



Trusted RF Solutions™

NuPower™ 12B01A-10 S-Band Solid State Power Amplifier

10 Watt CW
2.5 Watts Linear, 5% EVM @ 34 dBm
2200 MHz - 2395 MHz

P/N: NW-PA-12B01A-10



The NuPower™ 12B01A-10 is a small, highly efficient solid state power amplifier that provides over 10 watts of RF power to boost performance of data links and transmitters.

Based on the latest gallium nitride (GaN) technology, NuPower's 30% - 50% power efficiency and 3.9 in³ form factor make it ideal for size, weight, and power-constrained broadband RF telemetry and tactical communication systems.

The NuPower 12B01A-10 power amplifier accepts a nominal 0 dBm RF input and provides 40 dB of gain from 2200 MHz to 2395 MHz. The NuPower 12B01A-10 module comes standard with a NW-PA-ACC-CB09MA interface cable, for ease of integration. This model is also available with a 1 watt input drive level (P/N: NW-PA-12B01A-10-D30), making it ideal for use with L-3 Communications' Bandit miniature S-band transceiver.

NuPower PAs feature over-voltage and reverse-voltage protection and can operate over a wide temperature range of -30 °C to +60 °C.

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

Features

- 10 Watts RF Output Power
- 2200 MHz to 2395 MHz
- Miniature Package (3.00" x 2.00" x 0.65")
- High-Efficiency GaN Technology
- 0 dBm Nominal RF Input
- Reverse-Voltage Protection
- Logic On/Off Control

Benefits

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

Applications

- Unmanned Aircraft Systems (UAS), Group 2 & 3
- Unmanned Ground Vehicles (UGV)
- Broadband RF Telemetry
- RF Communication Systems
- Software Defined Radios

NuPower™ 12B01A-10 Power Amplifier

Specifications

Absolute Maximums

| Parameter | Rating | Unit |
|---------------------------------------|--------|------|
| Max Device Voltage | 32 | V |
| Max Device Current | 2.4 | 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 @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$

| Parameter | Symbol | Min | Typ | Max | Unit | Condition |
|---|---------------|-------|---------|-------|---------|----------------------------|
| Operating Frequency | BW | 2200 | | 2395 | MHz | |
| RF Output Power | P_{SAT} | 10 | 14 | | W | $P_{in} = 0 \text{ dBm}$ |
| Output Power @ 1dB Compression | P_{1dB} | | 35 | | dBm | 2200 MHz |
| | | | 35 | | | 2300 MHz |
| | | | 34 | | | 2400 MHz |
| Small Signal Gain | G | | 46 | | dB | 2200 MHz, @ -30 dBm input |
| | | | 46 | | | 2300 MHz, @ -30 dBm input |
| | | | 48.5 | | | 2400 MHz, @ -30 dBm input |
| Small Signal Gain Flatness | ΔG | | ± 2 | | dB | $P_{in} = -30 \text{ dBm}$ |
| Power Gain Flatness | | | ± 0 | | dB | $P_{in} = 0 \text{ dBm}$ |
| Input VSWR | VSWR | 1.1:1 | 1.4:1 | 1.6:1 | | |
| Nominal Input Drive Level | P_{IN} | | 0 | | dBm | |
| Operating Voltage | VDC | 11 | 28 | 30 | V | |
| Quiescent Current | I_{DQ} | | 0.35 | | A | |
| Operating Current | I_{DD} | | 1.5 | 2.4 | A | $P_{in} = 0 \text{ dBm}$ |
| Module Efficiency | | | 30 | | % | |
| Switching Speed | $TX_{ON/OFF}$ | | | 2 | μS | 10% to 90% |
| Third Order Order Intercept Point (Two tone test at 1 MHz spacing, $P_{out} = 20 \text{ dBm} / \text{tone}$) | OIP3 | | 39 | | dBm | 2200 MHz |
| | | | 39.5 | | | 2300 MHz |
| | | | 40 | | | 2400 MHz |
| Harmonics | 2nd | -38 | -31 | -25 | dBc | |
| | 3rd | -28 | -25 | -19 | | |
| Output Mismatch (No Damage) | | | | 10:1 | | |

NuPower™ 12B01A-10 Power Amplifier

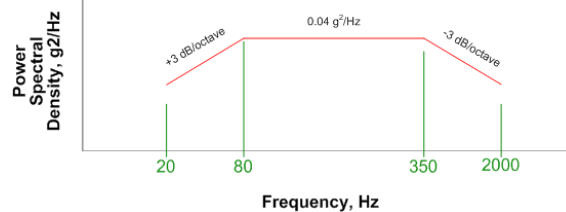
Specifications (cont.)

