

# NuWaves

## RF Solutions

### NuPower™ S-10-C02-S01 S-Band Power Amplifier

Precision Output Power Control  
14 Watt CW (typ)  
2200 MHz - 2500 MHz

P/N: NW-PA-S-10-C02-S01



Contact [sales@nuwaves.com](mailto:sales@nuwaves.com) for custom options

**The NuWaves' NuPower™ S-10-C02-S01 is a smart, miniature solid state power amplifier (SSPA) that typically delivers 14 watts of RF power across the frequency range of 2200 to 2500 MHz, and features automatic gain with RF output power level adjustment.**

The NuPower S-10-C02-S01 offers digital control through a simple RS-232 interface. Utilizing the onboard automatic gain control, the NuPower S-10-C02-S01 offers 16 discrete, user-programmable output settings, in 1 dB steps from the maximum RF output power level.

Based on the latest gallium nitride (GaN) technology, the NuPower S-10-C02-S01's 21 - 25% power efficiency and small 7.75 in<sup>3</sup> form factor make it ideal for size, weight, and power-constrained RF telemetry and tactical communication systems. The NuPower S-10-C02-S01's rugged chassis allows the system integrator to easily incorporate the unit into a platform operating in harsh environments with limited space.

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

#### Features

- 14 Watts (typ) RF Output Power
- 2200 to 2500 MHz
- Maintains Output Power over Input Power of 0 dBm to +10 dBm
- Small form Factor (2.125" x 5" x 0.73")
- High-Efficiency GaN Technology
- Single Power Supply
- Over-Voltage Protection
- Reverse-Voltage Protection

#### Benefits

- Extended Range
- Improved Link Margin
- Lessened load on DC power budget due to high efficiency operation
- Consumes less volume on space-constrained platforms
- Precision Power Control

#### Applications

- Unmanned Aircraft Systems (UAS), Group 2 through Group 5
- Air Launch Effect (ALE)
- Common Launch Tube (CLT)
- Counter UAS Detection & Mitigation
- MIMO/MANET Radio Range Extension
- SISO Radio Range Extension
- Test Labs

# NuPower™ S-10-C02-S01 Power Amplifier

## Specifications

### Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	3	A
Max RF Input Power, $Z_L = 50 \Omega$	12	dBm
Max Operating Temperature (ambient)	60	°C
Max Operating Temperature (baseplate)	85	°C
Max Storage Temperature	85	°C

Export Classification
EAR99

### Electrical Specifications @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$ , CW, 0 dBm Input Power, Pmax, Unless otherwise stated

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	2200		2500	MHz	
RF Output Power	$P_{SAT}$	10	14		W	2.2-2.5 GHz
Small Signal Gain	G		49		dB	Pin = -40 dBm
Small Signal Gain Flatness	$\Delta G$		$\pm 2$		dB	Pin = -40 dBm; 2.2-2.5 GHz
Power Gain Flatness	$\Delta G$		$\pm 0.26$		dB	
Input VSWR	VSWR		1.4:1			
Nominal Input Drive Level	$P_{IN}$		0		dBm	
Operating Voltage	VDC	22	28	32	V	
Quiescent (standby) Current	$I_{DQ}$		0.13		A	RF OFF (RF Enable Floating)
Quiescent (bias) Current	$I_{DQ}$		0.43		A	RF ON (RF Enable Low)
Operating Current	$I_{DD}$		2.29	3	A	
Module Efficiency			22		%	
Harmonics	2nd		-70		dBc	
	3rd		-44			
Output Mismatch (No Damage)				10:1	$\Psi$	No damage at all phase angles

