



Trusted RF Solutions™

## NuPower™ 13G05A L-Band Solid State Power Amplifier

35 Watts CW  
6.3 Watts Linear, 5% EVM @ 38 dBm  
800 MHz to 2.0 GHz



P/N: NW-PA-13G05A

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

**The NuPower™ 13G05A is a small, highly efficient, solid state power amplifier that provides 35 watts of RF power to boost performance of data links and transmitters.**

The NuPower 13G05A Power Amplifier accepts a nominal 0 dBm (1 mw) RF input and provides 45 dB of gain from 800 MHz to 2000 MHz. This module handles both constant envelope and complex waveforms such as OFDM, QAM, DVB-T, etc.

Based on the latest gallium nitride (GaN) technology, the NuPower 13G05A's 40% power efficiency at rated power and <math><10\text{ in}^3</math> form factor make it ideal for size, weight, and power-constrained broadband 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

- 35 Watts RF Output Power
- 800 MHz to 2.0 GHz
- Small Form Factor (4.50" x 3.50" x 0.61")
- High-Efficiency GaN Technology
- 0 dBm Nominal RF Input
- Over-Voltage Protection
- Logic On/Off Control

### 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

- Broadband RF Telemetry
- RF Communication Systems
- Electronic Warfare - Airborne Electronic Attack
- Unmanned Aircraft Systems (UAS)
- Unmanned Ground Vehicles (UGV)
- Software Defined Radios

# NuPower™ 13G05A Power Amplifier

## Specifications

### Absolute Maximums

Parameter	Rating	Unit
Max Device Voltage	32	V
Max Device Current	4.75	A
Max RF Input Power, $Z_L = 50 \Omega$	15	dBm
Max Operating Temperature (ambient)	60	°C
Max Operating Temperature (baseplate)	85	°C
Max Storage Temperature	85	°C

Export Classification
EAR99

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

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Frequency	BW	800		2000	GHz	
RF Output Power	$P_{SAT}$	35			W	800 MHz - 2000 MHz, 0 dBm input
Output Power @ 1dB Compression	$P_{1dB}$		33		dBm	800 MHz
			31			1500 MHz
			30			2000 MHz
Small Signal Gain	G		60		dB	800 MHz, @ -30 dBm input
			58			1500 MHz, @ -30 dBm input
			56			2000 MHz, @ -30 dBm input
Small Signal Gain Flatness	$\Delta G$		5		dB	$P_{in} = -30$ dBm
Input VSWR	VSWR		1.9	2.3		
Nominal Input Drive Level	$P_{IN}$		0		dBm	
Operating Voltage	VDC	27	28	30	V	
Quiescent Current	$I_{DQ}$		0.65		A	
Operating Current	$I_{DD}$		3		A	$P_{in} = 0$ dBm
Module Efficiency			42		%	
Switching Speed	$TX_{ON/OFF}$			2	$\mu S$	10% to 90%
Third Order Order Intercept Point (Two tone test at 1 MHz spacing, $P_{out} = 20$ dBm / tone)	OIP3		44		dBm	800 MHz
			42			1500 MHz
			44			2000 MHz
Harmonics	2nd			-17	dBc	
	3rd			-18		
Output Mismatch (No Damage)				10:1		

# NuPower™ 13G05A Power Amplifier

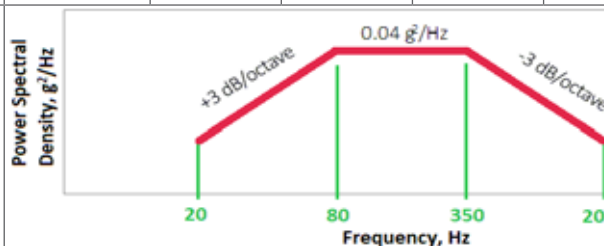
## Specifications (cont.)

