

NuWaves

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 RF Solutions.

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 | 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 | Psat | | 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, $Z_S=Z_L=50 \Omega$

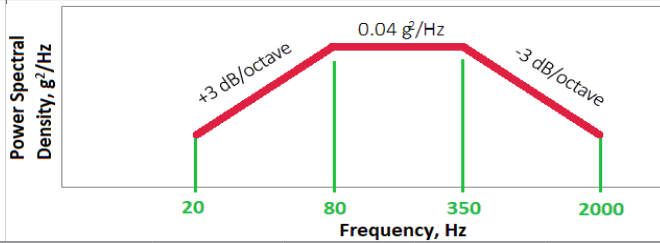
| Parameter | Symbol | Min | Typ | Max | Unit | Condition |
|-----------------------|------------|-----|-----|-----------|------|-------------------------|
| Receive P1dB | P1dB | | 3 | | dBm | |
| Receive Gain | G | | 15 | | dB | |
| Receive Gain Flatness | ΔG | | | ± 0.5 | dB | Over any 20 MHz segment |
| 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 | Adequate Heatsink Required | | |

Environmental Specifications

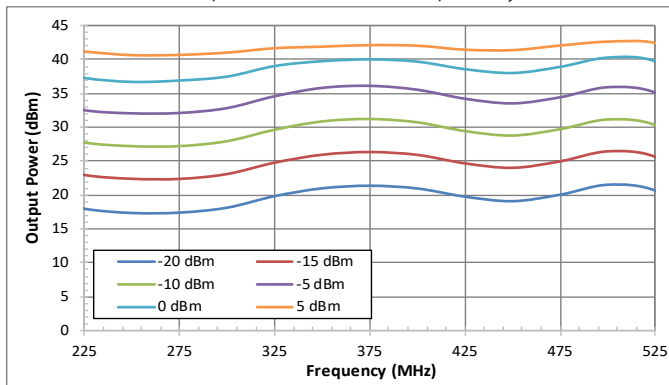
| Parameter | Symbol | Min | Typ | Max | Unit |
|-----------------------------------------------------------------------------------------------------------------|-----------|-----|-----|--------|------|
| Operating Temperature (ambient) | T_A | -40 | | +60 | °C |
| Operating Temperature (baseplate) | 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) | | | | | |



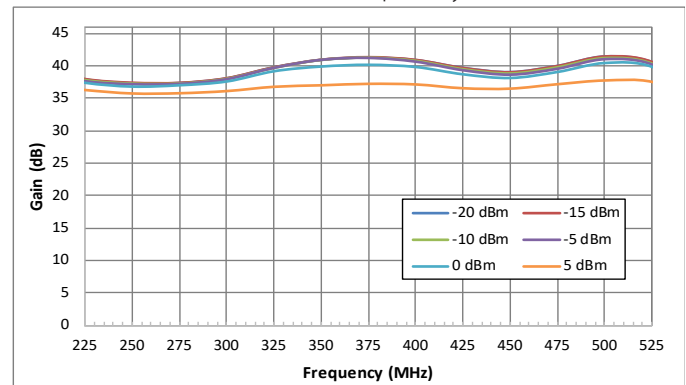
Performance Plots

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

Output Power vs. Frequency



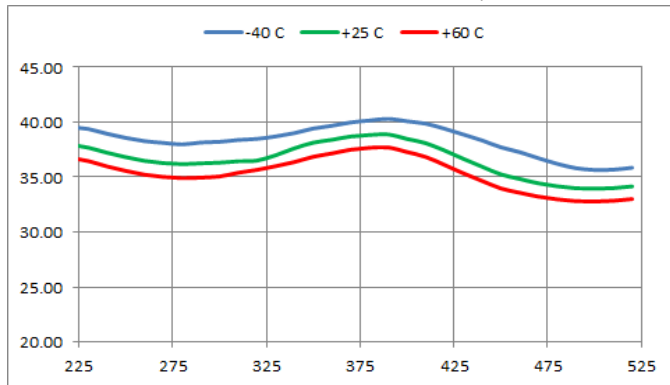
Gain vs. Frequency



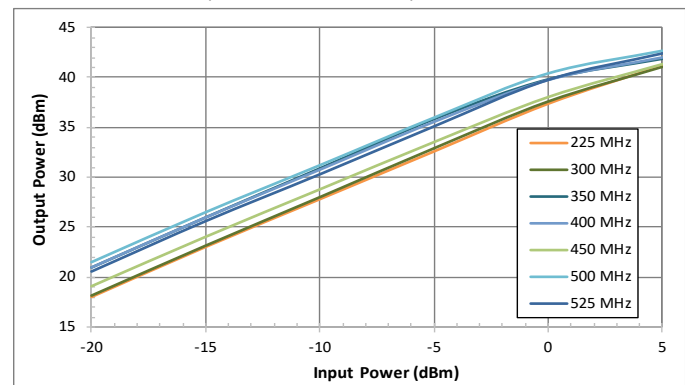
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Performance Plots

