

Solid State High Power Amplifier

2236
2800 – 3500 MHz / 24 Kilowatts

The 2236 is comprised of multi-drawer liquid-cooled integrated subsystems to produce a minimum output of 24kW CW in the S-band frequency. The amplifier subsystem 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. It is performed remotely by a web browser or M2M (machine to machine interface) or locally by a panel computer. The control system runs an embedded OS (Linux), 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



PRELIMINARY

ELECTRICAL SPECIFICATIONS over temperature conditions (0 to +50°C)

Parameter	Symbol	Min	Typical	Max	Unit
Operating Frequency	BW	2800		3500	MHz
Power Output – CW ^(NOTE 1)	P _{SAT}	24			kW
Power Output @ 1dB Gain Compression ^(NOTE 2)	P _{1dB}	18			kW
Power Gain @ Rated P _{OUT}	G _P	74			dB
Input Power for Rated P _{OUT} – MGC Mode	P _{IN}		-5	0	dBm
Input Power Range – ALC Mode	P _{IN, ALC}	-10		0	dBm
Small Signal Gain (MGC) / Leveled ALC – Flatness	ΔG			±3.5 / ±1.0	dB
Gain Adjustment Range	VVA	15	20		dB
Input Return Loss	S ₁₁			-10	dB
Noise Figure @ Maximum Gain	NF		20	25	dB
Third Order Intermodulation 2-Tone @ 67dBm/tone, 1 MHz Spacing	IM3		-25		dBc
Harmonics @ 24kW	2 ND		-40		dBc
	3 RD		-50		
Spurious Signals	Spur			-60	dBc
Operating Voltage @ 3-phase (Line-to-Line)	V _{AC}	180	208	260	Volt
Power Consumption @ 24kW	PD			100	kVA

NOTES:
 1. CW measurement is performed in MGC Mode (Manual Gain Control)
 2. P1dB measurement is performed with AM 80%depth of modulation @ 1 kHz modulation signal.

Solid State High Power Amplifier

2236
2800 – 3500 MHz / 24 Kilowatts
MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Overall Dimension W x H x D	2 x 19" Racks, 40U height, 40" depth	-
Total Weight	TBD	Pound
RF Connectors Input / Output	Input: N-Type Female Output: WR-284	RF INPUT RF OUTPUT
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	70 typical GPM

ENVIRONMENTAL CHARACTERISTICS:

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T _C	0		+50	°C
Non-operating Temperature	T _{STG}	-35		+75	°C
Relative humidity (non-condensing)	RH			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

Solid State High Power Amplifier

2236

2800 – 3500 MHz / 24 Kilowatts

NOTIONAL BLOCK DIAGRAM

