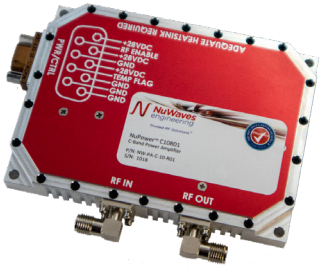
NuWaves
RF Solutions

NuPower™ C10R01
C-Band Solid State Power Amplifier

18 Watts CW
5100 MHz - 5900 MHz



P/N: NW-PA-C-10-R01 (Standard/3.3V Logic)
P/N: NW-PA-C-10-R01-5V (5V Logic)

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

The NuPower™ C10R01 is a small, highly efficient, solid state power amplifier (SSPA) that typically provides 18 watts of RF power across the 5100 to 5900 MHz frequency range, boosting performance of data links and transmitters.

The NuPower C10R01 accepts a nominal 0 dBm RF input and typically provides 42 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 PAs feature over-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

- 18 Watts RF Output Power (typ)
- 5100 to 5900 MHz
- Small Form Factor (3.57" x 2.57" x 0.50")
- High Efficiency GaN Technology
- 0 dBm Nominal RF Input
- 42 dB of Transmit Gain (typ)
- Over-Voltage Protection
- 3.3 V Logic Control (C10R01)
- 5V Logic Control (C10R01-5V)

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 through Group 5
- Unmanned Ground Vehicles (UGV)
- RF Telemetry & Communications Systems
- Air Launch Effect (ALE)
- Common Launch Tube (CLT)
- Counter UAS Detection & Mitigation
- MIMO/SISO/MANET Radio Range Extenstion

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

NuPower™ C10R01 Power Amplifier

Specifications

Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current @ 28 VDC	3	A
Max RF Input Power, CW, $Z_L = 50\ \Omega$	+12	dBm
Max Operating Temperature (ambient)	60	℃
Max Operating Temperature (baseplate)	85	℃
Max Storage Temperature	100	℃

Export Classification
EAR99

Electrical Specifications

@ 28 VDC, 25 ℃, Z_S=Z_L=50 Ω, CW, 0 dBm Input Power (unless otherwise stated)

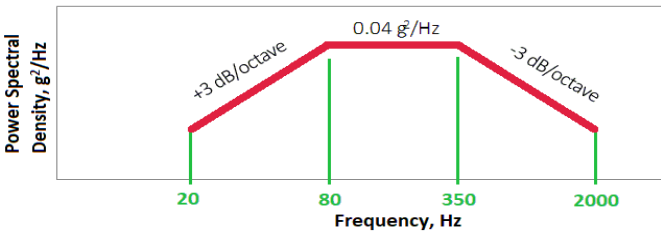
Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	5100		5900	MHz	
RF Output Power	P_{SAT}	8	18		W	
Output Power @ 1 dB/3dB Compression	P1dB/P3dB		25/35		dBm	5100 MHz
			30/40			5500 MHz
			25/37			5900MHz
Small Signal Gain	G		48		dB	5100 MHz, @ -30 dBm input
			50			5500 MHz, @ -30 dBm input
			51			5900 MHz, @ -30 dBm input
Small Signal Gain Flatness	ΔG		±1.7		dB	5.1-5.9 GHz; Pin = -30 dBm
Power Gain Flatness	ΔG		±1.1			5.1-5.9 GHz
Input VSWR	VSWR		1:9:1			
Nominal Input Drive Level	P_{IN}		0		dBm	
Operating Voltage	VDC	27	28	32	V	
Quiescent Current (RF Enable Off)	I_{DQ}		60		mA	
Quiescent Current (RF Enable On)	I_{DQ}		360		mA	
Operating Current	I_{DD}		2.1		A	
Module Efficiency			32		%	
Switching Speed	$TX_{ON/OFF}$		0.4	2	µS	10% to 90%
Third Order Order Intercept Point (Two tone test at 1 MHz spacing, Pout = 20 dBm / tone)	OIP3		38		dBm	5100 MHz
			38			5500 MHz
			39			5900 MHz
Harmonics	2nd		-43		dBc	
	3rd		-46		dBc	
Output Mismatch (No Damage)	VSWR			10:1	Ψ	No damage at all phase angles

Specifications (cont.)

Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	3.57 x 2.57 x 0.50	in	Max
Weight	4.0	oz	
RF Connectors, Input/Output	SMA Female, right angle		
Interface Connector	Micro-D, 9-pin Socket		
Cooling	Adequate Heatsink Required		

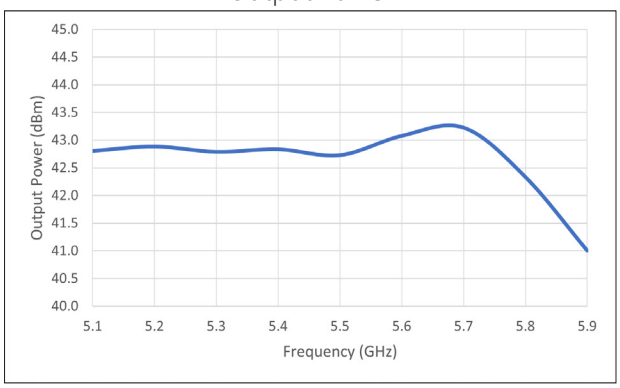
Environmental Specifications

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	T_A	-40		+60	℃
Operating Temperature (baseplate)	T_C	-40		+85	℃
Storage Temperature	T_{STG}	-60		+100	℃
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration Profile (Random profile in x,y, z axis, as per Figure for 15 minute duration in each axis)					

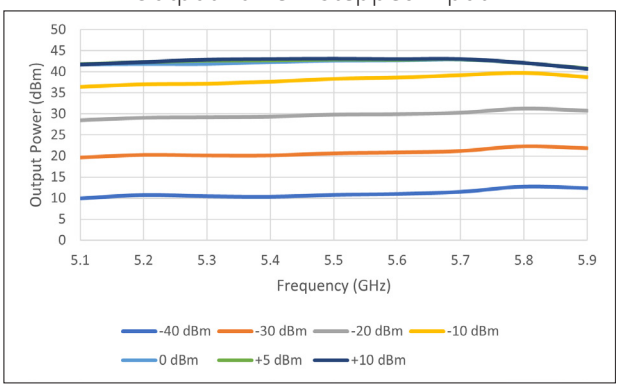
Performance Plots

Test Conditions: +28 VDC, +25 ℃, Z_S=Z_L=50 Ω, CW, 0 dBm Input Power (unless otherwise stated)

Output Power



Output Power - Stepped Input

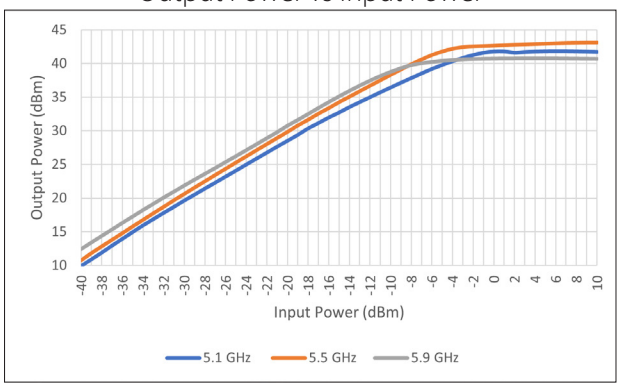


NuPower™ C10R01 Power Amplifier

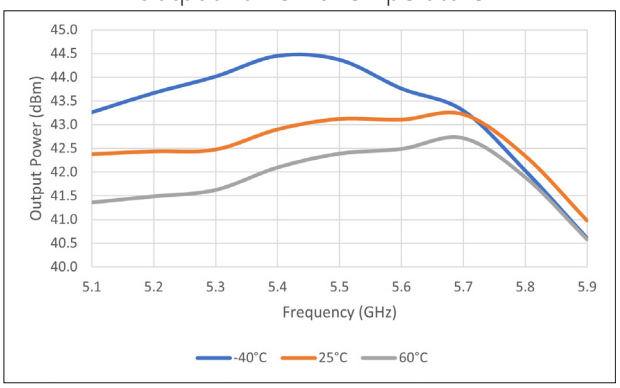
Performance Plots (cont.)

