Figure 1. The Physical Photo of AHVA2KV2X100MA

MAIN FEATURES

- **Built-in High Voltage Converter**
- **Compact Size: 181.5(L)×149.0(W)×38.3(H) mm**
- **High Current Capability: Up to 100mA**
- **High Slew Rate: 150V/μs**
- **Wide Output Voltage Range: V_{OUT} = 0~2kV@V_{IN} = 24V**
- **Offset Voltage Range: 10V**
- **Bandwidth: Up to 10kHz**
- **Weight: 2.2lb (1.0kg)**

APPLICATIONS

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

DESCRIPTION

The AHVA2KV2X100MA 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.

CAUTION

First, set up the AC power supply and fix it stably and firmly. Then make sure that the two switches of the high voltage amplifier are OFF. Connect the 24V DC power supply to the VPS and PGND of the high voltage amplifier. After the connection is complete, turn on the low voltage switch and set the input AC voltage or DC voltage. Then use the output monitor to check whether the input set voltage is correct. Finally turn on the high voltage switch.

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	IHVMON	Analog Input	-
7	HVMON	Analog Output	Output voltage indication. When going from 0 to 10V, it indicates the output voltage is from 0 to 2kV.
8	OFFSO	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+Offset	Analog Output	Input+Offset input control signal indication.
BNC 3	HVOUT	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°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		100	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				150		V/µs

