NuWaves engineering

Trusted RF Solutions™

NuPower™ 12B01A

L- & S-Band Solid State Power Amplifier

10 Watt CW
2.5 Watts Linear, 5% EVM @ 34 dBm
1.0 GHz - 2.5 GHz

P/N: NW-PA-12B01A

(includes NW-PA-ACC-CB09MA interface cable)

The NuPower™ 12B01A is a small, highly efficient solid state power amplifier that provides over 10 watts 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 in^3 form factor make it ideal for size, weight, and power-constrained broadband RF telemetry and tactical communication systems.

The NuPower 12B01A power amplifier accepts a nominal 0 dBm RF input and provides 40 dB of gain from 1.0 GHz to 2.5 GHz. The NuPower 12B01A module comes standard with a NW-PA-ACC-CB09MA interface cable, for ease of integration. This model is also available with a 1 watt input drive level (P/N: NW-PA-12B01A-D30), making it ideal for use with L-3 Communications' Bandit miniature L- and S-band transceiver.

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

- 10 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
- 0 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

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NuPower™ 12B01A Power Amplifier

Specifications

Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	2.4	A
Max RF Input Power, $Z_L = 50\ \Omega$	10	dBm
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

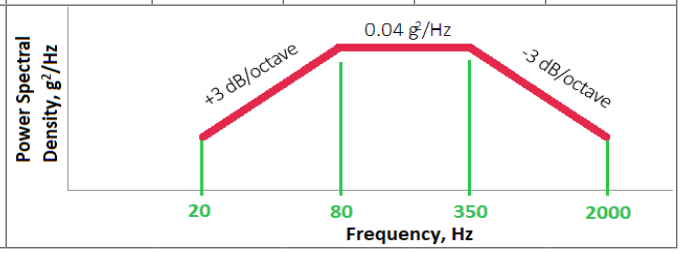
Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	1000		2500	MHz	
RF Output Power	P_{SAT}	10	18	23	W	Pin = 0 dBm
Output Power @ 1dB Compression	P1dB		31		dBm	1.0 GHz
			31			1.5 GHz
			36			2.0 GHz
			38			2.5 GHz
Small Signal Gain	G		50		dB	1.0 GHz, @ -30 dBm input
			49			1.5 GHz, @ -30 dBm input
			47			2.0 GHz, @ -30 dBm input
			46			2.5 GHz, @ -30 dBm input
Small Signal Gain Flatness	ΔG		± 3		dB	Pin = -30 dBm
Power Gain Flatness			± 1		dB	Pin = 0 dBm
Input VSWR	VSWR	1.1:1	1.8:1	3.5:1		
Nominal Input Drive Level	P_{IN}		0		dBm	
Operating Voltage	VDC	11	28	32	V	
Quiescent Current	I_{DQ}		0.35		A	
Operating Current	I_{DD}	1.5	1.9	2.1	A	Pin = 0 dBm
Module Efficiency		27	35	42	%	Pin = 0 dBm
Switching Speed	$TX_{ON/OFF}$			2	µS	10% to 90%
Third Order Intercept Point (Two tone test at 1 MHz spacing, Pout = 20 dBm / tone)	OIP3		42		dBm	1.0 GHz
			42			1.5 GHz
			39			2.0 GHz
			41			2.5 GHz
Harmonics	2nd	-46	-21	-8	dBc	
	3rd	-35	-24	-11		
Output Mismatch w/o Damage				10:1		

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		

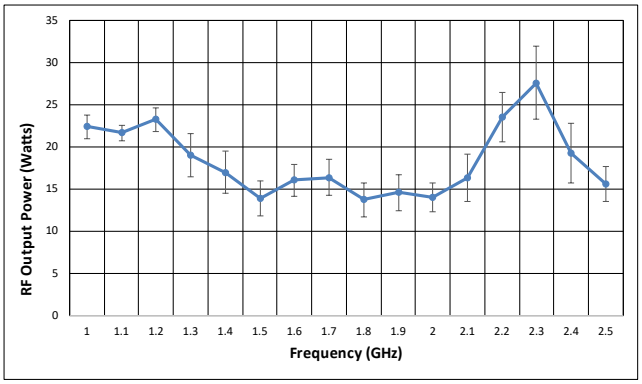
Environmental Specifications

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	T_A	-40		+60	℃
Operating Temperature (baseplate)	T_C	-40		+85	℃
Storage Temperature	T_{STG}	-55		+85	℃
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)					

