

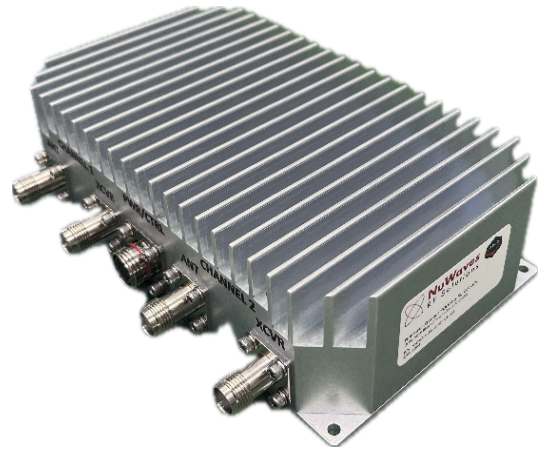
NuWaves
RF Solutions

NuPower Xtender™ DUAL-S-50-C01-S01

50 Watt CW

2.2 GHz - 2.5 GHz

P/N: NW-BA-DUAL-S-50-C01-S01



Contact sales@nuwaves.com for custom packaging, including: single channel, 3x3, or 4x4 options. Customized logic options also available.

The NuPower Xtender™ DUAL-S-50-C01-S01 is a 50W 2x2 dual channel bi-directional amplifier ideal for extending the range of communications and datalinks for ISR applications. This amplifier supports NxN MIMO radios, where 2x2 or 4x4 configurations are used for high data rate applications. This amplifier combines a power amplifier, LNA, and switch, in an integrated microwave assembly for a low SWaP solution to pair with MIMO radios.

Based on highly linear LDMOS technology, this amplifier is perfect for applications requiring both high data rates and high RF output power for long distance data links. It supports complex modulations with high peak-to-average ratios (PARs), where minimal signal distortion is required. Constant envelope signals such as CW, AM, and FM are also supported.

At a nominal +25dBm RF input, the amplifier typically provides 24dB of gain to achieve a nominal 50 Watts at each of the antenna ports. Each channel is its own independent bi-directional amplifier. The amplifier switches between transmit and receive through a DC control input. Alternatively, the module can be configured for Autosense where it switches between transmit and receive automatically based on the RF input power detected at the XCVR Port.

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

Features

- 50 Watts (typ) RF Output Power
- 2.2 to 2.5 GHz
- Bidirectional Operation
- 24 dB (typ) of Transmit Gain
- 14.5 dB (typ) Receive Gain
- Integrated Heatsink
- Fast T/R Mode Switching with Auto-Sensing or Manual T/R Line
- Small Form Factor
- Highly Linear LDMOS Technology
- Over-Voltage & Reverse-Voltage Protection

Applications

- Unmanned Aircraft Systems (UAS) - Group 2 and Group 3
- Unmanned Ground Vehicles (UGV)
- Software Defined Radios
- Counter UAS Detection and Mitigation
- MIMO/MANET Radio Range Extension
- SISO Radio Range Extension

NuPower Xtender™ DUAL-S-50-C01-S01

Specifications

Absolute Maximums

Per Channel		
Parameter	Rating	Unit
Max Device Voltage	30	V
Max Device Current ¹	9.5	A
Max RF Input Power CW, $Z_L=50\Omega$	XCVR Port: +28	dBm
	ANT Port: +30	
Max Operating Temperature (ambient)	+71 °C	°C
Max Operating Temperature (baseplate)	+85 °C	°C

Export Classification
EAR 99

Electrical Specifications - Operational @ 28 VDC, 25 °C, $Z_S=Z_L=50\Omega$, CW, Pin = +25 dBm (unless otherwise specified)

Per Channel						
Parameter	Symbol	Min	Typ	Max	Unit	Condition
RF Output Power, Psat	Psat	45	48		dBm	
Operating Frequency	BW	2200		2500	MHz	
Switching Speed	TX _{ON/OFF}		1.0	2.0	µs	10% control to 90% RF
Operating Voltage	VDC	24	28	30	V	
Operating Current (Transmit)	I _{DD}		8	9.5	A	
Module Efficiency (Transmit)			28		%	

Electrical Specifications - Transmit @ 28 VDC, 25 °C, $Z_S=Z_L=50\Omega$, CW, 2.2-2.5 GHz, Pin = +25 dBm (unless otherwise specified)