Test Conditions: +28 VDC, +25 °C, Z_S=Z_L=50 Ω, CW, 0 dBm Input Power (unless otherwise stated)

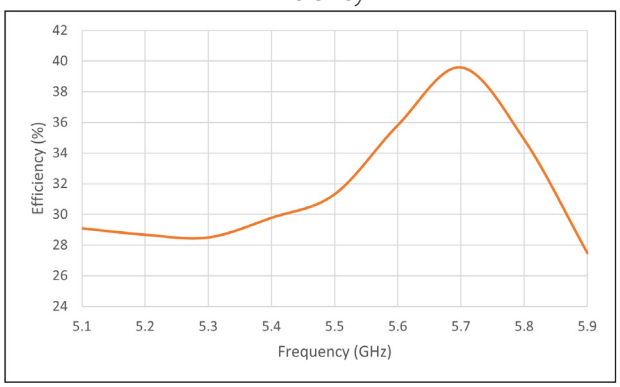
Output Power vs Input Power



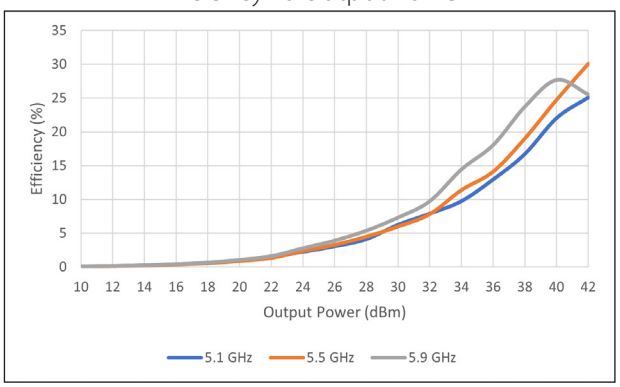
Output Power vs Temperature



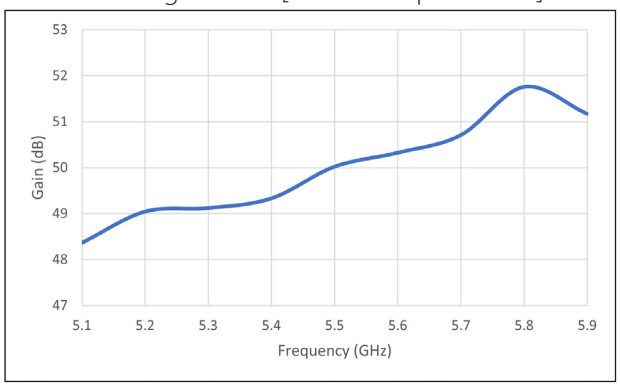
Efficiency



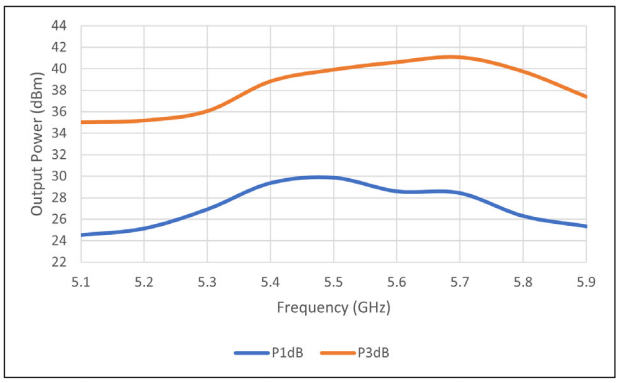
Efficiency vs Output Power



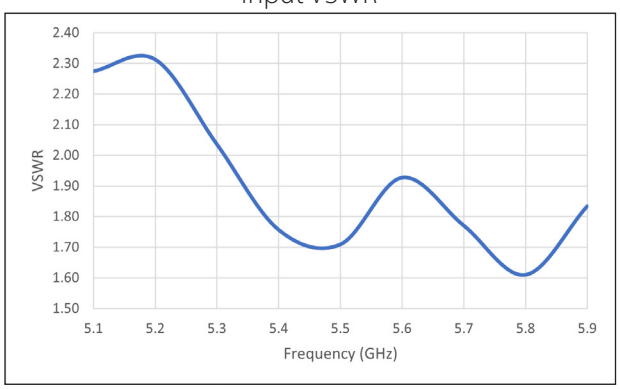
Small Signal Gain [-30 dBm Input Power]



