



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: 200V/μs**
- **Wide Output Voltage Range: $V_{OUT}=0\sim 2kV@V_{IN}=24V$**
- **Offset Voltage Range: 10V**
- **Bandwidth: Up to 20kHz**
- **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

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 | Output current indication. When going from 0 to 10V, it indicates the output current is from 0 to 100mA. |
| 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. |

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.



| 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 | | 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 | | | | 200 | | V/ μs |

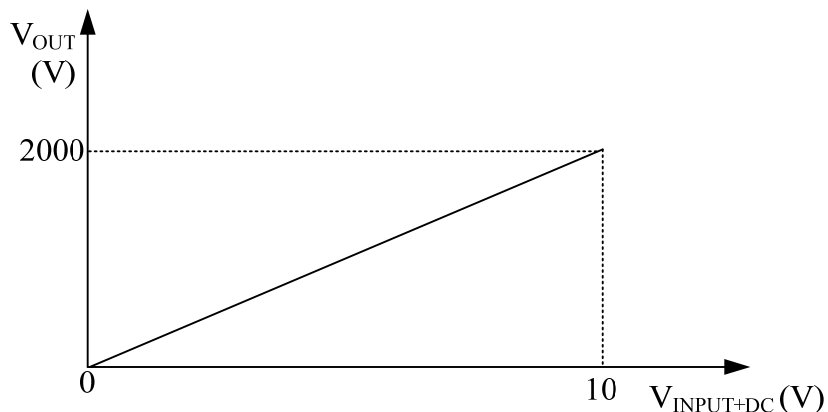


Figure 2. V_{OUT} vs. V_{VIN}

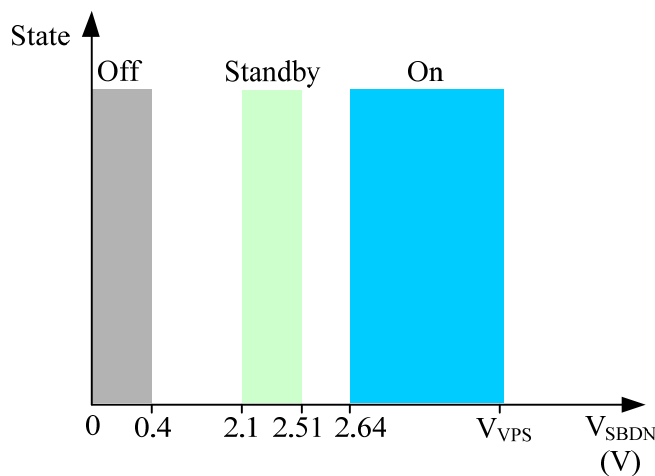
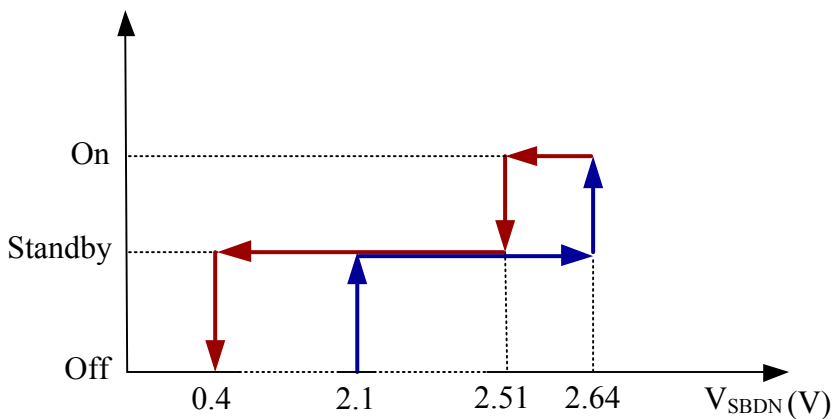


