



*Trusted RF Solutions™*

## NuPower Xtender™ C15RX01 C-Band Solid State Bidirectional Amplifier

20 Watts CW, 4.4 GHz - 4.9 GHz  
4% EVM @ 32 dBm  
-30 dBc ACPR @ 2W Average Power



P/N: NW-BA-C-15-RX01

**The NuPower Xtender™ C15RX01 is a small, highly efficient, solid state bidirectional amplifier (BDA) that provides 20 watts of RF power (3 W linear) across the 4.4 to 4.9 GHz frequency range to boost performance of data links and transmitters.**

The NuPower Xtender C15RX01 accepts a nominal 0 dBm (1mW) RF input and provides 43 dB (typ) of gain from 4.4 to 4.9 GHz for continuous wave (CW) and near-constant envelope waveforms.

Based on the latest gallium nitride (GaN) technology, the NuPower Xtender C15RX01's power efficiency and form factor make it ideal for size, weight, and power-constrained broadband RF telemetry, tactical communication systems, and electronic warfare systems.

NuPower BDA's feature over-voltage protection and can operate over a wide temperature range of -40 °C to +85 °C (baseplate)

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

### Features

- 20 Watts RF Output Power
- 4.4 GHz to 4.9 GHz
- Bidirectional Operation
- 43 dB of Transmit Gain
- 10 dB of Receive Gain
- Miniature Package
- Manual or Auto Sensing T/R Control
- Single Power Supply
- Over-Voltage Protection
- 3.3 V or 5 V Logic Control

### 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

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

# NuPower™ Xtender C15RX01 BDA

## Specifications

### Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current @ 28 VDC	7	A
Max RF Input Power @ ANT Port, $Z_L = 50 \Omega$	+5	dBm
Max RF Input Power @ XCVR Port, $Z_L = 50 \Omega$	+15	dBm
Max Operating Temperature (ambient)	55	°C
Max Operating Temperature (baseplate)	85	°C
Max Storage Temperature	100	°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	4.4		4.9	GHz	
Switching Speed	$T_{XON/OFF}$		2		$\mu$ S	10% to 90%
Operating Voltage	VDC	27	28	32	V	
Operating Current - Transmit	$I_{DD}$		4.0		A	CW, +28 Vin, Pin = 0 dBm
Operating Current - Receive	$I_{DD}$		35		mA	Receive Mode
Quiescent Current	$I_{DQ}$		800		mA	No RF Signal Applied, Transmit Mode
Module Efficiency			25		%	CW, Pin = 0 dBm, Transmit mode

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

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	4.4		4.9	GHz	
RF Output Power	$P_{SAT}$	15	20		W	4.4 GHz - 4.9 GHz, 0 dBm input
RF Output Power, P1dB	P1dB		31		dBm	4.4 GHz
			35			4.65 GHz
			38			4.9 GHz
Small Signal Gain	G		50		dB	4.4 GHz, @ -30 dBm input
			55			4.65 GHz, @ -30 dBm input
			55			4.9 GHz, @ -30 dBm input
Small Signal Gain Flatness	$\Delta G$		5		dB	Pin = -30 dBm
Input VSWR	VSWR		2:1			
Output Mismatch (No Damage)	VSWR			10:1	$\Psi$	no damage at all phase angles
Nominal Input Drive Level	$P_{IN}$		0		dBm	
Operating Voltage	VDC	27	28	32	V	
Quiescent Current (Transmit Mode)	$I_{DQ}$		0.8		A	No RF Signal Applied
Operating Current	$I_{DD}$		4.0		A	Pin = 0 dBm
Module Efficiency			25		%	
Switching Speed	$T_{XON/OFF}$		2		$\mu$ S	10% to 90%
Third-Order Intermodulation Distortion	IMD3		-30		dBc	Two tone test @ 1 MHz spacing $P_{out} = 2W$
Harmonics	2nd			-25	dBc	
	3rd			-25	dBc	

# NuPower™ Xtender C15RX01 BDA

## Specifications (cont.)

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

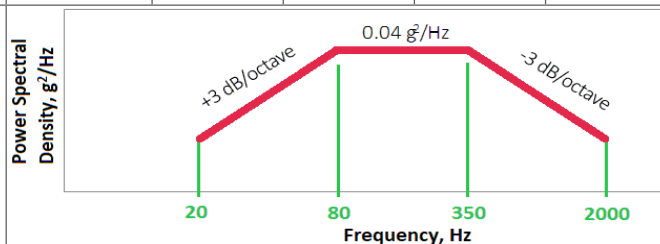
Parameter	Symbol	Min	Typ	Max	Unit	Condition
Receive P1dB	P1dB		+18		dBm	
Receive Gain	G		10		dB	
Receive Gain Flatness	$\Delta G$		$\pm 1$		dB	From 4.4 GHz to 4.7 GHz
Receive Current	$I_{RX}$		35		mA	
Receive Noise Figure	NF		3.5		dB	

## Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	5.5 x 4.25 x 0.68	in	Max
Weight	10.5	oz	
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		+100	°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)					

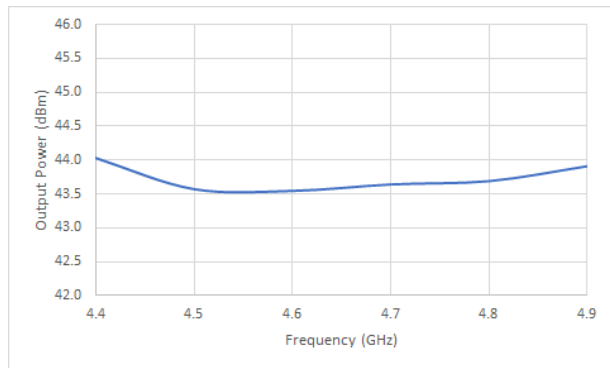


# NuPower™ Xtender C15RX01 BDA

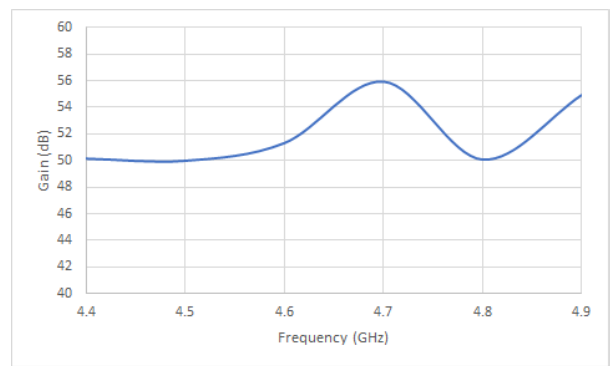
## Performance Plots

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

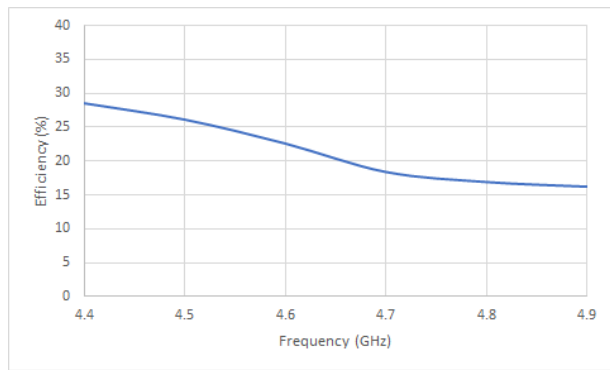
Output Power [0dBm Input Power]



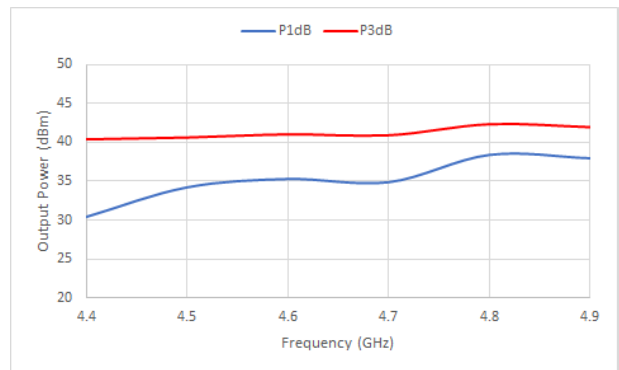
Small Signal Gain [-40dBm Input Power]



