EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2018 - BBS4A6AHM

1000 – 3000 MHz / 50 Watts

The BBS4A6AHM (SKU 2018) is suitable for ultra broadband high power linear applications, laboratory, and RFI/EMC susceptibility testing. This amplifier utilizes high power GaAsFET devices that provide wide frequency response and dynamic range, high gain, low distortions, and excellent linearity. Employing advanced broadband RF matching networks and combining techniques, EMI/RFI filters, and all qualified components achieve exceptional performance, and high efficiency. The system includes a universal voltage, single phase, power supply and a built in forced air-cooling system. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state Class A linear design
- Instantaneous ultra broadband
- Small form factor and lightweight
- Suitable for CW, AM, and FM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness
- Built in control, monitoring and protection circuits

ELECTRICAL SPECIFICATIONS @ $120V_{AC}$, 25°C, 50 Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1000		3000	MHz
Output Power CW	P_{SAT}	50			Watt
Output Power @ 1dB Gain Compression	P_{1dB}	40			Watt
Power Gain @ P_{1dB}	G_{1dB}	46			dB
Input Power for Rated P_{SAT}	P_{IN}		0		dBm
Small Signal Gain Flatness	ΔG			±2.0	dB
Gain Adjustment Range	FGA	20	25		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure	NF		10		dB
Third Order Intercept Point 2-Tone @ 38dBm/Tone, 100kHz Spacing	IP3		+58		dBm
Harmonics @ P_{OUT} = 40W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (single phase)	V_{AC}	100		240	Volt
Power Consumption @ $120V_{AC}$, P_{OUT} = 50W	P_D		600	750	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Limits
Dimensions	19 x 5.25 x 22	Inch	Max
Weight	50	lb.	Max
RF Connectors Input/Output	Type-N, Female		
Cooling	Built-in internal forced air cooling system		

ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	0		+50	°C
Storage Temperature	T_{STG}	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude (MIL-STD-810F Method 500.4)	ALT			30,000	Feet
Vibration/Shock MIL-STD-810F - Method 514.5/516.5 – Proc I	VI/SH		Airborne		

LIMITS

Input RF drive level without damage	+10 dBm	Max
Load VSWR @ P_{OUT} = 50W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

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AVAILABLE OPTIONS (Refer to table for systems options)

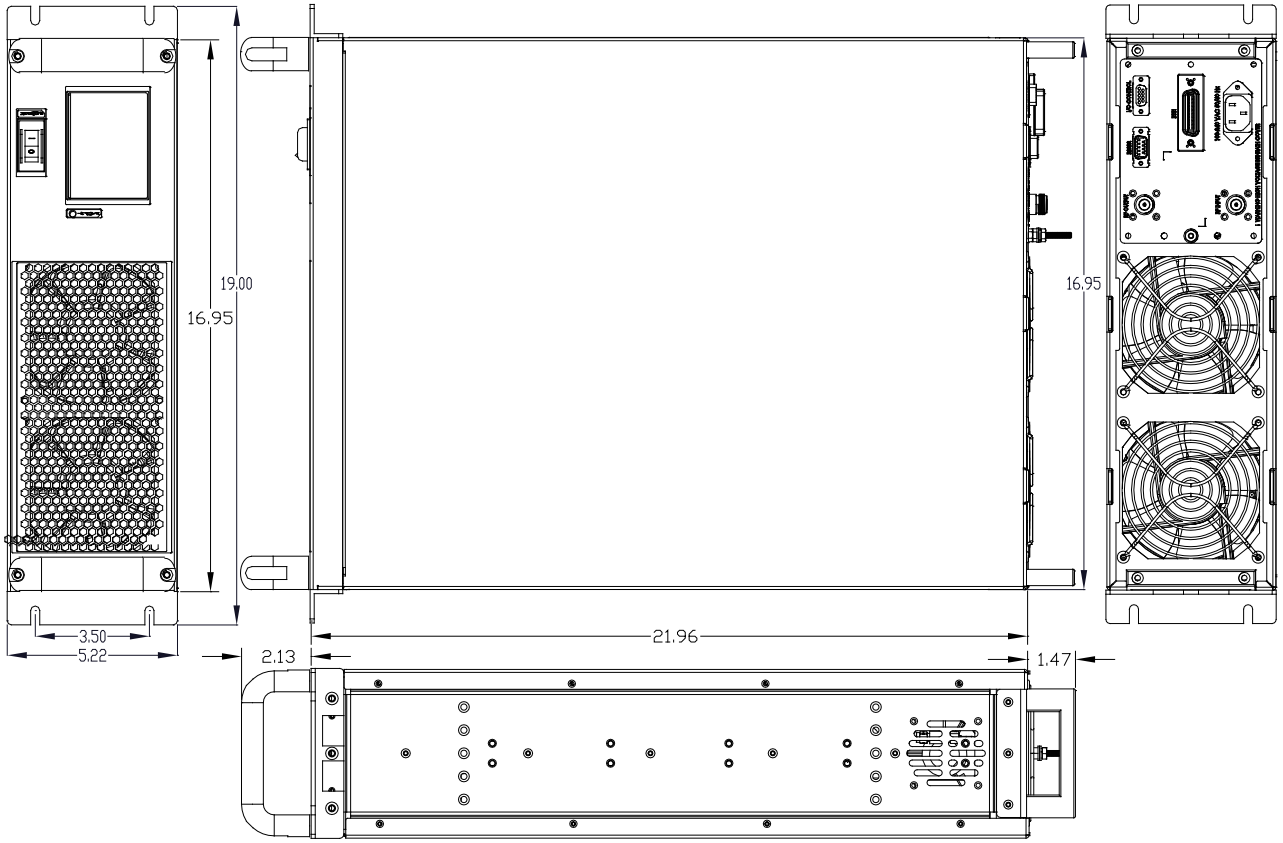
Option	Number	Description	Price
FGA	**061**	Front panel 10 turns manual gain adjustment.	Standard
LCD	**062**	Touchscreen Digital Display, including Fwd/Rev Power indication (dB or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel HPIB/GPIB IEEE-488.2 and RS-232 or Full Duplex RS-422 remote interface. **Note: Output Power is lowered by 0.5 - 0.75 dB with this option.**	Call
FCN	**051**	Front Panel Type-N, Female	N/C
RCN	**052**	Rear Panel Type-N, Female	N/C

