

Solid State Broadband High Power Amplifier

2045 - BBS3K4ARR

500 - 1000MHz / 500Watts

The BBS3K4ARR (2045) is suitable for broadband P-Band high power linear applications. This rack mount amplifier is utilizing advanced Push-Pull LDMOS power devices technology that provides high gain, wide dynamic range, low distortions 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 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#: 2045FFRBAXXXX

- Solid-state Class AB design
- Instantaneous ultra broadband
- Small and lightweight, High reliability and ruggedness
- Standard front panel manual gain adjust
- Built-in Control, Monitoring & Protection Circuits
- Suitable for CW, AM, and FM (Consult factory for other modulation types)
- 50 Ohm Input/Output impedance

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	500		1000	MHz
Output Power CW	P _{SAT}	500	600		Watt
Output Power @ 1dB Gain Compression	P _{1dB}	400	500		Watt
Power Gain @ 1dB Gain Compression	G _{1dB}	56			dB
Input Power for Rated P _{SAT}	P _{IN}		0	3	dBm
Small Signal Gain Flatness	ΔG			±1.5	dB
Gain Adjustment Range	FGA	20			dB
Input Return Loss	S ₁₁			-10	dB
Noise Figure @ max gain	NF		10		dB
Third Order Intercept Point 2-Tone @ 50dBm/Tone, 100kHz Spacing	IP3	+62	+66		dBm
Harmonics @ P _{OUT} = 400W	2 ND /3 RD		-20/20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V _{AC}	180		260	Volt
Power Consumption @ P _{OUT} = 500W CW	P _D		2000	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 (Designed to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T _A	0		+50	°C
Non-operating Temperature	T _{STG}	-20		+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	+6dBm	Max
Load VSWR @ P _{OUT} = 400W	5:1 @ any angle & magnitude	Continuous
Thermal Overload	80°C shutdown	Max

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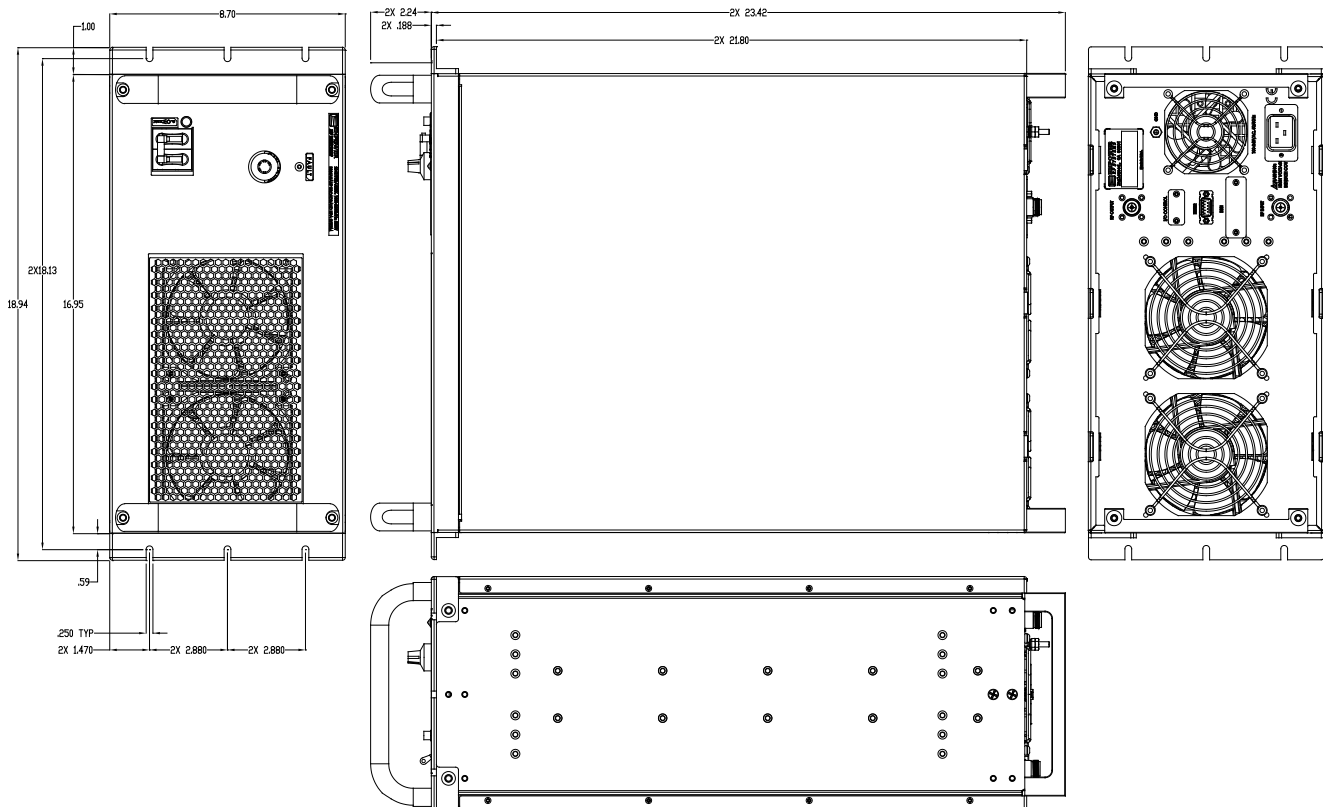
AVAILABLE OPTIONS

