



Figure 1. Physical Photos of AHVA2KV2X20MA

MAIN FEATURES

- Built-in High Voltage Converter
- Compact Size: 181.5(L)×149.0(W)×38.3(H) mm
- High Current Capability: Up to 20mA
- High Slew Rate: 200V/μs
- Wide Output Voltage Range: $V_{OUT}=0\sim 2kV@V_{IN}=24V$
- Offset Voltage Range: 10V
- Bandwidth: Up to 50kHz
- Weight: 2.2lb (1.0kg)

APPLICATIONS

High voltage amplifications for driving piezos and other high voltage loads.

DESCRIPTION

The AHVA2KV2X20MA is an electronic module for amplifying an analog input voltage into a high voltage output. Figure 1 shows its physical photo. It comes with a high voltage DC-DC converter, which converts the 24V input voltage into a 0 to 2kV output voltage. The analog output voltage can swing almost from 0 to 2kV when it is powered by a 24V power supply. There is three LEDs indicating if the amplifier works properly.

Table 1. Descriptions of Terminal Block Pin Functions

Pin #	Name	Type	Description
1	VPS	Power Input	Power supply 24V.
2	PGND	Power Ground	Power ground pin.
3	SBDN	Digital Input	This is a duplex pin. It sets the amplifier into Off, Standby or On mode.
4	AGND	Signal Ground	Signal ground pin. Connect ADC and DAC grounds to here.
5	10VR	Analog Output	10V voltage reference.
6	AIO	Analog Input	Output current indication. When going from 0 to 10V, it indicates the output current is from 0 to 20mA.
7	ACO	Analog Output	Output voltage indication. When going from 0 to 10V, it indicates the output voltage is from 0 to 2kV.
8	BIASO	Analog Input	Output voltage setting. When going from 0 to 10V, it indicates the output voltage is from 0 to 2kV. The pin is controlled by a potentiometer.
9	GND	Signal Ground	Signal ground pin. Connect ADC and DAC grounds to here.



Pin #	Name	Type	Description
BNC 1	INPUT	Analog Input	Output voltage setting. When going from 0 to 10V, it indicates the output voltage is from 0 to 2kV.
BNC 2	INPUT+DC	Analog Input	INPUT+DC input control signal indication.
BNC 3	VOUT	Analog Output	Output voltage for driving the load.
	OGND	Output Ground	Connect this pin to the load return terminal.

SPECIFICATIONS

Table 2. Characteristics (Test ambient temperature $T_A = 25^\circ\text{C}$)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Power Supply Input						
Input Range	V_{VPS}		23	24	25	V
Input Current	I_{IN}		0		4	A
Voltage Output						
Output Voltage	V_{OUT}		0		2000	V
Output Current	I_{OUT}		0		18	mA
SBDN Pin (Pin 3)						
SBDN Voltage	$V_{SBDN-ON}$		2.64		V_{VPS}	V
	$V_{SBDN-STANDBY}$		2.1		2.5	V
	$V_{SBDN-OFF}$		0		0.4	V
	$V_{SBDN-SB-HI}$ Going up from Standby to On threshold voltage		2.508		2.64	V
	$V_{SBDN-SB-LOW}$ Going down from On to Standby threshold voltage		2.5		2.6	V
	$V_{SBDN-OFF-HI}$ Going up from Off to Standby threshold voltage				2.1	V
	$V_{SBDN-OFF-LOW}$ Going down from Standby to Off threshold voltage			0.4		V
SBDN Current	I_{SBDN}			10	20	μA
10VR Pin (Pin 5)						
Voltage Reference	V_{REF}			10		V
Maximum Input Power				80		W
Maximum Slew Rate				200		V/ μs

