EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2223 | 500 - 6000 MHz / 150 Watts

The 2223 is suitable for multi-octave bandwidth high power CW, modulated, and pulse applications. This amplifier utilizes high power GaN on SiC devices that provide wide frequency response, high gain, high peak power capability, 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, and all qualified components. The amplifier is constructed within a single 5RU drawer including the forced air-cooling. Available operating voltage configurations are 1-phase or 3-phase AC up to 400 Hz.

The amplifier includes a built-in control and monitoring system, with protection functions which preserve high availability. Remote management and diagnostics are via an embedded web server allowing network managed site status and control simply by connecting the unit's Ethernet port to a LAN. Using a web browser and the unit's IP address (IPV4) allows ease of access with the benefit of multi-level security. The control system core runs an embedded OS (Linux), has a built-in non-volatile memory for event recording, and factory setup recovery features. The extended memory option allows storage of control parameters and event logs.

Empower RF's ISO9001:2015 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state Class AB compact modular design
- Suitable for CW, AM, FM, Pulse and some linear applications (Consult factory for other modulation types)
- Embedded directional coupler – Eliminates the need for external component
- 50 ohm input/output impedance
- Built-in Control, Monitoring and Protection functions
- High reliability and ruggedness

ELECTRICAL SPECIFICATIONS over temperature conditions (-10 to +40ºC)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	500		6000	MHz
Power Output CW *(Notes 1, 2)*	P_{SAT}	100	150		Watt
Power Gain	G_P	52			dB
Input Power for Rated P_{SAT}	P_{IN}		-10		dBm
Input Power Range, Mode ALC	P_{IN}	-5.0		+5.0	dBm
Small Signal Gain Flatness / Leveled ALC	ΔG			±6.0 / ±1.5	dB
Gain Adjustment Range @ P_{IN} = -30dBm	VVA	20	30		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ maximum gain	NF		-15	-25	dB
Third Order Intermodulation Distortion 2-Tone @ 45.8dBm/Tone, 1MHz Spacing	IM3		-20		dBc
Harmonics @ P_{OUT} = 150W	2^{ND}		-20	-15	dBc
	3^{RD}		-25	-20	
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V_{AC}	110		260	Volt
Operating Voltage (3-phase) line to line		180	208	260	
Power Consumption @ 150W CW	P_D			2250	VA
Switching Speed	$T_{ON/OFF}$		1	2	µSec

Notes: ***1.CW measurement performed in MGC Mode (Manual Gain Control), Rated output power from 500-5500 MHz is 150 watts. Power rolls off linearly between 5500-6000 MHz from 150 to 100 watts.***
2. The front RF connectors option output power is less by up to 1.50 dB due to added insertion loss of the RF cable routed to the front panel.

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions W x H x D (excludes connectors, handles and brackets)	17 x 8.75 x 22	Inch
Weight	95	Pound
RF Connectors Input/Output	Input: N-type, Female Output: N-type, Female	RF INPUT RF OUTPUT
RF Sample Connectors	SMA, Female	FWD / REV
Blanking/Gating Input Connector	BNC, Female	Blanking
Cooling	Built-in forced air cooling system – front to rear	Airflow Direction

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ENVIRONMENTAL CHARACTERISTICS (Qualification Data available for review)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T_A	-10		+40	°C
Non-operating Temperature	T_{STG}	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Shock / Vibration - MIL-STD-810F Shock Method 516.5, Vibration Method 514.5	SH / VI				-

PROTECTIONS

Parameter	Specification	Unit
Input Overdrive	+10 dBm	Max
VSWR protection	≥3:1– PA mutes or when reverse power ~6dB below rated output	-
Thermal – Graceful Degradation	Ambient 40ºC	Min
Default Data Recovery	Factory Default Calibration Recovery	-

COMMUNICATION INTERFACES

Function	Utility	Connector
Ethernet	Network management of device / web interface	RJ45
USB	Mass storage / Expansion Bus	USB 1.x/2.0 compatible
RS-232, default (RS422 – factory configurable)	Serial management of device / local operator access	D-Sub 9-position Male

SYSTEM I/O CONNECTOR – 14-Position

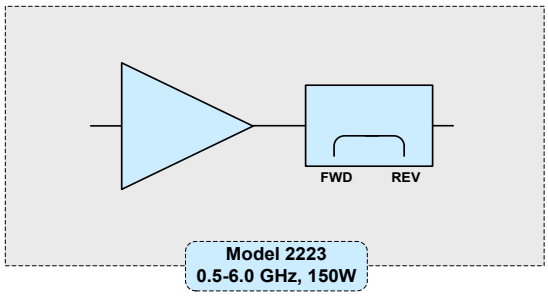
Pin #	Description	Specification
1	FWD Test Point	Forward detected power (analog voltage: 0-5 Volt)
2	REV Test Point	Reverse detected power (analog voltage: 0-5 Volt)
3	Summary Fault	Summary Fault: Active TTL Logic Low (≤0.7V) (*Internally Pulled-High*)
4	Reserved	No Connection
5	Shutdown	Amplifier Disable: TTL Logic Low (≤0.7V) (*Internally Pulled-High*)
6	Aux P/S Test Point	+12.0V_{DC} ±2.0V (resettable 0.5amp fuse)
7	Main P/S Test Point	+44.0V_{DC} ±4.8V (resettable 0.5amp fuse)
8	GND	Ground
9-11	Open drain control	Site management utility (reserved)
12&13	Digital I/O (configurable)	Site management utility (reserved)
14	GND	Ground

