

# NuWaves

## RF Solutions

### NuPower™ C30R01 C-Band Solid State Power Amplifier

30 Watts CW, 5.03 GHz - 5.09 GHz  
5% EVM @ 45 dBm

P/N: NW-PA-C-30-R01

(Includes NW-PA-ACC-CB09MC interface cable)



**The NuPower™ C30R01 is a small, highly efficient, solid state power amplifier that provides 30 watts of RF power to boost performance of data links and transmitters.**

The NuPower C30R01 accepts a nominal 0 dBm (1 mW) RF input and provides 45 dB of gain from 5.03 GHz - 5.09 GHz for continuous wave (CW) and near-constant envelope waveforms.

Based on the latest gallium nitride (GaN) technology, the NuPower C30R01's 30% power efficiency and <math>< 10 \text{ in}^3</math> 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 RF Solutions.**

#### Features

- 30 Watts RF Output Power
- 5.03 GHz - 5.09 GHz
- Small Form Factor (4.50" x 3.50" x 0.61")
- High-Efficiency GaN Technology
- 0 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

# NuPower™ C30R01 Power Amplifier

## Preliminary Specifications

### Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	5	A
Max RF Input Power, $Z_L = 50 \Omega$	15	dBm
Max Operating Temperature (ambient)	55	°C
Max Operating Temperature (baseplate)	85	°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	5.03		5.09	GHz	
RF Output Power	$P_{SAT}$	30	35		W	5.03 GHz - 5.09 GHz, 0 dBm input
Output Power @ P3dB Compression	P3dB		40		dBm	5.03 GHz
			41			5.06 GHz
			42			5.09 GHz
Small Signal Gain	G		54		dB	5.03 GHz, @ -30 dBm input
			53			5.06 GHz, @ -30 dBm input
			52			5.09 GHz, @ -30 dBm input
Small Signal Gain Flatness	$\Delta G$		2		dB	Pin = -30 dBm
Input VSWR	VSWR		2.3:1			
Nominal Input Drive Level	$P_{IN}$		0		dBm	
Operating Voltage	VDC	27	28	32	V	
Quiescent Current (RF Enable Off)	$I_{DQ}$		10		mA	
Quiescent Current (RF Enable On)	$I_{DQ}$		0.85		A	
Operating Current	$I_{DD}$		4.1		A	Pin = 0 dBm
Module Efficiency			30		%	
Switching Speed	$TX_{ON/OFF}$			2	$\mu S$	10% to 90%
Third Order Intercept Point (Two tone test at 1 MHz spacing, $P_{out} = 20 \text{ dBm} / \text{tone}$ )	OIP3		40		dBm	
Harmonics	2nd		-70		dBc	
	3rd		-70			
Output Mismatch (No Damage)				10:1	$\Psi$	No damage at all angles

# NuPower™ C30R01 Power Amplifier

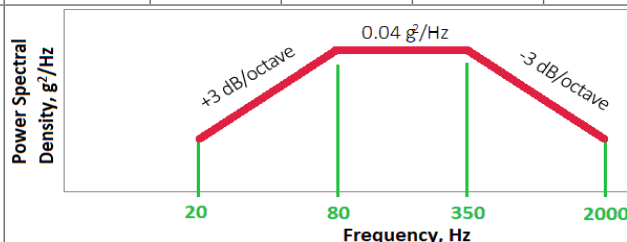
## Preliminary Specifications (cont.)

### Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	4.5 x 3.5 x 0.61	in	Max
Weight	9	oz	Max
RF Connectors, Input/Output	SMA Female		
Interface Connector	Micro-D, 9-pin Socket		
Cooling	Adequate Heatsink Required		

### Environmental Specifications

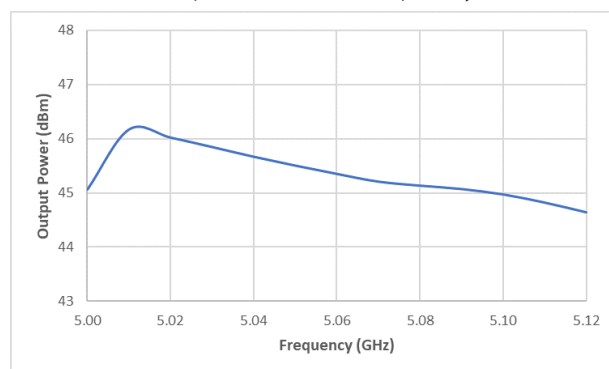
Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	$T_A$	-40		+55	°C
Operating Temperature (baseplate)	$T_C$	-40		+60	°C
Storage Temperature	$T_{STG}$	-55		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration / Shock Profile (Random profile in x,y, z axis, as per Figure for 15 minute duration in each axis)					



