

Figure 1. Physical Photo of AHV12V3KV1MAW

**FEATURES**

- High precision
- Full modulation range on output voltage
- Linear regulation
- Shutdown

**APPLICATIONS**

This power module, AHV12V3KV1MAW, is designed for achieving DC-DC conversion from low voltage to high voltage. High voltage power supply is widely used in industry, agriculture, national defense, scientific research and other fields including: X-ray machine high voltage power supply, laser high voltage power supply, spectral analysis high voltage power supply, nondestructive inspection high voltage power supply, semiconductor manufacturing equipment high voltage power supply, capillary electrophoresis high voltage power supply, nondestructive detection high voltage power supply, particles injection high voltage power supply in semiconductor technology, physical vapor phase deposition high voltage power supply, nanolithography high voltage power supply. They are widely applied in ion beam deposition, ion beam assisted deposition, electron beam

evaporation, electron beam welding, ion source, DC reactive magnetron sputtering, glass / fabric coating, glow discharge, microwave treatment high voltage capacitance test, CRT monitor test, high voltage cable fault test (PD testing), TWT test, and H-POT test. Particle accelerator, free electron laser, neutron source, cyclotron accelerator, capacitor and inductance pulse generator, Marx high voltage pulse generator, and capacitor charger. Microwave heating, radio frequency amplification, nanotechnology application, electrostatic technology application, electrospinning preparation of nanofiber, high voltage power supply can be applied for nuclear power and other products.

**DESCRIPTION**

Draw a clear distinction between input lead and output lead: input 12V (red lead), ground electrodes (black lead), regulation wire (white lead), reference voltage 5V (yellow lead), shutdown (blue lead), and output high-tension cable (thick brown lead).

While regulating the potentiometer, connect the intermediate tap of the potentiometer with white lead, and connect the other two ends to ground (black lead) and reference voltage (yellow lead) respectively. Switch on the



power, and regulate the potentiometer to have the required output voltage.

### SHUTDOWN MODE OPERATION

A logic low <0.8V or a 0V on the SDN pin will turn the device off. When SDN is in logic high >1.2V or left unconnected, the product is working well.

### SAFETY PRECAUTIONS

The internal protection circuit is provided in the high voltage power supply, but the high voltage short circuit shall be avoided.

Make sure the circuit is insulated perfectly, especially between the high voltage output and the surroundings so as to avoid electronic shock.

### SPECIFICATIONS

Table 1. Characteristics.

