

## Solid State Broadband High Power Amplifier

**2092 - BBS5K8CAJ**
**2500 – 6000 MHz / 10 Watts**

The BBS5K8CAJ (SKU 2092) is suitable for C-Band broadband high power linear 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.



Shown with Option Package 06

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

### ELECTRICAL SPECIFICATIONS @ 120 VAC, 25°C, 50 Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	2500		6000	MHz
Output Power CW	P <sub>SAT</sub>	10	12		Watt
Output Power @ 1dB Gain Compression Point	P <sub>1dB</sub>		8		Watt
Power Gain @ 1dB Gain Compression Point	G <sub>1dB</sub>	40			dB
Input Power for Nominal P <sub>OUT</sub>	P <sub>IN</sub>		0		dBm
Small Signal Gain Flatness	ΔG		±1.0	±1.5	dB
Gain Adjustment Range	VVA	25			dB
Input Return Loss	S <sub>11</sub>			-10	dB
Noise Figure @ max Gain	NF			10	dB
Third Order Intercept Point	IMD		-36		dBc
2-Tones@ 30 dBm/Tone, Δ = 100 KHz	IP3		+48		dBm
Harmonics @ rated 1dB Gain Comp.Point	H		-20	-15	dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (single phase)	V <sub>AC</sub>	100		240	Volt
AC Power Consumption	P <sub>D</sub>		100	120	Watt
Switching Time, 1 KHz TTL, P <sub>IN</sub> = 0 dBm	T <sub>ON/OFF</sub>			5	uSec

### MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Limits
Dimensions	19 x 3.5 x 18	Inch	Max
Weight	30	lb.	Max
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>c</sub>	-10		+55	°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	10,000		30,000	Feet
Shock / Vibration (MIL-STD-810F Method 516.5)	SH / VI		Airborne		

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### PROTECTIONS

Input Overdrive	+10 dBm		Max
Load VSWR	$\infty$ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous		Nom
Thermal Overload	85°C shutdown		Max

### AVAILABLE OPTIONS (Refer to [www.empowerrf.com](http://www.empowerrf.com) for detailed systems options)

Option	Number	Description	Price
<b>FGA</b>	<b>061</b>	Front panel 10 turns manual gain adjustment.	Standard
<b>LCD</b>	<b>062</b>	Touchscreen Digital Display, including Fwd/Rev Power indication (dB or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel GPIB IEEE-488.2 or Full Duplex RS232 remote interface. <b>Note: Output Power is lowered by 0.5 - 0.75 dB with this option.</b>	Call
<b>FCN</b>	<b>051</b>	Front Panel Type-N female	N/C
<b>RCN</b>	<b>052</b>	Rear Panel Type-N female	N/C

