

TECHNICAL DATASHEET

AVBR1020H53-T1

The AVBR1020H53-T1 is a 200W high gain Solid State Broadband High Power Amplifier with High Average Efficiency around 40%. This amplifier module utilizes the latest high power RF GaN transistors and also features built in control and monitoring, with protection functions to ensure high availability. This amplifier is suitable for broadband jamming and EMC testing, and good consistency for high power combination.

**Features**

- |                                    |                                       |
|------------------------------------|---------------------------------------|
| 1.0GHz-2.0GHz frequency range      | Solid-state Class AB Broadband design |
| Psat 53.4dBm typ., 53dBm Min.      | Instantaneous ultra-broadband         |
| High Average Efficiency around 40% | Design for CW, and Pulse              |
| 50 ohm input/output impedance      | Small and lightweight                 |
| Forward Power Indicator Function   | High reliability and ruggedness       |

**ELECTRICAL SPECIFICATIONS(T=25°C, DC Voltage= 48V, Load VSWR ≤ 1.2)**

Description	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1.0		2.0	GHz
Output Power CW @ Pin = 0dBm	Psat	200	220		W
Output Power Pulse*1 @ Pin = 0dBm	Psat	200	220		W
Pulse Width	PW	0.1		300	us
Duty Cycle	DC	2		10	%
Power Gain @ Pin = 0dBm	Gp	53	55		dB
Power Gain Flatness @ Pin = 0dBm	ΔGp		±1.0		dB
Input Power for Rated PSAT	P <sub>IN</sub>	-2	0	2	dBm
Harmonics @ Pin = -5dBm	2 <sup>nd</sup> / 3 <sup>rd</sup>		-20/-25	-12/-12	dBc
Spurious Signals @ Pin = 0dBm	Spur		-70	-65	dBc
Input Return Loss	S11			-10	dB
Third Intermodulation					
2-Tone @ 44dBm/Tone, 100kHz Spacing*2	IMD3		N/A		dBc
Operating Voltage	V <sub>DC</sub>	42	48	50	V
Quiescent Current @ Enable=+3.3V	IDQ		1.5		A
Current Consumption @ Pout= 200~220 W	IDD		11	14	A
Power Added Efficiency @ Pout= 200~220 W	PAE	30	40		%
Module to Module Amplitude Tracking (±) *3 @ Pin = 0dBm	ΔGt			1	dB
Module to Module Phase Tracking (±) *3 @ Pin = 0dBm	ΔGp		10	15	°
Switching Time @ 1kHz TTL, Pin = 0dBm	TON/TOFF			500	nS

- Note\*1** : Pulse status Duty Cycle=10%, Pulse Width=300uS.  
**Note\*2** : IP3 or IMD3 data, please contact sales engineer.  
**Note\*3** : Module to module consistency data, please contact sales engineer.

## MECHANICAL SPECIFICATIONS

Cooling External Heat Sink Needed (Not Supplied)

Length* Width*Height[ mm ]	200*140*25
Weight[ Kg ] ,Max	2.2
RF Connector Input	SMA, Female
RF Connector Output	Type N, Female
DC interface connector	Hybrid D-Sub 7 Pin, Male

## ENVIRONMENTAL SPECIFICATIONS

Module Operation Temperature	-55	85*1	°C
Storage Temperature Range	-55	85	°C
Relative-Humidity		95	%
Altitude *2	N/A		
Vibration/Shock *2	N/A		

**Notes** \*1: Should Supply Adequate Heat Dissipation, Enough Fan and Heat-Sink is necessary during the Temp Test.

**Notes** \*2: Altitude /Vibration are designed with considerations, but without tests and experiments.

## LIMITS

Input RF drive level without damage	Pin ≤ 10	dBm
Load VSWR @ POUT =150W	VSWR ≤ 5:1 [Design To Meet]	N/A
Load VSWR @ POUT =200W	VSWR ≤ 3:1 [Design To Meet]	N/A
Thermal Degradation	Module Surface=95 ± 5°C [recovery@85 ± 5°C]	°C

