■ Features

- High Power GaN HEMT for DC to 3GHz
- High Power : 130W @ 2.45GHz
- High Efficiency: 59% @ 2.45GHz
- CW Operable
- Easy of Matching: Input Pre-matched for 3GHz
- Small Flangeless Package

■ Description

Sumitomo Electric's GaN-HEMT SGNH130M1H offers high power, high efficiency, ease of matching and greater consistency for DC to 3GHz high power applications with 50V operation.

ABSOLUTE MAXIMUM RATING

Item	Symbol	Rating	Unit
Operating Voltage	V_{DS}	55	V
Drain-Source Voltage	V_{DS}	200 @ V_{GS}-8V	V
Gate-Source Voltage	V_{GS}	-15	V
Total Power Dissipation	P_t	170 @T_c=25deg.C	W
Storage Temperature	T_{stg}	-55 to +125	deg.C
Channel Temperature	T_{ch}	+250	deg.C

RECOMMENDED OPERATING CONDITION(Case Temperature T_c=25 deg.C)

Item	Symbol	Condition	Limit	Unit
Drain-Source Voltage	V_{DS}		<=50	V
Forward Gate Current	I_{GF}	Rg=5ohm	<=125	mA
Reverse Gate Current	I_{GR}	Rg=5ohm	>=-7.2	mA
Channel Temperature	T_{ch}		<=180	deg.C

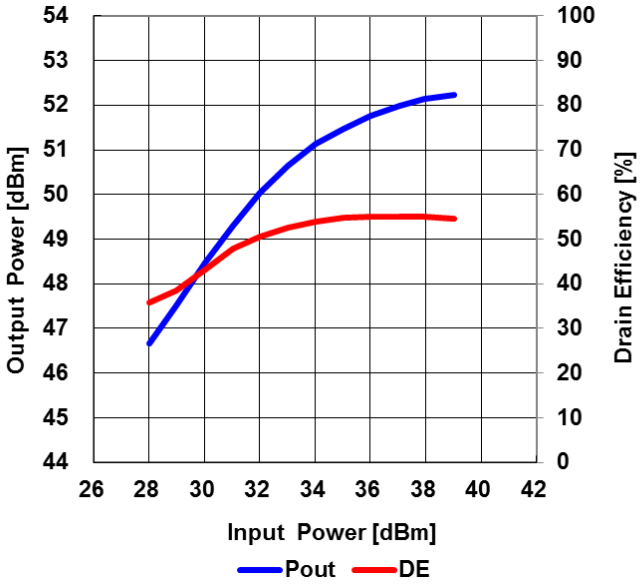
ELECTRICAL CHARACTERISTICS (Case Temperature T_c=25 deg.C)

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-off Voltage	V_P	V_{DS}=50V, I_{DS}=36mA	-4.0	-2.5	-1.5	V
Saturated Power	P_{sat}	V_{DS}=50V, $I_{DS(DC)}$=500mA, Pin=38dBm, f=2.45GHz, CW	-	51.1	-	dBm
Drain Efficiency	DE		-	59.0	-	%
Power Gain	G_P		-	13.1	-	dB
Saturated Power	P_{sat}	V_{DS}=50V, $I_{DS(DC)}$=500mA, Pin=38dBm, f=3GHz, PW=200µs, Duty=10%	51.1	51.9	-	dBm
Drain Efficiency	DE		50.0	56.5	-	%
Power Gain	G_P		-	13.9	-	dB
Thermal Resistance	R_{th}	Channel to Case at 90W P_{DC}	-	1.1	1.32	deg.C/W