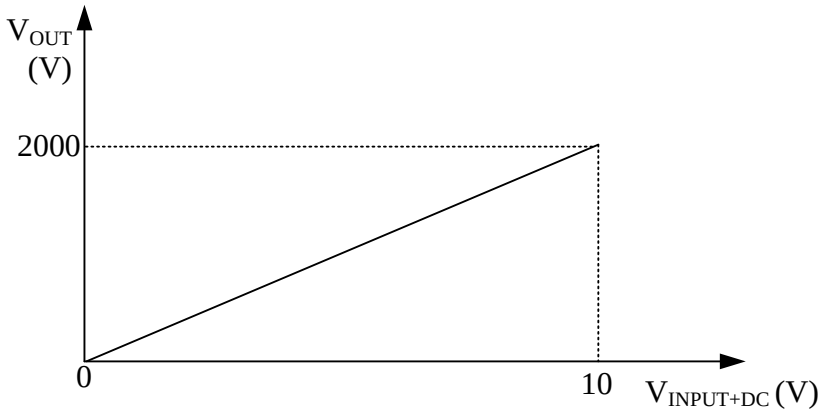

Figure 2. V_{OUT} vs. V_{VIN}

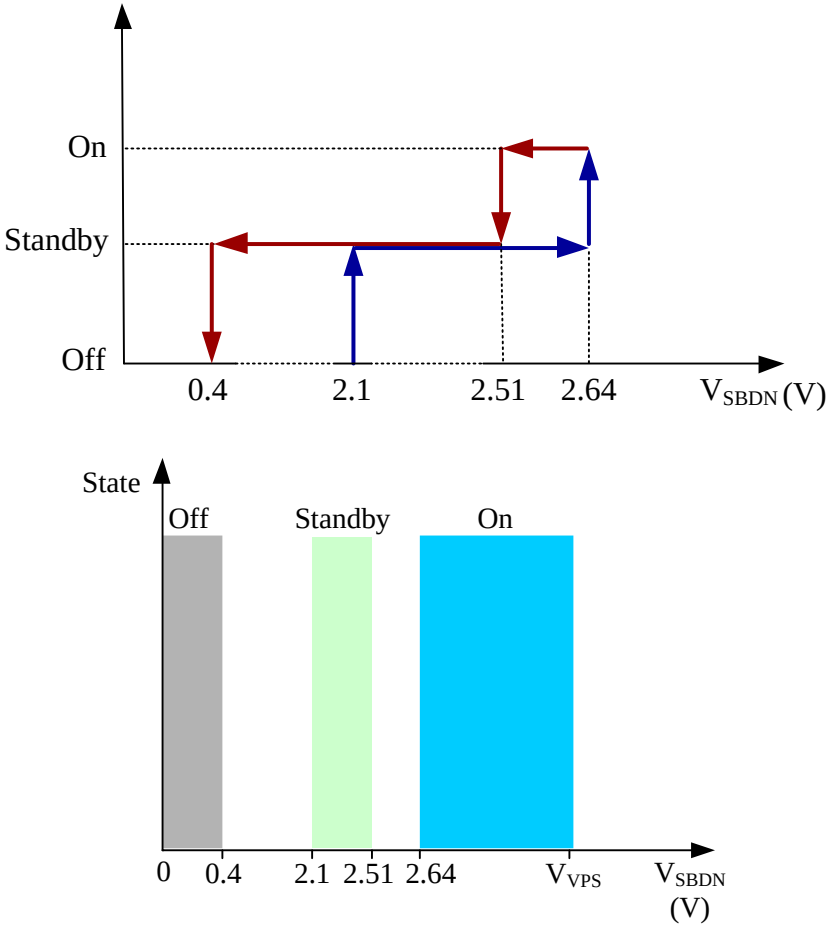

Figure 3. The States of Amplifier vs. V_{SBDN}

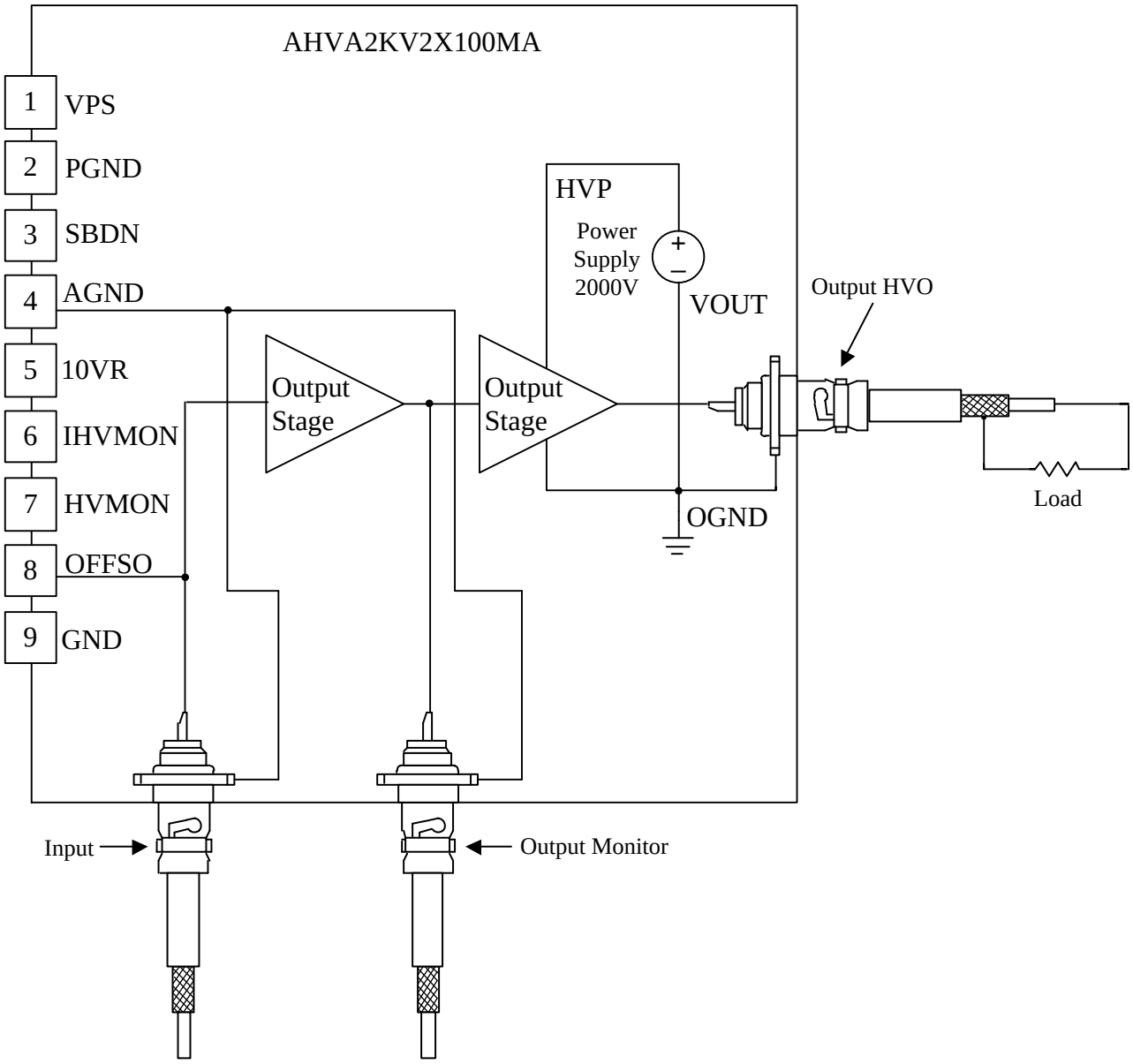

Figure 4. Schematic for Driving the Load

