

# Solid State Broadband High Power Amplifier

**1025 - BBM3I4AHM**
**400 – 1000 MHz / 50 Watts**

The BBM3I4AHM (SKU 1025) is suitable for broadband or band specific high power linear applications. This amplifier utilizes high Power LDMOS 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 AB linear design
- Instantaneous ultra broadband
- Small and lightweight
- Suitable for CW, AM, and FM (for other modulation type consult factory)
- 50 ohm input/output impedance
- High reliability and ruggedness

## ELECTRICAL SPECIFICATIONS @ +28 or +24 VDC, 25°C, 50Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	400		1000	MHz
Power Output CW @ 28 V <sub>DC</sub>	P <sub>SAT</sub>	50			Watt
Power Output CW @ 24 V <sub>DC</sub> (OPT042)	P <sub>SAT</sub>		50		Watt
Output Power @ 1 dB Gain Compression Point	P <sub>1dB</sub>		30		Watt
Power Gain @ 1 dB Gain Compression Point	G <sub>1dB</sub>	46			dB
Input Power for Rated Pout	P <sub>IN</sub>		0		dBm
Small Signal Gain Flatness	ΔG			±1.5	dB
Gain Adjustment Range (VVA: 0 – 5 V <sub>DC</sub> )	VVA	25	30		dB
Input Return Loss	S <sub>11</sub>			-10	dB
Noise Figure @ minimum attenuation	NF			10	dB
Third Order Intercept Point 2-Tones @ 2 W/Tone	IP3	+50			dBm
Harmonics @ P1 dB Gain Compression Point	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (28 V <sub>DC</sub> )	V <sub>DC</sub>	26	28	30	Volt
Operating Voltage (24 V <sub>DC</sub> OPT042)	V <sub>DC</sub>	22	24	26	Volt
Supply Current @ 50 W, +28 V <sub>DC</sub>	I <sub>DD</sub>			7.0	Amp
Supply Current @ 50 W, +24 V <sub>DC</sub> (OPT042)	I <sub>DD</sub>		8.0		Amp

## MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Limits
Dimensions (excluding heatsink)	6.4 x 3.4 x 1.1	Inch	Max
Weight without HS	1.0	lb.	Max
RF Connectors In/Out	SMA female		
DC Connectors	Dsub, 9-Pins, Male		
Cooling	External Heatsink		

## ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T <sub>c</sub>	0		+50	°C
Storage Temperature	T <sub>stg</sub>	-40		+85	°C
Relative humidity (non-condensing)	RH			95	%
Altitude (MIL-STE-810F Method 500.4)	ALT	10,000		30,000	Feet
Shock / Vibration (MIL-STE-810F Method 516.5)	SH / VI		Airborne		