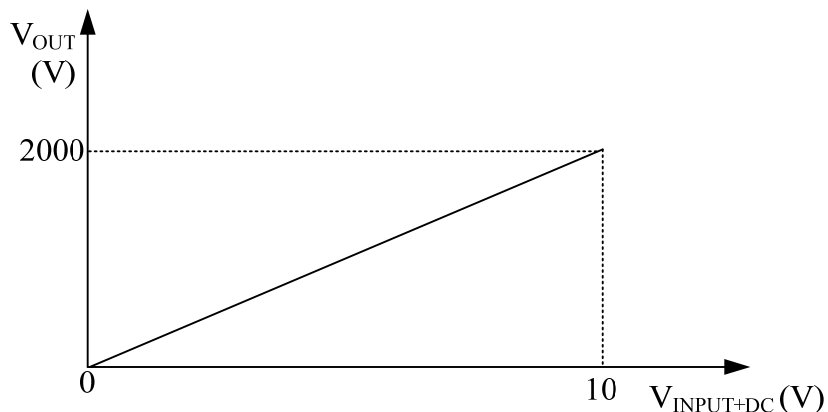


Figure 2. V_{OUT} vs. V_{VIN}

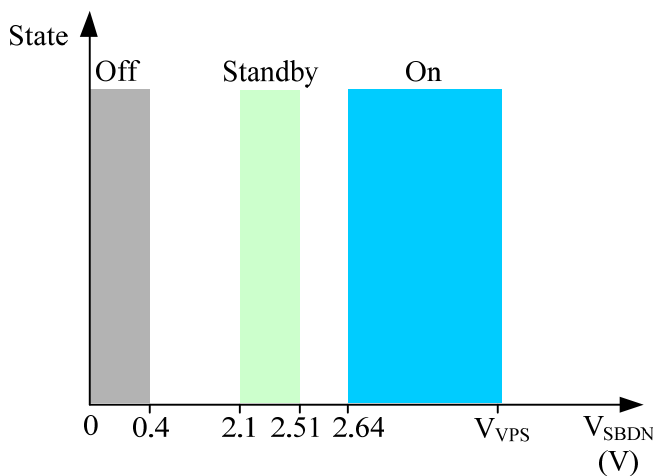
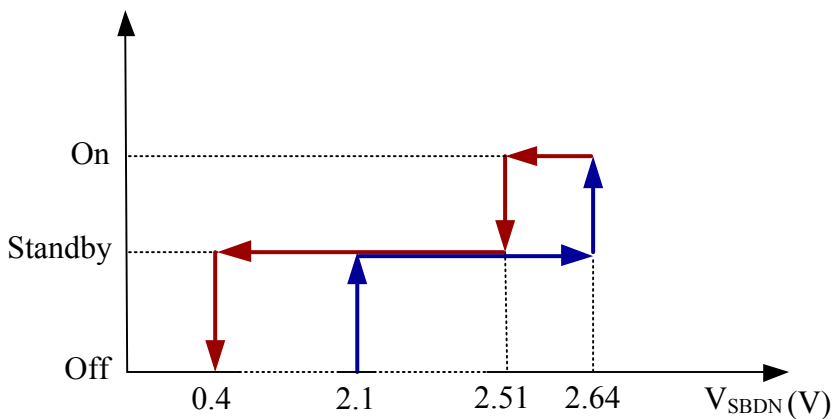


