

## Solid State Broadband High Power Amplifier

**2039 - BBS3C3KRR**
**100 – 500 MHz / 500 Watts**

The BBS3C3KRR (2039) is suitable for broadband VHF & UHF high power linear applications. This rack mount amplifier is utilizing advanced Push-Pull MOSFET and LDMOS 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#: 2039FLFBAXLXX

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

### ELECTRICAL SPECIFICATIONS @ 208V<sub>AC</sub>, 25°C, 50 Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	100		500	MHz
Output Power CW	P <sub>SAT</sub>	500			Watt
Output Power @ 1dB Gain Compression	P <sub>1dB</sub>	400			Watt
Power Gain @ 1dB Gain Compression	G <sub>1dB</sub>	56			dB
Input Power for Rated P <sub>SAT</sub>	P <sub>IN</sub>		0	3	dBm
Small Signal Gain Flatness	ΔG			±1.5	dB
Gain Adjustment Range	FGA		25		dB
Input Return Loss	S <sub>11</sub>			-10	dB
Noise Figure @ max gain	NF		10		dB
Third Order Intercept Point	IP3		+64		dBm
2-Tone @ 47dBm/Tone, 100kHz Spacing					
Harmonics @ P <sub>OUT</sub> = 400W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V <sub>AC</sub>	180		260	Volt
Power Consumption @ P <sub>OUT</sub> = 500W	P <sub>D</sub>		2200	3000	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 <sub>A</sub>	0		+50	°C
Non-operating Temperature	T <sub>STG</sub>	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude (MIL-STD-810F Method 500.4)	ALT			30,000	Feet
Vibration / Shock	VI / SH		Airborne		
MIL-STD-810F - Method 514.5/516.5 – Proc I					

### LIMITS

Input RF drive level without damage	+6 dBm	Max
Load VSWR @ P <sub>OUT</sub> = 500W	5:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

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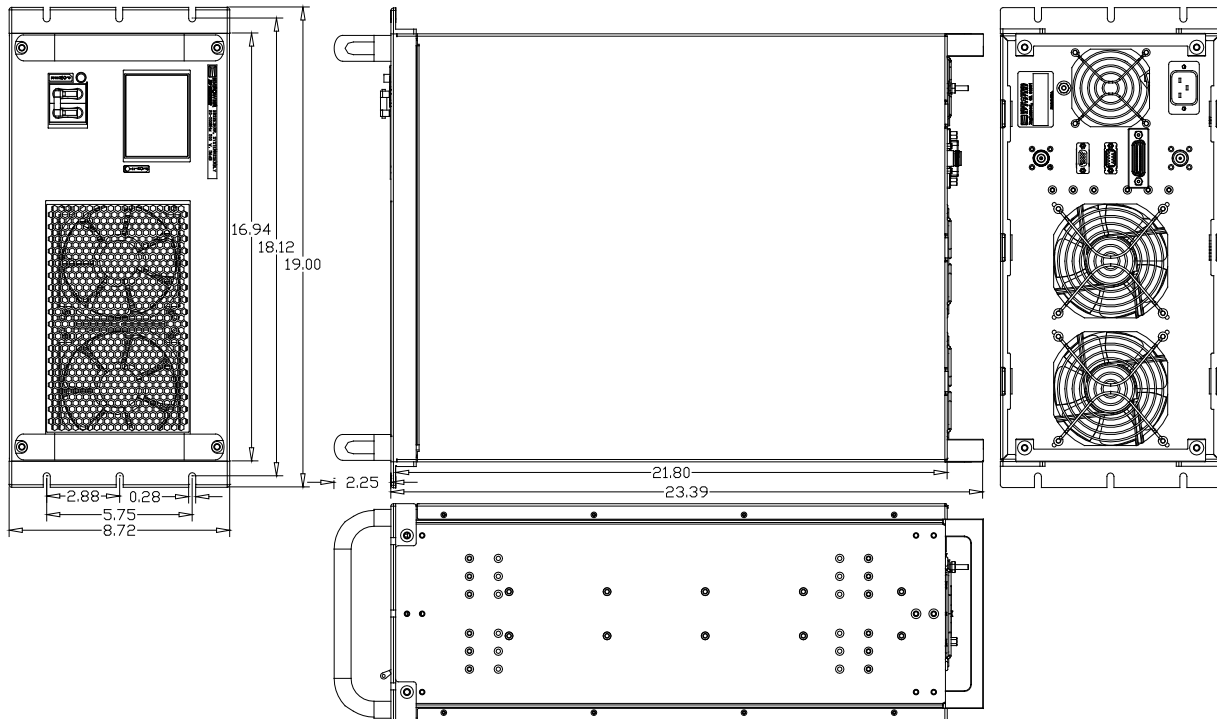
## AVAILABLE OPTIONS

