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 ISO9001:2015 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state Class AB 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

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			Watt
Output Power @ 1dB Gain Compression	P_{1dB}	50			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	25	30		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ max. gain	NF		7	10	dB
Third Order Intercept Point 2-Tone @ 37dBm/Tone, 100kHz Spacing	IP3		+56		dBm
Harmonics @ P_{OUT} = 100W	2nd		-40		dBc
	3rd		-15		
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage	V_{DC}	26	28	30	Volt
Current Consumption @ 100 W	I_{DD}			9.5	Amp
Switching Time @ 10kHz TTL, 50% Duty Cycle	$T_{ON/OFF}$		1.0		uSec

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimension	6.4 x 3.4 x 1.1	Inch
Weight	1.0	Pound
RF Connectors Input / Output	Type-SMA, Female	J1 / J2
DC Interface Connector	D-Sub 9-Pin, Male	J3
Cooling	External Heatsink (not supplied)	-

ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

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

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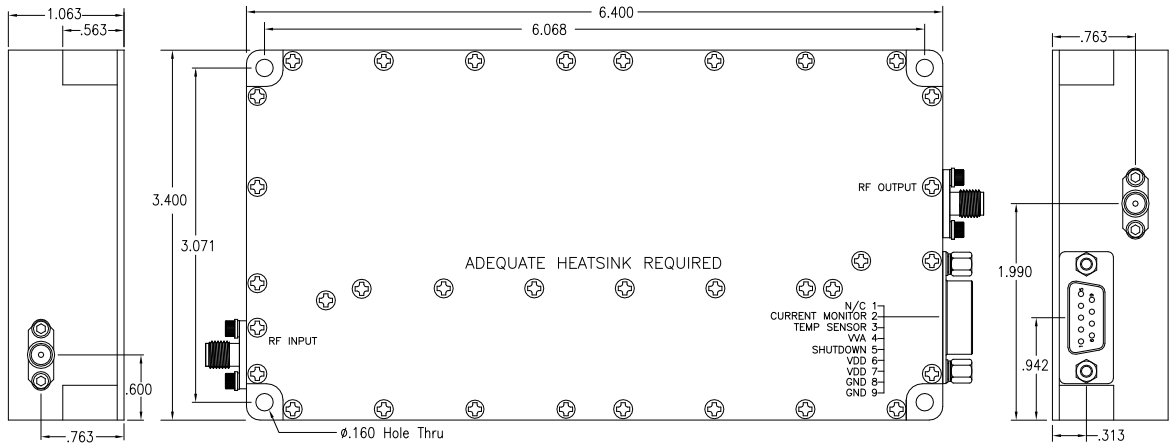
SURVIVABILITY

Input RF drive level without damage	P_{OD}	+10 dBm	Max
Load VSWR @ P_{OUT} = 60W	Ψ	∞ @ all load phase & amplitude	1 minute
Load VSWR @ P_{OUT} = 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

DC INTERFACE CONNECTOR - D-Sub, 9-pin, Male

Pin #	Description	Specification
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	Control voltage range, 0-5V_{DC} Maximum Gain = 0V_{DC}, Minimum Gain = 5V_{DC}
5	Shutdown	Amplifier Disable: TTL Logic High (5V_{DC}) (*Internally Pulled-Low, 0V*)
6&7	VDD	+26.0-30.0V_{DC}
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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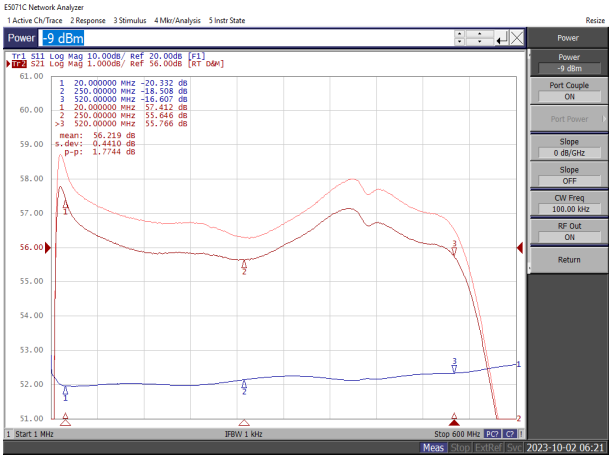
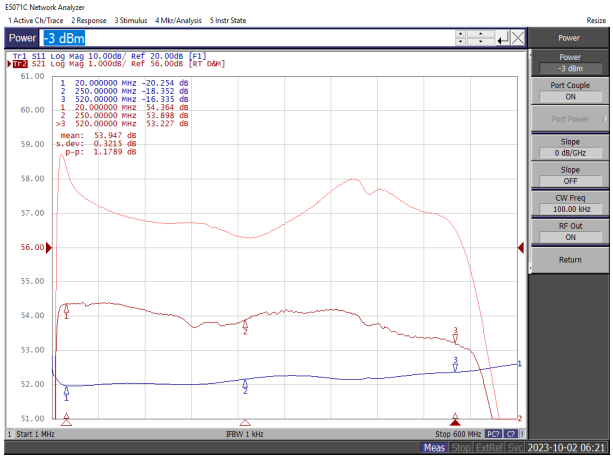
TYPICAL PERFORMANCE PLOTS

Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -9.0dBm
Reference: 56dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 20dB, 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} = -3.0dBm
Reference: 56dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 20dB, 10dB/div.



Plot 3 – Gain Adjustment Range, P_{IN} = -20dBm
Top Curve: Max. Gain @ VVA_{CTRL} = 0.0V
Middle Curve: Min. Gain @ VVA_{CTRL} = 5.0V
Reference: 30dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 20dB, 10dB/div.