Figure 3. The States of Amplifier vs. V_{SBDN}

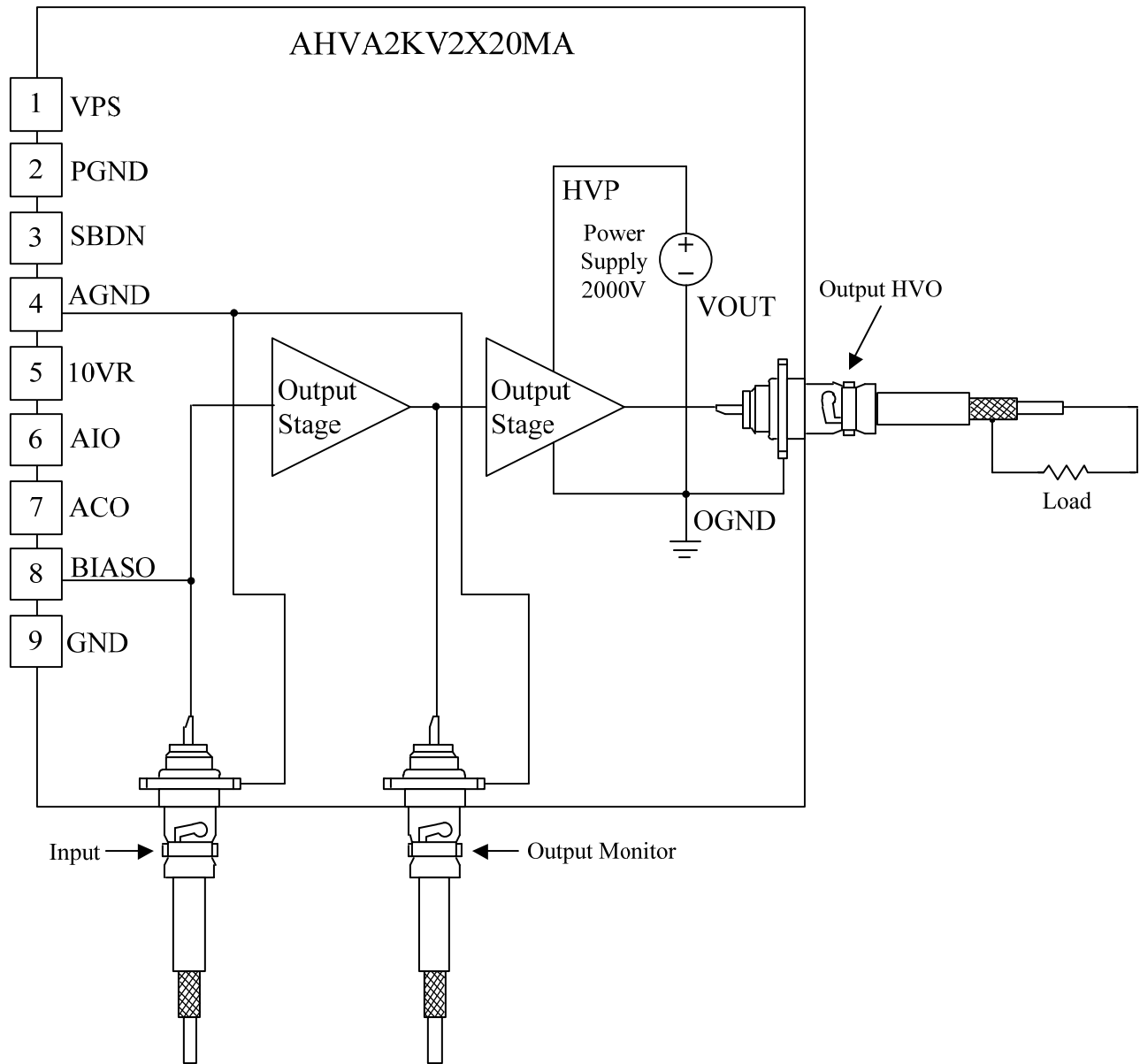


Figure 4. Schematic for Driving the Load

As shown in Figure 5 and Figure 6, when a square wave of 0V ~ 10V, $f=100\text{Hz}$, is applied to AC input pin, measure the waveform of HVO. The rise time should be about $10\mu\text{s}$, and the fall time should be about $11\mu\text{s}$.

