



Trusted RF Solutions™

Preliminary

NuPower™ C10R01

C-Band Solid State Power Amplifier

10 Watts CW

5100 MHz - 5900 MHz

P/N: NW-PA-C-10-R01

NW-PA-C-10-R01-AH [Active High T/R Enable Logic]

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



The NuPower™ C10R01 is a small, highly efficient, solid state power amplifier that provides 10 watts of RF power across the 5100 to 5900 MHz frequency range to boost performance of data links and transmitters.

The NuPower C10R01 accepts a nominal 0 dBm RF input and provides 40 dB of gain from 5100 to 5900 MHz for continuous wave (CW) and near-constant envelope waveforms.

Based on the latest gallium nitride (GaN) technology, the NuPower C10R01's power efficiency and form factor make it ideal for size, weight, and power-constrained broadband RF telemetry, tactical communication systems, and electronic warfare systems.

NuPower PA's feature over-voltage protection and can operate over a wide temperature range of -40 °C to +85 °C (baseplate). The NuPower C10R01-AH supports an active high (inverted) logic.

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

Features

- 10 Watts RF Output Power
- 5100 to 5900 MHz
- Small Form Factor (3.57" x 2.57" x 0.50")
- High Efficiency GaN Technology
- 0 dBm Nominal RF Input
- 40 dB of Transmit Gain
- Over-Voltage Protection
- 3.3 V or 5 V Logic Control

Benefits

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

Applications

- Unmanned Aircraft Systems (UAS), Group 2 & 3
- Unmanned Ground Vehicles (UGV)
- RF Telemetry
- RF Communication Systems
- Software Defined Radios

NuPower™ C10R01 Power Amplifier

Preliminary Specifications

Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current @ 28 VDC	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	100	°C

Export Classification
EAR99

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

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	5100		5900	MHz	
RF Output Power	P_{SAT}		10		W	
Output Power @ 1 dB Compression	P1dB		29		dBm	5100 MHz
			30			5500 MHz
			33			5900MHz
Small Signal Gain	G		54		dB	5100 MHz, @ -30 dBm input
			50			5500 MHz, @ -30 dBm input
			48			5900 MHz, @ -30 dBm input
Small Signal Gain Flatness	ΔG		6		dB	Pin = -30 dBm
Input VSWR	VSWR		2:1			
Nominal Input Drive Level	P_{IN}		0		dBm	
Operating Voltage *	VDC	27	28	32	V	
Quiescent Current (RF Enable Off)	I_{DQ}		45		mA	
Quiescent Current (RF Enable On)	I_{DQ}		360		mA	
Operating Current	I_{DD}		1.6		A	CW, +28 Vin, Pout = 10 W
Module Efficiency			25		%	
Switching Speed	$T_{XON/OFF}$			2	μS	10% to 90%
Third Order Order Intercept Point (Two tone test at 1 MHz spacing, Pout = 20 dBm / tone)	OIP3		tbr		dBm	5100 MHz
			tbr			5500 MHz
			tbr			5900 MHz
Harmonics	2nd		tbr		dBc	
	3rd		tbr		dBc	
Output Mismatch (No Damage)	VSWR			10:1	Ψ	No damage at all phase angles

NuPower™ C10R01 Power Amplifier

Preliminary Specifications (cont.)

Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	3.57 x 2.57 x 0.50	in	Max
Weight	2.6 (TBR)	oz	
RF Connectors, Input/Output	SMA Female, right angle		
Interface Connector	Micro-D, 9-pin Socket		
Cooling	Adequate Heatsink Required		

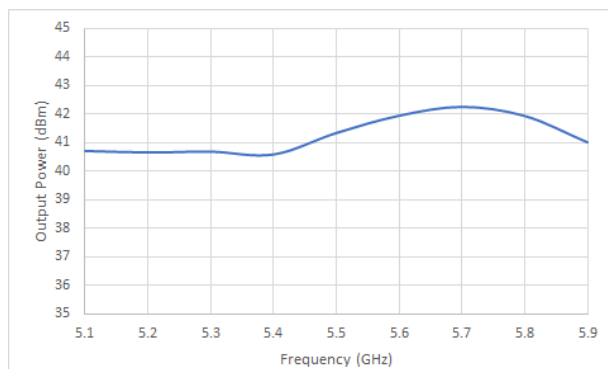
Environmental Specifications

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}	-60		+100	°C	
Relative Humidity (non-condensing)	RH			95	%	
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft	
Vibration Amplitude	4 Hz - 15 Hz	A	0.024	0.030	0.036	in
	16 Hz - 25 Hz	A	0.016	0.020	0.024	in
	26 Hz - 33 Hz	A	0.008	0.010	0.012	in
Shock Peak Acceleration (Functional Shock)				30 g for 15 ms		
				20 g for 20 ms		