Figure 3. The States of Amplifier vs. V_{SBDN}

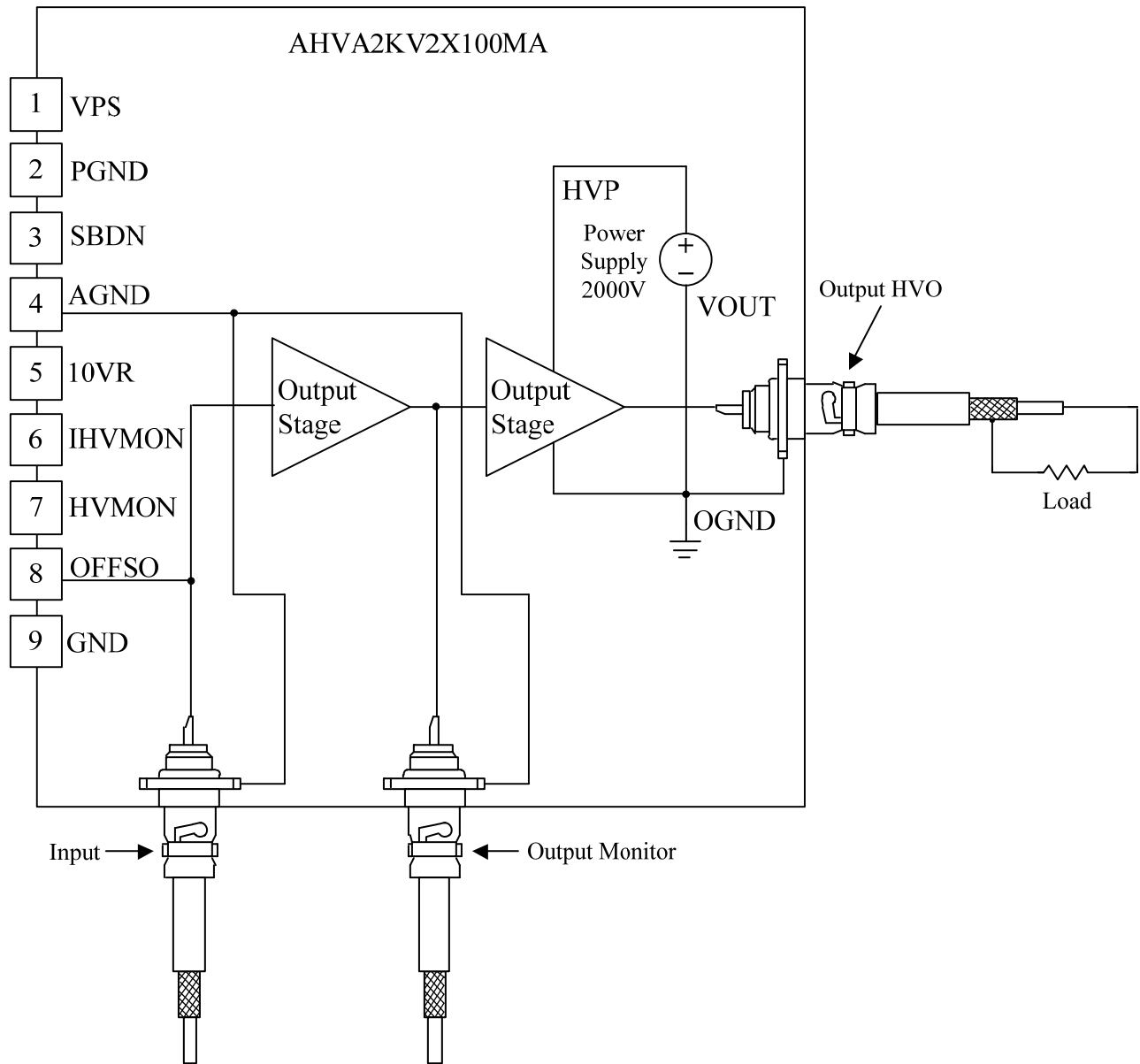


Figure 4. Schematic for Driving the Load

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 $11\mu\text{s}$.

