



Trusted RF Solutions™

## NuPower Xtender™ VU4GX02 VHF/UHF Solid State Bidirectional Amplifier

225 MHz - 512 MHz  
16 Watts CW  
4 Watts Linear



P/N: NW-BA-VU-4-GX02

**The NuPower Xtender™ VU4GX02 is a highly efficient, miniature solid state bidirectional amplifier (BDA) that provides 16 watts Psat and 4 watts of linear RF power across the 225 to 512 MHz frequency range. This BDA is ideal for extending the communication range of half-duplex transceivers running constant envelope waveforms such as FM, BPSK, and GMSK, as well as high peak-to-average waveforms such as OFDM.**

The efficiency and compact form factor of the NuPower Xtender™ VU4GX02 BDA makes it ideal for size, weight, and power-constrained RF telemetry and tactical communication systems. This solid state BDA features a compact form-factor, allowing the system integrator to easily incorporate the unit into the communications payload of small unmanned aircraft systems (UAS) or other small platforms.

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

### Features

- 16 Watts Psat and 4 Watts Linear
- 225 MHz to 512 MHz
- Bidirectional Operation
- 15 dB Gain LNA
- Miniature Package
- External T/R Control
- Single Power Supply
- Over-Voltage Protection

### Benefits

- Extended Range
- Improved Link Margin
- Lessened load on DC power budget due to high efficiency operation
- Consumes less volume on space-constrained platforms

### Applications

- Low Power VHF/UHF Transceivers
- Unmanned Aircraft Systems (UAS), Group 2 & 3
- Unmanned Ground Vehicles (UGV)
- RF Telemetry
- RF Communication Systems
- Software Defined Radios

# NuPower Xtender™ VU4GX02 BDA

## Specifications

### Absolute Maximums

Parameter		Rating	Unit
Max Device Voltage		32	V
Max Device Current	@ 10 VDC	7	A
	@ 28 VDC	2.75	A
	@ 32 VDC	2.5	A
Max RF Input Power @ ANT Port, $Z_L = 50 \Omega$		+30	dBm
Max RF Input Power @ XCVR Port, $Z_L = 50 \Omega$		+20	dBm
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	225		512	MHz	
Switching Speed	$T_{XON/OFF}$		8	10	$\mu$ S	10% to 90%
Operating Voltage	VDC	10	28	32	V	
Operating Current - Transmit	$I_{DD}$		1.1	1.4	A	CW, +28 Vin, Pout = 4 W
			1.6	2.5	A	CW, +28 Vin, Pout = 10 W
Operating Current - Receive	$I_{DD}$		175	200	mA	Receive Mode
Quiescent Current	$I_{DQ}$		340		mA	No RF Signal Applied, Transmit Mode
Module Efficiency			35		%	CW, Pin = 5 dBm, Transmit mode

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

Parameter	Symbol	Min	Typ	Max	Unit	Condition
RF Output Power, Linear	$P_L$		4		W	-33 dBc ACLR (TBR), PIN = 5 dBm
RF Output Power, Psat	Psat		16		W	
Small Signal Gain	G		36		dB	Pin = 5 dBm
Small Signal Gain Flatness	$\Delta G$			$\pm 0.75$	dB	Pin = 5 dBm; Over any 25 MHz segment
Input VSWR	VSWR			2.0:1		
Output Mismatch VSWR	VSWR			10:1		
Nominal Input Drive Level	$P_{IN}$		5	10	dBm	
Spurious Emissions				-50	dBc	
2nd Harmonic				-13	dBc	
Gain Flatness over Temperature	$\Delta G\_Temp$		1 dB			Temp. Range -40 C to +85 C Baseplate

# NuPower Xtender™ VU4GX02 BDA

## Specifications (cont.)

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

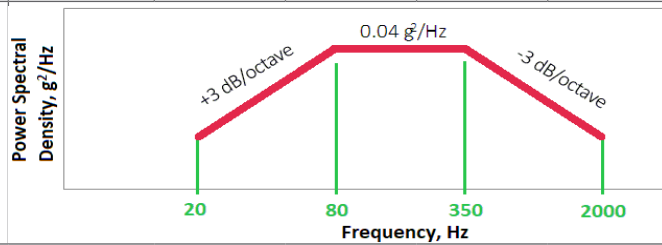
Parameter	Symbol	Min	Typ	Max	Unit	Condition
Receive P1dB	P1dB		3		dBm	
Receive Gain	G		15		dB	
Receive Gain Flatness	$\Delta G$			$\pm 0.5$	dB	Over any 20 MHz segment
Receive Noise Figure	NF		2.5			

## Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	2.34 x 2.34 x 0.7	in	Max
Weight	2.4	oz	
RF Connectors, Input/Output	SMA Female		
Interface Connector	Micro-D, 15-pin Socket		
Cooling	Adequate Heatsink Required		

## Environmental Specifications

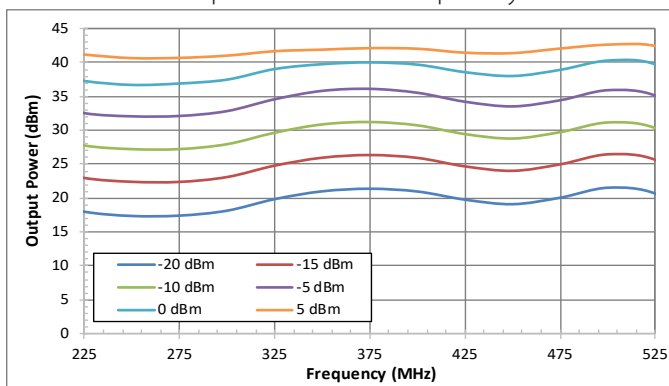
Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	$T_A$	-40		+60	°C
Operating Temperature (baseplate)	$T_C$	-40		+85	°C
Storage Temperature	$T_{STG}$	-55		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration / Shock Profile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



