EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

1099 - BBM0D3FHM

0.15 – 250 MHz / 50 Watts

The BBM0D3FHM (SKU 1099) is suitable for high power ultra broadband or band specific linear applications. This amplifier utilizes push-pull MOSFET power devices that provide high gain, wide dynamic range, low distortions 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 A linear 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 & protection circuits

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	0.15		250	MHz
Output Power CW	P_{SAT}	50			Watt
Output Power @ 1dB Gain Compression	P_{1dB}	30			Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	46			dB
Input Power for Rated P_{SAT}	P_{IN}		0		dBm
Small Signal Gain Flatness	ΔG		±1.0	±2.0	dB
Gain Adjustment Range	VVA	20	25		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ minimum attenuation	NF		7	10	dB
Third Order Intercept Point 2-Tone @ 34dBm/Tone, 100kHz Spacing	IP3		+53		dBm
Harmonics @ P_{OUT} = 30W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage	V_{DC}	26	28	30	Volt
Current Consumption @ P_{OUT} = 50W	I_{DD}		7.0		Amp

MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Limits
Dimensions	7.0 X 5.0 X 1.3	Inch	Max
Weight	3.0	lb.	Max
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		+50	°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-810 F - Method 514.5/516.5 – Proc I	VI/SH		Airborne		

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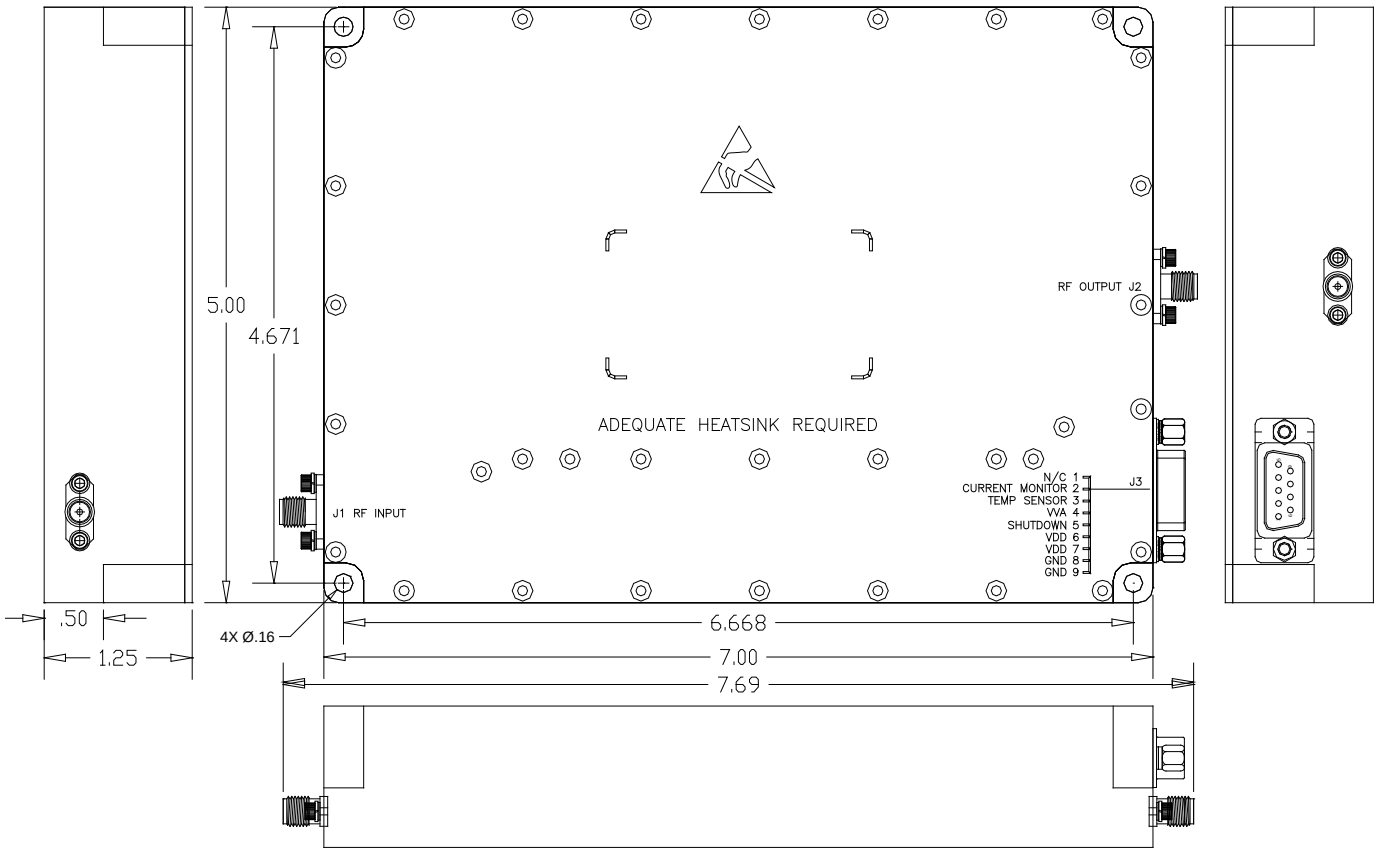
LIMITS

