

ULTRAVOLT HVA SERIES

PRECISION HIGH VOLTAGE AMPLIFIER

The UltraVolt® HVA series of DC-to-DC high voltage power supplies operates a precision filter/divider and linear HV switch to produce a high voltage amplifier (HVA). These modules provide a high-resolution, programmable, high voltage DC to full scale waveform capability greater than 1 kHz output. This is optimized for bias applications while providing excellent line regulation, load regulation, dynamic response, and stability. It can both source and sink current.

PRODUCT HIGHLIGHTS

- DC, reversible, and amplifier modes
- Fast slew rate (40 V/μs) and high bandwidth
- Can both source and sink current
- Bipolar models available at 0 to 5 kV
- Unipolar models available at 0 to 10 kV
- PPM level line and load regulation
- 50 ppm temperature coefficient (25 ppm optional)
- Available reduced ripple option
- Differential precision 0 to 10 VDC control input
- Precision output voltage and current monitors
- UL/cUL recognized component; CE Mark (LVD and RoHS)

TYPICAL APPLICATIONS

- Drivers
 - PZT actuators
 - MEMS devices
 - Electroactive polymers
 - Electrorheological materials
 - Electrohydrodynamics
 - Electrostatic chuck
 - Pockels cells
 - Laser and electro-optic modulation
 - Electrophoresis
- Amplifiers
 - Beam devices such as mass spectrometers and electron microscopes as electrostatic deflection/focusing, flocking, coating, electrospinning, precipitation, and electrocoalescence

ELECTRICAL SPECIFICATIONS

Parameter	Conditions	Models							Units
Input		All Types							
Voltage Range	Full Power	24 VDC $\pm 10\%$							VDC
Current	Standby/Disable	< 70 unipolar, < 105 bipolar							mA
Current	Full Load, Max Eout	< 420							mA
Current	No Load, Max Eout	< 400							mA
Output ¹		1 kV/ ± 1 kV	2 kV/ ± 2 kV	4 kV/ ± 4 kV	± 5 kV	6 kV	10 kV		
Power	Nominal Input, Max Eout	0.25	0.5	1	1	1	1	W	
Current	Iout Entire Voltage Range	250	250	250	200	167	100	μ A	
Ripple	Full Load, Max Eout	0.05	0.05	0.05	0.03	0.03	0.01	%V pp	
Ripple with -F Option	Full Load, Max Eout	0.0125	0.0125	0.0125	0.0075	0.0075	0.0025	%V pp	
Voltage Monitor	Normal Operating Conditions	0 to 10 $\pm 0.5\%$							VDC
Current Monitor	Normal Operating Conditions	0 to 10 $\pm 1\%$							VDC
Line Regulation	Vin Min to Vin Max, Max Eout	< 0.01							%
Load Regulation	No Load to Full Load, Max Eout	< 0.01							%
Programming and Controls		All Types							
Input Impedance	Normal Operating Conditions	10							M Ω
Adjust Voltage	Differential	0 to +10							VDC
HV ON/OFF (Enable/Disable)		0 to +0.8 V disable, +2.5 to +10 enable (default = disable)							VDC
Reference Voltage	T = +25°C, Initial Value	+10.00 $\pm 0.05\%$							VDC
Max Source Current	T = +25°C	5							mA

Environmental		All Types							
Operating	Full Load, Max Eout, Case Temp.	+10 to +45							°C
Temperature Coefficient	Over the Specified Temperature	50 PPM or 25 PPM							PPM/°C
Thermal Shock	Mil-Std 810, Method 503.4-2	-40 to +65							°C
Storage	Non-Operating, Case Temp.	-40 to +100							°C
Humidity	All Conditions, Standard Package	0 to 95%, non-condensing							-
Altitude	Standard Package, All Conditions	Sea level through 10,000							ft
Shock	Mil-Std-810, Method 516, Proc. 4	20							Gs
Vibration	Mil-Std-810, Method 514, Fig. 514-3	10							Gs

¹ Units listed without polarity can be ordered as positive (+) or negative (-). Units listed as (\pm) are bipolar.

