NuWaves
RF Solutions

NuPower™ ULS-25-C01-S01

25 W Mini Multi-Octave Power Amplifier

25 Watt CW
200 MHz - 2600 MHz

P/N: NW-PA-ULS-25-C01-S01

NuWaves' NuPower™ ULS-25-C01-S01 is a highly efficient, miniature solid state power amplifier that provides ultra-broadband operation across multiple octaves from high VHF through S-band frequencies. This module delivers 25 watts of RF power across the frequency range of 200 MHz to 2.6 GHz.

Based on the latest gallium nitride (GaN) technology, the NuPower ULS-25-C01-S01's 42% efficiency (typ) 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 ULS-25-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

- 25 Watts RF Output Power
- 200 MHz to 2.6 GHz
- Miniature Package (2.84 in^3)
- High-Efficiency GaN Technology
- Transmit/Standby Mode
- Single Power Supply
- Over-Voltage Protection
- Reverse-Voltage Protection
- Power Backoff

Benefits

- Extended Range
- Increased Link Margin
- Improved 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
- Test Labs

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

NuPower™ ULS-25-C01-S01 Power Amplifier

Specifications

Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	3.0	A
Max RF Input Power, $Z_L = 50\ \Omega$	10	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 Ω, 0dBm Input Power (unless otherwise stated)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	200		2600	MHz	
RF Output Power	P_{SAT}	10	25		W	
Output Power @ 1dB Compression	P1dB		32		dBm	200 MHz
			29			1400 MHz
			32			2600 MHz
Small Signal Gain	G		69		dB	200 MHz (Pin=-35dBm)
			53			1400 MHz (Pin=-35dBm)
			48			2600 MHz (Pin=-35dBm)
Small Signal Gain Flatness	ΔG		± 21		dB	Pin = -35 dBm
Power Gain Flatness			± 4.7		dB	
Input VSWR	VSWR		2.2			
Nominal Input Drive Level	P_{IN}		0		dBm	
Operating Voltage	VDC	11	28	32	V	
Quiescent (no RF) Current	I_{DQ}		0.60		A	
Operating Current	I_{DD}		2.0	3.0	A	
Module Efficiency			42		%	
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	200 MHz
			44			1400 MHz
			46			2600 MHz
Harmonics	2nd		-15		dBc	
	3rd		-21			
Output Mismatch (No Damage)				10:1	Ψ	No damage at all phase angles

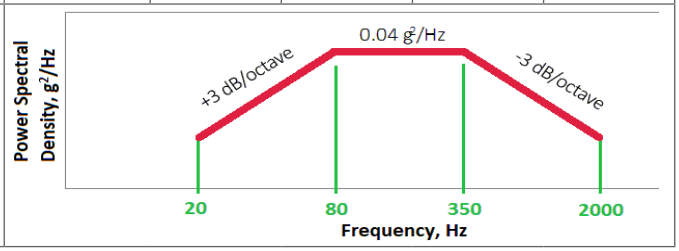
NuPower™ ULS-25-C01-S01 Power Amplifier

Specifications (cont.)

Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	2.340 x 1.960 x 0.620	in	Max
Weight	2.0	oz	Max
RF Connectors, Input/Output	SMA Female		
Interface Connector	Micro-D, 9-pin Socket		
Cooling	Adequate Heatsink Required		

Environmental Specifications

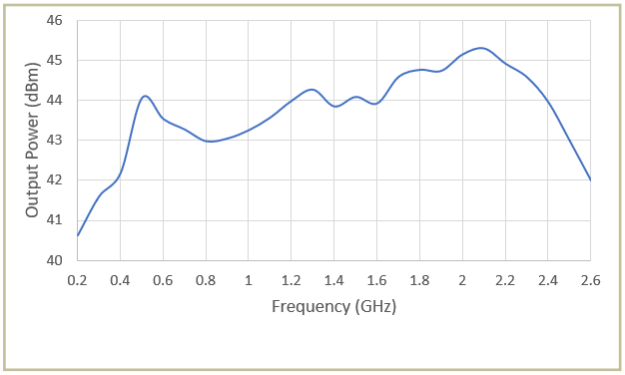
Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	T_A	-40		+60	°C
Operating Temperature (baseplate)	T_C	-40		+85	°C
Storage Temperature	T_{STG}	-55		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration / Shock Profile (Random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

