

Solid State Broadband High Power Amplifier

2245
2000 – 4000 MHz / 5000 Watts

The 2245 is comprised of multi-drawer integrated liquid-cooled subsystems to produce output of 5000 watts CW in the S-band frequency. Each of the amplifier subsystems features multiple 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. Each drawer is a full gain PA with integrated single phase power supply and liquid cooling. It features gain and phase control and is fully hot swappable in case of failure.

The amplifier system includes a built-in control and monitoring system, with protection functions which preserve maximum output availability and reliability. Remote management and diagnostics are via Ethernet port to a LAN. These functions are performed remotely by a web browser or M2M (machine to machine interface) or locally by a front panel computer. The control system runs an embedded OS (Linux) and has a built-in non-volatile memory for factory setup.

We are delivering more than just RF power, the next generation family of systems provide dynamic adjustments linked to the processing power and digital controls, which focus on maximizing system availability time as well as power output under ALL conditions.

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

- Solid-state class AB design
- Suitable for CW, AM, FM, Pulse and some linear applications (consult for other modulation types).
- Compact Modular design and scalable architecture
- 50 ohm input/output impedance
- Built-in Control, Monitoring and Protection functions
- High reliability and ruggedness



ELECTRICAL SPECIFICATIONS over temperature conditions (-10 to +50°C)

Parameter	Symbol	Min	Typical	Max	Unit
Operating Frequency	BW	2000		4000	MHz
P _{rated} Output - CW (η)	P _{rated}	66.2	67		dBm
Power Output – CW (NOTE 1)	P _{SAT}		5		kW
Power Output – CCDF method (NOTE 1)	P _{SAT}		66.99		dBm
Power Output @ 1dB Gain Compression (NOTE 2)	P _{1dB}	65.5	66.9		dBm
Power Gain @ Rated P _{OUT}	GP	68			dB
Input Power for Rated P _{OUT} – MGC Mode (@ P _{1dB})	P _{IN}	-11		+5	dBm
Input Power Range – ALC Mode	P _{IN_ALC}		0		dBm
Small Signal Gain (MGC) / Leveled ALC – Flatness	ΔG			±3.0 / ±1.0	dB
Gain Adjustment Range	VVA	20			dB
Input Return Loss	S ₁₁			-10	dB
Noise Figure @ Maximum Gain	NF			20	dB
Third Order Intermodulation 2-Tone @ 60dBm/tone, 1 MHz Spacing	IM3			-25	dBc
Harmonics @ 4kW	2 ND - 5 TH		-40	-25	dBc
Spurious Signals	Spur			-60	dBc
Operating Voltage @ 3-phase (Line-to-Line)	V _{AC}	180	208	260	Volt
Power Consumption @ 4kW	PD			30	kVA

NOTES: 1. CW measurement is performed in MGC Mode (Manual Gain Control)
 2. P_{1dB} measurement is performed with AM 80%depth of modulation @ 1 kHz modulation signal.
 § P_{1dB} measurement is performed using CCDF method (IS95 signal)

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MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Overall Dimension W x H x D	19" Racks, 40U height, 40" depth	-
Total Weight	TBD	Pound
RF Connectors Input / Output	Input: N-Type Female Output: WR-200	RF IN RF OUT
RF Sample Connectors	System Level: SMA, Female Booster Level: SMA, Female	Forward/Reverse
Blanking/Gating Input Connector	BNC, Female	BLANKING
Cooling System – Liquid	Pressure	20 typical PSI
	Liquid Flow	35 typical GPM

ENVIRONMENTAL CHARACTERISTICS:

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T _c	-10		+50	°C
Non-operating Temperature	T _{STG}	-40		+85	°C
Relative humidity (non-condensing)	RH	5		95	%
Altitude (MIL-STD-810F)	ALT			10,000	Feet
Shock / Vibration (MIL-STD-810F, Shock Method 516.5 , Vibration Method 514.5)	SH / VI				

PROTECTIONS

Parameter	Specification
Input Overdrive	≥10 dBm – shutdown
Load VSWR Protection	The unit disables RF when reverse power exceeds the safe level of 3:1 VSWR or reduces power by 6dB
Thermal Shutdown	Baseplate ≥80 °C
Default Data Recovery	Factory Default Calibration Recovery

COMMUNICATION INTERFACES:

Function	Utility	Connector
Ethernet	Network management of device / web interface	RJ45

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NOTIONAL BLOCK DIAGRAM

