

# NuWaves

## RF Solutions

### NuPower™ KU-20-C01-S01 Solid State Power Amplifier

20 Watts CW (min)  
14.5 GHz to 15.5 GHz



P/N: NW-PA-KU-20-C01-S01

Custom options available; contact [sales@nuwaves.com](mailto:sales@nuwaves.com) for more information

(includes NW-PA-ACC-CB09MC interface cable)

**The NuPower™ KU-20-C01-S01 is a small connectorized solid state power amplifier that delivers over 20 watts of RF power to extend the operational range of data links and transmitters.**

The NuPower KU-20-C01-S01 accepts a nominal +10 dBm RF input and provides 33 dB (min) of power gain from 14.5 GHz to 15.5 GHz for continuous wave (CW) and near-constant envelope waveforms. Based on the latest gallium nitride (GaN) technology, the power and form factor of the NuPower KU-20-C01-S01 make it ideal for size, weight, and power-constrained RF telemetry, tactical communication systems, and electronic warfare systems. NuPower PAs 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™ amplifiers from NuWaves Engineering.**

#### Features

- 20 Watts RF Output Power (min)
- Small Form Factor
- Temp Fault Indicator
- Over/Under Voltage Protection
- Thermal Protection via Optional Fan-Cooled Heatsink

#### 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 through Group 5
- Air Launch Effect (ALE)
- Common Launch Tube (CLT)
- Counter UAS Detection & Mitigation
- MIMO/MANET Radio Range Extension
- SISO Radio Range Extension
- CDL/BE-CDL Waveforms

# NuPower™ KU-20-C01-S01 Power Amplifier

## Specifications

### Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	7.5	A
Max RF Input Power, $Z_L = 50 \Omega$ , CW	15	dBm
Max Operating Temperature (ambient)	50	°C
Max Operating Temperature (baseplate)	85	°C
Max Storage Temperature	85	°C

Export Classification
ECCN 3A001.B.2.B.2

### Electrical Specifications @ 28 VDC, 25 °C, $Z_S=Z_L=50 \Omega$ , CW, +10 dBm Input Power, Unless otherwise specified

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	14.5 <sup>1</sup>		15.5 <sup>1</sup>	GHz	
RF Output Power	$P_{SAT}$	43	44.5		dBm	
Output Power @ 1dB & 3dB Compression Points	P1dB/P3dB		28/39		dBm	14.5 GHz
			34/41			15.0 GHz
			30/38			15.5 GHz
Small Signal Gain	G		43.9		dB	14.5 GHz; Pin=-35 dBm
			42			15.0 GHz; Pin=-35 dBm
			47.4			15.5 GHz; Pin=-35 dBm
Power Gain Flatness	$\Delta G$		$\pm 0.3$		dB	14.5 - 15.5 GHz
Small Signal Gain Flatness	$\Delta G$		$\pm 3$		dB	14.5 - 15.5 GHz
Input VSWR	VSWR		3:1			
Nominal Input Drive Level	$P_{IN}$		+10		dBm	
Operating Voltage	VDC	24 <sup>2</sup>	28	32	V	
Quiescent Current (RF Enable Off)	$I_{DQ}$		50		mA	
Quiescent Current (RF Enable On)	$I_{DQ}$		1.1		A	
Operating Current	$I_{DD}$		6.2		A	
Module Efficiency			15.4		%	
Switching Speed	$TX_{ON/OFF}$			2	$\mu S$	
Output Mismatch (No Damage)				10:1	$\Psi$	No Damage at All Phase Angles

<sup>1</sup> Capable of covering full CDL frequency band of 14.4 GHz to 15.35 GHz. Outputs 20W typical over 13-16 GHz. Consult factory if operating outside of specified bandwidth of 14.5-15.5 GHz. A band-specific isolator must be used internally to meet VSWR mismatch tolerance. Contact sales@nuwaves.com for more information.

<sup>2</sup> Capable of operating down to 16VDC with factory changes. Contact sales@nuwaves.com for wider voltage range.

