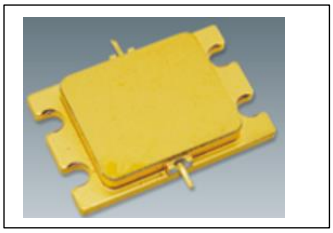
2.7-3.1GHz, 500W, 50V GaN IMFET PA



Description

The SMDV2731-500H2 is a 500-watt,single stage integrated Power Amplifier Module, designed for pulsed amplifier applications, with frequencies from 2.7 to 3.1GHz. 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 17*24 mm metal RF package with excellent capability for heat dissipation.

● Typical Pulsed CW RF performance with device soldered(20us, 10%) V_{DS}=50V, Vgs=-3.4V

● Freq (MHz)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)	P3dB Gain(dB)	P4.5dB (dBm)	P4.5dB (W)	P4.5dB Eff(%)
2700	57.7	589.0	63.1	13.69	57.74	594.2	63.7
2800	57.44	554.5	64.7	14.45	57.59	574.1	65.6
2900	57.36	544.1	62.2	14.82	57.6	575.4	63.4
3000	57.44	555.1	59.9	14.66	57.7	588.9	61.1
3100	57.38	547.4	58.8	13.8	57.64	580.1	60.0

● Product Features

- Operating Frequency Range: 2.7-3.1GHz
- Operating Drain Voltage(Recommended): +50V
- 50 Ω Input/Output (External DC block capacitor needed)
- Psat≥500W (Typical，Pulsed CW)
- Power gain @Pout=500W:>13dB
- Efficiency:>60%
- 17*24 mm metal RF package
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Applications

- S 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

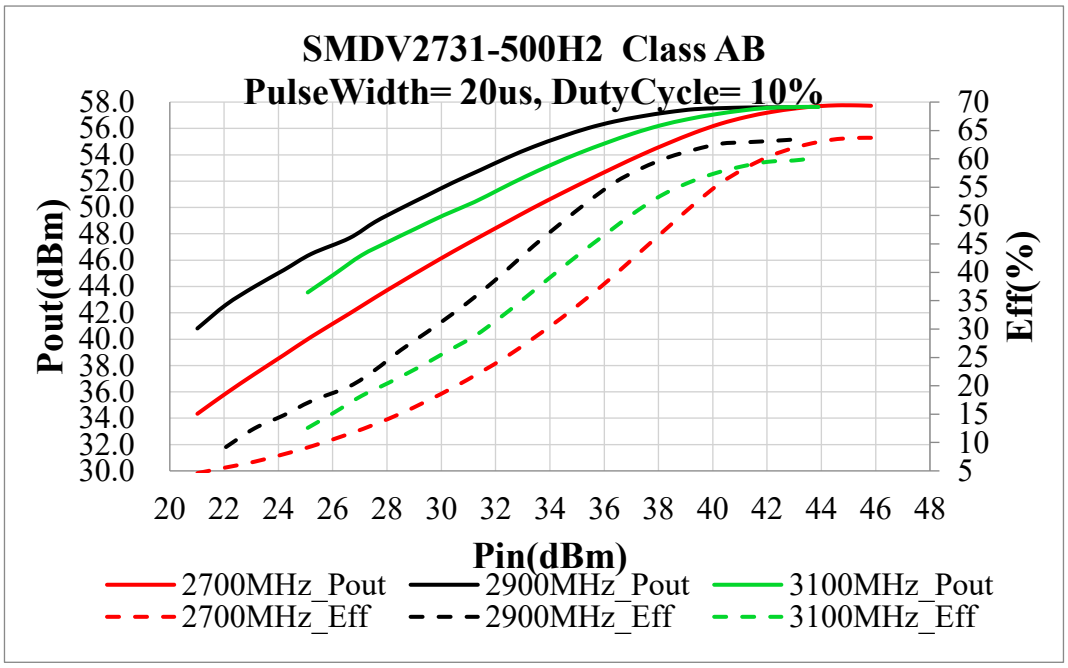
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 25°C, Pout=500W Pulsed CW, FEA	$R_{\theta JC}$	0.6	°C/W

