NuWaves
RF Solutions

NuPower™ VUL-10-C01-S01

Mini Multi-Octave Power Amplifier

14 Watt CW
30 MHz - 1000 MHz

P/N: NW-PA-VUL-10-C01-S01

The NuWaves NuPower™ VUL-10-C01-S01 is a highly efficient, miniature solid state power amplifier that provides ultra-broadband operation across multiple octaves from low VHF to L-band frequencies, and delivers 14W (typ) of RF power across the frequency range of 30 MHz to 1000 MHz.

Based on the latest gallium nitride (GaN) technology, the NuPower™ VUL-10-C01-S01's typical 38% power efficiency and 2.84 in^3 form factor make it ideal for size, weight, and power-constrained broadband RF telemetry and tactical communication systems. The NuPower™ VUL-10-C01-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

- 14Watts RF Output Power
- 30 MHz to 1.0 GHz
- Miniature Package (2.84 in^3)
- High-Efficiency GaN Technology
- Internal Power Back Off
- Over-Voltage Protection
- Logic On/Off 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)
- Broadband RF Telemetry
- RF Communication Systems
- Software Defined Radios
- Common Launch Tube (CLT)
- Test Labs

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NuPower™ VUL-10-C01-S01 Power Amplifier

Specifications

Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current @ 11 VDC	5.35	A
Max Device Current @ 28 VDC	2.5	A
Max RF Input Power, Z_L = 50 Ω, CW, 30-100 MHz	+3	dBm
Max RF Input Power, Z_L = 50 Ω, CW, 100-300 MHz	+8	
Max RF Input Power, Z_L = 50 Ω, CW, 300-1000 MHz	+12	
Max Operating Temperature (ambient)	60	℃
Max Operating Temperature (baseplate)	85	℃
Max Storage Temperature	85	℃

Export Classification
EAR99

Electrical Specifications

@ 28 VDC, 25 ℃, Z_S=Z_L=50 Ω, CW, 30-1000 MHz, Pin= -3 dBm, Unless otherwise Stated

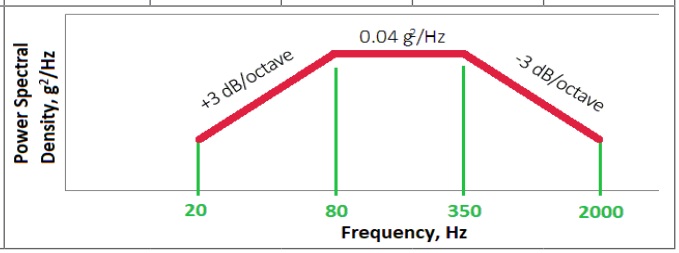
Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	30		1000	MHz	
RF Output Power	P_{SAT}	5	14		W	30 MHz - 50 MHz
		8				50 MHz - 1000 MHz
Output Power @ 1dB Compression	P1dB		28		dBm	30 MHz
			30			500 MHz
			29			1000 MHz
Small Signal Gain	G		73		dB	30 MHz; Pin = -50 dBm
			59			500 MHz; Pin = -50 dBm
			49			1000 MHz; Pin = -50 dBm
Small Signal Gain Flatness	ΔG		±14		dB	Pin = -50 dBm
Power Gain Flatness			± 2.6		dB	
Input VSWR	VSWR		2.1:1			
Nominal Input Drive Level	P_{IN}		-3		dBm	
Operating Voltage	VDC	11	28	32	V	
Quiescent (no RF) Current	I_{DQ}		0.65		A	
Operating Current	I_{DD}		1.4	2.5	A	
Module Efficiency			38		%	
Switching Speed	$TX_{ON/OFF}$			30	µS	10% to 90%
Third Order Order Intercept Point (Two tone test at 1 MHz spacing, Pout = 20 dBm / tone)	OIP3		45		dBm	30 MHz
			44			500 MHz
			41.5			1000 MHz
Harmonics	2nd		-11		dBc	
	3rd		-11			
Output Mismatch (No Damage)				10:1	Ψ	No Damage at All Phase Angles

Specifications (cont.)

Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	2.340 x 1.960 x 0.620	in	Max
Weight	2.5	oz	Max
RF Connectors, Input/Output	SMA Female		
Interface Connector	Micro-D, 9-pin Socket		
Cooling	Adequate Heatsink Required		

Environmental Specifications

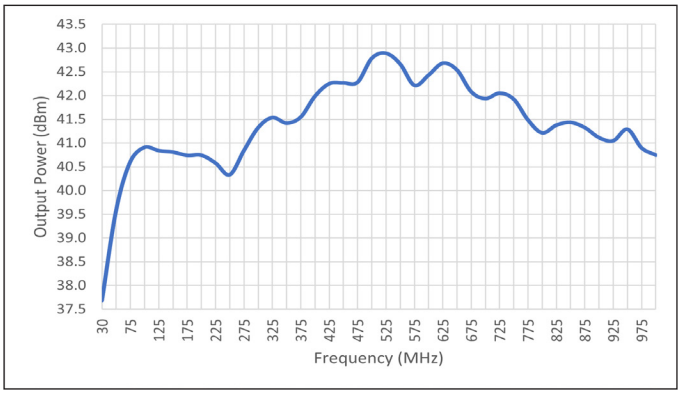
Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	T_A	-40		+60	°C
Operating Temperature (baseplate)	T_C	-40		+85	°C
Storage Temperature	T_{STG}	-55		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration / Shock Profile (Random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

NuPower™ VUL-10-C01-S01 Power Amplifier

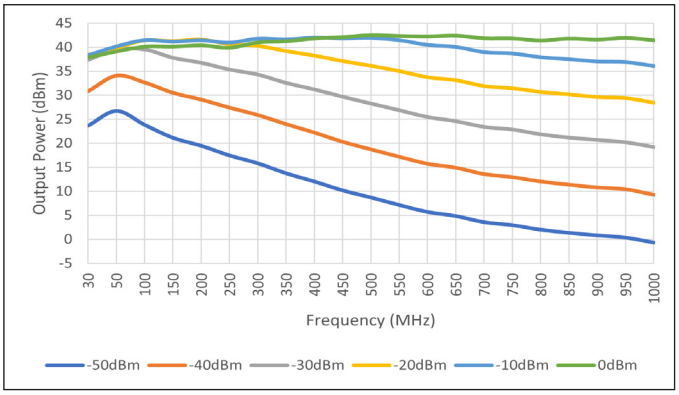
Performance Plots

Test Conditions: @ 28 VDC, 25 °C, Z_S=Z_L=50 Ω, CW, 30-1000 MHz, Pin= -3 dBm, Unless otherwise Stated