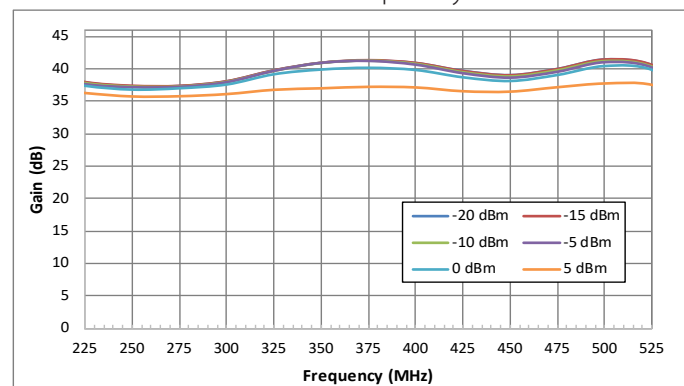
## Performance Plots

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

Output Power vs. Frequency



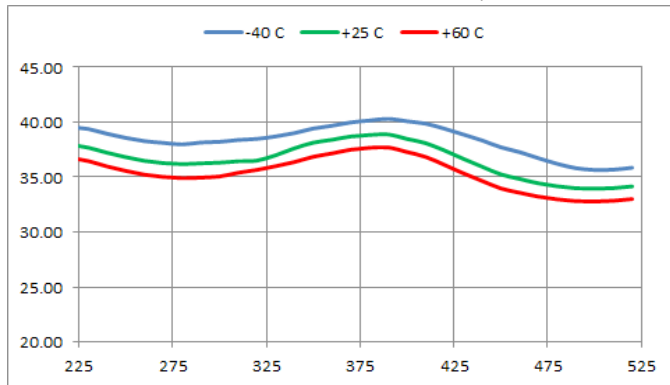
Gain vs. Frequency



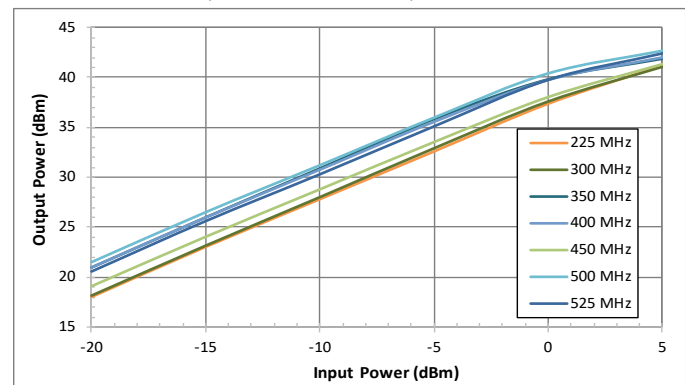
# NuPower Xtender™ VU4GX02 BDA

## Performance Plots

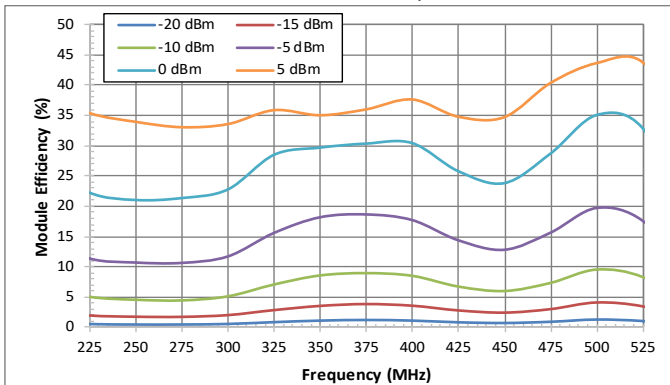
### Gain Flatness over Temp



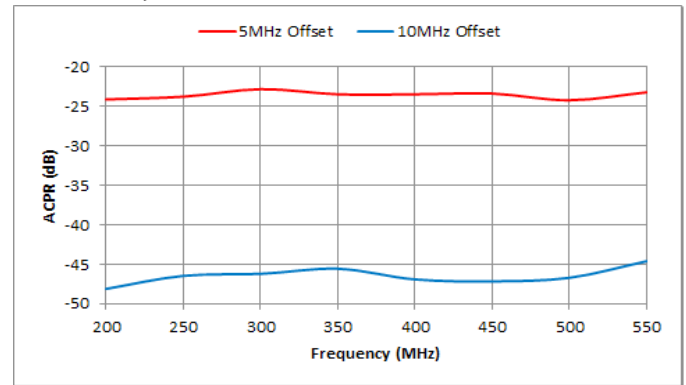
### Output Power vs. Input Power



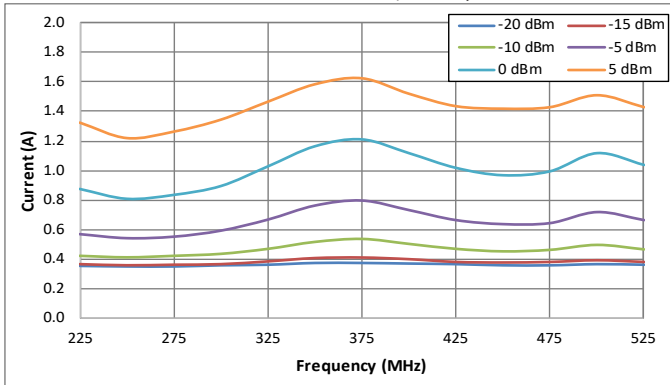
### Module Efficiency (%)



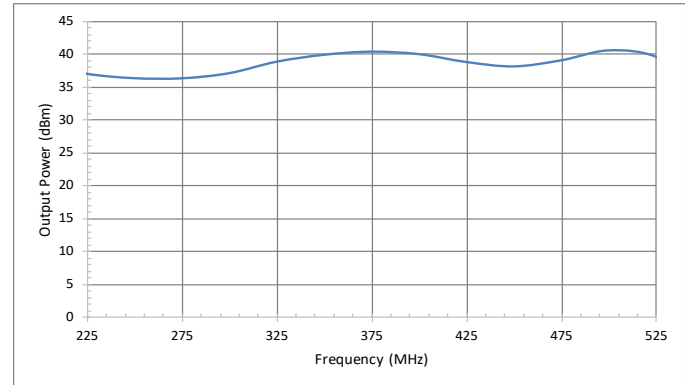
### Adjacent Channel Power Ratio (ACPR)