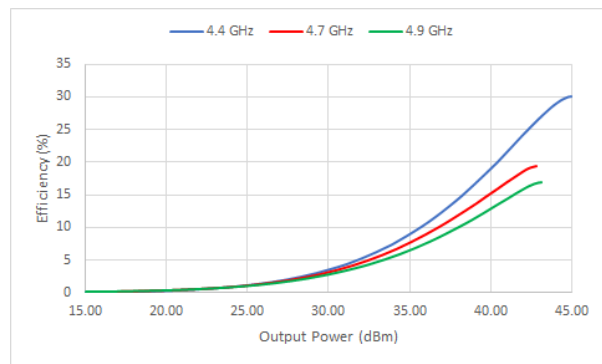
Efficiency



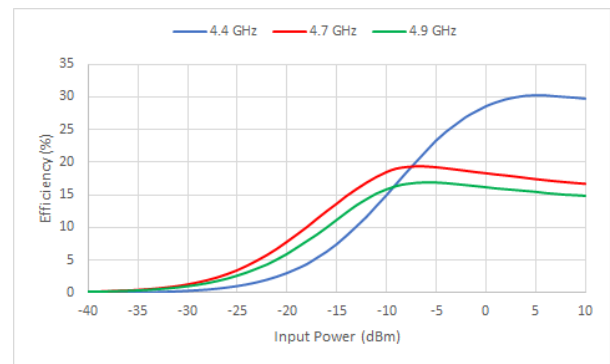
P1dB & P3dB



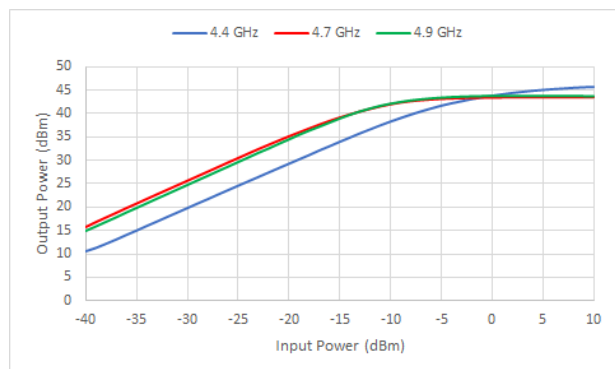
Efficiency vs. Output Power



Efficiency vs. Input Power

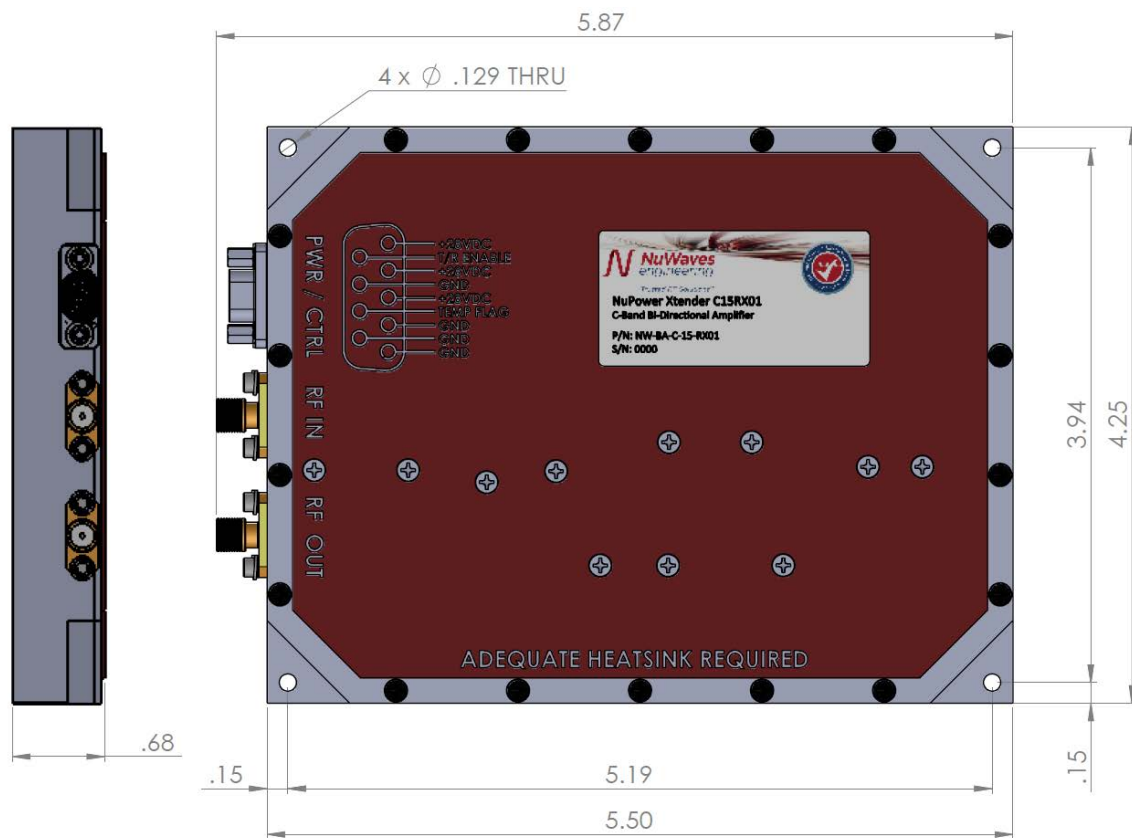


Output Power vs. Input Power



# NuPower™ Xtender C15RX01 BDA

## Mechanical Outline



## Accessory Part Numbers

Part Number	Description
NW-BA-ACC-CB09MC	Standard Interface Cable Assembly - Flying Leads (not included with module)
NW-BA-ACC-CT09MC	Upgraded Interface Cable Assembly - Banana Plug Termination
NW-BA-ACC-KT03	Accessory Kit, which includes Fan-Cooled Heatsink and Upgraded Interface Cable

## Pinout

Function	I/O	Pin
DC Power (+28 Volts)	I	3, 4, 5
Ground	I	1, 2, 6, 8
Over Temperature Flag (0 Volts = Temperature Fault) (+5 Volts = No Fault)	O	7
TR Control (3.3 V or 5 V Logic)	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



NuWaves Engineering  
 132 Edison Drive  
 Middletown, OH 45044

[www.nuwaves.com](http://www.nuwaves.com)  
[sales@nuwaves.com](mailto:sales@nuwaves.com)  
 513.360.0800

**NuWaves**  
 engineering  
 Trusted RF Solutions™