Available Option Packages: 01, 02, 03, 04, 05, 06

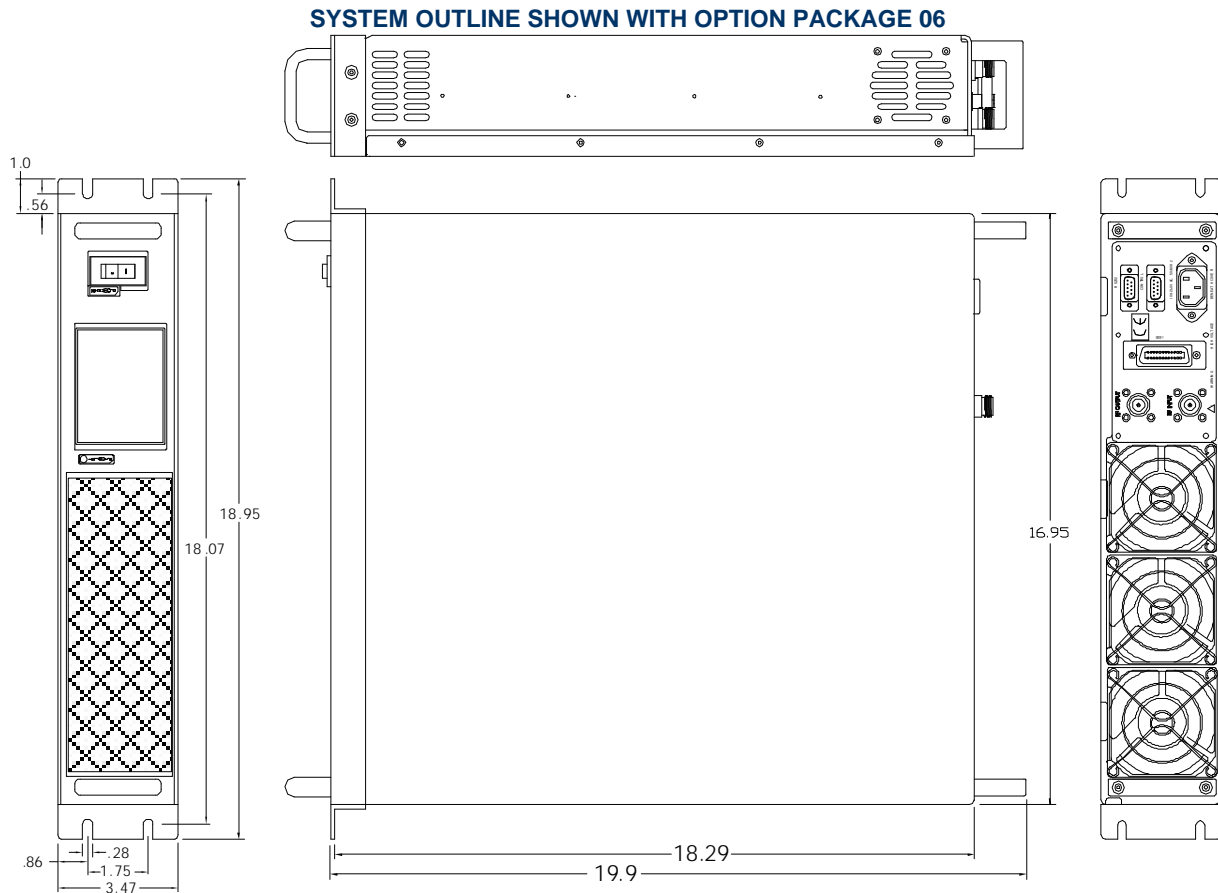
### I/O CONNECTOR – Dsub, 9 Pin

Pin #	Description	Specifications
1	Forward Test Point	0-5 V Analog Voltage relative to Forward Power Output (with LCD Option 62 only)
2	Reverse Test Point	0-5 V Analog Voltage relative to Reverse Power (with LCD Option 62 only)
3	+5 V Test Point	5 V <sub>DC</sub> ±0.2 V Output Measurement Voltage (not connected on Bench Top unit)
4	VVA Test Point	5.6 V <sub>DC</sub> ±0.2 V VVA Gain Control (not available with LCD Option)
5	EXT Shutdown	Amplifier Enable: TTL Low (0 V) Amplifier Disable: TTL High (5 V)
6	+12 V (Test Point)	12 V <sub>DC</sub> ±0.5 V Output
7	PS+ (Test Point)	28 V <sub>DC</sub> ±1 V Unit Supply Voltage (not connected on Bench Top unit)
8	GND	Ground
9	GND	Ground

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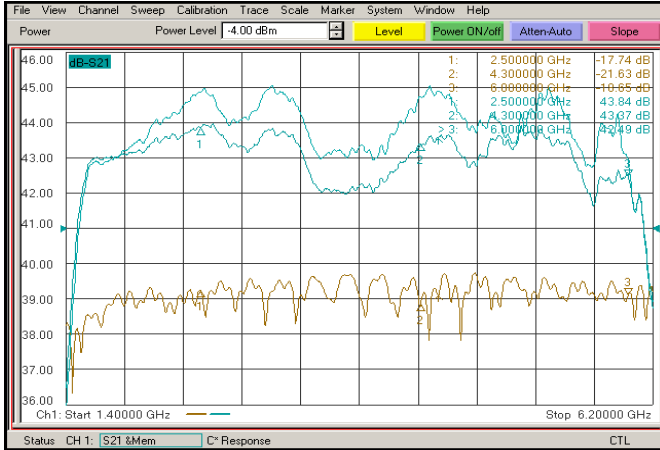
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## TYPICAL PERFORMANCE PLOTS

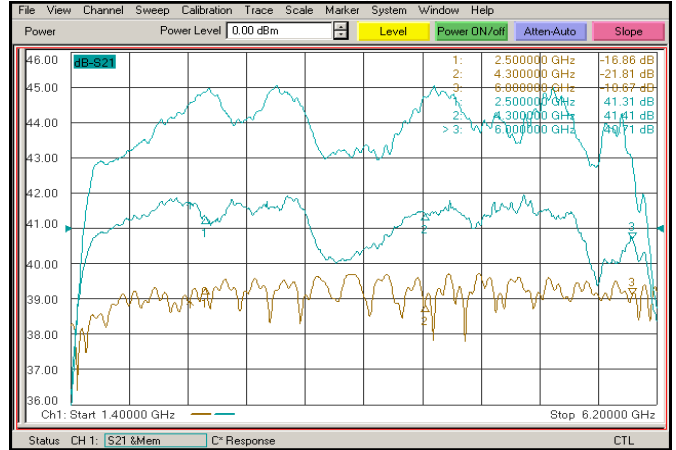
### Plots 1 - Small Signal and $P_{1dB}$ Gain

Top Curve: Small Signal Gain @  $P_{IN} = -20dBm$   
 Middle Curve: Power Gain @  $P_{1dB}$ ,  $P_{IN} = -4dBm$  (Note 2, 3)  
 Reference: 41dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



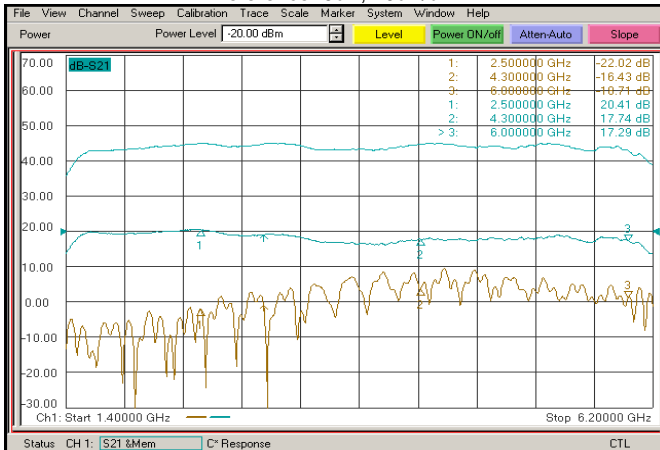
### Plot 2 - Small Signal and $P_{SAT}$

Top Curve: Small Signal Gain @  $P_{IN} = -20dBm$   
 Middle Curve:  $P_{SAT}$  @  $P_{IN} = 0dBm$  (Note 2, 3)  
 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: VVA @ Minimum Gain  
 Reference: 20dB, 10dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



### Plot 4 - ALC Flatness @ 6W & 2W

Top Curve: ALC @ 6W  $P_{IN} = 0dBm$   
 Bottom Curve: ALC @ 2W  $P_{IN} = 0dBm$   
 Reference: 37dB, 1dB/div.  
 Middle Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.