# NuPower™ KU-20-C01-S01 Power Amplifier

## Specifications (cont.)

### Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	6.00 x 4.10 x 0.88	in	Max
Weight	20	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 <sub>A</sub>	-40		+50	°C
Operating Temperature (baseplate)	T <sub>C</sub>	-40		+85	°C
Storage Temperature	T <sub>STG</sub>	-55		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Vibration / Shock Profile (Random profile in x,y, z axis, as per Figure for 15 minute duration in each axis)					

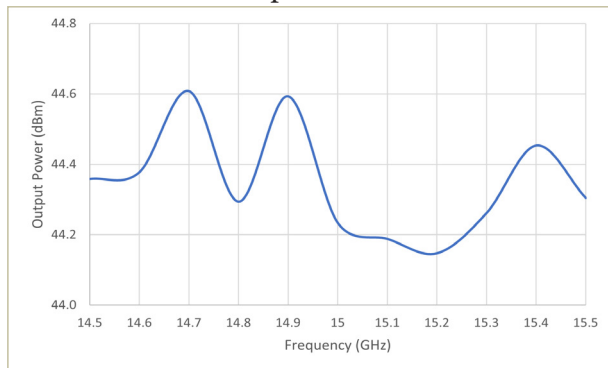
The graph shows a trapezoidal vibration profile. The y-axis is Power Spectral Density in g<sup>2</sup>/Hz, and the x-axis is Frequency in Hz. The profile starts at 20 Hz, rises with a slope of +3 dB/octave to 80 Hz, remains constant at 0.04 g<sup>2</sup>/Hz until 350 Hz, and then falls with a slope of -3 dB/octave to 2000 Hz.

