



NuWaves
engineering

Trusted RF Solutions™

NuPower™ 12B01A-D30 L- & S-Band Solid State Power Amplifier w/ 1 Watt Input Drive Level

20 Watts (CW) typ
1.0 - 2.5 GHz

P/N: NW-PA-12B01A-D30

(Replaces P/N: NW-SSPA-10W-1.0-2.5-D30)



The NuPower™ 12B01A-D30 is a small, highly efficient solid state power amplifier that provides 20 watts (typ) of RF power to boost performance of data links and transmitters.

Based on the latest gallium nitride (GaN) technology, NuPower's 30% - 50% power efficiency and 3.9 in³ form factor make it ideal for size, weight, and power-constrained broadband RF telemetry and tactical communication systems.

The NuPower 12B01A-D30 power amplifier accepts a nominal 1 watt RF input and provides 10 dB of gain from 1000 MHz to 2500 MHz. The NuPower 12B01A-D30 module comes standard with a NW-PA-ACC-CB09MA interface cable, for ease of integration. This model is also available with the standard 0 dBm input drive level (P/N: NW-PA-12B01A), making it making it perfect for use with typical communcations systems.

NuPower PAs feature over-voltage and reverse-voltage protection and can operate over a wide temperature range of -30 °C to +60 °C.

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

Features

- 20 Watts RF Output Power
- 1.0 GHz to 2.5 GHz
- Miniature Package (3.00" x 2.00" x 0.65")
- High-Efficiency GaN Technology
- +30 dBm Nominal RF Input
- 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
- Software Defined Radios

NuPower™ 12B01A-D30 Power Amplifier

Specifications

Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	2.7	A
Max RF Input Power, $Z_L = 50 \Omega$	33	dBm
Max Operating Temperature (ambient)	60	°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	1000		2500	MHz	
RF Output Power	P_{SAT}	14	20		W	Pin = +30 dBm
Small Signal Gain	G		12.5		dB	1000 MHz, @ -30 dBm input
			13.2			1500 MHz, @ -30 dBm input
			13.4			2000 MHz, @ -30 dBm input
			13.6			2500 MHz, @ -30 dBm input
Small Signal Gain Flatness	ΔG		± 3		dB	Pin = -30 dBm
Power Gain Flatness			± 1		dB	Pin = +30 dBm
Input VSWR	VSWR		1.8	3.5		
Nominal Input Drive Level	P_{IN}		30		dBm	
Operating Voltage	VDC	11	28	32	V	
Quiescent Current	I_{DQ}		0.35		A	
Operating Current	I_{DD}		1.5	2.7	A	Pin = +30 dBm
Module Efficiency			30		%	
Switching Speed	$TX_{ON/OFF}$			2	μS	10% to 90%
Third Order Order Intercept Point (Two tone test at 1 MHz spacing, $P_{out} = 20 \text{ dBm} / \text{tone}$)	OIP3		42		dBm	1000 MHz
			41			1500 MHz
			38			2000 MHz
			41			2500 MHz
Harmonics	2nd		-21	-8	dBc	
	3rd		-24	-11		
Output Mismatch (No Damage)				10:1		

NuPower™ 12B01A-D30 Power Amplifier

Specifications (cont.)

Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	3.0 x 2.0 x 0.65	in	Max
Weight	3	oz	Max
RF Connectors, Input/Output	SMA Female		
Interface Connector	Micro-D, 9-pin Socket		
Cooling	Adequate Heatsink Required		

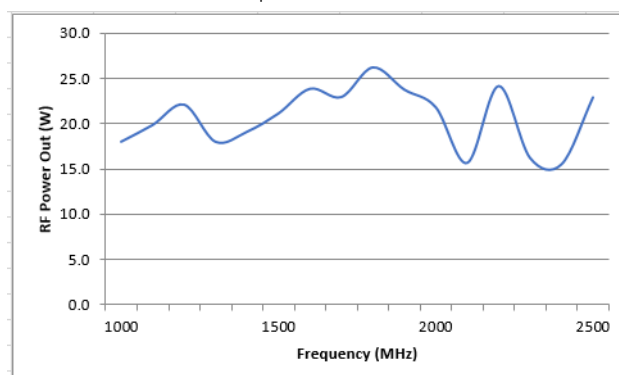
Environmental Specifications

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)					

