



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
ECCN 5A991.G

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	μ 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	P_{sat}		16		W	
Small Signal Gain	G		36		dB	Pin = 5 dBm
Small Signal Gain Flatness	ΔG			± 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	ΔG_{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	ΔG			± 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	External 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)

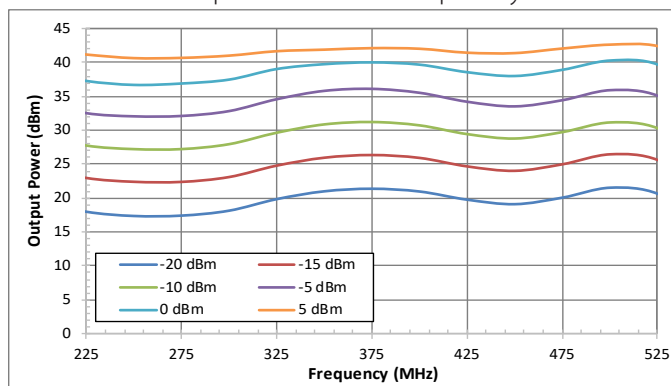
Power Spectral Density, g^2/Hz

Frequency, Hz

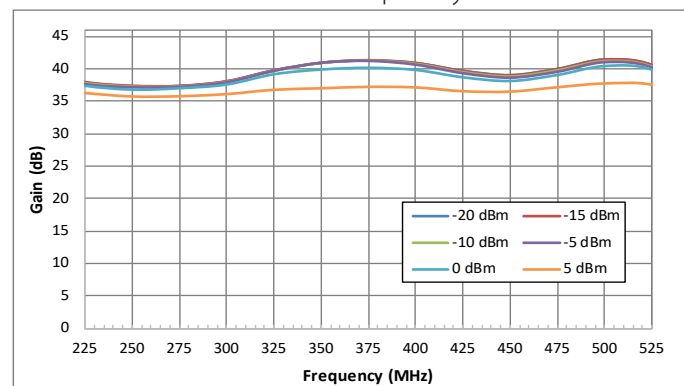
Performance Plots

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

Output Power vs. Frequency



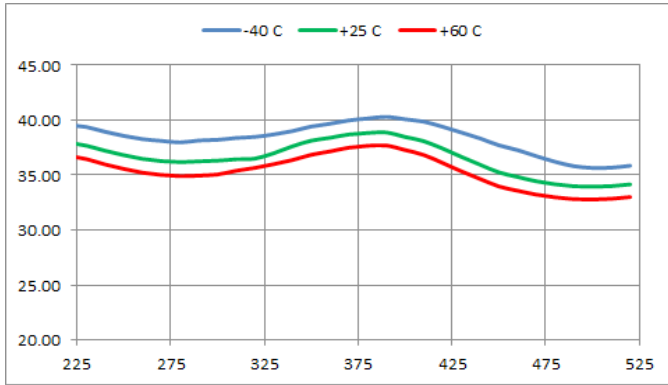
Gain vs. Frequency



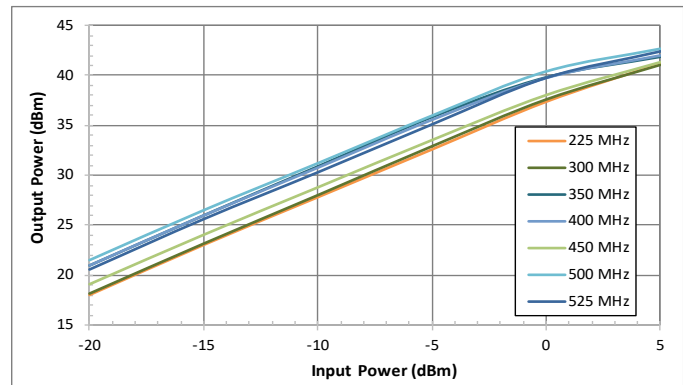
NuPower Xtender™ VU4GX02 BDA

Performance Plots

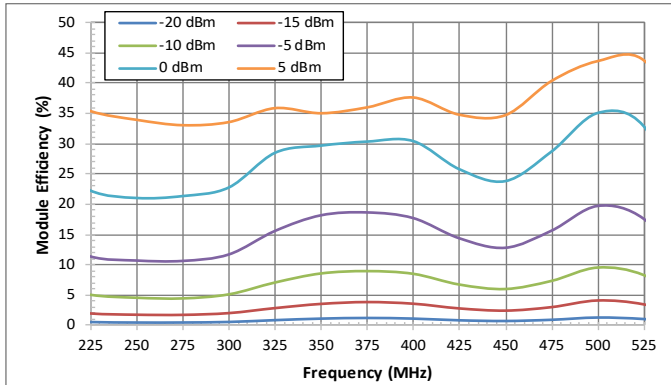
Gain Flatness over Temp



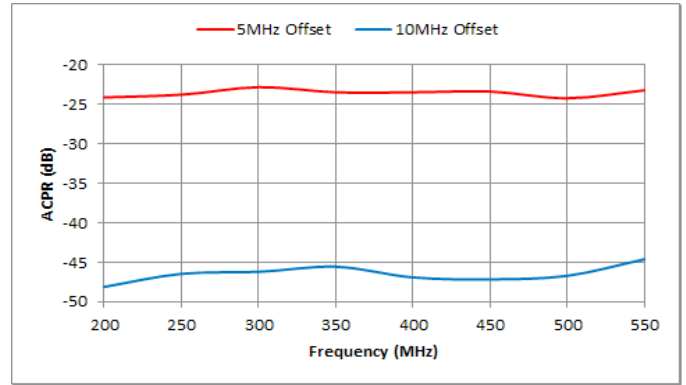
Output Power vs. Input Power



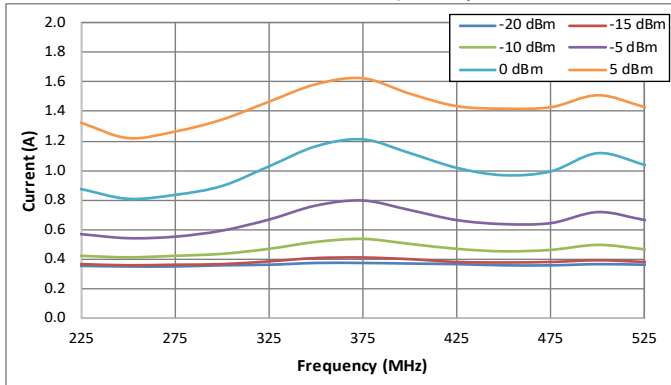
Module Efficiency (%)



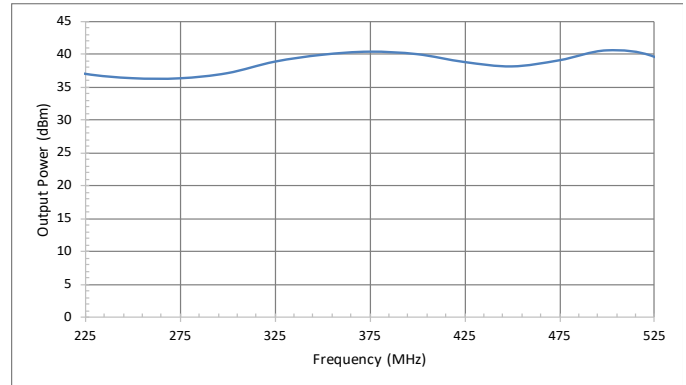
Adjacent Channel Power Ratio (ACPR)