# NuPower™ KU-20-C01-S01 Power Amplifier

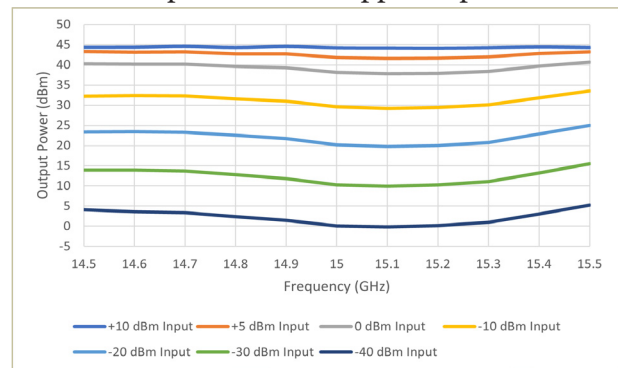
## Performance Plots

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

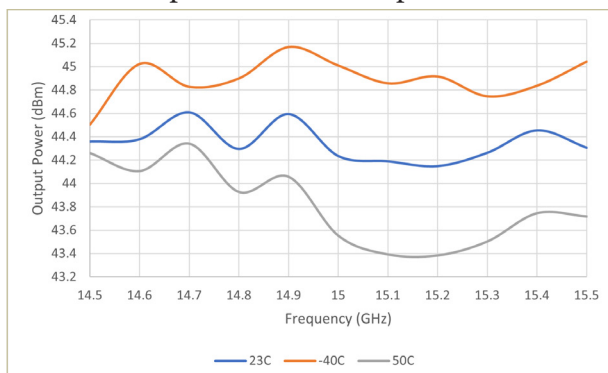
### Output Power



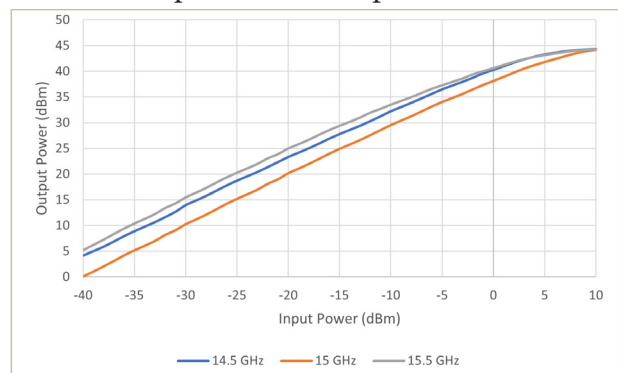
### Output Power - Stepped Inputs



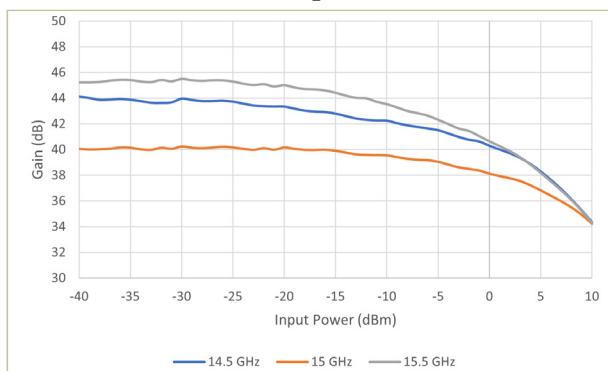
