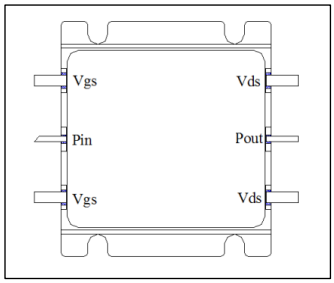
0.6-2.0GHz, 300W, 50V GaN IMFET Pulsed PA



Description

The SMBV0620-300H3 is a 300-watt,single stage integrated Power Amplifier Module, designed for pulsed amplifier applications, with frequencies from 0.6 to 2.0GHz. The module is 50 Ω input/output matched and requires minimal external components.

The module implements multiple GaN active dice and its matching network within highly compact 30.8*27.4mm metal RF package with excellent capability for heat dissipation.

It is only recommended to be used as pulsed CW, Not CW operation allowed

Vgs =-3.3 V； Vds=50V；Idq =500mA, 100us, 10%

Freq(MHz)	Psat(dBm)	Psat(W)	IDS(A)	Pin(dBm)	Gain(dB)	Eff(%)	2nd Harmonic	3rd Harmonic
500	54.1	257.0	0.92	41.3	12.8	55	-16.3	-15.7
600	55.66	368.1	1.54	43.12	12.54	47	-11.5	-14.2
700	55.14	326.6	1.78	42.8	12.34	37	-10	-18.9
800	54.88	307.6	1.53	42.32	12.56	40	-8.6	-17.7
900	55.14	326.6	1.55	41.3	13.84	42	-7.7	-12.4
1000	55.73	374.1	1.45	41.57	14.16	51	-13.2	-16.9
1100	55.72	373.3	1.32	40.77	14.95	56	-15.1	-17.5
1200	55.2	331.1	1.23	41.74	13.46	53	-11.1	-17.3
1300	55.01	317.0	1.22	44.52	10.49	51	-10	-13.6
1400	55.47	352.4	1.7	45.27	10.2	42	-10.5	-25
1500	55.23	333.4	1.68	46.42	8.81	40	-12.7	-25.8
1600	55.23	333.4	1.55	45.56	9.67	43	-10.7	-24.7
1700	55.89	388.2	1.56	44.55	11.34	49	-14	-24
1800	55.71	372.4	1.35	42.87	12.84	55	-16.7	-22.8
1900	55.65	367.3	1.46	42.89	12.76	50	-15.3	-27.8
2000	56.17	414.0	1.84	45.11	11.06	45	-22.8	-35.5
2100	55.08	322.1	1.83	44.65	10.43	35	-32	-30
2200	55.22	332.7	1.76	45.76	9.46	38	-27.2	-26.4
2300	55.11	324.3	1.58	45.2	9.91	41	-23	-25.3
2400	54.61	289.1	1.14	43.32	11.29	50	-20.7	-31.5

Applications

- UHF band power amplifier
- L band power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

1. Set VGS to the pinch--off (VP) voltage, typically –5 V
2. Turn on VDS to nominal supply voltage (28V)
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically –5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