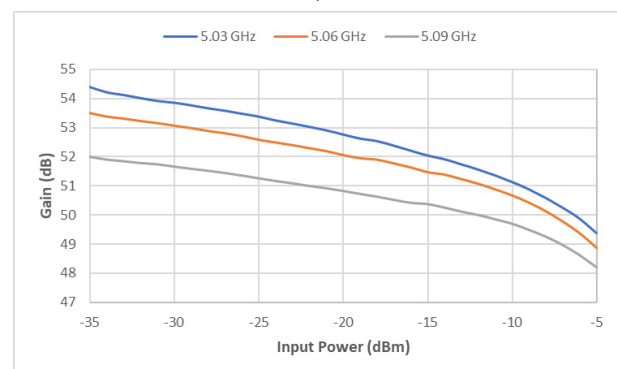
## Performance Plots

Test Conditions: +28 VDC, +25 °C,  $Z_s=Z_L=50 \Omega$ , Pin=0 dBm

Output Power vs. Frequency



Gain vs. Input Power

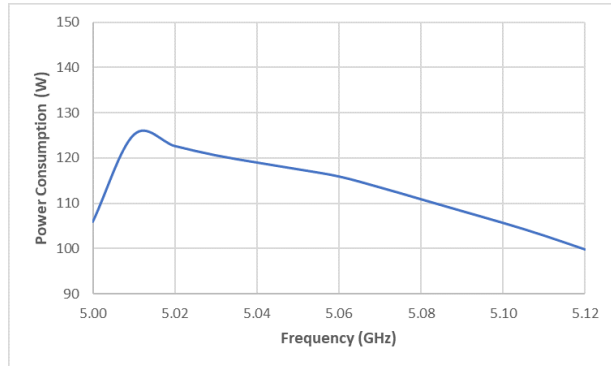


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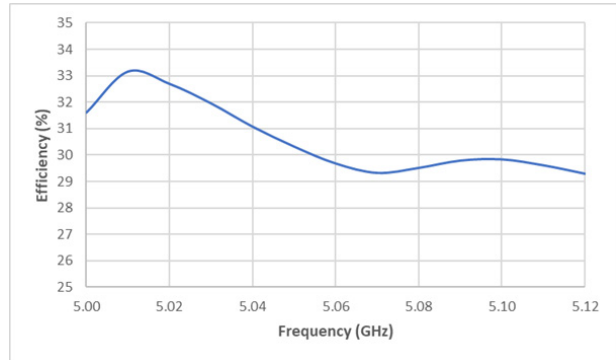
## Performance Plots (cont.)