### Power Control @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$

Setting	Description	Typical Output Power	Typical Current
Pmax	Maximum Output Power	41.57 dBm	2.29 A
Pmax -1	1 dB Backoff from Pmax	40.71 dBm	2.07 A
Pmax -2	2 dB Backoff from Pmax	39.80 dBm	1.87 A
Pmax -3	3 dB Backoff from Pmax	38.99 dBm	1.71 A
Pmax -4	4 dB Backoff from Pmax	38.08 dBm	1.55 A
Pmax -5	5 dB Backoff from Pmax	37.19 dBm	1.41 A
Pmax -6	6 dB Backoff from Pmax	36.29 dBm	1.28 A
Pmax -7	7 dB Backoff from Pmax	35.41 dBm	1.17 A
Pmax -8	8 dB Backoff from Pmax	34.48 dBm	1.07 A
Pmax -9	9 dB Backoff from Pmax	33.69 dBm	0.99 A
Pmax -10	10 dB Backoff from Pmax	32.7 dBm	0.90 A
Pmax -11	11 dB Backoff from Pmax	31.75 dBm	0.83 A
Pmax -12	12 dB Backoff from Pmax	30.85 dBm	0.77 A
Pmax -13	13 dB Backoff from Pmax	29.92 dBm	0.72 A
Pmax -14	14 dB Backoff from Pmax	29.05 dBm	0.67 A
Pmin	15 dB Backoff from Pmax	28.14 dBm	0.63 A

# NuPower™ S-10-C02-S01 Power Amplifier

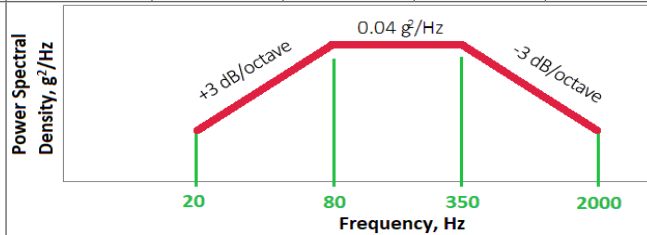
## Specifications (cont.)

### Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	2.125 x 5.000 x 0.730	in	Max
Weight	8	oz	Max
RF Connectors, Input/Output	SMA Female		
Interface Connector	Micro-D, 9-Pin Socket		
Cooling	Adequate Heatsink Required		

### Environmental Specifications

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	$T_A$	-40		+60	°C
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)					

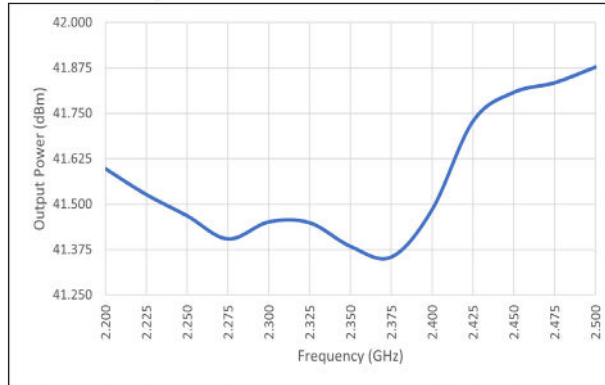


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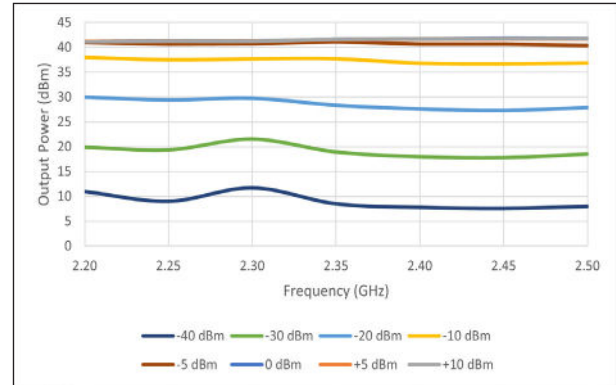
## Performance Plots

Test Conditions: +28 VDC, +25 °C,  $Z_s=Z_L=50 \Omega$ , CW, Pmax, 0 dBm Input Power (unless otherwise specified)

