

Solid State Broadband High Power Amplifier

2094 - BBS2E3KHM
20 – 500 MHz / 50 Watts

The BBS2E3KHM (SKU 2094) is suitable for FM, VHF & UHF broadband and band specific applications. This amplifier utilizes push-pull MOSFET and LDMOS power devices that provide 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 housing, and qualified components. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.



SKU#: 2094CLFAAXXX

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

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	20		500	MHz
Power Output CW	P _{SAT}	50			Watt
Power Output @ 1dB Gain Compression	P _{1dB}	30			Watt
Power Gain @ 1dB Gain Compression	G _{1dB}	46			dB
Input Power for Rated P _{SAT}	P _{IN}		0		dBm
Small Signal Gain Flatness, P _{IN} = -20dBm	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, 37dBm/Tone, 100kHz Spacing	IP3		+55		dBm
Harmonics @ P _{OUT} = 30W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V _{AC}	100		240	Volt
Power Consumption @ 50W CW	P _D			300	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions	19 x 3.5 x 18.5	Inch
Weight	27	Pound
RF Connectors Input/Output	Type-N, Female	
Cooling	Built-in 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		

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LIMITS

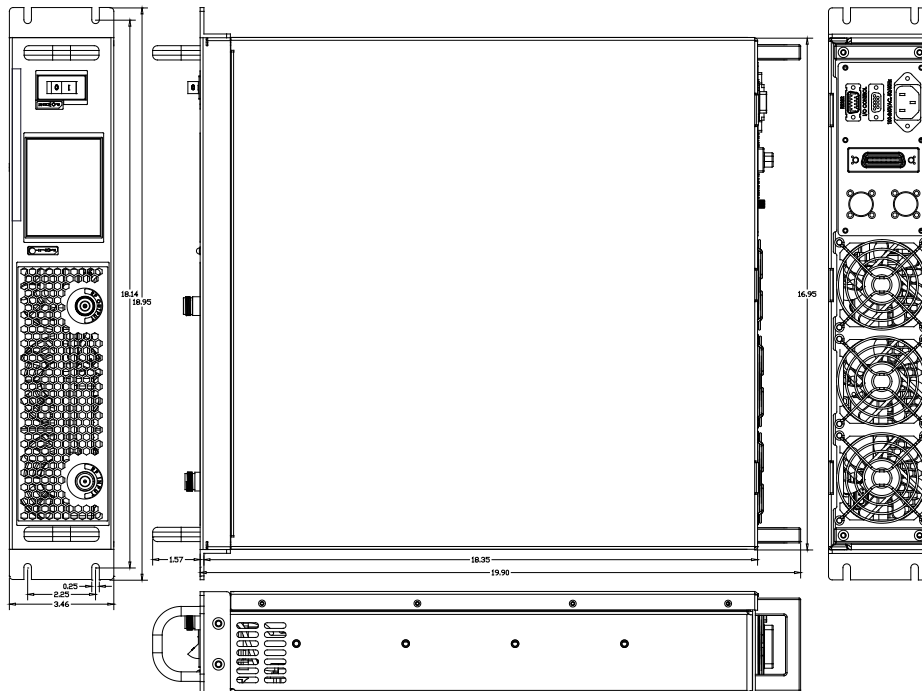
Input RF drive level without damage	+10 dBm	Max
Load VSWR @ P _{OUT} = 30W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

AVAILABLE OPTIONS

SKU #	Description	LCD Touchscreen
2094CLFAAXXXX	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. <small>Note: (Output power is lowered by 0.5-0.75dB with this option)</small>
2094CLRAAXXXX	LCD controller, Rear RF connectors 100-240VAC, 50/60Hz.	
2094CFFAAXXXX	FGA (Front Gain Adjust) Front RF Connectors, 100-240VAC, 50/60Hz	
2094CFRAAXXXX	FGA (Front Gain Adjust) Rear RF Connectors, 100-240VAC, 50/60Hz	
Optional	Rack Slides (Call for price)	

I/O CONNECTOR – D-Sub 9-Pin, Female

Pin #	Description	Specification	Option	
			FGA	LCD
1	Forward TP	Analog Voltage 0-5V _{DC} relative to forward power level		√
2	Reverse TP	Analog Voltage 0-5V _{DC} relative to reverse power level		√
3	5V TP	Test point: 5.0V _{DC} ±0.2V	√	√
4	VVA TP	Test point: 5.6V _{DC} ±0.2V	√	
5	EXT Shutdown	Amplifier Disable: TTL High (5V) (Internally Pulled-low)	√	√
6	12V TP	Test point: 12.0V _{DC} ±0.5V	√	√
7	P/S TP	Test point: 26.0-30.0V _{DC}	√	√
8&9	GND	Ground	√	√

SYSTEM OUTLINE SHOWN
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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} , $P_{IN} = 1dBm$
 Reference: 46dB, 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} , $P_{IN} = 4dBm$
 Reference: 49dB, 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, 5dB/div.
 Bottom Curve: Input Return Loss @ Minimum Gain
 Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness @ 44dBm & 37dBm

Top Curve: ALC @ 44dBm, $P_{IN} = 0dBm$
 Bottom Curve: ALC @ 37dBm, $P_{IN} = 0dBm$
 Reference: 41dB, 1.5dB/div.
 Middle Curve: Input Return Loss
 Reference: 0dB, 10dB/div.