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

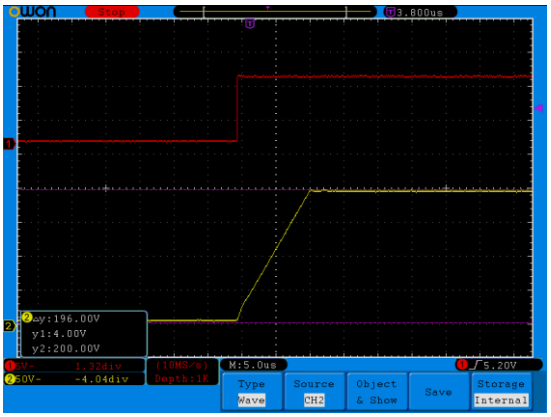

Figure 5. Rise Time

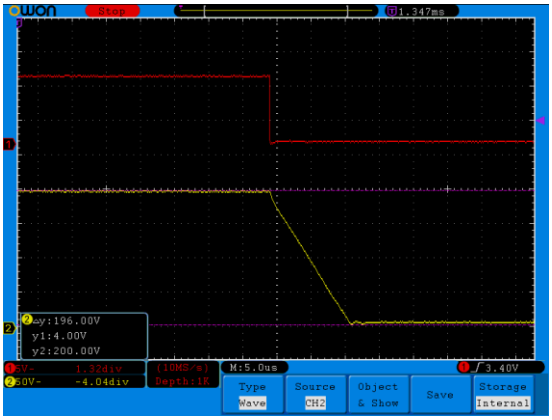

Figure 6. Fall Time

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

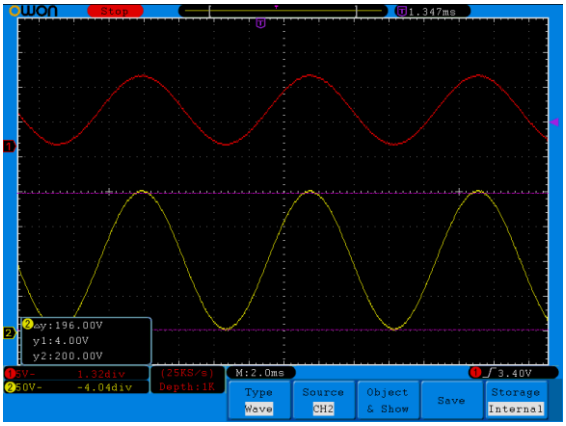