TYPICAL CHARACTERISTICS

Figure 1. Pout，Efficiency as function of Pin under pulse conditions 20us, 10%



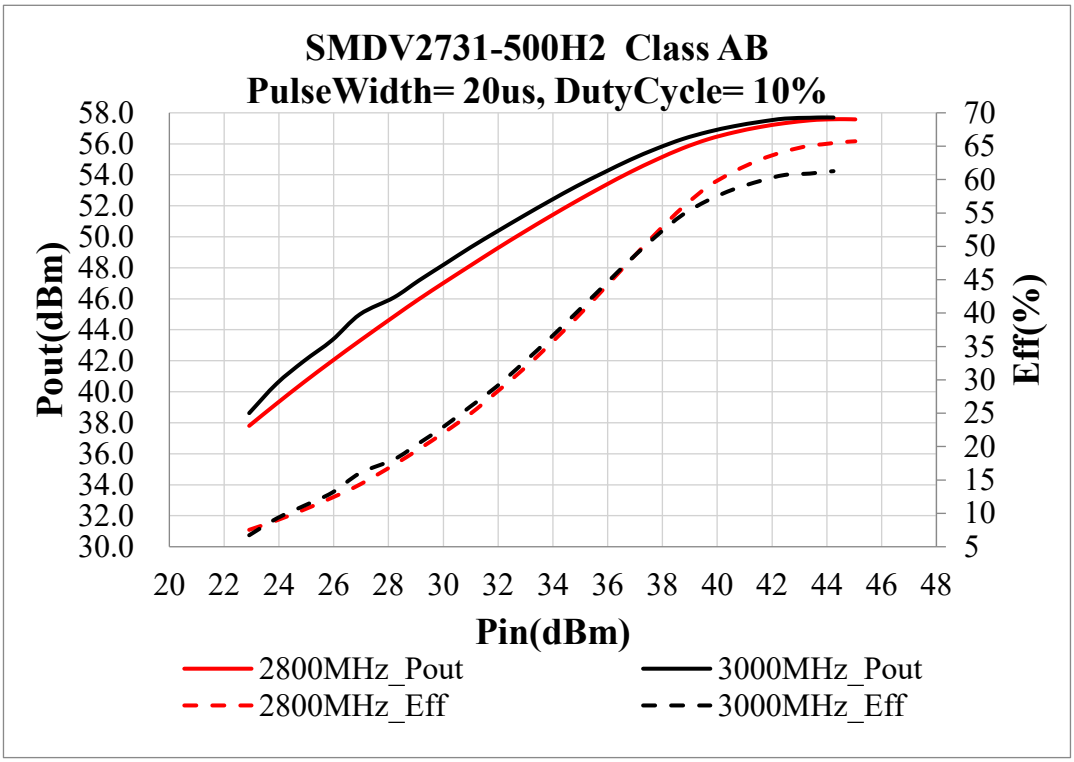
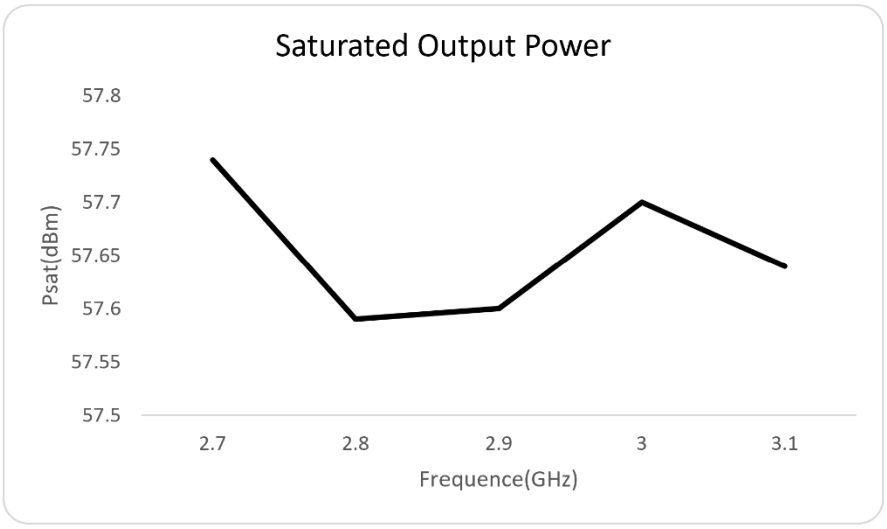
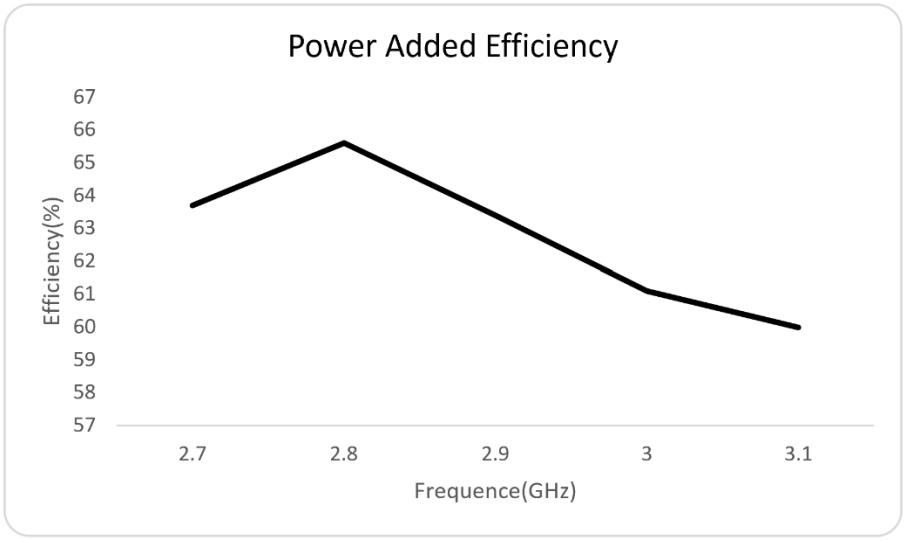