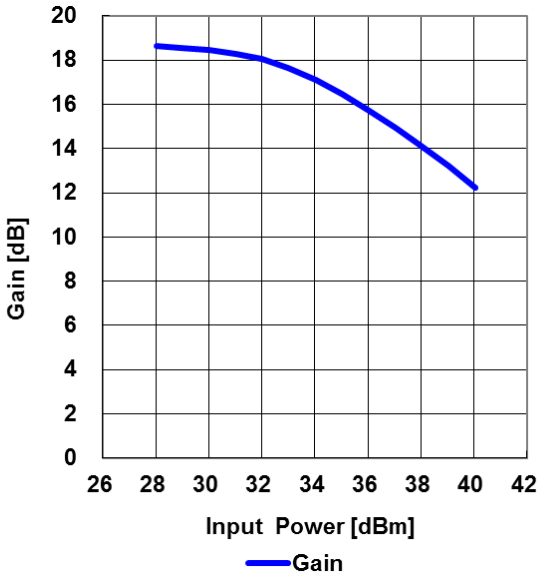
Case Style	M1H
RoHS Compliance	YES

■ RF Characteristics @f=3GHz, Pulse

Output Power and Drain Efficiency vs. Input Power
VDS=50V, IDS (DC)=0.5A, f=3GHz,
Pulse Width=200μs, 10%-duty

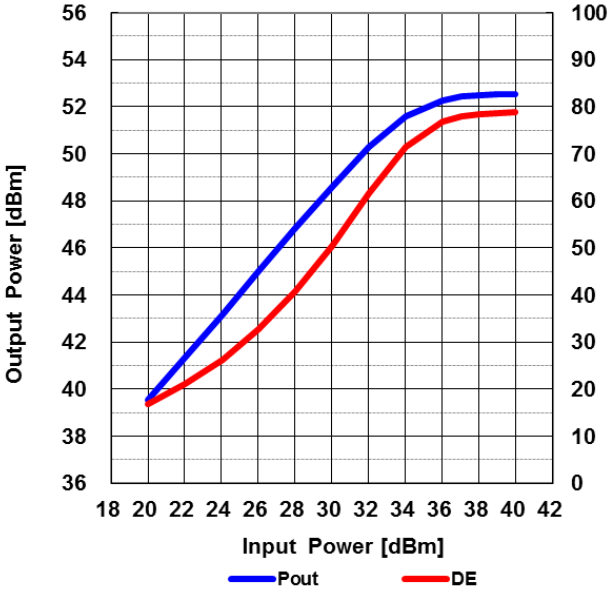


Gain vs. Input Power
VDS=50V, IDS (DC)=0.5A, f=3GHz,
Pulse Width=200μs, 10%-duty

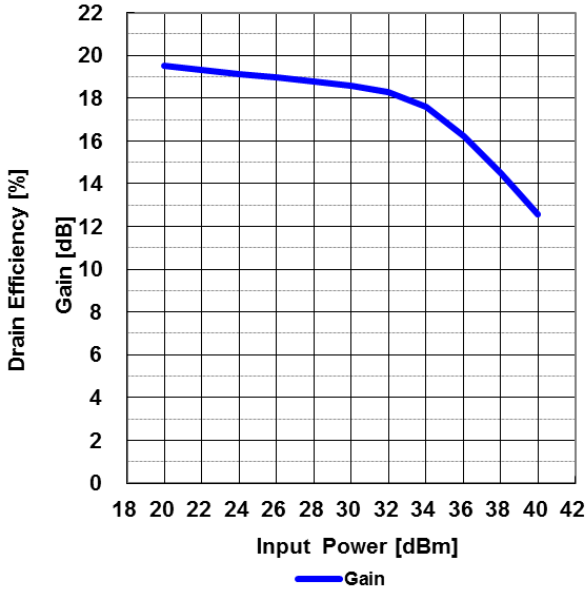


■ RF Characteristics @f=500MHz, CW

Output Power and Drain Efficiency vs. Input Power
VDS=50V, IDS (DC)=0.5A, f=500MHz, CW