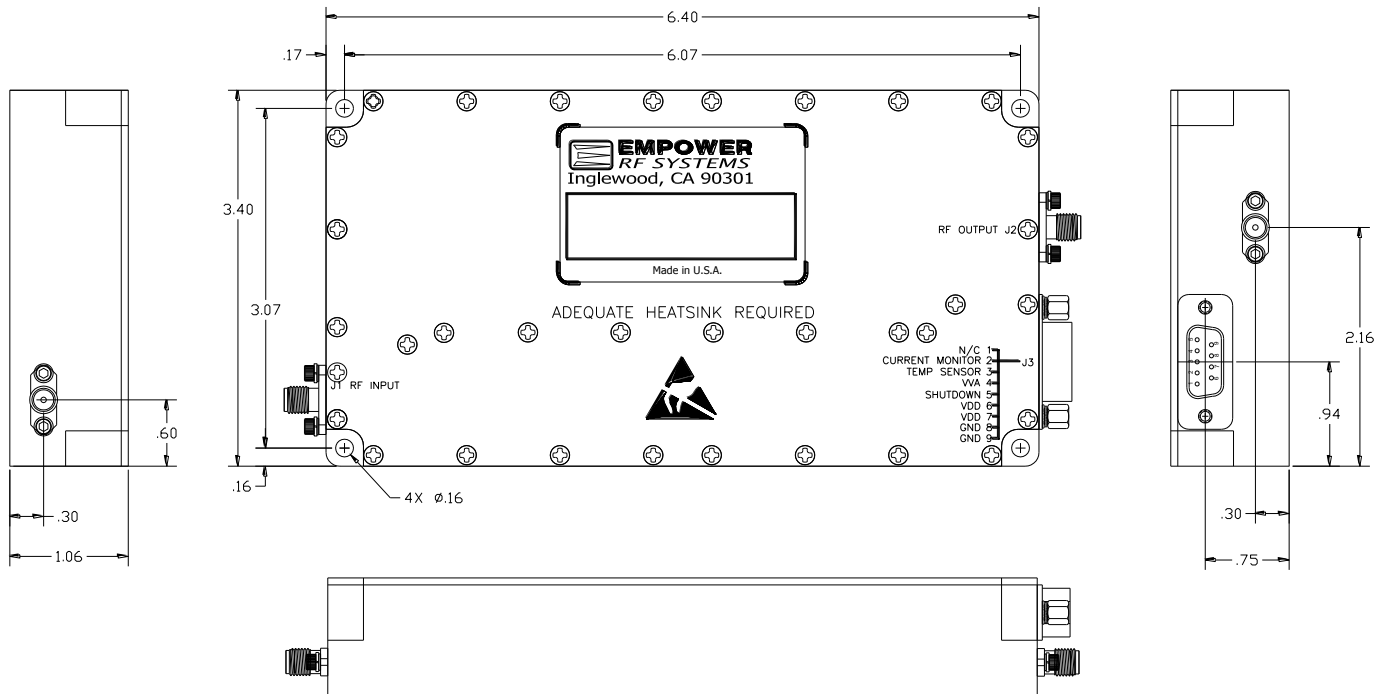
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**PROTECTIONS**

Input Overdrive	+10 dBm	Max
Load VSWR @ rated P1 dB Gain Compr. Point	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	Nom
Thermal Overload	85°C shutdown	Max

**INTERFACE CONNECTOR - Dsub, 9-Pin**

Pin #	Description	Specifications
1	N/C	Spare
2	Current Consumption Monitor	Analog voltage relative to I <sub>D</sub> @ 50 mV/100 mA
3	Temperature Sensor	Analog voltage relative to Module's Temperature @ 10 mV/°C
4	VVA	Max Gain = 0 V <sub>DC</sub> Min Gain = 5 V <sub>DC</sub>
5	Shutdown	Amplifier Enable: TTL "Low" or Open Amplifier Disable: TTL "High"
6	VDD	+28 ±2 V <sub>DC</sub> or optional +24 ±2 V <sub>DC</sub>
7	VDD	+28 ±2 V <sub>DC</sub> or optional +24 ±2 V <sub>DC</sub>
8	GND	Ground
9	GND	Ground