Contact AE for preset fixed outputs or other requirements.

ELECTRICAL SPECIFICATIONS (CONTINUED)

Sample HVA Series Waveforms

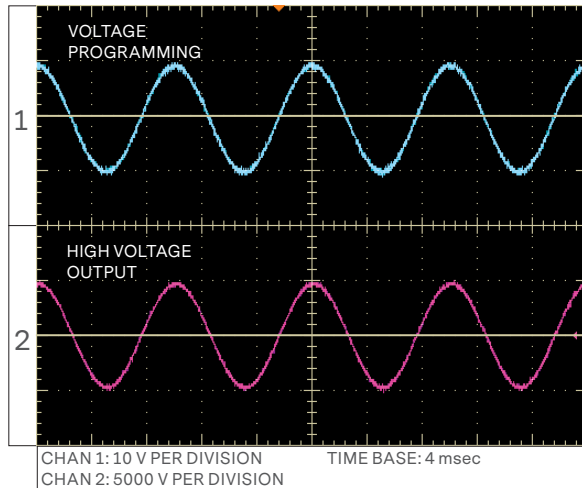


Figure A. 5HVA24-BP1 sine wave input

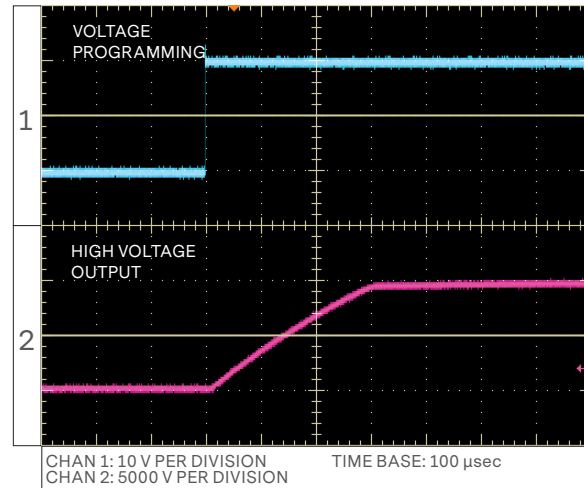


Figure B. 5HVA24-BP1 10 kV step wave input with no load