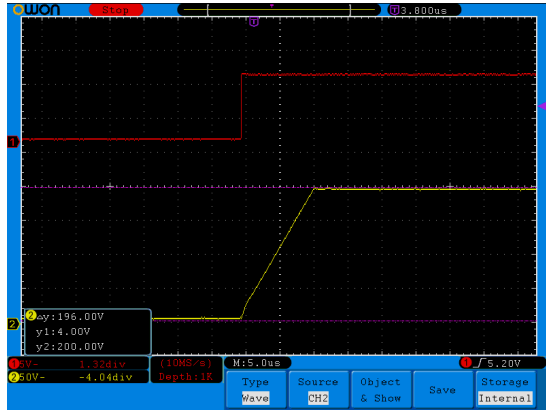


Figure 5. Rise Time

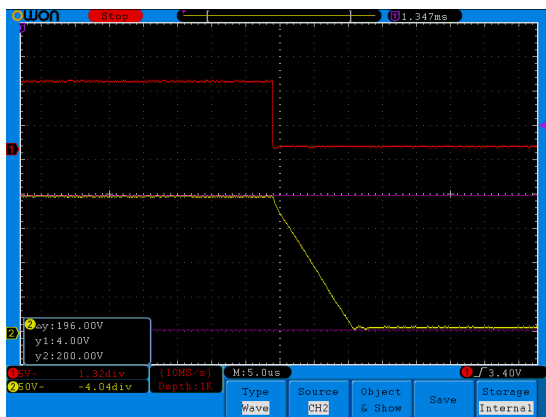


Figure 6. Fall Time

As shown in Figure 7 ~ Figure 10, when a sine wave of 0V ~ 10V, $f=100\text{Hz}/10\text{kHz}/20\text{kHz}/35\text{kHz}$, is applied to AC input pin, measure the waveform of HVO. Gain=200.

