

TECHNICAL DATASHEET

AVNP5600H59

The AVNP5600H59 is a 800W high gain Solid State High Power Pulsed Amplifier. 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 high power pulse applications or Radar system.

Features

5.3GHz-5.8GHz frequency range	Solid-state Class A/B design
Psat 58.5 dBm min, 59dBm Typ.	Wideband chirp
Power gain 59dB	Suitable for pulse applications or Radar system
Built-in control, monitoring and protection circuits	Small and lightweight

ELECTRICAL SPECIFICATIONS (T=25°C, DC Voltage= 32V, PW=100us, DC=10%, Load VSWR≤1.2)

Description	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	5.3		5.8	GHz
Output Power @Pin=0 dBm	PPK	700	800		W
Pulse Width* ¹	PW	0.2		100	us
Duty Cycle	DC		10	15	%
PRI	PRI	70		1300	us
Input Power for Rated P _{SAT}	P _{IN}	-2	0	2	dBm
RF Input Range	P _{IN}	-10		10	dBm
Harmonics @Pin=0 dBm	2 nd		-45	-35	dBc
Spurious Signals@ Pin=0 dBm	Spur		-65	-60	dBc
Input Return Loss@ Pin=-30dBm	S ₁₁		-15	-10	dB
Noise Level @ Enable= 0 V, RF Switching= 0 V	P _{floor}		-120	-100	dBm
Rise /Fall time (Pulse Performance)	TRISE/FALL/OFF(10-90)		50		ns
Power droop	Droop		0.5	0.8	dB
Input/Output Impedance	Impedance		50		Ω
Operating Voltage	VDC	30	32	33	V
Average Current Consumption @ Pout=700W~800W@DC=10%	IDD-AVG		8	9.5	Amp
Power Added Efficiency	PAE	20	25		%
Enable Switching Time @ 1kHz TTL, PIN = 0dBm* ²	T _{Enable}		1	1.2	μs
RF Switching Time@ 1kHz TTL, PIN = 0dBm* ³	T _{RFON/OFF}		50	150	ns

Note *¹: The input pulse signal with a pulse width of 200ns is only 160ns after being output by the power amplifier

TECHNICAL DATASHEET

AVNP5600H59

module. (Reason: The power amplifier module group delay is 40ns).

Note ^{*2}: Enable Switching Time means how long it will take to turn on or turn off Quiescent Current of Transistors. which is controlled by Pin3-ENABLE. , and can be customized for less than 1us, please contact our sales.

Note ^{*3}: RF Switching Time means how long it will take to turn on or turn off the RF-Switch before the pre-driver stage, which is controlled by Pin5-RF ON/OFF.

PROTECTION AND WARNING FUNCTION

Over threshold of pulse width (High pulse width)

Factory setting: for pulse width protection exceeding about 250us, and input signal amplitude $\geq -15\text{dBm}$.

Over threshold of duty cycle (High duty cycle)

Factory setting: over 25% duty cycle and input signal amplitude $\geq -15\text{dBm}$, then over-duty cycle protection

Over threshold of current

Factory setting: $\text{IDD_Avg} \geq 14\text{A}$, then over current protection

Over threshold of temperature

Warning low RF output power (optional)

Output Power Level Indicator (optional)

Note: The factory setting value is subjected to change without any notice.

MECHANICAL SPECIFICATIONS

Cooling External Heat Sink Needed (Not Supplied)

Length* Width*Height[mm]	350x 180 x35
Weight[Kg]	4
RF Connector Input	Type SMA-K, Female
RF Connector Output	Typ-N, Female
DC Interface Connector	Hybrid, D-Sub 7W2, Male

ENVIRONMENTAL SPECIFICATIONS (Design to Meet)

Module Operation Temperature ^{*1}	-20	60 ^{*2}	°C
Storage Temperature Range	-40	85	°C
Relative-Humidity		95	%
Altitude ^{*2}	N/A		
Vibration/Shock ^{*2}	N/A		

Note ^{*1}: If the temperature needs to be extended or customized condition, such as $-45^{\circ}\text{C} \sim +75^{\circ}\text{C}$, please contact our sales.

Note ^{*1}: Should Supply Adequate Heat Dissipation, Enough Fan and Heat-Sink is necessary during the Temp Test.

Note ^{*2}: Altitude /Vibration are designed with considerations, but without tests and experiments.

