

Solid State Broadband High Power Amplifier

2009 – BBS5A7AEL

2000 – 4000 MHz / 25 Watts

The BBS5A7AEL (2009) is suitable for S-Band broadband high power linear applications. This amplifier utilizes linear GaAsFET power devices that provide high gain, wide dynamic range, low distortions and excellent 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#: 2009CLRAAXXX

- Solid-state class A linear design
- Instantaneous ultra broadband
- Small and lightweight
- Front panel manual gain adjust or LCD controller
- Suitable for CW, AM, and FM (Consult factory for other modulation types)
- 50 Ohm Input/Output impedance
- High reliability and ruggedness

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	2000		4000	MHz
Output Power CW	P _{SAT}	25	30		Watt
Output Power @ 1dB Gain Compression	P _{1dB}	20	25		Watt
Power Gain @ 1dB Gain Compression	G _{1dB}	44			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	NF			10	dB
Third Order Intercept Point 2-Tone @ 33dBm/Tone, 100kHz Spacing	IP3		+53		dBm
Harmonics @ P _{OUT} = 20W	H		-20		dBc
Spurious Signals	Spur		-60		dBc
Operating Voltage (1-phase)	V _{AC}	100		240	Volt
Power Consumption @ P _{OUT} = 25W CW	P _D		200	300	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimension	19 x 3.5 x 22	Inch
Weight	27	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}	-40		+85	°C
Relative Humidity w/o condensation	RH			95	%
Altitude (MIL-STD-810F Method 500.4 – Proc I)	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} = 20W	∞ @ all load phase and amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

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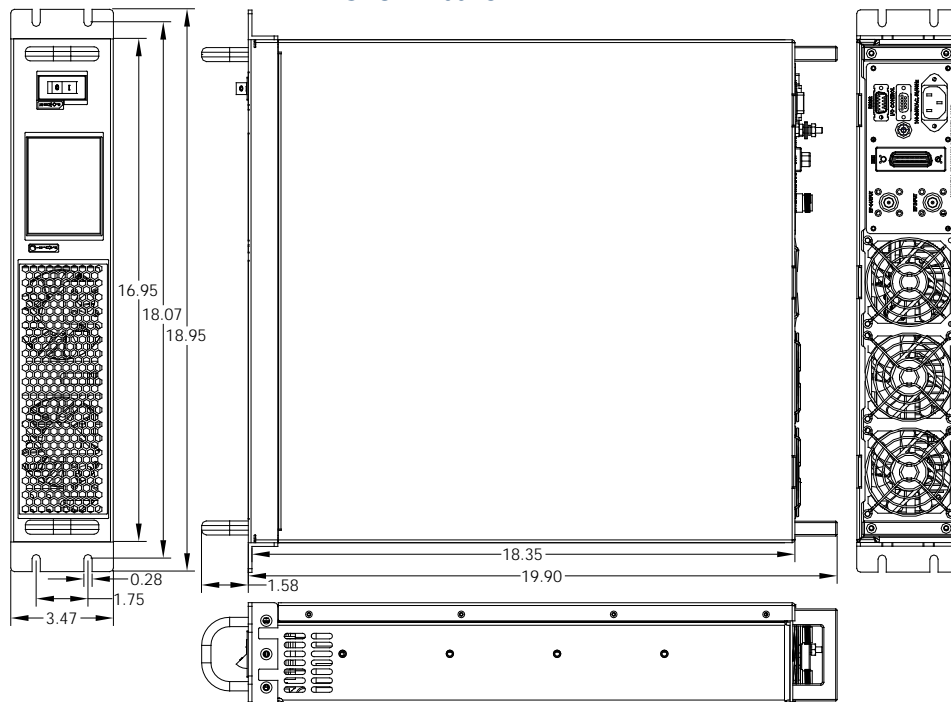
AVAILABLE OPTIONS

SKU #	Description	LCD Touchscreen
2009CLRAAXXX	LCD controller, Rear 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. <small>Note: (Output power is lowered by 0.5-0.75dB with this option)</small>
2009CFRAAXXX	FGA (Front Gain Adjust), Rear RF connectors, 100-240VAC, 50/60Hz	
Optional	Rack Slides (Call for price)	

I/O INTERFACE 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	Output +5.0V _{DC} ±0.2V	√	√
4	VVA Test Point	VVA Gain Control +5.6V _{DC} ±0.2V	√	
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (Internally Pulled-Low)	√	√
6	12V Test Point	Output +12.0V _{DC} ± 0.5V	√	√
7	P/S Test Point	Power Supply Output voltage: +12.0-15.0V _{DC}	√	√
8	GND	Ground	√	√
9	GND	Ground	√	√

OUTLINE DRAWING – SHOWN SKU #: 2002CLRAAXXX



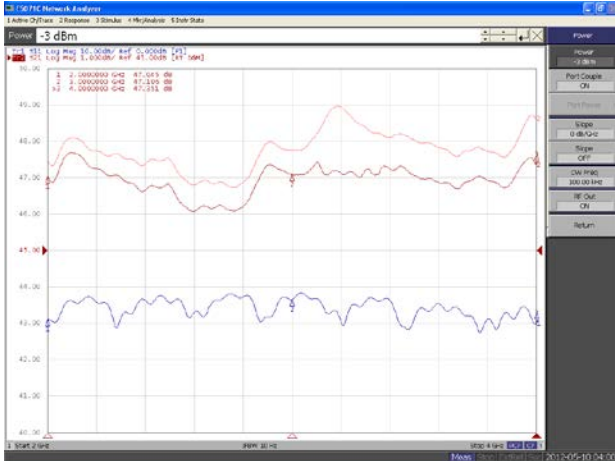
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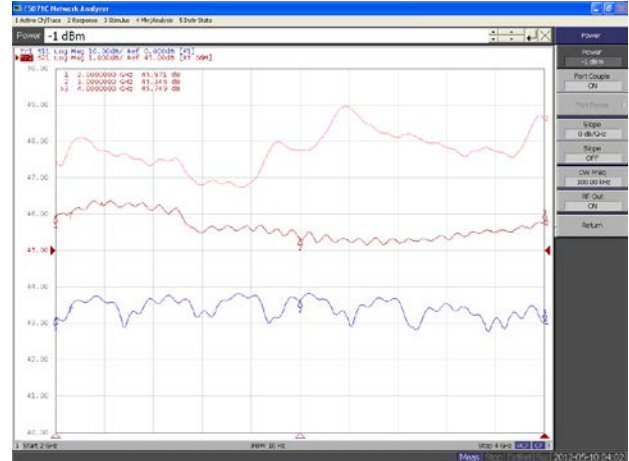
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TYPICAL PERFORMANCE PLOTS

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: 45dB, 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: 45dB, 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
 Reference: 0dB, 10dB/div.



Plot 3 – ALC Flatness @ 42dBm and 37dBm
 Top Curve: ALC @ 42dBm, $P_{IN} = 0dBm$
 Bottom Curve: ALC @ 37dBm, $P_{IN} = 0dBm$
 Reference: 40dB, 1dB/div.
 Middle Curve: Input Return Loss
 Reference: 0dB, 10dB/div.

