

Solid State Broadband High Power Amplifier

2107 - BBS4A5APQ
1000 - 2000MHz / 300Watts

The BBS4A5APQ (SKU 2107) is suitable full octave L-Band broadband high power linear applications. This rack mount amplifier utilizes advanced GaAsFET power devices that provide high gain, wide dynamic range, low distortions and excellent linearity. Exceptional performance, long term reliability and high efficiency are achieved by employing advanced broadband RF matching networks and combining techniques, built in high quality power supply, EMI/RFI filters, machined housings and all qualified components. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.



- Solid-state linear design
- Instantaneous octave bandwidth
- Standard front panel manual gain adjust
- Suitable for CW, AM, and FM (Consult factory for other modulation types)
- 50 Ohm Input/Output impedance
- High reliability and ruggedness modular design
- Built in protection and monitoring circuits

ELECTRICAL SPECIFICATIONS @ 220V_{AC}, 25°C, 50Ω system

Parameter	Symbol	Min	Typ	Max	Units
Frequency Response	BW	1000		2000	MHz
Output Power CW	P _{SAT}	300			Watt
Output Power @ 1dB Gain Compression	P _{1dB}	250			Watt
Power Gain @ P _{1dB}	G _{1dB}	54	56		dB
Input Power for Rated P _{SAT}	P _{IN}		0		dBm
Small Signal Gain Flatness	ΔG		±1.5	±2.0	dB
Gain Adjustment Range	FGA	20	25		dB
Input Return Loss	S ₁₁			-10	dB
Noise Figure	NF		7	10	dB
Harmonics @ Rated P _{1dB} = 250W	H		-20		dBc
Third Order Intercept Point 2-Tone @ 47dBm/Tone, 100kHz Spacing	IP3	+58	+64		dBm
Spurious Signals	Spur		-70	-60	dBc
Supply Voltage (single phase)	V _{AC}	100		240	Volt
Power Consumption @ Rated P _{SAT} = 300W	P _D		1800	2000	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions W x H x D	19 x 8.75 x 22	Inch
Weight	100	lb.
RF Connectors Input/Output	Type-N, Female	
Cooling	Built in forced-air system	

ENVIRONMENTAL SPECIFICATIONS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature	T _C	0		50	°C
Non-operating Temperature	T _{STG}	-40		+85	°C
Relative Humidity w/o condensation	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		-

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PROTECTIONS

Input Overdrive	+10dBm	Max
Load VSWR @ Rated P _{1dB} = 250W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

AVAILABLE OPTIONS (Refer to www.empowerrf.com for complete systems options table)

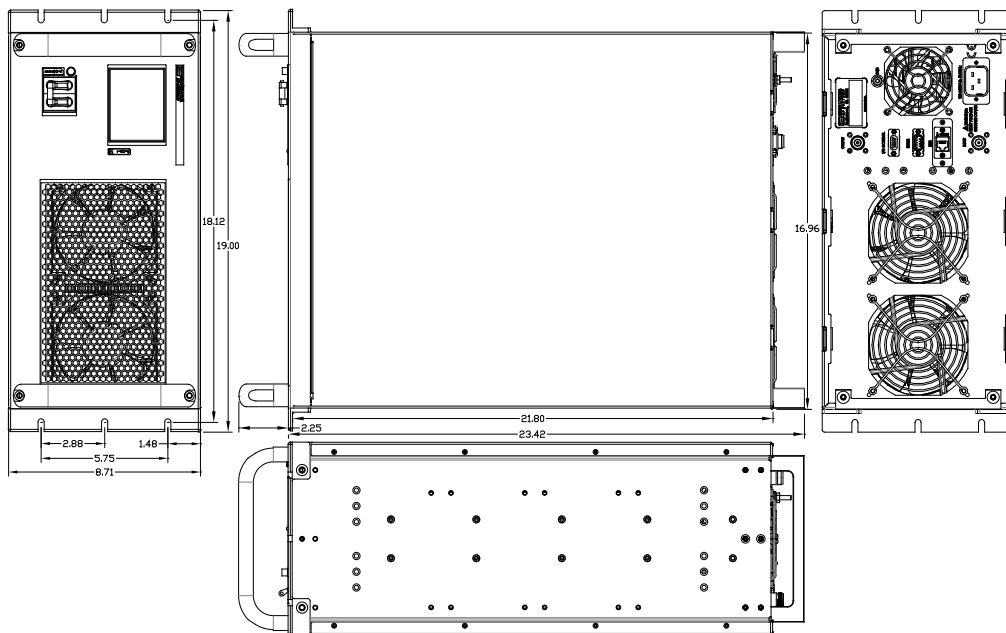
Option	Number	Description	Price
FGA	061	Front panel manual gain adjustment 10 turns	Standard
LCD	062	Touchscreen Digital Display, including Fwd/Rev Power indication (dB or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel HPIB/GPIB IEEE-488.2 and Half Duplex RS232 or Full Duplex RS422 remote interface. Note: Output Power is lowered by 0.5 - 0.75dB 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: 15, 16, 17, 18

I/O INTERFACE 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	Gain Control Voltage +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/+2.0	√	√
8	GND	Ground	√	√
9	GND	Ground	√	√

OUTLINE DRAWING SHOWN WITH OPTION PACKAGE 18



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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} , $P_{IN} = -6dBm$
 Reference: 61dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



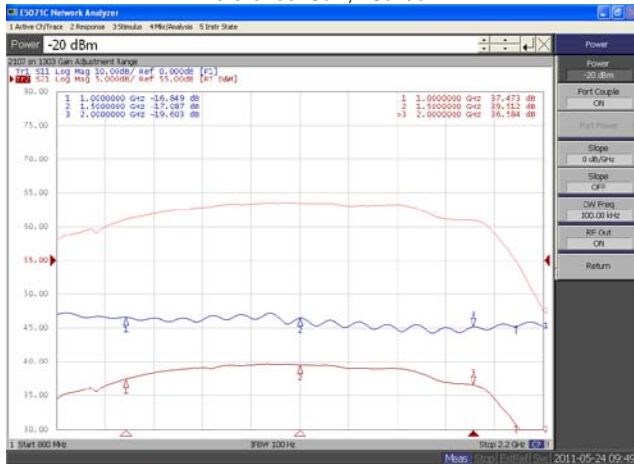
Plot 2 – Small Signal Gain and P_{SAT}

Top Curve: Small Signal Gain @ $P_{IN} = -20dBm$
 Middle Curve: Power Gain @ P_{SAT} , $P_{IN} = -4dBm$
 Reference: 59dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range

Top Curve: Maximum Gain @ $P_{IN} = -20dBm$
 Bottom Curve: Minimum Gain
 Reference: 55dB, 5dB/div.
 Middle Curve: Input Return Loss @ Minimum Gain
 Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness @ 52dBm & 45dBm

Top Curve: ALC @ 52dBm, $P_{IN} = 0dBm$
 Bottom Curve: ALC @ 45dBm, $P_{IN} = 0dBm$
 Reference: 49dB, 1dB/div.
 Middle Curve: Input Return Loss
 Reference: 0dB, 10dB/div.

