NuWaves RF Solutions

NuPower™ S100A01

S-Band Solid State Power Amplifier

125 Watts CW (typ)
50 Watts Linear, 5% EVM [16 QAM]
2.0 GHz - 2.5 GHz

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

The NuPower™ S100A01 is a small, highly efficient, solid state power amplifier that typically provides 125 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 2.0 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 typically provides 40% module efficiency and <30 in^3 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 +70 °C (baseplate).

Extend your operational communication range with NuPower™ amplifiers from NuWaves RF Solutions.

Features

- 125 Watts (typ) RF Output Power
- 2.0 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

132 Edison Drive, Middletown, OH 45044 | 513.360.0800 | sales@nuwaves.com | www.nuwaves.com

NuPower™ S100A01 Power Amplifier

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)[1]	45	℃
Max Operating Temperature (baseplate)[2]	70	℃
Max Storage Temperature	85	℃

[1]With the HTSK-07 Heatsink with integrated fan; $P_{out} = 100$ W
[2]Module only; $P_{out} = 100$ W

Export Classification
EAR99

Electrical Specifications @ 28 VDC, 25 ℃, Z_S=Z_L=50 Ω, Unless Otherwise Stated

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	2.0		2.5	GHz	
RF Output Power	P_{SAT}	90	125		W	2.0 GHz - 2.5 GHz
Output Power @ 1dB Compression	P1dB		38		dBm	
Small Signal Gain	G		28		dB	
Small Signal Gain Flatness	ΔG		± 1.5		dB	Pin = -5 dBm
Input VSWR	VSWR		1.5:1			
Nominal Input Drive Level	P_{IN}		+30		dBm	
Operating Voltage	VDC	26	28	32	V	
Quiescent Current (RF Enable Off)	I_{DQ}		13		mA	No RF Applied
Quiescent Current (RF Enable On)	I_{DQ}		1.3		A	No RF Applied
Operating Current	I_{DD}		11.5		A	
Module Efficiency			40		%	$P_{OUT} = 100$ W
Switching Speed	$TX_{ON/OFF}$		0.5	2	µS	10% to 90%
Third Order Intercept Point (Two tone test at 1 MHz spacing, Pout = 30 dBm / tone)	OIP3		46		dBm	2.00 GHz
			47			2.25 GHz
			49			2.50 GHz
Harmonics	2nd		-52		dBc	
	3rd		-55			
Output Mismatch (No Damage)				10:1	Ψ	No damage at all phase angles

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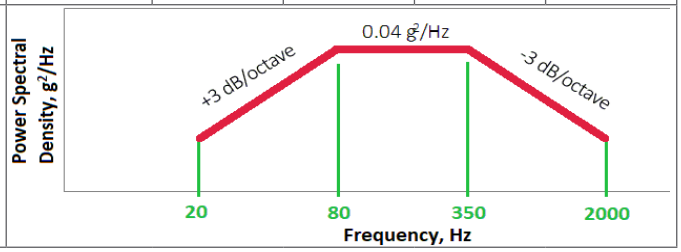
Specifications (cont.)

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	

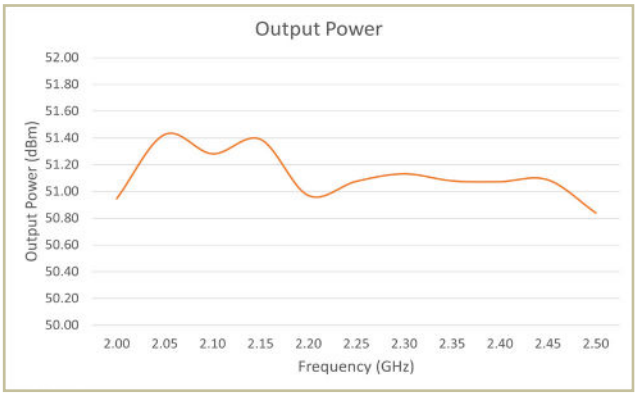
Environmental Specifications

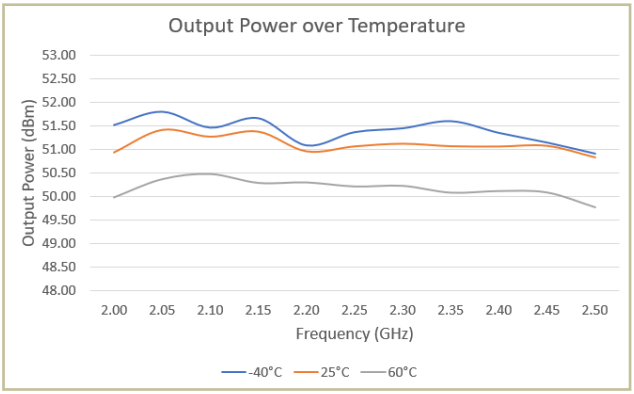
Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (baseplate)	T_C	-40		+70	℃
Storage Temperature	T_{STG}	-55		+85	℃
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration / Shock Profile (Random profile in x,y, z axis, as per Figure for 15 minute duration in each axis)					