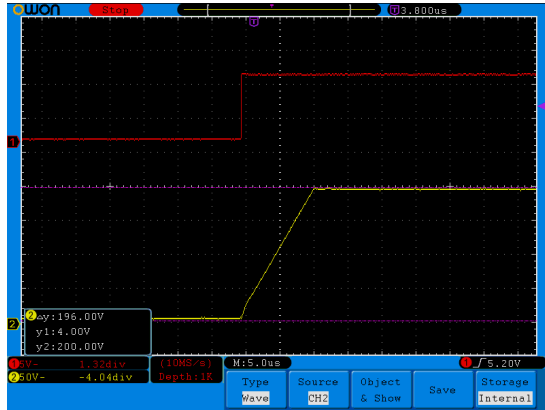


Figure 5. Rise Time

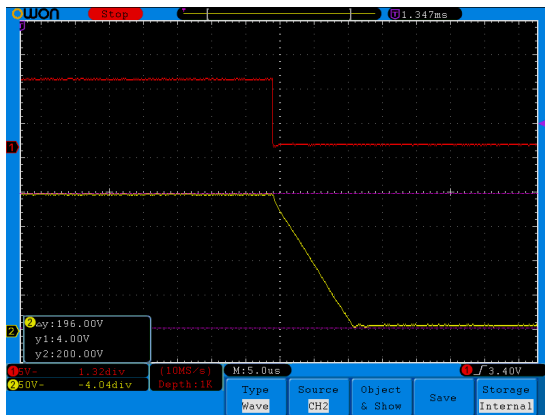


Figure 6. Fall Time

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.

