

NuWaves

RF Solutions

NuPower Xtender™ 12B04A L- & S-Band Bidirectional Amplifier

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

P/N: NW-BA-12B04A

(includes NW-BA-ACC-CB09MA)



The NuPower Xtender™ 12B04A is a small, lightweight, and power-efficient bidirectional amplifier ideal for extending the communication range of half-duplex L- or S-band transceivers running constant-envelope or near-constant-envelope waveforms. The bidirectional amplifier generates 10 Watts of RF power from 1000 to 2500 MHz in transmit mode and the integrated low-noise amplifier provides a minimum of 13 dB of gain in receive mode.

Based on the latest gallium nitride (GaN) technology, the Xtender offers greater than 30% power efficiency at most frequencies and its compact size makes it ideal for integration into space-constrained platforms. Adjacent radio frequency bands, such as the popular 900 MHz Industrial, Scientific and Medical (ISM) band, are also supported by the bidirectional PA, at lower peak power levels.

Accepting a +5 dBm RF input, the Xtender provides 37 dB of gain. The Xtender also features over-voltage and reverse-voltage protection and operates over a wide temperature range of -30 to +60 °C.

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

Features

- 10 Watts RF Output Power
- 1.0 to 2.5 GHz
- Bidirectional Operation
- 37 dB (typ) of Transmit Gain
- 16 dB (typ) Receive Gain LNA
- Fast T/R Mode Switching with Auto-Sensing or Manual T/R Line
- Small Form Factor
- High Efficiency GaN Technology
- Over-Voltage & Reverse-Voltage Protection

Applications

- Unmanned Aircraft Systems (UAS) - Group 2 and Group 3
- Unmanned Ground Vehicles (UGV)
- RF Communication Systems
- Software Defined Radios

NuPower Xtender™ 12B04A BDA

Specifications

Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	3.5	A
Max RF Input Power, $Z_L = 50 \Omega$, CW [XCVR Port]	+10	dBm
Max RF Input Power, $Z_L = 50 \Omega$, CW [ANT Port]	-13.5 (Autosense)	dBm
	+30 (Manual T/R)	
Max Operating Temperature (ambient)	60	°C
Max Operating Temperature (baseplate)	85	°C
Max Storage Temperature	85	°C

Export Classification
EAR99

Electrical Specifications - Operational @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	1000		2500	MHz	
Switching Speed	$T_{XON/OFF}$		1.5		μ S	10% to 90%
Operating Voltage	VDC	11	28	32	V	
Operating Current	I_{DD}		2.2	2.6	A	CW, Pin = +5 dBm
Module Efficiency			30		%	CW, Pin = +5 dBm

Electrical Specifications - Transmit @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$, Conditions at CW, Pin = +5 dBm (unless specified otherwise)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
RF Output Power, Linear	P_L		2.5		W	802.11g, 10 MHz BW, 16 QAM
RF Output Power, Psat	Psat	7	12		W	
Transmit Gain	G		37		dB	
Transmit Gain Flatness	ΔG		11		dB	CW, Pin=-30dBm
2nd Harmonic			-13		dBc	
Nominal Input Drive Level	P_{IN}		5		dBm	
Transmit Current	I_{TX}		2.2	2.6	A	
Transmit Output Mismatch VSWR				10:1	Ψ	no damage at all phase angles
Transmit Input VSWR						

Electrical Specifications - Receive @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Receive P1dB	P1dB		16.5		dBm	
Receive Gain	G	13	16		dB	Pin = -30 dBm
Receive Gain Flatness	ΔG		3.5		dB	
Receive Current	I_{RX}		100		mA	
Receive Noise Figure	NF		3.5			

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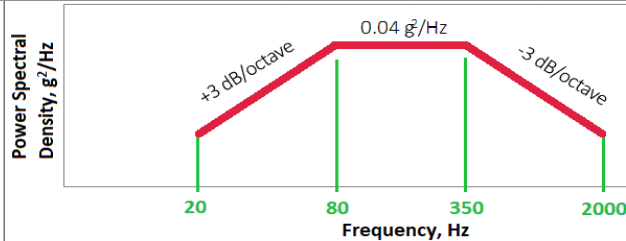
Specifications (cont.)

Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	3.0 x 2.0 x 1.16	in	Max
Weight	5.8	oz	Max
RF Connectors, Input/Output	SMA Female		
Interface Connector	Micro-D, 9-pin Socket		
Cooling	Adequate Heatsink Required		

Environmental Specifications

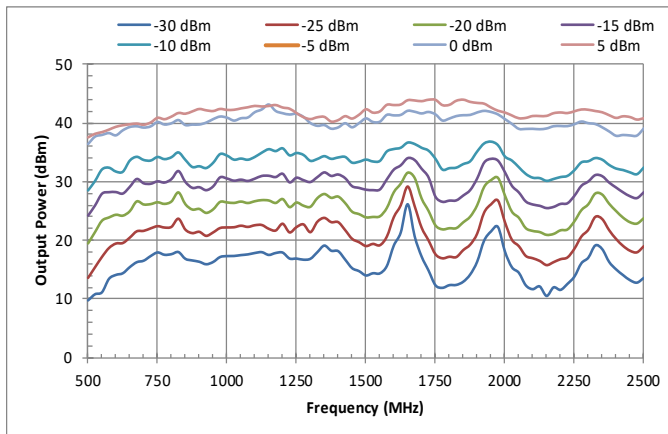
Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	T_A	-40		+60	°C
Operating Temperature (baseplate)	T_C	-40		+85	°C
Storage Temperature	T_{STG}	-55		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration / Shock Profile (Random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



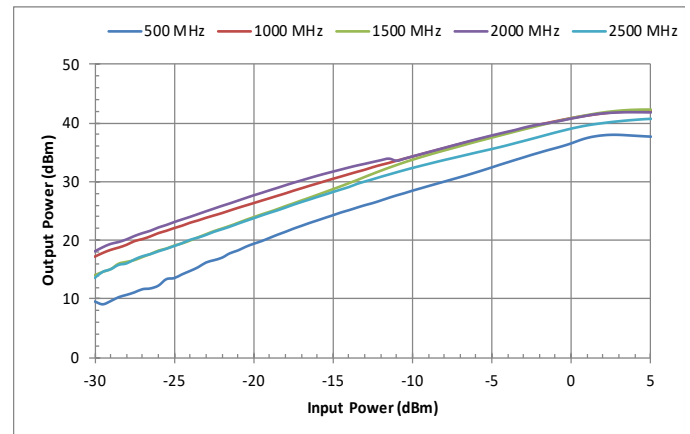
Performance Plots

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

Output Power vs. Frequency



Output Power vs. Input Power

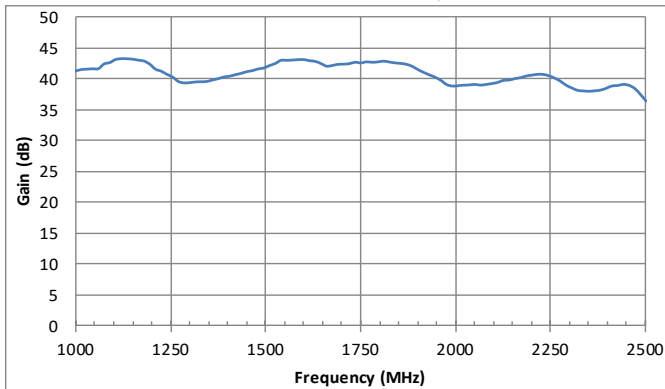


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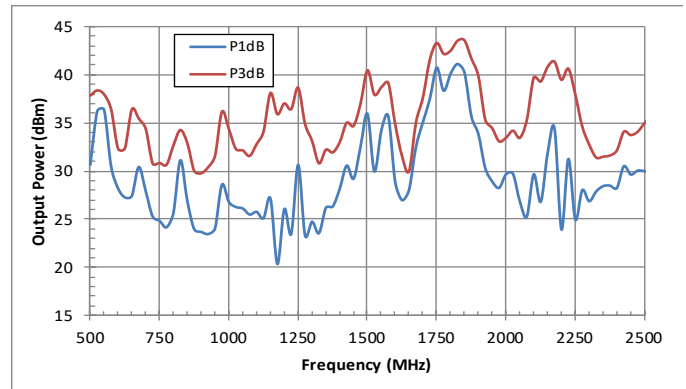
Performance Plots (cont.)

