

Solid State Broadband High Power Amplifier

2001 - BBS3Q7ECK

800 – 4200 MHz / 15 Watts

The BBS3Q7ECK (SKU 2001) is suitable for multi-octave ultra broadband high power linear applications. This amplifier utilizes GaAsFET power devices that provide wide frequency response and dynamic range, high gain, 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, EMI/RFI filters, and all qualified components. The system includes a universal voltage, single phase PFC 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#: 2001CLRAAXLXX

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

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	800		4200	MHz
Output Power CW	P _{SAT}	13	15		Watt
Output Power @ 1dB Gain Compression	P _{1dB}	10			Watt
Power Gain @ 1dB Gain Compression	G _{1dB}	42			dB
Input Power for Rated P _{SAT}	P _{IN}		0	3	dBm
Small Signal Gain Flatness	ΔG			±2.0	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		+50		dBm
Harmonics @ P _{OUT} = 10W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V _{AC}	100		240	Volt
Power Consumption @ 13W CW	P _D			150	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions – Bench Top / Rack Mount	8.5 x 3.5 x 16 / 19 x 3.5 x 18	Inch
Weight	20 / 30	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	+10 dBm	Max
Load VSWR @ P _{OUT} = 10W	∞ @ 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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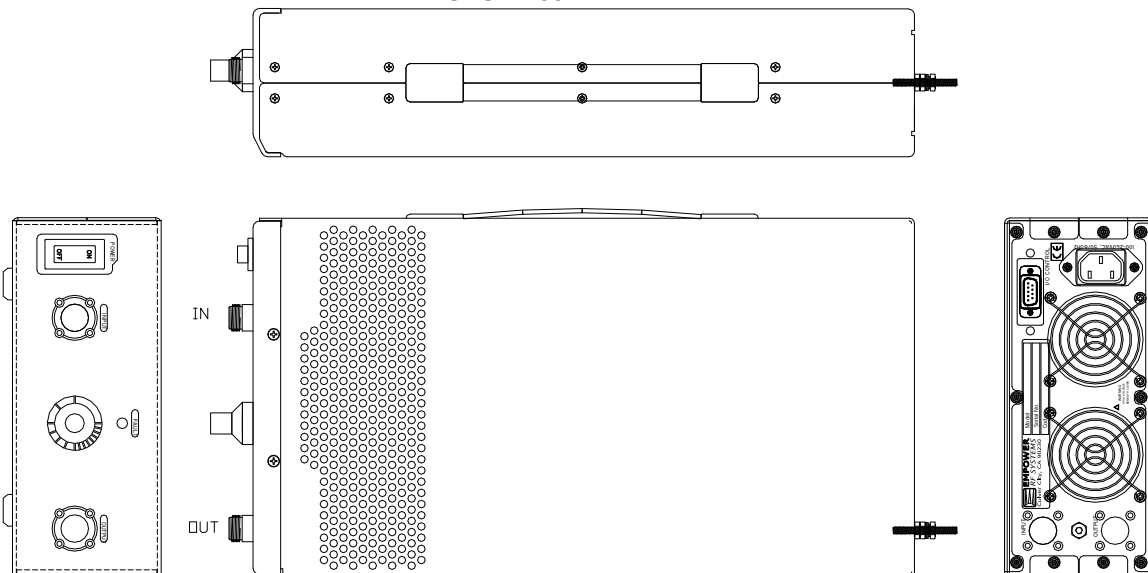
AVAILABLE OPTIONS

SKU Number	Description	LCD Touchscreen
2001CLFAAXXXX	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. <i>Note: (Output power is lowered by 0.5-0.75dB with this option)</i>
2001CLRAAXLXX	LCD controller, Rear RF connectors 100-240VAC, 50/60Hz.	
2001CFFAAXXXX	FGA (Front Gain Adjust) Front RF Connectors, 100-240VAC, 50/60Hz	
Optional	Rack Slides (Call for price)	
2001AFFAAXXXX	Bench Top, FGA (Front Gain Adjust), Front RF connectors, 100-240VAC, 50/60Hz	