NuPower™ ULS-25-C01-S01 Power Amplifier

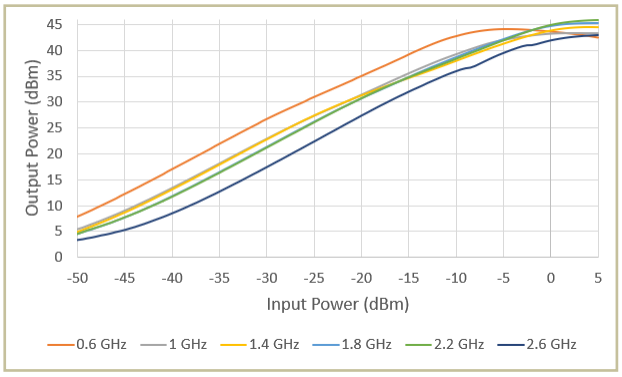
Performance Plots

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

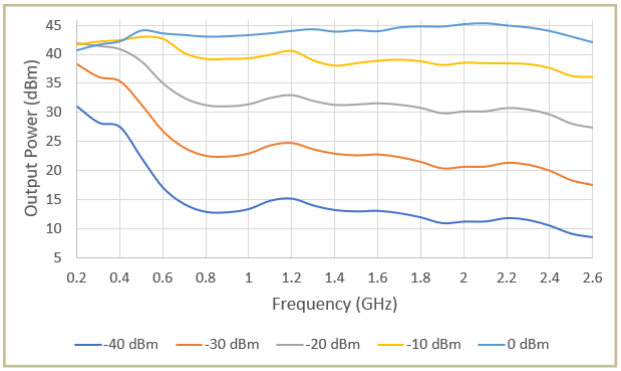
Output Power vs. Frequency



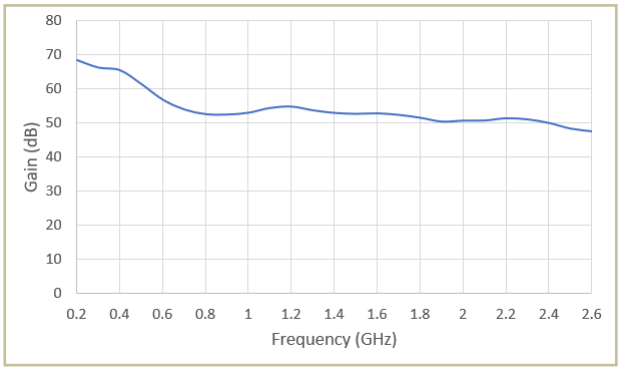
Output Power vs. Input Power



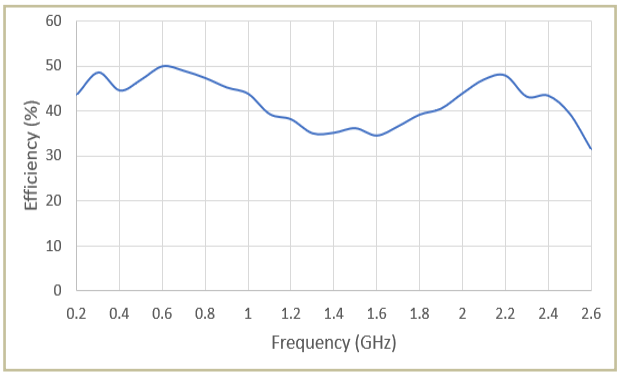
Output Power vs. Input Power [Stepped Input]



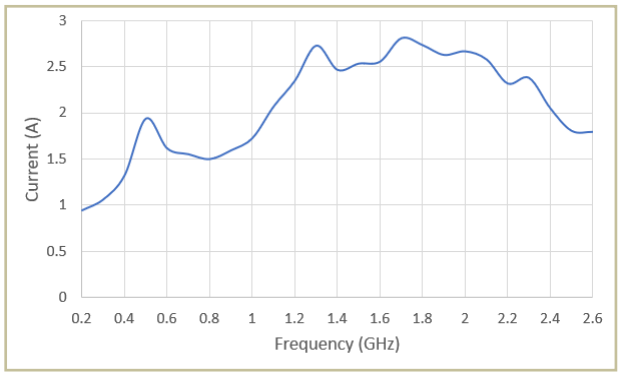
Small Signal Gain [-35dBm Input]