Table 1. Maximum Ratings

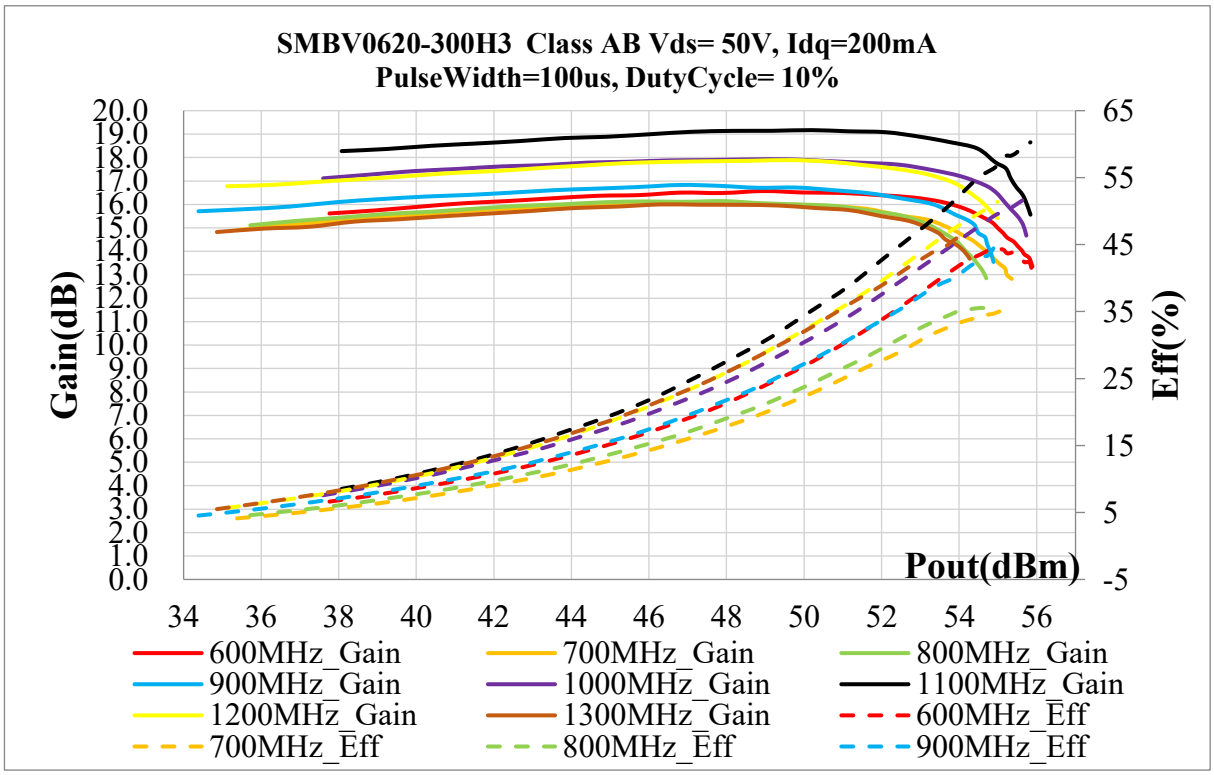
Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	200	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	+55	Vdc
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 25°C, Pout=300W Pulsed CW, FEA	$R_{\theta JC}$	TBD	°C/W

