Amplifiers

Model 456

Features:

- 90 kW Pulse Peak Power, 1 - 200 MHz
- Class A design
- Full VSWR tolerant
- Built-in fault monitoring, logging and protection
- Touch screen display
- Remote control: Ethernet, USB, GPIB, fiber-optic serial, RS-232
- Modular design for easy maintenance and service
- Low acoustical noise

Applications:

- HEMP & NEMP Testing
- EMC Test applications
- EW Communication/Test/Jamming
- RADAR
- Science

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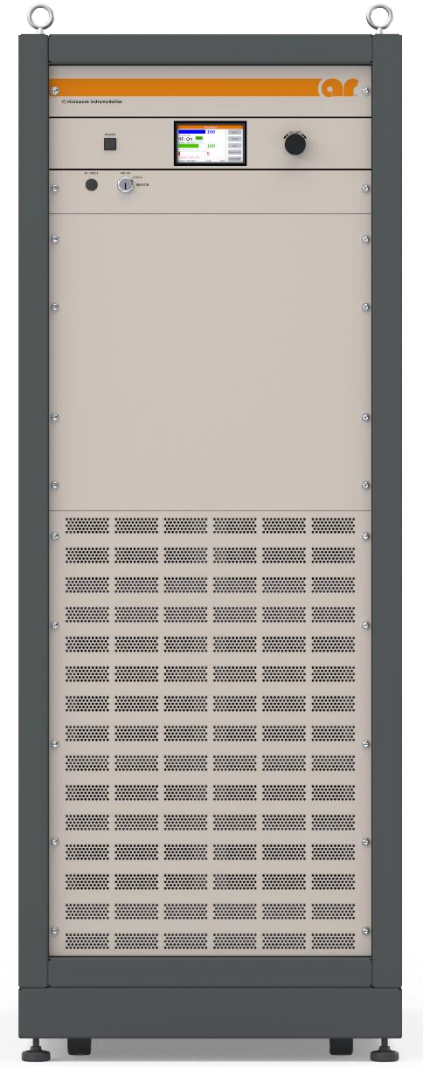
ISO 9001:2015 Certified
ISO 17025:2017 Accredited

Model 456 is a solid-state, Class A design, self-contained, air-cooled, broadband power amplifier designed for pulse applications at low duty factors where instantaneous bandwidth and high gain are required. It will provide a minimum of 90 kilowatts peak (V peak x I peak) minimum across its operating bandwidth.

Model 456 is equipped with a Digital Control Panel (DCP) which provides both local and remote control of the amplifier. The DCP uses a color LCD touch screen and a single rotary knob to offer status reporting and control capability. Special features include a gain control and RF output level protection.

Protection is provided from various failure conditions including over-temperature and power supply faults. A front panel display indicates the operational status and fault conditions. All amplifier control functions, and status indications are available remotely using GPIB/IEEE-488, RS-232, fiber-optic serial, USB, or Ethernet. Interface connectors are located on the back panel. Local and remote operation is managed by a switch on the front panel.

The export classification for this equipment is 3A999.d. These commodities, technology or software are controlled for export in accordance with the U.S. Export Administration Regulations. Diversion contrary to U.S. law is prohibited.