### Output Power vs Temperature



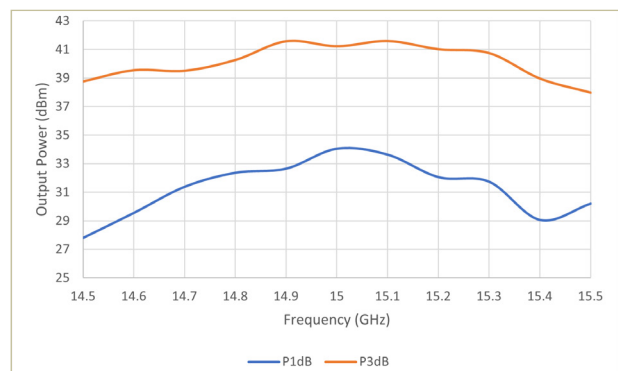
### Output Power vs Input Power



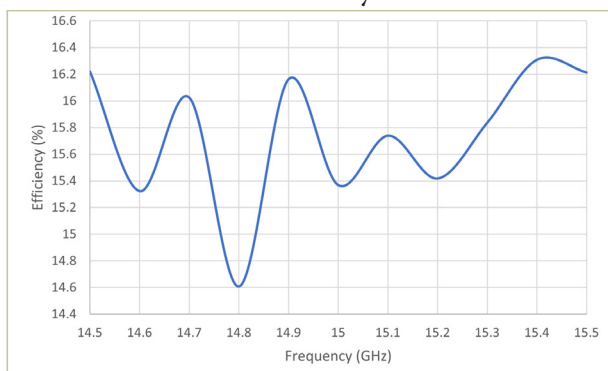
### Gain vs Input Power



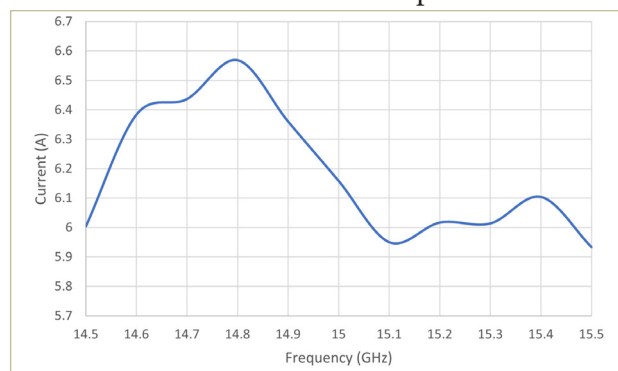
### P1dB & P3dB



### Efficiency



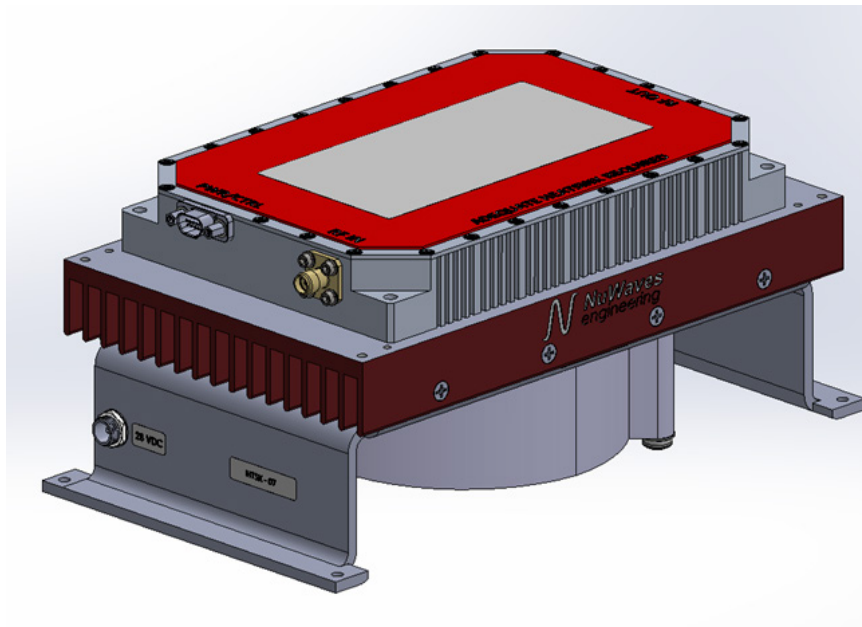
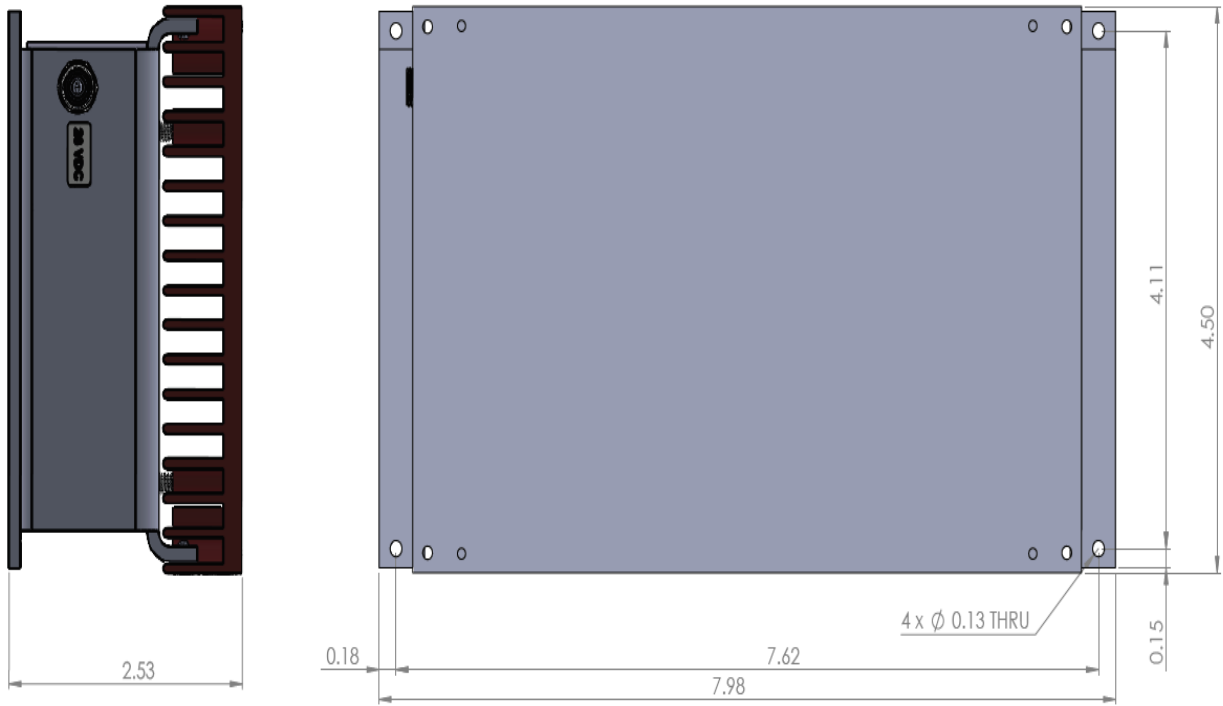
### DC Current Consumption