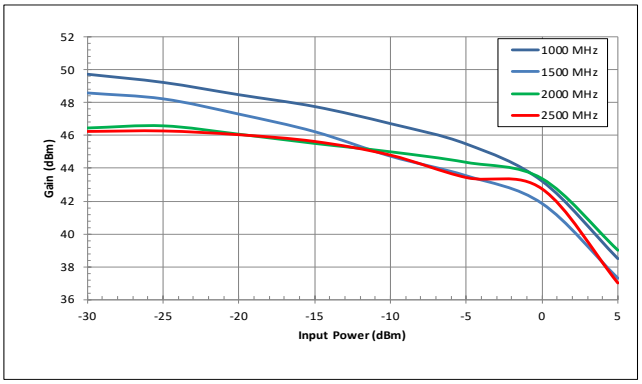
Performance Plots

Test Conditions: +28 VDC, +25 °C, Z_S=Z_L=50 Ω

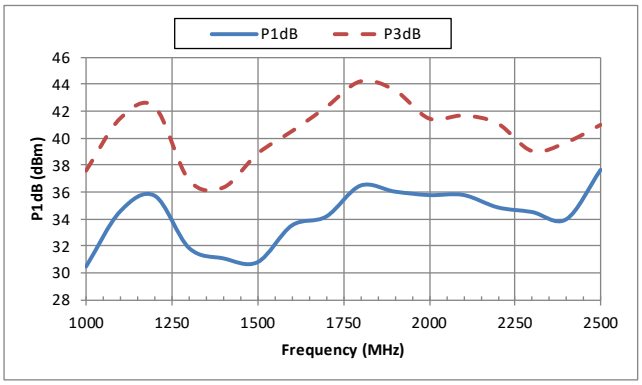
RF Output Power vs. Frequency
[@ 0 dBm Input Drive w/ Std Dev]