TECHNICAL DATASHEET

AVNP5600H59

LIMITS

Input RF drive level without damage	$P_{in} \leq 10$	dBm
Load VSWR @ POUT =500W	$VSWR \leq 5:1$ (Duty Cycle=10%)	N/A
Thermal Protection	$90 \pm 5^{\circ}\text{C}$ @ heat-sink [recovery@ $<80 \pm 5^{\circ}\text{C}$]	$^{\circ}\text{C}$

DC INTERFACE CONNECTOR – [Hybrid D-Sub 7W2, Male]- CONFIGURATION 1 Analog Control*¹

Pin #	Description	Specifications
A1	GND	Ground
A2	VDD	32VDC
1	CURRENT SENSE	Analog voltage relative to IDD @ 100mV per Ampere
2	TEMP SENSE	Analog voltage relative to Module's Temperature @ 10 mV/ $^{\circ}\text{C}$ * ²
3	ENABLE(TX-GATE)	Amplifier Enable: TTL Logic High (2.8-5.5V)(Internally Pulled-Low)* ³
4	GND	Ground
5	RF ON/OFF	RF On: TTL Logic High (2.8-5.5V) (Internally Pulled-Low)* ³

DC INTERFACE CONNECTOR – [Hybrid D-Sub 7W2, Male]- CONFIGURATION 2:RS232 Control*¹

Pin #	Description	Specifications
A1	GND	Ground
A2	VDD	32VDC
1	RS232(-)	Transmit data-RxD
2	RS232(+)	Transmit data-TxD
3	ENABLE(TX-GATE)	Amplifier Enable: TTL Logic High (3.3V) (Internally Pulled-Low)* ³
4	GND	Transmit data-GND
5	RF ON/OFF	RF On: TTL Logic High (2.8-5.5V) (Internally Pulled-Low)* ³

Note*¹: Default Option is CONFIGURATION 1 Analog Control

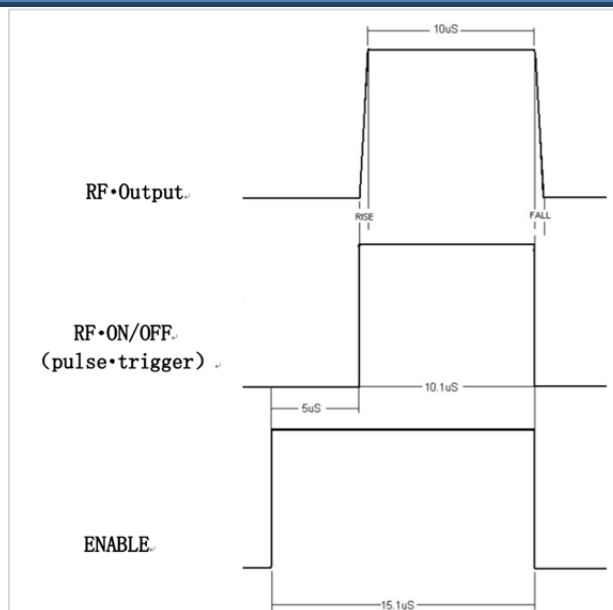
Note*²: Temp sense has a positive temperature coefficient of approximately 10mV/ $^{\circ}\text{C}$ by design.

The Temp sense voltage can be calculated using the equation: $V_T(\text{mV}) = 500\text{mV} + 10\text{mV} * \text{Temp}$

Note*³: Typical Function diagram-Relationship between ENABLE, RF ON/OFF, RF-output/input: (10uS RF pulse.)

TECHNICAL DATASHEET

AVNP5600H59



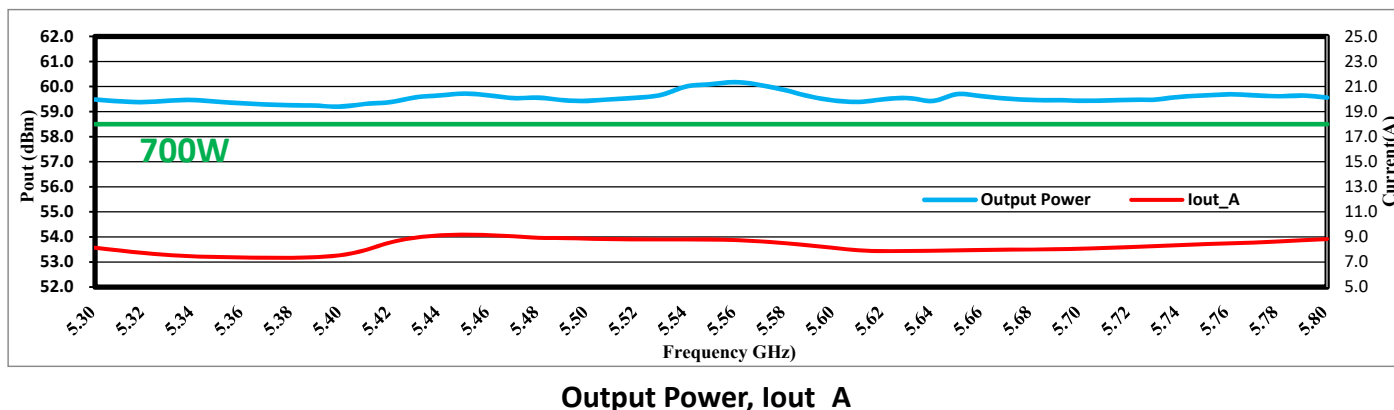
PLOTTED AND OTHER DATA

Notes:

