EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

1154 - BBM1C4A6F

1 – 1000 MHz / 4 Watts

The BBM1C4A6F (SKU 1154) is suitable for ultra broadband and band specific high power applications. This amplifier module utilizes MOSFET power devices that provide high gain, wide dynamic range 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 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 type)
- 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	1		1000	MHz
Output Power CW	P_{SAT}	4	5		Watt
Output Power @ P_{1dB} Gain Compression	P_{1dB}	3			Watt
Power Gain @ P_{1dB}	G_{1dB}	32			dB
Input Power for Rated P_{SAT}	P_{IN}		4	6	dBm
Small Signal Gain Flatness	ΔG			±1.0	dB
Gain Adjustment Range	VVA		25		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure max. gain	NF		7	10	dB
Harmonics @ P_{OUT} = 3W	H		-25		dBc
Third Order Intercept Point 2-Tone @ 26dBm/Tone, 100kHz Spacing	IP3		+43		dBm
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage	V_{DD}	26	28	30	Volt
Quiescent Current	I_{DQ}		1.0		Amp
Current Consumption @ P_{OUT} = 4W	I_{DD}			1.5	Amp

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions	3.5 x 2.5 x 1.1	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	0		+75	°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	SH / VI		Airborne		

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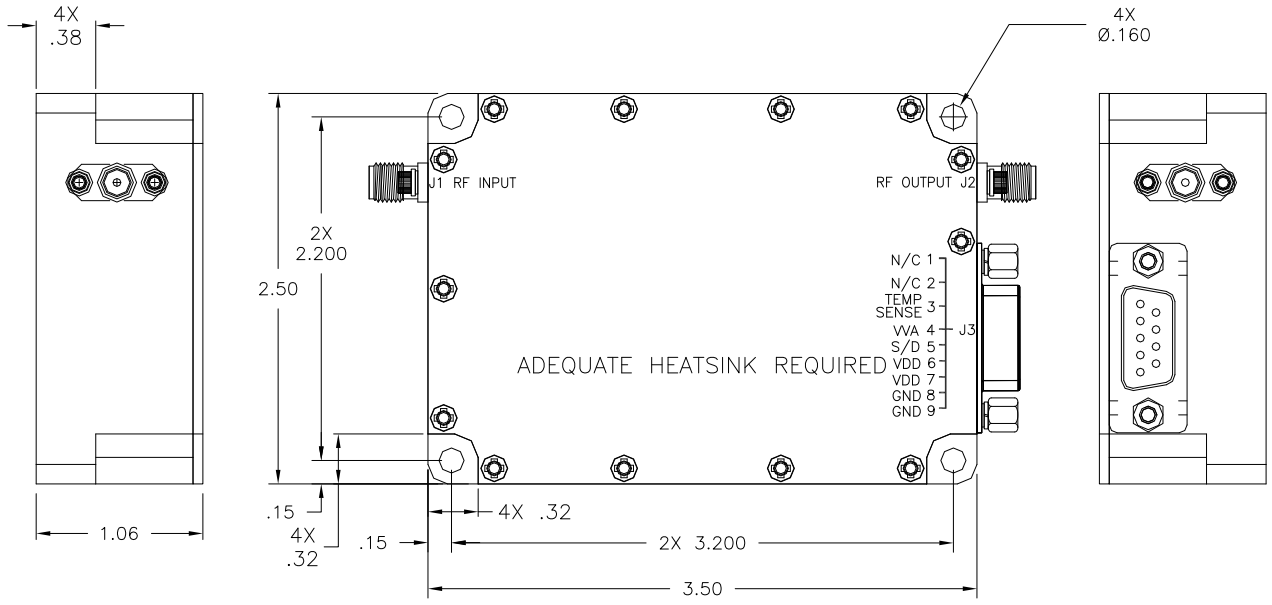
LIMITS

Input RF drive level without damage	+10 dBm	Max
Load VSWR @ P_{OUT} = 3W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

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

Pin #	Description	Specification
1	N/C	No Connection
2	N/C	No Connection
3	Temp Sense	Analog voltage relative to Module's Temperature @ 10mV/°C
4	VVA	Control voltage range; 0-5V_{DC} Maximum Gain: 0$V_{DC,}$ Minimum Gain: 5V_{DC}
5	S/D (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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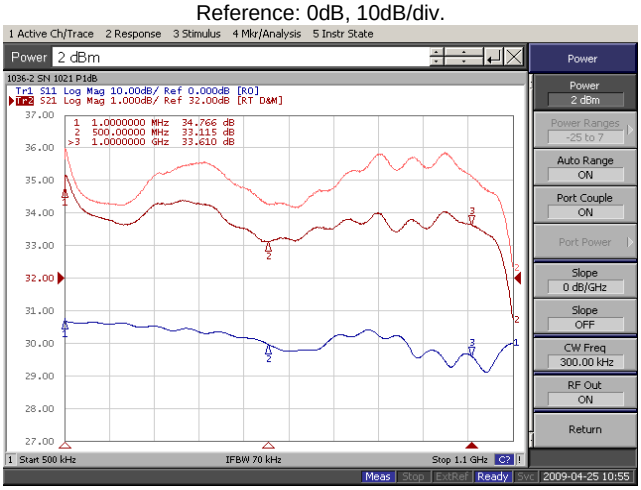
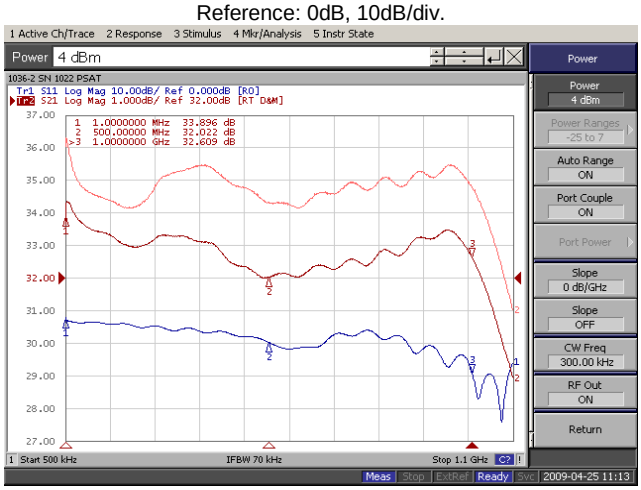
TYPICAL PERFORMANCE PLOTS

Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = 2.0dBm
Reference: 32dB, 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} = +4.0dBm
Reference: 32dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 –Gain Adjustment Range @ P_{IN} = -20dBm
Top Curve: Max. Gain @ VVA_{CTRL} = 0V
Middle Curve: Min. Gain @ VVA_{CTRL} = 5V
Reference: 0.0dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.