Figure 7. f = 100Hz

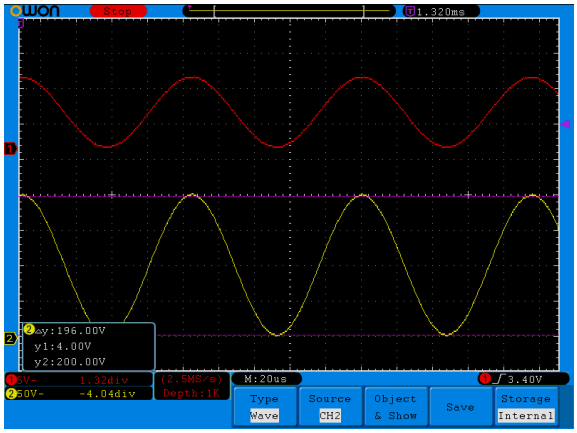

Figure 8. f=10kHz

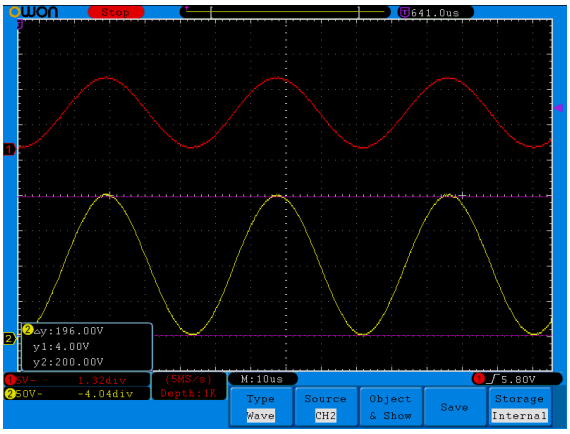

Figure 9. f = 20kHz

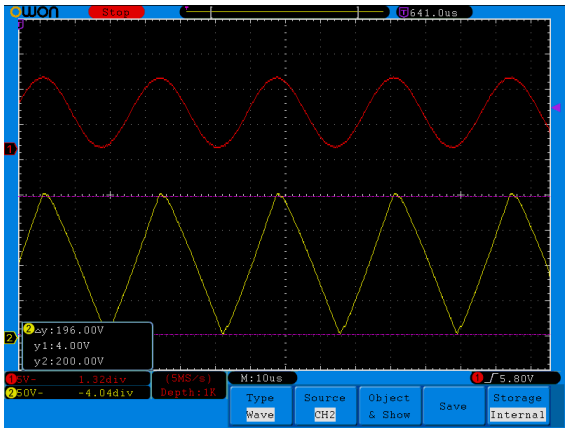

Figure 10. f = 35kHz

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.

