Amplifiers

Model 850

Features:

- Pulse Class AB design:
- 50 kW 1-2 GHz
  35 kW 2-4 GHz
  25kW 4-6 GHz
- CW Class A Design:
  2 kW 1-4 GHz
  1.5kW 4-6 GHz
- Full VSWR tolerant
- Built-in fault monitoring, logging and protection
- Touch screen display
- Forward and reverse power monitoring
- VSWR monitor with user settable limit
- Remote control: Ethernet, USB, GPIB, fiber-optic serial, RS-232
- Modular design for easy maintenance and service
- CE & RoHS Compliant

Applications:

- EMC (military, aviation, automotive, commercial)
- Radiated and conducted EMC testing

To view our full amplifier portfolio visit: www.arworld.us

AR RF/Microwave Instrumentation
160 Schoolhouse Rd
Souderton, PA 18964
215.723.8181
info@arworld.us
www.arworld.us
ISO 9001:2015 Certified
ISO 17025 :2017 Accredited

The Model 850 is a solid-state, self-contained, air-cooled, broadband power amplifier designed for applications where instantaneous bandwidth, high gain is required. It is designed to be operated as either a pulse amplifier for low duty factors or a CW amplifier. It will provide a minimum of 50 kW across its operating bandwidth of 1-2 GHz, 35 kW across its operating bandwidth of 2-4 GHz, 25 kW across its operating bandwidth of 4-6 GHz when operated as a pulse amplifier. It will provide a minimum of 2 kW across its operating bandwidth of 1-4 GHz, 1.5 kW across its operating bandwidth of 4-6 GHz when operated as a CW amplifier. The amplifier's RF output is divided into three separate bands through the following RF connectors:

1-5/8 EIA for 1 – 2 GHz
WRD-200 for 2 – 4 GHz
WRD-350 for 4 – 6 GHz

Protection from input overdrive beyond 0 dBm is provided as well as protection 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 3A001. 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
CW Rated Power Output (1 – 4 GHz)	PSAT	2000	2500	>3000	W
CW Rated Power Output (4 – 6 GHz)		1500	2000	>2500	
Pulse Rated Saturated Power Output	PSAT	*Reference Pulse Psat Power Table #1 below			W
Input for Rated Output	Pin			1	mW
				0	dBm
CW Power Output @ 1dB Compression (1 - 4 GHz)	P1dB	1500	1800	>2250	W
CW Power Output @ 1dB Compression (4 - 6 GHz)		1100	1300	>1800	
Pulse Power Output @ 1dB Compression	P1dB	**Reference Pulse P1dB Power Table #2 below			W
Operating Frequency	BW	1.0		6.0	GHz
Gain (Small Signal)		78	82	86	dB
Gain Reduction Adjustment (when below gain compression)		10	12	15	dB
Flatness @ small signal (-20dBm input) for each band	ΔG		±2.5	±3.0	dB
Input Impedance	Z in		50		Ohm
			1.5:1	2.0:1	VSWR
Output Impedance	Z out		50		Ohm
3rd Order Intercept	IP3		+73		dBm
Noise Figure	NF		10	12	dB
Harmonic Distortion @ Rated Power	H2, H3		-20	-15	dBc
Harmonic Distortion @ P1dB	H2, H3		-25	-20	dBc
Spurious			-73		dBc
Power Consumption	P_D			40	kW
Modulation	AM, FM or Pulse				

Pulse Capability

Parameter	Minimum	Typical	Maximum
Pulse Width	100 ns	50 µs	1000 µs
Pulse Droop for 50 µs PW pulse@ rated Psat	-	0.3 dB	0.5 dB
Pulse Rate (PRF)	-	-	10 kHz
Duty Cycle	0	-	6%
RF Rise and Fall	-	-	20 ns maximum (10 - 90%) (Internal RF switch)
Trigger to output RF pulse delay	-	-	2.5 µs
Pulse Width Distortion (difference between Pulse input gate and RF pulse)	-	-	±25 ns
Pulse Off Isolation	60 dB	70 dB	80 dB
Pulse Trigger level (high impedance input)	+3.3 V	+5 V	+6.5 V

