

Solid State Broadband High Power Amplifier

2013 - BBS0D3FHM

0.15 – 230 MHz / 50 Watts

The BBS0D3FHM (SKU 2013) is suitable for broadband high power UHF linear applications; this amplifier utilizes push-pull MOSFET power devices that provide wide frequency response and dynamic range, high gain, low distortions, and excellent linearity. Employing advanced broadband RF matching networks and combining techniques, EMI/RFI filters, and all qualified components achieve exceptional performance, and high efficiency. The system includes a universal voltage, single phase, power supply and a built in forced air-cooling system. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.



Shown with Option Package 06

- Solid-state linear design
- Instantaneous broadband
- Small and lightweight
- Standard front panel manual gain adjust
- Suitable for CW, AM, and FM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness

ELECTRICAL SPECIFICATIONS @ 120V_{AC}, 25°C, 50 Ω system

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	0.15		230	MHz
Output Power CW	P _{SAT}	50	75		Watt
Output Power @ 1dB Gain Compression	P _{1dB}	30	50		Watt
Power Gain @ 1dB Gain Compression	G _{1dB}	46			dB
Input Power for Rated P _{SAT}	P _{IN}		0		dBm
Small Signal Gain Flatness	Δ G			± 1.5	dB
Gain Adjustment Range	FGA	20	25		dB
Input Return Loss	S ₁₁			-10	dB
Noise Figure	NF		10		dB
Third Order Intercept Point 2-Tone @ 37dBm/Tone, 100kHz Spacing	IP3		+53		dBm
Harmonics @ P _{OUT} = 30W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (single phase)	V _{AC}	100		240	Volt
Power Consumption @ P _{OUT} = 50W CW	P _D			300	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Limits
Dimensions	19 x 3.5 x 18	Inch	Max
Weight	27	lb.	Max
RF Connectors Input/Output	Type-N female		
Cooling	Built-in internal forced air cooling system		

ENVIRONMENTAL CHARACTERISTICS (Design to Meet*)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature	T _C	0		+50	°C
Non-operating Temperature	T _{STG}	-40		+85	°C
Relative humidity w/o condensation	RH			95	%
Altitude (MIL-STD-810F Method 500.4)*	ALT			30,000	Feet
Vibration / Shock *	VI / SH		Airborne		
MIL-STD-810F - Method 514.5/516.5 – Proc I					

LIMITS

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

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AVAILABLE OPTIONS (Refer to table for systems options)

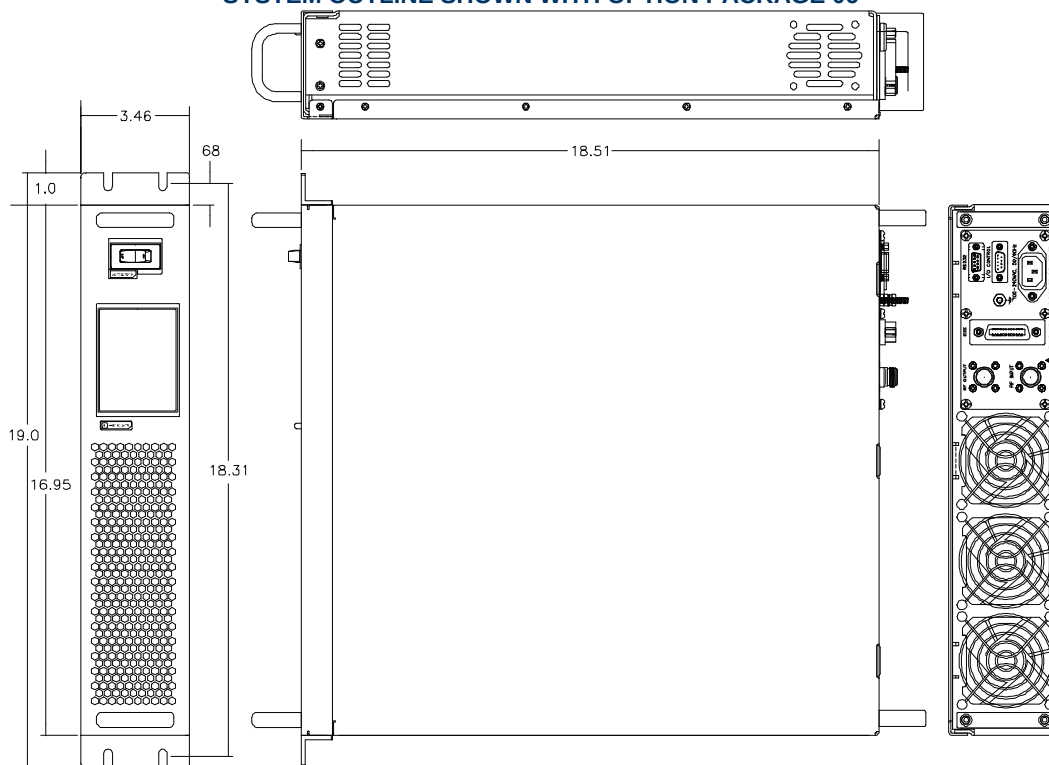
Option	Number	Description	Price
FGA	061	Front panel 10 turns manual gain adjustment.	Standard
LCD	062	Touchscreen Digital Display, including Fwd/Rev Power indication (dBm or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel GPIB/IEEE-488.2 and Half Duplex RS-232 or Full Duplex RS422 remote interface. Note: Output Power is lowered by 0.5 - 0.75 dB with this option.	Call
FCN	051	Front Panel Type-N female	N/C
RCN	052	Rear Panel Type-N female	N/C