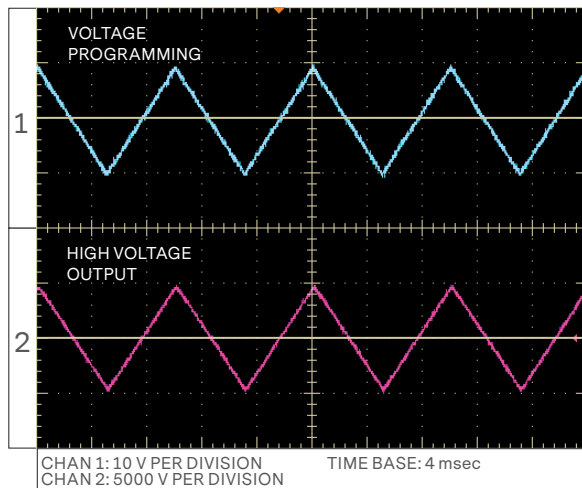


Figure C. 5HVA24-BP1 triangle wave input

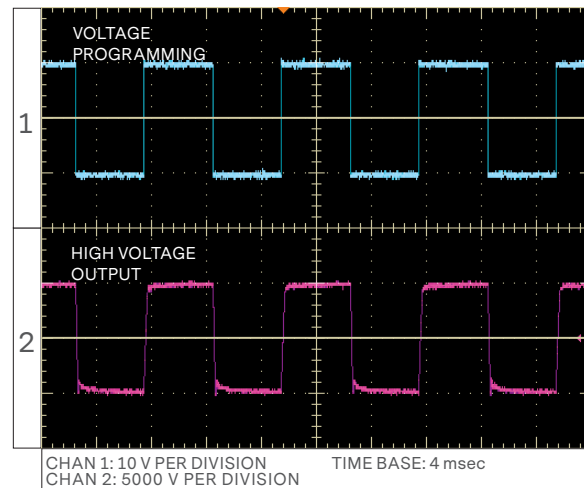


Figure D. 5HVA24-BP1 square wave input

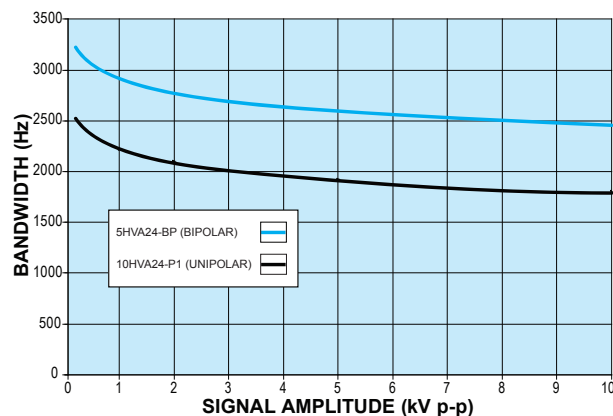


Figure E. Bandwidth vs. signal amplitude with no load

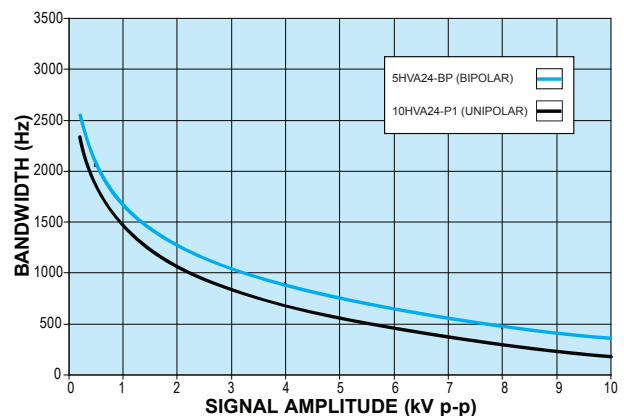
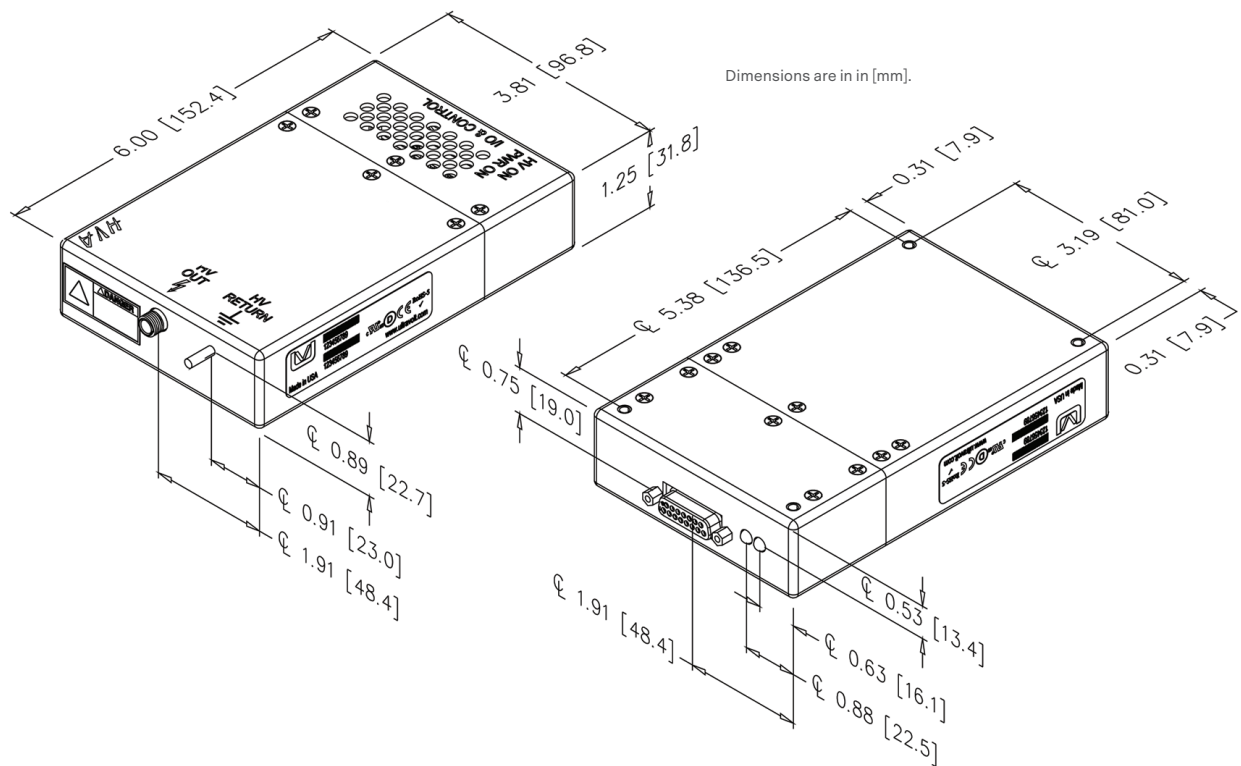


