EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2024 - BBS1C4ALP

1 – 1000 MHz / 120 Watts

The BBS1C4ALP (2024) is suitable for ultra broadband high power linear applications; this amplifier utilizes high power RF MOSFET devices that provide wide frequency response and dynamic range, high gain, low distortions, and good 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.

SKU#: 2024FLFBAXXXX

- Solid-state class AB design
- Instantaneous ultra broadband
- Small form factor and lightweight
- Front panel manual gain adjust or LCD controller
- Suitable for CW, AM, and FM (for other modulation types consult factory)
- 50 ohm input/output impedance
- High reliability and ruggedness

ELECTRICAL SPECIFICATIONS @ $208V_{AC}$, 25°C, 50Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1		1000	MHz
Output Power CW	P_{SAT}	120	150		Watt
Output Power @ 1dB Gain Compression	P_{1dB}	80	100		Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	52			dB
Input Power for Rated P_{SAT}	P_{IN}		0	3	dBm
Small Signal Gain Flatness	ΔG		±1.5	±2.0	dB
Gain Adjustment Range	VVA	20	25		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure	NF			10	dB
Third Order Intercept Point (IMD) 2-Tone @ 41dBm/Tone, 100kHz Spacing	IP3		+58		dBm
Harmonics @ P_{OUT} = 80W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V_{AC}	180		260	Volt
Power Consumption @ P_{OUT} = 120W CW	Pd		-	2500	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions	19 x 8.75 x 22	Inch
Weight	80	Pound
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 Ambient Temperature	T_A	0		+50	°C
Non-operating 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	+6 dBm	Max
Load VSWR @ P_{OUT} = 80W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2024 - BBS1C4ALP

