

NuWaves

RF Solutions

NuPower Xtender™ 12B04A-01 L-Band Bidirectional Amplifier

16 Watt CW
2.5 Watts Linear, 5% EVM @ 34 dBm
1.0 GHz - 1.5 GHz



P/N: NW-BA-12B04A-01

(includes NW-BA-ACC-CB09MA)

The NuPower Xtender™ 12B04A-01 is a small, lightweight, and power-efficient bidirectional amplifier ideal for extending the communication range of half-duplex L-band transceivers running constant-envelope or near-constant-envelope waveforms. This bidirectional amplifier generates 16 Watts of RF power from 1000 to 1500 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 35 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

- 16 Watts RF Output Power
- 1.0 to 1.5 GHz
- Bidirectional Operation
- 35 dB of Transmit Gain
- 13 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-01 BDA

Specifications

Absolute Maximums

| Parameter | Rating | Unit |
|---------------------------------------|--------|------|
| Max Device Voltage | 32 | V |
| Max Device Current | 3.5 | A |
| Max RF Input Power, $Z_L = 50 \Omega$ | 10 | dBm |
| 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 | | 1500 | 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, $Z_S=Z_L=50 \Omega$,

| 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 | 13 | 16 | | W | CW, Pin = +5 dBm |
| Transmit Gain | G | | 35 | | dB | CW, Pin = +5 dBm |
| Transmit Gain Flatness | ΔG | | | | dB | CW, Pin = +5 dBm |
| 2nd Harmonic | | | | -13 | dBc | CW, Pin = +5 dBm |
| Spurious Emissions | | | | | dBc | CW, Pin = +5 dBm |
| Nominal Input Drive Level | P_{IN} | | 5 | | dBm | CW, Pin = +5 dBm |
| Transmit Current | I_{TX} | | 2.2 | 2.6 | A | CW, Pin = +5 dBm |
| Transmit Output Mismatch VSWR | | | | | | CW, Pin = +5 dBm |
| Transmit Input VSWR | | | | | | CW, Pin = +5 dBm |

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

| Parameter | Symbol | Min | Typ | Max | Unit | Condition |
|-----------------------|------------|-----|-----|-----|------|-----------|
| Receive P1dB | P1dB | | | | | |
| Receive Gain | G | | 13 | | dB | |
| Receive Gain Flatness | ΔG | | | | dB | |
| Receive Current | I_{RX} | | 100 | | mA | |
| Receive Noise Figure | NF | | 3.5 | | | |

NuPower Xtender™ 12B04A-01 BDA

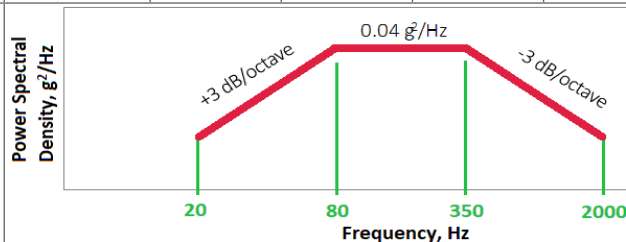
Specifications (cont.)

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

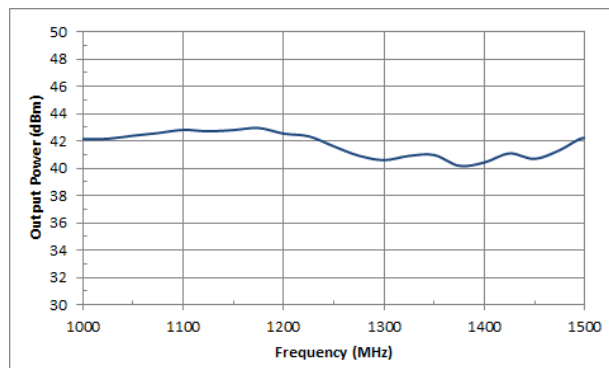
| Parameter | Symbol | Min | Typ | Max | Unit |
|---|-----------|-----|-----|--------|------|
| Operating Temperature (ambient) | T_A | -40 | | +60 | °C |
| Operating Temperature (baseplate) | T_C | -40 | | +85 | °C |
| Storage Temperature | T_{STG} | -55 | | +85 | °C |
| Relative Humidity (non-condensing) | 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) | | | | | |