Test Conditions: +28 VDC, +25 °C,  $Z_S=Z_L=50 \Omega$ ,  $P_{in}=0 \text{ dBm}$

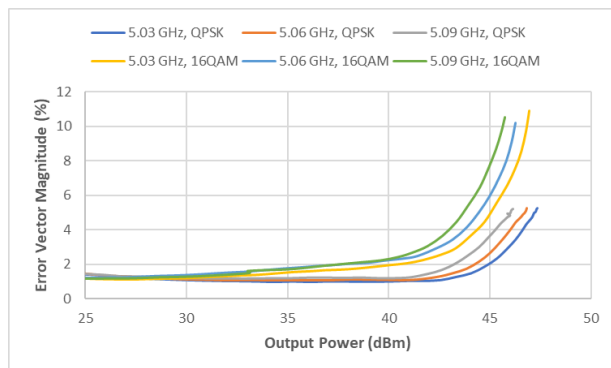
### Power Consumption vs. Frequency



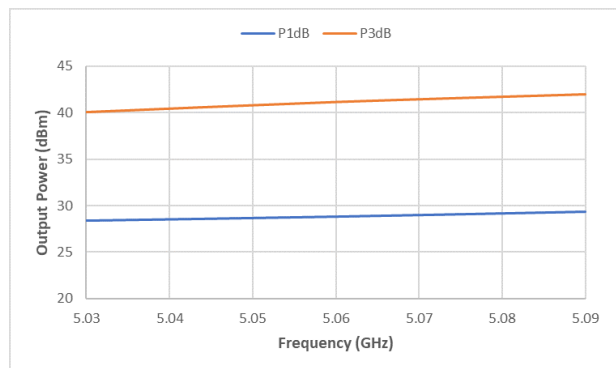
### Efficiency vs. Frequency



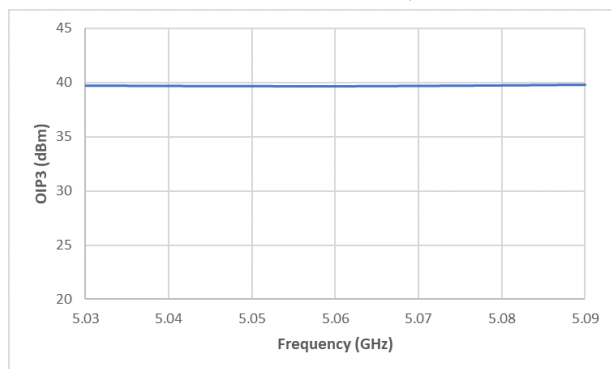
### EVM (%) vs. Output Power



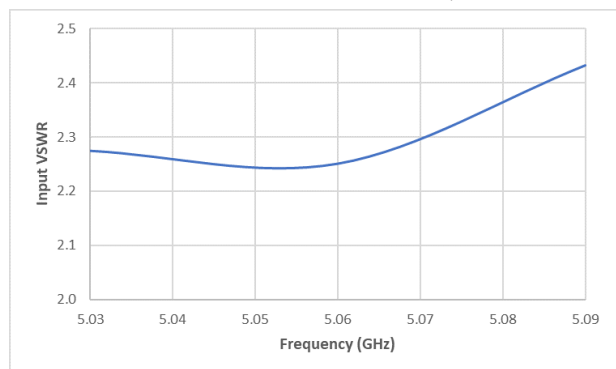
### P1dB & P3dB vs. Frequency



### OIP3 vs. Frequency



### Input VSWR vs. Frequency

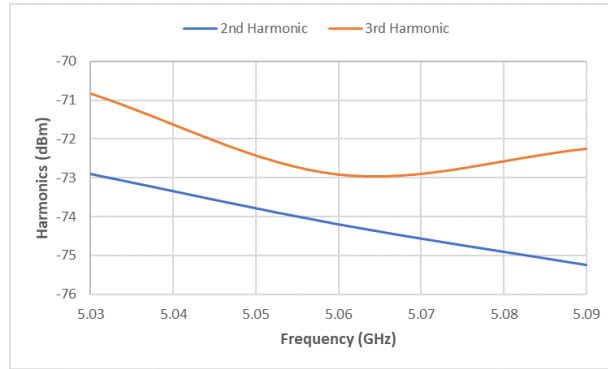


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## Performance Plots (cont.)

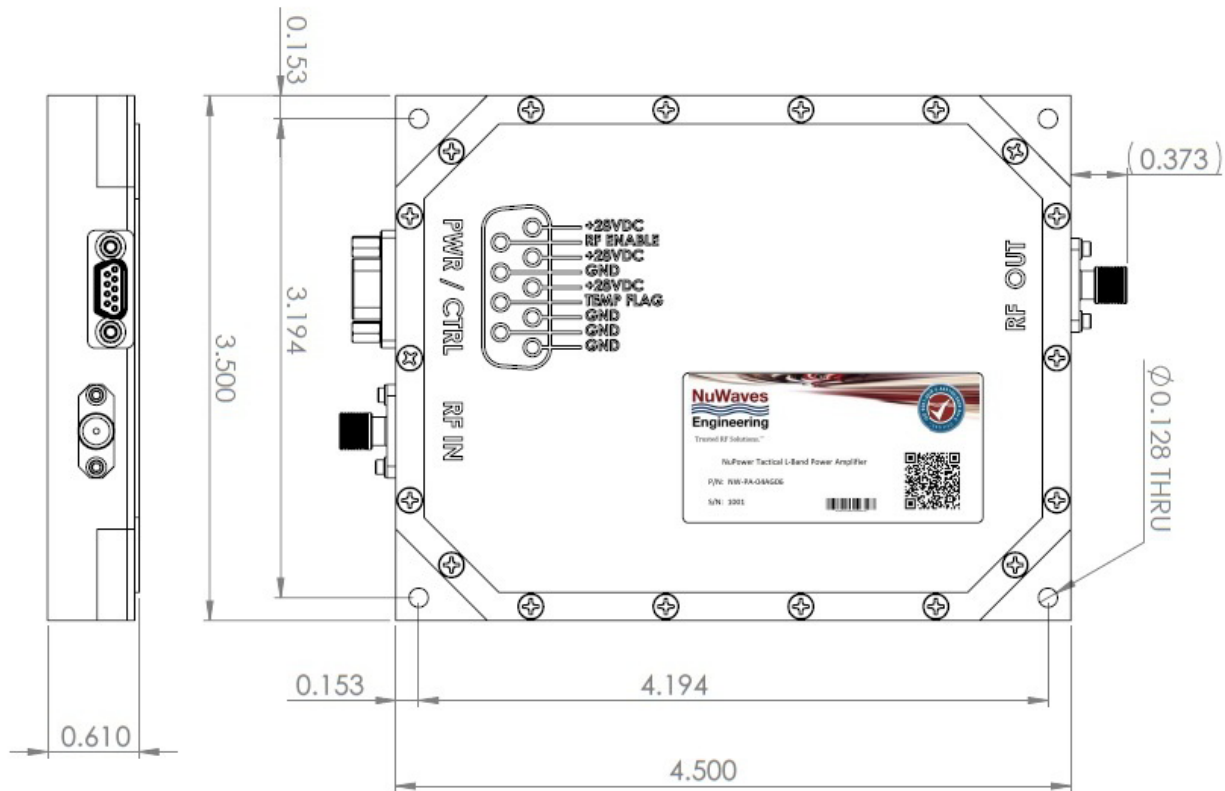
Test Conditions: +28 VDC, +25 °C,  $Z_S=Z_L=50 \Omega$ , Pin=0 dBm