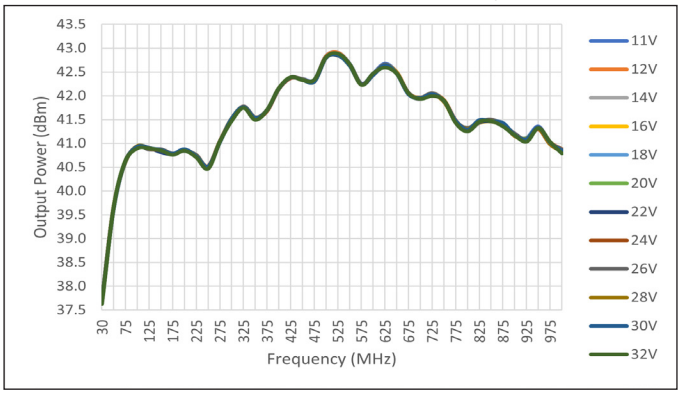
Output Power @ Nominal Input



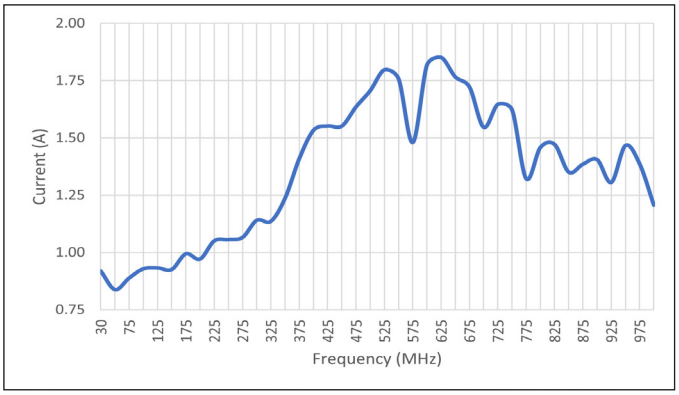
Output Power - Stepped Input Power



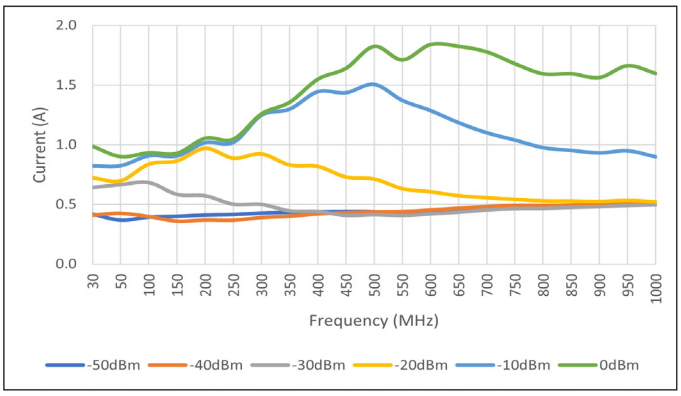
Output Power vs Input Voltage



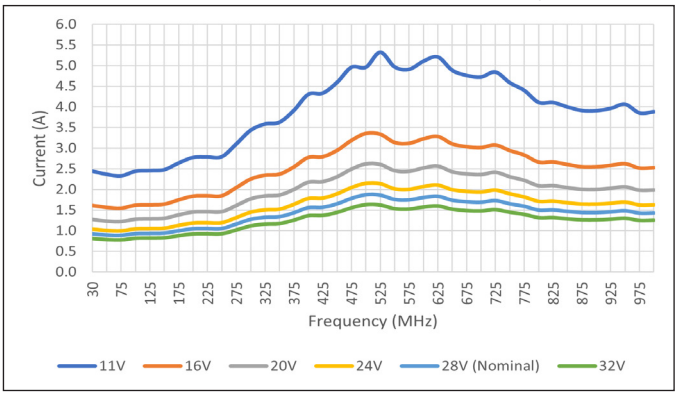
Current Consumption



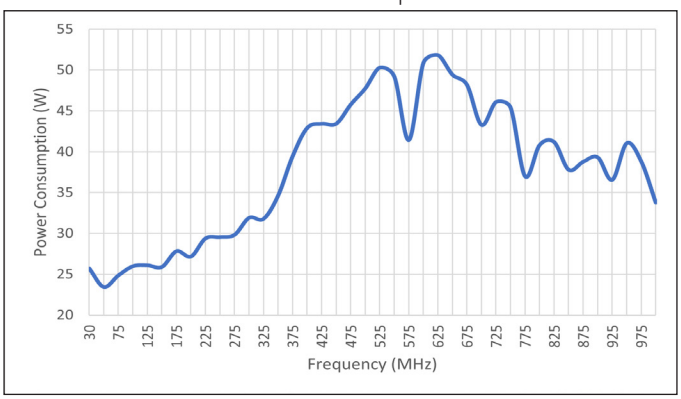
Current Consumption - Stepped Input Power