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

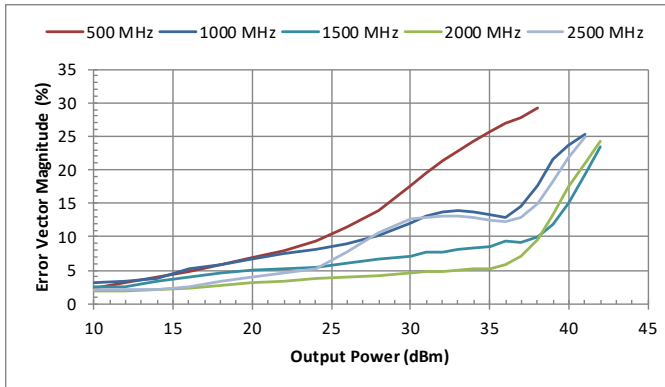
Gain vs. Frequency



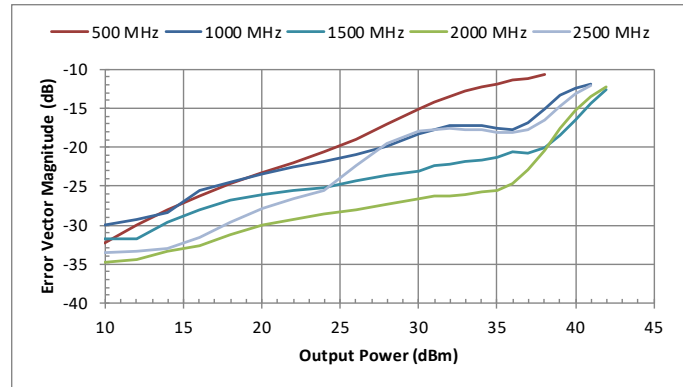
P1dB & P3dB



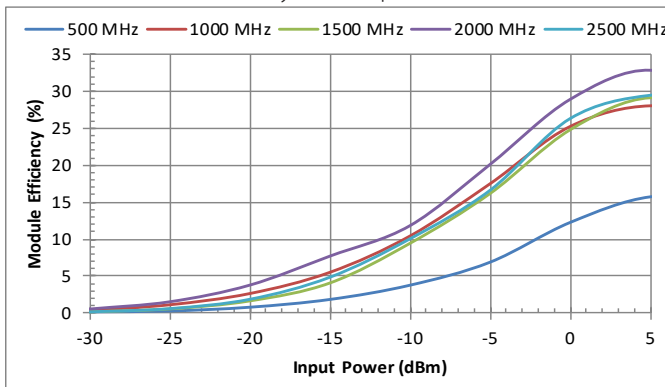
Error Vector Magnitude (%)
[Measured with 802.11g, 10 MHz BW, 16 QAM, 24 Mbps]



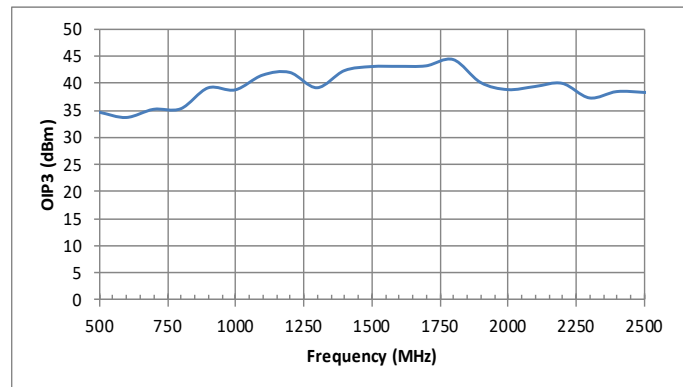
Error Vector Magnitude (dB)
[Measured with 802.11g, 10 MHz BW, 16 QAM, 24 Mbps]



