

NuWaves

RF Solutions

NuPower Xtender™ SCISR-20-C01-S01 Tri-Band, Multi-Channel Bidirectional Amplifier

L-Band: 1000 MHz - 2000 MHz
S-Band: 2000 MHz - 2500 MHz
C-Band: 4400 MHz - 5100 MHz

P/N: NW-BA-SCISR-20-C01-S01



(Custom options available: contact us at sales@nuwaves.com for more information)

The NuPower Xtender™ SCISR-20-C01-S01 is a multi-channel, tri-band, solid-state bidirectional amplifier (BDA) that provides 20 watts of highly efficient RF power and 14 dB of receive gain†. This BDA is ideal for extending the communication range of multi-channel half-duplex (in-band) or full-duplex (cross-band) transceivers running constant envelope waveforms such as FM, BPSK, and GMSK, as well as high peak-to-average waveforms such as OFDM.

The efficiency and compact form factor of the NuPower Xtender™ SCISR-20-C01-S01 BDA makes it ideal for size, weight, and power-constrained RF telemetry and tactical communication systems. This solid state BDA features a compact form-factor, allowing the system integrator to easily incorporate the unit into the communications payload of small unmanned aircraft systems (UAS) or other small platforms.

Features

- Independently-controlled RF channels for half-duplex (in-band) and full-duplex (cross-band) operation
- Auto-sense or manual T/R control
- Optimized size, weight, and power (SWaP)
- High-efficiency GaN technology
- Non-proprietary interfaces
- Over-voltage protection
- 3.3 V or 5 V logic control

Applications

- Unmanned Aircraft Systems (UAS)
-Group 2 - 5
- Unmanned Ground Vehicles (UGV)
- Software Defined Radios
- Counter UAS Detection and Mitigation
- MIMO/MANET Radio Range Extension
- SISO Radio Range Extension
- Airborne datalinks allowing ISR and command and control C2 data transmission

Supports

- Collins Aerospace RT-2071 (C) Secure CDL ISR (SCISR) Radio*
- Cubic Nano Multiband Transceiver (nMT)/SCISR
- Kratos SCISR/TBS Radio*
- L3 BANDIT™ 2/SCISR Transceiver

† Band-dependent

* Verified compatibility with radio OEM

NuPower Xtender™ SCISR-20-C01-S01

Specifications

Absolute Maximums

Parameter		Rating	Unit
Max Device Voltage		32	V
Max Device Current [L- & S-Band]	@ 11 VDC	8.9	A
	@ 28 VDC	3.5	A
	@ 32 VDC	3.1	A
Max Device Current [C-Band]	@ 27 VDC	2.0	A
	@ 28 VDC	2.14	A
	@ 32 VDC	2.25	A
Max RF Input Power @ XCVR Port, $Z_L = 50 \Omega$, CW [All Bands]		+33	dBm
Max RF Input Power @ ANT Port, $Z_L = 50 \Omega$, CW [L- & S-Band]		-20 (Autosense)	dBm
		+30 (Manual T/R)	
Max RF Input Power @ ANT Port, $Z_L = 50 \Omega$, CW [C-Band]		+30	dBm
Max Operating Temperature (baseplate)		85	°C
Max Storage Temperature		85	°C

Export Classification
EAR99

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

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	1000		2500	MHz	L- & S-Band
		4400		5100		C-Band
Switching Speed	$T_{XON/OFF}$			2	μ S	10% to 90%
Operating Voltage	VDC	11	28	32	V	L- & S-Band
		27	28	32		C-Band
Operating Current - Transmit	I_{DD}		2.5		A	L- & S-Band
			1.6			C-Band
Operating Current - Receive	I_{DD}		75		mA	L- & S-Band
			50			C-Band
Quiescent Current	I_{DQ}		75		mA	L- & S-Band
			50			C-Band
Module Efficiency			39		%	L- & S-Band
			22			C-Band

In-Band and Cross-Band Operation

Each channel operates independent of one another. Here are a few examples of how the SCISR-20-C01-S01 could be operated:

- Receiving on S-band while transmitting on S-band (half-duplex)
- Receiving on S-band while transmitting on C-band (full-duplex)
- Receiving on S-band while transmitting on L- and C-band (full-duplex)
- Receiving on L-, S-, and C-band simultaneously
- Transmitting on L-, S-, and C-band simultaneously

NuPower Xtender™ SCISR-20-C01-S01

Specifications (cont.)