I/O CONNECTOR – D-Sub 9-Pin, Female

Pin #	Description	Specification	Option		
			Bench Top	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 – Bench Top Shown
 SKU#: 2001AFFAAXXXX

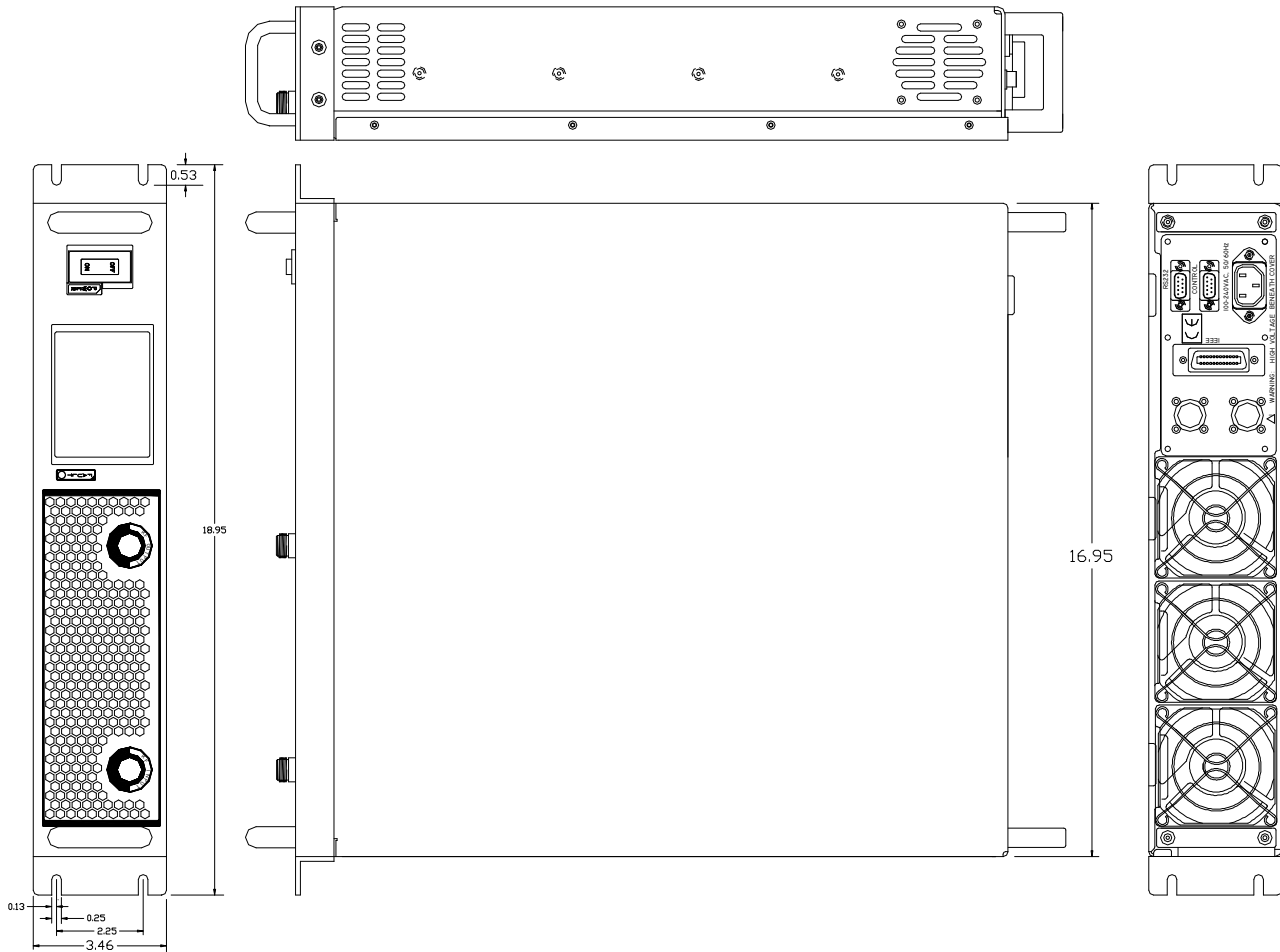


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OUTLINE DRAWING – Rack Mount Shown
SKU#: 2001CLFAAXXX



