EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

1138 – BBM5K8CAJ

2500 – 6000 MHz, 10 Watts

The BBM5K8CAJ (SKU 1138) is suitable for broadband high power L and S band and jamming applications. This compact module utilizes high-power advanced GaN devices that provide excellent power density, high efficiency, wide dynamic range and low distortion. 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.

Shown with Option

- Solid-state Class AB design
- Extremely wide instantaneous bandwidth
- Compact and lightweight
- Built-in control, monitoring and protection circuits
- Suitable for CW, AM and FM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- Highly rugged and reliable

RoHS Compliant available
SKU# 1138-0001

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	2500		6000	MHz
Output Power CW	P_{SAT}	10	12		Watt
Output Power @ 1dB Gain Compression	P_{1dB}		8		Watt
Power Gain @ P_{1dB}	G_{1dB}	40			dB
Input Power for Rated P_{SAT}	P_{IN}		0	5	dBm
Small Signal Gain Flatness	ΔG_{SS}		±1.0	±2.0	dB
Third Order Intercept Point 2-Tone @ 28dBm/Tone, 100kHz Spacing	IP3		+48		dBm
Gain Adjustment Range	VVA		25		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ max. gain	NF			10	dB
Harmonics @ P_{OUT} = 8W	H		-20	-15	dBc
Spurious Signals	Spur		-70	-60	dBc
Switching Time, 1kHz TTL, P_{IN} = 0dBm	$T_{ON/OFF}$			5	µs
Operating Voltage	V_{DC}	26	28	30	Volt
Current Consumption @ P_{OUT} = 10W	I_{DD}		2.7		Amp

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions	6.0 X 3.0 X 1.0	Inch
Weight	1.0	Pound
RF Connectors Input/Output	Type-SMA, Female	
DC Interface Connector	D-Sub 9-Pin, Male	
Cooling	External Heatsink (Not Supplied)	

ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	-20		+75	°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 I	VI/SH		Airborne		

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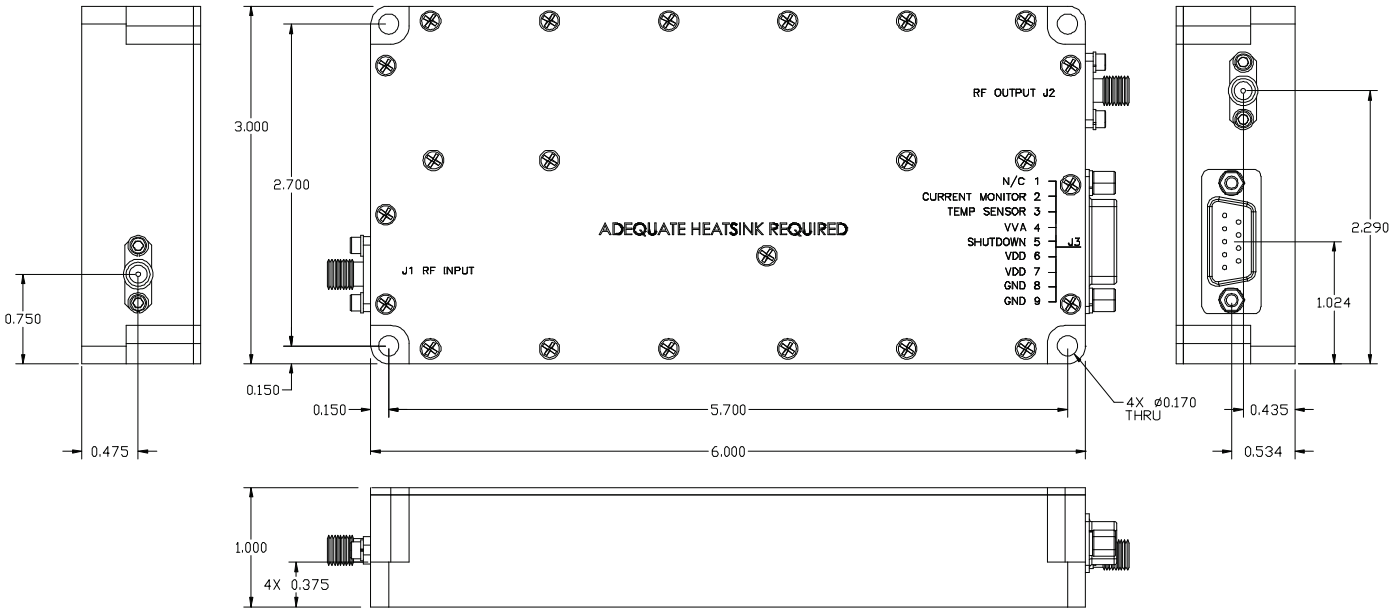
LIMITS