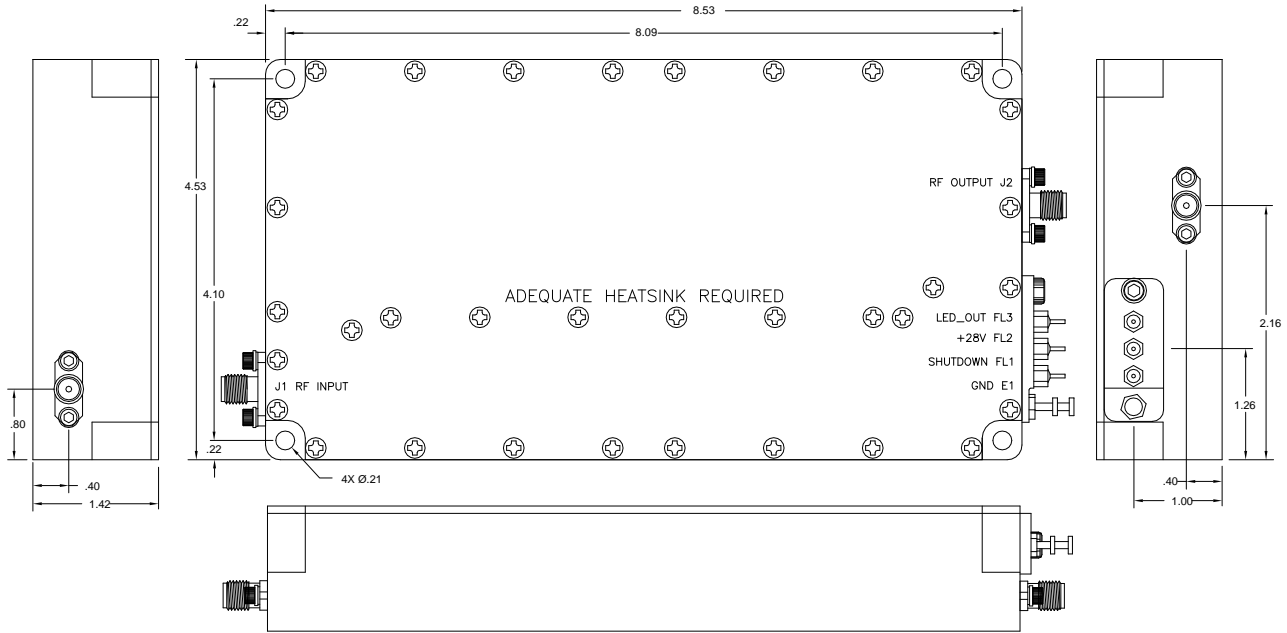
**OUTLINE DRAWING (Standard)**

**Features:**

- Built in gain adjust VVA
- Fast switching - Mute function
- Reverse polarity protection
- Temperature protection
- Temperature indication
- Current limit protection
- Current consumption indicator

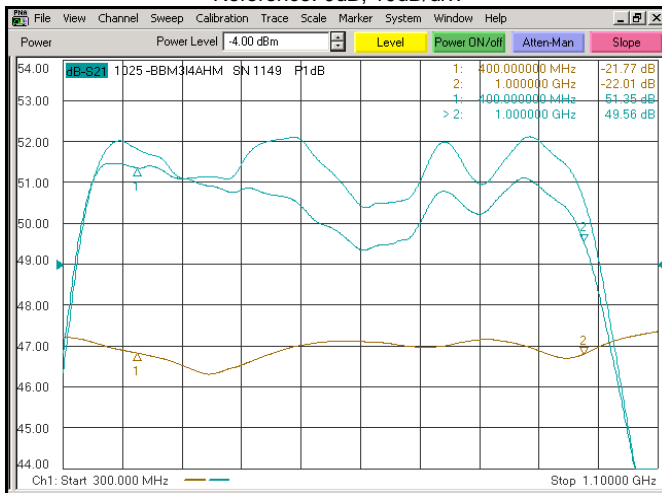
# Solid State Broadband High Power Amplifier

**1025 - BBM314AHM**
**400 – 1000 MHz / 50 Watts**
**INTERFACE CONNECTION - Feed Thru (OPT077 + OPT081 + OPT082 Version)**

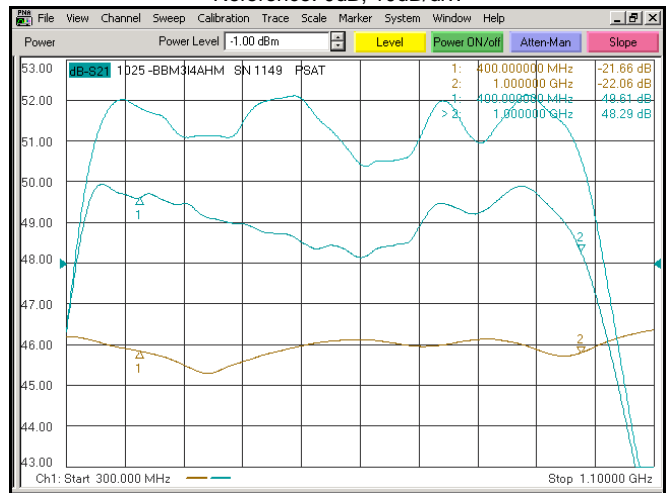
Pin #	Description	Specifications
FL1	Shutdown	Amplifier Enable: TTL "Low" or Open Amplifier Disable: TTL "High"
FL2	+VDD	+24 ±2 V <sub>DC</sub>
FL3	LED OUT	
E1	GND	Ground

**OUTLINE DRAWING (OPT077 + OPT081 + OPT082 Version)**

**TYPICAL PERFORMANCE PLOTS (24 V<sub>DC</sub> OPT042 Version)**
**Plots 1 - Small Signal and P<sub>1dB</sub> Gain**

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Power Gain @ P<sub>1dB</sub>, P<sub>IN</sub> = -4.1dBm (**Note 2**)  
 Reference: 49dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.