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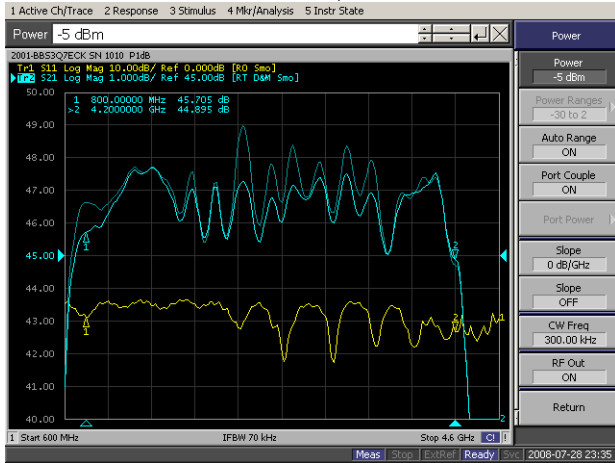
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TYPICAL PERFORMANCE PLOTS

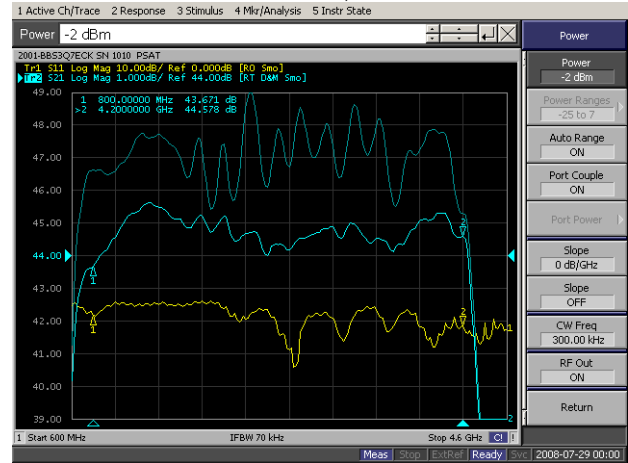
Plot 1 – Small Signal Gain and P_{1dB}

Top Curve: Small Signal Gain @ P_{IN} = -15dBm
 Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -5.2dBm
 Reference: 45dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



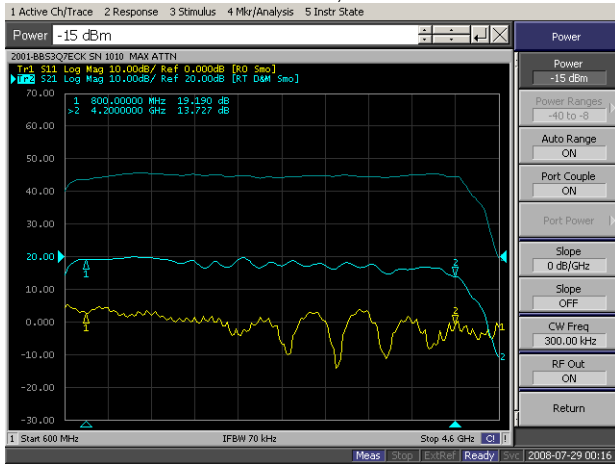
Plot 2 – Small Signal Gain and P_{SAT}

Top Curve: Small Signal Gain @ P_{IN} = -15dBm
 Middle Curve: Power Gain @ P_{SAT}, P_{IN} = -2.2dBm
 Reference: 44.0dB, 1.5dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range

Top Curve: Maximum Gain @ P_{IN} = -15dBm
 Middle Curve: Minimum Gain @ P_{IN} = -15dBm
 Reference: 20dB, 10dB/div.
 Bottom Curve: Input Return Loss @ Minimum Gain
 Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness @ 8W & 2W

Top Curve: ALC @ 8W, P_{IN} = 0dBm
 Middle Curve: ALC @ 2W, P_{IN} = 0dBm
 Reference: 33dB, 2dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.