Table #1	
Maximum Duty-Cycle for pulsed modes	**Min. 6%**
***Pulse Rated Saturated Power Output (Band 1: 1-2 GHz)**	
0.1 – 50 µs	Min. 50 kW
0.1-100 µs	Min. 38 kW
0.1-250 µs	Min. 28 kW
0.1-500 µs	Min. 21 kW
0.1-750 µs	Min. 17 kW
0.1-1000 µs	Min. 15 kW
***Pulse Rated Saturated Power Output (Band 2: 2-4 GHz)**	
0.1-50 µs	Min. 35 kW
0.1-100 µs	Min. 28 kW
0.1-250 µs	Min. 20 kW
0.1-500 µs	Min. 15 kW
0.1-750 µs	Min. 12 kW
0.1-1000 µs	Min. 10 kW
***Pulse Rated Saturated Power Output (Band 3: 4-6 GHz)**	
0.1-50 µs	Min. 25 kW
0.1-100 µs	Min. 20 kW
0.1-250 µs	Min. 15 kW
0.1-500 µs	Min. 11 kW
0.1-750 µs	Min. 9 kW
0.1-1000 µs	Min. 8 kW

Table #2	
Maximum Duty-Cycle for pulsed modes	**Min. 6%**
****Pulse P1dB Output Power (Band 1: 1-2 GHz)**	
0.1 – 50 µs	Min. 37 kW
0.1 - 100 µs	Min. 28 kW
0.1 - 250 µs	Min. 21 kW
0.1 - 500 µs	Min. 16 kW
0.1 - 750 µs	Min. 13 kW
0.1 - 1000 µs	Min. 11 kW
****Pulse P1dB Output Power (Band 2: 2-4 GHz)**	
0.1 – 50 µs	Min. 26 kW
0.1 - 100 µs	Min. 21 kW
0.1 - 250 µs	Min. 15 kW
0.1 - 500 µs	Min. 11 kW
0.1 - 750 µs	Min. 9 kW
0.1 - 1000 µs	Min. 7.5 kW
****Pulse P1dB Output Power (Band 3: 4-6 GHz)**	
0.1 – 50 µs	Min. 18 kW
0.1 - 100 µs	Min. 15 kW
0.1 - 250 µs	Min. 11 kW
0.1 - 500 µs	Min. 8 kW
0.1 - 750 µs	Min. 7 kW
0.1 - 1000 µs	Min. 6 kW