### Mechanical Specifications

Parameter	Value	Unit	Limits
Dimensions	4.5 x 3.5 x 0.61	in	Max
Weight	9	oz	Max
RF Connectors, Input/Output	SMA Female		
Interface Connector	Micro-D, 9-pin Socket		
Cooling	External Heatsink (Optional)		

### Environmental Specifications

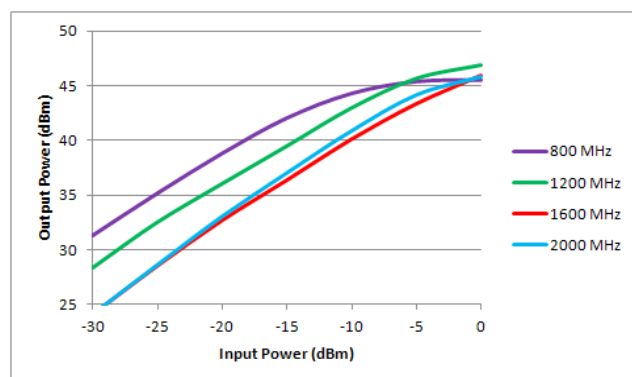
Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature (ambient)	$T_A$	-40		+60	°C
Operating Temperature (baseplate)	$T_C$	-40		+85	°C
Storage Temperature	$T_{STG}$	-55		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude MIL-STD-810F - Method 500.4	ALT			30,000	ft
Vibration / Shock Profile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