1 – 1000 MHz / 120 Watts

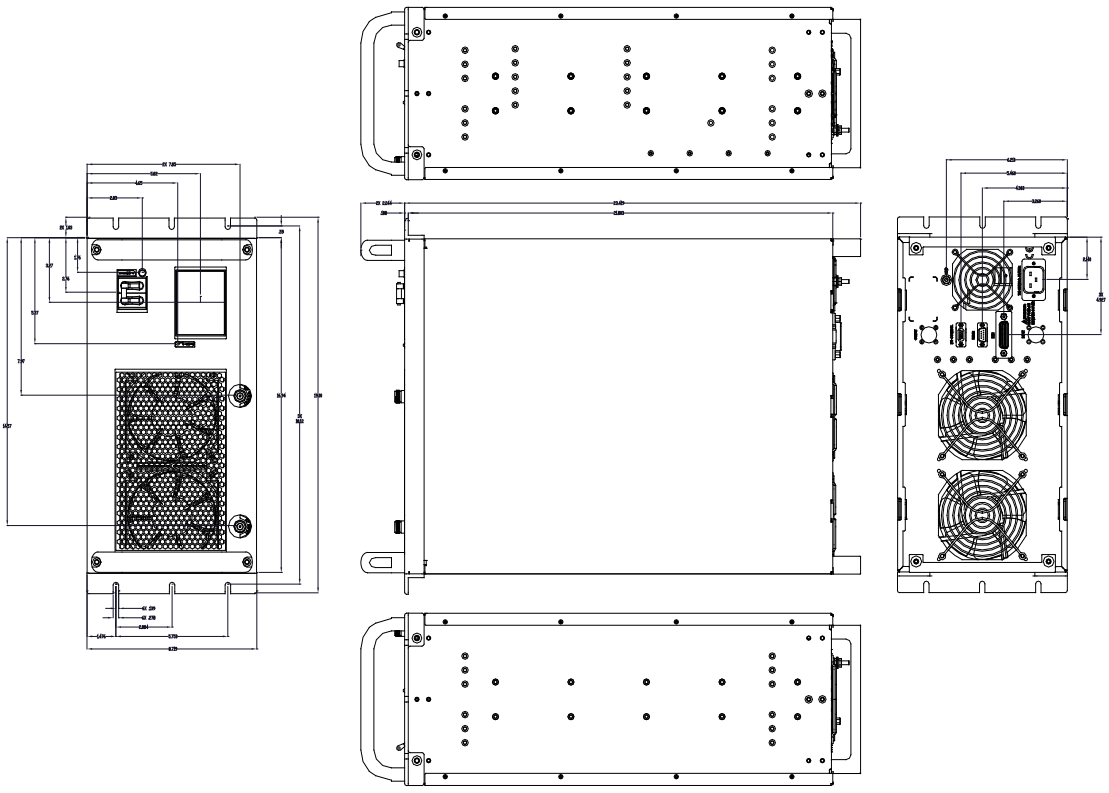
AVAILABLE OPTIONS

SKU #	Description	LCD Touchscreen
2024FLFBAXXXX	LCD controller, Front RF connectors 180-260VAC, 50/60Hz.	Touchscreen Digital Display, including FWD/REV Power indication (dBm or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel GPIB/HPIB IEEE-488.2 and Half Duplex RS232. *Note: (Output power is lowered by 0.5-0.75dB with this option)*
2024FLRBAXXFX	LCD controller, Rear RF Input/Output connectors, Front SMA sample port 180-260VAC, 50/60Hz.	
2024FFFBAXXXX	FGA (Front Gain Adjust), Front RF connectors, 180-260VAC, 50/60Hz	
Optional	Rack Slides (Call for price)	

I/O CONNECTOR – D-Sub 9-Pin, Female

Pin #	Description	Specification	Option FGA	Option 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 +26.0-30.0V_{DC}	√	√
8&9	GND	Ground	√	√

SYSTEM OUTLINE SHOWN
SKU#: 2020FLFBAXXXX



EMPOWER RF SYSTEMS, INC.

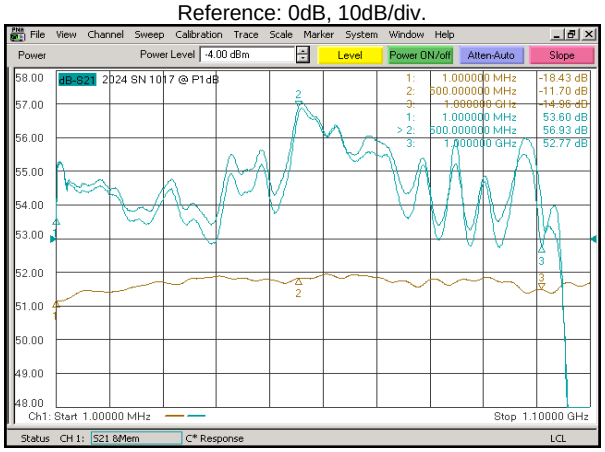
Solid State Broadband High Power Amplifier

2024 - BBS1C4ALP

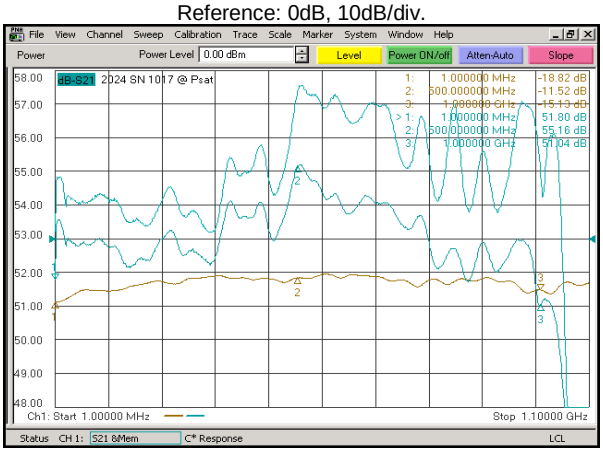
1 – 1000 MHz / 120 Watts

TYPICAL PERFORMANCE PLOTS

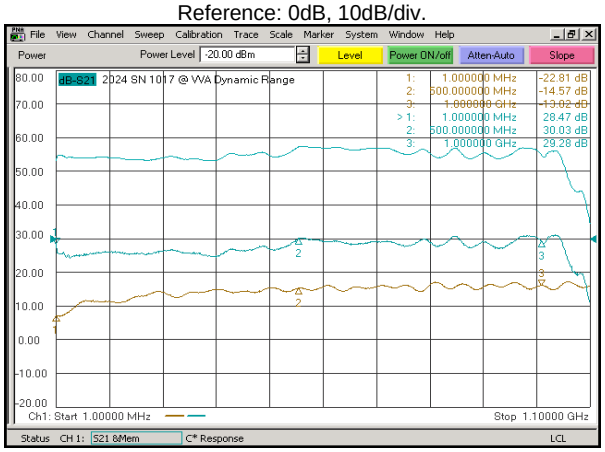
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -4.0dBm
Reference: 53dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = 0dBm
Reference: 53dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjust Range
Top Curve: Maximum Gain @ P_{IN} = -20dBm
Middle Curve: Minimum Gain@ P_{IN} = -20dBm
Reference: 30dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness @ 48dBm & 41dBm
Top Curve: ALC @ 48dBm, P_{IN} = 0dBm
Bottom Curve: ALC @ 41dBm, P_{IN} = 0dBm
Reference: 45dB, 1dB/div.
Middle Curve: Input Return Loss
Reference: 0dB, 10dB/div.