

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

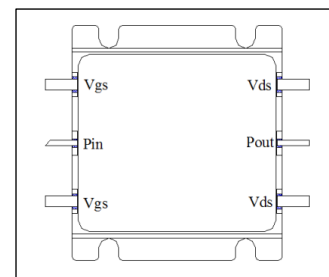
### Description

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  $\Omega$  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**

$V_{gs} = -3.3\text{ V}$ ;  $V_{ds} = 50\text{ V}$ ;  $I_{dq} = 500\text{ mA}$ , 100us, 10%



| Freq(MHz) | Psat(dBm) | Psat(W) | IDS(A) | Pin(dBm) | Gain(dB) | Eff(%) | 2 <sup>nd</sup> Harmonic | 3 <sup>rd</sup> 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**

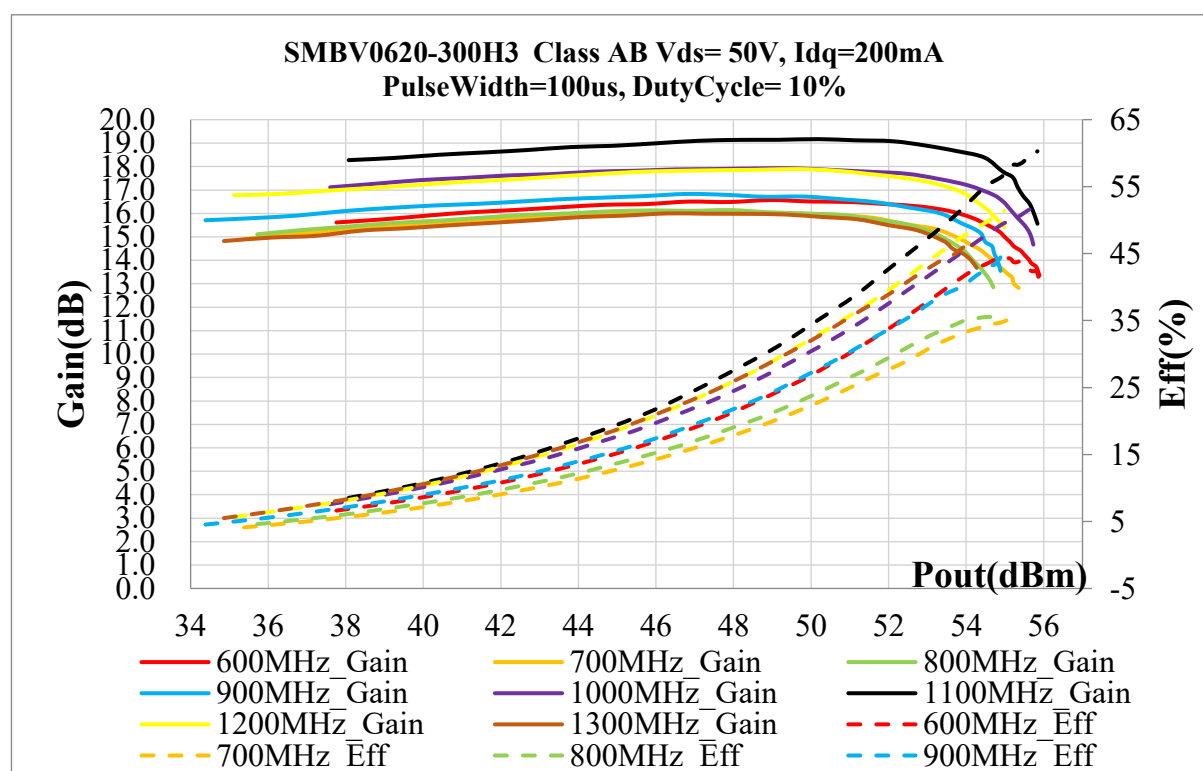
| Rating                         | Symbol    | Value       | Unit |
|--------------------------------|-----------|-------------|------|
| Drain--Source Voltage          | $V_{DS}$  | 200         | Vdc  |
| Gate--Source Voltage           | $V_{GS}$  | -10 to +2   | Vdc  |
| Operating Voltage              | $V_{DD}$  | +55         | Vdc  |
| Storage Temperature Range      | $T_{stg}$ | -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<br>$T_c = 25^\circ\text{C}$ , $P_{out} = 300\text{W}$ Pulsed CW, FEA | $R_{\theta JC}$ | TBD   | °C/W |