Input RF drive level without damage	+10 dBm	Max
Load VSWR @ P_{OUT} = 30W	∞ @ all phase & amplitude for duration of 1 minute 3:1 @ all phase & amplitude continuous	-
Thermal Overload	85°C shutdown - graceful degradation	Typical

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

Pin #	Description	Specifications
1	N/C	No Connection
2	Current Monitor	Analog voltage relative to I_{DD} @ 50mV/100mA
3	Temp Sensor	Analog voltage relative to module's temperature @ 10mV/°C
4	VVA	Continuous Analog Control Level: 0-5 V_{DC} Maximum Gain: 0V_{DC}, Minimum Gain: 5V_{DC}
5	Shutdown	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-Low*)
6, 7	VDD	+28.0V_{DC} ±2V
8, 9	GND	Ground

OUTLINE DRAWING



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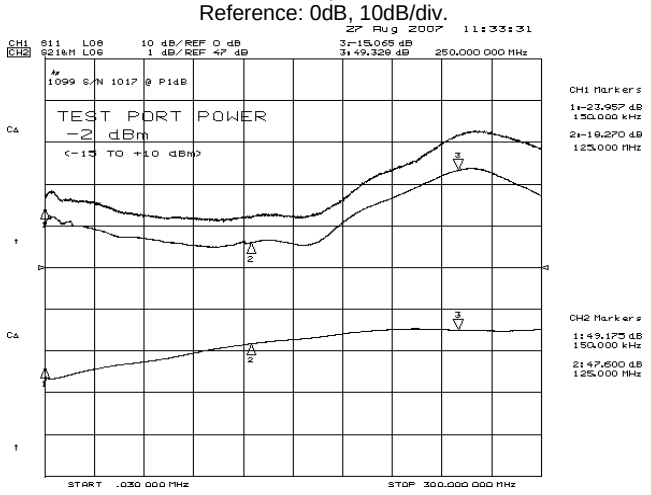
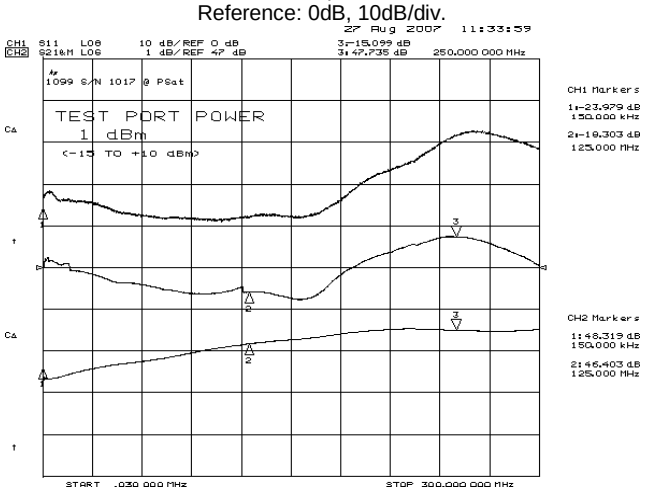
TYPICAL PERFORMANCE PLOTS

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: 47dB, 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} = +1.0dBm
Reference: 47dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range
Top Curve: Max. Gain @ VVA_{CTRL} = 0.0V, P_{IN} = -20dBm
Middle Curve: Min. Gain @ VVA_{CTRL} = 5.0V
Reference: 20dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.