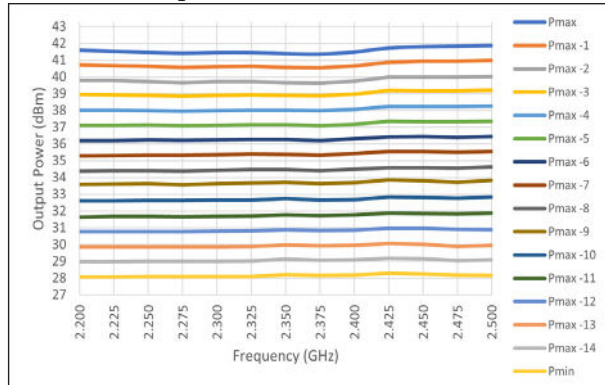
### Output Power [Pin: 0 to +10 dBm]



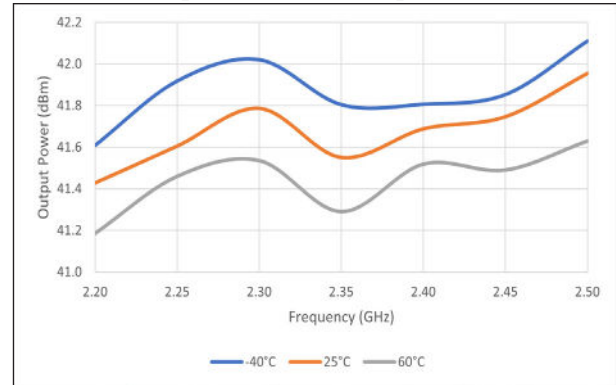
### Output Power - Stepped Input Power



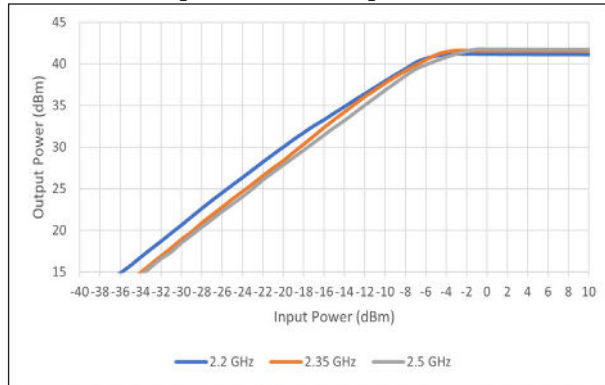
### Output Power - Power Backoff



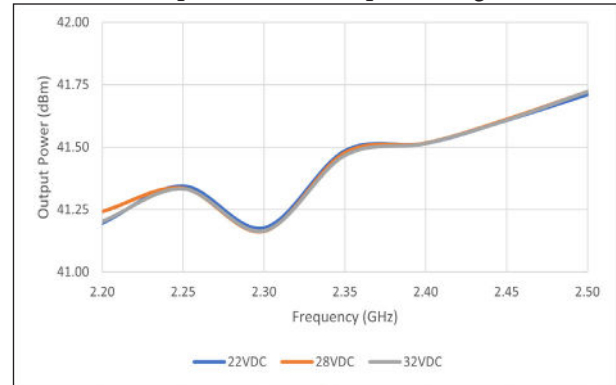
### Output Power vs. Temperature



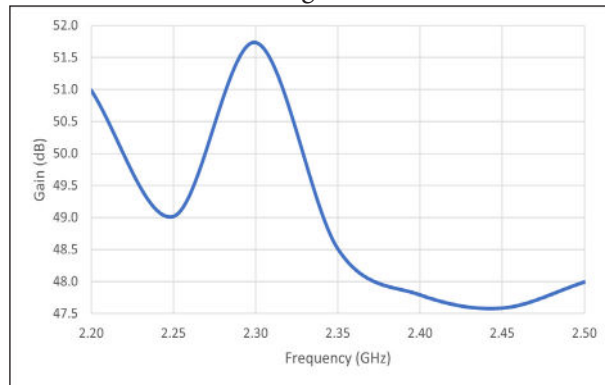
### Output Power vs. Input Power



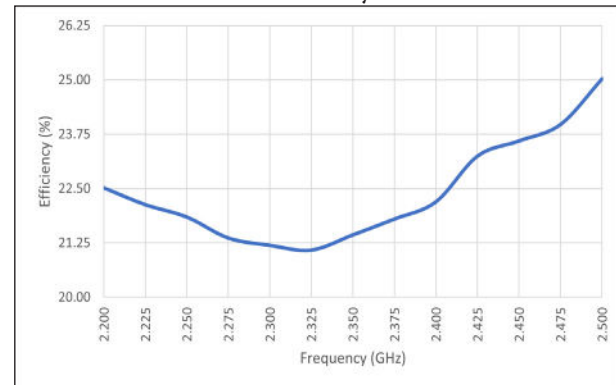