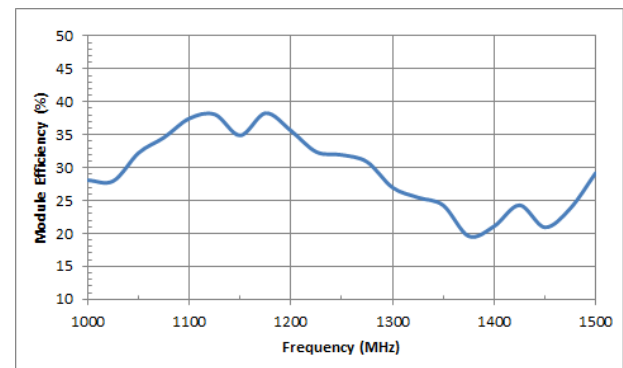
Performance Plots

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

RF Output Power

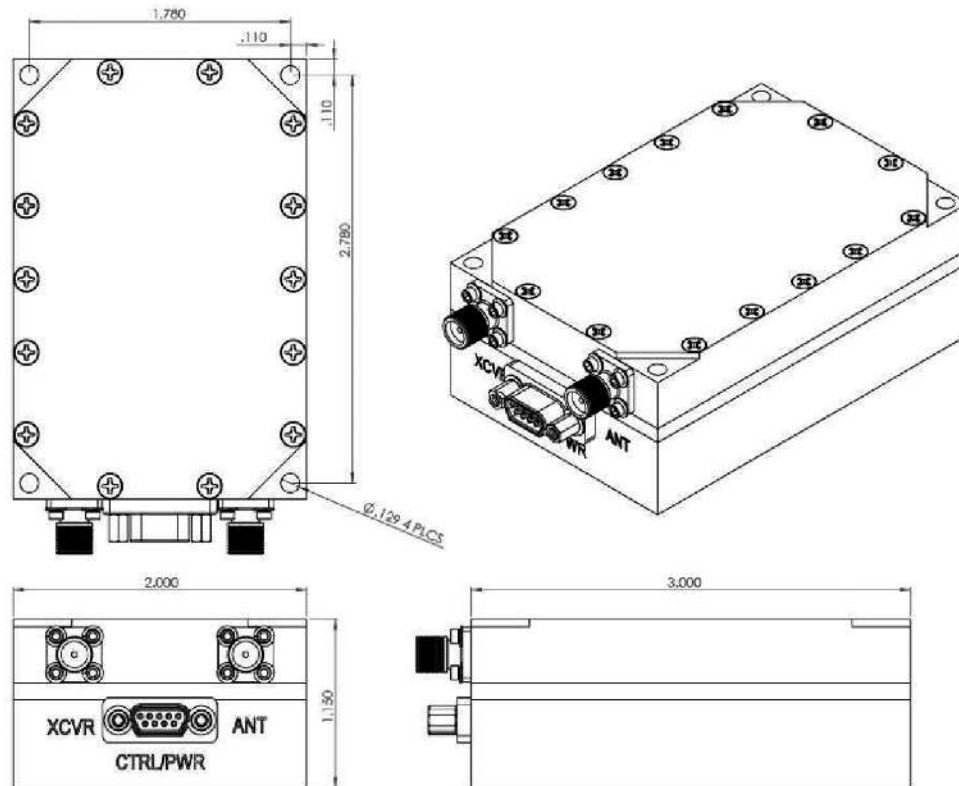


Efficiency



NuPower Xtender™ 12B04A-01 BDA

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



NuWaves RF Solutions
132 Edison Drive
Middletown, OH 45044

www.nuwaves.com
sales@nuwaves.com
513.360.0800