## TYPICAL CHARACTERISTICS

**Figure 1.  $P_{out}$ , Efficiency as function of  $P_{in}$  under pulse conditions 100us, 10%**



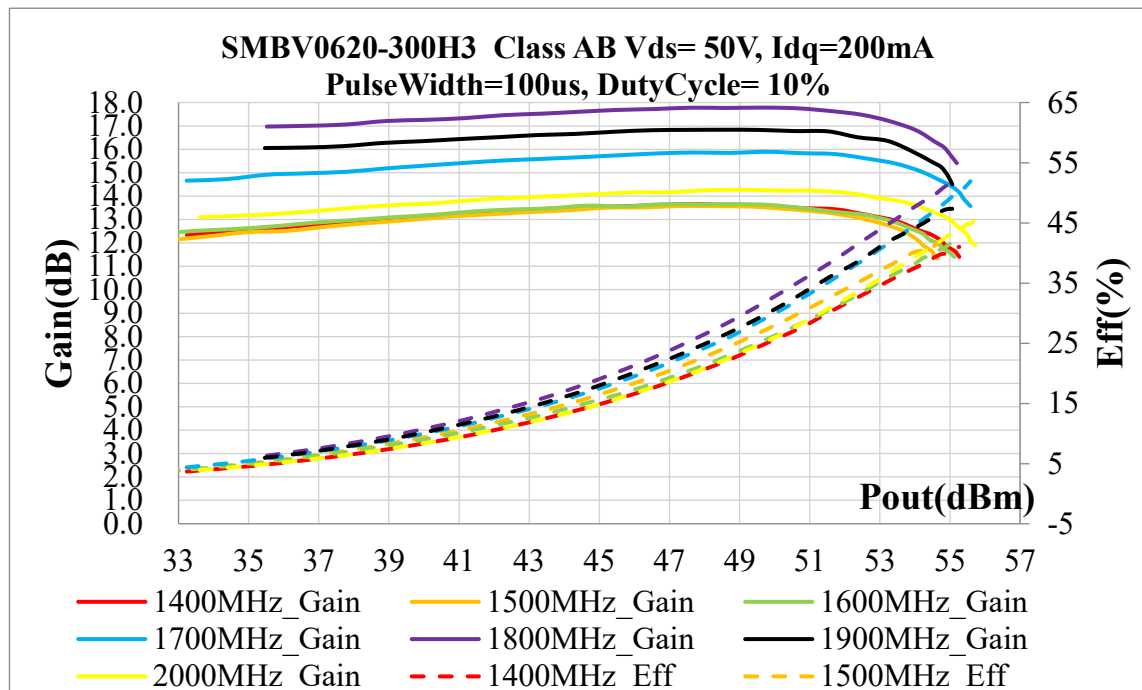
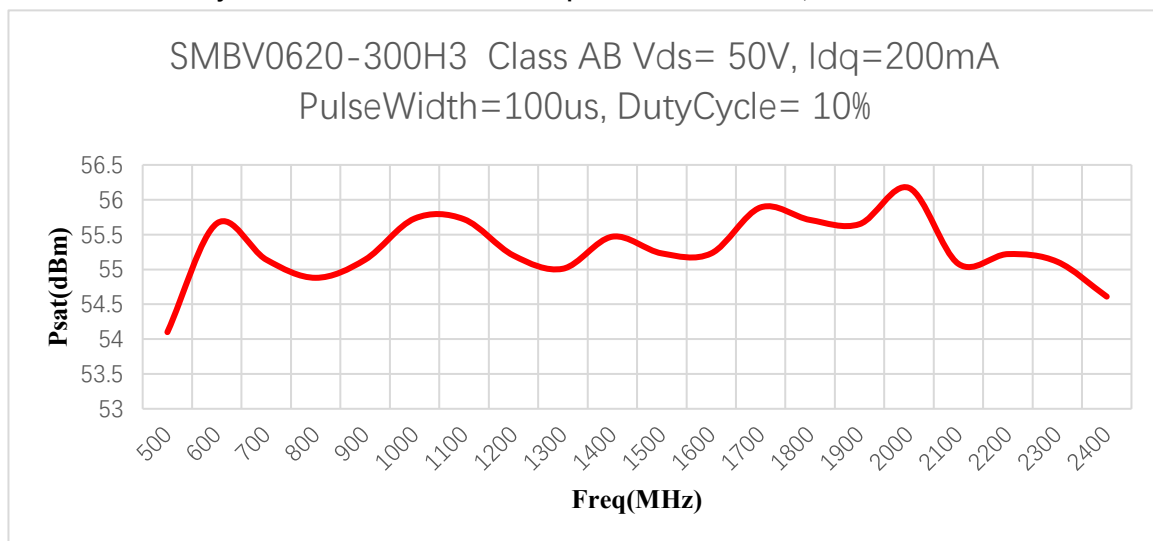