Per Channel						
Parameter	Symbol	Min	Typ	Max	Unit	Condition
RF Output Power, Psat	Psat	45	48		dBm	
Tx Gain	G	20	24		dB	
Power Gain Flatness	ΔG		±0.9		dB	
Small Signal Gain	G		25		dB	Pin = -10 dBm
Small Signal Gain Flatness	ΔG		±1.5		dB	Pin = -10 dBm
Harmonics @ Psat	2nd		-58		dBc	
	3rd		-80			
Nominal Input Drive Level	P _{IN}		+25		dBm	
Quiescent Current	I _{DD}		57		mA	T/R Enable Off (Receive Current)
Tx Current	I _{TX}		8	9.5 ¹	A	
Tx Input VSWR (XCVR Port)	VSWR		2:1			
Tx Output Mismatch VSWR	VSWR		10:1		Ψ	No damage at all phase angles

¹Specified at +25dBm input power with CW waveform. May draw >9.5A with higher input powers and/or different waveforms.

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Specifications (cont.)

EVM vs Output Power vs Modulation

Typical Performance Per Channel					
Modulation (802.11g, 20MHz BW, OFDM)	Date Rate	Output Power (W)	Current (A)	EVM (dB)	EVM (%)
64QAM	54 MBPS	10	2.4	≤ -27	≤ 4.46
16QAM	36 MBPS	20	3.4	≤ -21	≤ 8.91
QPSK	12 MBPS	35	4.8	≤ -15	≤ 17.78
BPSK	9 MBPS	50	6.4	≤ -7	≤ 44.66

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

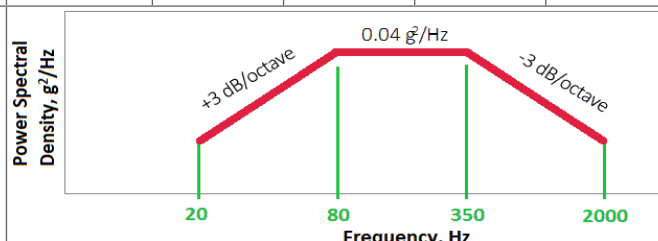
Per Channel						
Parameter	Symbol	Min	Typ	Max	Unit	Condition
RF Gain	G	12	14.5		dB	
Rx P1dB	P1dB		12		dBm	
Rx Gain Flatness	ΔG		±0.3		dB	
Rx Current	I_{RX}		57		mA	
Rx Noise Figure	NF		2.5		dB	
RX Input VSWR (ANT Port)	VSWR		2:1			

Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	4.00 x 7.00 x 2.00	in	Max
Weight	48.2	oz	Max
RF Connectors, Input/Output	TNC/TNC		
Interface Connector	Circular Locking		
Cooling	Adequate Heatsink Required		

Environmental Specifications

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	T_A	-40		+71	°C
Operating Temperature (baseplate)	T_C	-40		+85	°C
Storage Temperature	T_{STG}	-55		+85	°C
Altitude	ALT			50,000	ft
Vibration / Shock Profile (Random profile in x,y, z axis, as per Figure for 15 minute duration in each axis)					

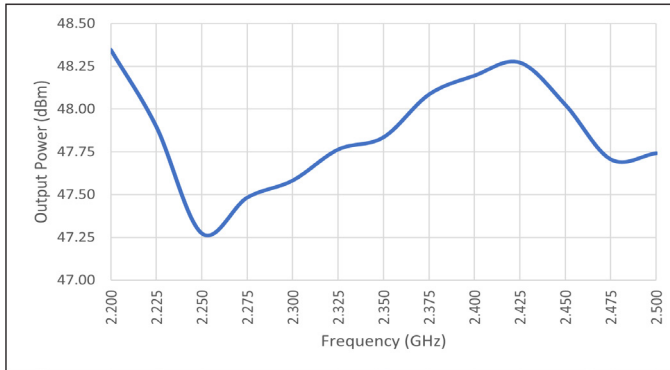


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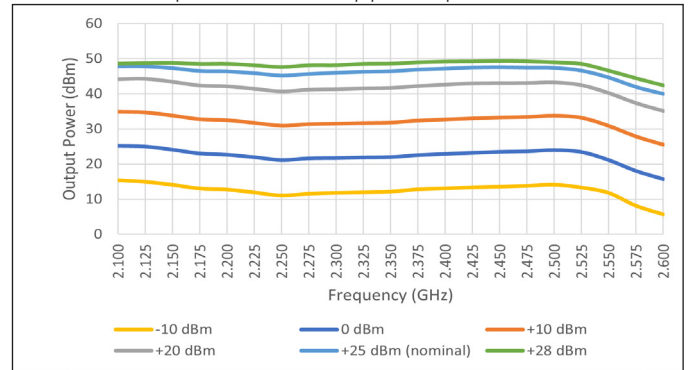
Transmit Performance

