EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

1149 – BBM4A5AMP | 1000 – 2000 MHz / 150 Watts

The BBM4A5AMP (SKU 1149) is suitable for broadband mobile Jamming and band specific high power applications in the P/L/S frequency bands. This compact module utilizes high power advanced GaN devices that provide excellent power density, high efficiency, wide dynamic range and low distortions. 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 design
- Instantaneous ultra broadband
- Small form factor and lightweight
- Suitable for CW, AM and FM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness
- Built-in control, monitoring and protection circuits

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1000		2000	MHz
Output Power CW	P_{SAT}	100		150	Watt
Output Power @ 1dB Gain Compression	P_{1dB}		80		Watt
Power Gain @ 1dB Gain Compression	G_P	48	50		dB
Input Power for Rated P_{SAT}	P_{IN}		0	3	dBm
Phase Tracking @ P_{SAT} (All module)	ΔPT			±10	Deg
Gain Tracking @ P_{SAT} (All module)	ΔGT			±1.0	dB
Input Return Loss	S_{11}			-10	dB
Noise Figure	NF			10	dB
Third Order Intercept Point 2-Tone @ 38dBm/Tone, 100kHz Spacing	IP3		+55		dBm
Harmonics @ P_{OUT} = 100W	$2^{ND}/3^{RD}$			-10/-17	dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage	V_{DC}	26	28	30	Volt
Current Consumption	I_{DD}			14	Amp
Quiescent Current (No RF input)	I_{DQ}			3.0	Amp
Switching Time (10% to 90%) @ 100kHz TTL	T_{SW}		2.0	5.0	uSec
Current Consumption @ Shutdown	I_{SD}			0.3	Amp

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions	7.4 x 4.1 x 1.06	Inch
Weight	2	Pound
RF Connectors In/Out	J1 – Input Type-SMA, Female J2 – Output Type-TNC, Female	
DC Interface Connector	J3 – Hybrid, D-Sub 7-Pin, Male (Mate: ITT Cannon: DAM7W2SA197)	
Cooling	External Heatsink (Not Supplied)	
Sealing and Coating	Sealed Unit with gaskets covers, sealed connectors, and conformal coated boards	
External Finish	AkzoNobel Interpon 700 EM150K 7.5YR6/3 SEMI GLOSS (Powder Application by electrostatic spraying) Base plate for thermal conduction coated with conversion coating according to MIL-C-5541 class 3	

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ENVIRONMENTAL CHARACTERISTICS (Qualified)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	-20		+70	°C
Non-operating Temperature	T_{STG}	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude (MIL-STD-810F Method 500.4)	ALT			50,000	Feet
Vibration/Shock MIL-STD-810F - Method 514.5/516.5 – Proc I	VI/SH		Airborne		

