EMPOWER
RF SYSTEMS, INC.

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 @ $208V_{AC}$, 25°C, 50 Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	100		500	MHz
Output Power CW	P_{SAT}	500			Watt
Output Power @ 1dB Gain Compression	P_{1dB}	400			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		25		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ max gain	NF		10		dB
Third Order Intercept Point 2-Tone @ 47dBm/Tone, 100kHz Spacing	IP3		+64		dBm
Harmonics @ P_{OUT} = 400W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V_{AC}	180		260	Volt
Power Consumption @ P_{OUT} = 500W	P_D		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_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} = 500W	5:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

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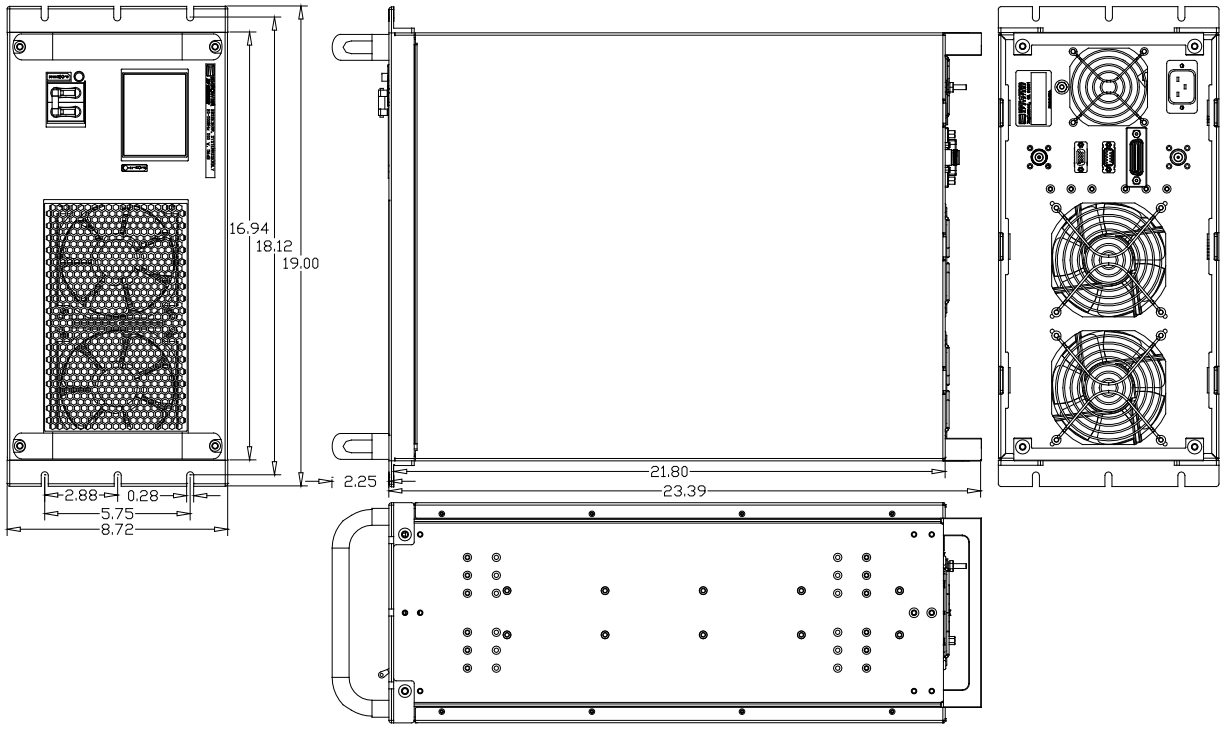
AVAILABLE OPTIONS

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. ***Note:*** ***(Output power is lowered by 0.5-0.75dB with this option)***
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	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	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#: 2039FLRBAXLXX



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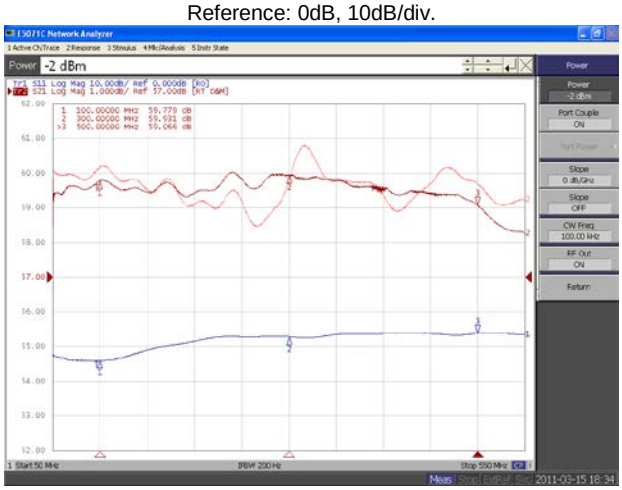
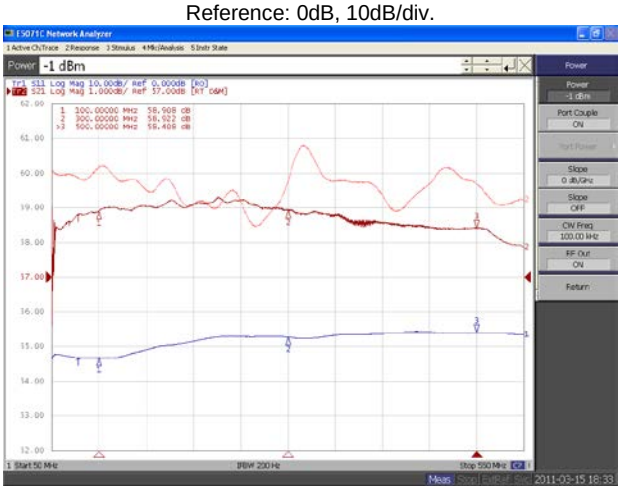
TYPICAL PERFORMANCE PLOTS

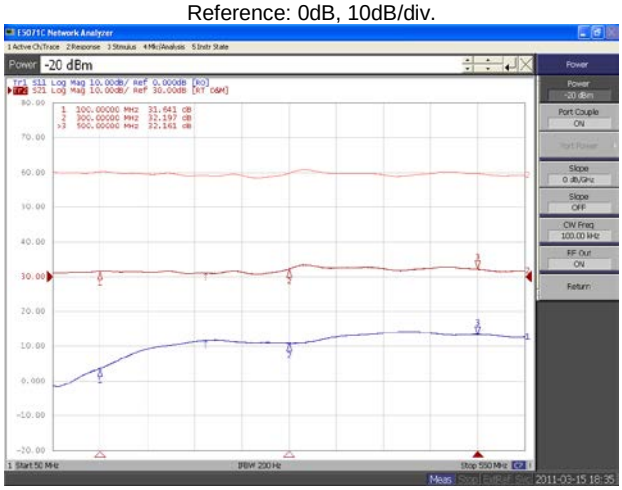
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -2.0dBm
Reference: 57dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = -1.0dBm
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: 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} = 0dBm
Bottom Curve: ALC @ 50W, P_{IN} = 0dBm
Reference: 51dB, 1dB/div.
Middle Curve: Input Return Loss
Reference: 0dB, 10dB/div.