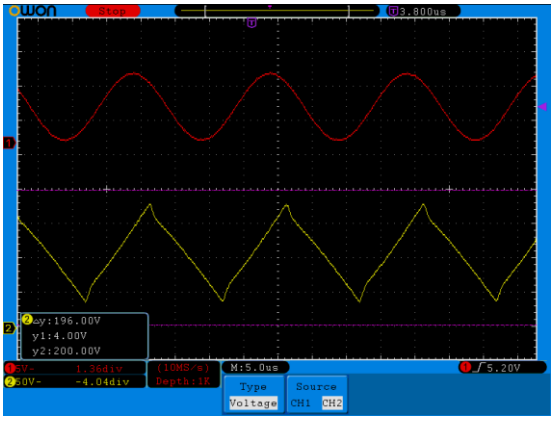

Figure 11. f = 50kHz

BLOCK DIAGRAM

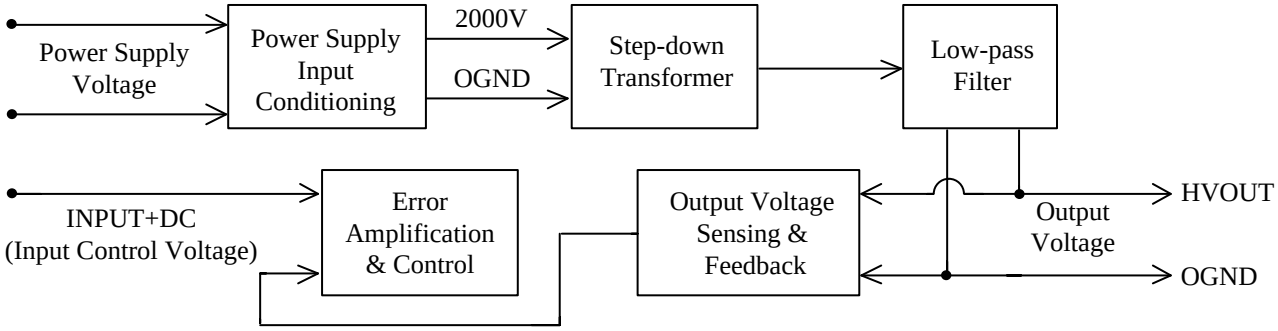

Figure 12. Block Diagram

DIMENSIONS

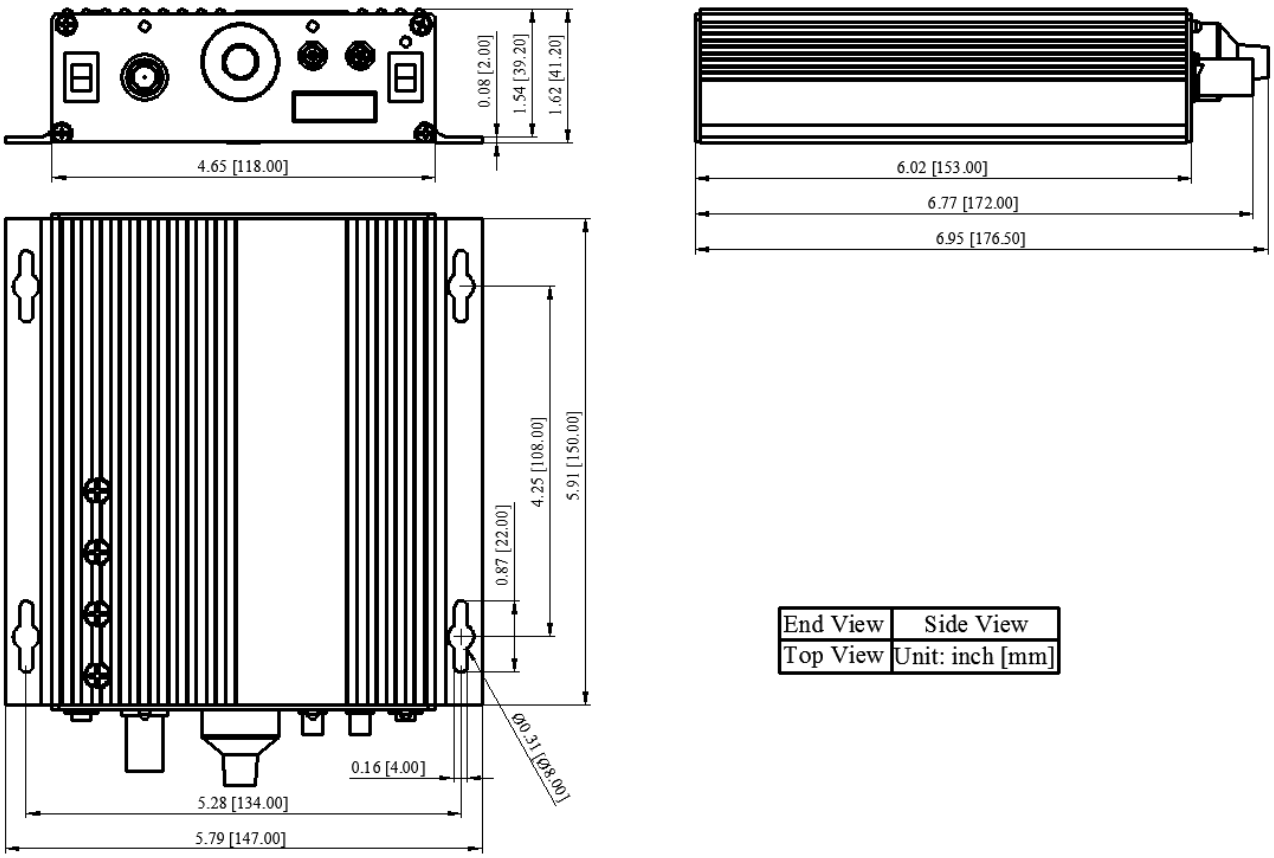

Figure 13. Dimensions of AHVA2KV2X100MA

ORDERING INFORMATION

Table 3. Part Number

Part Number	Description
AHVA2KV2X100MA	2kV high voltage amplifier, with 10mA output current and 20kHz bandwidth

NOTICE

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