1. Values at +25°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.

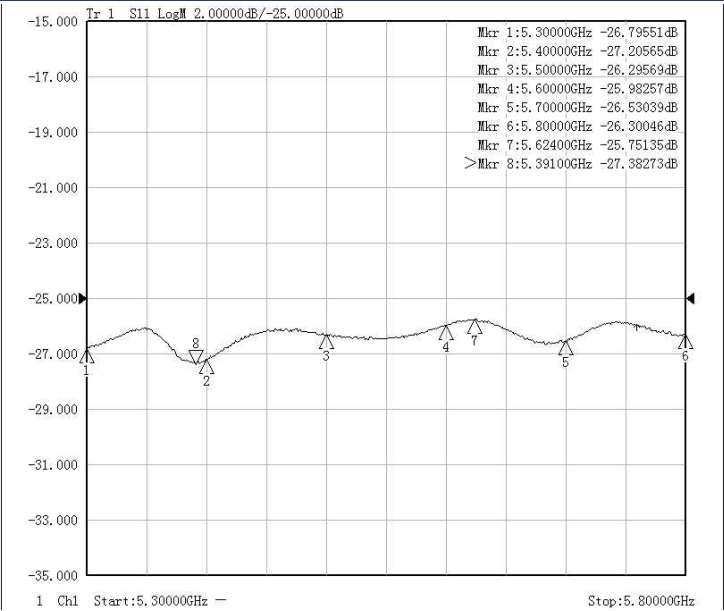
TYPICAL PERFORMANCE DATA [Volume Shipment product data for Reference]

[DC Voltage= 32V,PW=10us,DC=10%,Load VSWR ≤ 1.2,Ambient temp. +25±3°C]

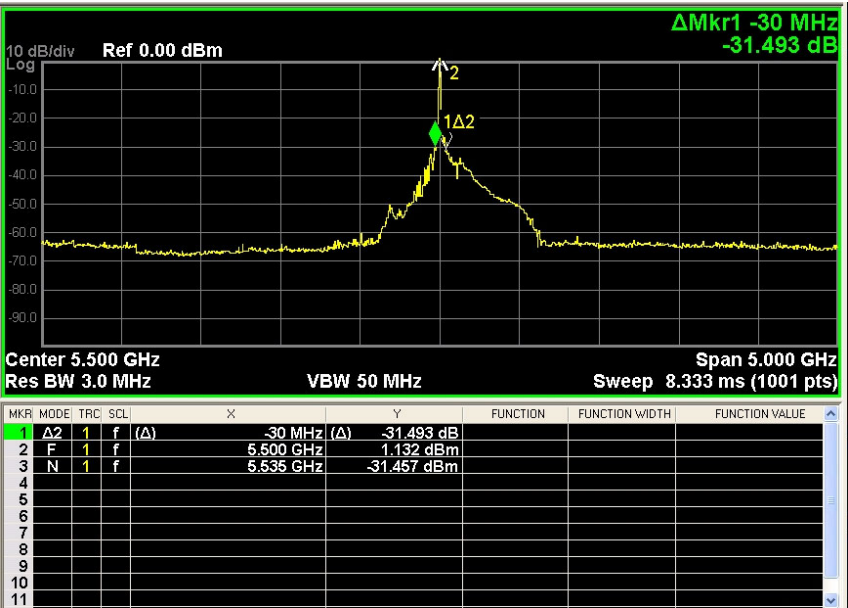


TECHNICAL DATASHEET

AVNP5600H59



Input Return Loss (Pin=-30dBm)



The characteristic of the Pulse by spectrum analyzer (Center: 5.5GHz)