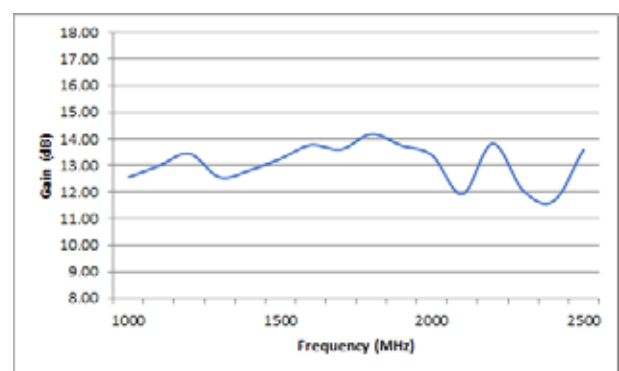
NuPower™ 12B01A-D30 Power Amplifier

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

RF Output Power



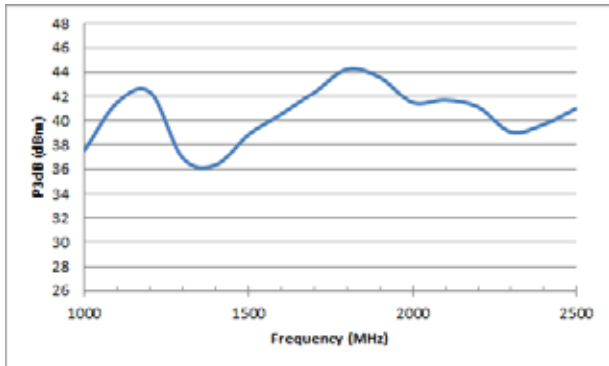
Small Signal Gain



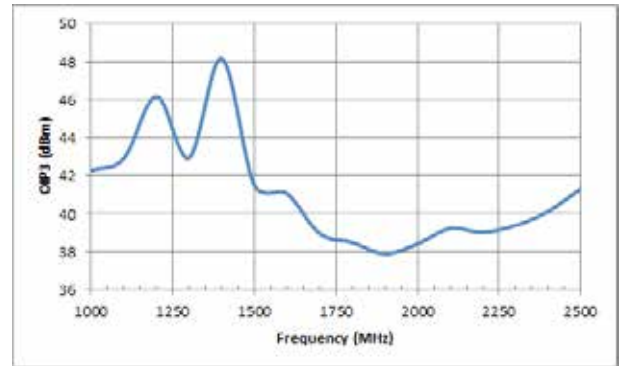
NuPower™ 12B01A-D30 Power Amplifier

Performance Plots (cont.) (Test Conditions: +28 VDC, +25 °C, $Z_S=Z_L=50 \Omega$)

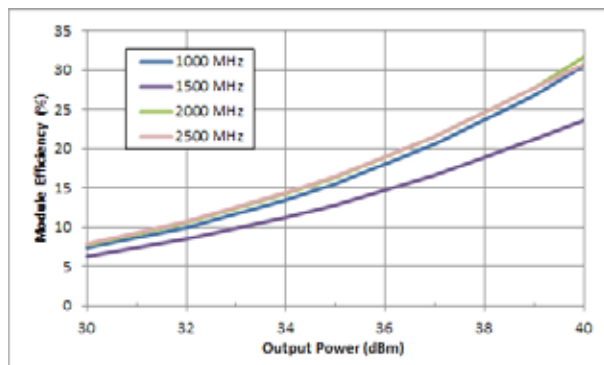
P3dB



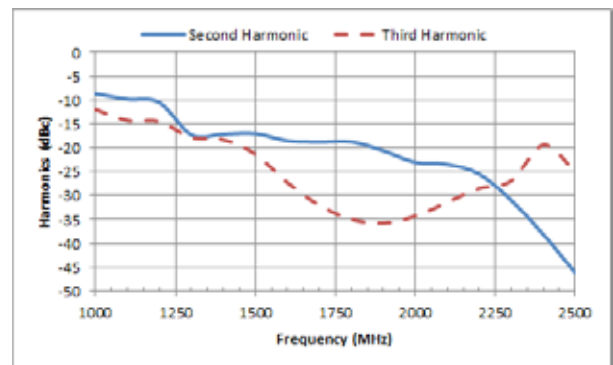
OIP3



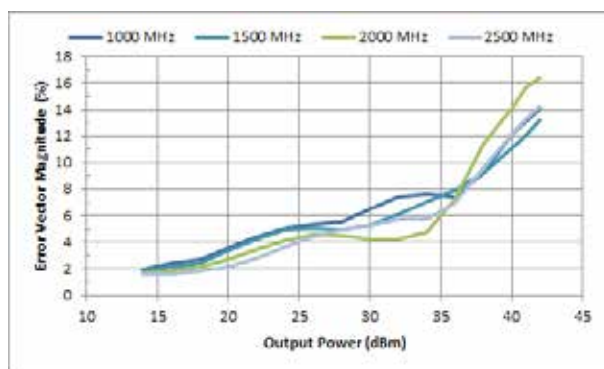
Efficiency



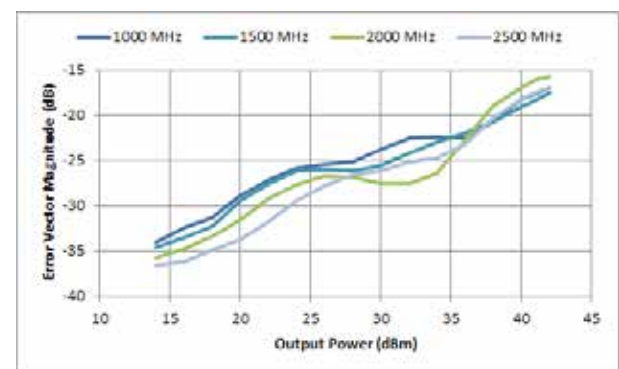
Harmonics (@ Psat)



