EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2034 - BBS2E3KPQ

20 – 500 MHz / 300 Watts

The BBS2E3KPQ (SKU 2034) is suitable for VHF & UHF ultra broadband high power linear applications. This amplifier utilizes MOSFET and LDMOS push-pull 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, built in high quality power supply, EMI/RFI filters, machined housings and all qualified components. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

Shown with Option Package 10

- Solid-state linear 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 @ $120V_{AC}$, 25°C, 50 Ω system

Characteristics	Rating	Min	Typ	Max	Units
Frequency Response	BW	20		500	MHz
Output Power CW	P_{SAT}	300			Watt
Output Power @ 1dB Gain Compression	P_{1dB}	200			Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	54			dB
Input Power for Rated P_{SAT}	P_{IN}		0		dBm
Small Signal Gain Flatness	ΔG		±1.5	±2.0	dB
Gain Adjustment Range	FGA	25	30		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ maximum gain	NF			10	dB
Harmonics @ P_{OUT} = 200W	H		-20		dBc
Third Order Intercept Point 2-Tone @ 47dBm/Tone, 100kHz Spacing	IP3		+63		dBm
Spurious Signals	Spur		-70	-60	dBc
Supply Voltage (single phase)	V_{AC}	100		240	Volt
Power Consumption	P_D		1200	1400	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Limits
Dimensions	19 x 5.25 x 22	Inch	Max
Weight	55	lb.	Max
RF Connectors Input/Output	Type-N, Female		
Cooling	Built in internal forced air cooling system		

ENVIRONMENTAL SPECIFICATIONS (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 (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	+6 dBm	Max
Load VSWR @ P_{OUT} = 120W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

AVAILABLE OPTIONS

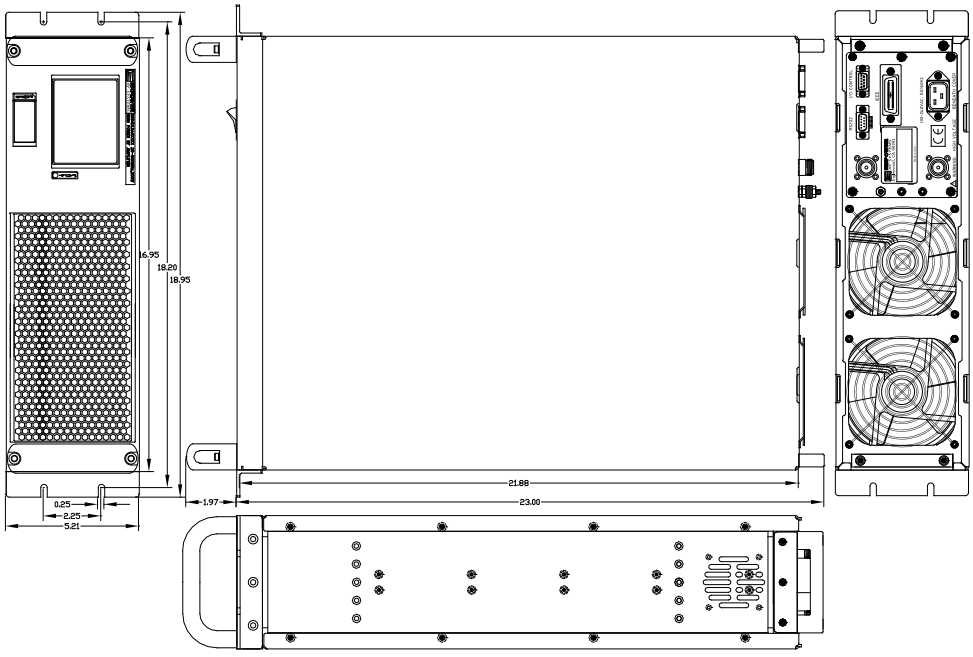
Option	Number	Description	Price
FGA	**061**	Front panel manual gain adjustment 10 turns	Standard
LCD	**062**	Touchscreen Digital Display, including Fwd/Rev Power indication (dB or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel HPIB/GPIB IEEE-488.2 and Half Duplex RS-232 or Full Duplex RS-422 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 Options Packages: 07, 08, 09, 10