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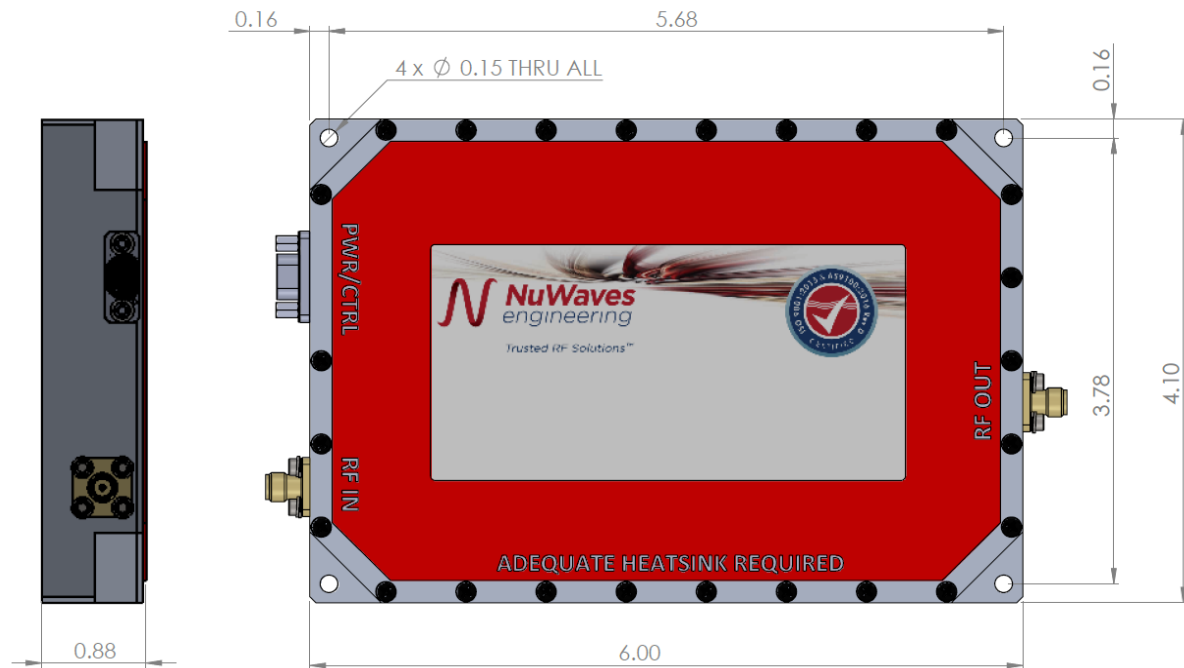
## Optional Heatsink Drawing

Heatsink and Integrated Fan: HTSK-07



# NuPower™ KU-20-C01-S01 Power Amplifier

## Mechanical Outline



## Accessory Part Numbers

Part Number	Description
NW-PA-ACC-CB09MC	Standard Interface Cable Assembly - Flying Leads (included with module)
NW-PA-ACC-CT09MC	Upgraded Interface Cable Assembly - Banana Plug Termination
HTSK-07	Heatsink with Integrated Fan

## Pinout

Function	I/O	Pin	Logic Voltage
DC Power (+28 VDC)	I	3, 4, 5	–
Ground	I	1, 2, 6, 8	–
Over Temperature Flag [0V = temperature fault ; +5V = no fault]	O	7	5V Logic (CMOS) -0.5V to +1.5V = Logic LOW +3.5V to +5.5V = Logic HIGH
RF Enable <sup>1</sup> [0V or GND = RF ON; +5V <sup>1</sup> or NC = RF OFF]	I	9	5V Logic (CMOS) 0V to +1.35V = Logic LOW 3.15V to +5V = Logic HIGH

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>

<sup>1</sup>RF Enable is pulled high internally and does not require user to apply voltage to this line

## Contact NuWaves



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