

NuWaves
RF Solutions

NuPower Xtender™ ULS-10-S01-D30 UHF, L-, & S-Band Bidirectional Amplifier

24 Watt CW

200-2500 MHz

P/N: NW-BA-ULS-10-S01-D30

Contact sales@nuwaves.com for custom options



The NuPower Xtender™ ULS-10-S01-D30 is a small, lightweight, and power-efficient bidirectional amplifier ideal for extending the communication range of half-duplex UHF, L, or S-band transceivers running constant-envelope or near-constant-envelope waveforms. The bidirectional amplifier typically generates 24 Watts of RF power from 200 to 2500 MHz in transmit mode and the integrated low-noise amplifier typically provides over 14 dB of gain in receive mode.

Based on the latest gallium nitride (GaN) technology, the Xtender boasts an impressive 42% typical power efficiency and its compact size makes it ideal for integration into space-constrained platforms.

Accepting a +30 dBm RF input, the Xtender typically provides over 13 dB of transmit gain. The Xtender also features over-voltage and reverse-voltage protection and operates over a wide temperature range of -40 to +85 °C baseplate.

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

Features

- 24 Watts (typ) RF Output Power
- 200-2500 MHz
- Bidirectional Operation
- 13 dB (typ) of Transmit Gain
- 14 dB (typ) Receive Gain
- Fast T/R Mode Switching with Auto-Sensing or Manual T/R Line
- Small Form Factor
- High Efficiency GaN Technology
- Over-Voltage Protection

Applications

- Unmanned Aircraft Systems (UAS) - Group 2 and Group 3
- Unmanned Ground Vehicles (UGV)
- Software Defined Radios
- Air Launch Effect (ALE)
- Common Launch Tube (CLT)
- Counter UAS Detection and Mitigation
- MIMO/MANET Radio Range Extension
- SISO Radio Range Extension

NuPower Xtender™ ULS-10-S01-D30 BDA

Specifications

Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	3.5	A
Max RF Input Power, CW, $Z_L = 50 \Omega$	XCVR Port: +33	dBm
	ANT Port ¹ : +30	
Max Operating Temperature (ambient)	60	°C
Max Operating Temperature (baseplate)	85	°C
Max Storage Temperature	85	°C

Export Classification
EAR99

¹Max operational receive input power (autosense mode) = -20 dBm

Electrical Specifications - Operational @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$, CW, 0.2-2.5 GHz, $P_{in} = +30$ dBm (unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	200		2500	MHz	
Switching Speed	TX _{ON/OFF}		0.95	2	μ S	Rx - Tx (Manual T/R)
			1.3	2		Tx - Rx (Manual T/R)
			1.3	2		Rx - Tx (Autosense)
			1.6	2		Tx - Rx (Autosense)
Operating Voltage	VDC	11	28	32	V	
Operating Current (Transmit)	I _{DD}		2.1	3.5	A	
Module Efficiency (Transmit)			42		%	

Electrical Specifications - Transmit @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$, CW, 0.2-2.5 GHz, $P_{in} = +30$ dBm (unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
RF Output Power, Psat	Psat	7	24		W	
Transmit Gain	G		13.5		dB	
Power Gain Flatness	Δ G		± 1.6		dB	
Small Signal Gain	G		23		dB	$P_{in} = -10$ dBm
Small Signal Gain Flatness	Δ G		± 5		dB	$P_{in} = -10$ dBm
Harmonics @ Psat	2nd		-18		dBc	
	3rd		-19			
Nominal Input Drive Level	P _{IN}		30		dBm	
Quiescent Current	I _{DQ}		75		mA	T/R Enable Off (Receive Current)
Transmit Current	I _{TX}		2.1	3.5	A	
Transmit Input VSWR (XCVR Port)	VSWR		1.6:1			
Transmit Output Mismatch VSWR	VSWR			10:1	Ψ	No damage at all phase angles

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Specifications (cont.)