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

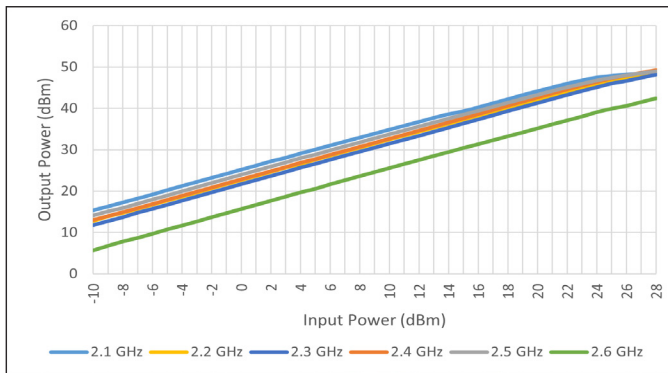
Output Power @ Nominal Drive



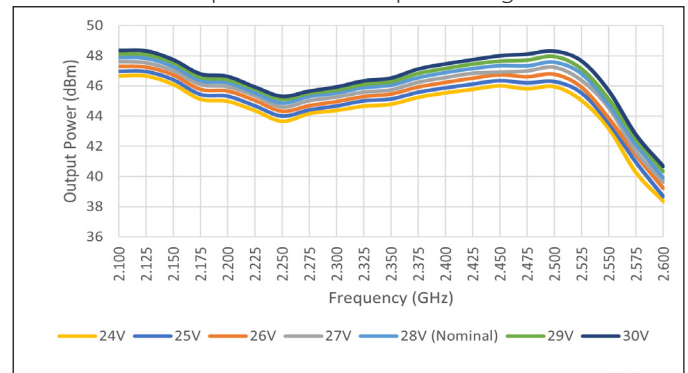
Output Power - Stepped Input Power



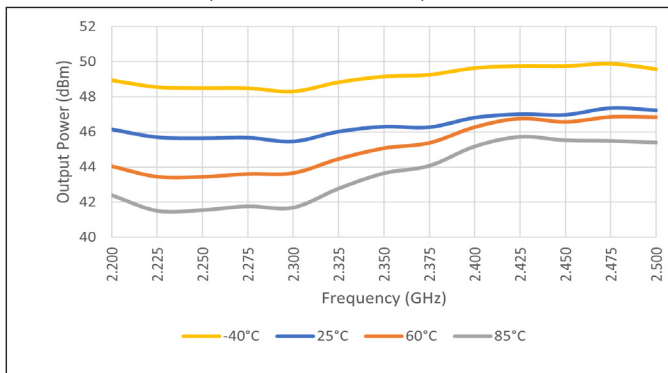
Output Power vs. Input Power



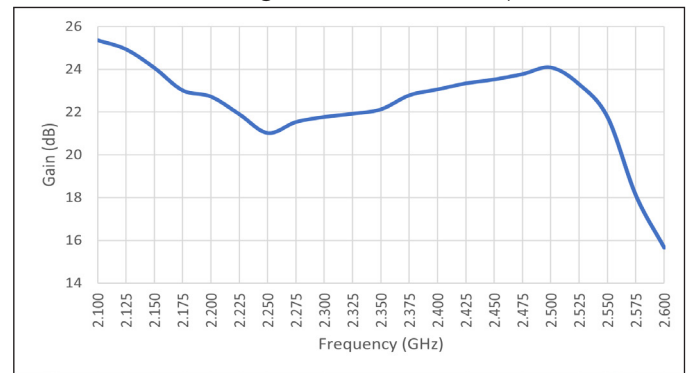
Output Power vs. Input Voltage



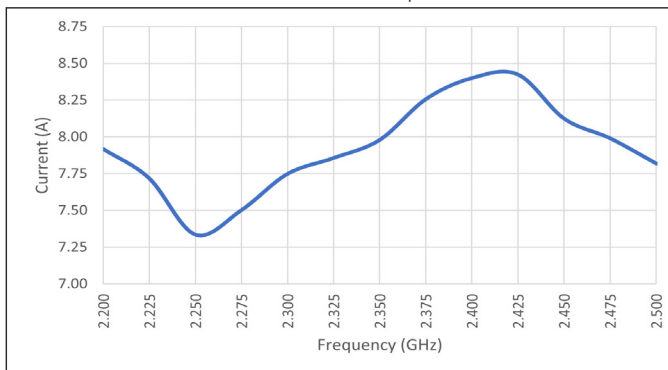