Electrical Specifications - Transmit (L- & S-Band) @ 28 VDC, 25 °C, $Z_S=Z_L=50\ \Omega$, CW, +30 dBm Input Drive (unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
RF Output Power, P _{sat}	P _{sat}	7	25		W	
Power Gain	G		14		dB	
Power Gain Flatness	ΔG		± 1.1		dB	1.0 - 2.5 GHz
Small Signal Gain	G		20		dB	Pin = -5 dBm
Small Signal Gain Flatness	ΔG		± 2.5		dB	Pin = -5 dBm; 1 - 2.5 GHz
Input VSWR	VSWR		2:1			
Output Mismatch VSWR	VSWR			10:1	ψ	No damage at all phase angles
Nominal Input Drive Level	P _{IN}		+30		dBm	
2nd Harmonic			-18		dBc	
3rd Harmonic			-22		dBc	

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

Parameter	Symbol	Min	Typ	Max	Unit	Condition
RF Output Power, P _{sat}	P _{sat}	8	12		W	
Power Gain	G		10		dB	
Power Gain Flatness	ΔG		0.4		dB	4.4 - 5.1 GHz
Small Signal Gain	G		18		dB	Pin = -5 dBm
Small Signal Gain Flatness	ΔG		± 2.4		dB	Pin = -5 dBm; 4.4 - 5.1 GHz
Input VSWR	VSWR		2.8:1			
Output Mismatch VSWR	VSWR			10:1	ψ	No damage at all phase angles
Nominal Input Drive Level	P _{IN}		+30		dBm	
2nd Harmonic			42		dBc	

Electrical Specifications - Receive (L- & S-Band) @ 28 VDC, 25 °C, $Z_S=Z_L=50\ \Omega$, -5 dBm Input Drive (unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Receive Gain	G	12	14		dB	
Receive Gain Flatness	ΔG		± 1		dB	1 - 2.5 GHz
Receive Noise Figure	NF		1.4			-40 °C
			2.1			+25 °C
			2.0			+60 °C

Electrical Specifications - Receive (C-Band) @ 28 VDC, 25 °C, $Z_S=Z_L=50\ \Omega$, -5 dBm Input Drive (unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Receive Gain	G	9	12		dB	
Receive Gain Flatness	ΔG		± 1		dB	4.4 - 5.1 GHz
Receive Noise Figure	NF		2.2			-40 °C
			2.8			+25 °C
			3.45			+60 °C

NuPower Xtender™ SCISR-20-C01-S01

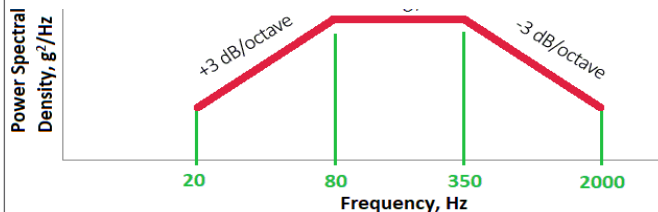
Specifications (cont.)

Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	7.25 x 4.50 x 1.00	in	Max
Weight	34 (TBR)	oz	
RF Connectors, Input/Output	SMA Female (6x) (2x per channel)		
Interface Connector	Micro-D, 25-pin Socket		
Cooling	Adequate Heatsink Required		

Environmental Specifications

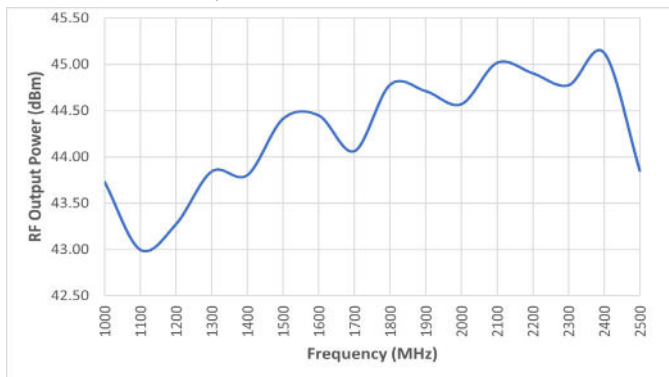
Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	T _A	-40		+60	°C
Operating Temperature (baseplate)	T _C	-40		+85	°C
Storage Temperature	T _{STG}	-55		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration Profile (Random profile in x,y, z axis, as per Figure for 15 minute duration in each axis)					