Electrical Specifications - Receive @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$, CW, 0.2-2.5 GHz, -30 dBm Input Power (unless otherwise specified)

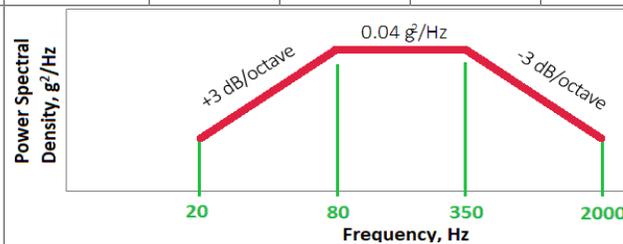
Parameter	Symbol	Min	Typ	Max	Unit	Condition
Receive Gain	G		14.5		dB	
Receive Gain Flatness	ΔG		± 1.4		dB	
Receive P1dB	P1dB		15.6		dBm	Typical Input P1dB: +2dBm
Receive Current	I_{RX}		75		mA	
Receive Noise Figure	NF		2.25		dB	
Receive Input VSWR (ANT Port)	VSWR		1.9:1			

Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	3.0 x 2.0 x 0.65	in	Max
Weight	4	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)					

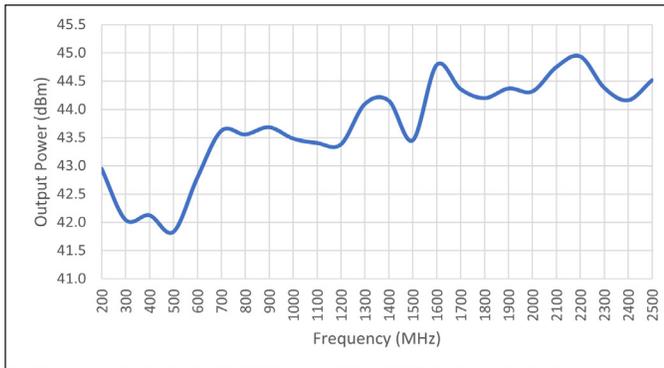


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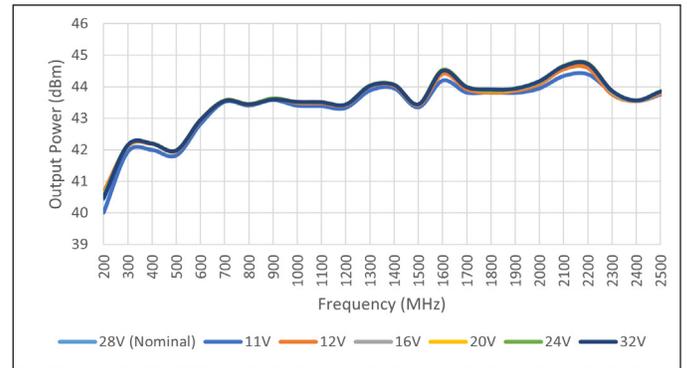
Transmit Performance Plots

Test Conditions: +28 VDC, +25 °C, $Z_s=Z_L=50 \Omega$, CW, +30dBm Input Power (unless otherwise specified)