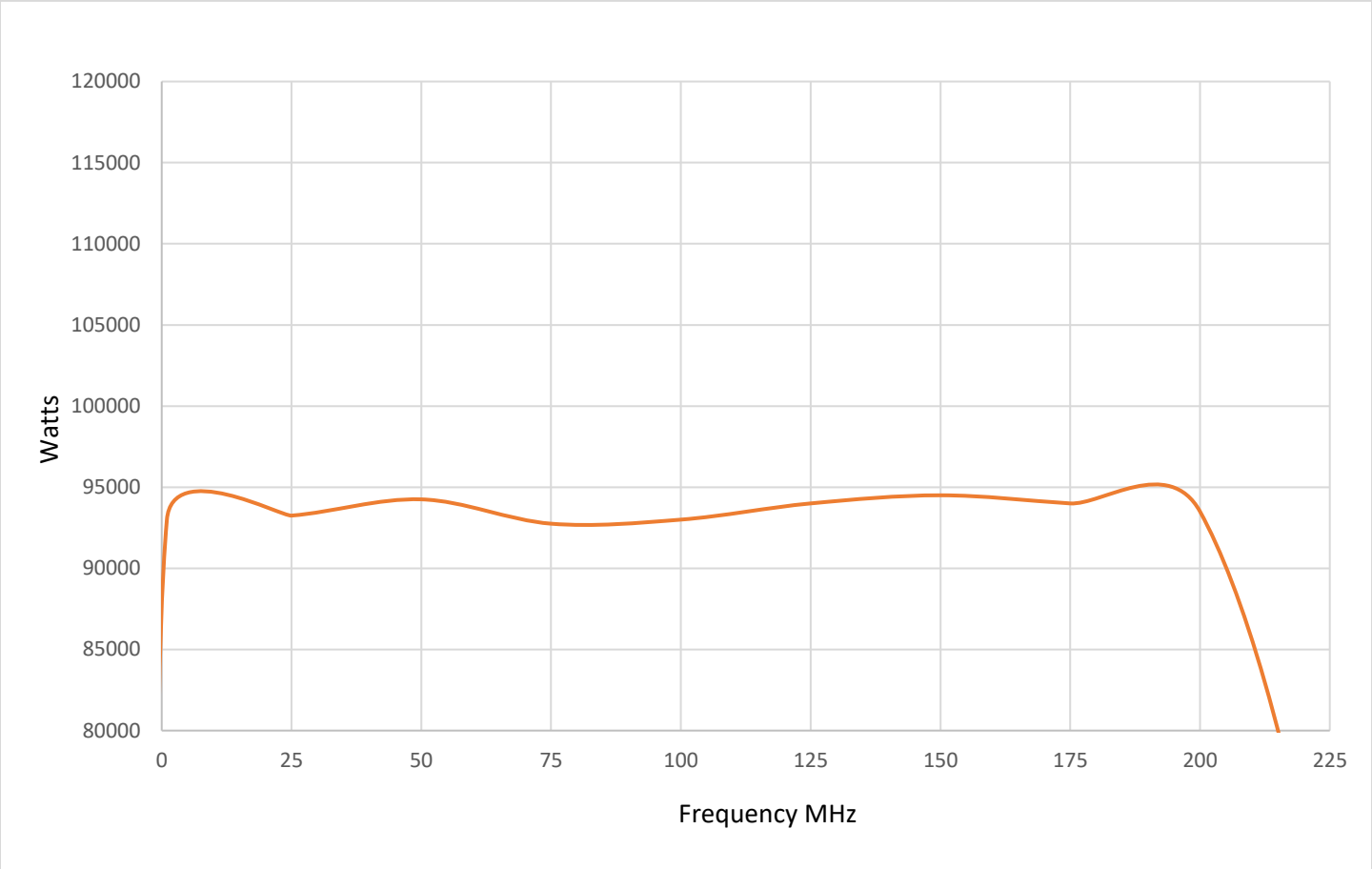
Electrical Specifications					
Parameter	**Symbol**	**Minimum**	**Typical**	**Maximum**	**Unit**
Rated Peak Power Output (1 - 200 MHz)	KWp	90	93	>95	kW
Linear Peak Power Output (1 - 200 MHz)	KWp	70	80	>85	kW
Peak Voltage into 50 ohms	Vp	3000	3130	>3260	V
Input for Rated Output	Pin			1	mW
				0	dBm
Pulse Droop – 50µs pulse @ 90 kW				<-0.3	dB
Operating instantaneous Frequency	BW	1		200	MHz
Transient Time	TT	2	5	8	ns
Gain (Small Signal)		80	82	84	dB
Gain Reduction Adjustment (when below compression)		20			dB
Flatness	ΔG		±1	±2	dB
Input Impedance	Z in		50		Ohm
				≤2.0:1	VSWR
Output Impedance	Z out		50		Ohm
Noise Figure	NF		10		dB
Harmonic Distortion @ rated power	H2, H3	-17	- 22	≤-30	dBc
Spurious			≤-60		dBc
Power Consumption for maximum duty-cycle	PD	1.7	2	2.2	kW
Modulation	AM, FM or Pulse				

Absolute Maximum Rating				
Parameter	**Minimum**	**Typical**	**Maximum**	**Unit**
RF Drive			+13	dBm
Mismatch Tolerance: Will operate without damage or oscillation when connected to any complex load impedance from short to open circuit.				
AC Power (single phase)	200		240	VAC
AC Power	47		63	Hz
Ambient Temperature	+5	+25	+40	°C
Storage Temperature	-20		+50	°C
Altitude			2000	m
Shock/Vibration	Normal Truck Transport			

Mechanical Specifications		
Parameters		**Unit**
Dimensions (19” 35U) (W x H x D)	56.3 x 176.0 x 95.5	cm
	22.6 x 69.3 x 37.6	in
Weight	396	kg
	872	lb
Cooling	Forced air (self-contained fans) Side /front inlets - rear outlet Δt = +7°C (typical)	
Acoustical Noise (Measured @ 1 meter from the front)	66 (typical)	dBA

Regulatory Compliance	
Type	**Standard**
EMC	EN 61326-1
Safety	UL 61010-1
	CAN/CSA C22.2 #61010-1
	CENELEC EN 61010-1
RoHS	Directive 2011/65/EU
Export	3A999.d

Connector interfaces	
Function	**Type**
RF Input	N female (50 Ω), rear
RF Output	EIA 1-5/8 female (50 Ω), rear
Pulse Input	BNC female, rear
RF Sample	N female (50 Ω) (50dB typical), rear
IEEE-488	24-pin female
RS-232	9-pin subminiature D female
RS-232 (fiber optic)	ST
USB 2.0	Type B
Ethernet	RJ-45
Interlock	15-pin subminiature D female

Pulse Capability	
Parameter	**Value**
Pulse Width	20 µs maximum for 2 Hz, (100 µs/ 1Hz)
Pulse Rate (PRF)	2 Hz maximum
Duty Cycle	0.1% maximum
RF Rise and Fall	30 ns maximum (10 - 90 %)
Delay	≤1 µs from pulse input to RF 90%
Pulse Width Distortion	±25 ns maximum (difference between Pulse input gate and RF pulse)
Pulse Off Isolation	60 dB minimum
Pulse Input	+5 V nominal / 50 ohms internal termination

TYPICAL PEAK POWER @ 0 dBm