



Trusted RF Solutions™

PRELIMINARY

NuPower™ S100A01

S-Band Solid State Power Amplifier

100 Watts CW

10 Watts Linear, 5% EVM @ 40 dBm

2.3 GHz - 2.5 GHz

P/N: NW-PA-S-100-A01

(Includes NW-PA-ACC-CB7W2A interface cable)



**The NuPower™ S100A01 is a small, highly efficient, solid state power amplifier that provides 100 watts of RF power to boost performance of data links and transmitters.**

The NuPower S100A01 accepts a nominal +30 dBm (1 W) RF input and provides 20 dB of gain from 2.3 GHz to 2.5 GHz for continuous wave (CW) and near-constant envelope waveforms.

Based on the latest gallium nitride (GaN) technology, the NuPower S100A01 will provide 30% module efficiency and <30 in<sup>3</sup> form factor make it ideal for size, weight, and power-constrained broadband RF telemetry, tactical communication systems, and electronic warfare systems.

NuPower PAs feature over-voltage and reverse-voltage protection and can operate over a wide temperature range of -40 °C to +85 °C (baseplate).

**Extend your operational communication range with NuPower™ amplifiers from NuWaves Engineering.**

## Features

- 100 Watts RF Output Power
- 2.3 to 2.5 GHz
- Small Form Factor (6.5" x 4.5" x 1.0")
- High-Efficiency GaN Technology
- +30 dBm Nominal RF Input
- Over-Voltage Protection
- Reverse-Voltage Protection
- Logic On/Off Control

## Benefits

- Extended Range
- Improved Link Margin
- Reduced load on DC power budget due to high efficiency operation
- Requires less volume on space-constrained platforms

## Applications

- Unmanned Aircraft Systems (UAS), Group 2 & 3
- Unmanned Ground Vehicles (UGV)
- Broadband RF Telemetry
- RF Communication Systems
- Electronic Warfare - Airborne Electronic Attack
- Software Defined Radios
- Ground Terminal Satellite

# NuPower™ S100A01 Power Amplifier

## Preliminary Specifications

### Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	13	A
Max RF Input Power, $Z_L = 50 \Omega$	+33	dBm
Max Operating Temperature (ambient)	TBR	°C
Max Operating Temperature (baseplate)	TBR	°C
Max Storage Temperature	85	°C

Export Classification
EAR99

### Electrical Specifications @ 28VDC, 25 °C, $Z_S=Z_L=50 \Omega$

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	2.3		2.5	GHz	
RF Output Power	$P_{SAT}$	90	100		W	2.3 GHz - 2.5 GHz, +30 dBm input
Output Power @ 1dB Compression	$P_{1dB}$		33		dBm	
Small Signal Gain	G		25		dB	
Small Signal Gain Flatness	$\Delta G$		$\pm 2$		dB	Pin = -5 dBm
Input VSWR	VSWR		2:1			
Nominal Input Drive Level	$P_{IN}$		+30		dBm	
Operating Voltage	VDC	26	28	32	V	
Quiescent Current (RF Enable Off)	$I_{DQ}$		~50		mA	No RF Applied
Quiescent Current (RF Enable On)	$I_{DQ}$		1.2		A	No RF Applied
Operating Current	$I_{DD}$		8		A	Pin = +30 dBm, $P_{OUT} = 100 W$
Module Efficiency			30		%	$P_{OUT} = 100 W$
Switching Speed	$T_{XON/OFF}$			2	$\mu S$	10% to 90%
Third Order Intercept Point (Two tone test at 1 MHz spacing, $P_{out} = 30 \text{ dBm / tone}$ )	OIP3		48		dBm	2.3 GHz
Harmonics	2nd		TBD		dBc	
	3rd		TBD			
Output Mismatch (No Damage)				10:1		No damage at all phase angles

# NuPower™ S100A01 Power Amplifier

## Preliminary Specifications (cont.)

### Mechanical Specifications

Parameter	Value	Unit
Dimensions	6.5 x 4.5 x 1.0	in
Weight	22.6	oz
RF Connectors, Input/Output	SMA Female	
Interface Connector	Micro-D Hybrid, 7+2-pin Socket	
Cooling	Adequate Heatsink Required	