Available Option Packages: 03, 04, 05, 06

I/O INTERFACE CONNECTOR – D-sub 9-pin, Female

Pin #	Description	Specifications	Options	
			FGA	LCD
1	Forward Test Point	Analog Voltage 0-5V _{DC} relative to Forward Power Level		√
2	Reverse Test Point	Analog Voltage 0-5V _{DC} relative to Reverse Power Level		√
3	5V Test Point	Output +5.0V _{DC} ±0.2V	√	√
4	VVA Test Point	VVA Gain Control +5.6V _{DC} ±0.2V	√	
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (Internally Pulled-Low)	√	√
6	12V Test Point	Output +12.0V _{DC} ± 0.5V	√	√
7	P/S Test Point	Power Supply Output voltage: +26.0-30.0V _{DC}	√	√
8	GND	Ground	√	√
9	GND	Ground	√	√

SYSTEM OUTLINE SHOWN WITH OPTION PACKAGE 06



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TYPICAL PERFORMANCE PLOTS

Plot 1 – Small Signal Gain and P_{1dB}

Top Curve: Small Signal Gain @ $P_{IN} = -20\text{dBm}$
 Middle Curve: Power Gain @ P_{1dB} , $P_{IN} = -2.0\text{dBm}$
 Reference: 47 dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



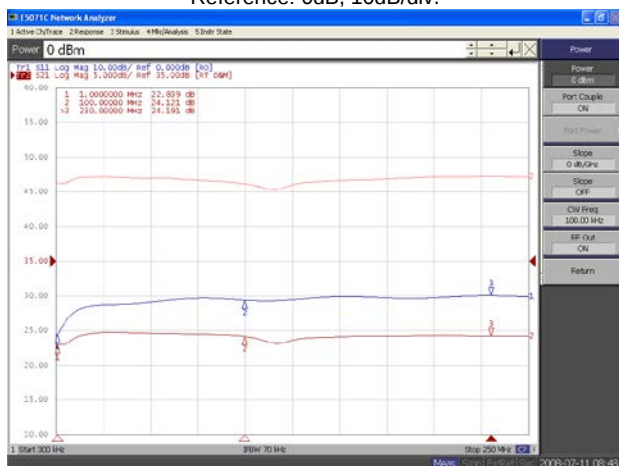
Plot 2 – Small Signal Gain and P_{SAT}

Top Curve: Small Signal Gain @ $P_{IN} = -20\text{dBm}$
 Middle Curve: Power Gain @ P_{SAT} , $P_{IN} = 1.0\text{dBm}$
 Reference: 47dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range

Top Curve: Maximum Gain @ $P_{IN} = -20\text{dBm}$
 Bottom Curve: Minimum Gain @ $P_{IN} = -20\text{dBm}$
 Reference: 30dB, 5dB/div.
 Middle Curve: Input Return Loss @ Minimum Gain
 Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness @ 25W & 5W

Top Curve: ALC @ 25W, $P_{IN} = 0\text{dBm}$
 Bottom Curve: ALC @ 5W, $P_{IN} = 0\text{dBm}$
 Reference: 41dB, 1dB/div.
 Middle Curve: Input Return Loss
 Reference: 0dB, 10dB/div.