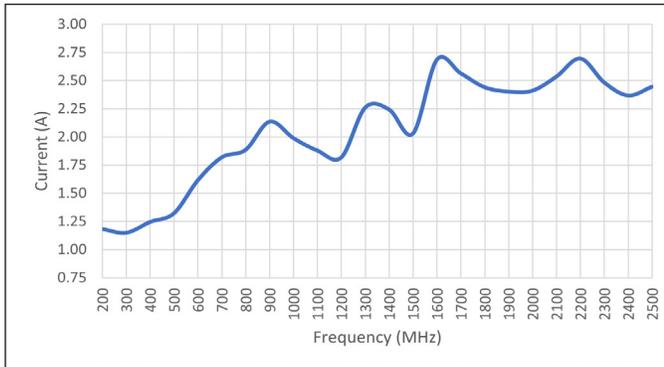
Output Power @ Nominal Drive



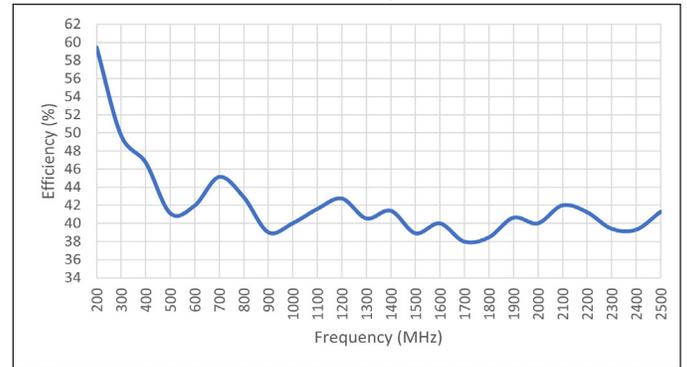
Output Power vs. Input Voltage



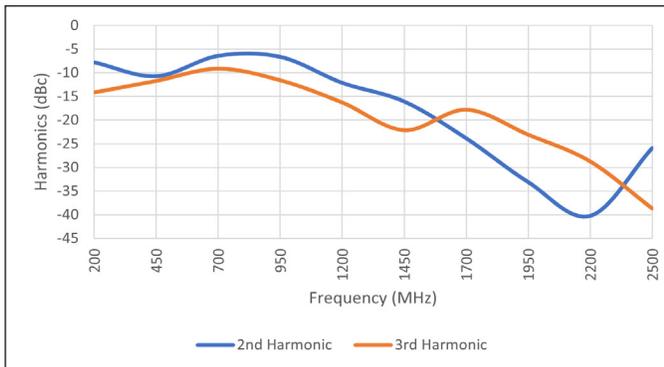
Current Consumption



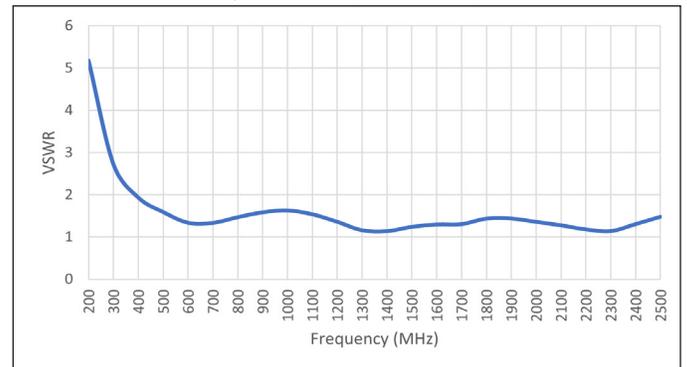
Efficiency



Harmonics



Input VSWR (XCVR Port)

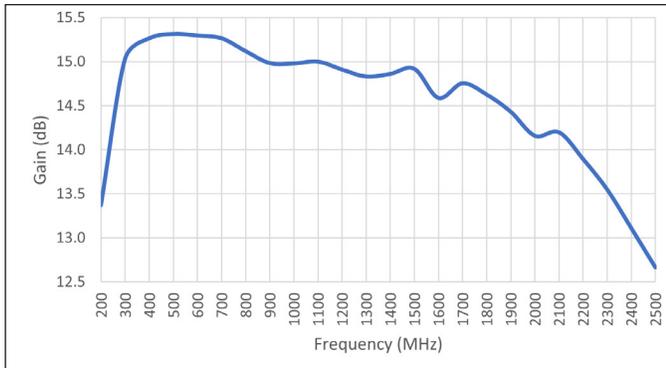


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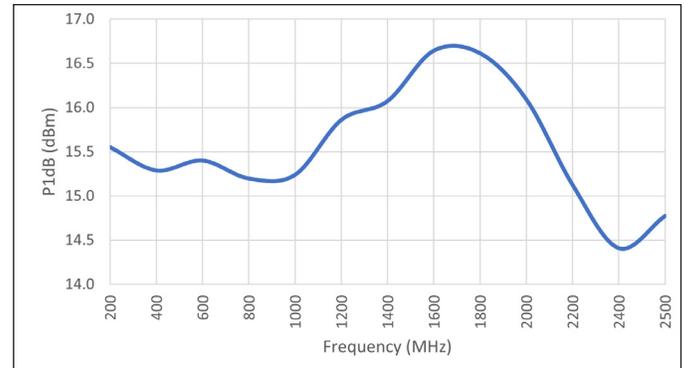
Receive Performance Plots

Test Conditions: +28 VDC, +25 °C, $Z_s=Z_L=50 \Omega$, CW, -30 dBm Input Power (unless otherwise specified)