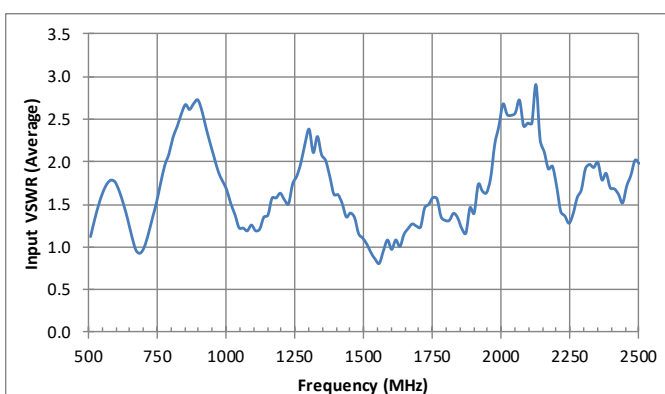
Efficiency vs. Output Power



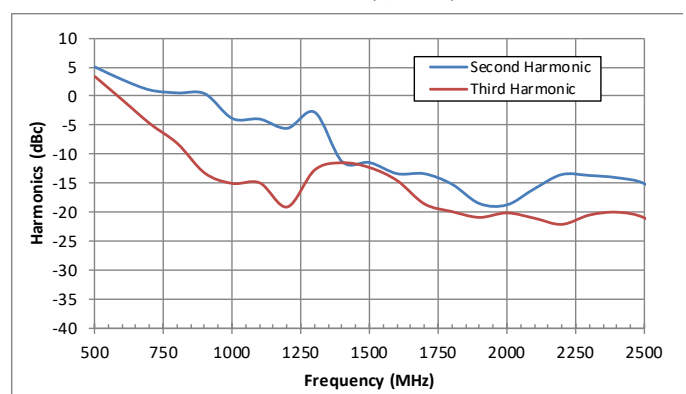
OIP3



VSWR

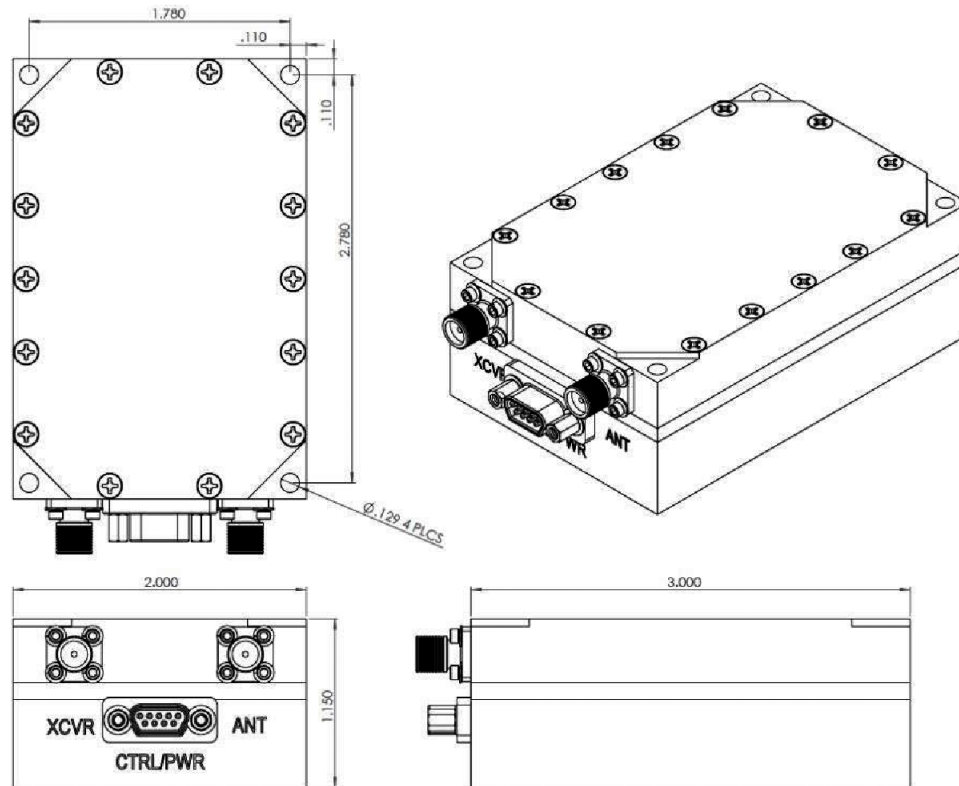


Harmonics (@ P_{sat})



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Mechanical Outline



Accessory Part Numbers

Part Number	Description
NW-FL-05LPLE-2500-SFSF-M01	Harmonic Filter Module
NW-BA-ACC-CB09MA	Standard Interface Cable Assembly - Flying Leads (included with module)
NW-BA-ACC-CT09MA	Upgraded Interface Cable Assembly - Banana Plug Termination
NW-BA-ACC-KT01	Accessory Kit, which includes Fan-Cooled Heatsink and Upgraded Interface Cable
HTSK-01	Heatsink with Integrated Fan

Pinout

Function	I/O	Pin
DC Power (+11 to +32 Volts)	I	1, 2, 9
Ground	I	3, 4, 5
RS-485 Data Transmit	O	6
RS-485 Data Receive	I	7
Transmit/Receive Source or Sink	I/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>

Contact NuWaves



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