### Output Power vs. Input Voltage



### Small Signal Gain



### Efficiency

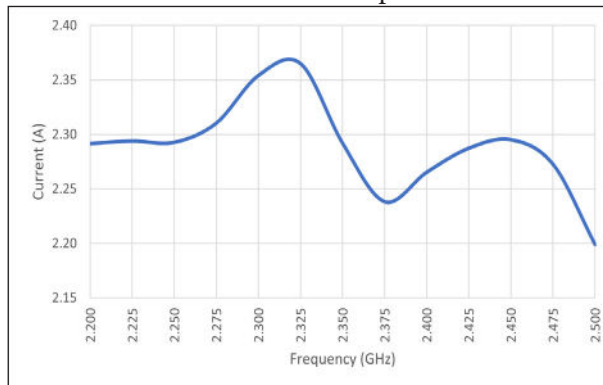


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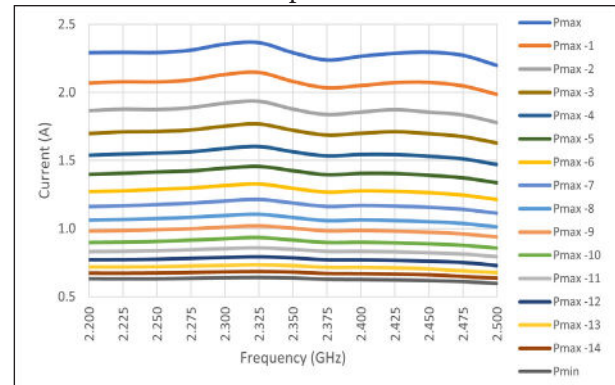
## Performance Plots (cont.)

Test Conditions: +28 VDC, +25 °C,  $Z_s=Z_L=50 \Omega$ , CW, Pmax, 0 dBm Input Power (unless otherwise specified)