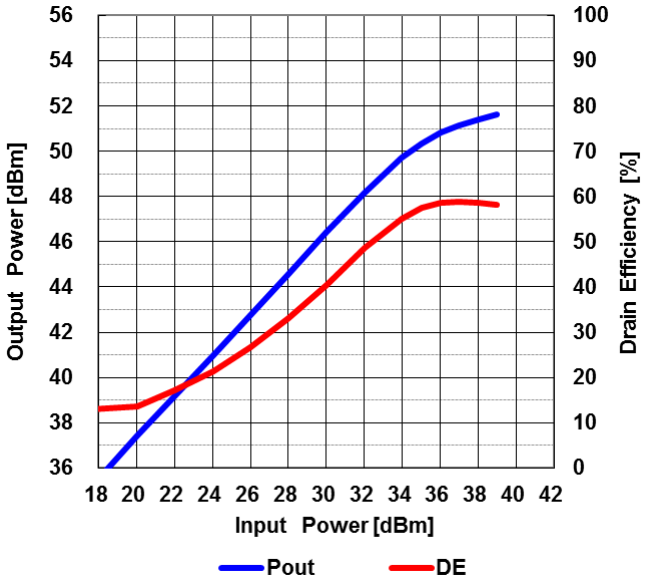


Gain vs. Input Power
VDS=50V, IDS (DC)=0.5A, f=500MHz, CW

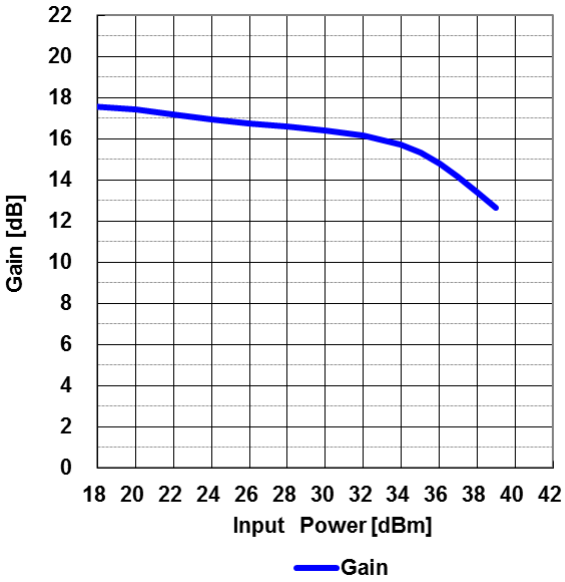


■ RF Characteristics @f=2.45GHz, CW

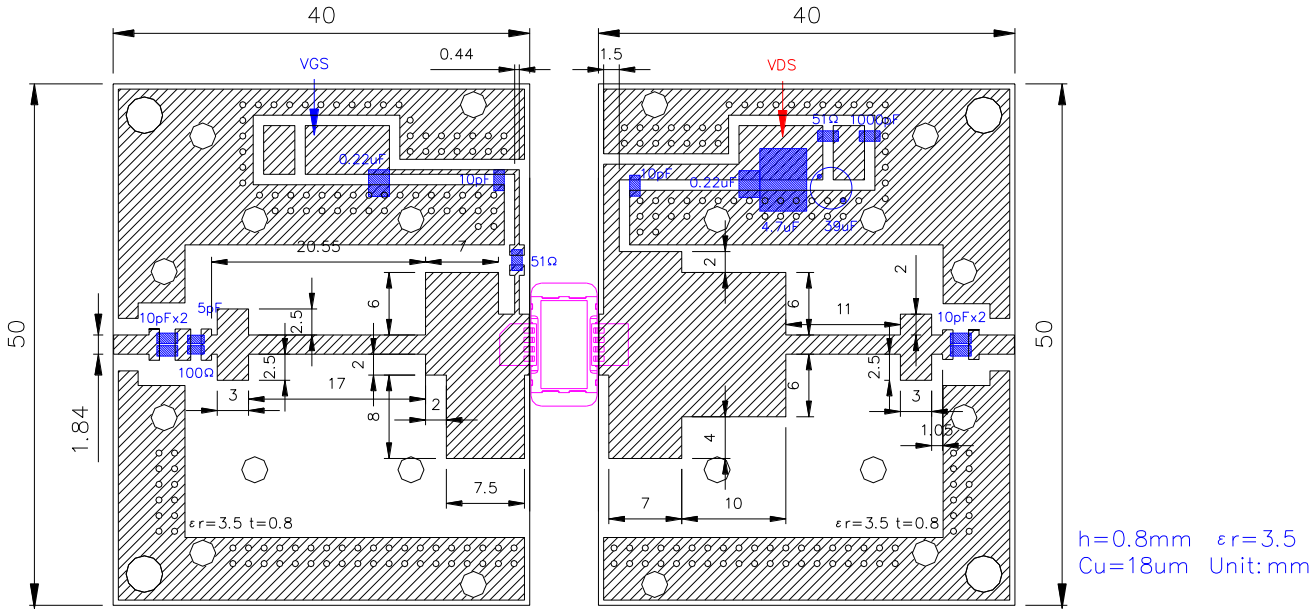
Output Power and Drain Efficiency vs. Frequency
VDS=50V, IDS (DC) =0.5A, f=2.45GHz, CW