2nd & 3rd Harmonic vs. Frequency



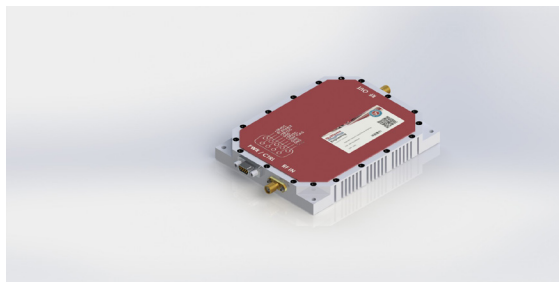
## Mechanical Outline

### PA Module

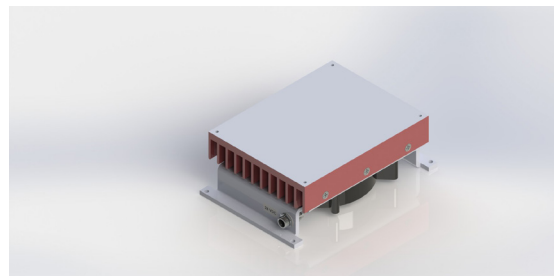


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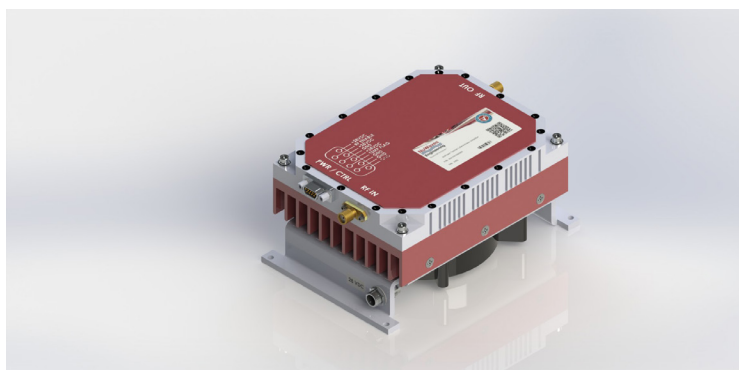
## PA Module and Accessory Images



PA Module



Optional Fan-Cooled Heatsink



PA Module w/ Fan-Cooled Heatsink

## Accessory Part Numbers

Part Number	Description
NW-PA-ACC-CB09MC	Standard Interface Cable Assembly - Flying Leads (included with module)
NW-PA-ACC-CT09MC	Upgraded Interface Cable Assembly - Banana Plug Termination
NW-PA-ACC-KT03	Accessory Kit, which includes Fan-Cooled Heatsink and Upgraded Interface Cable
NW-PA-ACC-HS05	Heatsink with Integrated Fan

## Pinout

Function	I/O	Pin
DC Power (+28 Volts)	I	3, 4, 5
Ground	I	1, 2, 6, 8
Over Temperature Flag 0V = temperature fault +5V = no fault	O	7
RF Enable 0V or GND = RF ON +5V or NC = RF OFF	I	9

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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