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 Degradation	Max

DC INTERFACE CONNECTOR – D-Sub 9-Pin, Male

Pin #	Description	Specification
1	N/C	No Connection
2	Current Monitor	Analog voltage relative to current consumption @ 100mV/100mA
3	Temp Sense	Analog voltage relative to case temperature @ 10mV/°C (0.25V = 25°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) (*Internally Pulled-Low*)
6&7	VDD	+26.0-30.0V_{DC}
8&9	GND	Ground

OUTLINE DRAWING



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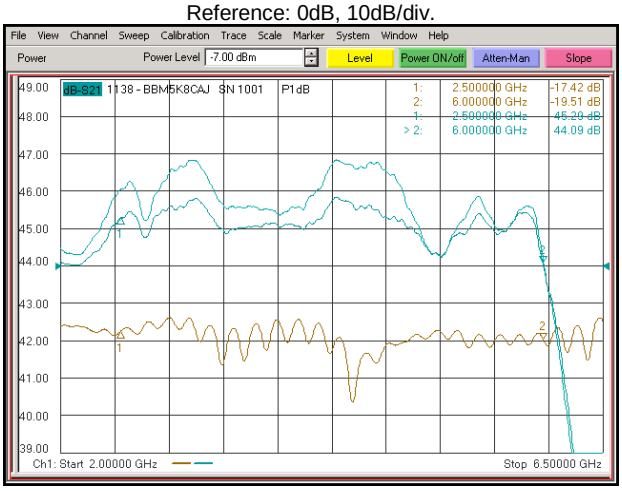
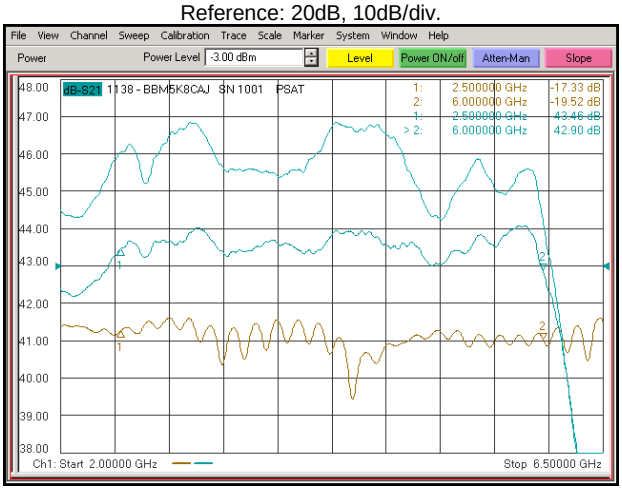
TYPICAL PERFORMANCE PLOTS

Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -7.0dBm
Reference: 44dB, 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} = -3.0dBm
Reference: 43dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 20dB, 10dB/div.



Plot 3 – Gain Adjustment Range
Top Curve: Max. Gain @ VVA_{CTRL} = 0V, P_{IN} = -20dBm
Middle Curve: Min. Gain @ VVA_{CTRL} = 5.0V, P_{IN} = -20dBm
Reference: 15dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.