EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

1165 – BBM4A5ALO	1000 – 2000 MHz / 120 Watts

The BBM4A5ALO (SKU 1165) is suitable for broadband mobile Jamming, Communication and band specific high power applications in the L frequency band. 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
- Environmentally & hermetically sealed

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}	120			Watt
Output Power @ 1dB Gain Compression	P_{1dB}		50		Watt
Power Gain @ P_{1dB}	G_p	50			dB
Input Power for Rated P_{SAT}	P_{IN}		0	3	dBm
Gain Flatness @ Rated P_{SAT}	ΔG			±1.5	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 @ P_{OUT} = 120W	I_{DD}			14	Amp
Quiescent Current	I_{DQ}			3.0	Amp
Switching Speed (10% to 90%)	$T_{ON/OFF}$		2.0	5.0	uSec

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimension	7.4 x 4.1 x 1.1	Inch
Weight	2	Pound
RF Connectors Input/Output	Input: J1 – Type-SMA, Female Output: J2 – Type-TNC, Female Finish: Stainless Steel	
DC Interface Connector	J3 – Hybrid D-Sub, 7-Pin, Male Mating Connector: ITT Cannon – P/N: DAM7W2SA197	
Cooling	External Heatsink (not supplied)	
Sealing and Coating	Sealed Unit with gasket cover, 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 shall be coated with conversion coating acc. to MIL-C-5541 class 3	

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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			50,000	Feet
Vibration/Shock MIL-STD-810F Method 514.5/516.5 – Proc 1	VI/SH		Airborne		

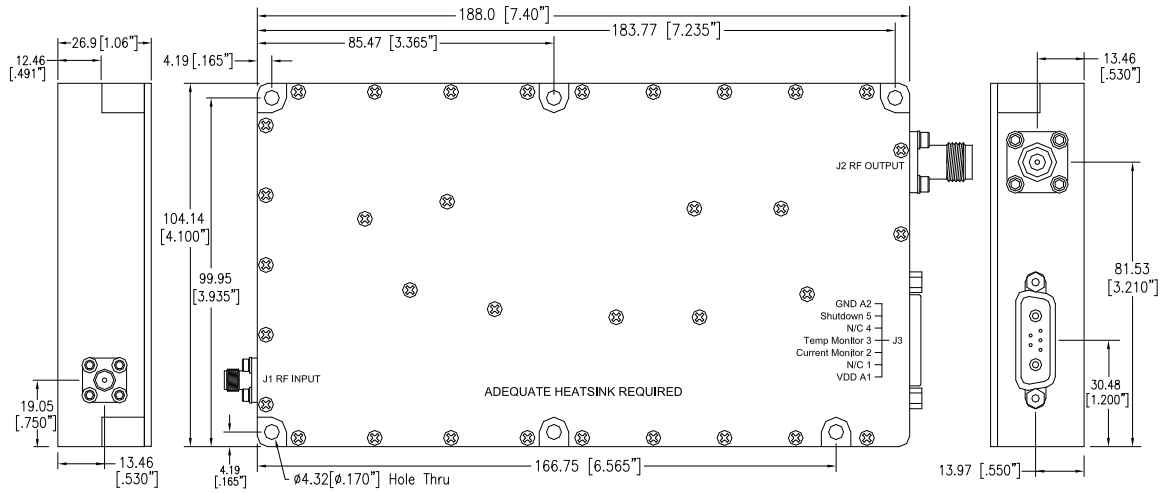
LIMITS

Input RF drive level without damage	+15 dBm	Max
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

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

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 (- 500mV)
4	N/C	No Connection
5	Shutdown	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-Low*)

OUTLINE DRAWING



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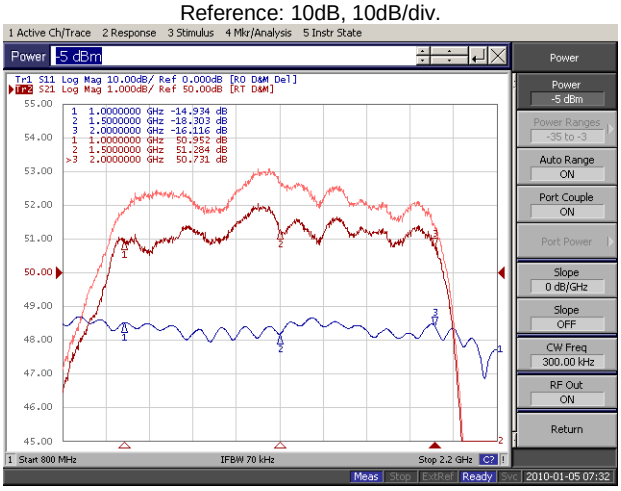
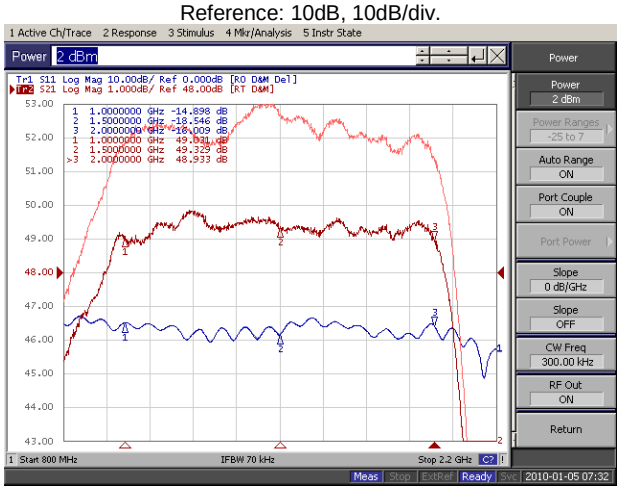
TYPICAL PERFORMANCE PLOTS

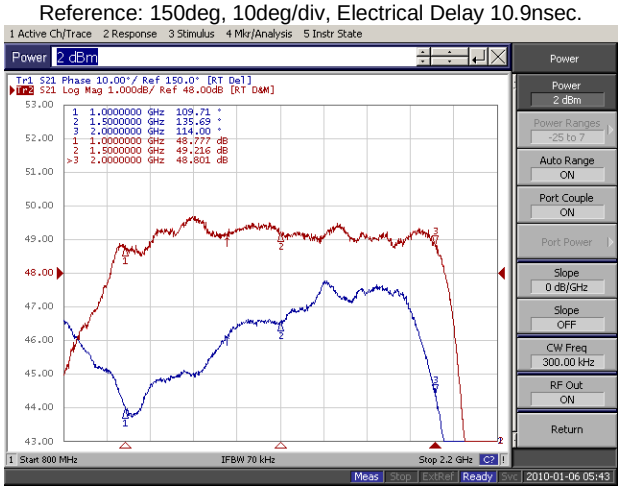
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -5dBm
Reference: 50dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 10dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = +2dBm
Reference: 48dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 10dB, 10dB/div.



Plot 3 – P_{SAT} Gain & Phase Tracking
Top Curve: P_{SAT} Gain @ P_{IN} = +2dBm
Reference: 48dB, 1dB/div.
Bottom Curve: Phase
Reference: 150deg, 10deg/div, Electrical Delay 10.9nsec.



Plot 4 – Switching Time, 200KHz TTL, P_{IN} = 0dBm