EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

1094 - BBM2E3KKO

20 – 520 MHz / 100 Watts

The BBM2E3KKO (SKU 1094) is suitable for VHF & UHF broadband and band specific high power linear applications. This amplifier utilizes push-pull 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, EMI/RFI filters, machined housings and qualified components. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state Class AB linear design
- Instantaneous ultra broadband
- Small and lightweight
- Built in Protection, Control & Monitoring Circuits
- Suitable for CW, AM, and FM (Consult factory for other modulation type)
- 50 ohm input/output impedance
- High reliability, ruggedness, and High Efficiency

RoHS Compliant available
SKU# 1094-0001

ELECTRICAL SPECIFICATIONS @ +28V_{DC}, 25°C, 50 Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	20		520	MHz
Output Power CW	P_{SAT}	100	120		Watt
Output Power @ 1dB Gain Compression	P_{1dB}		60		Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	50			dB
Input Power for Rated P_{OUT}	P_{IN}		0		dBm
Small Signal Gain Flatness	ΔG		±1.0	±1.5	dB
Gain Adjustment Range (VVA_{CTRL} = 0 – 5 V_{DC})	VVA	25	30		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ minimum attenuation	NF		7	10	dB
Third Order Intercept Point 2 - Tone @ 37dBm/Tone, Δ = 100kHz	IP3		+56		dBm
Harmonics @ P_{OUT} = 100W	2^{nd}		-40		dBc
	3^{rd}		-15		
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage	V_{DC}	26	28	30	Volt
Current Consumption @ 100 W	I_{DD}		8.0	8.5	Amp
Switching Time @ 10kHz TTL, 50% Duty Cycle	$T_{ON/OFF}$		1.0		uSec

MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions	6.4 x 3.4 x 1.1	Inch
Weight	1.0	lb.
RF Connectors Input/Output	Type-SMA, Female	
DC Interface Connector	D-Sub 9-Pin, Male	
Cooling	External Heatsink	

ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	-40		+85	°C
Storage 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 1	VI/SH		Airborne		

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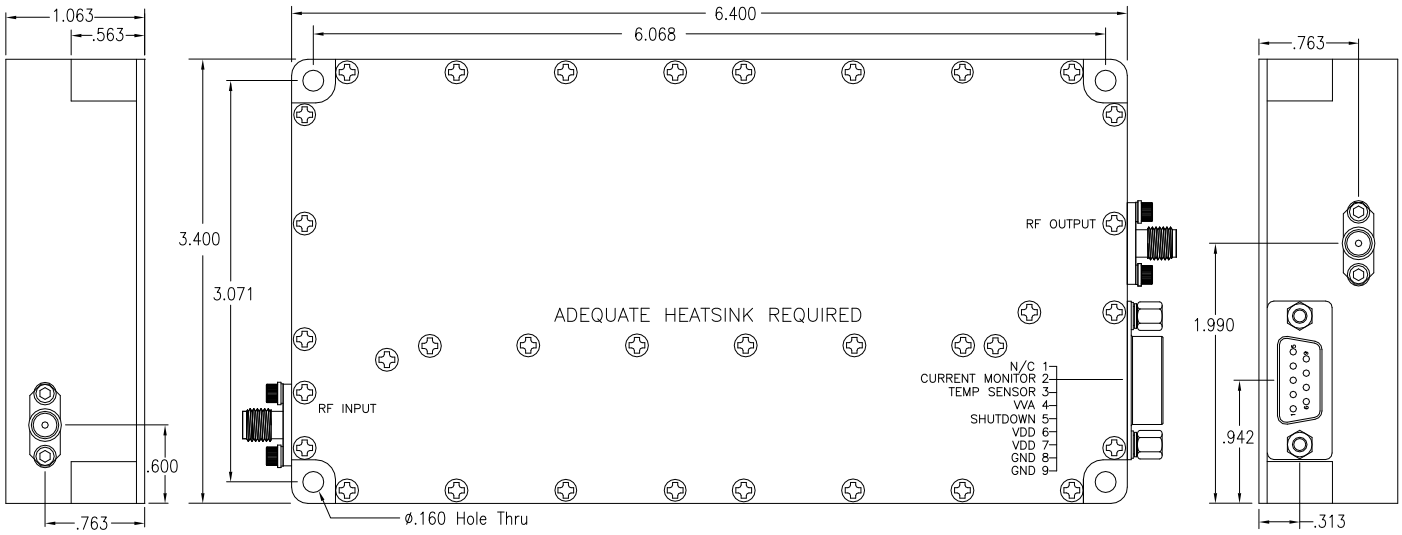
SURVIVABILITY