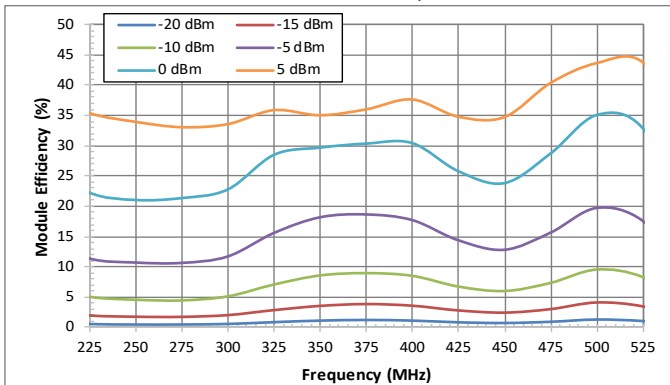
Gain Flatness over Temp



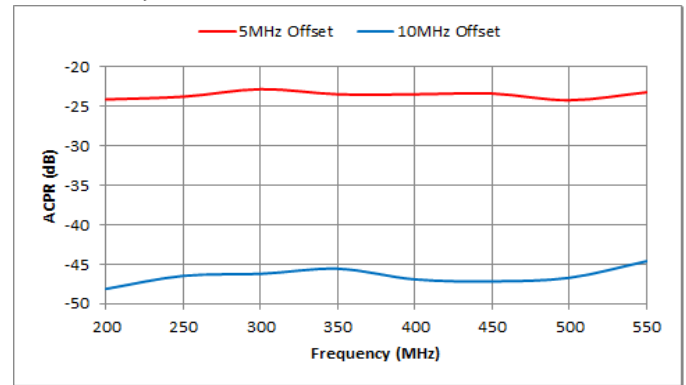
Output Power vs. Input Power



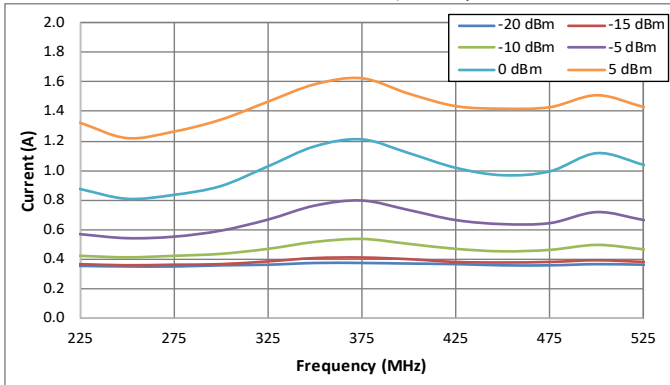
Module Efficiency (%)



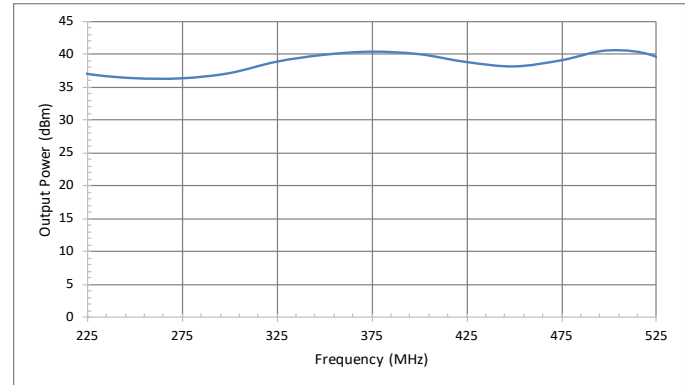
Adjacent Channel Power Ratio (ACPR)