T<sub>A</sub> = 25°C, unless otherwise noted

| Parameter                            | Symbol                               | Condition                    | Min.                        | Typ.  | Max. | Unit/Note |
|--------------------------------------|--------------------------------------|------------------------------|-----------------------------|-------|------|-----------|
| Input Voltage                        | VPS                                  |                              | 11                          | 12    | 13   | V         |
| Quiescent Input Current              | I <sub>INQO</sub>                    | I <sub>OUT</sub> = 0mA       | 60                          | 70    | 80   | mA        |
| Full Load Input Current              | I <sub>INFLD</sub>                   | I <sub>OUT</sub> = 1.0mA     | 300                         | 350   | 400  | mA        |
| Input Voltage Regulation Ratio       | ΔV <sub>OUT</sub> /ΔVPS              | VPS = 11V ~ 13V              |                             | 0.1   |      | %         |
| Output Voltage                       | V <sub>OUT</sub>                     | I <sub>OUT</sub> = 0 ~ 1.0mA | 0                           |       | 3000 | V         |
| Maximum Output Current               | I <sub>OUTMAX</sub>                  | VPS = 11V ~ 13V              |                             |       | 1.0  | mA        |
| Stability of Reference Voltage       | V <sub>REF</sub>                     | -20 ~ 50°C                   | 4.98                        | 5     | 5.02 | V         |
| Load                                 |                                      |                              |                             | 3     |      | MΩ        |
| Regulation Mode                      |                                      |                              | 0 ~ 5V or 10K potentiometer |       |      |           |
| Control Input vs. Output Linearity   | ΔV <sub>REF</sub> /ΔV <sub>OUT</sub> |                              |                             | <0.2  |      | %         |
| Load Regulation Rate                 |                                      | I <sub>OUT</sub> = 0 ~ 1.0mA |                             | ≤0.05 |      | %         |
| Instantaneous Short Circuit Current  | I <sub>SC</sub>                      |                              |                             | <500  |      | mA        |
| Shutdown Supply Current              | I <sub>SHDN</sub>                    |                              |                             |       | 15   | mA        |
| Shutdown Logic Input Current         | I <sub>LOGIC</sub>                   |                              |                             |       | 3    | uA        |
| Shutdown Logic Low                   | V <sub>INL</sub>                     |                              |                             |       | 0.8  | V         |
| Shutdown Logic High                  | V <sub>INH</sub>                     |                              | 1.2                         |       |      | V         |
| Full Load Efficiency                 | η                                    |                              |                             | ≥70   |      | %         |
| Temperature Coefficient              | TCV <sub>O</sub>                     | -20 ~ 50°C                   |                             | <0.01 |      | %/°C      |
| Time Drift                           | Short Time Drift                     |                              |                             | <0.5  |      | %/min     |
|                                      | Long Time Drift                      |                              |                             | <1    |      | %/h       |
| Output Voltage Temperature Stability |                                      | -20 ~ 50°C                   |                             | <±1   |      | %         |
| Operating Temperature Range          | T <sub>opr</sub>                     |                              | -20                         |       | 50   | °C        |
| Storage Temperature Range            | T <sub>stg</sub>                     |                              | -55                         |       | 100  | °C        |
| External Dimensions                  |                                      |                              | 82×55×28                    |       |      | mm        |
| Weight                               |                                      |                              |                             | 210   |      | g         |
|                                      |                                      |                              |                             | 0.46  |      | lbs       |
|                                      |                                      |                              |                             | 7.4   |      | Oz        |



TESTING DATA

I. DC Testing

High voltage power supply testing data (Test condition: the load is 3 MΩ)