## DC INTERFACE CONNECTOR – [Hybrid D-Sub 7 Pin, Male]

Pin #	Description	Specifications
A1	GND	Ground
A2	VDD	48VDC
1	CURRENT SENSE	Analog voltage relative to IDD @ 100mV per Ampere
2	TEMP SENSE	Analog voltage relative to Module's Temperature @ 10 mV/°C*1
3	ENABLE	Amplifier Disable: TTL Logic Low(0~0.6V) Amplifier Enable: TTL Logic High(3.3~5V)(Internally Pulled-Low)
4	GND	Ground
5	POWER INDICATOR*2	Output power ≥ 20W: TTL Logic High (3.3~5V) (Internally Pulled-Low).

**Note**\*1: Temp sense has a positive temperature coefficient of approximately 10mV/°C by design.

The Temp sense voltage can be calculated using the equation: VT(mV)= 500mV+10mV\*Temp

The temperature sensor can operate from -55°C-+125°C, but can only indicate the voltage range from -50°C-+125°C.

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The operating temperature  $-50^{\circ}\text{C}$ , temperature detecting output voltage is 0V. The operating temperature  $+125^{\circ}\text{C}$ , temperature detecting output voltage is 1.75V,

**Note\*2:** Use Power indicator to make sure the power amplifier is operating Ok. Pin5 outputs a high level (3.3~5V), indicating that the amplifier output power is  $\geq 20\text{W}$  (test conditions: single tone, continuous wave). Pin5 can also be changed to an analog voltage output (forward power detection, analog voltage), and the output voltage changes linearly with the positive output power (Power indicator has a negative power coefficient of approximately +40 mV/dB by design). Please contact sales if you want customize this function.

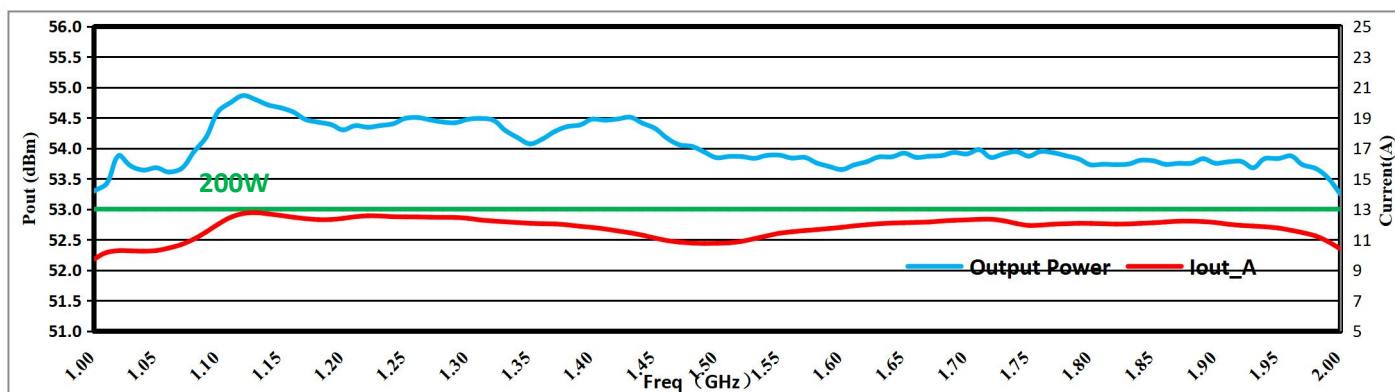
**PLOTTED AND OTHER DATA**

Notes:

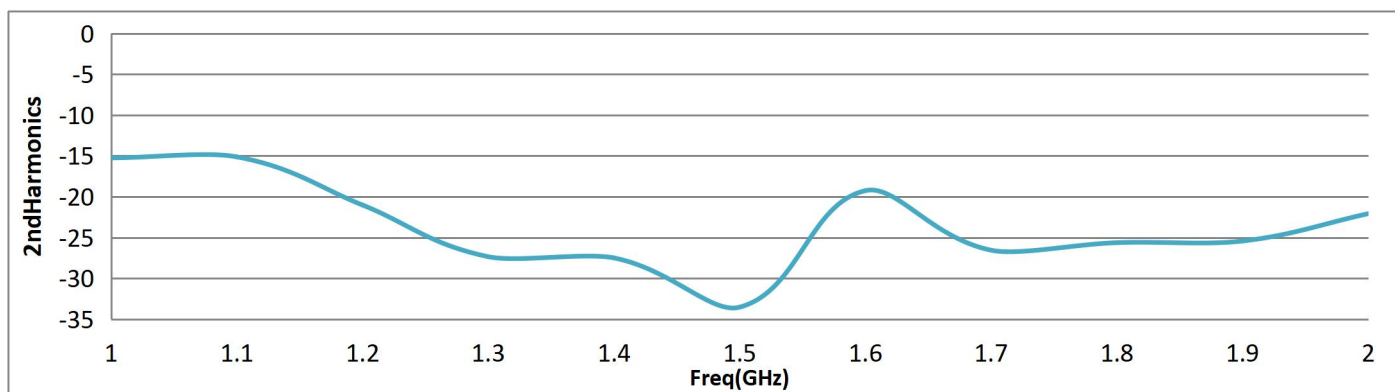
1. Values at  $+25^{\circ}\text{C}$ , sea level.
2. ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in approved ESD Workstation.
3. Heat Sink required for Proper Operation, Unit is cooled by conduction to heat sink.

**TYPICAL PERFORMANCE DATA**[Volume Shipment product data for Reference] [ DC Voltage= 48V, CW, Load VSWR

$\approx 1.2$ , Ambient temp.  $+25 \pm 3^{\circ}\text{C}$ ]