Gain vs. Input Power
VDS=50V, IDS (DC)=0.5A, f=2.45GHz, CW

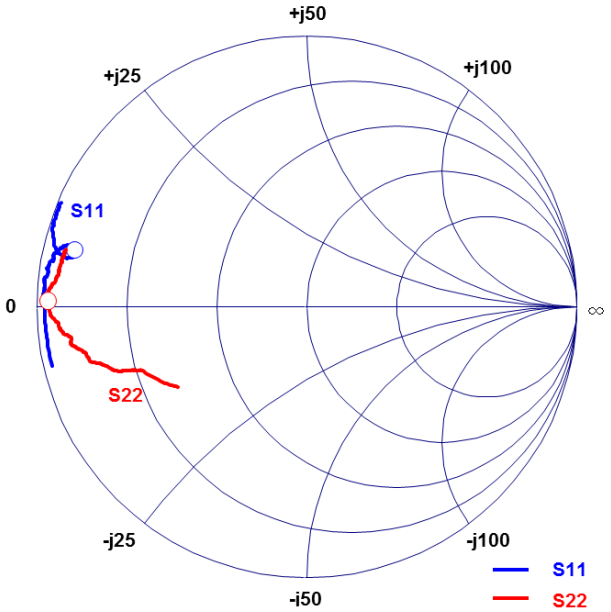


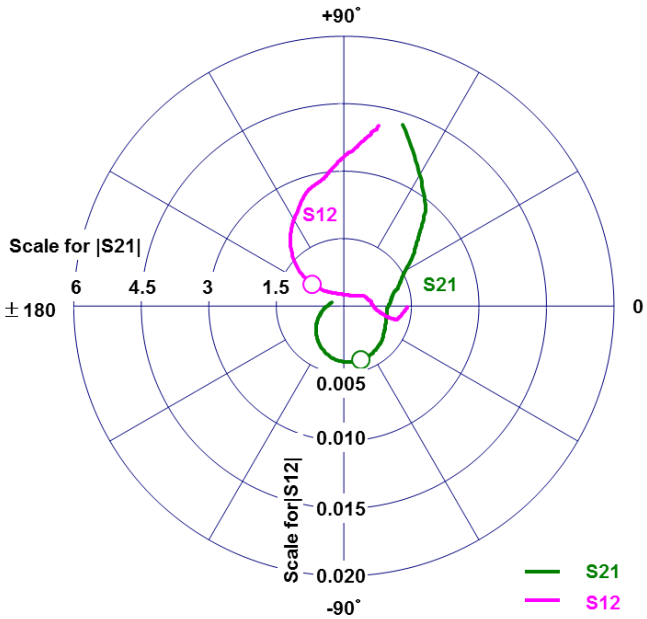
■ Test Fixture for 2.45GHz



■ S-parameters

V_{DS}=50V, $I_{DS(DC)}$=0.5A, f=0.5 to 4.5GHz, Zl=Zs=50 ohm, Marker: 3.0GHz

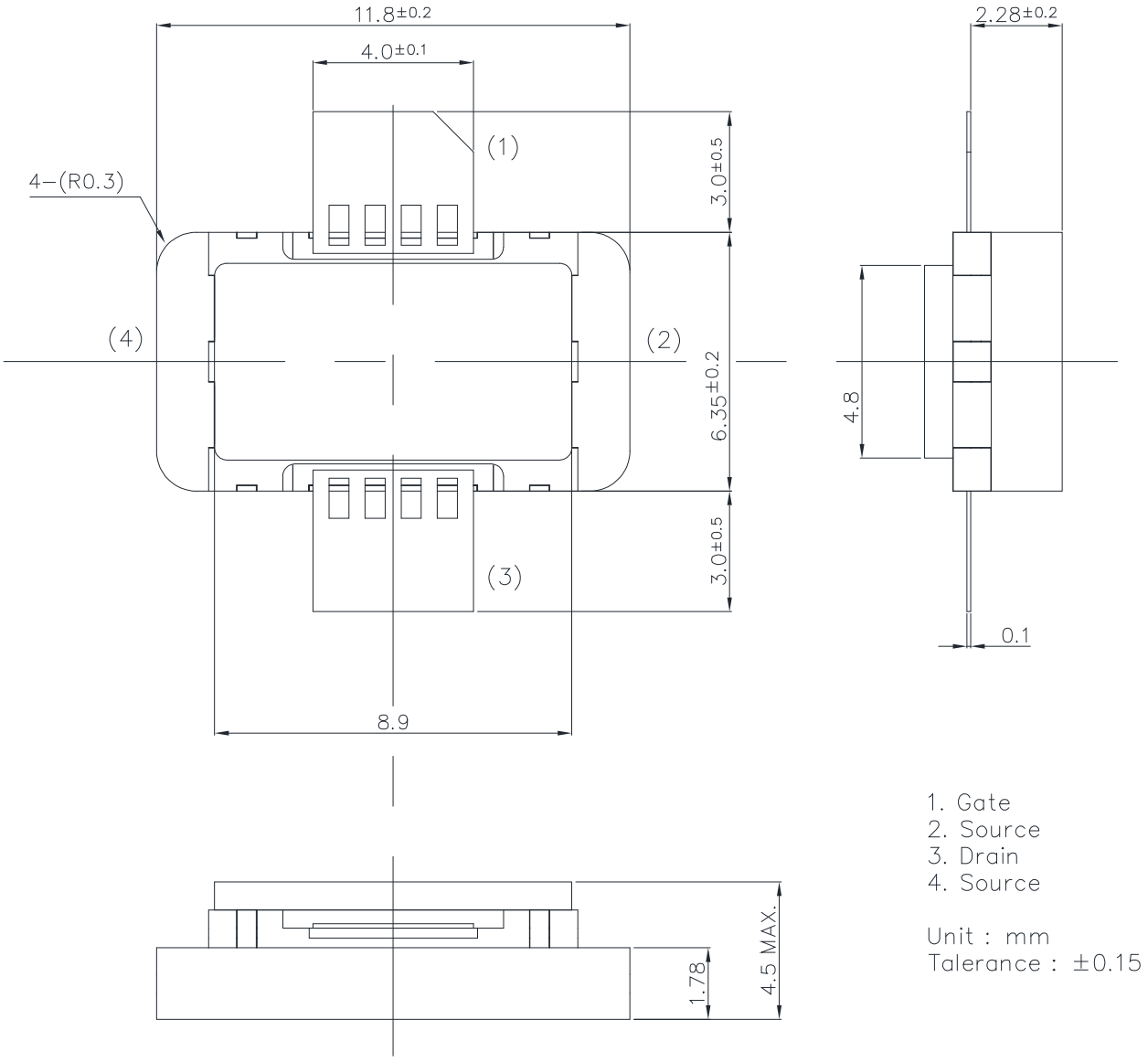




Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.5	0.97	-167.05	4.24	71.99	0.005	-0.66	0.56	-148.35
0.6	0.97	-173.95	3.39	60.26	0.004	-8.18	0.61	-153.37
0.7	0.97	179.51	2.78	49.11	0.004	-14.65	0.65	-158.82
0.8	0.97	178.64	2.36	44.28	0.004	-14.75	0.68	-160.00
0.9	0.97	177.81	2.08	39.76	0.003	-14.21	0.71	-160.62
1.0	0.98	177.21	1.86	35.31	0.003	-13.80	0.74	-161.10
1.1	0.98	176.59	1.65	31.40	0.003	-12.46	0.76	-162.41
1.2	0.97	175.87	1.48	27.56	0.003	-10.67	0.78	-163.90
1.3	0.98	174.88	1.37	23.21	0.003	-8.90	0.80	-164.82
1.4	0.98	174.45	1.28	19.46	0.002	-6.10	0.82	-165.52