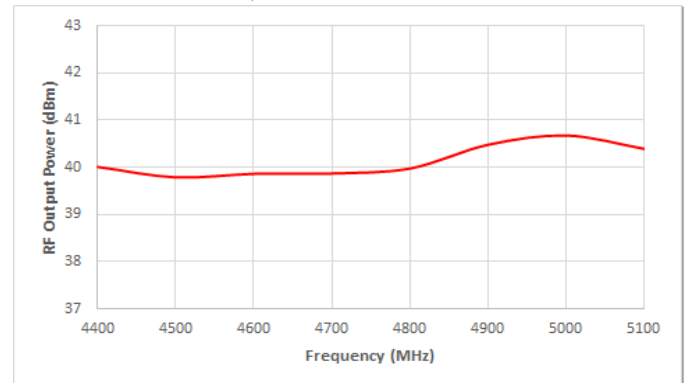
NuPower Xtender™ SCISR-20-C01-S01

Performance Plots - Transmit @ 28 VDC, 25 °C, $Z_S=Z_L=50\ \Omega$, Pin = +30 dBm

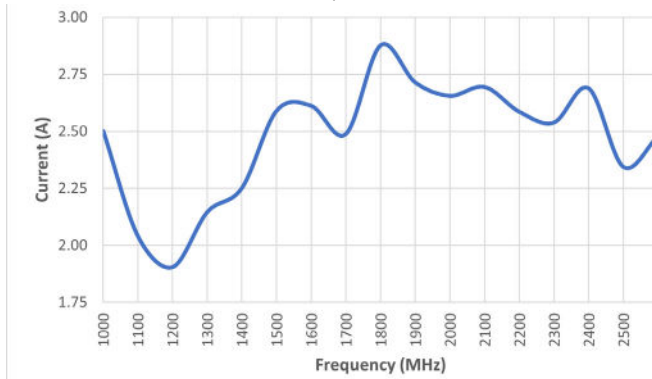
Output Power - L/S-Band