Available Options

2223-00X
-001 180-260 VAC, 3-phase, 47-63 Hz, Rear RF Connectors
-002 110-260 VAC, 1-phase, 47-63 Hz, Rear RF Connectors
-
-
Contact us for other available options

Standard Feature:
-LCD Control, Ethernet & Serial Comm
*-Main RF Connectors: **Input / Output** [N-type, Female]*
-SMA-F Sample Ports: Forward & Reverse
-Blanking/Gating Port: BNC-F
-Rack Slides, Handles and Rackmount Bracket

NOTIONAL BLOCK DIAGRAM



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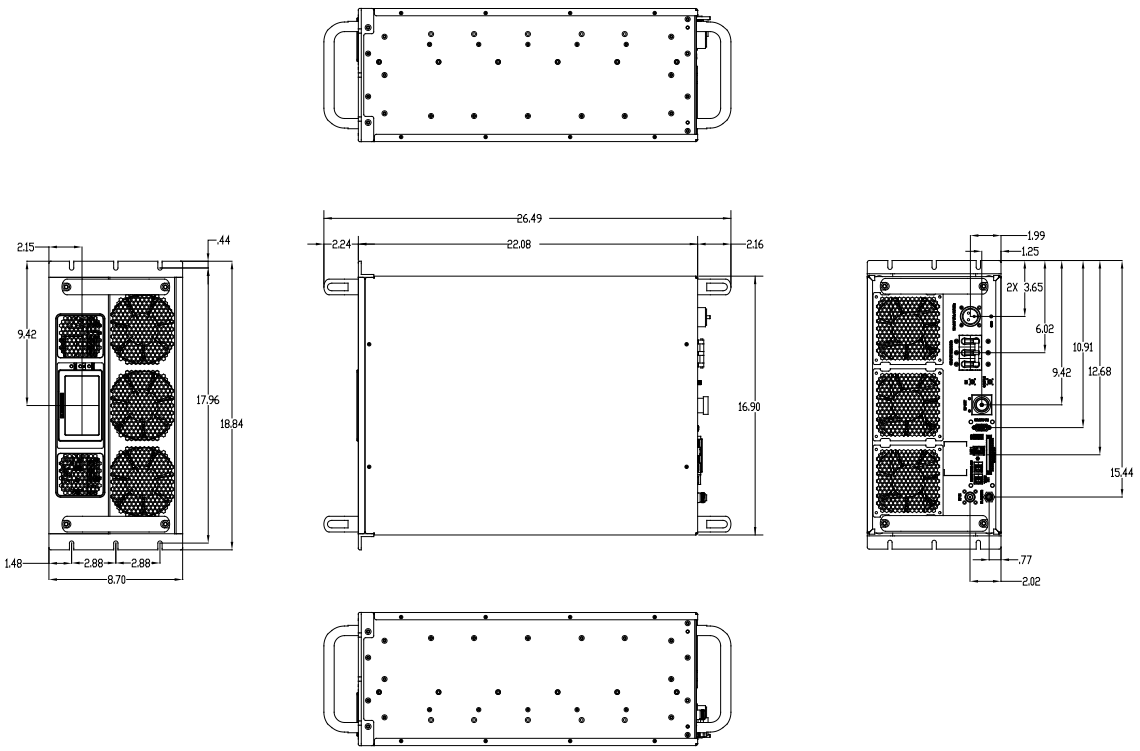
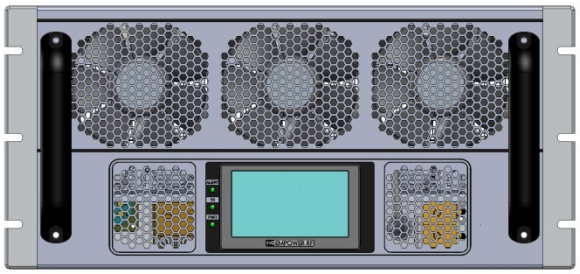
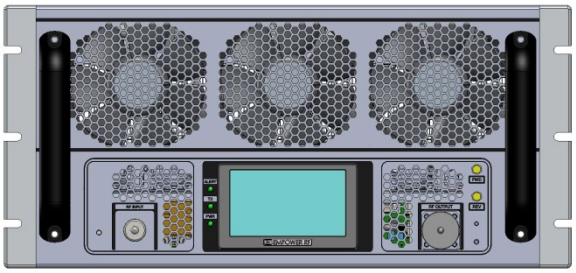
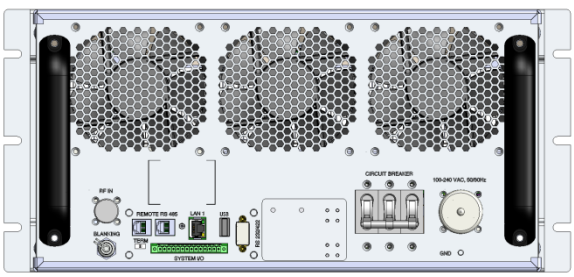
MECHANICAL OUTLINE (2223-001 shown)



FRONT AND REAR VIEWS

With rear RF connectors	With front RF connectors
	
	

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