Mechanical Specifications

| Parameter | Value | Unit | Limits |
|-----------------------------|------------------------------|------|--------|
| Dimensions | 3.0 x 2.0 x 0.65 | in | Max |
| Weight | 3 | oz | Max |
| RF Connectors, Input/Output | SMA Female | | |
| Interface Connector | Micro-D, 9-pin Socket | | |
| Cooling | External Heatsink (Optional) | | |

Environmental Specifications

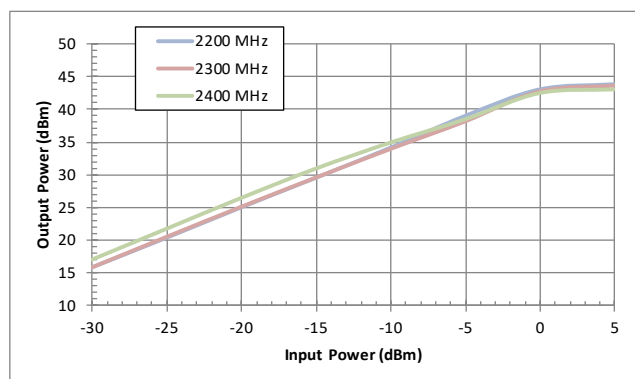
| Parameter | Symbol | Min | Typ | Max | Unit |
|---|-----------|-----|-----|--------|------|
| Operating Temperature (ambient) | T_A | -40 | | +60 | °C |
| Operating Temperature (baseplate) | T_C | -40 | | +85 | °C |
| Storage Temperature | T_{STG} | -55 | | +85 | °C |
| Relative Humidity (non-condensing)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



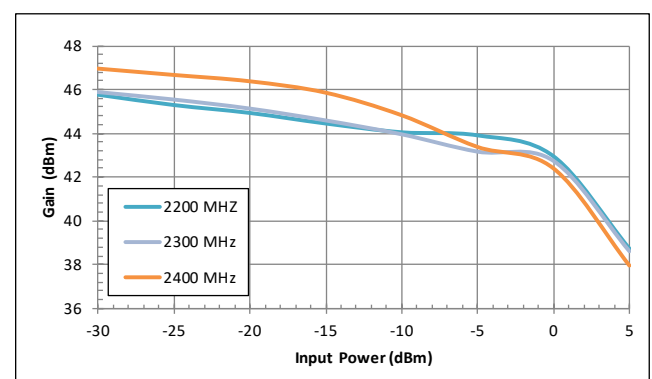
Performance Plots

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

Output Power vs. Input Power



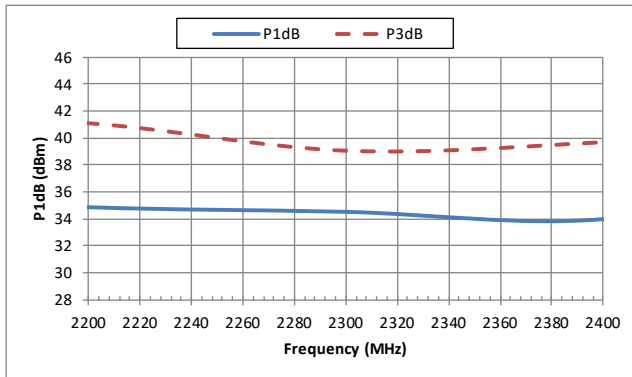
Gain vs. Input Power



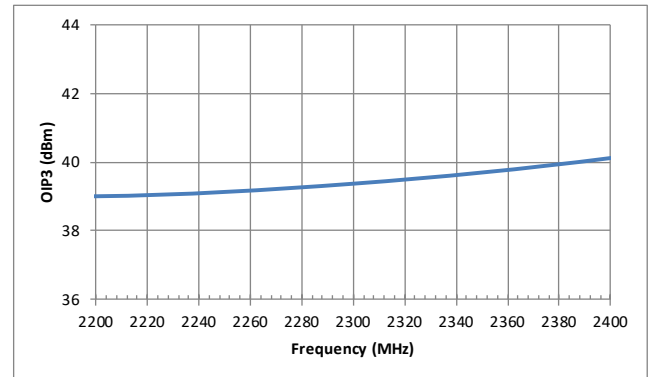
NuPower™ 12B01A-10 Power Amplifier

Performance Plots (cont.)