Figure 2. Psat，Efficiency and Pout at Pin=44dBm across the band under pulse conditions 20us, 10%





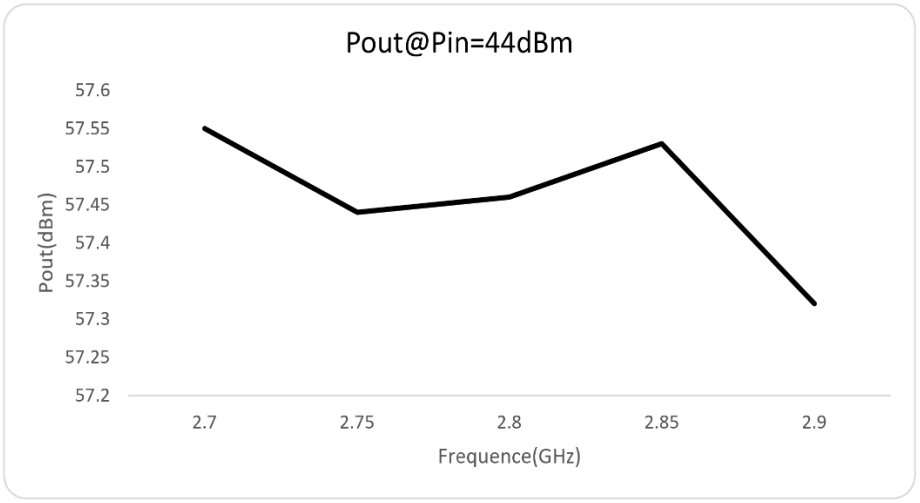
