

Solid State Broadband High Power Amplifier

1146 - BBM4A6AK5
1000 - 3000MHz / 100Watts

The BBM4A6AK5 (SKU # 1146) is suitable for broadband mobile Jamming and band specific high power applications in the L and 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 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

RoHS Compliant available
 SKU# 1146-0001

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1000		3000	MHz
Power Output CW	P _{SAT}	100			Watt
Output Power @ 1dB Gain Compression	P _{1dB}	40			Watt
Power Gain	G _P	7			dB
Small Signal Gain	G _{SS}	10	11		dB
Input Power for Rated P _{1dB}	P _{IN}		37		dBm
Small Signal Gain Flatness	ΔG _{SS}			±1.5	dB
Input Return Loss	S ₁₁			-10	dB
Noise Figure	NF			10	dB
Third Order Intercept Point 2-Tone @ 40dBm/Tone, 250kHz Spacing	IP3		+58		dBm
Harmonics @ P _{OUT} = 40W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage	V _{DC}	26	28	30	Volt
Current Consumption @ P _{OUT} = 100W	I _{DD}		10	12	Amp
Quiescent Current	I _{DQ}		1.1		Amp
Current Consumption @ Shutdown	I _{SD}		100		mA
Switching Time, 1kHz TTL, P _{OUT} = 40W	T _{ON} /T _{OFF}		2.0	5.0	uSec
Module to Module Gain Matching	Opt			±0.5	dB
Module to Module Phase Matching	Opt			±10	Deg

ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T _C	-20		+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 I	VI/SH		Airborne		

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MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions L x W x H	6.81 x 4.43 x 1.14	Inch
Weight	2.2	Pound
RF Connectors Input/Output	Type-SMA, Female	
DC Interface Connector	Hybrid, D-Sub 7-Pin, Male (7W2)	
Cooling	External Heatsink (Not Supplied)	

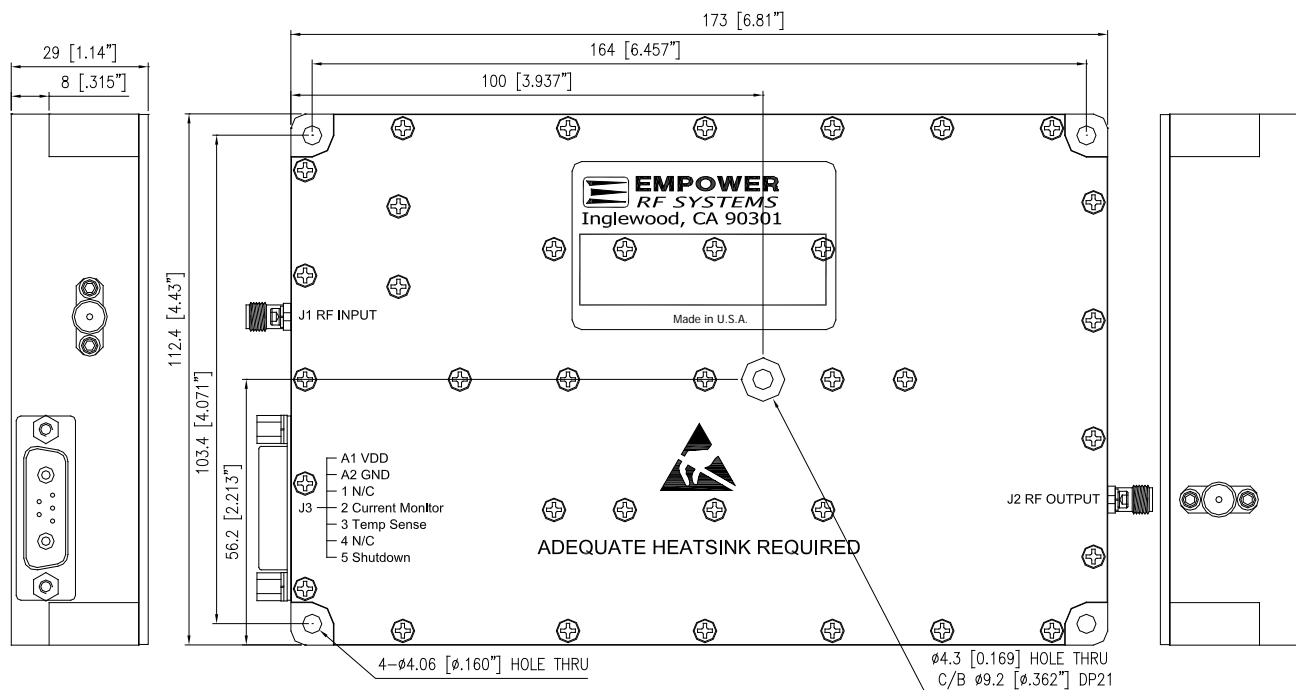
LIMITS

Input RF drive level without damage	+45dBm	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: @ 70°C, the power gain will not drop more than 1dB	Max