**Plot 2 - Small Signal and P<sub>SAT</sub>**

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: P<sub>SAT</sub> @ P<sub>IN</sub> = -1.1dBm (**Note 2**)  
 Reference: 48dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



# Solid State Broadband High Power Amplifier

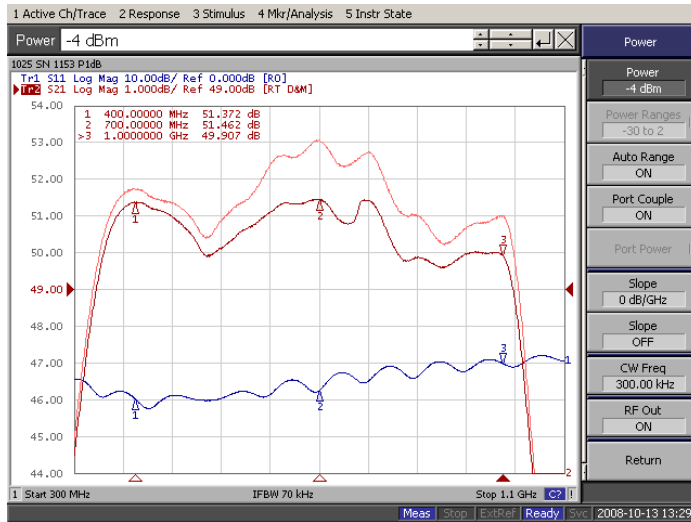
**1025 - BBM3I4AHM**

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**TYPICAL PERFORMANCE PLOTS (28 V<sub>DC</sub> Version)**

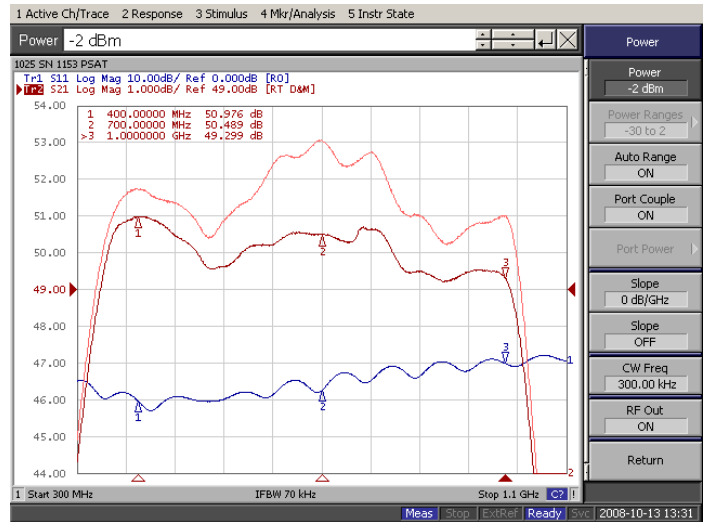
**Plots 1 - Small Signal and P<sub>1dB</sub> Gain**

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Power Gain @ P<sub>1dB</sub>, P<sub>IN</sub> = -4.0dBm  
 Reference: 49dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



**Plot 2 - Small Signal and P<sub>SAT</sub>**

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: P<sub>SAT</sub> @ P<sub>IN</sub> = -2.0dBm  
 Reference: 49dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



**Plot 3 - VVA Dynamic Range**

Top Curve: Max. Gain @ VVA = 0.0V, P<sub>IN</sub> = -20dBm  
 Middle Curve: Min. Gain @ VVA = 5.0V  
 Reference: 25dB, 10dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.