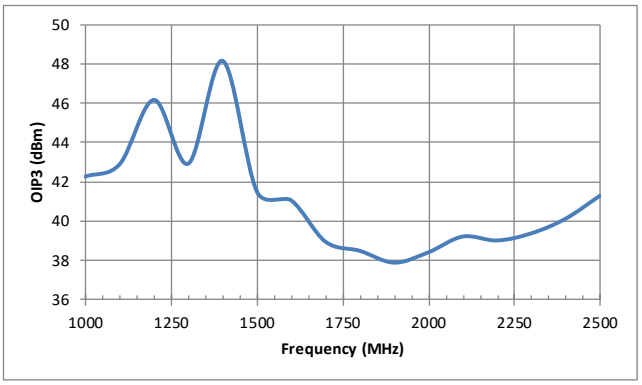
Gain vs. Input Power



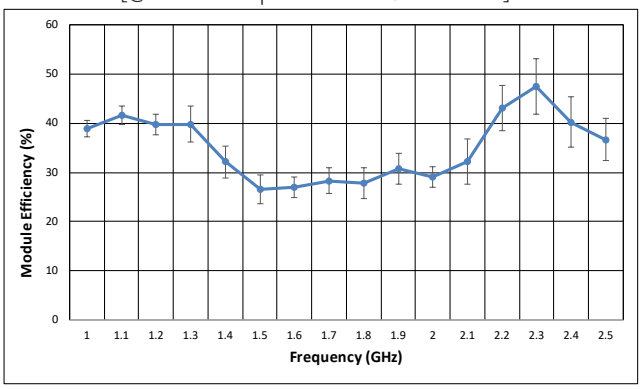
P1dB & P3dB



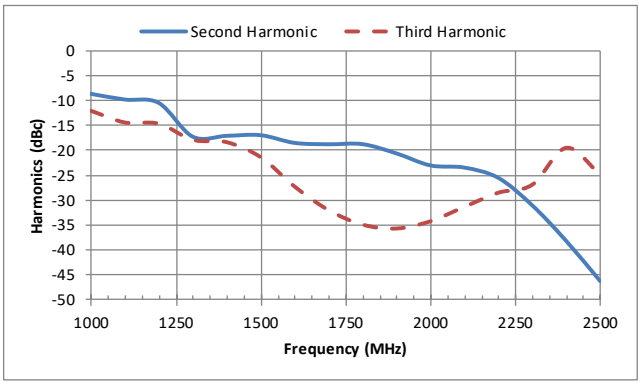
OIP3



Frequency vs. Module Efficiency
[@ 0 dBm Input Drive w/ Std Dev]



Harmonics (@ Psat)



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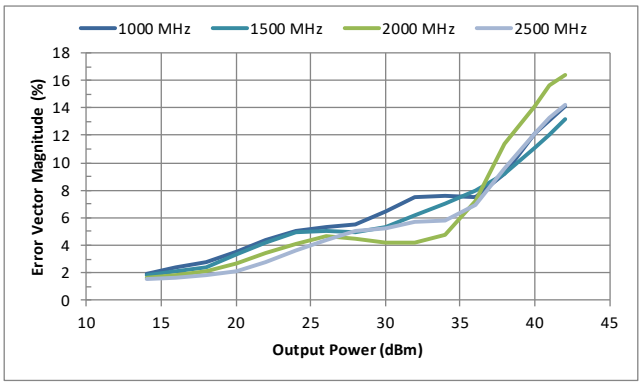
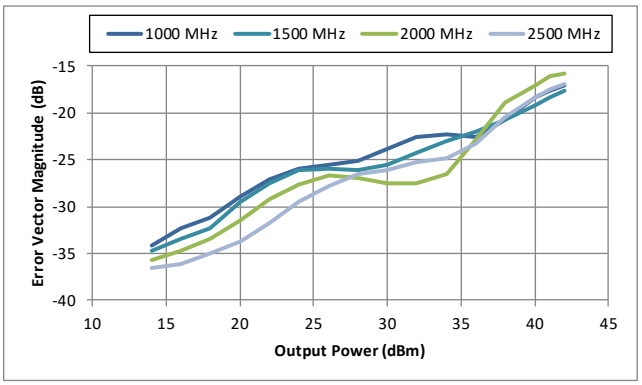
Performance Plots (cont.)

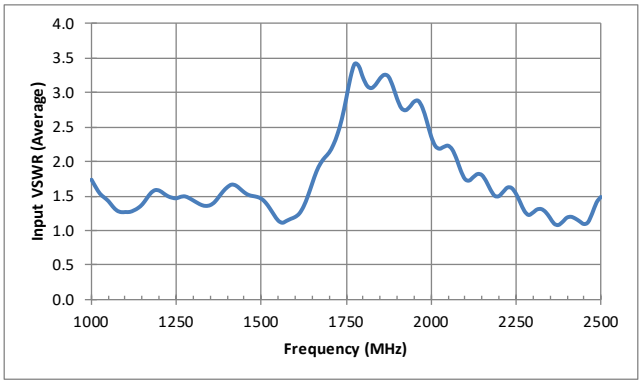
Error Vector Magnitude (%) [w/ OFDM Waveform]



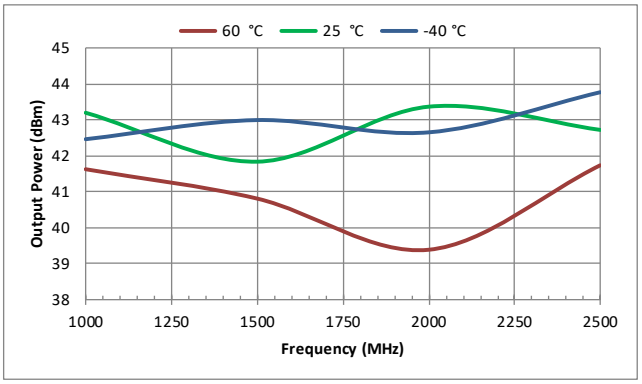
Error Vector Magnitude (dB) [w/ OFDM Waveform]