Figure 2. Psat, Efficiency and Gain across the band under pulse conditions 100us, 10%



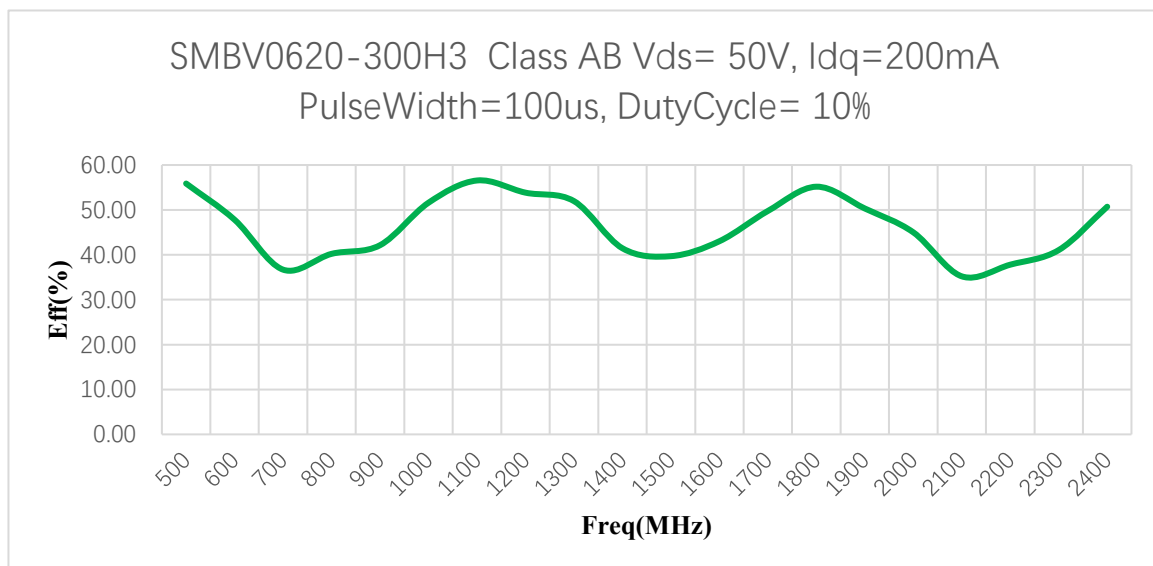