1.5	0.98	173.95	1.18	16.16	0.002	-1.93	0.83	-166.83
1.6	0.97	173.28	1.11	12.20	0.002	3.32	0.84	-168.32
1.7	0.97	172.23	1.06	8.41	0.002	7.56	0.85	-169.27
1.8	0.98	171.68	1.04	4.59	0.002	11.16	0.87	-169.92
1.9	0.97	171.23	1.00	0.93	0.002	15.01	0.88	-170.74
2.0	0.97	170.42	0.97	-2.56	0.002	20.40	0.88	-171.72
2.1	0.96	169.96	0.96	-7.02	0.002	23.74	0.89	-172.90
2.2	0.95	168.98	0.97	-11.59	0.002	27.00	0.90	-173.45
2.3	0.96	168.37	0.97	-16.22	0.002	30.41	0.91	-174.36
2.4	0.95	167.93	1.00	-20.33	0.001	36.02	0.92	-175.24
2.5	0.94	167.04	1.03	-26.21	0.001	44.01	0.92	-175.84
2.6	0.93	166.52	1.07	-32.93	0.001	61.81	0.93	-176.77
2.7	0.92	165.95	1.13	-40.30	0.001	92.68	0.95	-177.83
2.8	0.91	165.50	1.18	-49.63	0.001	123.39	0.95	-178.96
2.9	0.89	165.75	1.23	-60.45	0.002	141.60	0.95	179.94
3.0	0.89	166.27	1.25	-72.72	0.003	145.16	0.96	178.70
3.1	0.88	167.22	1.25	-86.40	0.004	141.90	0.96	177.16