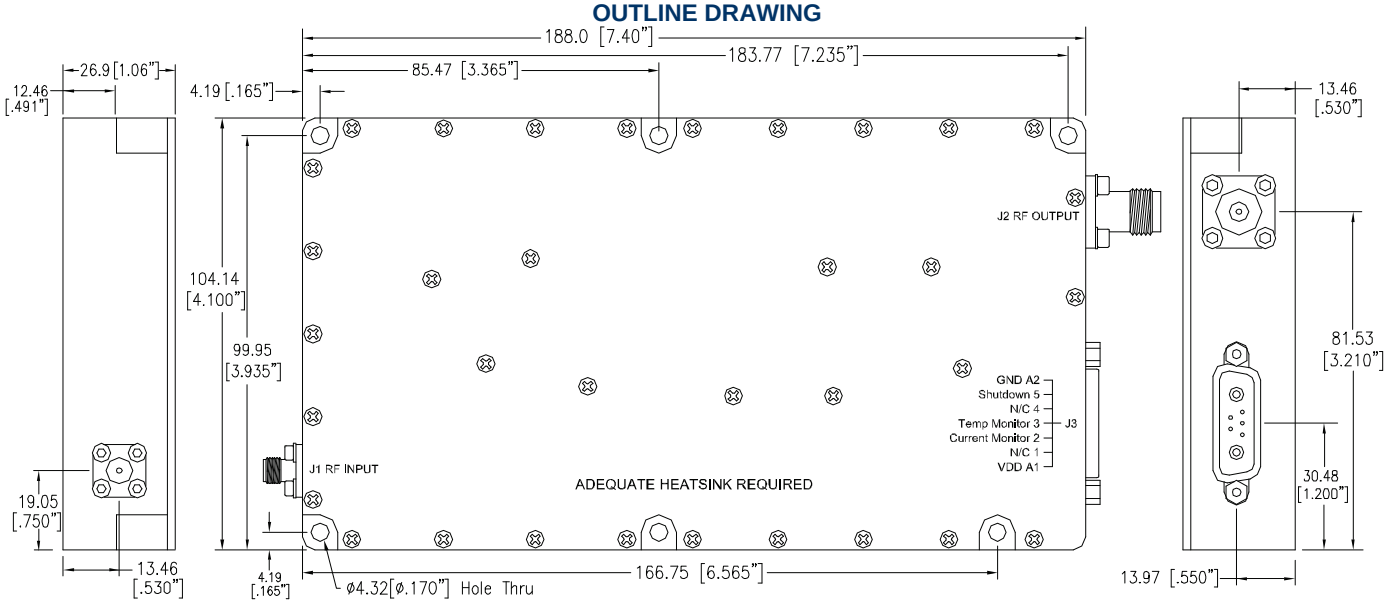
LIMITS

Input RF drive level without damage	+15 dBm	Max
DC Input	Reverse Polarity	
Load VSWR @ P_{OUT} = 100W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	Graceful Degradation	Typ

DC INTERFACE CONNECTOR – Hybrid, D-Sub 7-Pin, Male (J3)

Pin #	Description	Specification
A1	VDD	+26.0-30.0V_{DC}
A2	GND	Ground
1	N/C	No Connection
2	Current Monitor	Analog voltage relative to I_{DD} @ 25mV/100mA (4V max)
3	Temp Monitor	Analog voltage relative to module temperature @ 10mV/°C (0.50V_{OFFSET}) : ($V_{MEASURED}$ – 0.50V)/0.01)= °C, or e.g. (0.75V_{DC} – 0.50V)/0.01= 25°C
4	N/C	No Connection
5	Shutdown	Amplifier Enable: TTL Logic Low (0V) (*Internally Pulled-High*)

OUTLINE DRAWING



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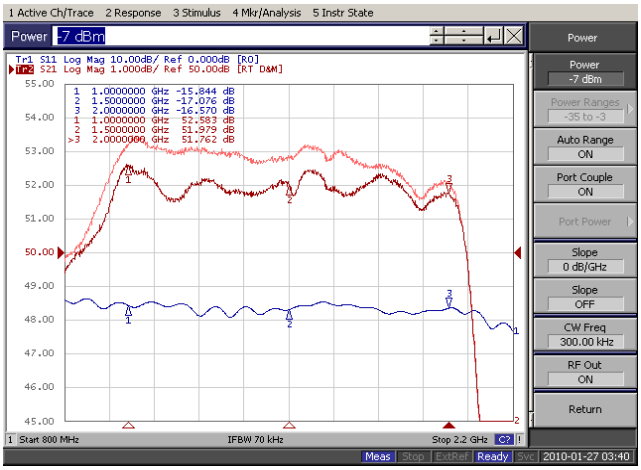
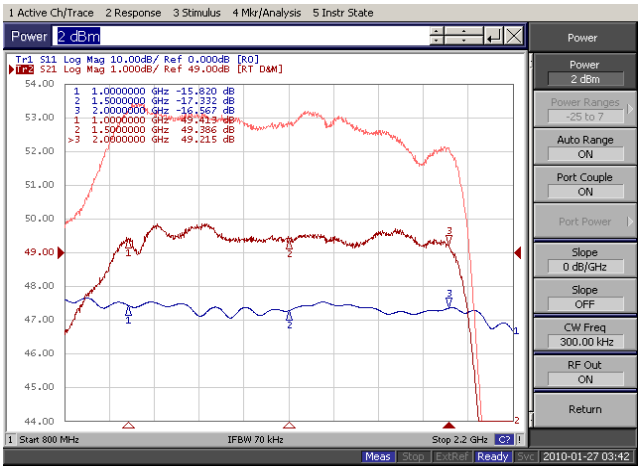
TYPICAL PERFORMANCE PLOTS

Plot 1 – Small Signal Gain and P1dB
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -7dBm
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 @ Pin = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = 2dBm
Reference: 49dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plots 3 –Power Gain & Phase Response
Top Curve: Power Gain @ P_{SAT}, P_{IN} = +2dBm
Reference: 48dB, 1dB/div.
Bottom Curve: Phase Response
Reference: 150deg, 10deg/div.
Electrical Delay 9.58nsec.