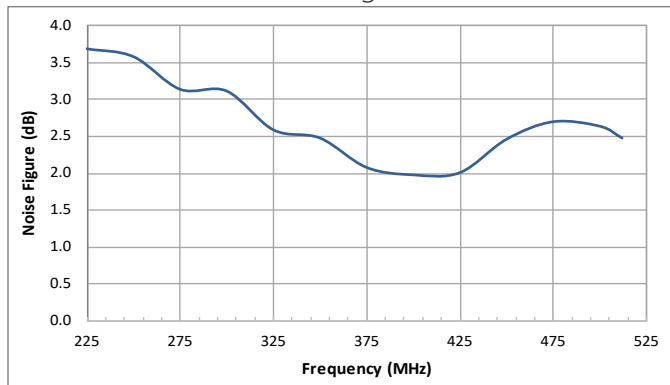
### Current vs. Frequency



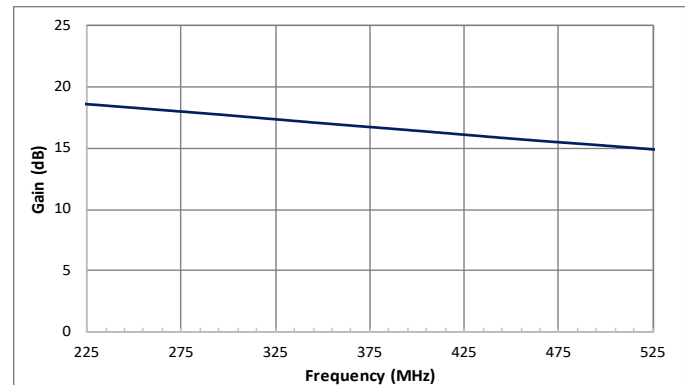
### P1dB



### Noise Figure

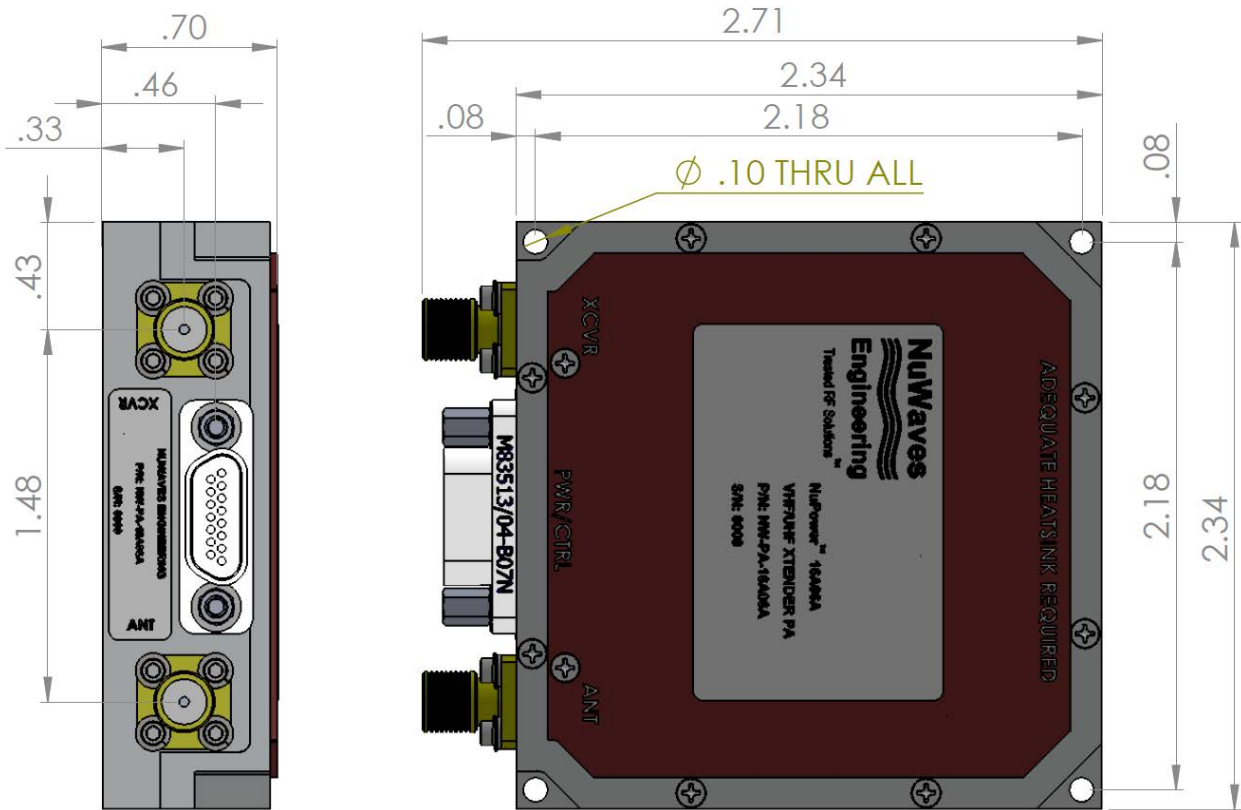


### Gain (S21) - Receive Mode



# NuPowerXtender™ VU4GX02 BDA

## Mechanical Outline



## Accessory Part Numbers

Part Number	Description
NW-BA-ACC-CB15MA	Standard Interface Cable Assembly - Flying Leads (not included with module)
NW-BA-ACC-CT15MA	Upgraded Interface Cable Assembly - Banana Plug Termination
NW-BA-ACC-KT02	Accessory Kit, which includes Fan-Cooled Heatsink and Upgraded Interface Cable
NW-BA-ACC-HS01	Heatsink with Integrated Fan

## Pinout

Function	I/O	Pin
DC Power (+10 to +32 Volts)	I	3, 4, 5, 6, 12, 13
Ground	I	1, 7, 8, 10, 11, 14, 15
Over Temperature Flag 0 V = Temperature Fault +5 V = No Fault	0	2
T/R Enable 0 V or GND = Transmit +5 V or NC = Receive	I	9

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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