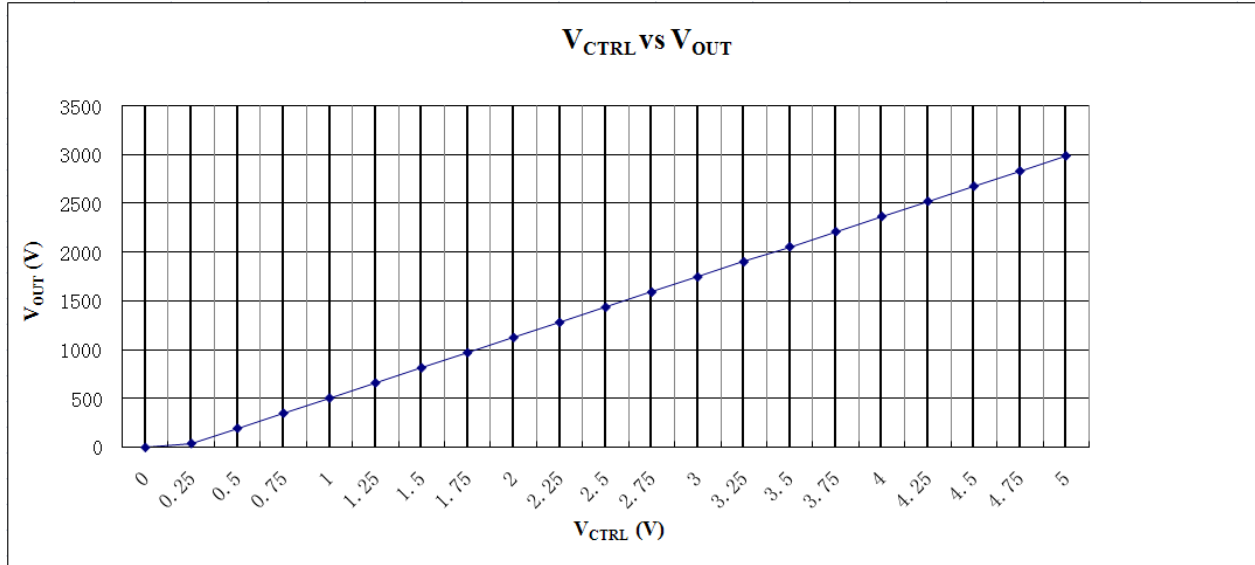


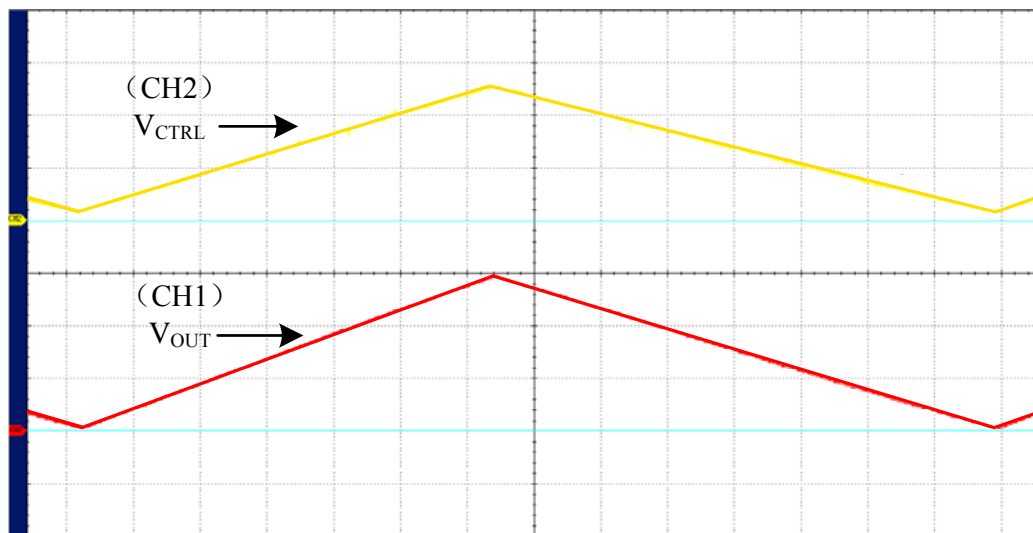
Figure 2. V\_CTRL vs. V\_OUT

II. AC Testing

Waveform curve and rise & fall time are tested by using the control voltage supplied by signal generator.

Under the testing condition of modulation frequency 0.1Hz, control voltage 0.25 ~ 5V, and 3MΩ load, the output voltage is 40 ~ 3000V.

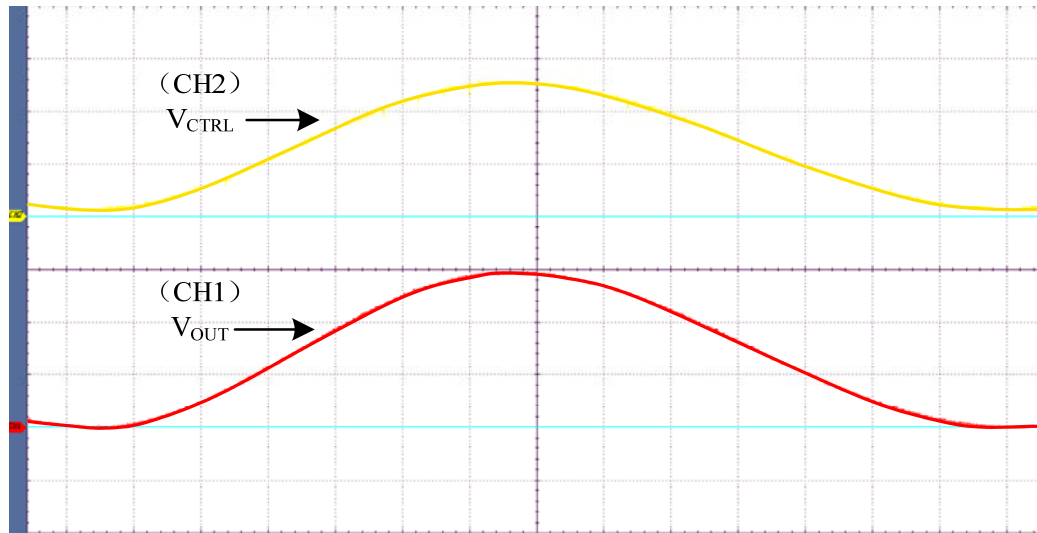
Note: as shown in the figures below, the output voltage is represented by yellow line and the control voltage by red line.