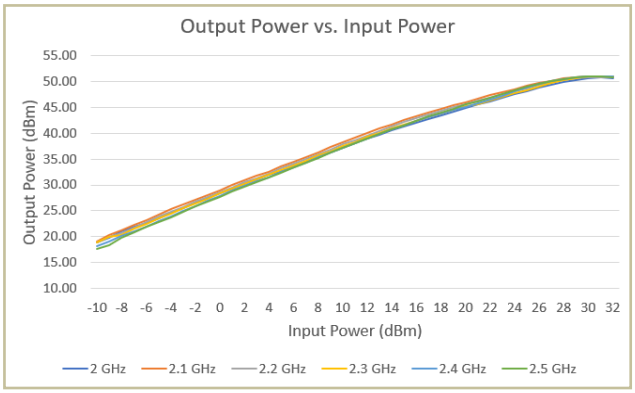
NuPower™ S100A01 Power Amplifier

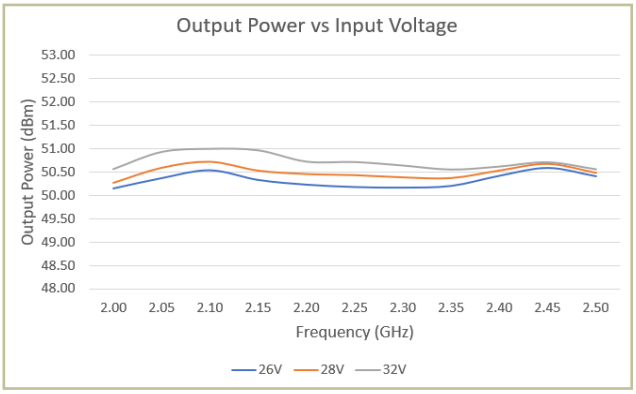
Performance Plots

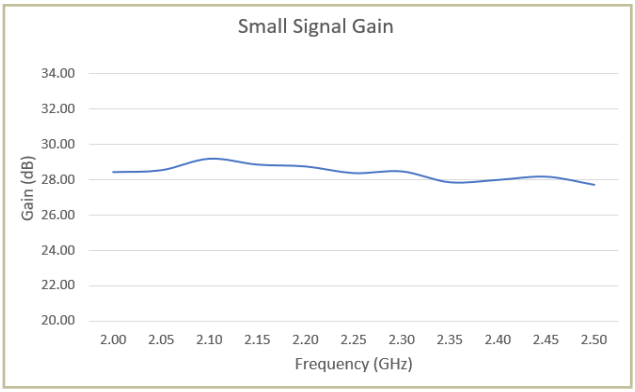
Test Conditions: +28 VDC, +25 °C, Z_S=Z_L=50 Ω, Unless Otherwise Stated