DC INTERFACE CONNECTOR – Hybrid, D-Sub, 7-Pin, Male (7W2)

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
3	Temp Sense	Analog voltage relative to Module's Temperature @ 10mV/°C
4	N/C	No Connection
5	Shutdown	Amplifier Disable: TTL Logic High (5V) (Internally Pulled-Low)

OUTLINE DRAWING



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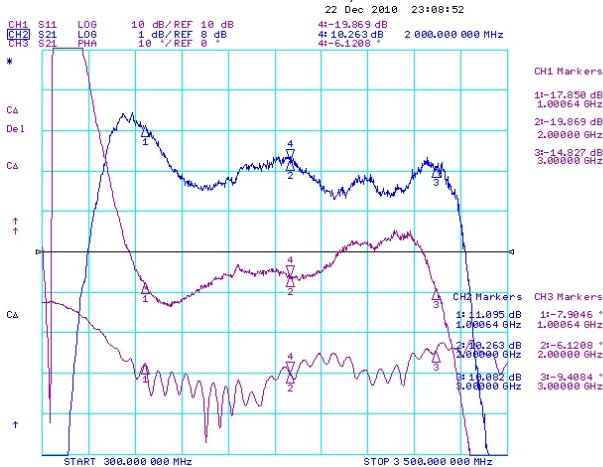
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PERFORMANCE PLOTS

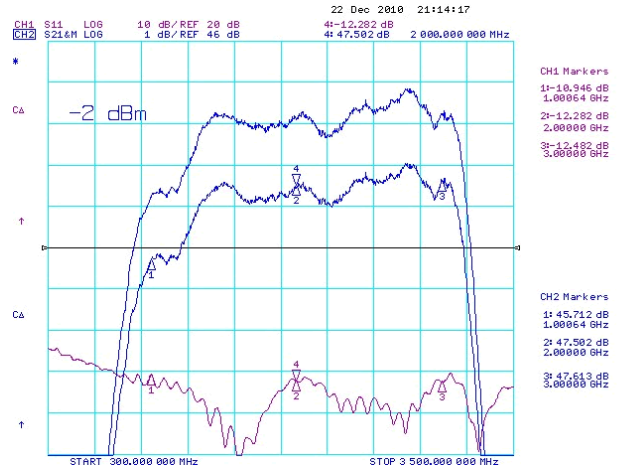
Plot 1 – Small Signal Gain and Phase Response

Top Curve: Small Signal Gain @ $P_{IN} = 0\text{dBm}$
 Reference: 8dB, 1dB/div.
 Middle Curve: Phase Response
 Reference: 0deg, 10deg/div, Elec. Delay 6.83nsec.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



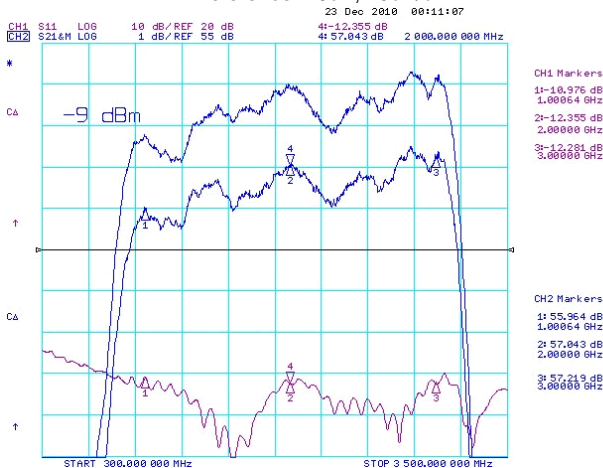
Plot 2 – Driver Small Signal Gain and P_{1dB} (1148)

Top Curve: Small Signal Gain @ $P_{IN} = -20\text{dBm}$
 Middle Curve: Power Gain @ P_{1dB} , $P_{IN} = -2\text{dBm}$
 Reference: 46dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 20dB, 10dB/div.



Plot 3 – Small Signal Gain and P_{1dB} with Driver

Top Curve: Small Signal Gain @ $P_{IN} = -20\text{dBm}$
 Middle Curve: Power Gain @ P_{1dB} , $P_{IN} = -9\text{dBm}$
 Reference: 55dB, 1dB/div.
 Bottom Curve: Input Return Loss of Driver
 Reference: 20dB, 10dB/div.



Plot 4 – Small Signal Gain and P_{SAT} with Driver

Top Curve: Small Signal Gain @ $P_{IN} = -20\text{dBm}$
 Middle Curve: Power Gain @ P_{SAT} , $P_{IN} = -3\text{dBm}$
 Reference: 55dB, 1dB/div.
 Bottom Curve: Input Return Loss of Driver
 Reference: 20dB, 10dB/div.