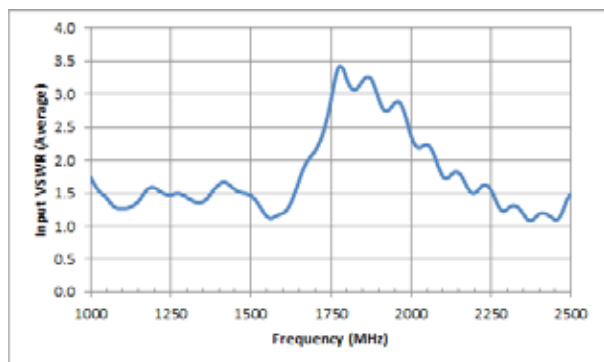
Error Vector Magnitude (%) [w/ OFDM Waveform]



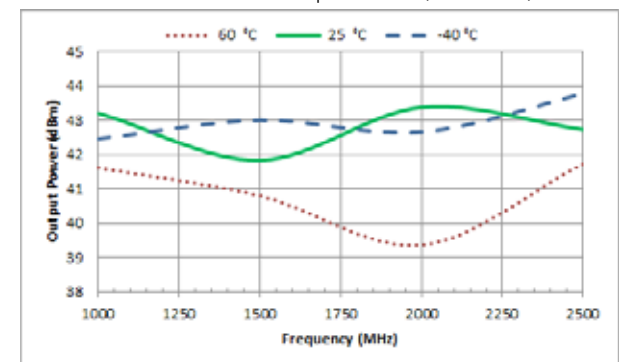
Error Vector Magnitude (dB) [w/ OFDM Waveform]



VSWR

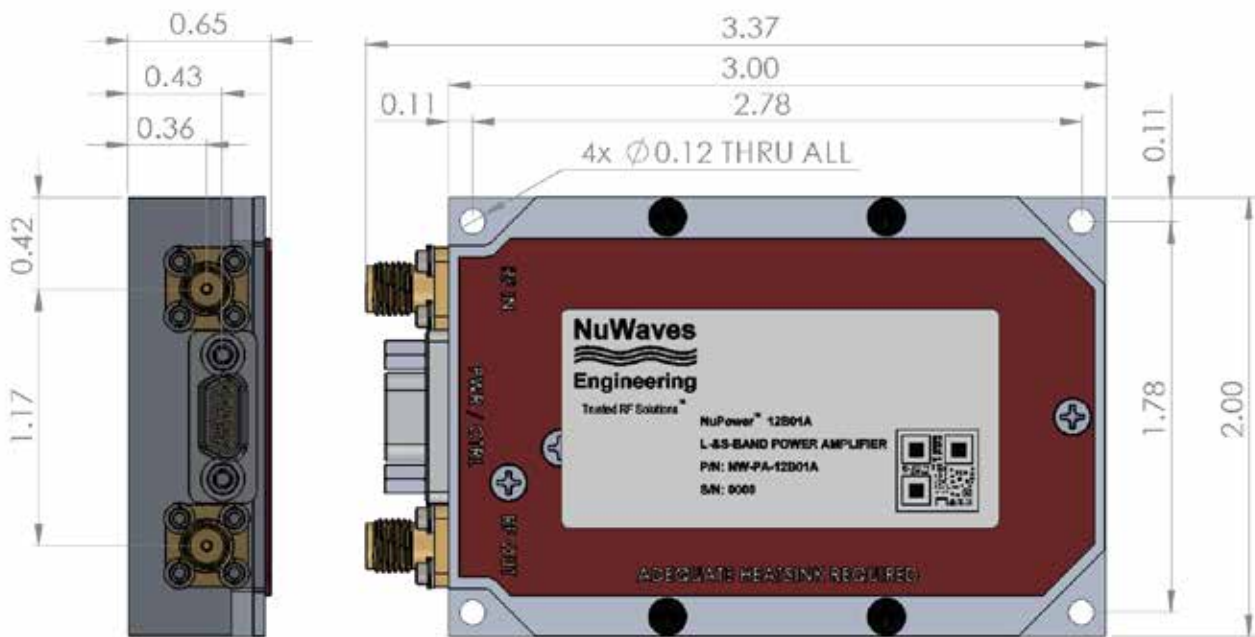


Power Out vs. Temperature (ambient)



NuPower™ 12B01A-D30 Power Amplifier

Mechanical Outline



Accessory Part Numbers

Part Number	Description
NW-FL-05LPLE-2500-SFSF-M01	Harmonic Filter Module
NW-PA-ACC-CB09MA	Standard Interface Cable Assembly - Flying Leads (included with module)
NW-PA-ACC-CT09MA	Upgraded Interface Cable Assembly - Banana Plug Termination
NW-PA-ACC-KT01	Accessory Kit, which includes Fan-Cooled Heatsink and Upgraded Interface Cable
NW-PA-ACC-HS01	Heatsink with Integrated Fan

Pinout

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

* Optional inverted RF Enable logic (Active High) is also available, in the NW-PA-12B01A-D30AH module

Contact NuWaves



NuWaves Engineering
132 Edison Drive
Middletown, OH 45044

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

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