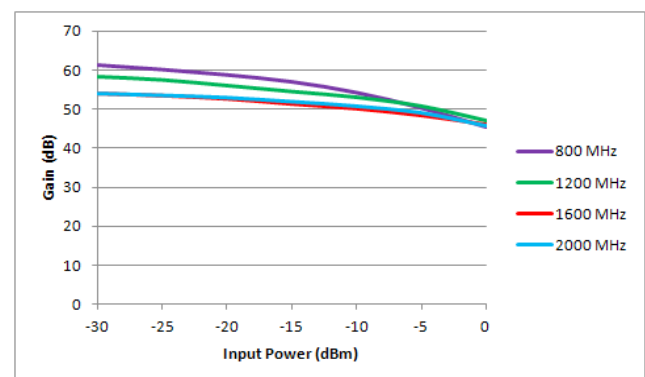
## Performance Plots

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

Output Power vs. Input Power



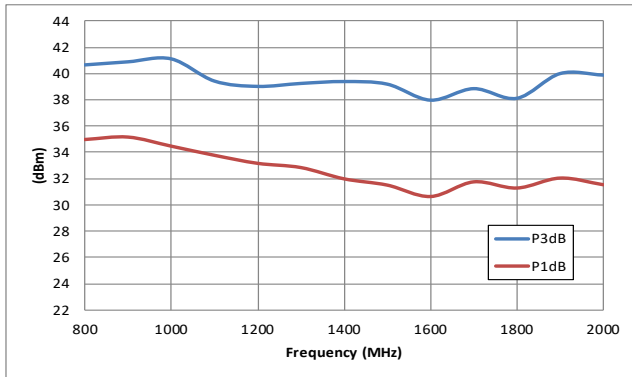
Gain vs. Input Power



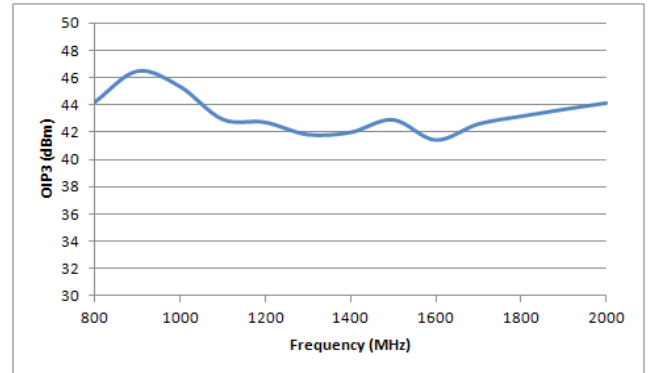
# NuPower™ 13G05A Power Amplifier

## Performance Plots (cont.)

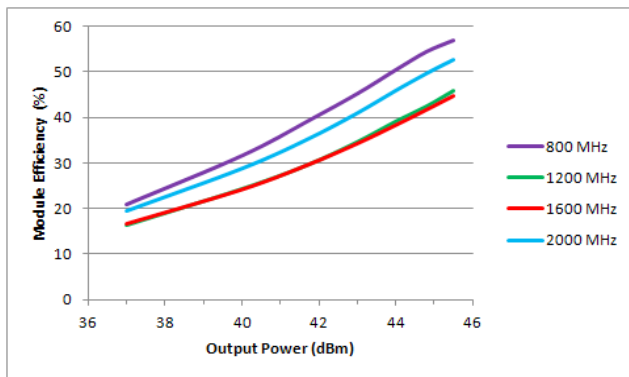
P3dB



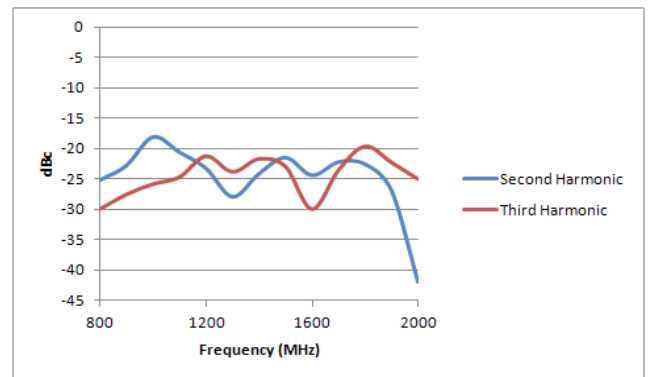
OIP3



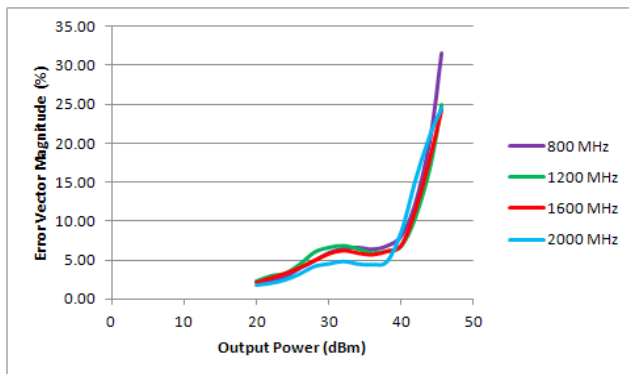
Efficiency



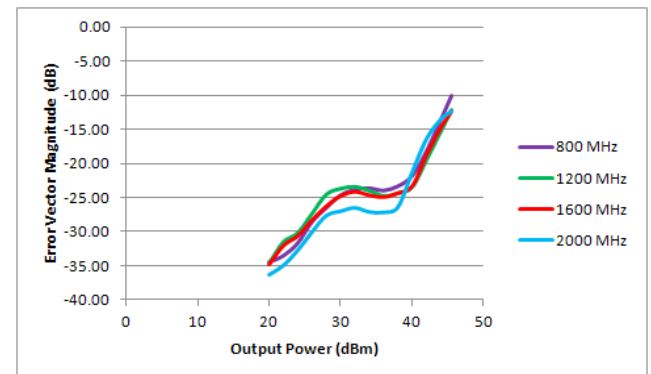
Harmonics (@ Psat)



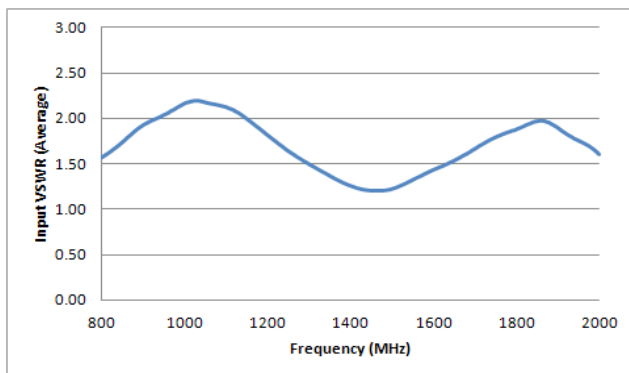
Error Vector Magnitude (%) [w/ OFDM Waveform]



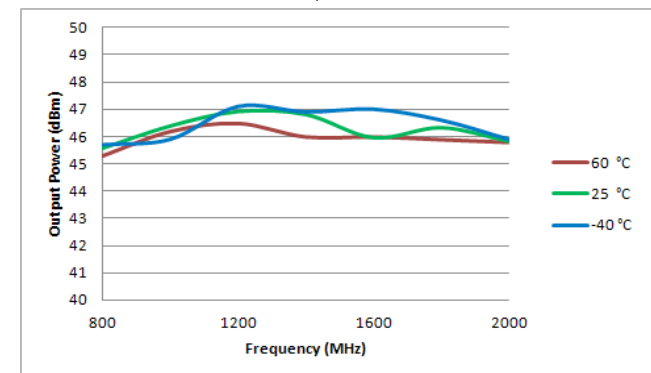
Error Vector Magnitude (dB) [w/ OFDM Waveform]