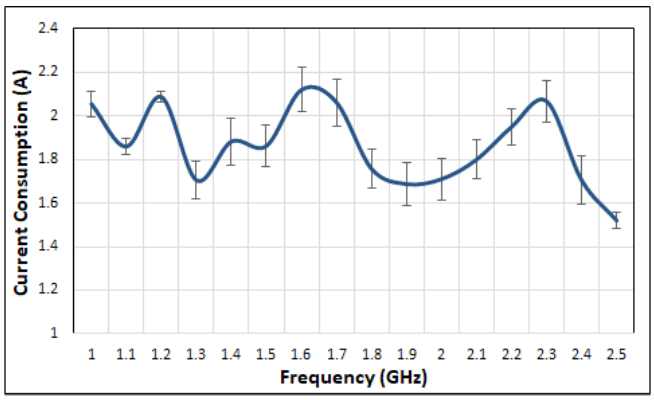
VSWR



Power Out vs. Temperature (ambient)



Current Consumption vs. Frequency
[@ 0 dBm Input Drive w/ Std Dev]



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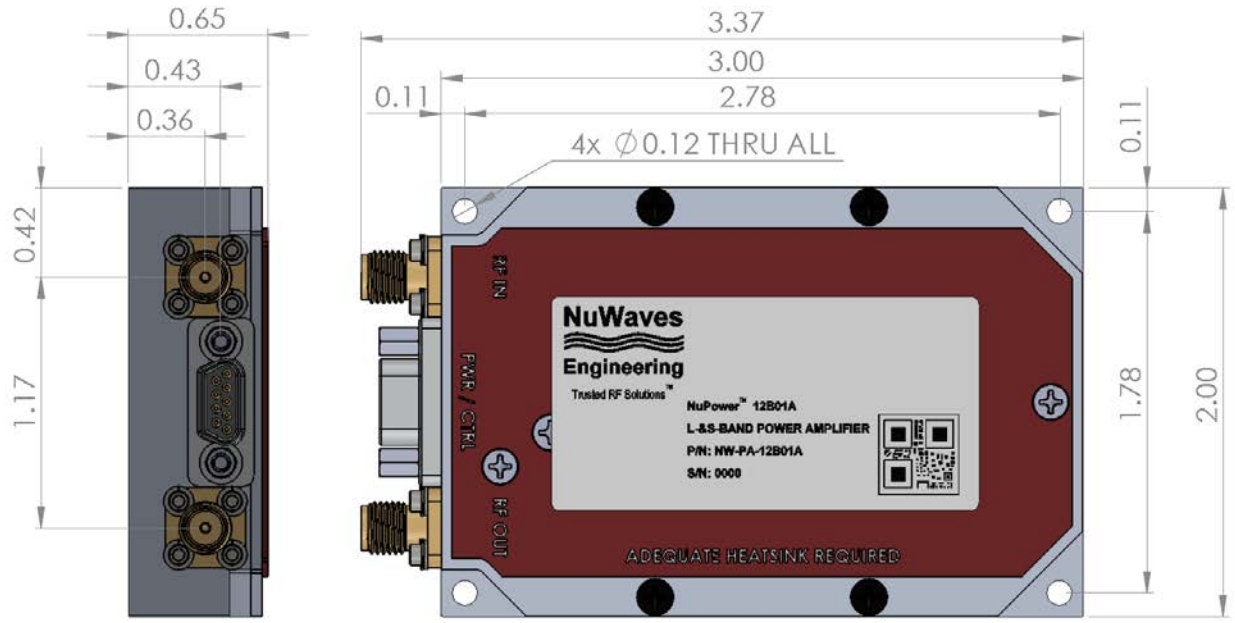
Mechanical Outline



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 0 V or GND = RF ON +5V or NC = RF OFF	I	5
No Connect	-	6, 7, 9
Over Temperature Flag 0V = temperature fault +5V = no fault	O	8

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

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