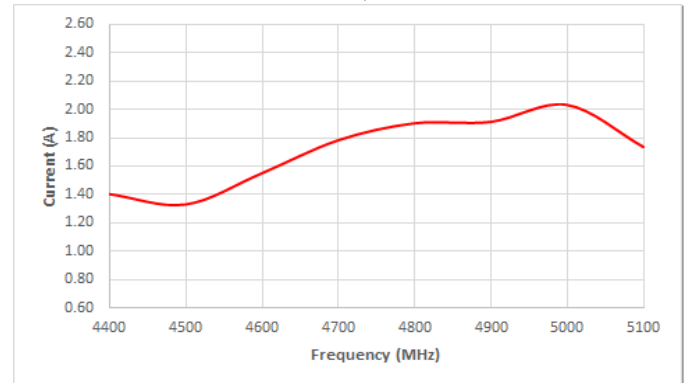
Output Power - C-Band



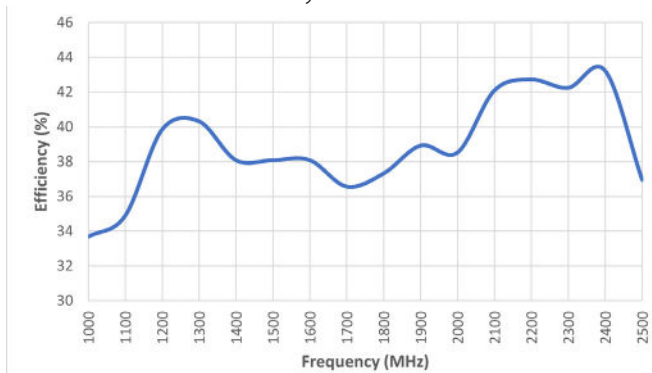
Current Consumption - L/S-Band



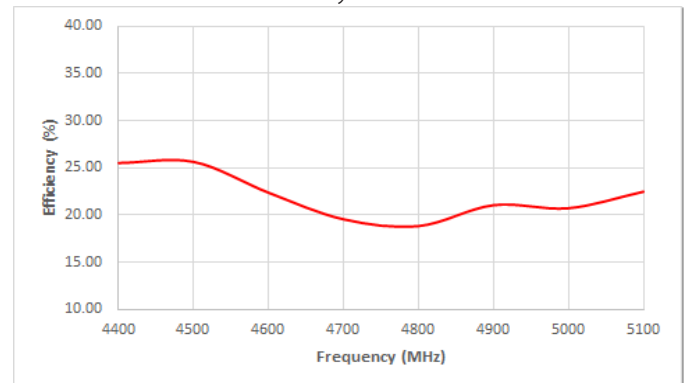
Current Consumption - C-Band



Efficiency - L/S-Band