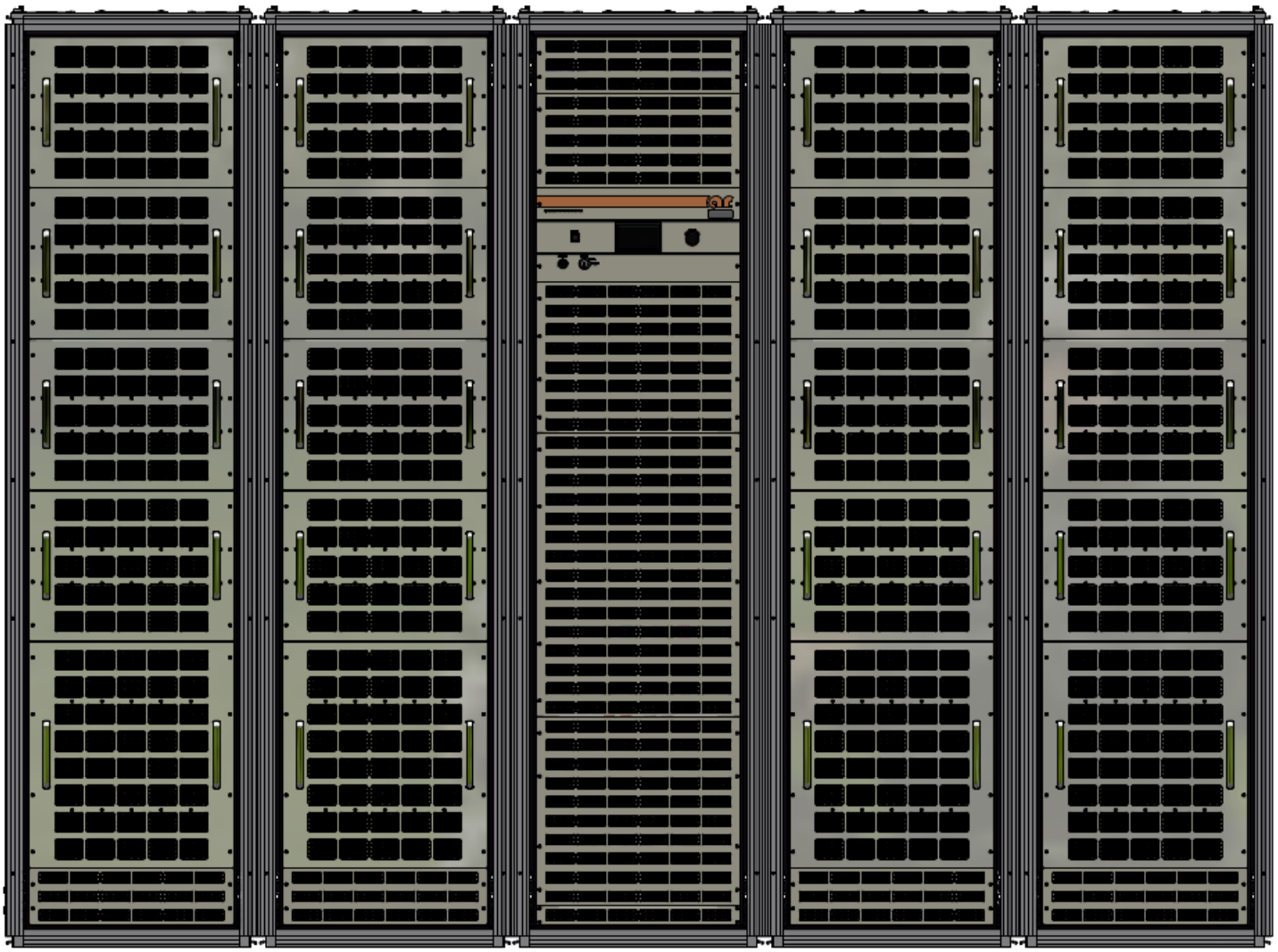
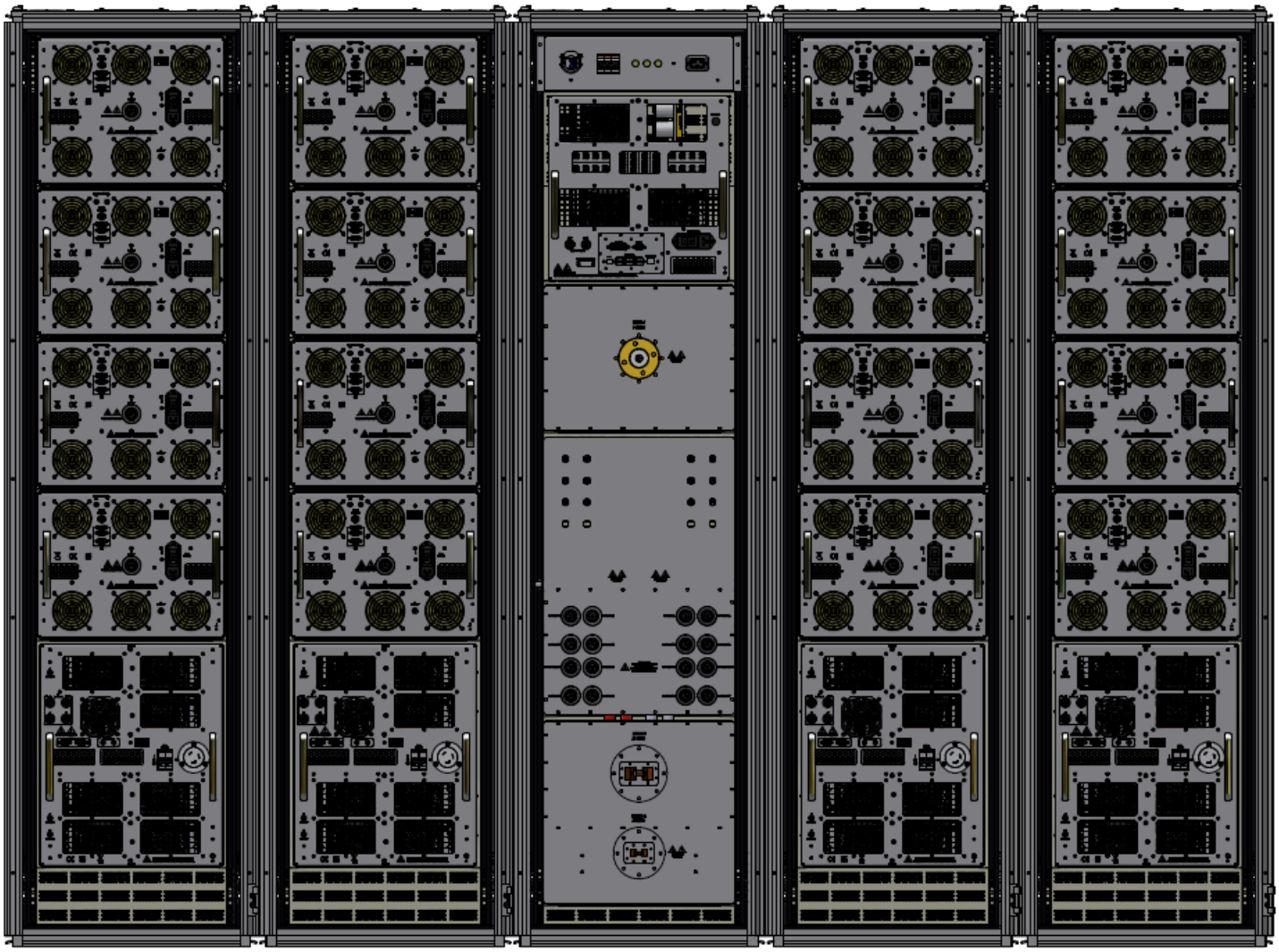
Absolute Maximum Rating **Exceeding any of the limits listed here may result in permanent damage to the device.**				
Parameter	**Minimum**	**Typical**	**Maximum**	**Unit**
RF Drive (damage level > +20dBm)		0	+13	dBm
RF Load		1:1	3:1	VSWR
RF Load Reflected Will operate without damage or oscillation when connected to any load impedance or from an open circuit to a short circuit, without the aid of foldback circuitry. However, mismatch above 6:1 may limit output to 1000 watts reflected CW power. For pulse operation management and protection, refer to Table #3 below.			50	%
AC Power (3-Phase, High Voltage, Wye 5-wire)	380		415	VAC
AC Power	47		63	Hz
Ambient Temperature	0	+25	+35	°C
Storage Temperature	-20		+70	°C
Storage Humidity (non-condensing)			95	%
Altitude			1000	m
Shock/Vibration	MIL-STD-810G Method 514 and 516			