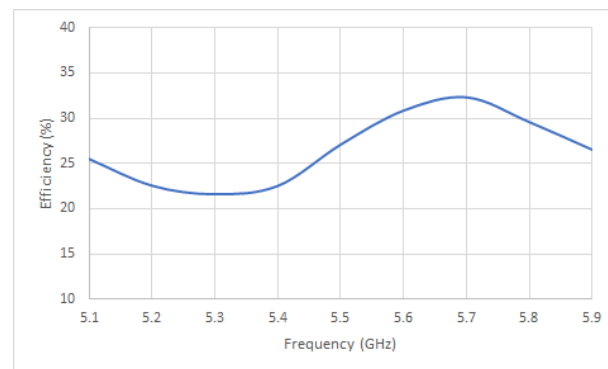
Performance Plots

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

Output Power [0dBm Input Power]



Efficiency

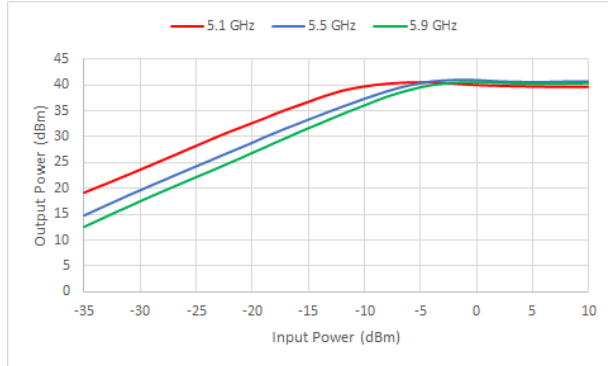


NuPower™ C10R01 Power Amplifier

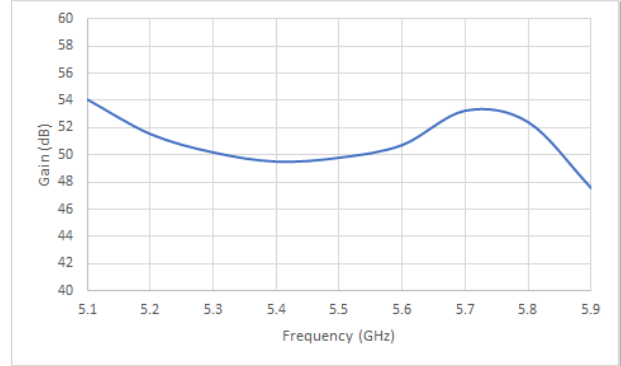
Performance Plots (con't)

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

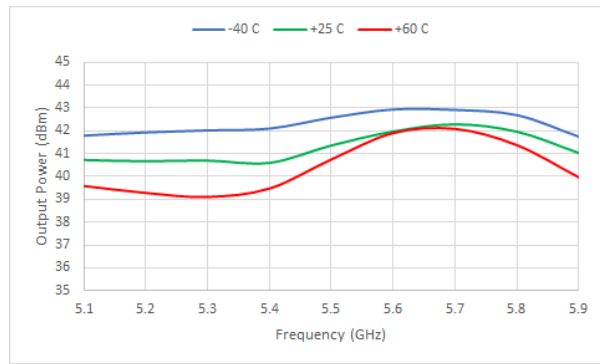
Output Power vs. Input Power



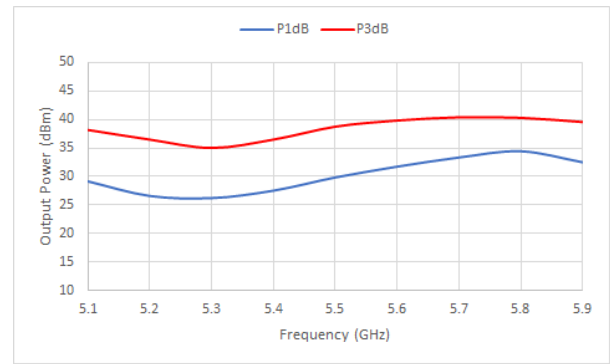
Small Signal Gain



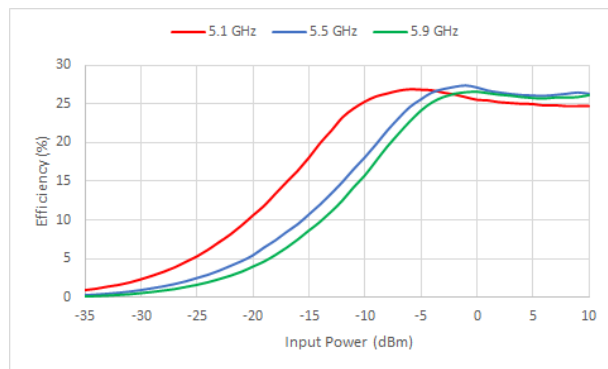
Output Power vs. Temperature [Baseplate]