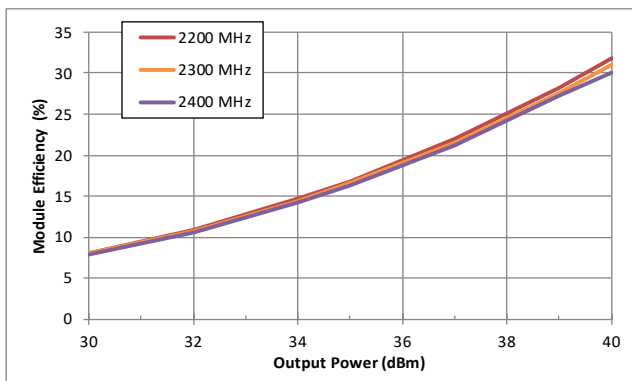
P1dB & P3dB



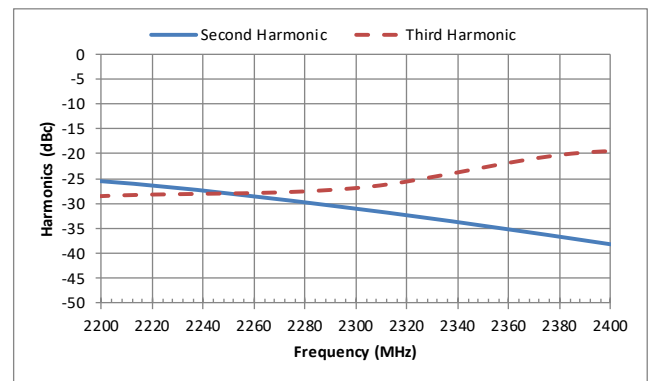
OIP3



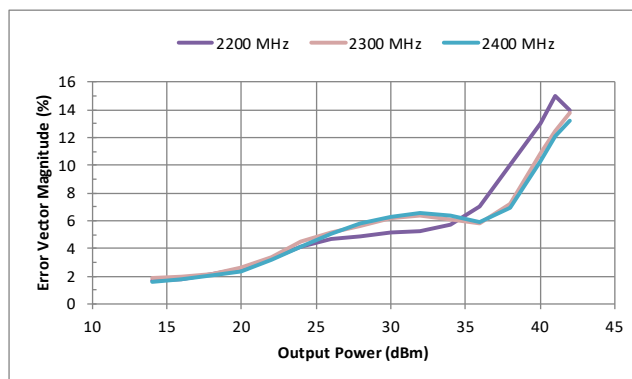
Efficiency



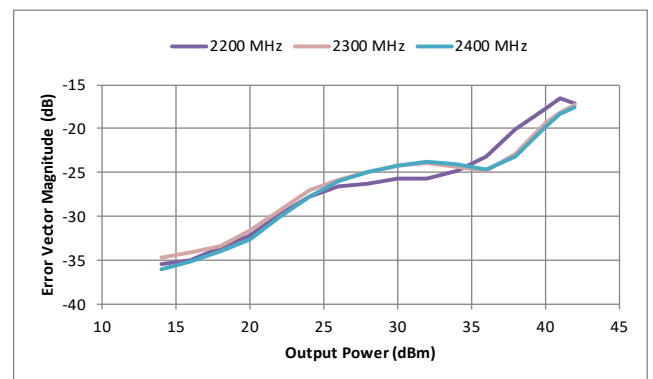
Harmonics (@ Psat)



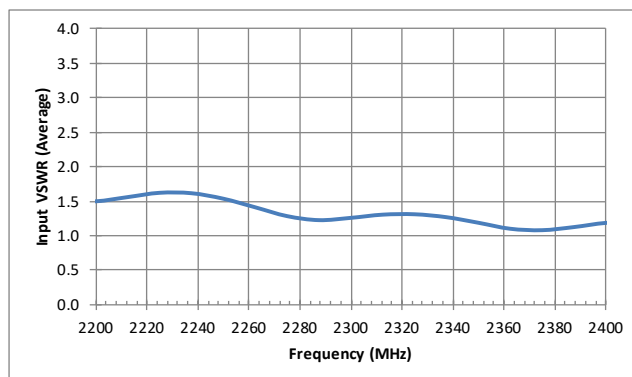
Error Vector Magnitude (%) [w/ OFDM Waveform]