Table #3		
Pulse width	**Min. Forward RF Power**	**Accepted reverse RF power before feedback action is performed by the amplifier.**
(Band 1: 1 - 2 GHz)		
0.1 – 50 µs	Min. 50 kW	25 kW min., except by user setting
0.1 - 100 µs	Min. 38 kW	19 kW min., except by user setting
0.1 - 250 µs	Min. 28 kW	14 kW min., except by user setting
0.1 - 500 µs	Min. 21 kW	10.5 kW min., except by user setting
0.1 - 750 µs	Min. 17 kW	8.5 kW min., except by user setting
0.1 - 1000 µs	Min. 15 kW	7.5 kW min., except by user setting
(Band 2: 2 - 4 GHz)		
0.1 – 50 µs	Min. 35 kW	17.5 kW min., except by user setting
0.1 - 100 µs	Min. 28 kW	14 kW min., except by user setting
0.1 - 250 µs	Min. 20 kW	10 kW min., except by user setting
0.1 - 500 µs	Min. 15 kW	7.5 kW min., except by user setting
0.1 - 750 µs	Min. 12 kW	6 kW min., except by user setting
0.1 - 1000 µs	Min. 10 kW	5 kW min., except by user setting
(Band 3: 4 - 6 GHz)		
0.1 – 50 µs	Min. 25 kW	12.5 kW min., except by user setting
0.1 - 100 µs	Min. 20 kW	10 kW min., except by user setting
0.1 - 250 µs	Min. 15 kW	7.5 kW min., except by user setting
0.1 - 500 µs	Min. 11 kW	5.5 kW min., except by user setting
0.1 - 750 µs	Min. 9 kW	4.5 kW min., except by user setting
0.1 - 1000 µs	Min. 8 kW	4 kW min., except by user setting

Mechanical Specifications		
Parameters	**Typical**	**Unit**
System Amplifier Dimensions (W x H x D) ***These are the rack dimensions for the customer supplied racks.**	171.9 x 196.4 x 103.1	cm
	67.8 x 77.3 x 40.6	in
System Amplifier Weight ***Excluding Racks**	2454	kg
	5410	lb
Cooling	Forced air (self-contained fans)	
Acoustical Noise (Measured @ 1 meter from the front)	72 (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	3A001.b.4.a.1

Connector interfaces	
Function	**Type**
RF input	N female (50 Ω), rear
Pulse Input	BNC, rear
RF output #1 (1 – 2 GHz)	1-5/8 EIA, rear
RF output #2 (2 – 4 GHz)	WRD-200, rear
RF output# 3 (4 – 6 GHz)	WRD-350, rear
RF sample	N female (50 Ω), rear (70dB typical) Forward and reverse ports automatically switched internally for each band
IEEE-488	24-pin, front
RS-232	9-pin subminiature D female, front
RS-232 (fiber optic)	ST, front
USB 2.0	Type B, front
Ethernet	RJ-45, front
Interlock	15-pin subminiature D female, front

Model 850

- Pulse: 50 kW 1-2GHz, 35 kW 2-4GHz, 25kW 4-6GHz
- CW: 2kW 1-4GHz, 1.5 kW 4-6GHz