CH1: 600V/Div CH2: 2V/Div M: 500ms

V\_CTRL: 0.25V ~ 5V V\_OUT: 40V ~ 3000V

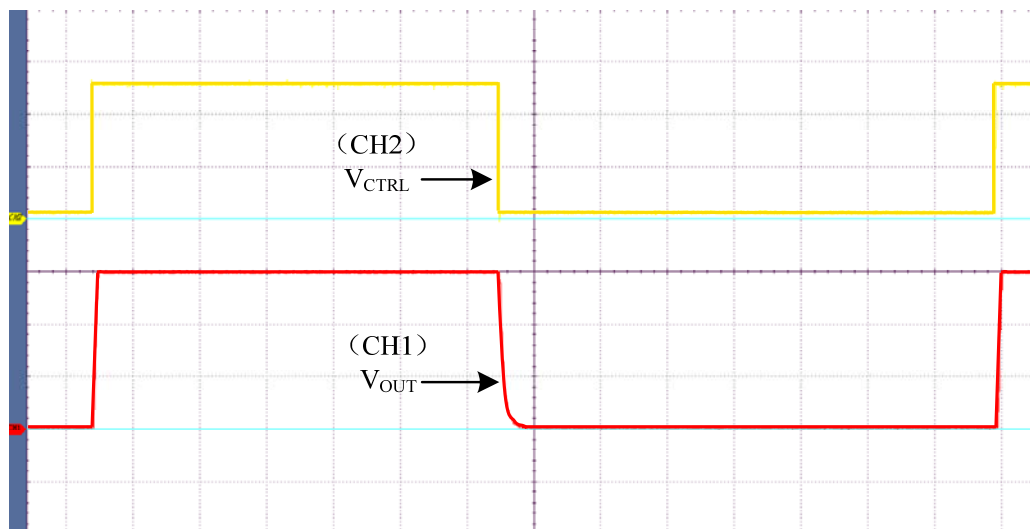
Figure 3. Triangle Wave



CH1: 600V/Div CH2: 2V/Div M: 500ms

$V_{CTRL}$ : 0.25V ~ 5V  $V_{OUT}$ : 40V ~ 3000V

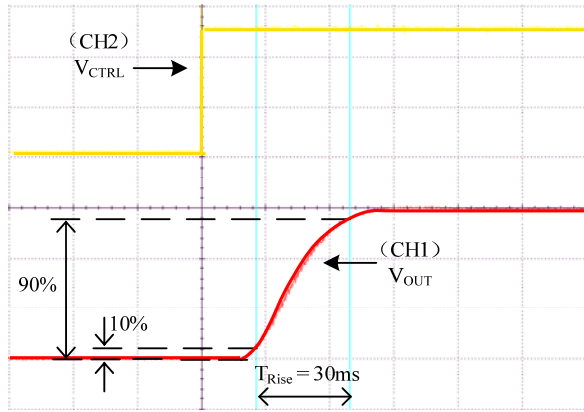
Figure 4. Sine Wave



CH1: 600V/Div CH2: 2V/Div M: 500ms

$V_{CTRL}$ : 0.25V ~ 5V  $V_{OUT}$ : 40V ~ 3000V

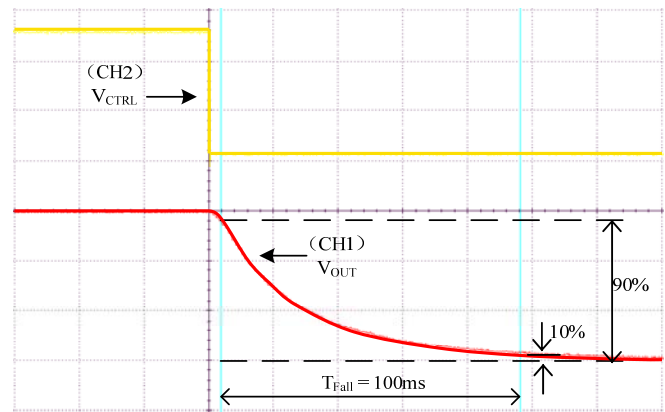
Figure 5. Square Wave



CH1: 600V/Div CH2: 2V/Div M: 20ms  
V\_CTRL: 0.25V ~ 5V V\_OUT: 40V ~ 3000V

Figure 6. Rise Time

As shown in Figure 6, when a square wave of 0.25V ~ 5V, F=0.10Hz is applied to Control, measure the waveform. The rise time is about 30ms.



