EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2049 – BBS0A3ERR

0.01 – 175 MHz / 500 Watts

Model BBS0A3ERR (2049) amplifier system is suitable for broadband high power linear applications, laboratory, and RFI/EMC susceptibility testing. This amplifier utilizes high power push-pull MOSFET devices that provide high gain, wide dynamic range, low distortion and good 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 universal voltage 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.

SKU#: 2049FLRBAXXXX

- Solid-state class AB design
- Instantaneous ultra broadband
- Three drawer modular design
- Built-in control, monitoring & protection circuits
- Suitable for CW, AM, and FM (Consult Factory for other modulation types)
- 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	0.01		175	MHz
Output Power CW	P_{SAT}	500*			Watt
Output Power @ 1dB Gain Compression	P_{1dB}	300**			Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	56			dB
Input Power for Rated P_{OUT}	P_{IN}		0	3	dBm
Small Signal Gain Flatness	ΔG		±1.5	±2.0	dB
Gain Adjustment Range	FGA	25			dB
Input Return Loss	S_{11}			10	dB
Third Order Intercept Point 2-Tone @ 40dBm/Tone, 100kHz Spacing	IP3		+60		dBm
Harmonics @ P_{OUT} = 300W	$2^{ND}/3^{RD}$		-40/-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage	V_{AC}	180	208	260	Volt
Power Consumption, P_{OUT} = 500W CW	P_D		1500	2100	Watt

Notes:

** 10-15 kHz-250 watts, 15-150 kHz-400 watts*
** * 10-15 kHz-150 watts, 15-150 kHz-300 watts*

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	SH / VI		Airborne		

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions	19 x 8.75 x 22	Inch
Weight	85	Pound
RF Connectors Input / Output	Type-N, Female	
Cooling	Built-in internal forced air cooling system	

EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2049 – BBS0A3ERR	0.01 – 175 MHz / 500 Watts

LIMITS

Input RF drive level without damage	+10 dBm	Max
Load VSWR @ P_{OUT} = 300W	5:1 @ all load phase & amplitude continuous	-
Thermal Shutdown	85°C shutdown	Max

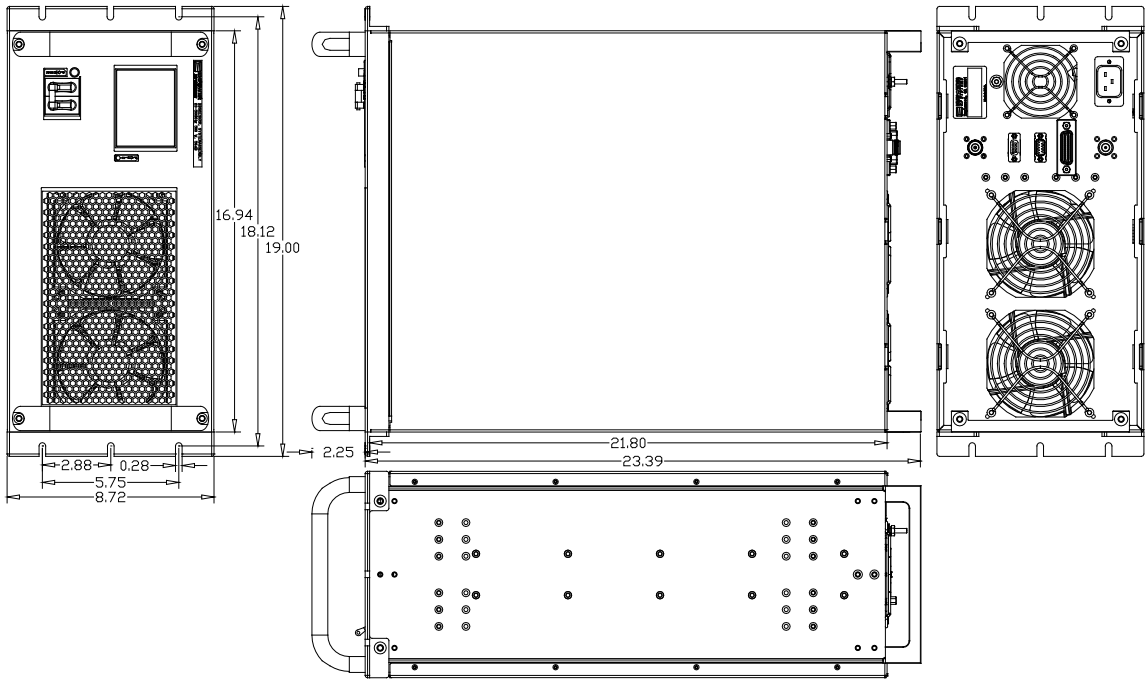
AVAILABLE OPTIONS

SKU Number	Description	LCD Touchscreen
2049FLRBAXXXX	LCD controller, Rear 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)***
2049FFRBAXXXX	FGA (Front Gain Adjust) Front RF Connectors, 180-260VAC, 50/60Hz	
Optional	Rack Slides (Call for price)	

I/O INTERFACE 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#: 2049FLRBAXXXX



EMPOWER
RF SYSTEMS, INC.