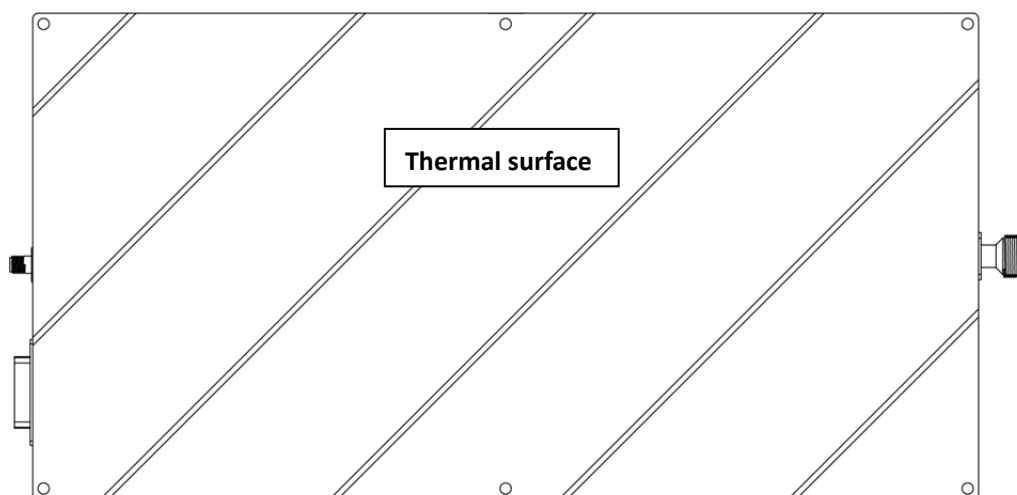
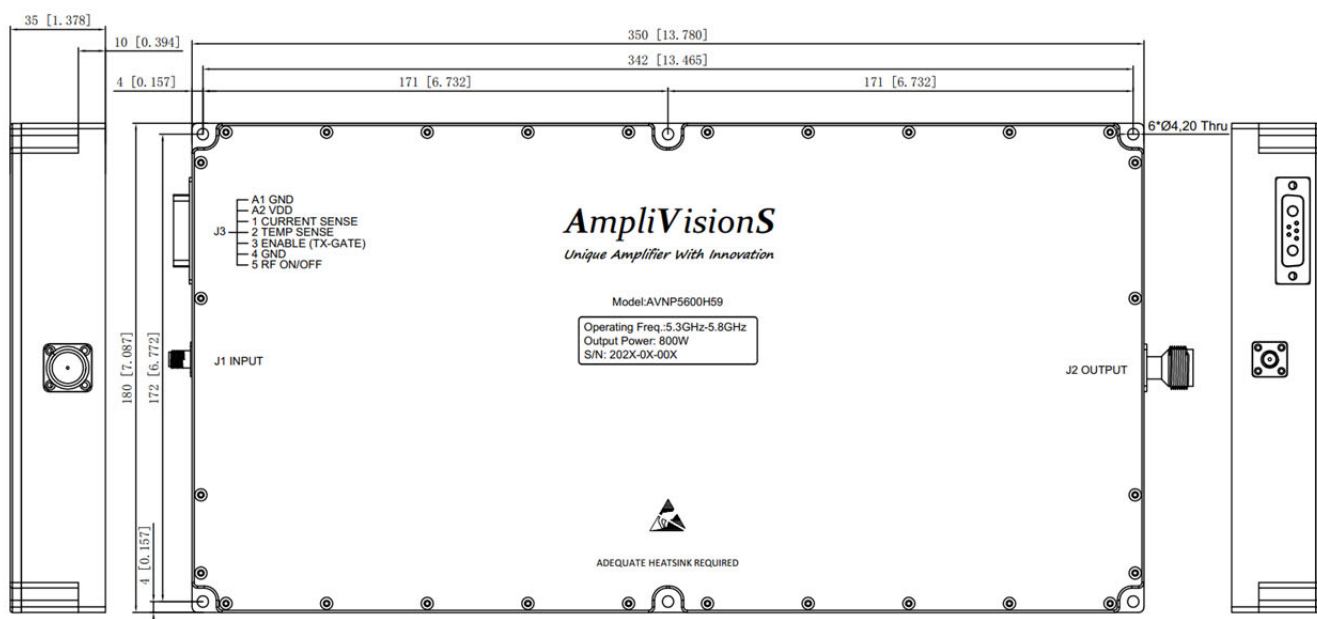
59dB Gain, 800W Psat, 5.3-5.8GHz
Solid State High Power Amplifier(Pulse)

AmpliVisionS
Unique Amplifier With Innovation

TECHNICAL DATASHEET

AVNP5600H59

OUTLINE DRAWING Surface: Natural color conductive oxidation.



Unit: mm[inch]Tolerance: ± 0.5 [0.019]

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

OUTLINE - Fabricated

Datasheet: REV A.1/ 12.17.2024

Unique Amplifier With Innovation

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59dB Gain, 800W Psat, 5.3-5.8GHz
Solid State High Power Amplifier(Pulse)

TECHNICAL DATASHEET

AVNP5600H59



Part Number	Version	Release Date	Modification	Status
AVNP5600H59	V1.0	12.17.2024	Based on AVNP5600H58	Official Release