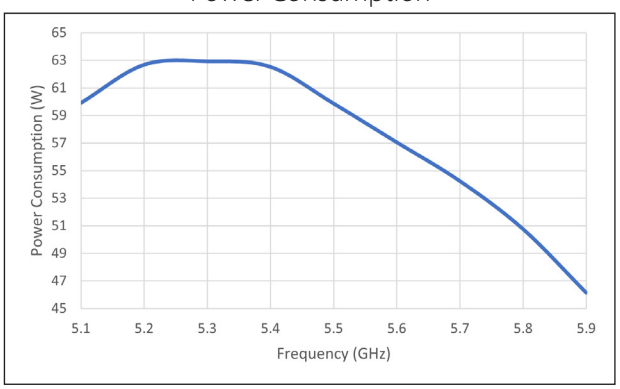
P1dB / P3dB



Input VSWR

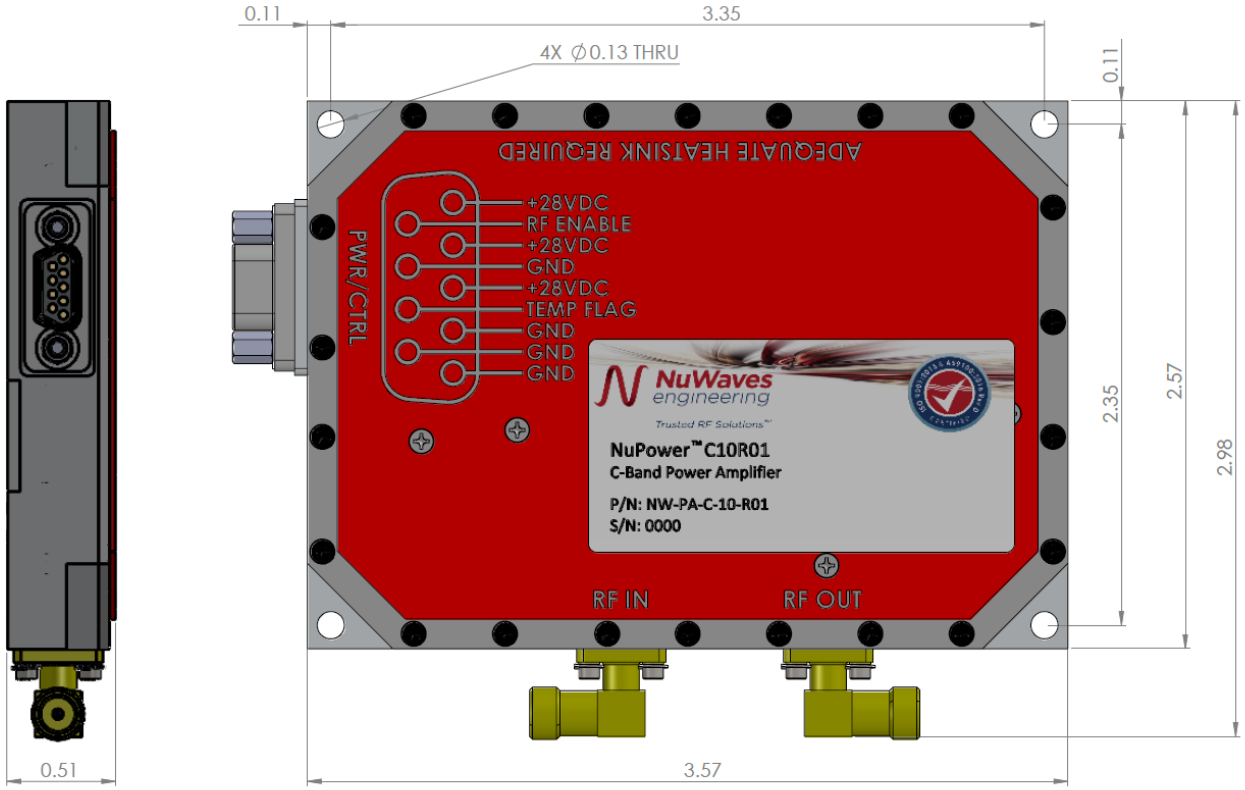


Power Consumption



NuPower™ C10R01 Power Amplifier

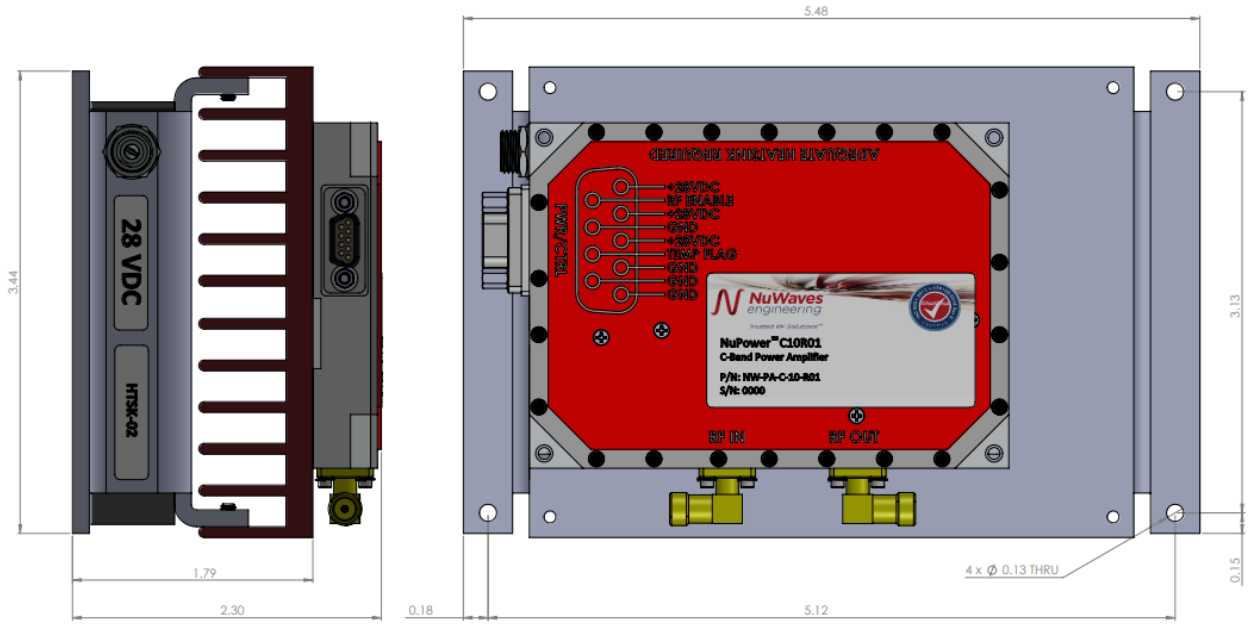
Mechanical Outline



NuPower™ C10R01 Power Amplifier

Optional Heatsink

Heatsink & Integrated Fan: HTSK-02



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
HTSK-02	Fan-Cooled Heatsink with Integrated Fan

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	3.3V Logic (C10R01 Only): -0.5 V to +0.99 V = Logic Low +2.31 V to +3.8 V = Logic High
			5V Logic (C10R01-5V Only): -0.5 V to +1.5 V = Logic Low +3.5 V to +5 .5V = Logic High
RF Enable[1,2] 0 V or GND = RF On NC = RF Off	I	9	3.3V Logic (C10R01 Only): 0 V to +0.8 V = Logic Low +2V to +3.3V = Logic High[3]
			5V Logic (C10R01-5V Only): 0 V to +1.5 V = Logic Low 3.5 V to +5 V = 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
[0 V 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 RF Solutions
132 Edison Drive
Middletown, OH 45044

www.nuwaves.com
sales@nuwaves.com
513.360.0800

NuWaves RF Solutions