VSWR

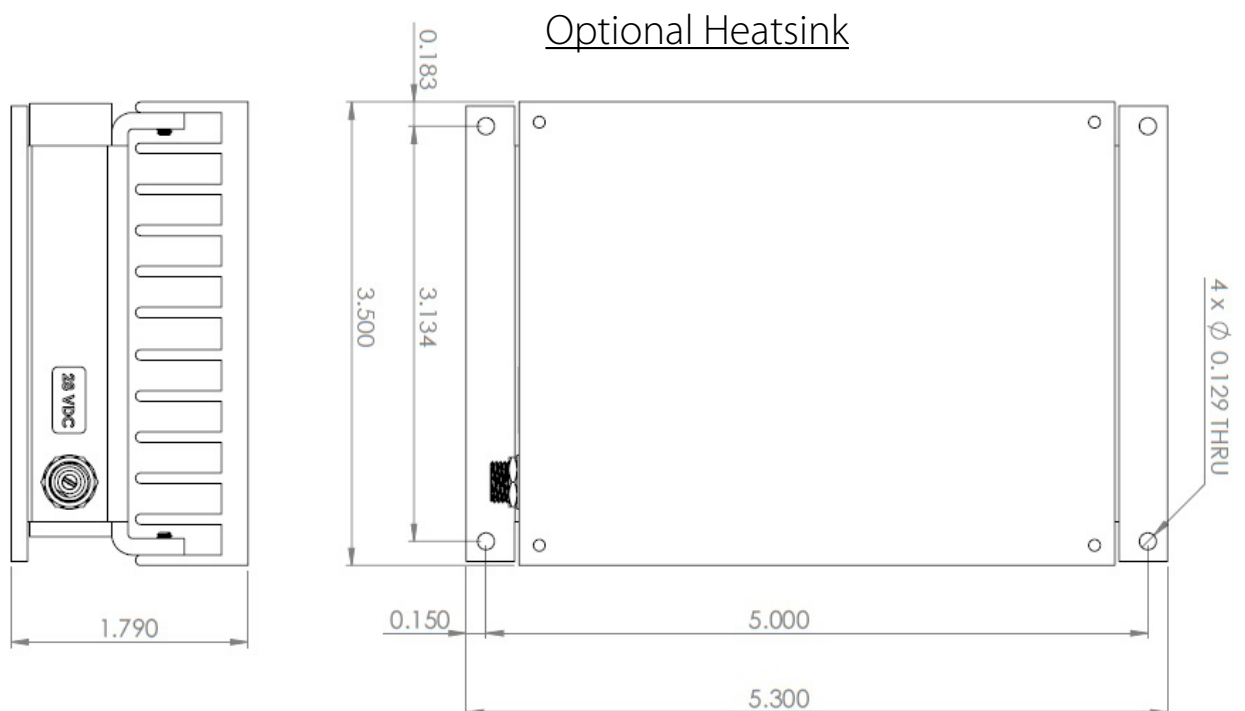
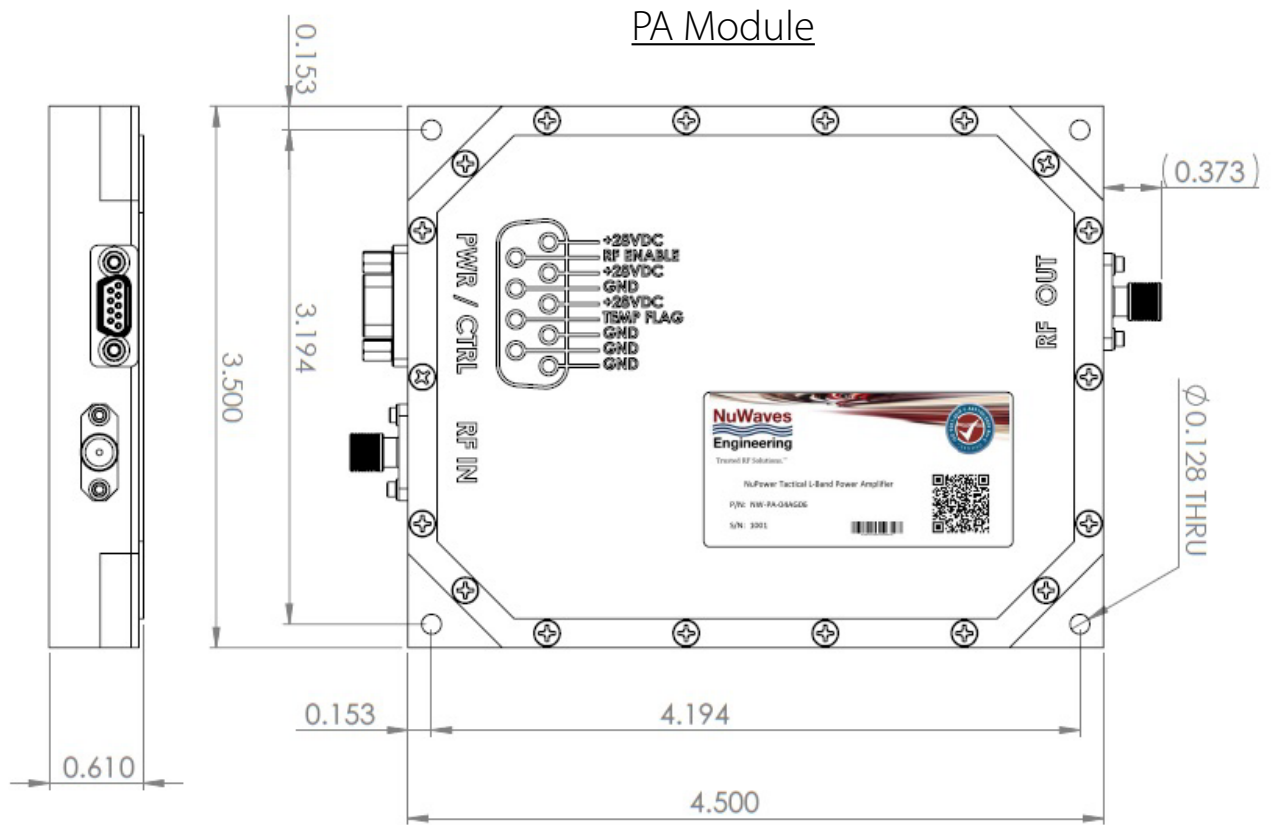