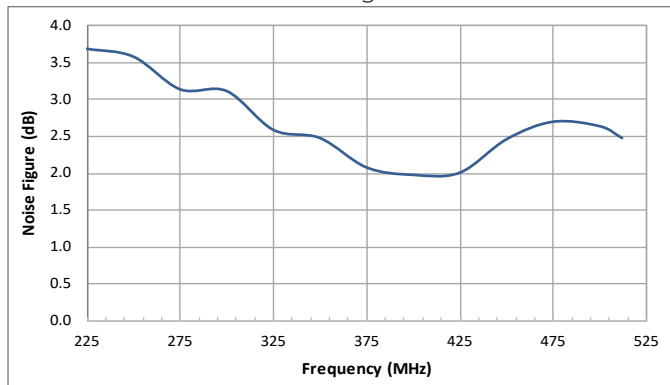
Current vs. Frequency



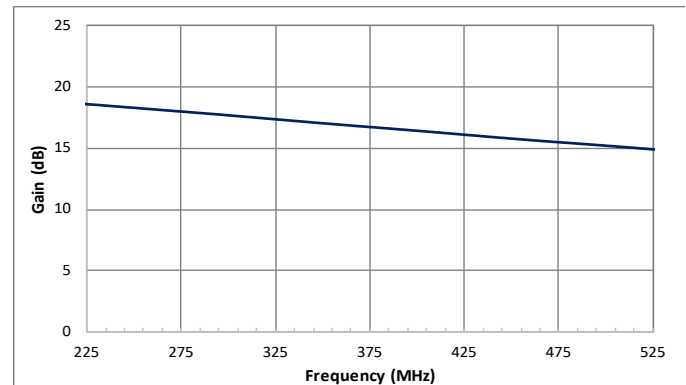
P1dB



Noise Figure

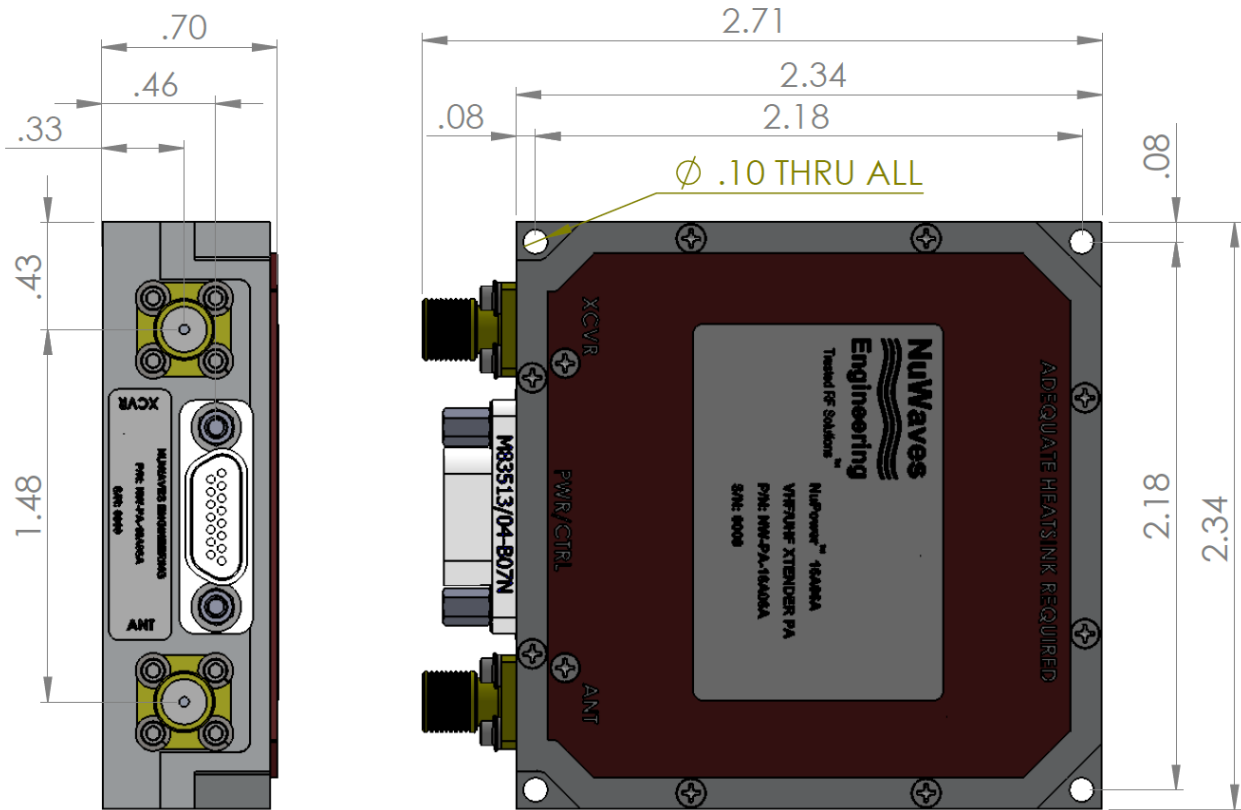


Gain (S21) - Receive Mode



NuPowerXtender™ VU4GX02 BDA

Mechanical Outline



Accessory Part Numbers - Sold Separately

Pinout

| Part Number | Description |
|------------------|-------------------------------------------------------------|
| NW-BA-ACC-CB15MA | Standard Interface Cable Assembly - Flying Leads |
| NW-BA-ACC-CT15MA | Upgraded Interface Cable Assembly - Banana Plug Termination |
| HTSK-01 | Heatsink with Integrated Fan |

| 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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