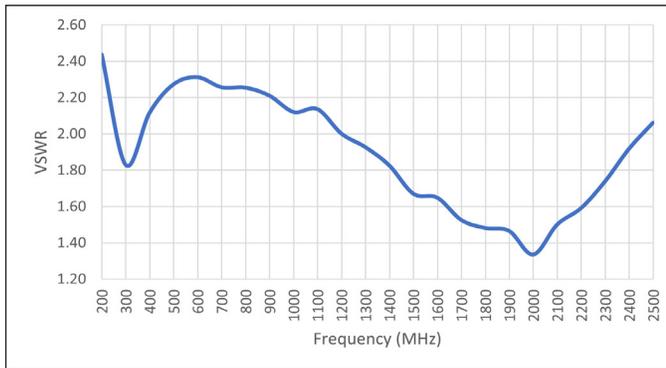
Receive Gain



Receive P1dB

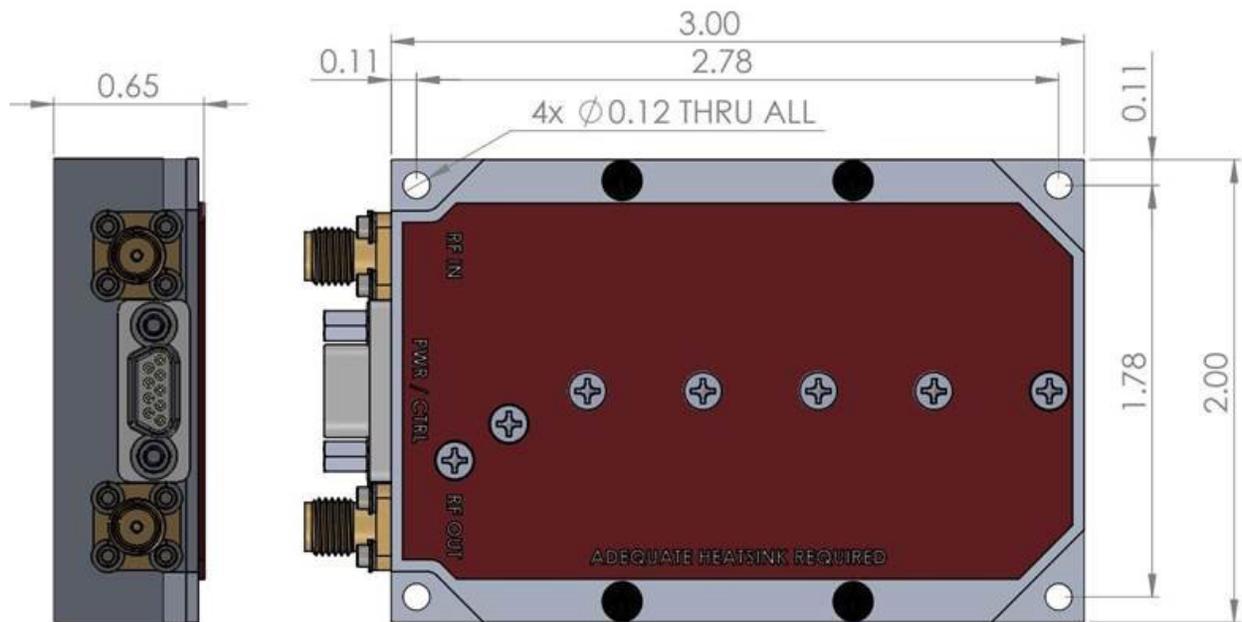


Input VSWR (ANT Port)



NuPower Xtender™ ULS-10-S01-D30 BDA

Mechanical Outline



NuPower Xtender™ ULS-10-S01-D30 BDA

Optional Heatsink Drawing

Heatsink and Integrated Fan: HTSK-01A

(HTSK-01A outline to be provided soon)

Accessory Part Numbers

Part Number	Description
NW-FL-05LPLE-2500-SFSF-M01	Harmonic Filter Module (sold separately)
NW-BA-ACC-CB09MA	Standard Interface Cable Assembly - Flying Leads (sold separately)
NW-BA-ACC-CT09MA	Upgraded Interface Cable Assembly - Banana Plug Termination (sold separately)
HTSK-01A	Heatsink with Integrated Fan (sold separately)

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>

Pinout

Function	I/O	Pin	Logic Voltage
DC Power (Primary Power, +11 to +32 Volts)	I	1, 2, 9	-
Ground (DC Return)	I	3, 4, 5	-
RS-485 Data Transmit	O	6	-
RS-485 Data Receive	I	7	-
T/R Enable			3.3V Logic ² High: 2.31 - 3.8 VDC Low: -0.5 - 0.99 VDC
T/R Mode: Source (Autosense) ¹ T/R Mode: Sink (Manual T/R) [High TX / Low RX]	I/O	8	5V Logic ² High: 3.5 - 5.5 VDC Low: -0.5 - 1.5 VDC

¹Autosense automatically switches to transmit and receive based on input signal strength. Autosense is default T/R Mode. See user manual for complete information, including typical transmit thresholds over frequency.

²Logic level configurable by user or factory. Default logic level is 3.3V.

Contact NuWaves



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