Input Overdrive	P_{OD}	+10 dBm	Max
Load VSWR @ Rated P_{1dB} = 60W	Ψ	∞ @ all load phase & amplitude	1 minute
Load VSWR @ Rated P_{1dB} = 60W	Ψ	3:1 @ all load phase & amplitude continuous	-
Thermal Overload	T_{OL}	60°C graceful degradation @ 85°C the power gain will not drop more than 3dB	Max

INTERFACE CONNECTOR - D-Sub, 9-Pin

Pin #	Description	Specifications
1	N/C	No Connection
2	Current Monitor	Analog voltage relative to I_{DD} @ 50mV/100 mA
3	Temp Sensor	Analog voltage relative to Module's Temperature @ 10mV/°C
4	VVA	Maximum Gain = $0V_{DC}$ Minimum Gain = $5V_{DC}$
5	Shutdown	Amplifier Disable: TTL Logic "High" (*Internally Pulled-Low*)
6, 7	VDD	$+28.0V_{DC}$, ±2V
8, 9	GND	Ground

OUTLINE DRAWING



Features:

a. Built in gain adjust VVA
b. Fast switching - Mute function
c. Reverse polarity protection
d. Temperature protection
e. Temperature indication
f. Current limit protection
g. Current consumption indicator

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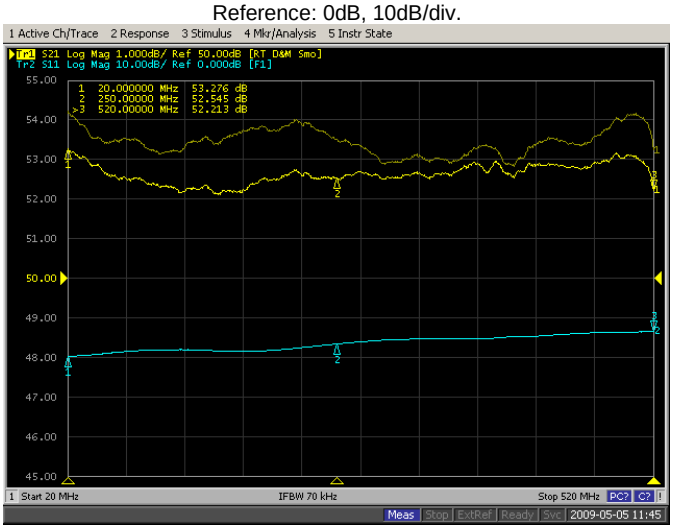
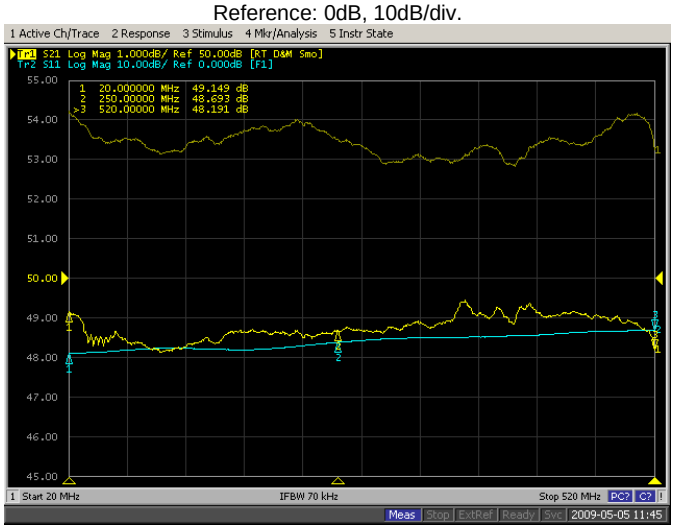
TYPICAL PERFORMANCE PLOTS

Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -3.4dBm
Reference: 50dB, 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}, Pin = 2dBm
Reference: 50dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range @ P_{IN} = -20dBm
Top curve: Maximum Gain, VVA_{CTRL} = 0V
Middle curve: Minimum Gain, VVA_{CTRL} = 5V
Reference: 20dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.