



Trusted RF Solutions™

NuPower Xtender™ 12B04A-D27 L- & S-Band Bidirectional Amplifier

20 Watt CW (typ)

1.0 GHz - 2.5 GHz



P/N: NW-BA-12B04A-D27

(includes NW-BA-ACC-CB09MA)

The NuPower Xtender™ 12B04A-D27 is a small, lightweight, and power-efficient bidirectional amplifier ideal for extending the communication range of half-duplex S-band transceivers running constant-envelope or near-constant-envelope waveforms. The bidirectional amplifier generates 20 Watts CW of RF power from 1000 to 2500 MHz in transmit mode and the integrated low-noise amplifier provides 14 dB of gain in receive mode.

Based on the latest gallium nitride (GaN) technology, the Xtender offers 30% power efficiency (typical) within a small form factor making it ideal for integration into space-constrained platforms. Accepting a +27 dBm RF input, the Xtender provides more than 15 dB of transmit 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 Engineering.

Features

- 20 Watts RF Output Power
- 1.0 to 2.5 GHz
- Bidirectional Operation
- 15 dB of Transmit Gain
- 14 dB 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-D27 BDA

Specifications

Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	3.5	A
Max Peak RF Input Power, $Z_L = 50 \Omega$	30	dBm
Max Operating Temperature (ambient)	60	°C
Max Operating Temperature (baseplate)	85	°C
Max Storage Temperature	85	°C

Export Classification
EAR99

Absolute Maximums (cont.)

Description	Autosense T/R Mode	Manual T/R Mode	Unit
Max Receive Input Power (No Damage)	-13.5	+27	dBm
Max Receive Input Power (Linear Operation)	-13.5	0	dBm

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}		2.5	3.2	A	CW, Pin = +27 dBm
Module Efficiency			30		%	CW, Pin = +27 dBm

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

Parameter	Symbol	Min	Typ	Max	Unit	Condition
RF Output Power, Psat	Psat	10	20		W	CW, Pin = +27 dBm
RF Output Power, P1dB	P1dB		38		dBm	CW, Pin = +27 dBm
Transmit Gain	G		15	18	dB	CW, Pin = +27 dBm
2nd Harmonic				-13	dBc	CW, Pin = +27 dBm
Nominal Input Drive Level	P_{IN}		27	30	dBm	
Transmit Current	I_{TX}		2.5	3.2	A	CW, Pin = +27 dBm
Transmit Output Mismatch VSWR				10:1	ψ	No damage at all phase angles
Transmit Input VSWR			1.7:1			

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

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Receive P1dB	P1dB		15		dBm	
Receive Gain	G	13	14		dB	
Receive Gain Flatness	ΔG		+/- 0.5		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)					

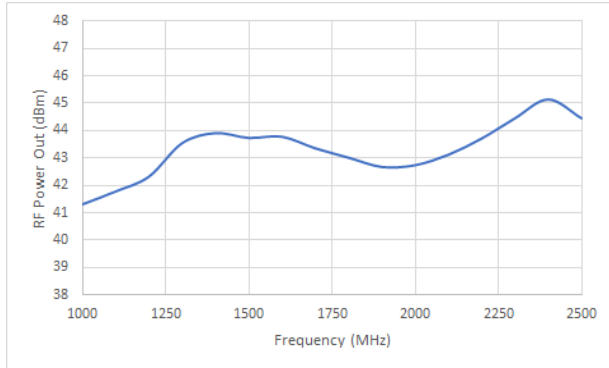
The graph shows a trapezoidal vibration profile. The y-axis is Power Spectral Density in g²/Hz, and the x-axis is Frequency in Hz. The profile starts at 20 Hz, rises with a slope of +3 dB/octave to 80 Hz, remains flat at 0.04 g²/Hz until 350 Hz, and then falls with a slope of -3 dB/octave to 2000 Hz.

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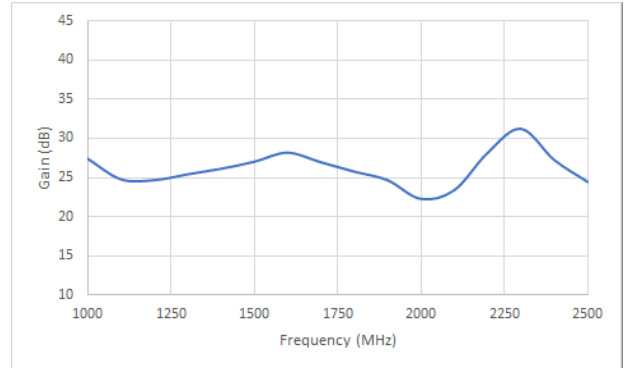
Performance Plots

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

Output Power [+27 dBm Input Power]