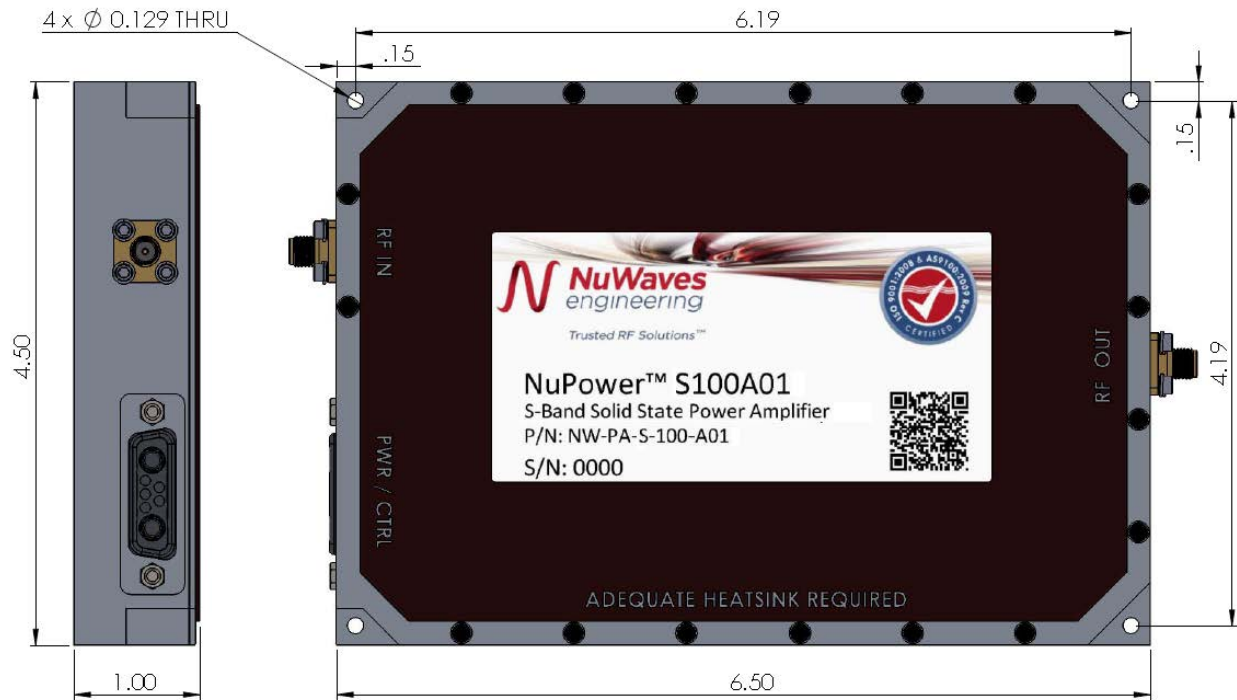
### Environmental Specifications

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (baseplate)	$T_C$	-40		+85	°C
Storage Temperature	$T_{STG}$	-55		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration / Shock Profile (Random profile in x,y, z axis, as per Figure for 15 minute duration in each axis)					

The graph shows a trapezoidal power spectral density profile. The y-axis is labeled 'Power Spectral Density, g<sup>2</sup>/Hz' and the x-axis is labeled 'Frequency, Hz'. The profile starts at 20 Hz, rises with a slope of +3 dB/octave to 80 Hz, remains flat at 0.04 g<sup>2</sup>/Hz until 350 Hz, and then falls with a slope of -3 dB/octave to 2000 Hz. Vertical green lines mark the frequencies 20, 80, 350, and 2000 Hz.

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## Mechanical Outline



## Accessory Part Numbers

Part Number	Description
NW-PA-ACC-CB7W2A	Standard Interface Cable Assembly - Flying Leads (included with module)
NW-PA-ACC-CT7W2A	Upgraded Interface Cable Assembly - Banana Plug Termination
NW-PA-ACC-KT05	Accessory Kit, which includes Fan-Cooled Heatsink and Upgraded Interface Cable
NW-PA-ACC-HS07	Heatsink with Integrated Fan

## Pinout

Function	I/O	Pin	Description
DC Power (+28 Volts)	I	A2	
Ground	I	3, A1	
Over Temperature Flag 0V = temperature fault +5V = no fault	O	2	+5V TTL Logic Level
RF Enable 0V or GND = RF ON +5V or NC = RF OFF	I	1	
Current Temp	O	4	Analog voltage calibrated to baseplate temp
N/C		5	

For information on product disposal (end-of-life), please refer to this document:  
<https://nuwaves.com/wp-content/uploads/Product-Disposal-End-of-Life.pdf>

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