EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

1178 – BBM5A8CGM | 2000 – 6000 MHz / 35 Watts

The BBM5A8CGM (SKU 1178) is suitable for broadband mobile jamming and band specific high power applications in the S and C 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 form factor and lightweight
- Built-in control, monitoring and protection circuits
- Suitable for CW, AM, and FM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness

ELECTRICAL SPECIFICATIONS @ +28.0V_{DC}, 25°C, 50Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	2000		6000	MHz
Power Output CW	P_{SAT}	35	40		Watt
Output Power @ 1dB Gain Compression	P_{1dB}		10		Watt
Power Gain @ 1dB Gain Compression	G_{1dB}		54		dB
Power Gain @ P_{SAT}	G_{SAT}	46			dB
Input Power for Rated P_{SAT}	P_{IN}		-5	0	dBm
Gain Flatness @ Rated P_{SAT}	ΔG		±1.0	±1.5	dB
Gain Adjustment Range	VVA	25			dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ max. gain	NF			10	dB
Third Order Intercept Point 2-Tone @ 33dBm/Tone, 100kHz Spacing	IP3		+46		dBm
Harmonics @ P_{OUT} = 10W	2^{nd} / 3^{rd}		-20 / -20		dBc
Spurious Signals	Spur			-60	dBc
Operating Voltage	V_{DC}	27	28	29	Volt
Current Consumption @ P_{OUT} = 35W	I_{DD}		7.5	10	Amp
Quiescent Current	I_{DQ}			6.0	Amp
Switching Speed (10% to 90%)	T_{SW}			5.0	µs

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions	6.9 x 3.6 x 1.1	Inch
Weight	2.0	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	-20		+70	°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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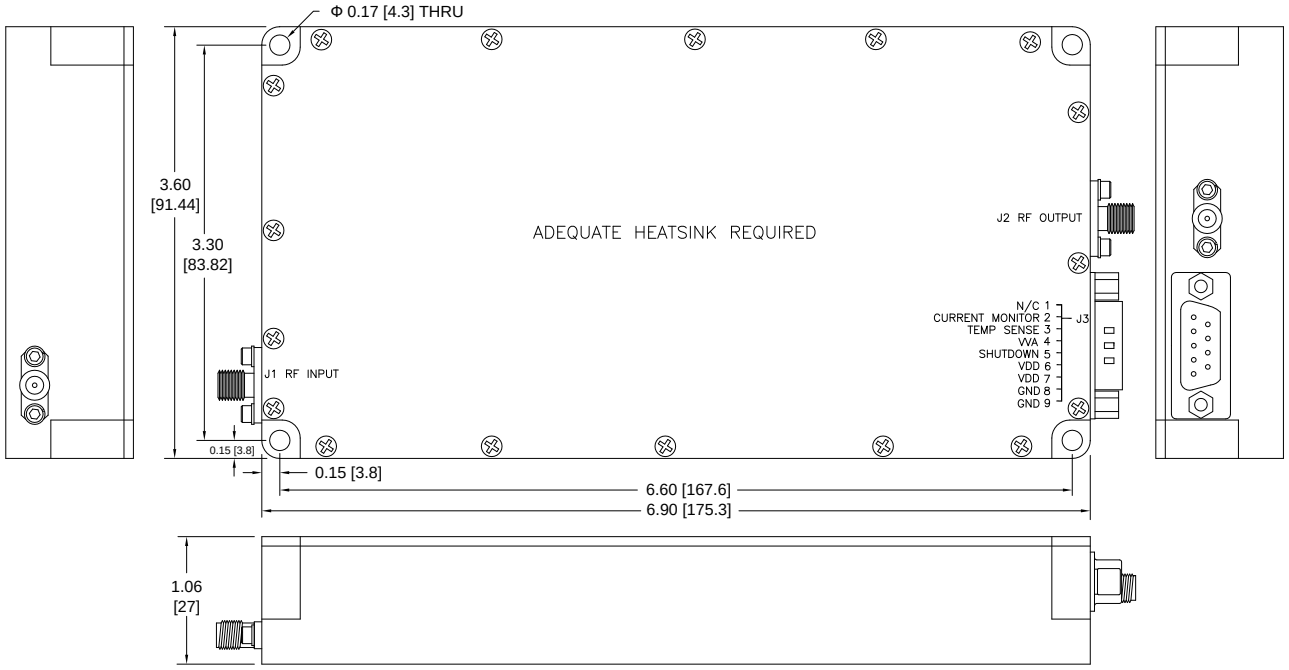
LIMITS

Input RF drive level without damage	+10 dBm	Max
Load VSWR @ P_{OUT} = 35W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	Graceful degradation (RF output power fold-back @ 85ºC base)	Typ.