SKU Number	Description	LCD Touchscreen
2045FLFCCXLFX	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. <i>Note: (Output power is lowered by 0.5-0.75dB with this option)</i>
2045FLRCCALXX	LCD controller, Rear RF connectors 180-260VAC, 50/60Hz and Rails.	
2045FFFBAAXXX	FGA (Front Gain Adjust) Front RF Connectors, 180-260VAC, 50/60Hz	
2045FFRBAXXX	FGA (Front Gain Adjust) Rear 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	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	Test point: 5.0V _{DC} ±0.2V	√	√
4	VVA Test Point	Test point: 5.6V _{DC} ±0.2V	√	
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (Internally Pulled-Low)	√	√
6	12V Test Point	Test point: 12.0V _{DC} ±0.5V	√	√
7	P/S Test Point	Test point: 26.0-30.0V _{DC}	√	√
8&9	GND	Ground	√	√

OUTLINE DRAWING SHOWN SKU#: 2045FFRBAXXX



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TYPICAL PERFORMANCE PLOTS

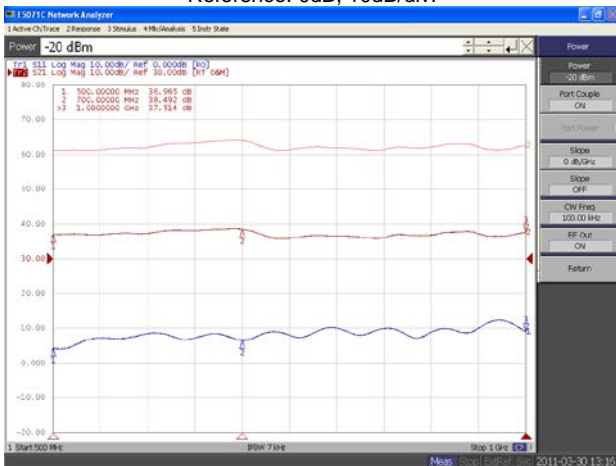
Plot 1 – Small Signal Gain and P_{1dB}
 Top Curve: Small Signal Gain @ P_{IN} = -20dBm
 Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -3.0dBm
 Reference: 59dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
 Top Curve: Small Signal Gain @ P_{IN} = -20dBm
 Middle Curve: Power Gain @ P_{SAT}, P_{IN} = -1.0dBm
 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
 Middle Curve: Minimum Gain @ P_{IN} = -20dBm
 Reference: 30dB, 10dB/div.
 Bottom Curve: Input Return Loss @ Minimum Gain
 Reference: 0dB, 10dB/div.



Plot 4 – Mode ALC @ 250W and 50W
 Top Curve: ALC @ 250W P_{IN} = 0dBm
 Bottom Curve: ALC @ 50W P_{IN} = 0dBm
 Reference: 50.5dB, 1dB/Div.
 Middle Curve: Input Return Loss
 Reference: 0dB, 10dB/Div.