Power Out vs. Temperature (ambient)



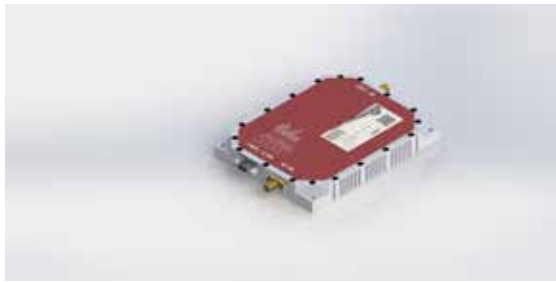
# NuPower™ 13G05A Power Amplifier

## Mechanical Outlines

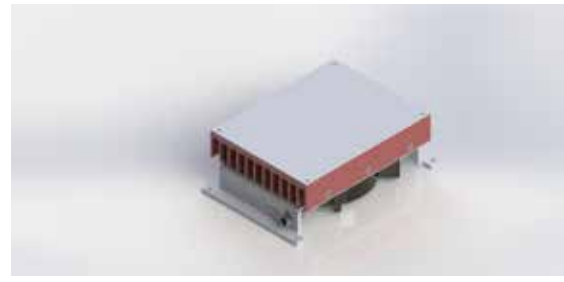


# NuPower™ 13G05A Power Amplifier

## PA Module and Accessory Images



PA Module



Optional Fan-Cooled Heatsink



PA Module w/ Fan-Cooled Heatsink

## Accessory Part Numbers

Part Number	Description
NW-FL-05LPLE-2500-SFSF-M01	Harmonic Filter Module
NW-PA-ACC-CB09MC	Standard Interface Cable Assembly - Flying Leads (included with module)
NW-PA-ACC-CT09MC	Upgraded Interface Cable Assembly - Banana Plug Termination
NW-PA-ACC-KT03	Accessory Kit, which includes Fan-Cooled Heatsink and Upgraded Interface Cable
NW-PA-ACC-HS05	Heatsink with Integrated Fan

## Pinout

Function	I/O	Pin
DC Power (+28 Volts)	I	3, 4, 5
Ground	I	1, 2, 6, 8
Over Temperature Flag 0V = temperature fault +5V = no fault	O	7
RF Enable 0V or GND = RF ON +5V or NC = RF OFF	I	9

## Contact NuWaves



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