3.2	0.89	167.96	1.19	-101.06	0.006	134.24	0.95	175.90
3.3	0.90	168.49	1.09	-114.81	0.007	125.90	0.95	175.08
3.4	0.92	168.28	0.96	-127.19	0.008	118.25	0.94	174.57
3.5	0.95	167.83	0.84	-137.44	0.008	111.98	0.94	173.75
3.6	0.96	166.77	0.73	-146.27	0.009	106.09	0.93	172.98
3.7	0.96	165.82	0.63	-154.20	0.009	100.76	0.93	172.66
3.8	0.97	164.67	0.56	-160.79	0.010	97.10	0.93	171.98
3.9	0.98	163.40	0.50	-166.67	0.010	94.15	0.93	171.31
4.0	0.99	162.28	0.44	-172.06	0.011	91.24	0.92	170.54
4.1	0.99	161.45	0.40	-176.87	0.011	88.55	0.92	169.99
4.2	0.99	160.28	0.36	178.49	0.012	86.14	0.92	169.44
4.3	0.99	158.93	0.33	173.40	0.012	83.55	0.92	168.32
4.4	0.99	158.01	0.30	168.72	0.013	81.18	0.92	167.54
4.5	0.99	157.10	0.28	164.35	0.014	78.95	0.92	166.72

■ Package Outline

Case Style: M1H



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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