EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2092 - BBS5K8CAJ

2500 – 6000 MHz / 10 Watts

The BBS5K8CAJ (2092) is suitable for C-Band broadband high power applications. This amplifier utilizes GaAsFET and high power GaN 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#: 2092CLRAAXXXX

- Solid-state class AB design
- Instantaneous ultra broadband
- Small form factor and lightweight
- Suitable for CW, AM, and FM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness
- Built-in control, monitoring and protection circuits

ELECTRICAL SPECIFICATIONS @ $120V_{AC}$, 25°C, 50Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	2500		6000	MHz
Output Power CW	P_{SAT}	10	12		Watt
Output Power @ 1dB Gain Compression	P_{1dB}		8		Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	40			dB
Input Power for Rated P_{SAT}	P_{IN}		0	3	dBm
Small Signal Gain Flatness	ΔG		±1.0	±1.5	dB
Gain Adjustment Range	FGA	20	25		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ maximum gain	NF		10	15	dB
Third Order Intercept Point 2-Tone @ 30dBm/Tone, 100kHz Spacing	IP3		+48		dBm
Harmonics @ P_{OUT} = 8W	2^{ND} / 3^{RD}		-20 / -45	-15 / -35	dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V_{AC}	100		240	Volt
Power Consumption @ 10W CW	P_D		100	120	Watt
Switching Time, 1kHz TTL, P_{IN} = 0 dBm	$T_{ON/OFF}$			5	uSec

MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions (no handles)	19 x 3.5 x 18.5	Inch
Weight	30	lb.
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	-10		+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	+10 dBm	Max
Load VSWR @ P_{OUT} = 8W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

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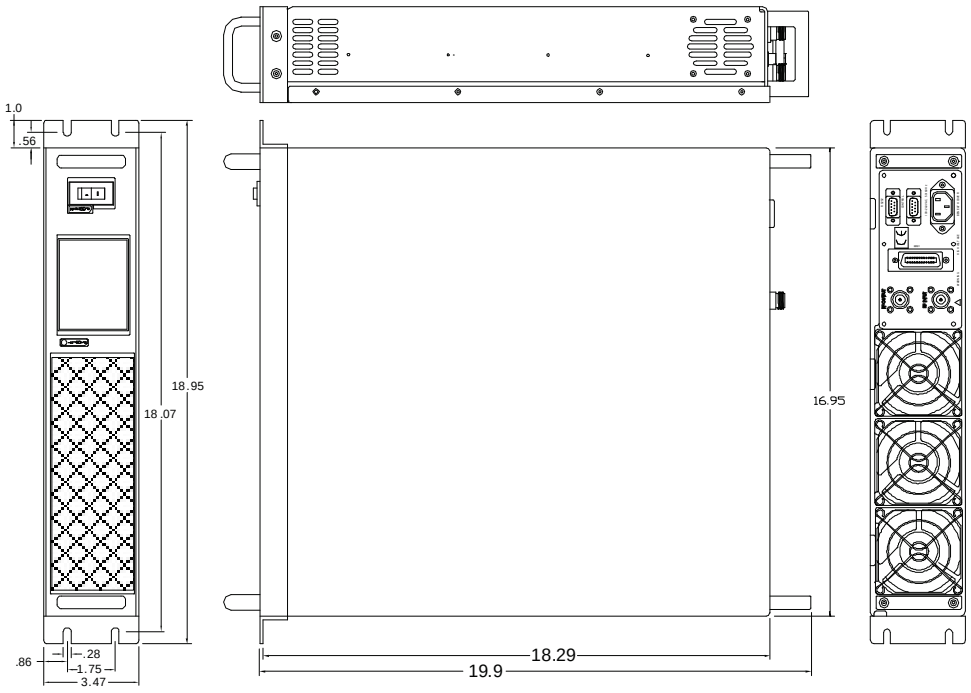
AVAILABLE OPTIONS

SKU #	Description	LCD Touchscreen
2092CLFAAXXXX	LCD controller, Front RF connectors 100-240VAC, 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.
2092CLRAAXXXX	LCD controller, Rear RF connectors 100-240VAC, 50/60Hz.	
Optional	Rack Slides (Call for price)	

I/O INTERFACE CONNECTOR – D-sub 9-pin, Female

Pin #	Description	Specifications
1	Forward Test Point	Analog Voltage 0-4V_{DC} relative to Forward Power Level
2	Reverse Test Point	Analog Voltage 0-4V_{DC} relative to Reverse Power Level
3	5V Test Point	+5.0V_{DC} ±0.2V
4	N/C	No Connection
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-Low*)
6	12V Test Point	+12.0V_{DC} ± 0.5V
7	P/S Test Point	+26.0-30.0V_{DC}
8&9	GND	Ground