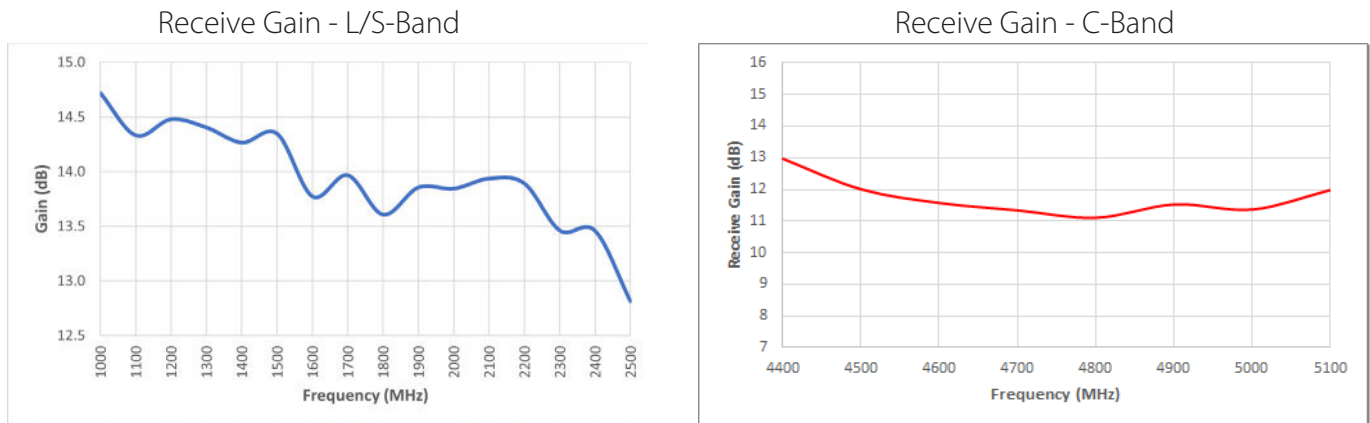


Efficiency - C-Band

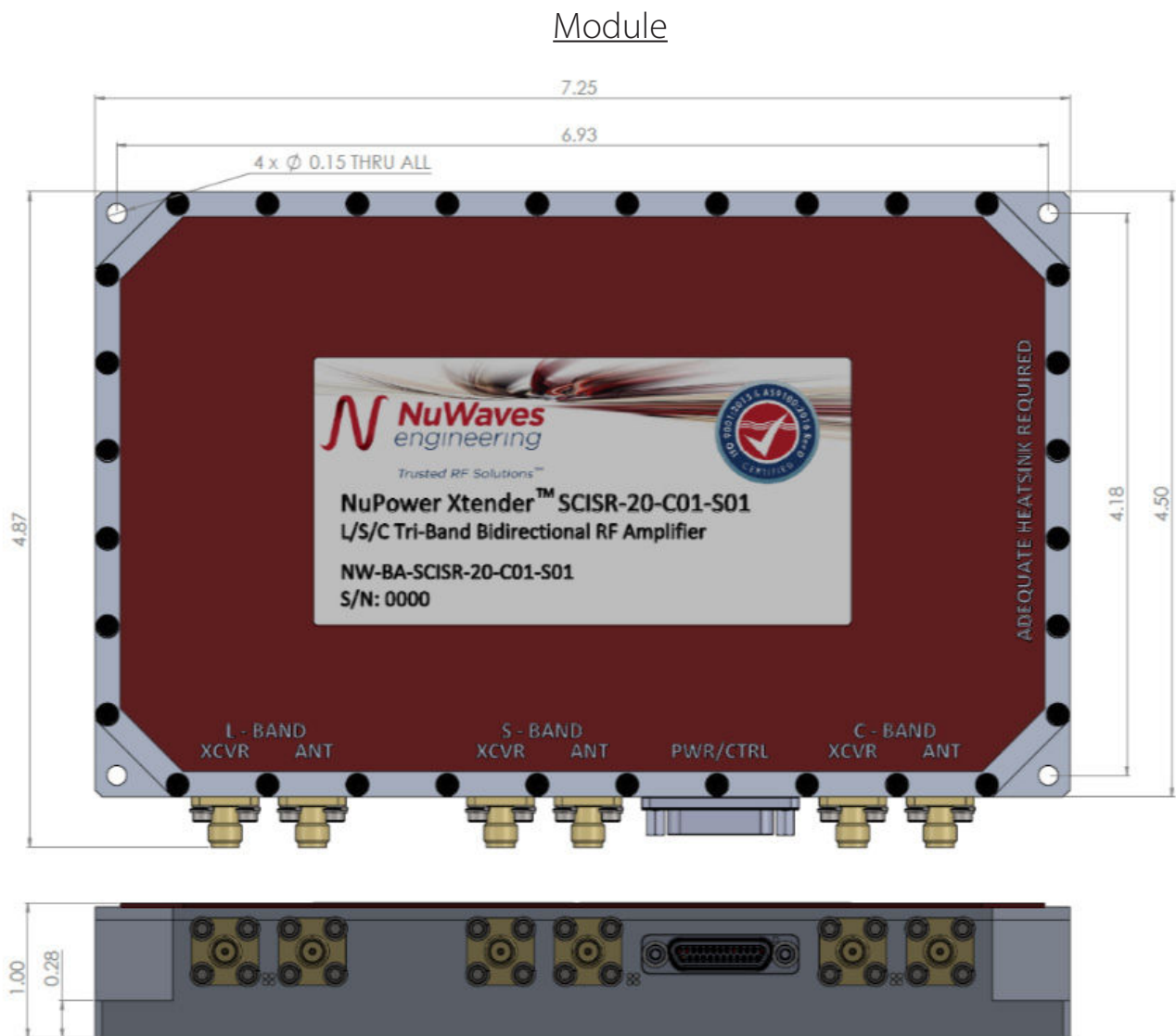


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Performance Plots - Receive @ 28 VDC, 25 °C, $Z_s=Z_L=50 \Omega$, Pin = -30 dBm