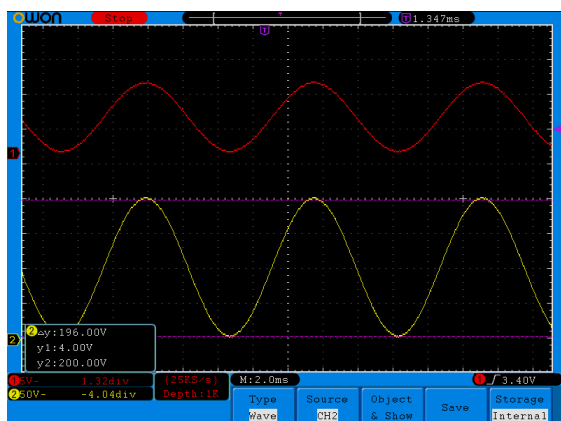


Figure 7. $f=100\text{Hz}$

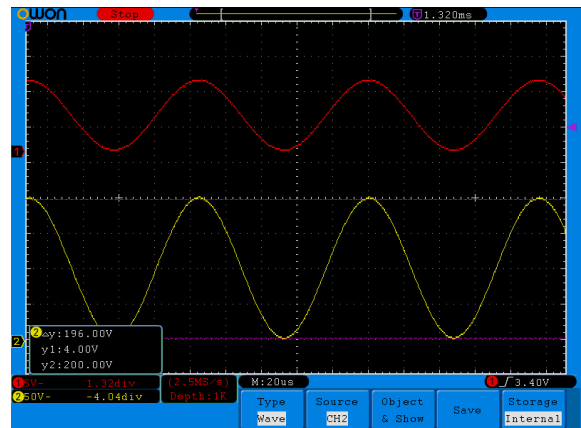


Figure 8. $f=10\text{kHz}$

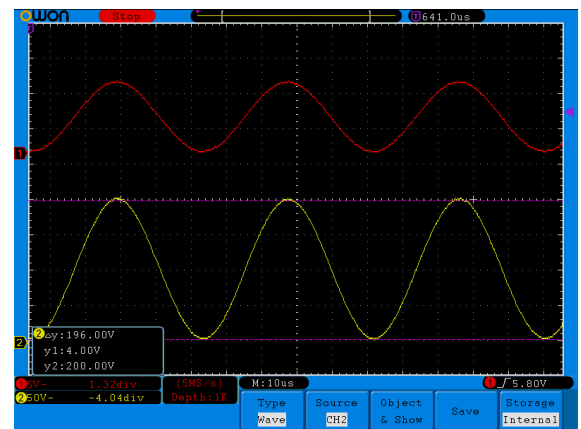


Figure 9. $f=20\text{kHz}$

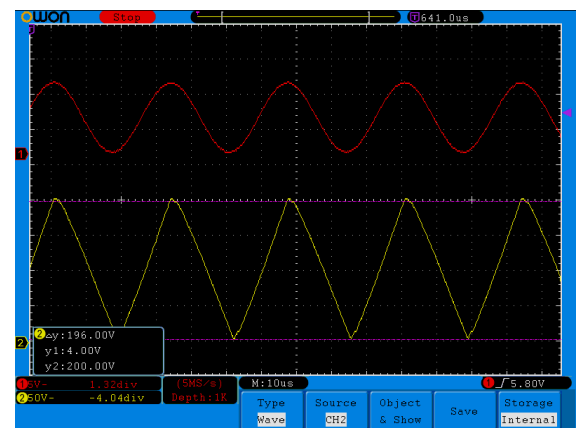


Figure 10. $f=35\text{kHz}$

As shown in Figure 11, when a sine wave of 0V ~ 10V, f=50kHz, is applied to AC input pin, measure the waveform of HVO. Gain = 140.