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

Pin #	Description	Specification
1	N/C	No Connection
2	Current Monitor	Analog voltage relative to I_{DD} @ 50mV/100mA
3	Temp Sense	Analog voltage relative to Module's temperature @ 10mV/°C
4	VVA	Control voltage range: 0-5V_{DC} Maximum Gain 0V, Minimum Gain 5V
5	Shutdown	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-Low*)
6&7	VDD	+27.0-29.0V_{DC}
8&9	GND	Ground

OUTLINE DRAWING



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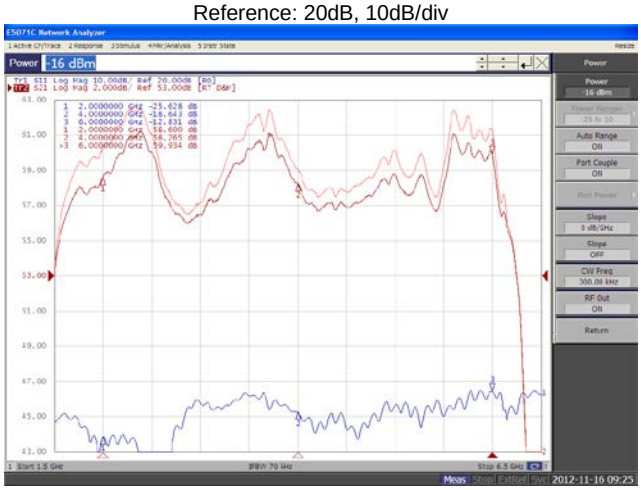
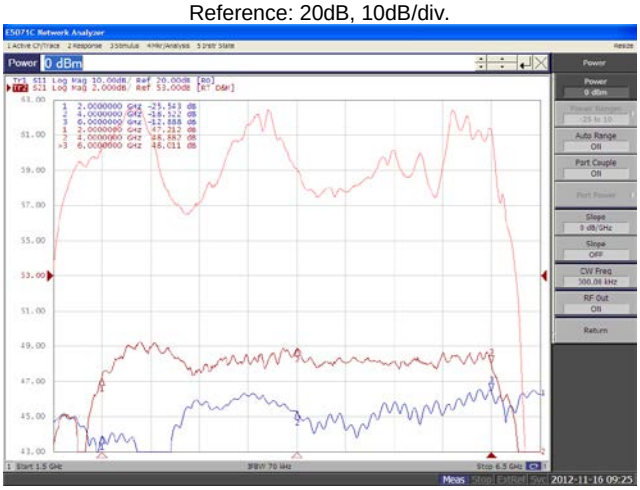
PERFORMANCE PLOTS

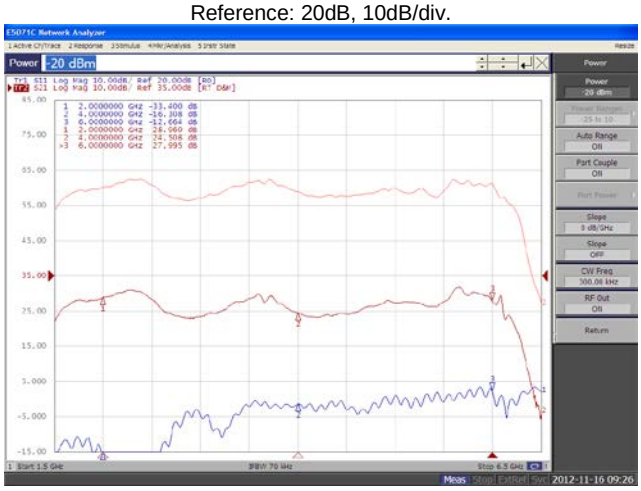
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -16dBm
Reference: 53dB, 2dB/div.
Bottom Curve: Input Return Loss
Reference: 20dB, 10dB/div



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = 0dBm
Reference: 53dB, 2dB/div.
Bottom Curve: Input Return Loss
Reference: 20dB, 10dB/div.



Plot 3 – Gain Adjustment Range @ P_{IN} = -20dBm
Top Curve: Max. Gain @ VVA_{CTRL} = $0V_{DC}$
Middle Curve: Min. Gain @ VVA_{CTRL} = $5V_{DC}$
Reference: 35dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 20dB, 10dB/div.



Plot 4 – Performance at 60 Deg C (Base)
Top Curve: P_{SAT} @ P_{IN} = 0dBm at 25 Deg. C(Base)
Middle Curve: P_{SAT} @ P_{IN} = 0dBm at 60 Deg. C(Base)
Reference: 46dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.