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 +28.0V_{DC} ±2.0V	√	√
8	GND	Ground	√	√
9	GND	Ground	√	√

OUTLINE DRAWING SHOWN WITH OPTION PACKAGE 10



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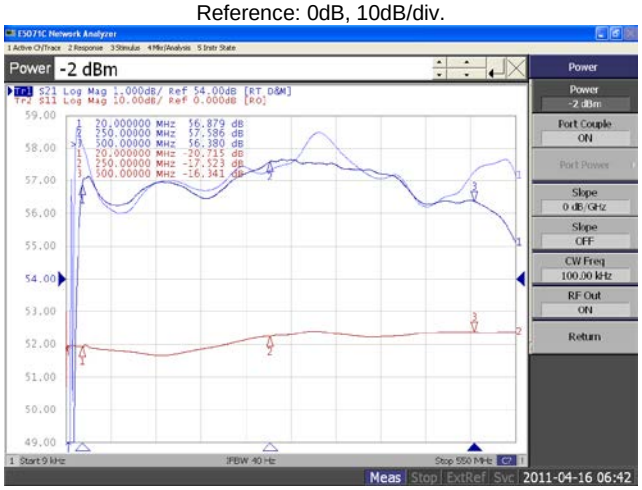
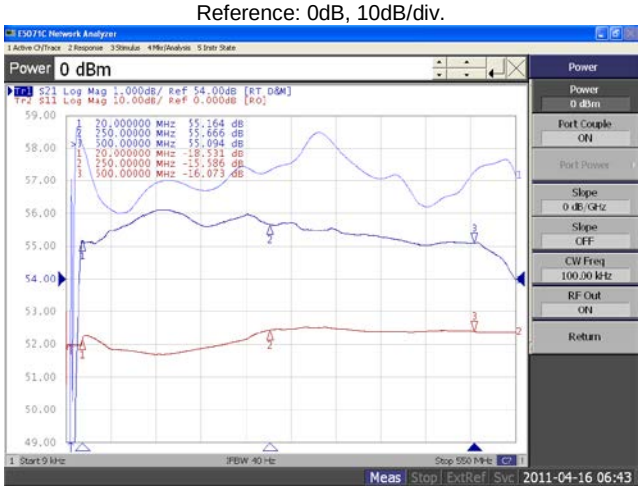
Performance Plots

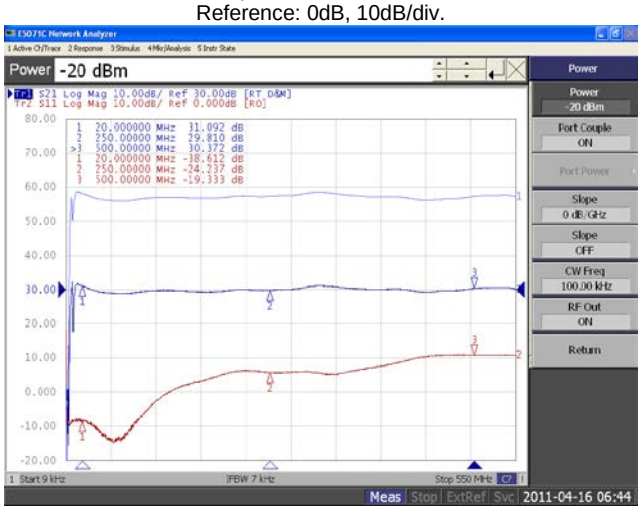
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -2.0dBm
Reference: 54dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = 0.0dBm
Reference: 54dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range
Top Curve: Maximum Gain @ P_{IN} = -20dBm
Middle Curve: VVA @ Minimum Gain
Reference: 30dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness Response
Top Curve: ALC @ 52dBm, P_{IN} = 0dBm
Bottom Curve: ALC @ 45dBm, P_{IN} = 0dBm
Reference: 49dB, 1dB/div.
Middle Curve: Input Return Loss
Reference: 0dB, 10dB/div.