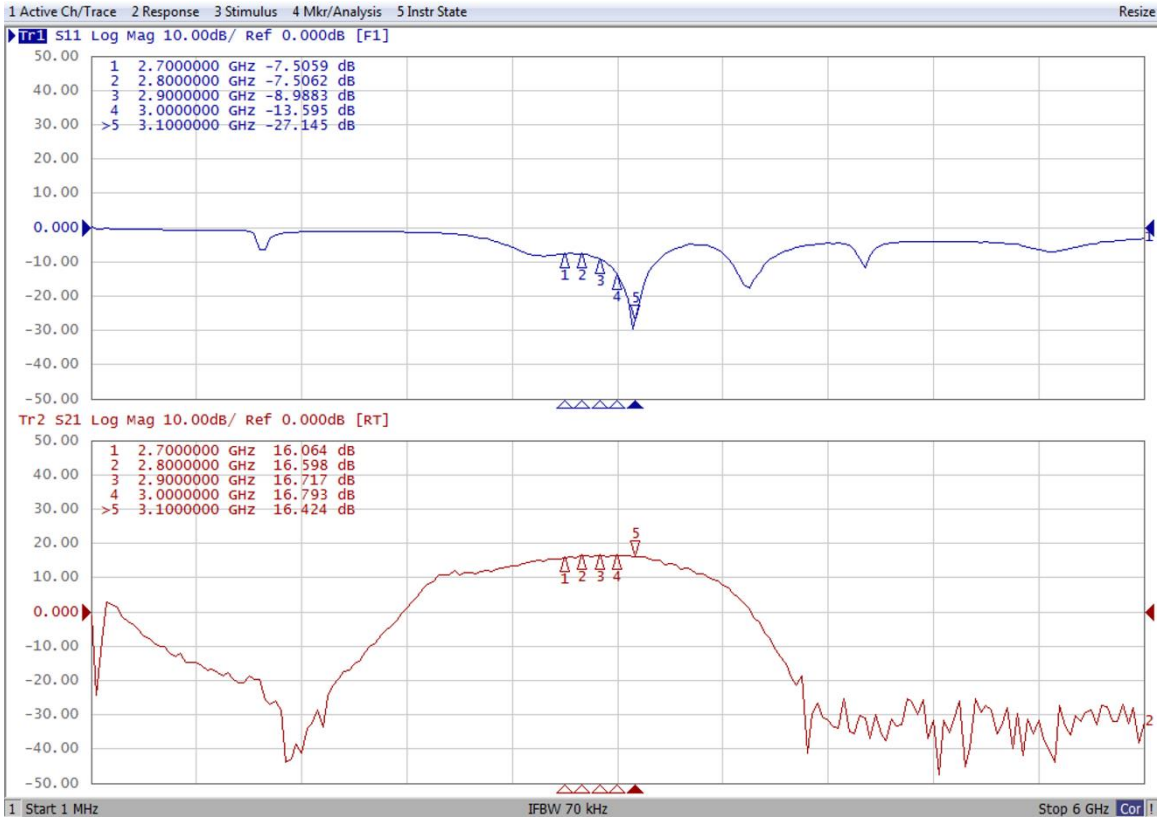
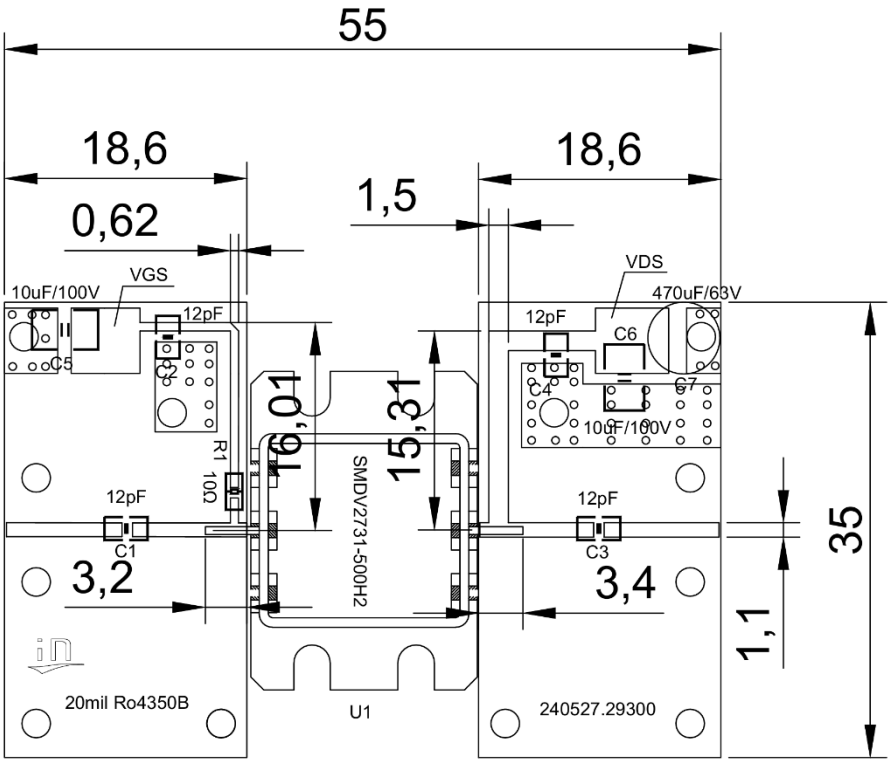
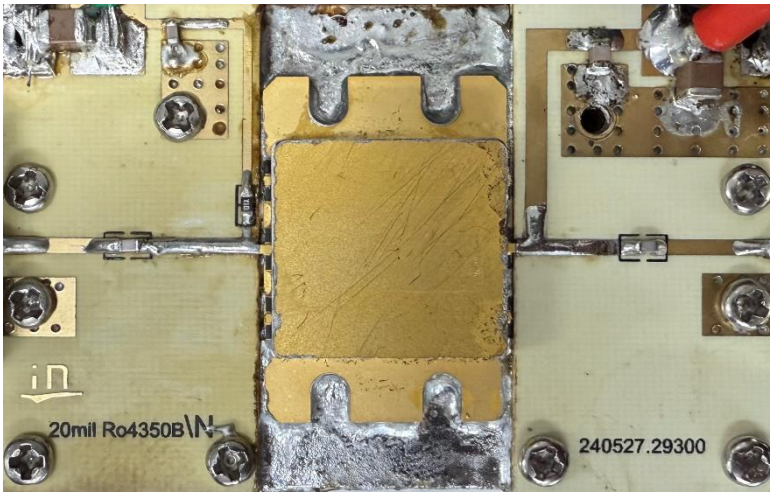