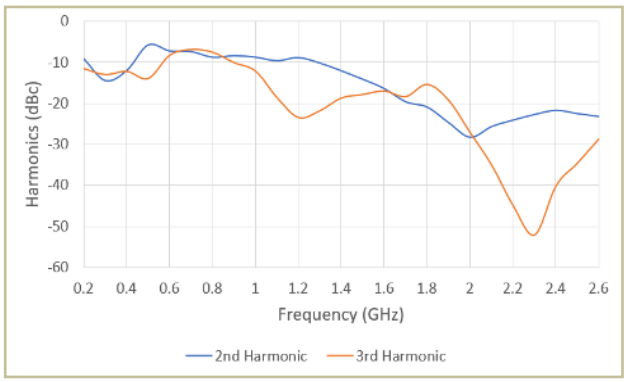
Efficiency



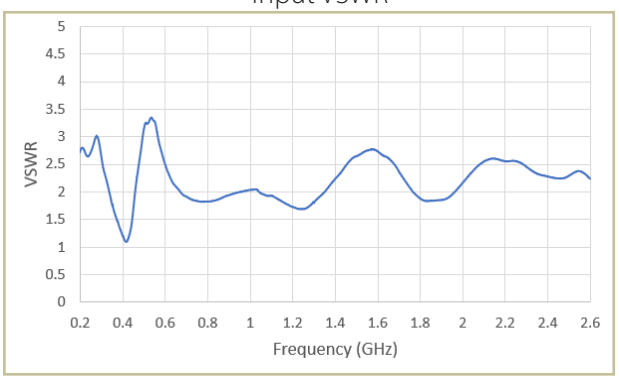
Current Consumption



Harmonics



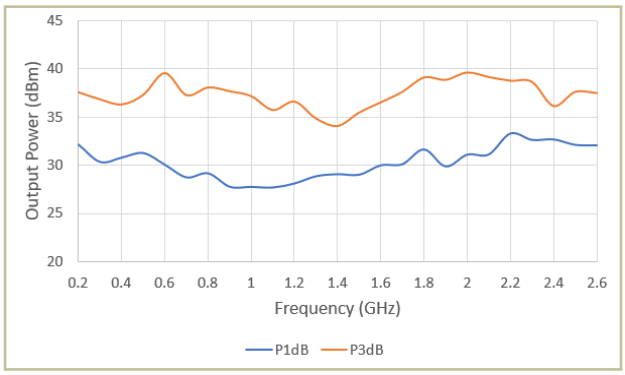
Input VSWR



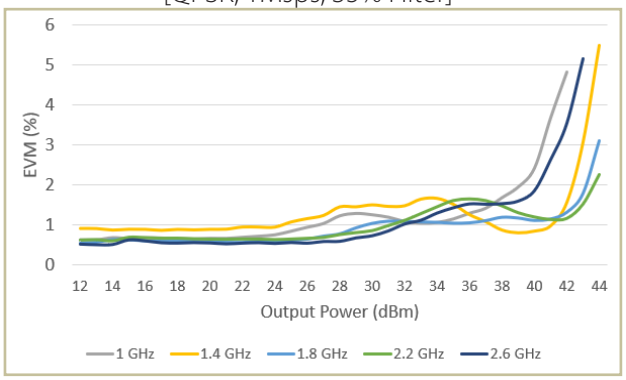
NuPower™ ULS-25-C01-S01 Power Amplifier

Performance Plots (cont.)

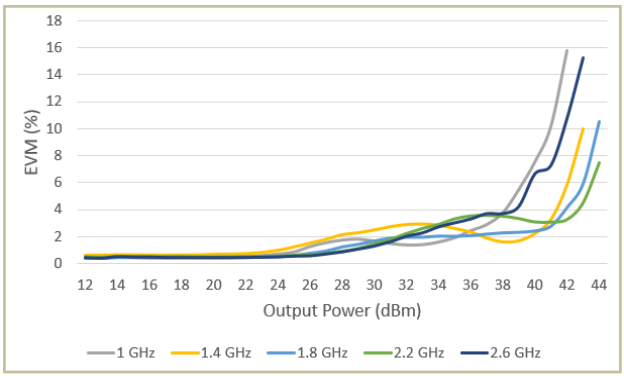
P1dB & P3dB



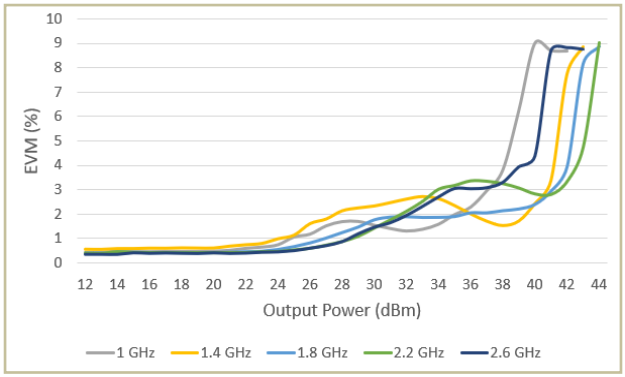
Error Vector Magnitude vs. Output Power
[QPSK, 1Msps, 35% Filter]