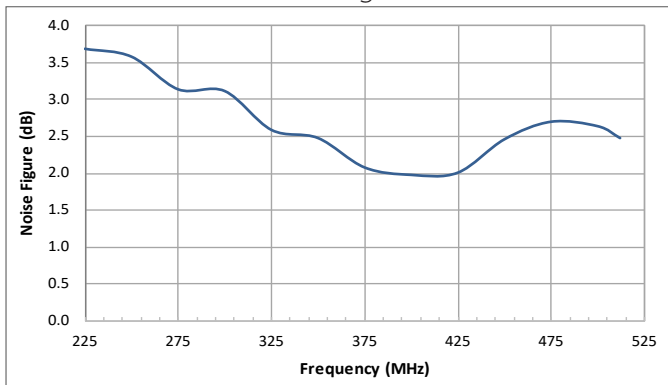
Current vs. Frequency



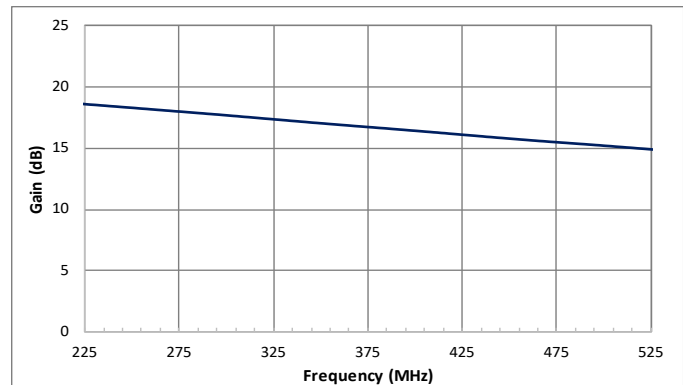
P1dB



Noise Figure

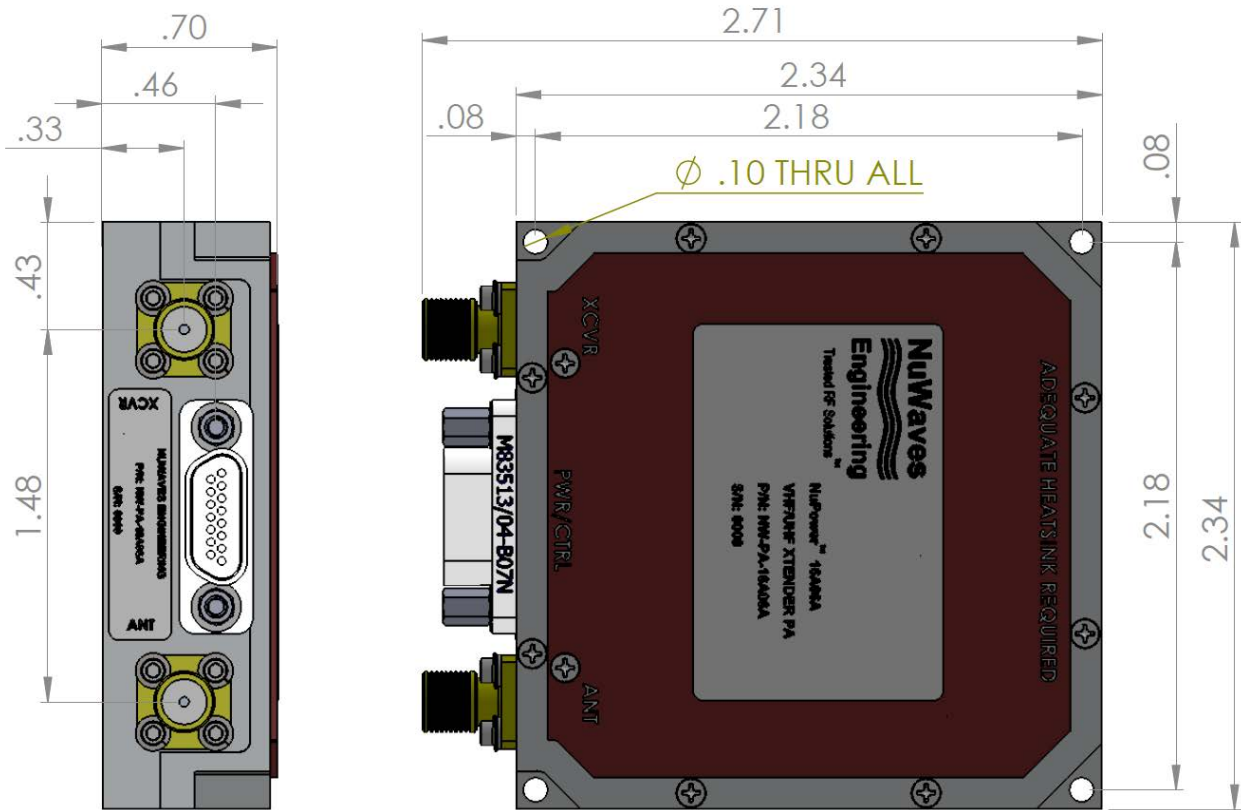


Gain (S21) - Receive Mode



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-KT03	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 0V = Temperature Fault +5V = No Fault	0	2
T/R Enable 0V or GND = Transmit +5V or NC = Receive	I	9

Contact NuWaves



NuWaves Engineering
132 Edison Drive
Middletown, OH 45044

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



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