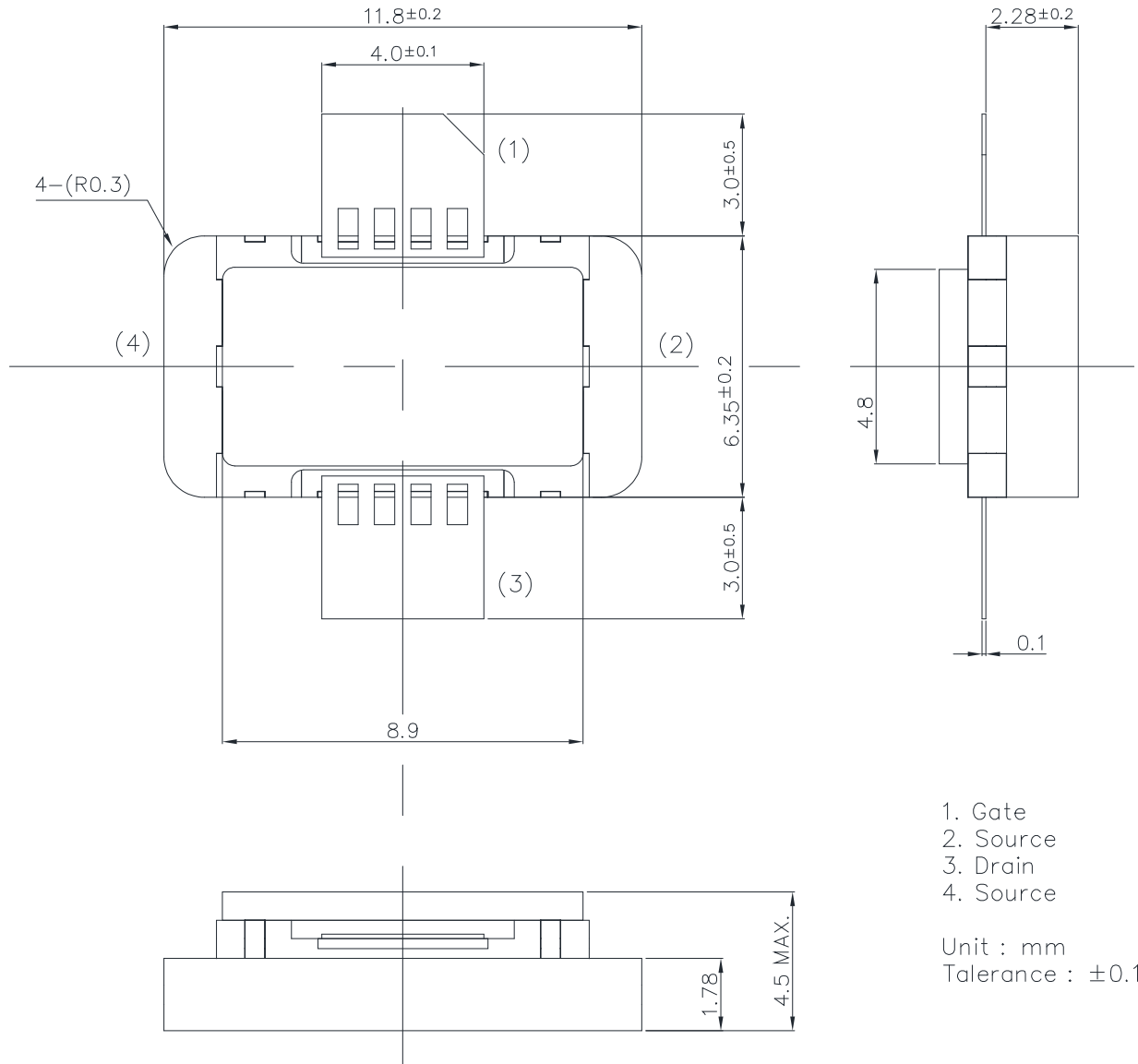
**ESD characteristic**

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

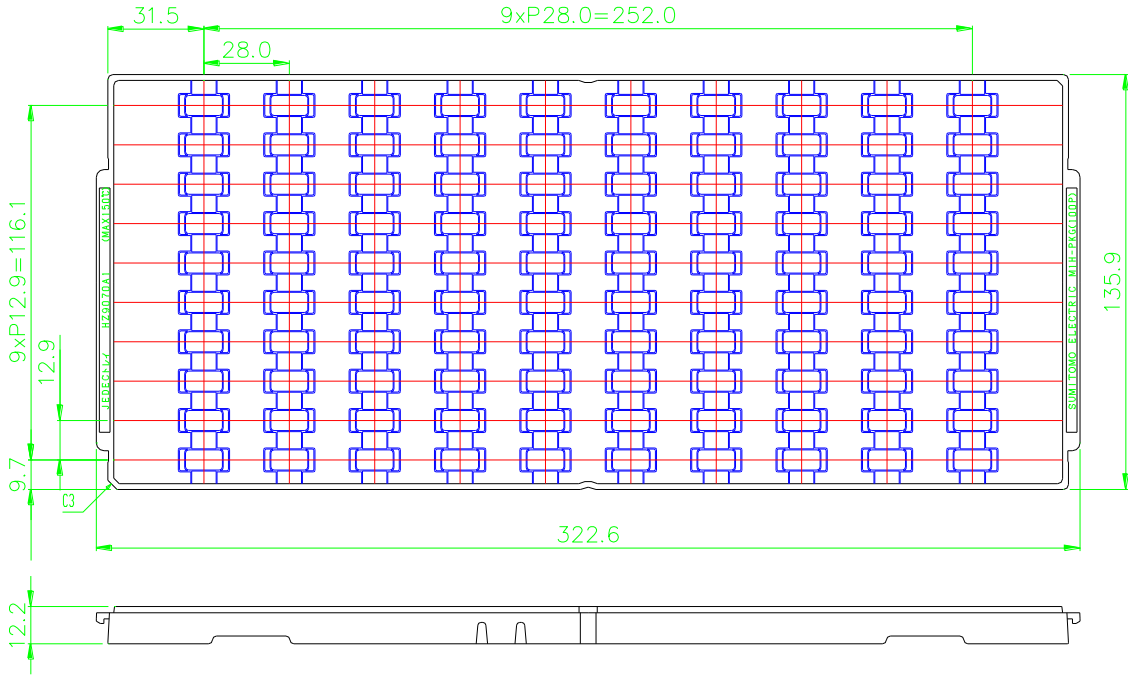
**Ordering Information**

Part Number	MOQ / MOU	Tray Style
SGN36H080M1H	No Limitation	30pcs Tray ( 30 pockets )
SGN36H080M1H/001	No Limitation	JEDEC Tray ( 100 pockets )

**M1H Package Outline**  
Metal-Ceramic Hermetic Package



**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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