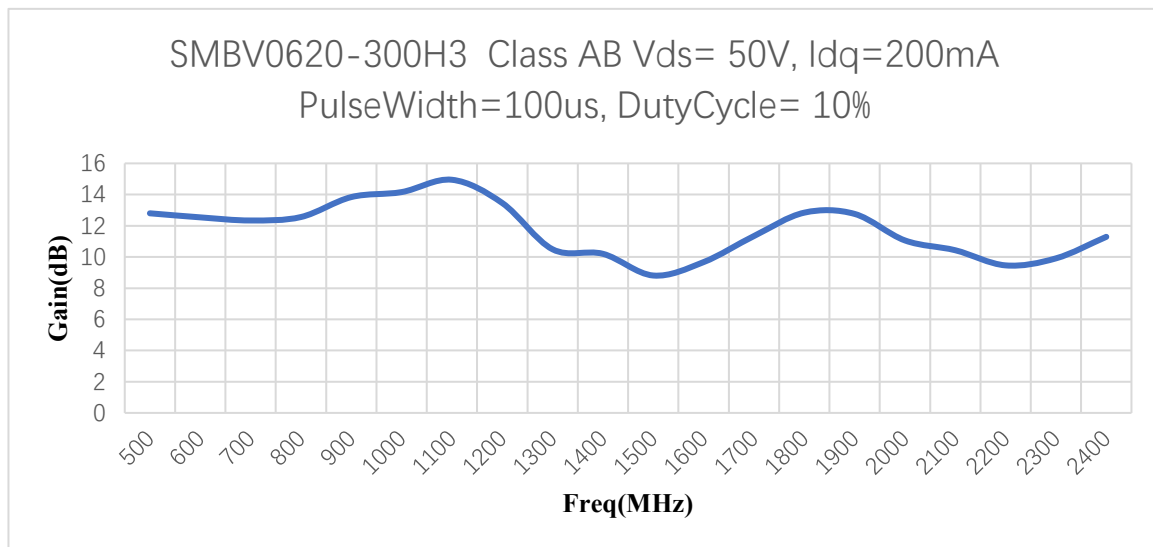
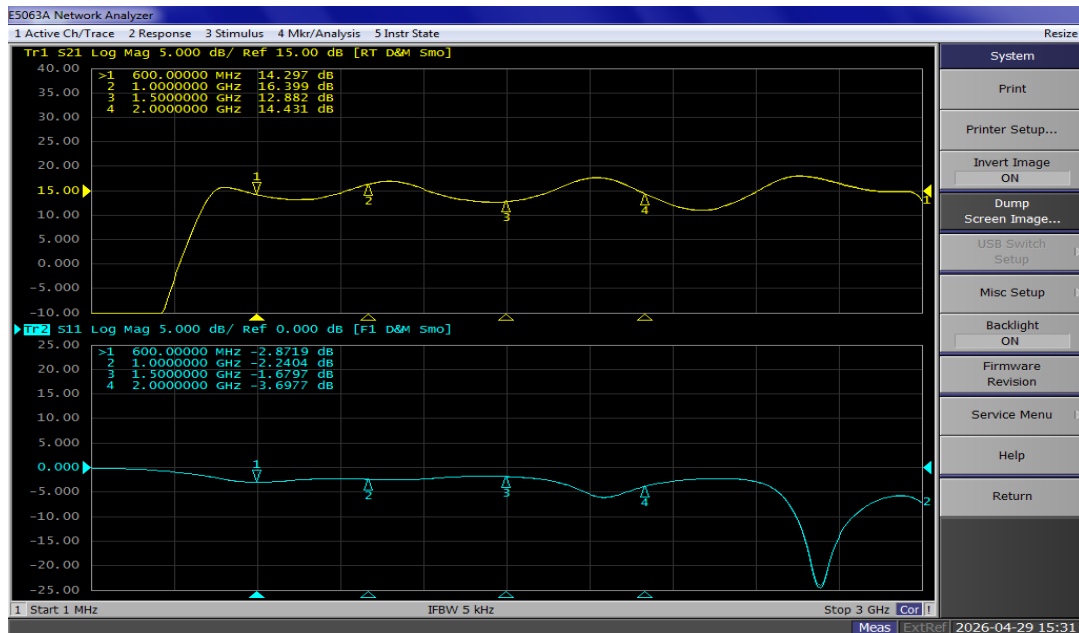
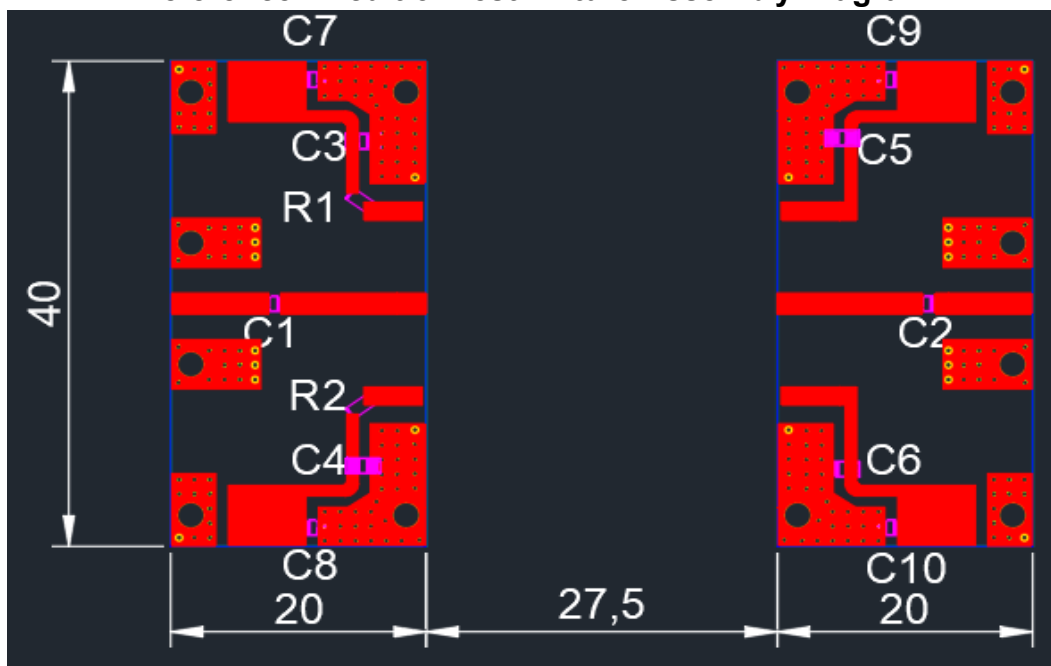