TYPICAL CHARACTERISTICS

Figure 1. Pout，Efficiency as function of Pin under pulse conditions 100us, 10%



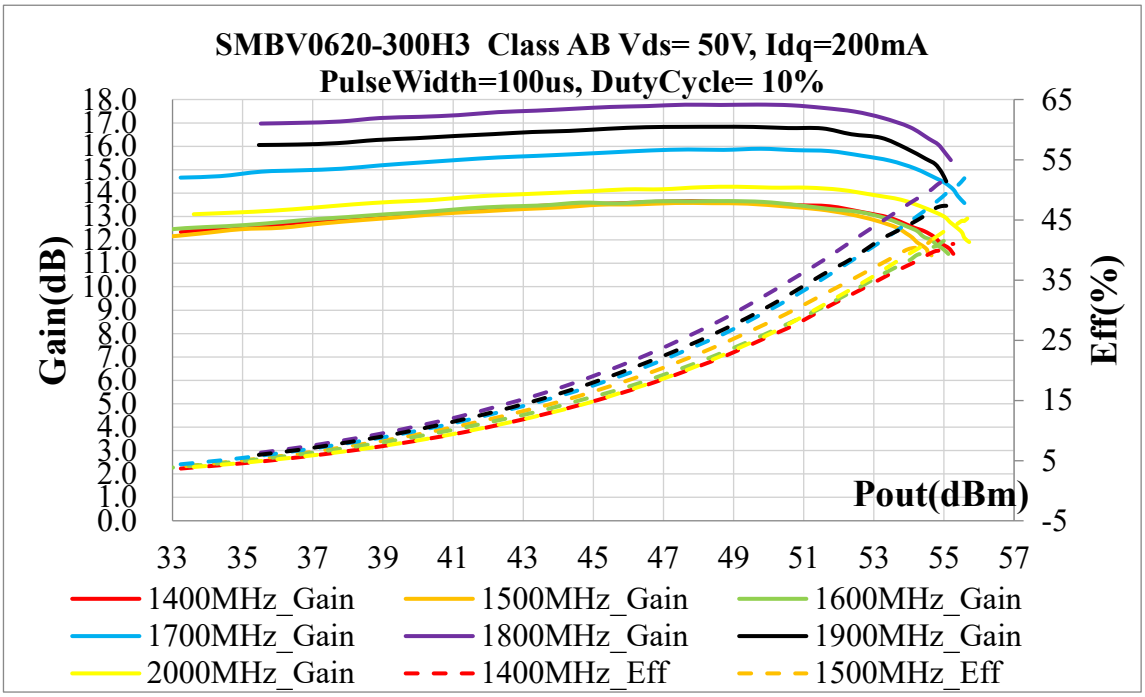
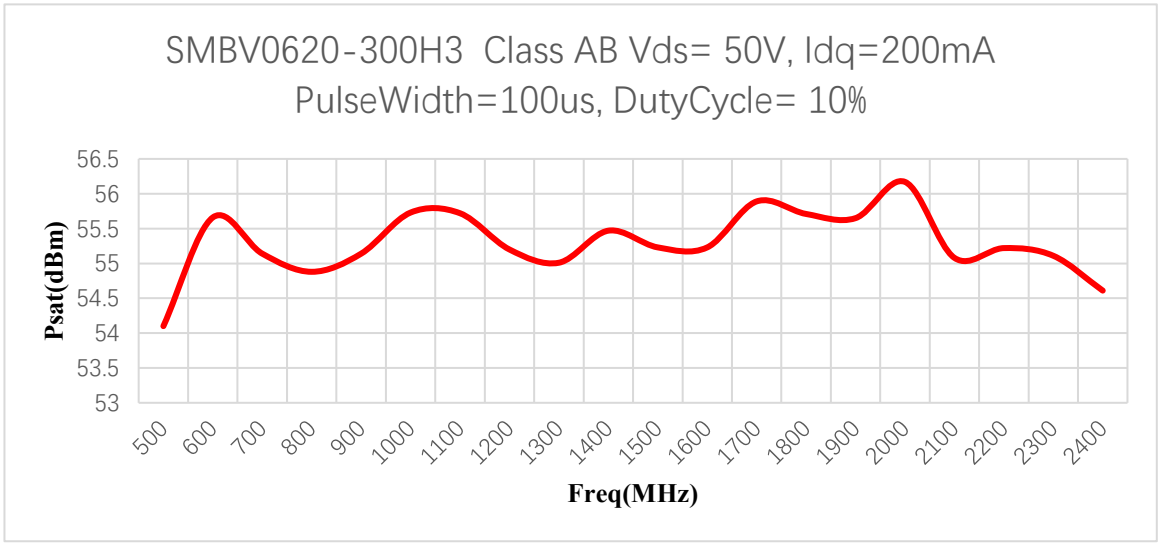
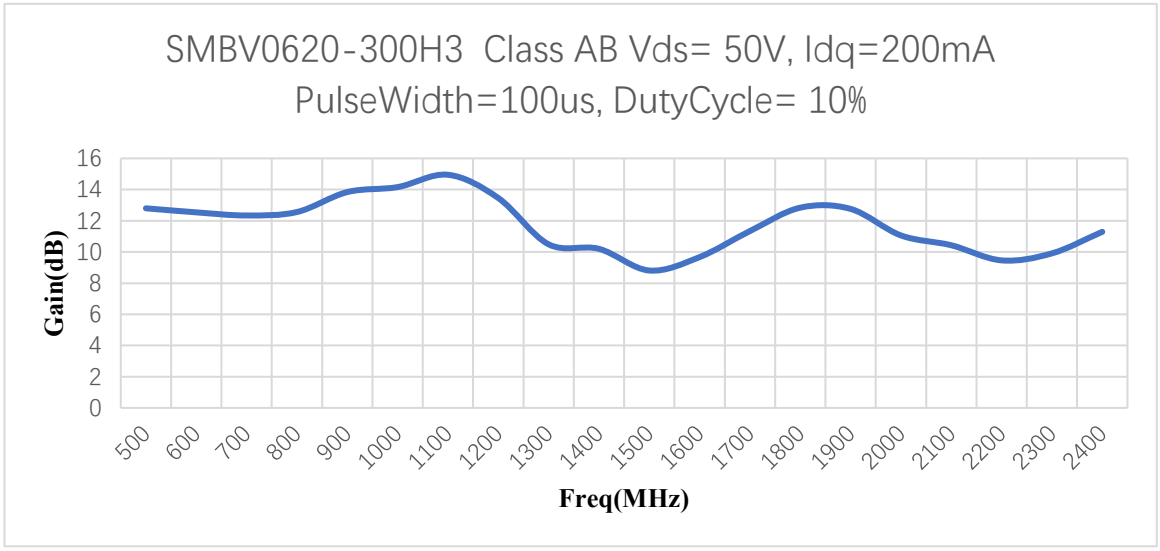