CH1: 600V/Div CH2: 2V/Div M: 20ms  
V\_CTRL: 0.25V ~ 5V V\_OUT: 40V ~ 3000V

Figure 7. Fall Time

As shown in Figure 7, when a square wave of 0.25V ~ 5V, F=0.10Hz is applied to Control, measure the waveform. The fall time is about 100ms.

**THE CONNECTION DIAGRAM OF MODULE'S PERIPHERAL CIRCUIT**

The leads colors in the figures below are identical with those in the physical AHV12V3KV1MAW.

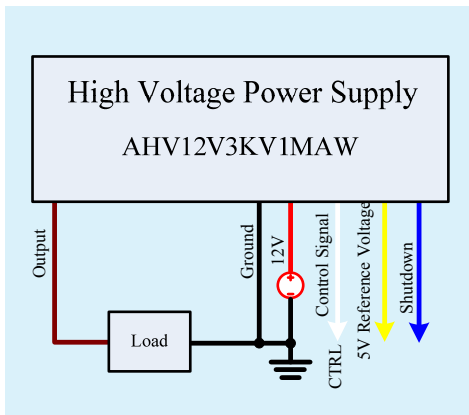


Figure 8. Control by External Signal Source

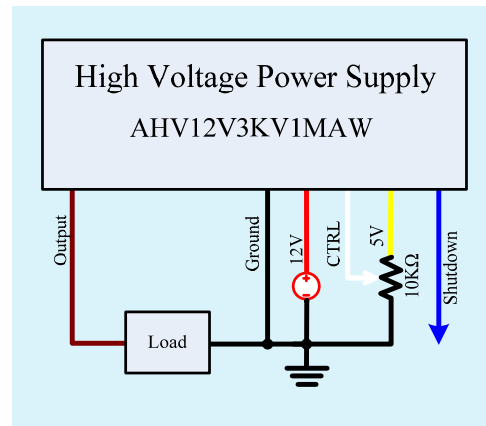


Figure 9. Constant Output Voltage

**Naming instructions**

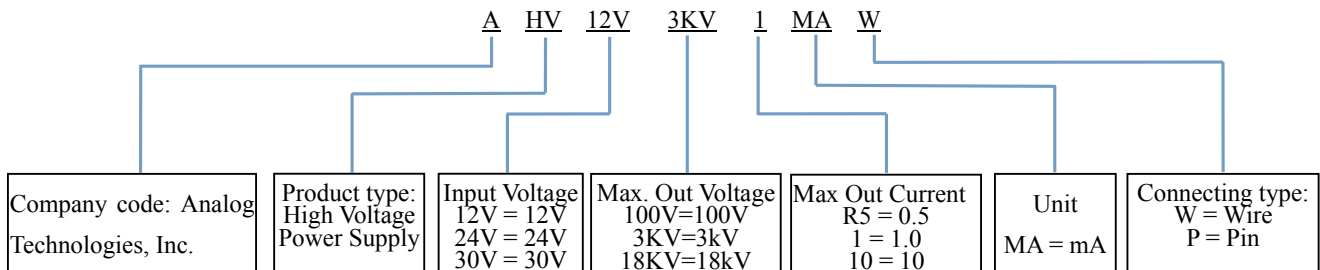


Figure 10. Physical Photo of AHV12V3KV1MAW



**DIMENSIONS**

I. Dimension of the leads.

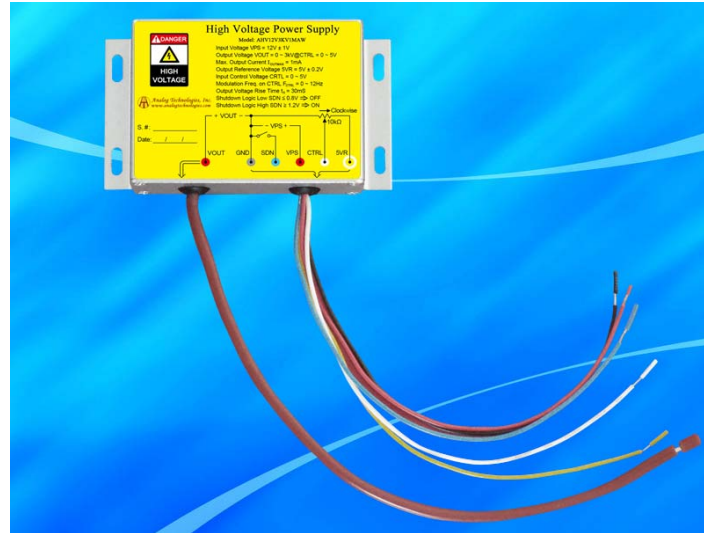