Figure 3. Network analyzer output S11/S21 (Pin=0dBm)

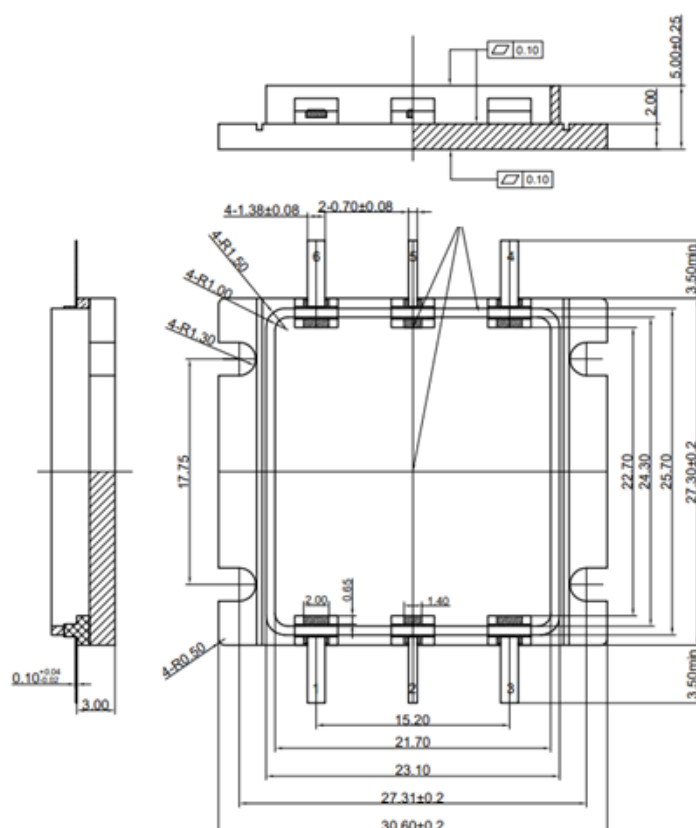


Reference Circuit of Test Fixture Assembly Diagram



| Component      | Description       | Suggested Manufacturer / Series Number |
|----------------|-------------------|----------------------------------------|
| C1 C3 C4 C5 C6 | 6.8 pF            |                                        |
| C2             | 6.8 pF x 2        |                                        |
| 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