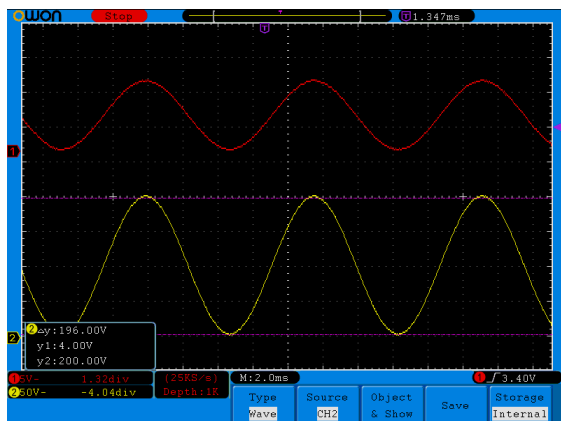


Figure 7. $f=100\text{Hz}$

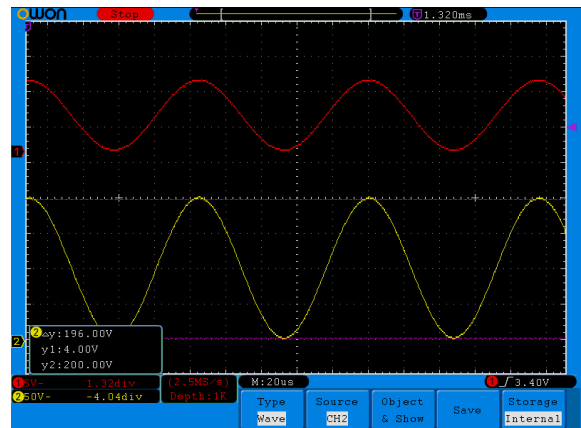


Figure 8. $f=10\text{kHz}$

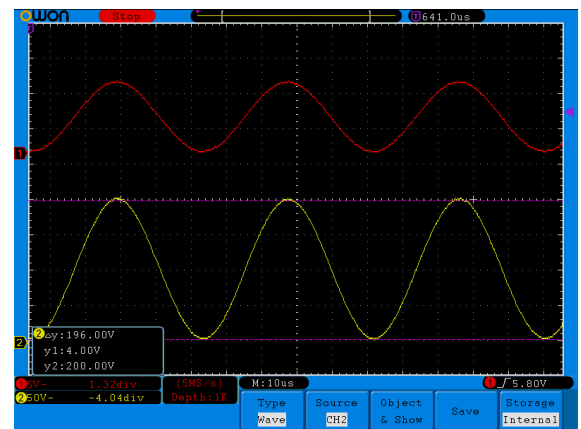


Figure 9. $f=20\text{kHz}$

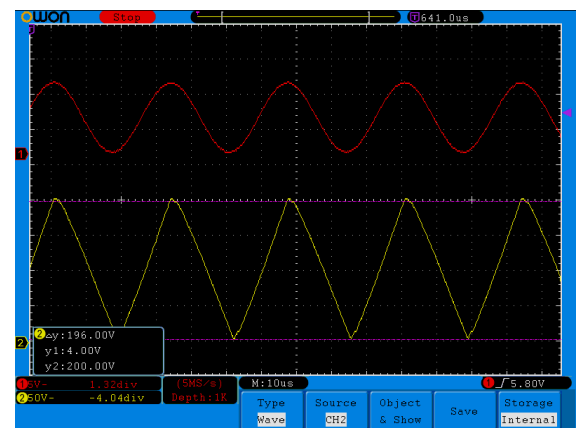


Figure 10. $f=35\text{kHz}$

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

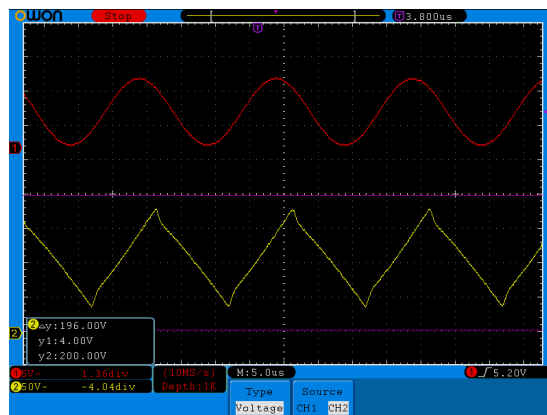


Figure 11. $f=50\text{kHz}$

BLOCK DIAGRAM

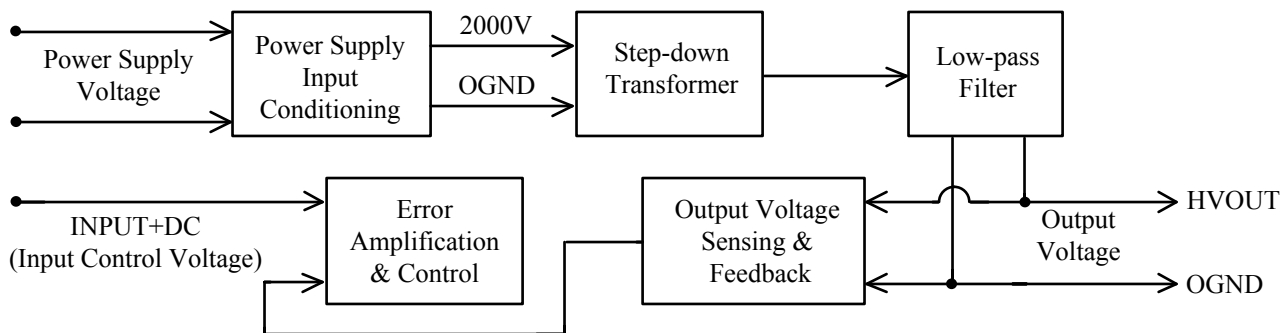
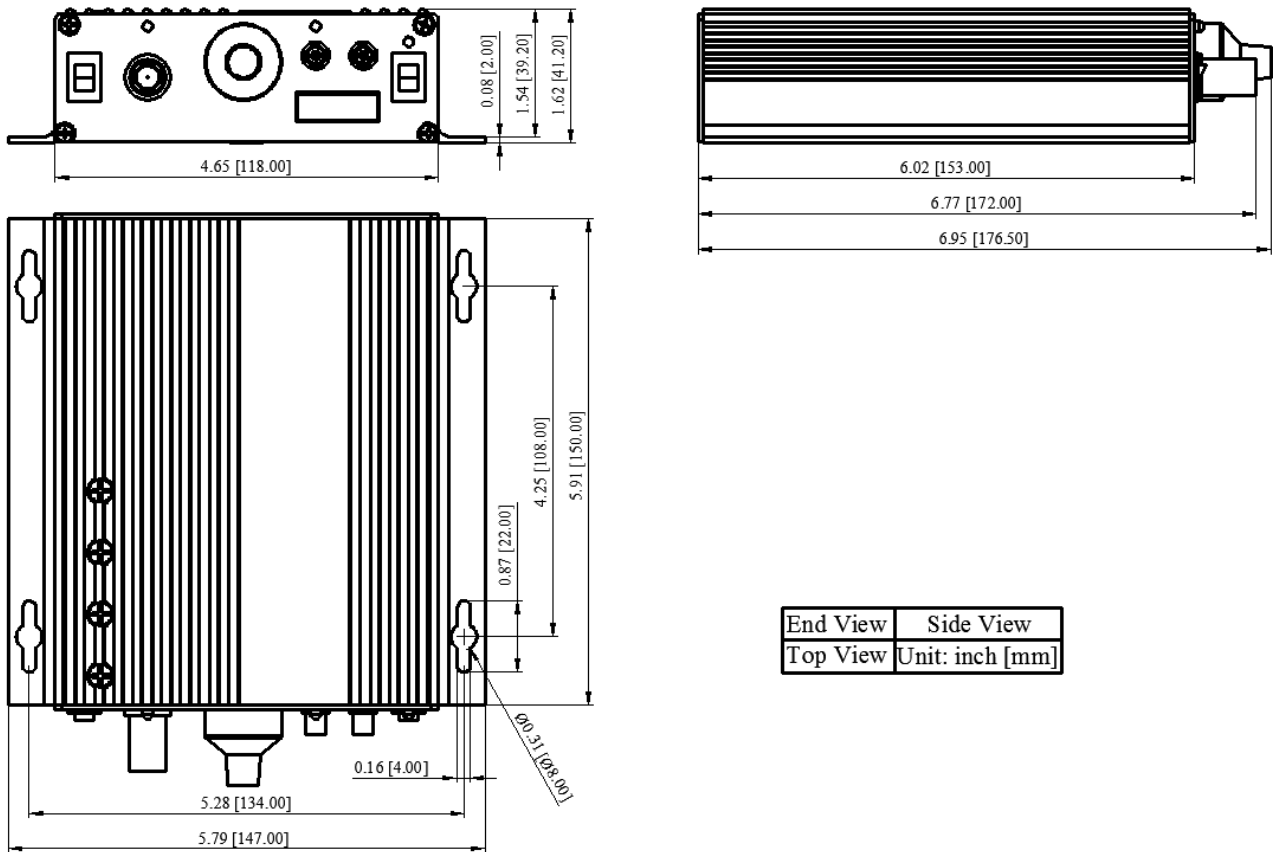


Figure 12. Block Diagram



DIMENSIONS



| | |
|----------|-----------------|
| End View | Side View |
| Top View | Unit: inch [mm] |

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 |

Table 4. Unit Price

| Quantity (pcs) | 1 – 4 | 5 – 8 | 9 – 12 | 13 – 16 | 17 – 20 | ≥21 |
|----------------|--------|--------|--------|---------|---------|--------|
| Unit Price | \$1699 | \$1649 | \$1599 | \$1549 | \$1499 | \$1449 |



NOTICE

1. ATI warrants performance of its products for one year to the specifications applicable at the time of sale, except for those being damaged by excessive abuse. Products found not meeting the specifications within one year from the date of sale can be exchanged free of charge.
2. ATI reserves the right to make changes to its products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete.
3. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgment, including those pertaining to warranty, patent infringement, and limitation of liability. Testing and other quality control techniques are utilized to the extent ATI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.
4. Customers are responsible for their applications using ATI components. In order to minimize risks associated with the customers' applications, adequate design and operating safeguards must be provided by the customers to minimize inherent or procedural hazards. ATI assumes no liability for applications assistance or customer product design.
5. ATI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of ATI covering or relating to any combination, machine, or process in which such products or services might be or are used. ATI's publication of information regarding any third party's products or services does not constitute ATI's approval, warranty or endorsement thereof.
6. IP (Intellectual Property) Ownership: ATI retains the ownership of full rights for special technologies and/or techniques embedded in its products, the designs for mechanics, optics, plus all modifications, improvements, and inventions made by ATI for its products and/or projects.