Output Power vs. Temperature



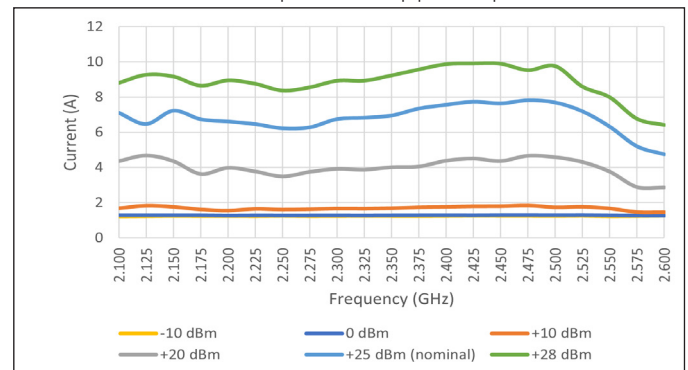
Transmit Small Signal Gain [-10dBm Input Power]



Current Consumption



Current Consumption - Stepped Input Power

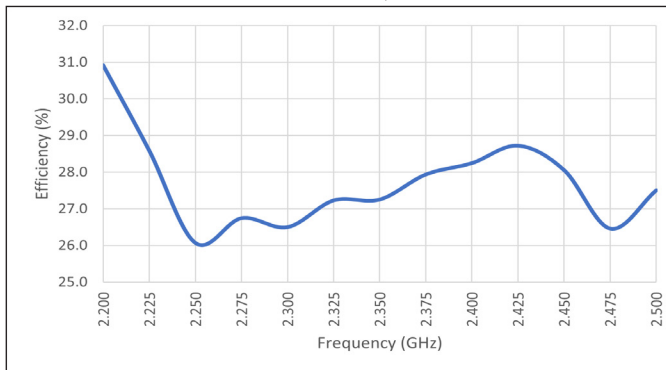


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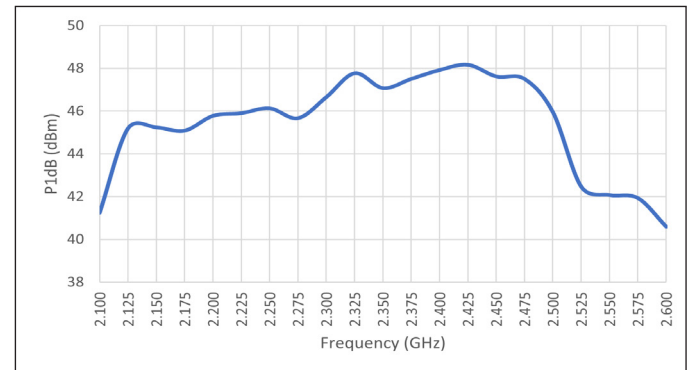
Transmit Performance Plots (cont.)