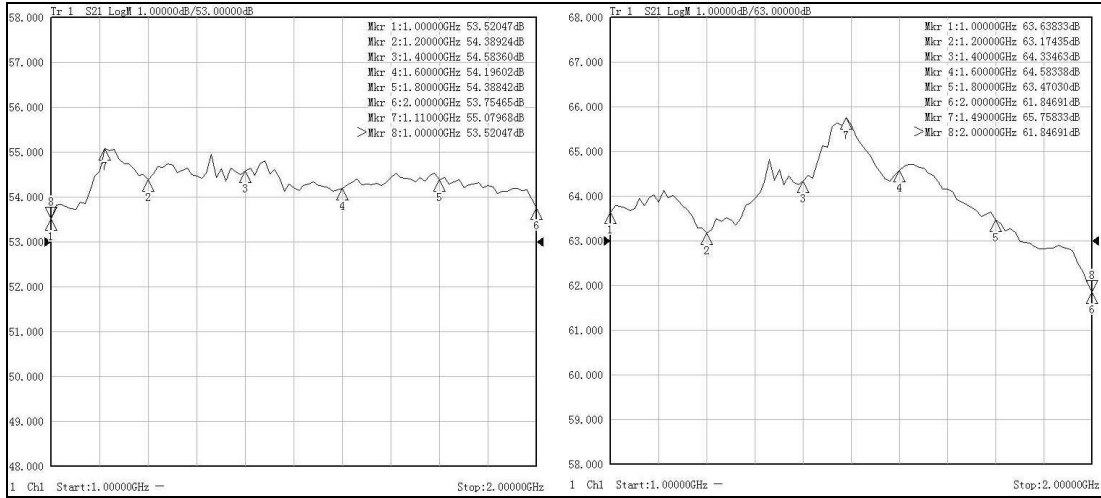


**Output power & Iout (Pin=0 dBm)**

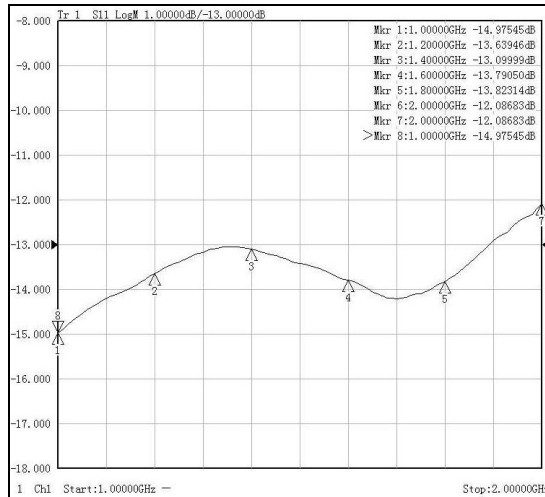


**2nd Harmonics @Pin=-5 dBm**

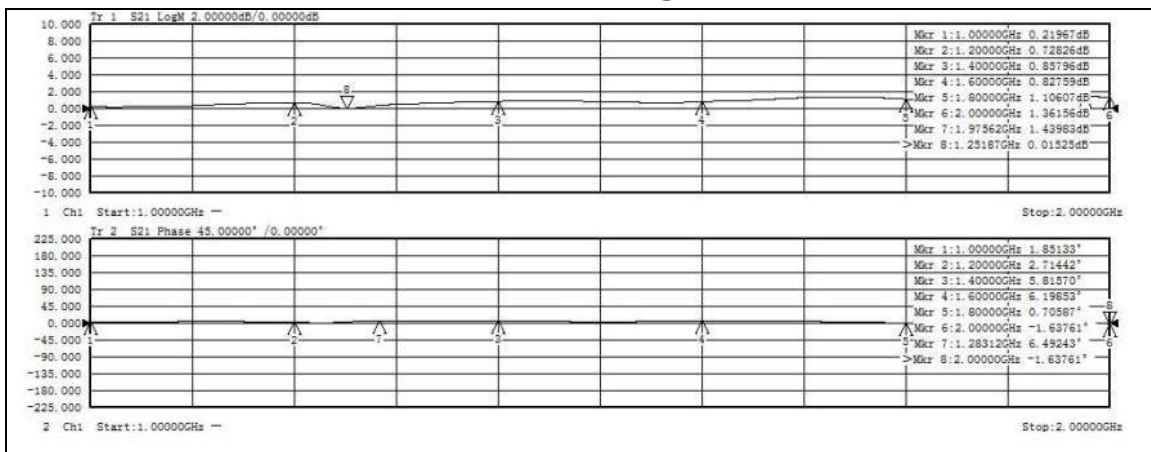
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**Graph Left: Power gain@ Pin=0 dBm, Right: small signal gain@ Pin=-30 dBm**