Figure 3. Network analyzer output S11/S21 (Pin=0dBm)



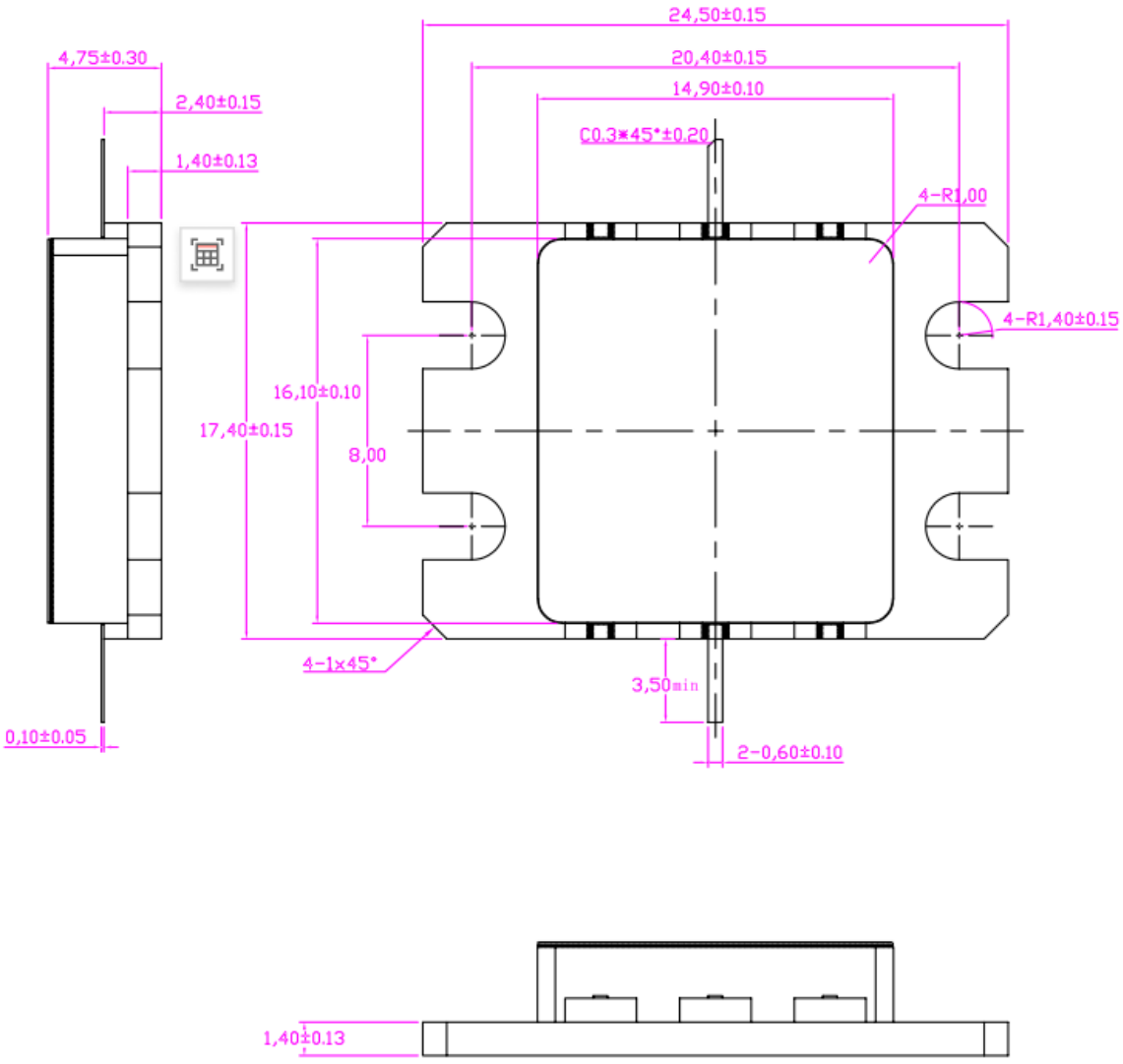
Reference Circuit of Test Fixture Assembly Diagram





Reference	Footprint	Value	Quantity
C1, C2, C3, C4	0805	12pF/250V	4
C5, C6	1210	10uF/100V	2
C7		470 uF/63V	1
R1	0603	10R	1
U1	H2	SMDV2731-500H2	1

Package Dimensions （Unit:mm）



Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2025/6/27	**Rev 1.0**	**Preliminary Datasheet**

Application data based on ZBB-25-20