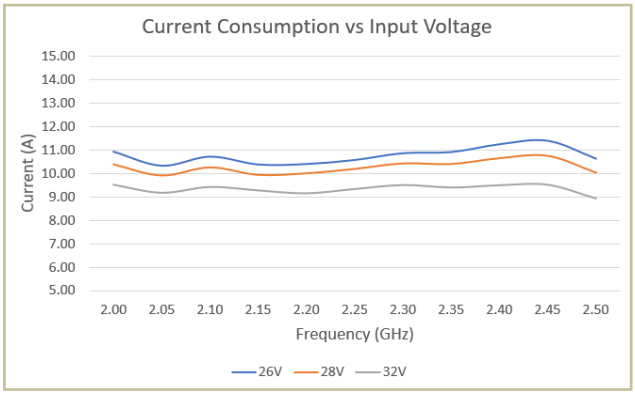


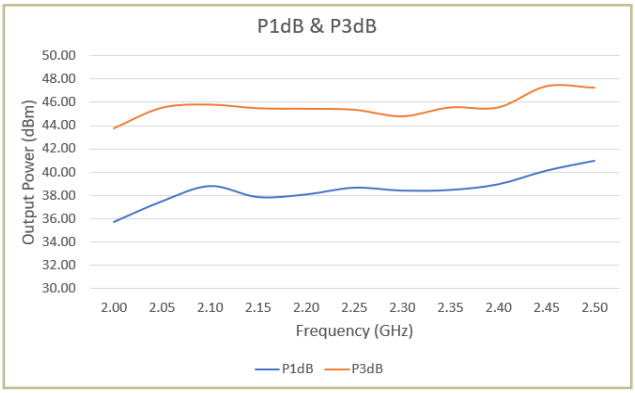


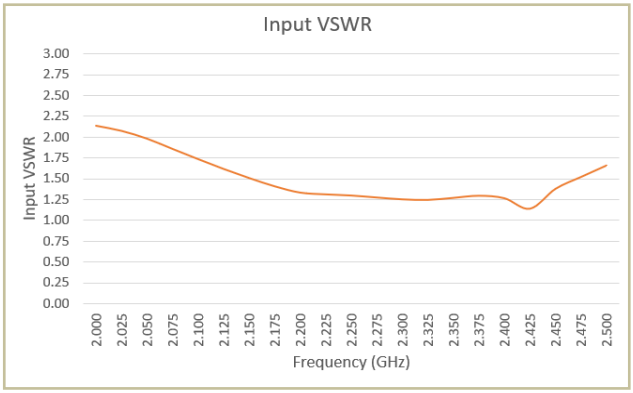












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Performance Plots

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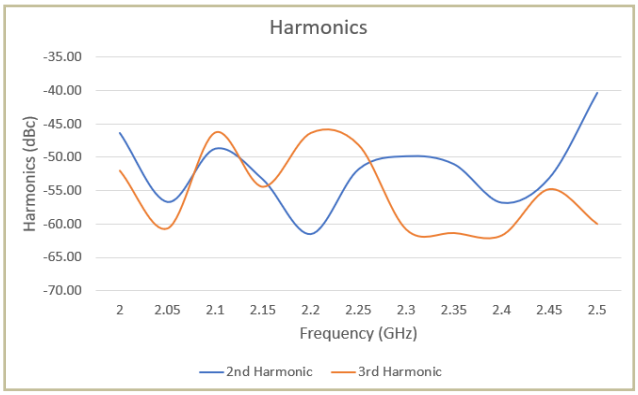
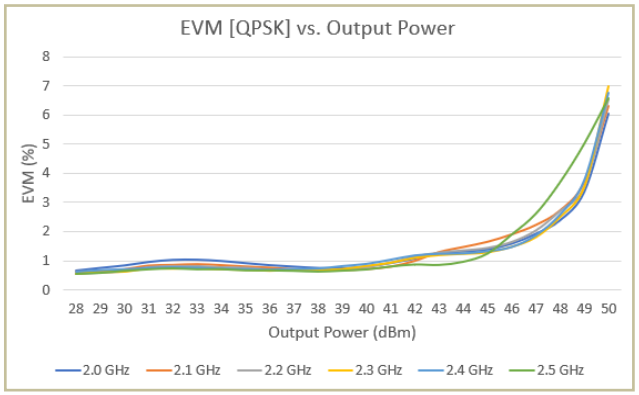
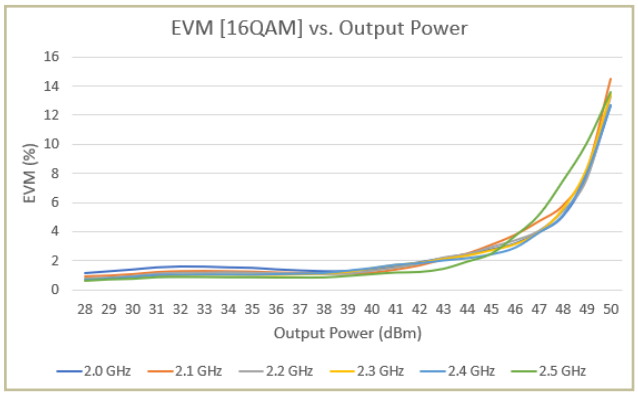
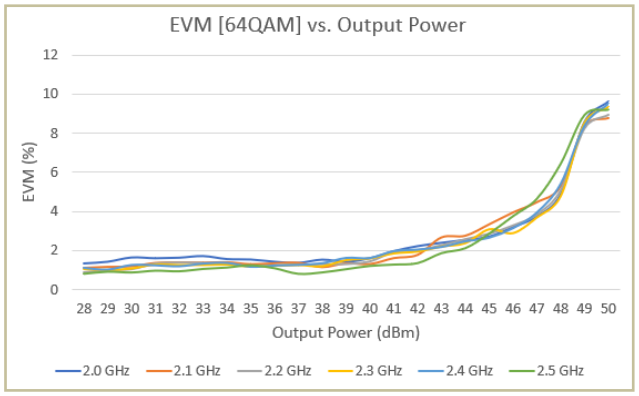