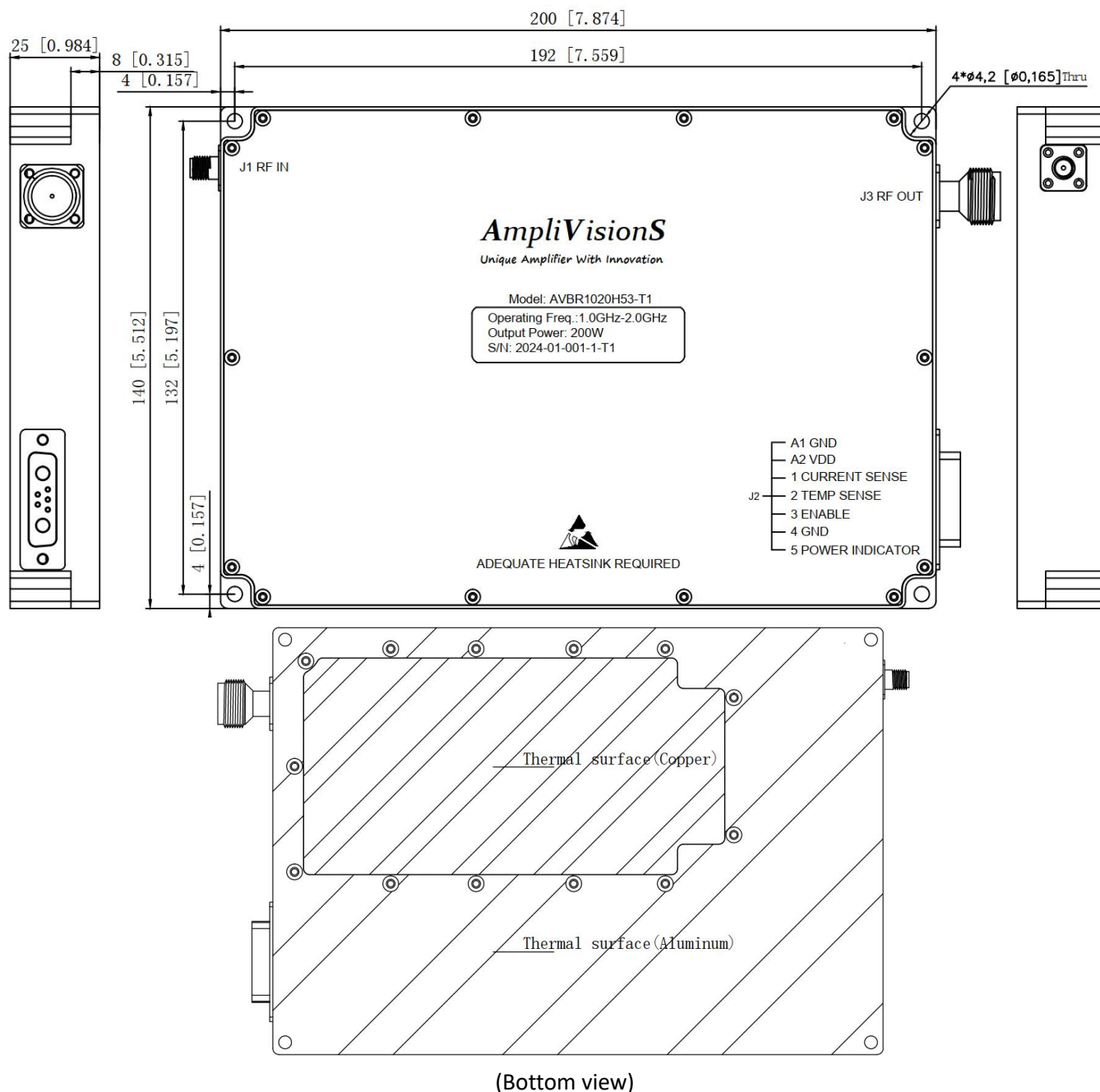


**Input return loss@ Pin=-25**



**Module to Module Amplitude &Phase Tracking@ Pin = 0dBm**

**OUTLINE DRAWING [mm]. Surface: Nickel plating.**



Unit: mm[inch] Tolerance:  $\pm 0.2$  [0.008]

Note \*1: The Outline and Functions can be customized, please contact our sales for further information.

Note \*2: thermal grease with a thermal conductivity of 3-6W/m-K is recommended. Accessory type AVS002 is recommend

**OUTLINE - Fabricated (AVBR1020H53)**



Part Number	Version	Release Date	Modification	Status
AVBR1020H53-T1	1.0	2024.4.25	Based on Product data AVBR1020H53 Module Operation Temperature changed from -50-+75°C to -55-+85°C; Storage Temperature Range changed from -50-+85°C to -55-+85°C;	Preliminary
AVBR1020H53-T1	1.1	6/7/2024	Add note:The temperature sensor can operate from -55°C-+125°C , but can only indicate the voltage range from -50°C-+125°C. The operating temperature -50°C,temperature detecting output voltage is 0V,The operating temperature +125°C,temperature detecting output voltage is 1.75V,	Preliminary
AVBR1020H53-T1	1.2	6/5/2024	Update outline drawing based product	Preliminary
AVBR1020H53-T1	1.3	2/12/2025	1. Updated the Pin5 silk screen from N/C to POWER INDICATOR 2. Added POWER INDICATOR function 3. Update test data Curve. 4. Updated product appearance (updated trademark); 5. Added bottom surface heat dissipation distribution diagram	Volume Production