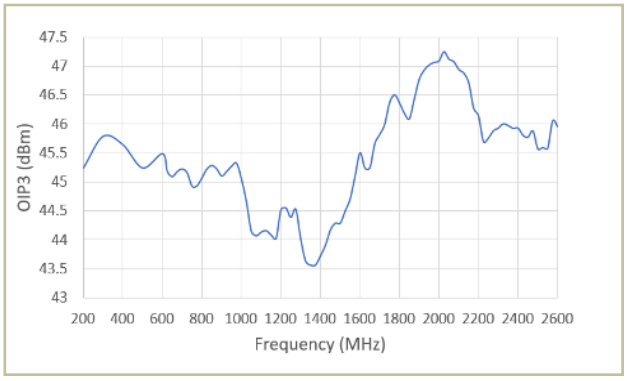
Error Vector Magnitude vs. Output Power
[16QAM, 2Msps, 35% Filter]



Error Vector Magnitude vs. Output Power
[64QAM, 5 Msps, 10% Filter]

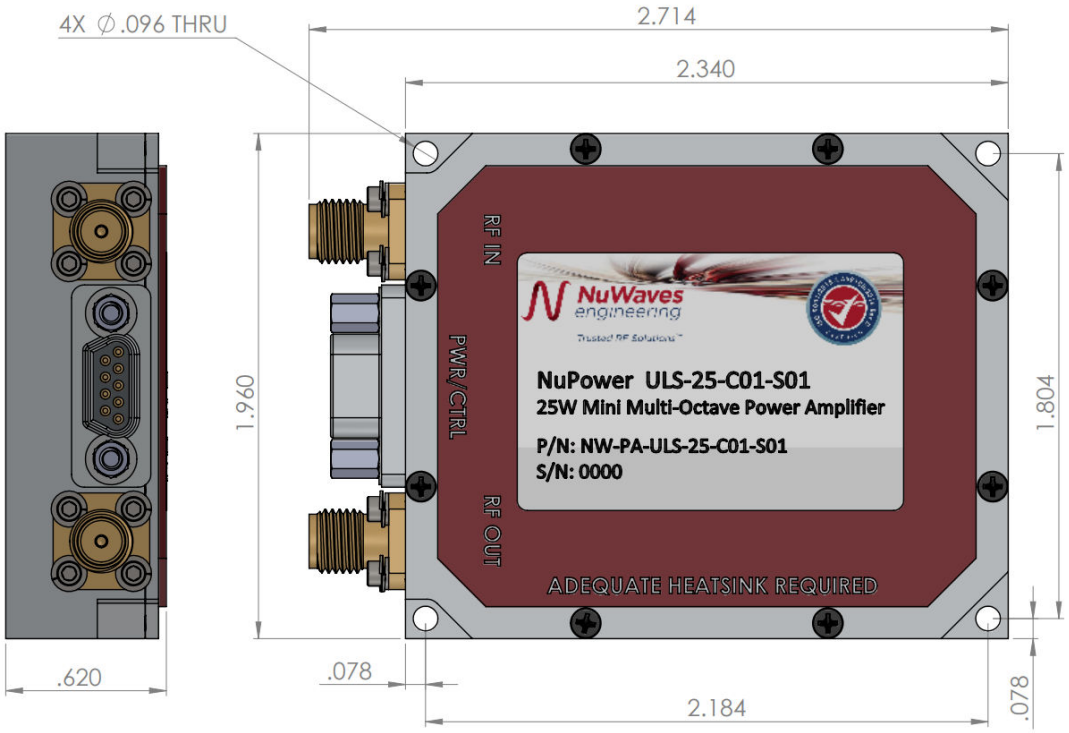


OIP3 [20dBm/tone, 1MHz Spacing]



NuPower™ ULS-25-C01-S01 Power Amplifier

Mechanical Outline



Accessory Part Numbers - Sold Separately

Part Number	Description
NW-FL-05LPLE-2500-SFSF-M01	Harmonic Filter Module
NW-PA-ACC-CB09ME	Standard Interface Cable Assembly - Flying Leads
NW-PA-ACC-CT09ME	Upgraded Interface Cable Assembly - Banana Plug Termination
HTSK-01	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[1]	I	7
Over Temperature Flag 0V = temperature fault +5V = no fault	O	8
Power Back-off, Bit 2[1]	I	9

Note[1]: Bit 1 and/or Bit 2 connected to GND enables 6dB, 9dB, or 12dB input attenuation. Bit 1 & Bit 2 (floating) = 0dB attenuation, Bit 1 & Bit 2 (GND) = -6dB, Bit 1 (GND) = -9dB, Bit 2 (GND) = -12dB

Contact NuWaves

NuWaves RF Solutions
132 Edison Drive
Middletown, OH 45044

www.nuwaves.com
sales@nuwaves.com
513.360.0800

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