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

Efficiency



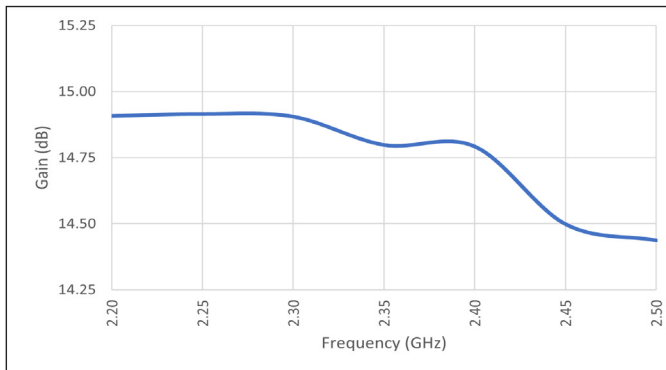
Transmit P1dB



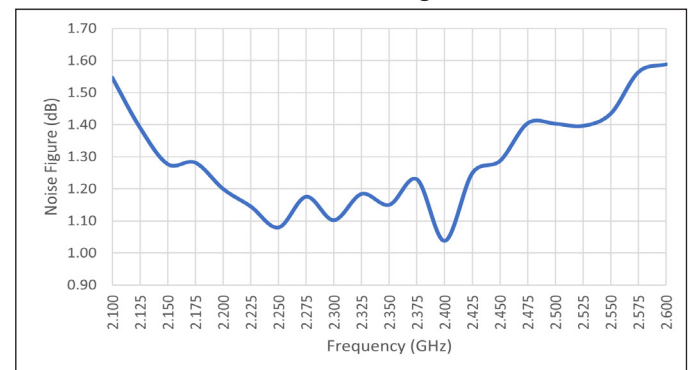
Receive Performance Plots

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

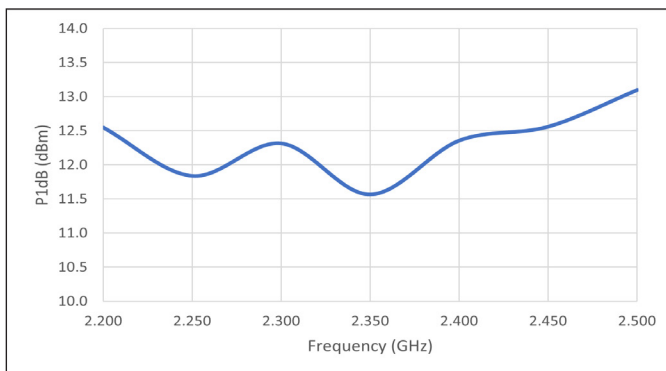
Receive Gain



Receive Noise Figure

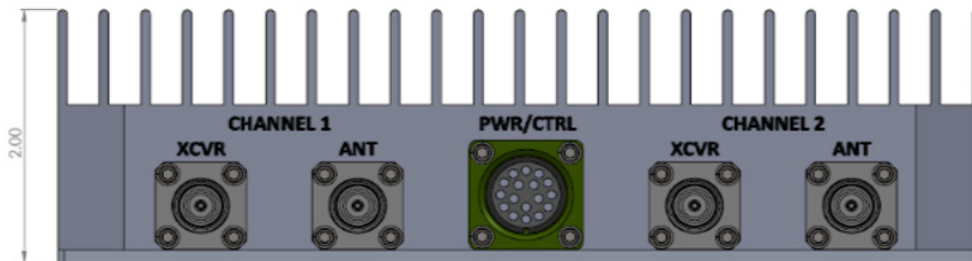


Receive P1dB



NuPower Xtender™ DUAL-S-50-C01-S01

Mechanical Outline



NuPower Xtender™ DUAL-S-50-C01-S01

Accessory Part Numbers - Sold Separately

Part Number	Description
BDA-CBL-12-F	Standard Interface Cable Assembly - Flying Leads
BDA-CBL-12-B	Upgraded Interface Cable Assembly - Banana Plug Termination

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
DC Power (Primary Power, +24 to +30 Volts)	I	Channel 1: 1, 4, 8
		Channel 2: 3, 7, 12
Ground (DC Return)	I	Channel 1: 2, 5, 9
		Channel 2: 6, 11, 16
Chassis Ground	I	18
Fault ¹ 0V = No Fault 3.3V = Fault	O	Channel 1: 13
		Channel 2: 10
Auto/Man ¹	I/O	Channel 1: 17
		Channel 2: 15
TX Enable ¹ T/R Mode: Sink (Manual T/R) ² T/R Mode: Source (Autosense) ³ [High TX / Low RX]	I/O	14

¹Default Logic = 3.3V. Contact sales@nuwaves.com for 5V or active high options.

²Default T/R Mode: Manual T/R. Contact sales@nuwaves.com for Autosense options.

³Autosense automatically switches to transmit and receive based on input signal strength. See user manual for complete information.

Contact NuWaves



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