SKU Number	Description	LCD Touchscreen
2039FLFBAXLXX	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>
2039FLRBAXLXX	LCD controller, Rear RF connectors 180-260VAC, 50/60Hz.	
2039FLFCCXXFX	LCD controller, Front RF connectors 115VAC, 3-phase, 50/60Hz.	
2039FLRCCALXX	LCD controller, Rear RF connectors 115VAC, 3-phase, 50/60Hz, Rails included.	
2039FFRBAXXXX	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	LCD
1	Forward Test Point	Analog Voltage 0-5V <sub>DC</sub> relative to forward power level		√
2	Reverse Test Point	Analog Voltage 0-5V <sub>DC</sub> relative to reverse power level		√
3	+5V Test Point	Test point: +5.0V <sub>DC</sub> ±0.2V	√	√
4	VVA Test Point	Test point: +5.6V <sub>DC</sub> ±0.2V	√	√
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) <i>(Internally Pulled-low)</i>	√	√
6	+12V Test Point	Test point: +12.0V <sub>DC</sub> ±0.5V	√	√
7	P/S Test Point	Test point: +26.0-30.0V <sub>DC</sub>	√	√
8&9	GND	Ground	√	√

## OUTLINE DRAWING SHOWN SKU#: 2039FLRBAXLXX



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## TYPICAL PERFORMANCE PLOTS

**Plot 1 – Small Signal Gain and  $P_{1dB}$**

Top Curve: Small Signal Gain @  $P_{IN} = -20\text{dBm}$   
 Middle Curve: Power Gain @  $P_{1dB}$ ,  $P_{IN} = -2.0\text{dBm}$   
 Reference: 57dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



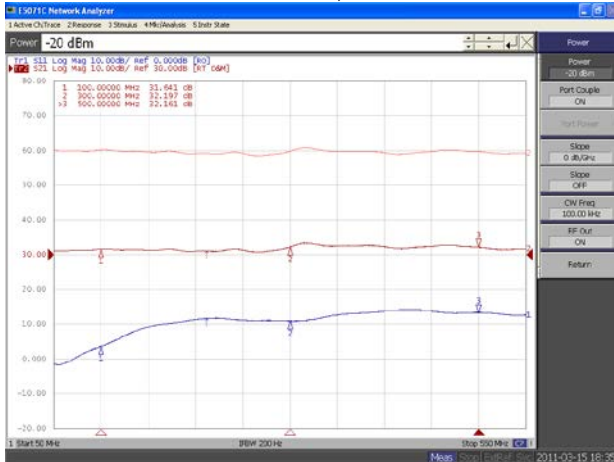
**Plot 2 – Small Signal Gain and  $P_{SAT}$**

Top Curve: Small Signal Gain @  $P_{IN} = -20\text{dBm}$   
 Middle Curve: Power Gain @  $P_{SAT}$ ,  $P_{IN} = -1.0\text{dBm}$   
 Reference: 57dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



**Plot 3 – Gain Adjustment Range**

Top Curve: Maximum Gain @  $P_{IN} = -20\text{dBm}$   
 Middle Curve: Minimum Gain @  $P_{IN} = -20\text{dBm}$   
 Reference: 30dB, 5dB/div.  
 Bottom Curve: Input Return Loss @ Minimum Gain  
 Reference: 0dB, 10dB/div.



**Plot 4 – ALC Flatness @ 250W & 50W**

Top Curve: ALC @ 250W,  $P_{IN} = 0\text{dBm}$   
 Bottom Curve: ALC @ 50W,  $P_{IN} = 0\text{dBm}$   
 Reference: 51dB, 1dB/div.  
 Middle Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.