Available Option Packages: 07, 08, 09, 10, B22

I/O CONTROL CONNECTOR – D-Sub 9-Pin, Female

Pin #	Description	Specifications	Options	
			FGA	LCD
1	Forward Test Point	Analog Voltage 0-5V_{DC} relative to Forward Power Level		√
2	Reverse Test Point	Analog Voltage 0-5V_{DC} relative to Reverse Power Level		√
3	5V Test Point	Output +5.0V_{DC} ±0.2V	√	√
4	VVA Test Point	VVA Gain Control +5.6V_{DC} ±0.2V	√	
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-Low*)	√	√
6	12V Test Point	Output +12.0V_{DC} ± 0.5V	√	√
7	P/S Test Point	Power Supply Output voltage +13.0V_{DC}, -1.0/+2.0V	√	√
8	GND	Ground	√	√
9	GND	Ground	√	√

SYSTEM OUTLINE SHOWN WITH OPTION PACKAGE 10



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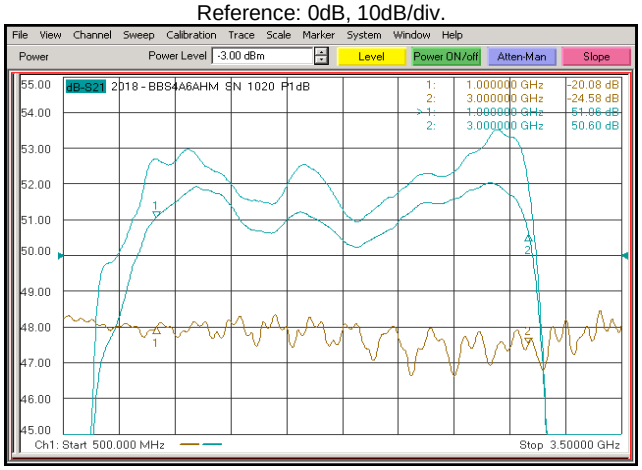
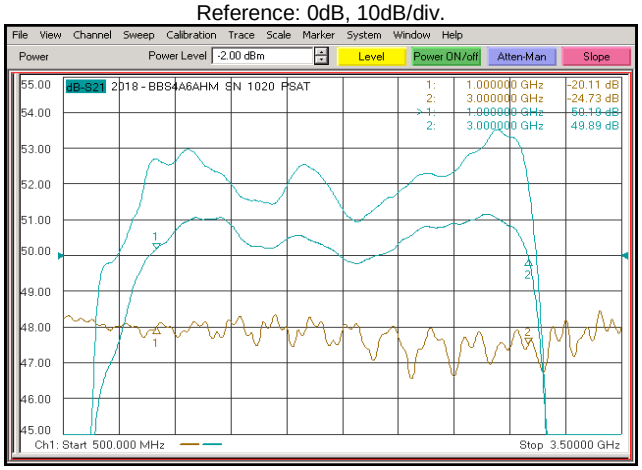
TYPICAL PERFORMANCE PLOTS

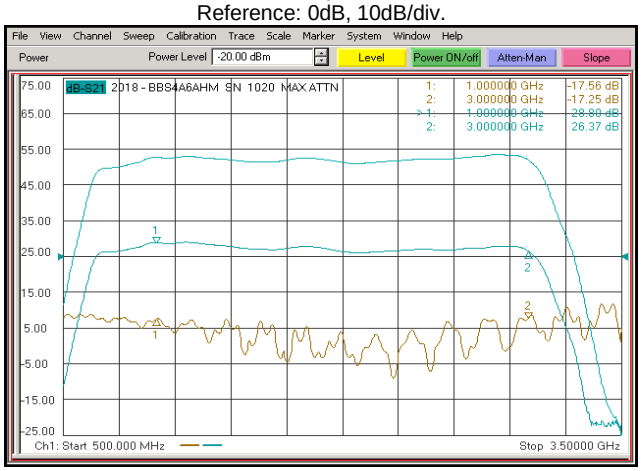
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -3.0dBm
Reference: 50dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: P_{SAT} @ P_{IN} = -2.0dBm
Reference: 50dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range
Top Curve: Maximum Gain @ P_{IN} = -20dBm
Middle Curve: VVA @ Minimum Gain
Reference: 25dB, 10dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness @ 25W & 5W
Top Curve: ALC @ 25W, P_{IN} = 0dBm
Middle Curve: ALC @ 5W, P_{IN} = 0dBm
Reference: 37dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.