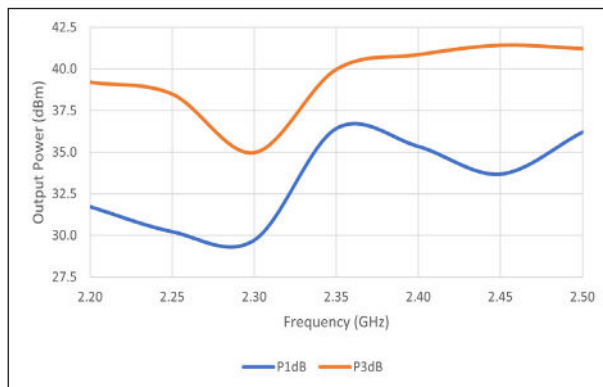
### Current Consumption



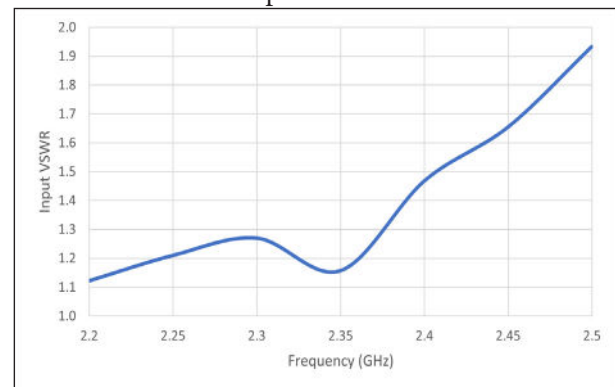
### Current Consumption - Power Backoff



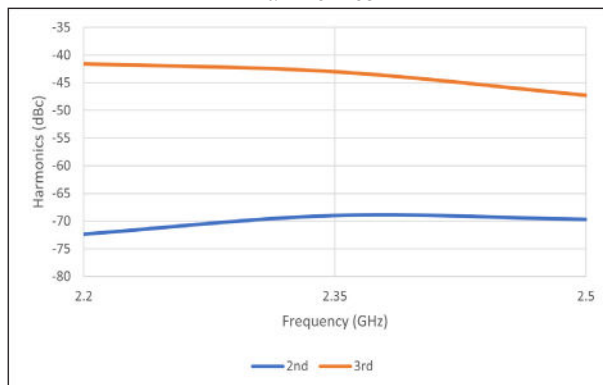
### P1dB & P3dB



### Input VSWR

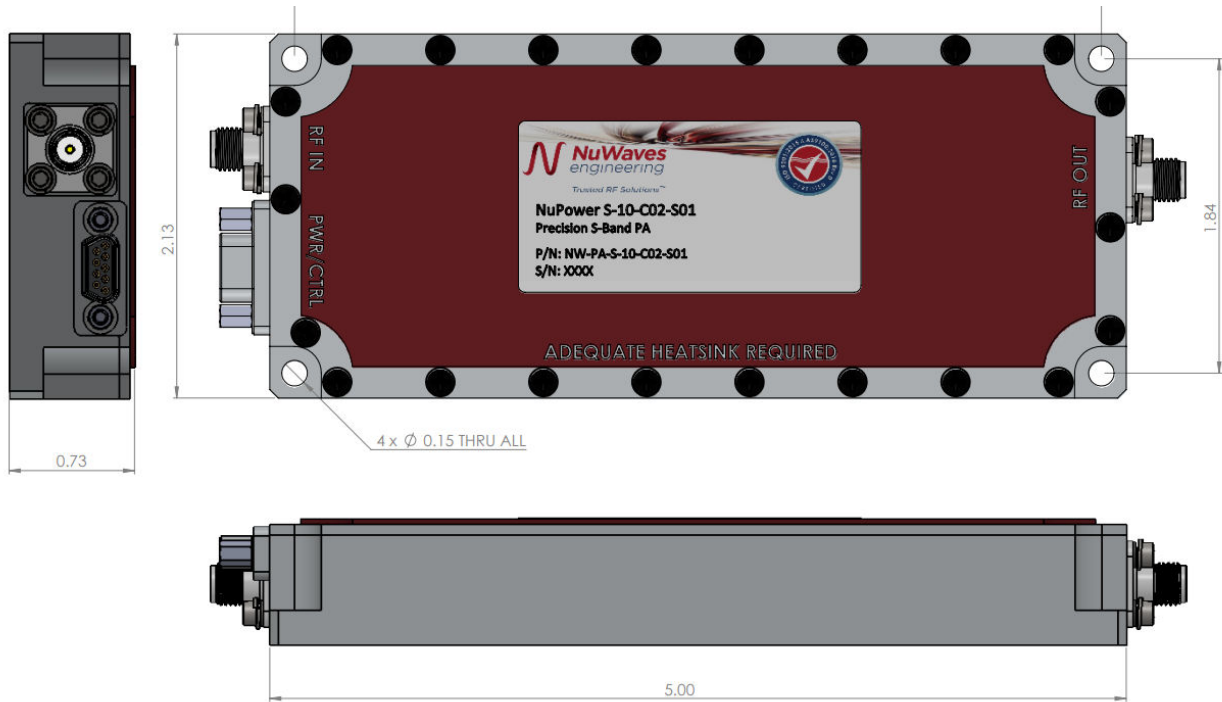


### Harmonics



# NuPower™ S-10-C02-S01 Power Amplifier

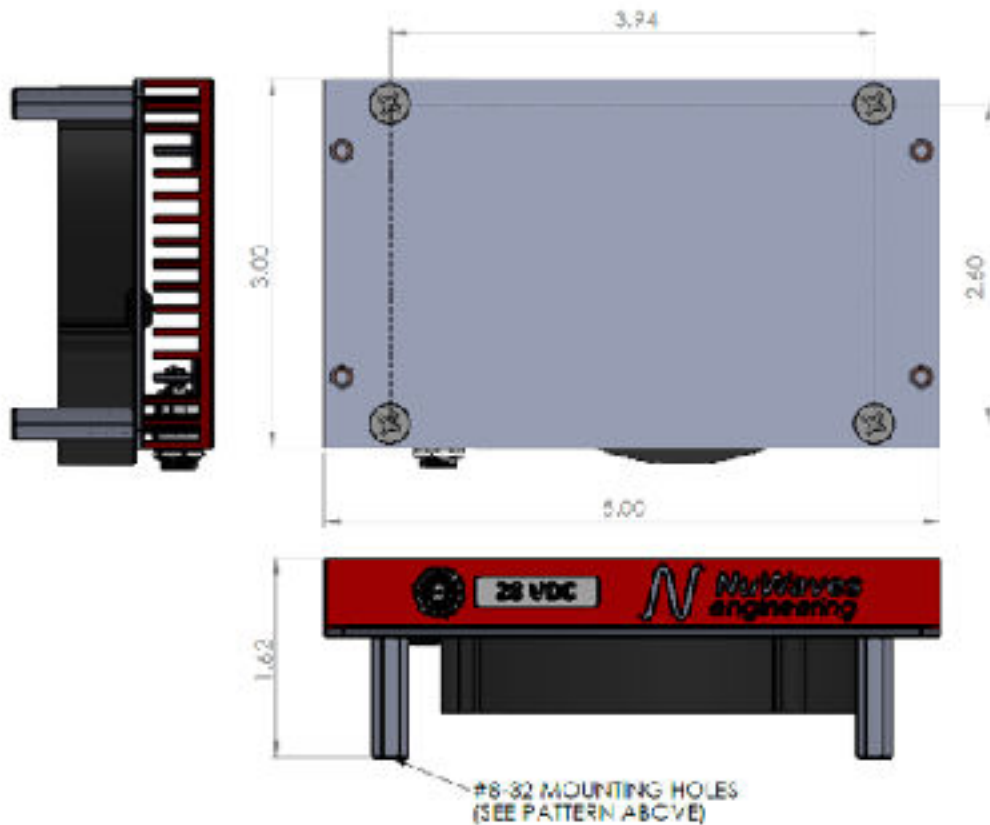
## Mechanical Outline



# NuPower™ S-10-C02-S01 Power Amplifier

## Optional Heatsink

Heatsink & Integrated Fan: HTSK-05



## Accessory Part Numbers - Sold Separately

Part Number	Description
<a href="#">NW-FL-05LPLE-2500-SFSF-M01</a>	Harmonic Filter Module
NW-PA-ACC-CB09MJ	Standard Interface Cable Assembly - Flying Leads
NW-PA-ACC-CT09MJ	Upgraded Interface Cable Assembly - Banana Plug Termination
HTSK-05	Heatsink with Integrated Fan

## Pinout

Function	I/O	Pin
Ground	I	1, 2, 6
DC Power (+22 to +32 VDC)	I	3, 4, 5
RF Enable 0 V or GND = RF ON +5V or NC = RF OFF	I	9
Rx Data (RS-232)	O	7
Tx Data (RS-232)	I	8

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



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