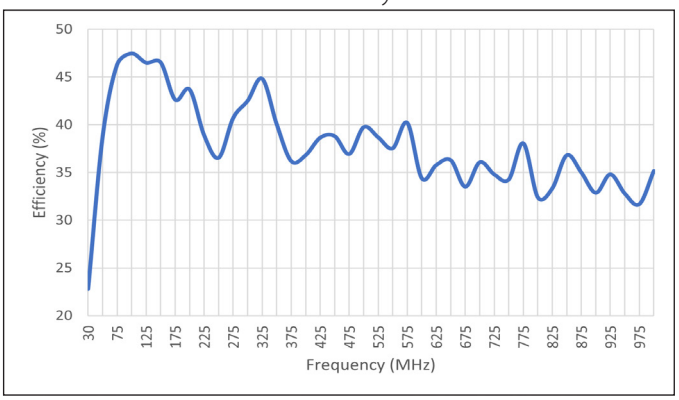
Current Consumption vs Input Voltage



Power Consumption



Efficiency



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Performance Plots

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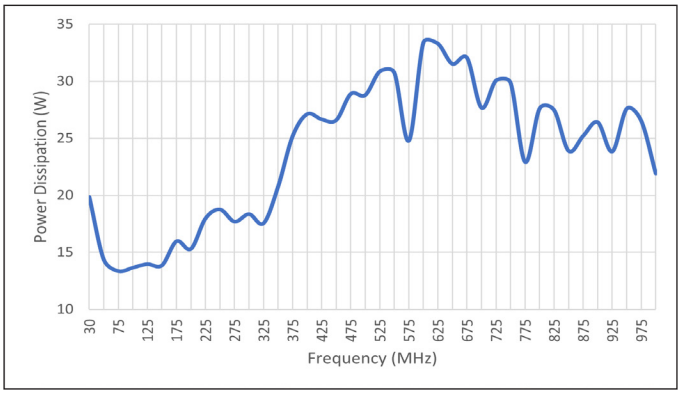
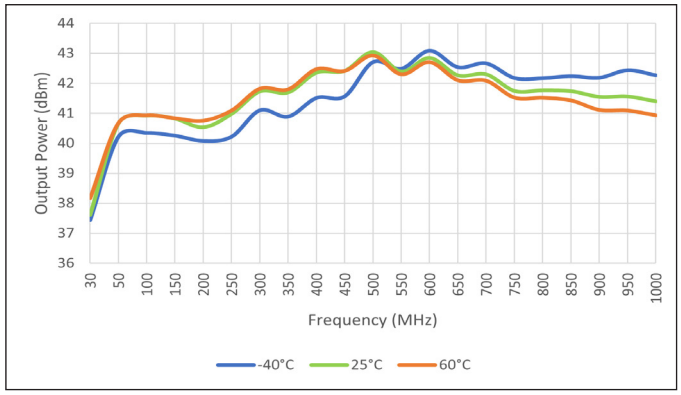
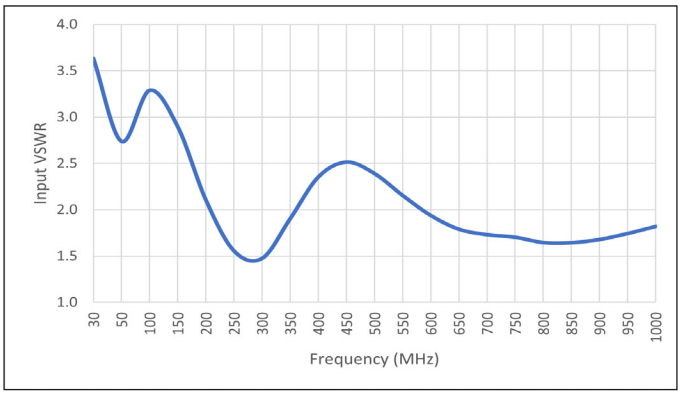
Power Dissipation