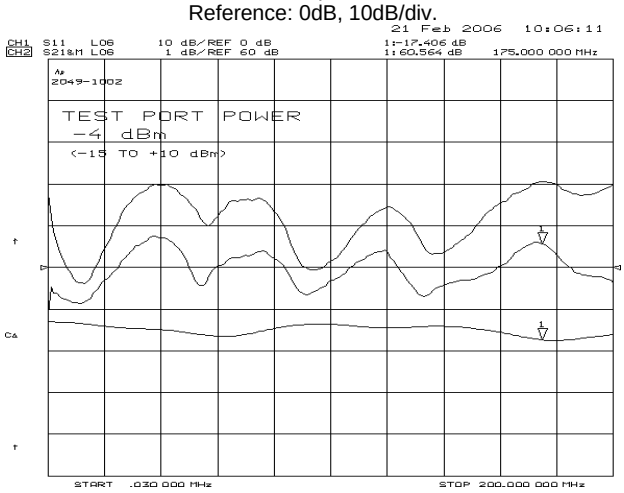
Solid State Broadband High Power Amplifier

2049 – BBS0A3ERR

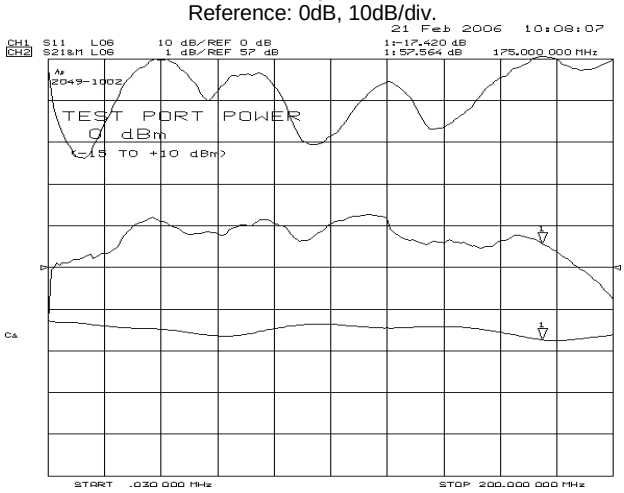
0.01 – 175 MHz / 500 Watts

TYPICAL PERFORMANCE PLOTS

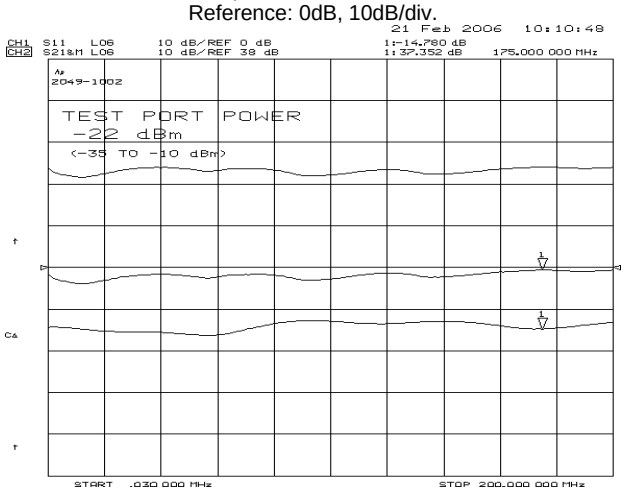
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -4.2dBm
Reference: 60dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = -0.2dBm
Reference: 57dB, 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: Minimum Gain @ P_{IN} = -20dBm
Reference: 38dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness @ 54dBm & 47dBm
Top Curve: ALC @ 54dBm, P_{IN} = 0dBm
Bottom Curve: ALC @ 47dBmW, P_{IN} = 0dBm
Reference: 52dB, 1dB/div.
Middle Curve: Input Return Loss
Reference: 0dB, 10dB/div.