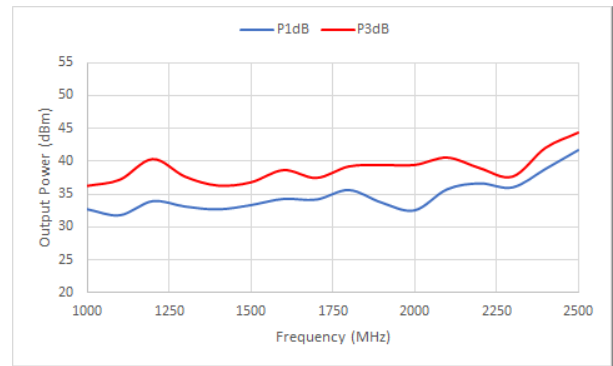
Small Signal Gain [0 dBm Input Power]



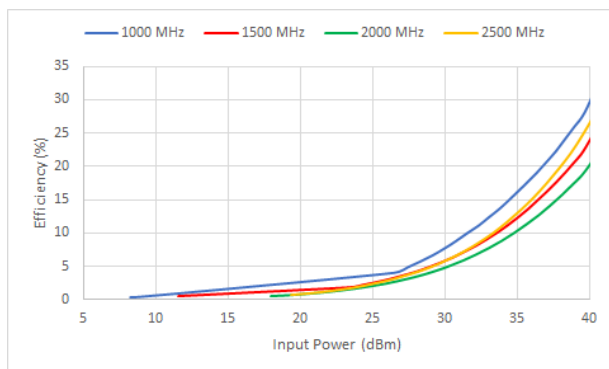
Output Power vs. Input Power



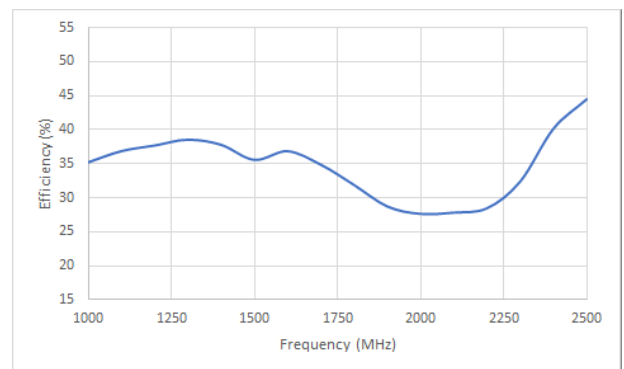
P1dB & P3dB



Efficiency vs. Output Power

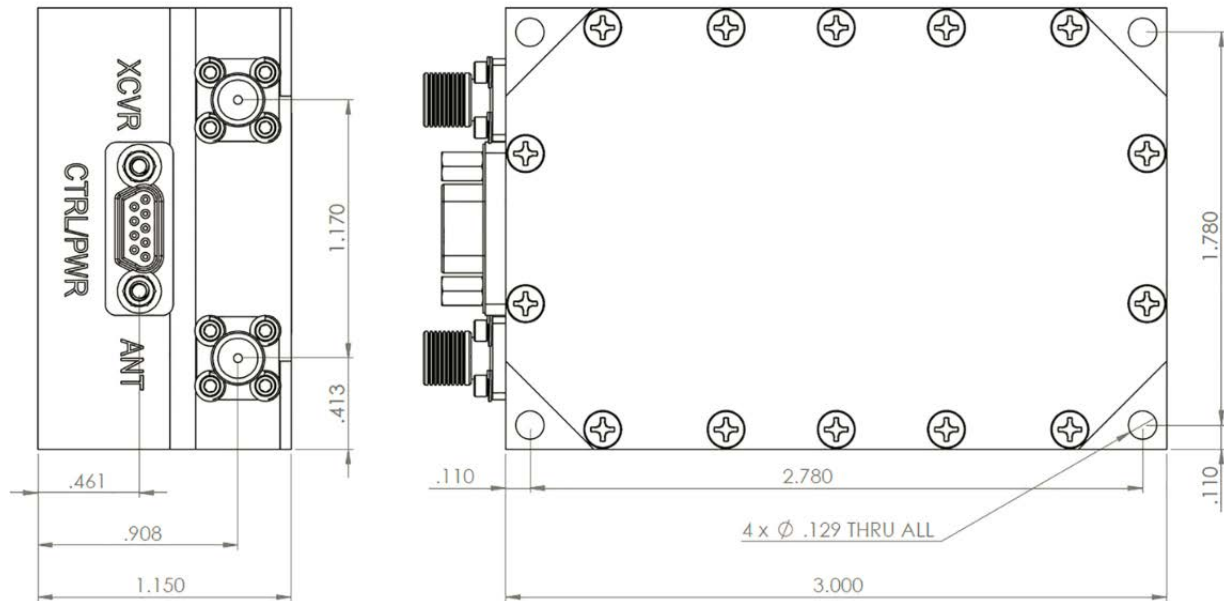


Efficiency [+27 dBm Input Power]



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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
NW-BA-ACC-HS02	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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