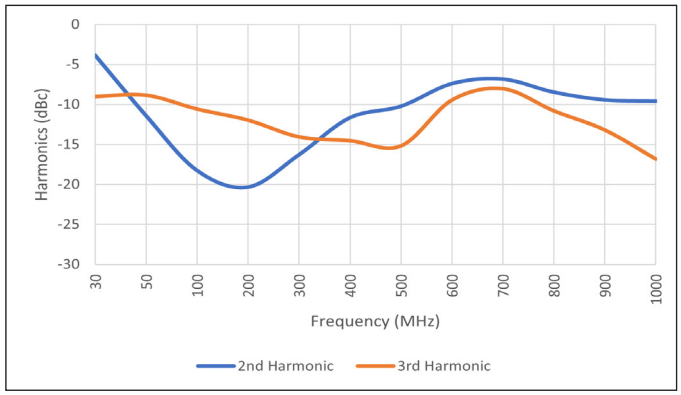
Output Power vs Temperature



Input VSWR



Harmonics

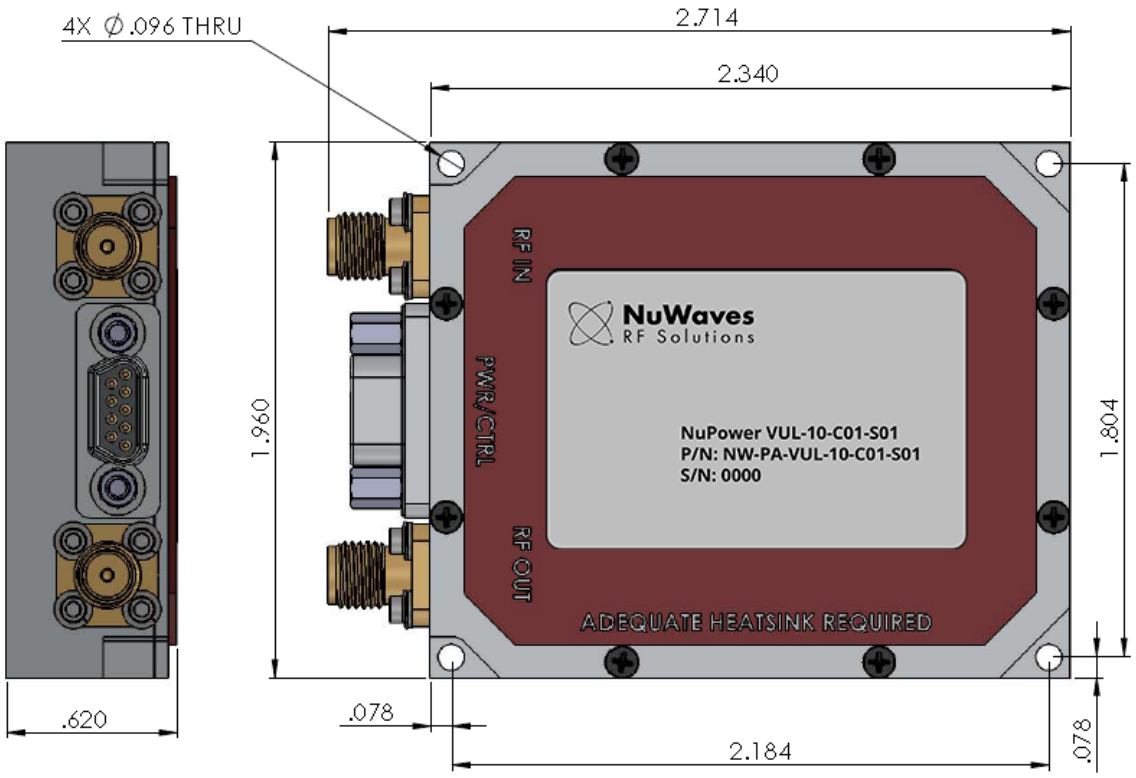


Efficiency

Power Consumption

NuPower™ VUL-10-C01-S01 Power Amplifier

Mechanical Outline



NuPower™ VUL-10-C01-S01 Power Amplifier

Accessory Part Numbers - Sold Separately

Part Number	Description
NW-PA-ACC-CB09ME	Standard Interface Cable Assembly - Flying Leads
NW-PA-ACC-CT09ME	Upgraded Interface Cable Assembly - Banana Plug Termination
HTSK-01A	Heatsink with Integrated Fan

Pinout

Function	I/O	Pin
Ground	I	1, 2
DC Power (+11 to +32 VDC)	I	3, 4
RF Enable 0 V or GND = RF ON +5V or NC = RF OFF	I	5
No Connect	-	6
Power Back-off, Bit 1	I	7
Over Temperature Flag 0V = temperature fault +5V = no fault	O	8
Power Back-off, Bit 2	I	9

Power Back Off - Truth Table[1]				
Atten.	Bit 1		Bit 2	
	N/C	GND	N/C	GND
0 dB	X		X	
6dB		X		X
9dB		X	X	
12dB	X			X

[1]Back off bits apply 0dB, 6dB, 9dB, or 12dB attenuation to the input, per truth table above.

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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