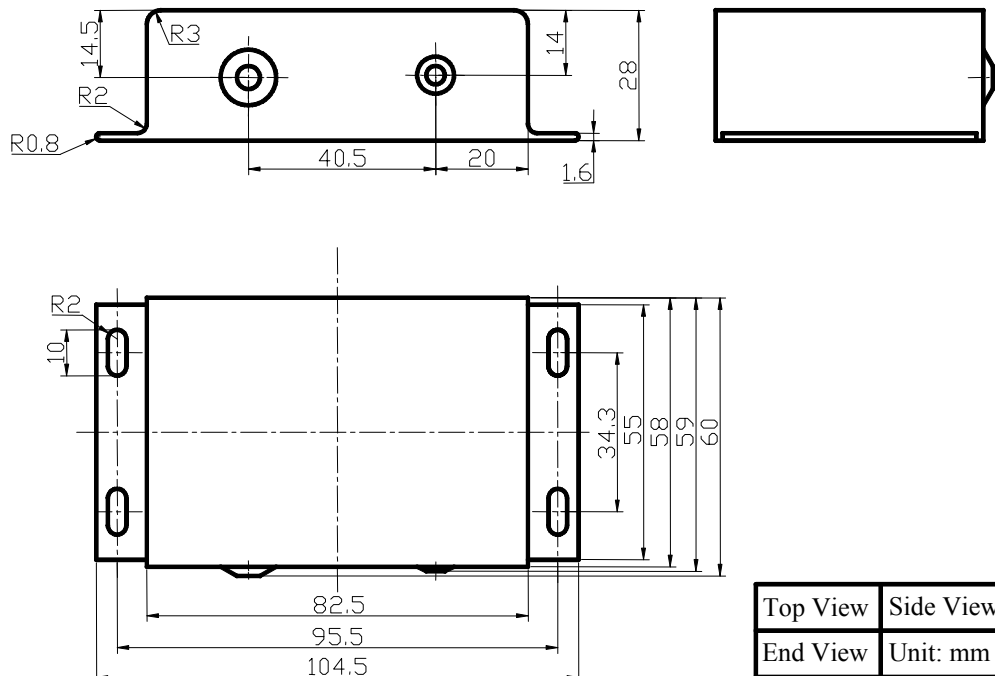


Figure 11. Leads of AHV12V3KV1MAW

| Leads                                    | Diameter (mm) | Length (mm) |
|--|---------------|-------------|
| Thick brown lead                         | 4.5           | 26          |
| Yellow, red, blue, black and white leads | 1.5           | 23          |

II. Dimension of AHV12V3KV1MAW.



|          |           |
|----------|-----------|
| Top View | Side View |
| End View | Unit: mm  |

Figure 12. Dimensions for AHV12V3KV1MAW





**PRICES**

| Quantity      | 1~9pcs | 10~49pcs | 50~99pcs | ≥100 |
|---------------|--------|----------|----------|------|
| AHV12V3KV1MAW | \$106  | \$96     | \$86     | \$76 |

**NOTICE**

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