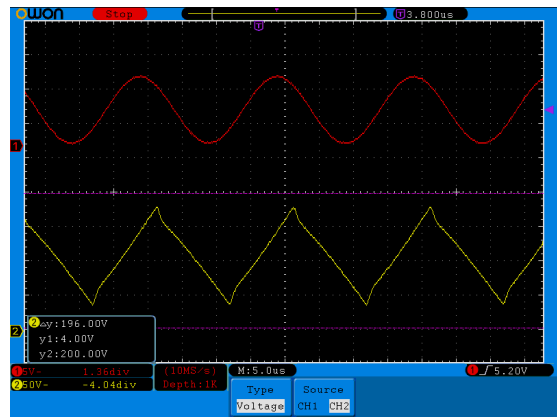


Figure 11. f=50kHz

BLOCK DIAGRAM

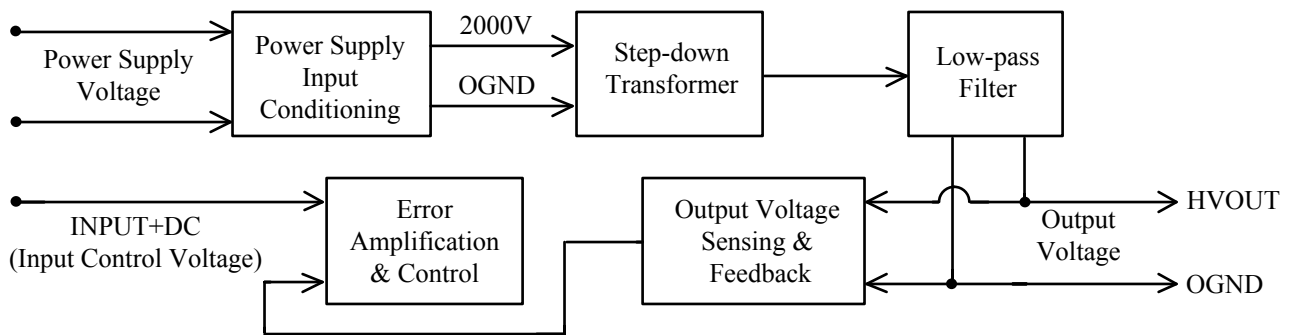
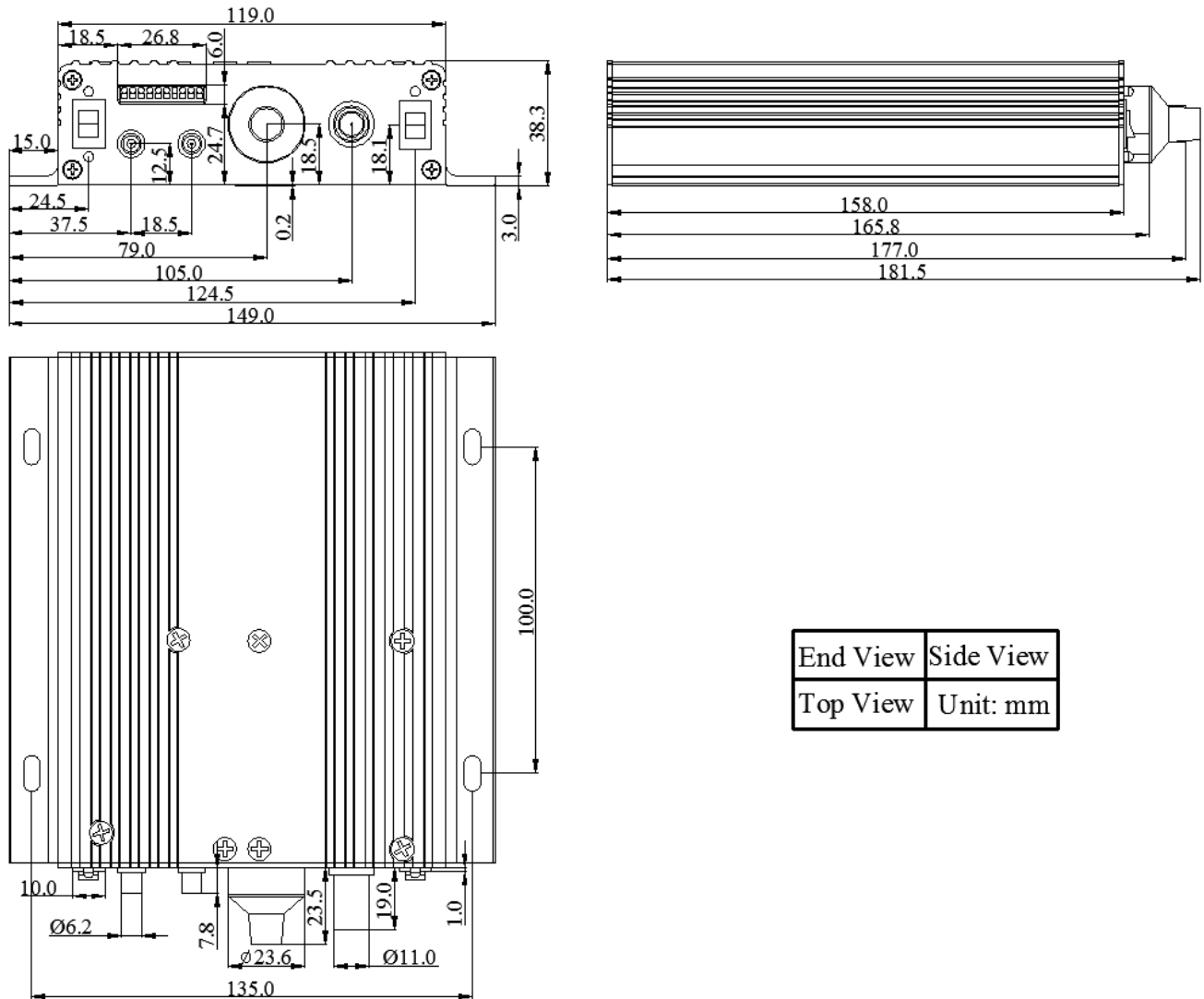


Figure 12. Block Diagram



DIMENSIONS



End View	Side View
Top View	Unit: mm

Figure 13. Dimensions of AHVA2KV2X20MA

ORDERING INFORMATION

Table 3. Part Number

Part Number	Description
AHVA2KV2X20MA	2kV high voltage amplifier

Table 4. Unit Price

Quantity (pcs)	1 – 4	5 – 8	9 – 12	13 – 16	17 – 20	≥21
Unit Price	\$1500	\$1450	\$1400	\$1350	\$1300	\$1250



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