Figure F. Bandwidth vs. signal amplitude with 100 pF load

MECHANICAL SPECIFICATIONS



Dimensions	
Construction	Aluminum alloy 5052-H32
	Anodize MIL-A-8625E blue

Volumes and Weights		
	cm³	in³
Volume	468.34	28.58
	kg	lb
Weight	0.68	1.5

INTERFACE

Connections

Sub-miniature D	15-pin, female
HV Connector	LGH1/2L
HV Return	#6-32 x 0.437 long threaded post

UV-HVA Input Connector Pinout Functions

Pin	Description	Function
1	Reference Voltage	+10.00 V precision reference
2	Voltage Programming -	0 to +10 V or 0 to -10 V to program full output voltage, depending on polarity. Programming input is differential between pins 2 and 3.
3	Voltage Programming +	
4	Voltage Monitor	0 to ± 10 V represents 0 to \pm full output voltage
5	N/C	No connection
6	Signal Ground	Reference all control signals here.
7	Input Power	+24 V input power
8	Input Power	
9	Power Ground	Input power return
10	Power Ground	
11	Enable	TTL high to enable, low to disable, default is OFF
12	Current Monitor	0 to ± 10 V represents 0 to \pm full output current
13	Current Limit Adjust	0 to +10 V sets current limit from 0 to full rated output current
14	N/C	No connection
15	Signal Ground	Reference all control signals here.

ORDERING INFORMATION

Type	0 to 1000 VDC Output	1HVA
	0 to 2000 VDC Output	2HVA
	0 to 4000 VDC Output	4HVA
	0 to 5000 VDC Output (Bipolar Only)	5HVA
	0 to 6000 VDC Output (Unipolar Only)	6HVA
	0 to 10000 VDC Output (Unipolar Only)	10HVA
Input	24 VDC Nominal	24
Polarity	Positive Output	-P
	Negative Output	-N
	Bipolar Output	-BP
Power	1 W Output	1
Option	Ripple Stripper® Output Filter	-F
	25 PPM Temperature Coefficient	-25PPM
Connections	LGH	Standard
	5 kV SHV Type	-SHV-5kV
	10 kV, BNC Type	-BNC-10kV

Popular accessories ordered with this product include our full range of high voltage output connectors. (See Accessories and Connectors datasheet.)