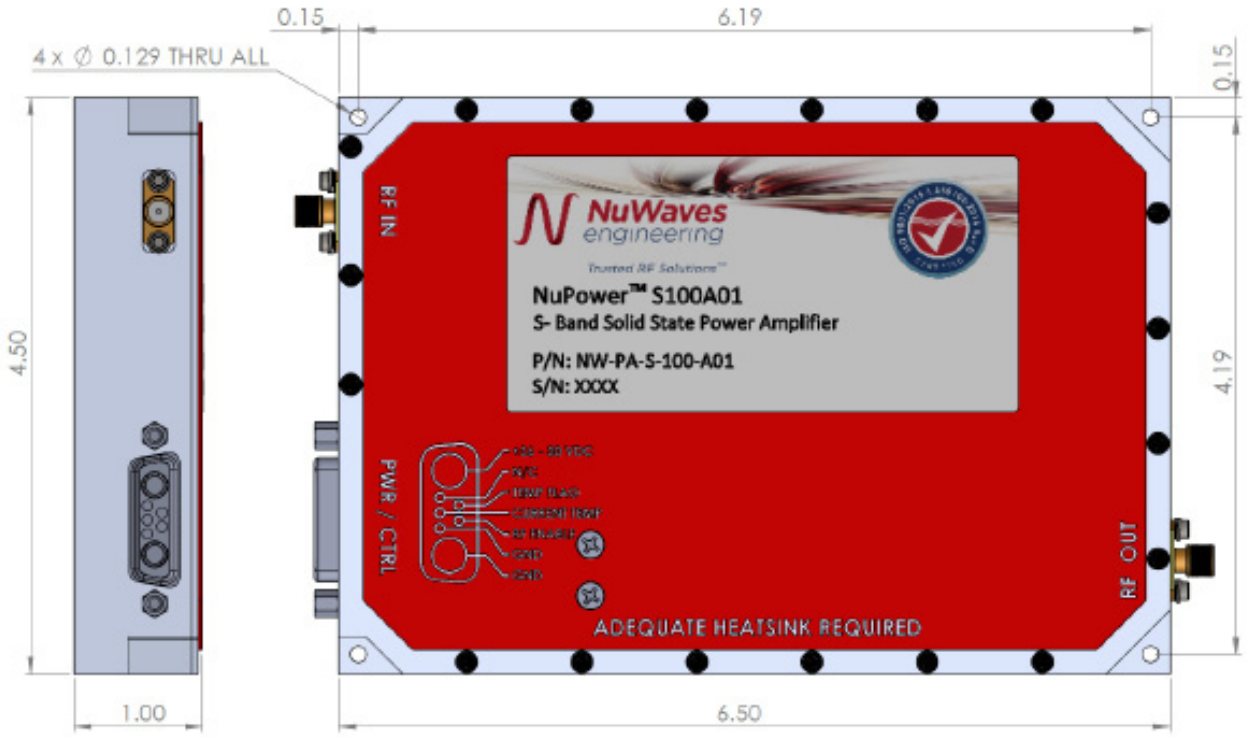






NuPower™ S100A01 Power Amplifier

Mechanical Outline



Accessory Part Numbers - Sold Separately

Part Number	Description
NW-PA-ACC-CB7W2A	Standard Interface Cable Assembly - Flying Leads
NW-PA-ACC-CT7W2A	Upgraded Interface Cable Assembly - Banana Plug Termination
HTSK-07	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 +5 V = no fault	O	2	+5 V CMOS Logic Level
RF Enable 0 V or GND = RF ON NC = RF OFF	I	1	5V CMOS Logic Levels: Logic HIGH [+2.1V to +5.0V] Logic LOW [0V to +0.8]
Current Temp	O	4	Analog voltage calibrated to internal 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

Contact NuWaves

NuWaves RF Solutions
132 Edison Drive
Middletown, OH 45044

www.nuwaves.com
sales@nuwaves.com
513.360.0800

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