System Outline Shown
SKU#: 2092CLRAAXXXX



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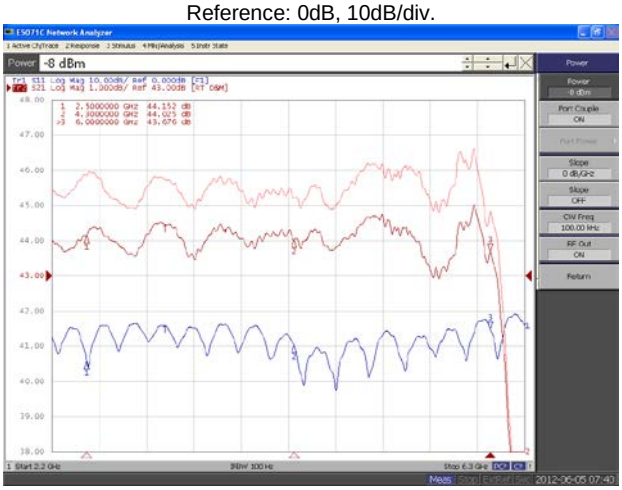
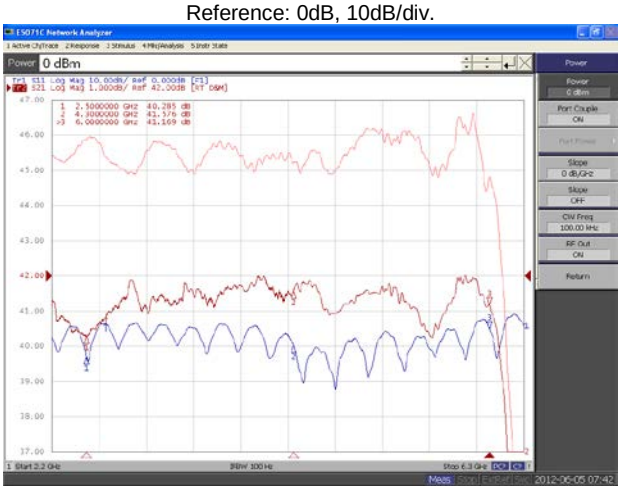
TYPICAL PERFORMANCE PLOTS

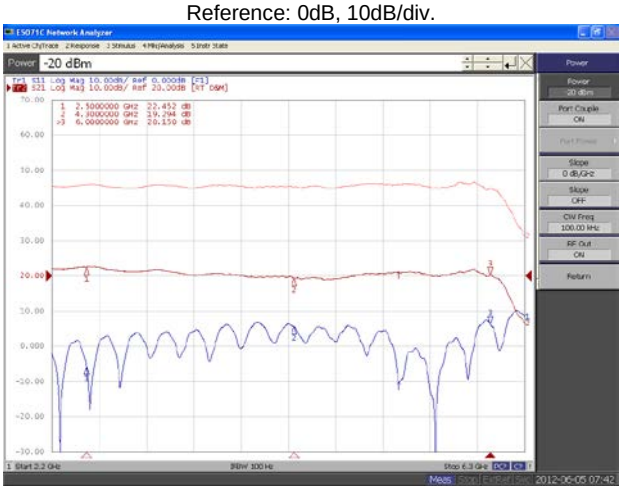
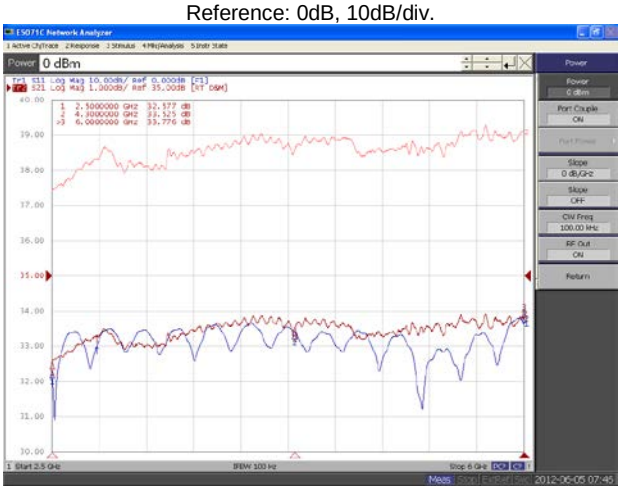
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -8dBm
Reference: 41dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: P_{SAT} @ P_{IN} = 0dBm
Reference: 41dB, 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: 20dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness @ 38dBm & 33dBm
Top Curve: ALC @ 38dBm, P_{IN} = 0dBm
Bottom Curve: ALC @ 33dBm, P_{IN} = 0dBm
Reference: 37dB, 1dB/div.
Middle Curve: Input Return Loss
Reference: 0dB, 10dB/div.