Figure 2. Psat，Efficiency and Gain across the band under pulse conditions 100us, 10%




SMBV0620-300H3 Class AB Vds= 50V, Idq=200mA
PulseWidth=100us, DutyCycle= 10%
Gain(dB)
16
14
12
10
8
6
4
2
0
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
Freq(MHz)

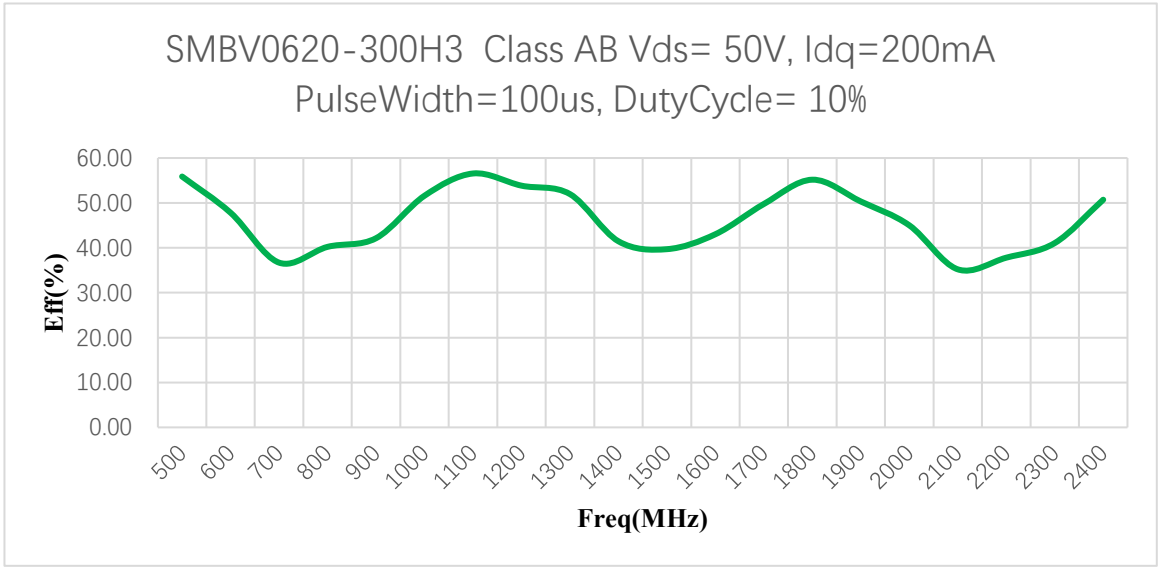
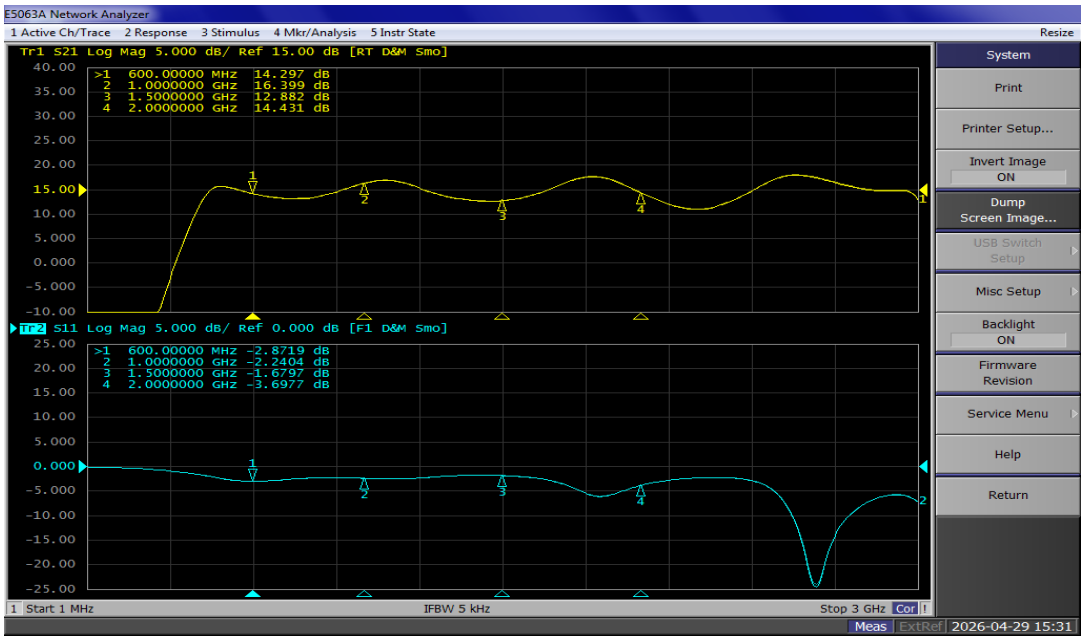
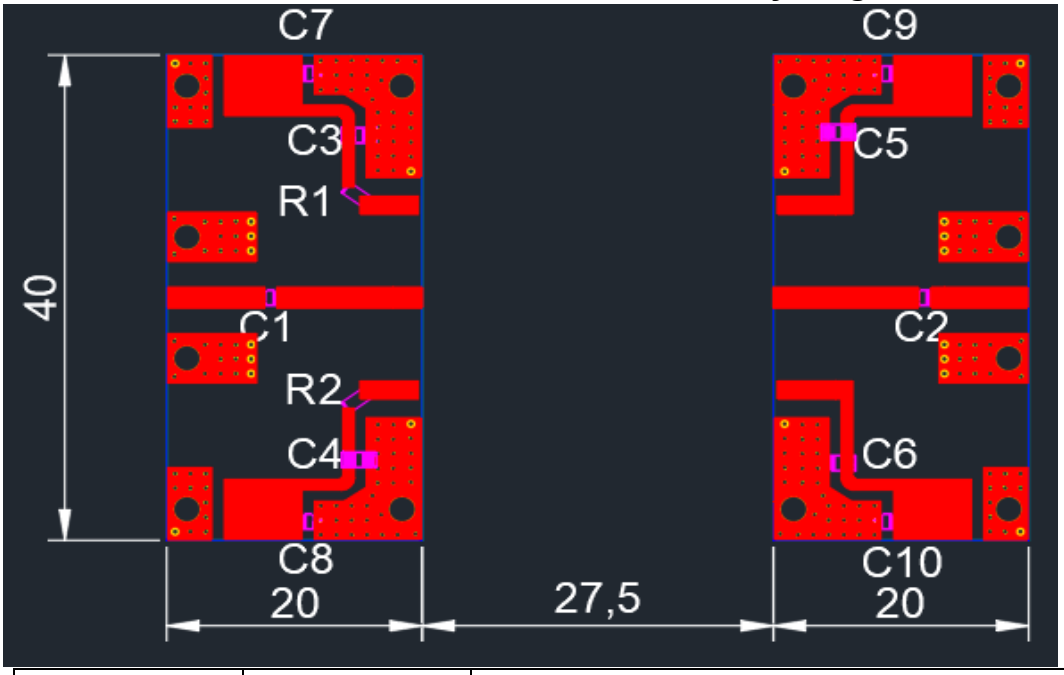