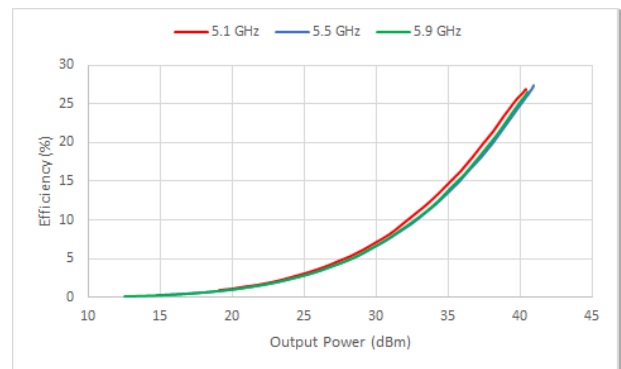
P1dB & P3dB



Efficiency vs. Input Power

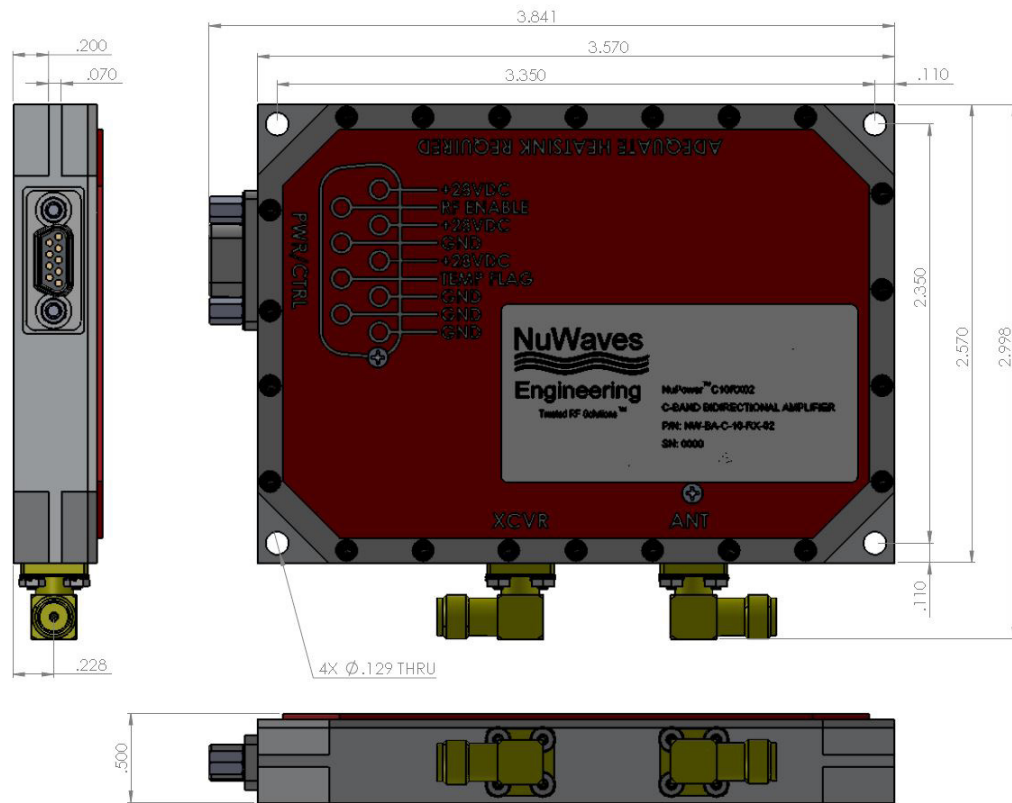


Efficiency vs. Output Power



NuPower™ C10R01 Power Amplifier

Preliminary Mechanical Outline



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

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>

Pinout

Function	I/O	Pin	Logic Voltage
DC Power (+28 Volts)	I	3, 4, 5	
Ground	I	1, 2, 6, 8	
Over Temperature Flag 0 Volts = Temperature Fault +3.3 ¹ Volts = No Fault	O	7	
RF Enable ² 0V or GND = RF On NC = RF Off	I	9	0V to +1.5V = Logic Low 3.5V to +5V = Logic High ³

¹ Default configuration for Pin 7 and Pin 9 = 3.3 V logic
For 5 V logic, please order p/n NW-PA-C-10-R01-5V

² For Inverted / Active High Logic, please order p/n NW-PA-C-10-R01-AH
[0V or GND = RF Off, NC = RF On]

³ RF Enable is pulled high internally and does not require user to apply voltage to this line

Contact NuWaves



NuWaves Engineering
132 Edison Drive
Middletown, OH 45044

www.nuwaves.com
product.sales@nuwaves.com
513.360.0800

NuWaves
engineering

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