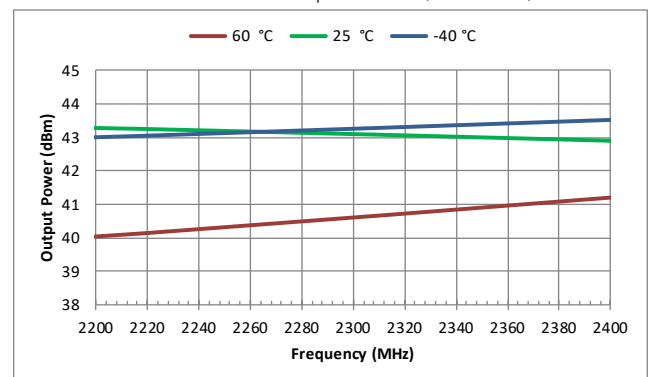
Error Vector Magnitude (dB) [w/ OFDM Waveform]



VSWR

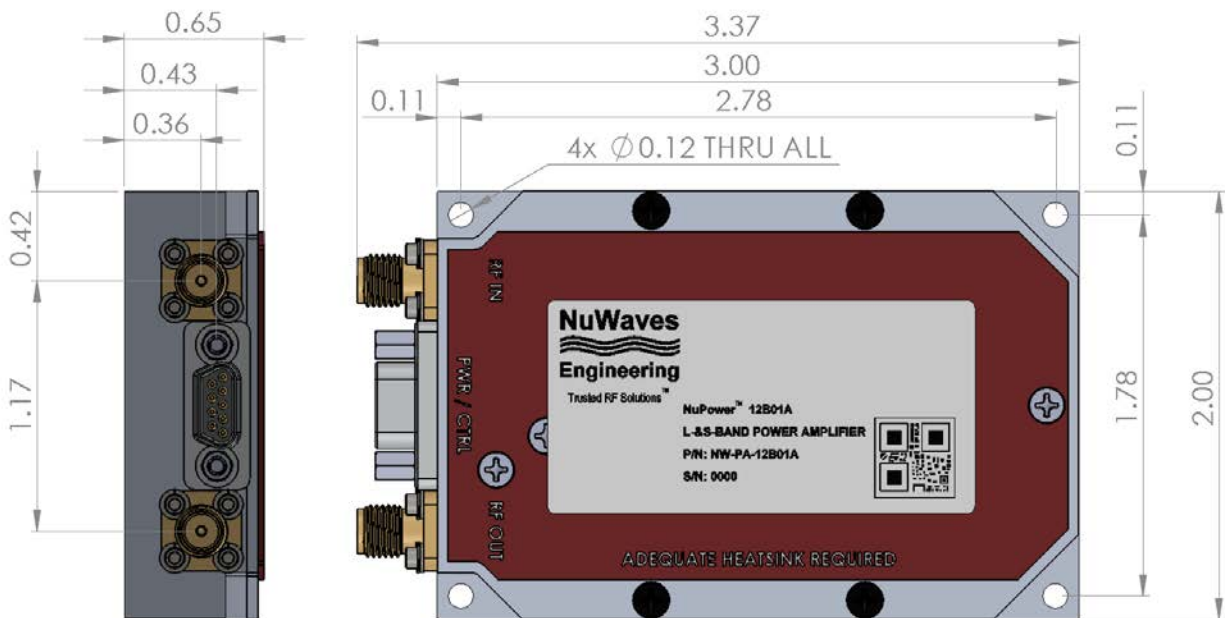


Power Out vs. Temperature (ambient)



NuPower™ 12B01A-10 Power Amplifier

Mechanical Outline



Accessory Part Numbers

| Part Number | Description |
|----------------------------|--|
| NW-FL-05LPLE-2500-SFSF-M01 | Harmonic Filter Module |
| NW-PA-ACC-CB09MA | Standard Interface Cable Assembly - Flying Leads (included with module) |
| NW-PA-ACC-CT09MA | Upgraded Interface Cable Assembly - Banana Plug Termination |
| NW-PA-ACC-KT01 | Accessory Kit, which includes Fan-Cooled Heatsink and Upgraded Interface Cable |
| NW-PA-ACC-HS02 | Heatsink with Integrated Fan |

Pinout

| Function | I/O | Pin |
|---|-----|---------|
| DC Power (+11 to +32 VDC) | I | 1, 2 |
| Ground | I | 3, 4 |
| RF Enable 0V or GND = RF ON +5V or NC = RF OFF | I | 5 |
| No Connect | - | 6, 7, 9 |
| Over Temperature Flag 0V = temperature fault +5V = no fault | 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 Engineering
 132 Edison Drive
 Middletown, OH 45044

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

NuWaves
 engineering

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