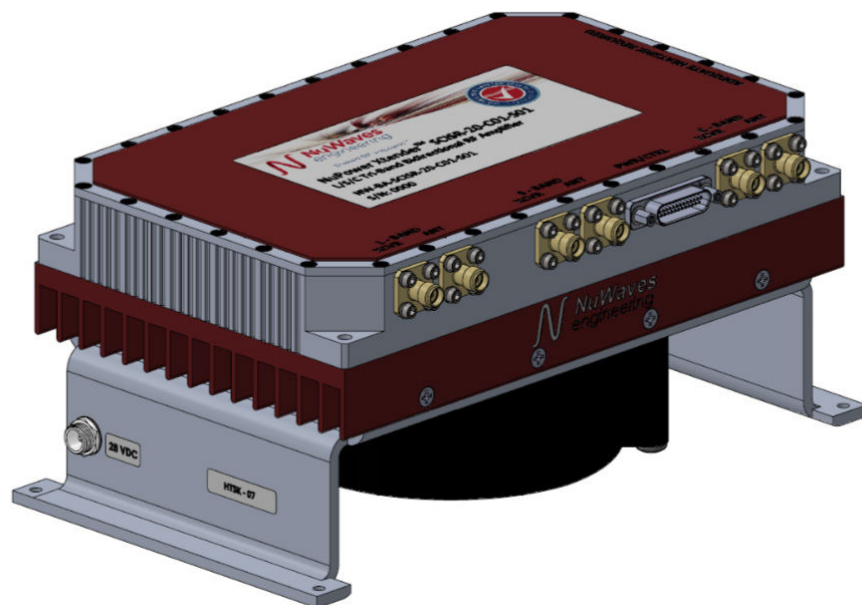
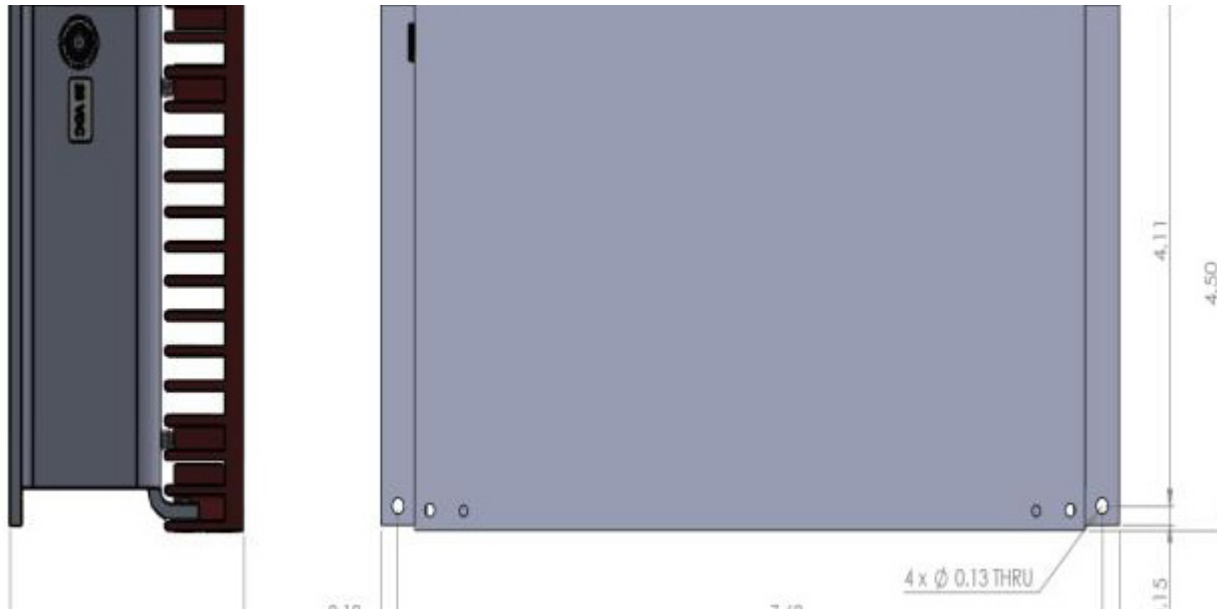
Mechanical Outline



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Mechanical Outline (cont.)

Optional Heatsink



NuPowerXtender™ SCISR-20-C01-S01

Accessory Part Numbers - Sold Separately

Pinout

Part Number	Description
BDA-CBL-03-F	Standard Interface Cable Assembly - Flying Leads
BDA-CBL-03-B	Upgraded Interface Cable Assembly - Banana Plug Termination
BDA-CBL-08-F	Shielded Interface Cable Assembly - Flying Leads
BDA-CBL-08-B	Shielded Interface Cable Assembly - Banana Plug Termination
HTSK-07	Heatsink with Integrated Fan

Function	I/O	Pin
DC Power, L-Band (+11 to +32 Volts)	I	12, 13, 22
DC Power, S-Band (+11 to +32 Volts)	I	5, 20, 21
DC Power, C-Band (+28 Volts)	I	1, 2
DC Ground, L-Band	I	10, 11
DC Ground, S-Band	I	18, 19
DC Ground, C-Band	I	3, 4
T/R Control, L-Band	O	23
T/R Control, S-Band	O	6
T/R Control, C-Band	O	14
RS-485 Data +, L-Band	I	24
RS-485 Data -, L-Band	I	25
Digital Ground, L-Band	I	9
RS-485 Data +, S-Band	I	7
RS-485 Data -, S-Band	I	8
Digital Ground, S-Band	I	17
Over Temperature Flag, C-Band 0V = Temperature Fault +5V = No Fault	O	15

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



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