SMBV0620-300H3 Class AB Vds= 50V, Idq=200mA
PulseWidth=100us, DutyCycle= 10%
Eff(%)
60.00
50.00
40.00
30.00
20.00
10.00
0.00
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
Freq(MHz)

Figure 3. Network analyzer output S11/S21 (Pin=0dBm)

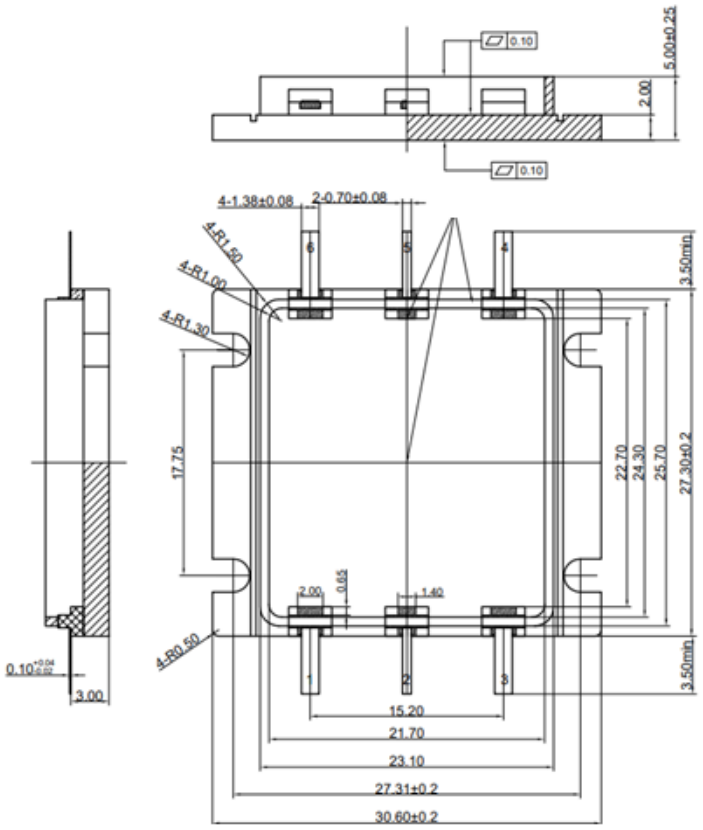


Reference Circuit of Test Fixture Assembly Diagram



Component	Description	Suggested Manufacturer / Series Number
C1 C3 C4 C5 C6	6.8 pF	
C2	6.8 pF x 2	
C3 C4 C5 C6	6.8 pF	
C7 C8 C9 C10	10 uF/1210	TDK
R1	10 Ohm	Open suppliers. 0603 SMD Resistor
PCB	30Mil Rogers 4350	Rogers

Package Dimensions （Unit:mm）



Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2026/4/30	**Rev 1.0**	**Preliminary Datasheet**

Application data based on SJJ-26-10