

**Proven
Reliability**

A SERIES

ISOLATED, PROPORTIONAL DC TO HV DC CONVERTERS

100V to 6000V @ 1.0 and 1.5 Watts

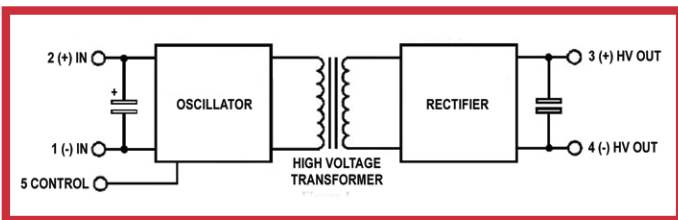
**Extremely Low Profile: 0.25 inches
and volume of < 0.100 cubic inches⁵**

**NOW
UL RECOGNIZED**



PRODUCT DESCRIPTION

The A Series is a new line of ultra-miniature, DC to HV DC converters that set an industry standard in high voltage miniaturization. This unique package occupies less than one tenth of a cubic inch of volume⁵, and features an extremely low profile of only 0.250 inches (6.35mm)! Controllable output voltages range from 100 volts to 6000 volts. These component-sized converters are ideal for applications requiring minimal size and weight. Please refer to our AG series data sheet for surface mount options.



APPLICATIONS

- Avalanche Photodiodes
- Capacitor Charging
- Electrophoresis
- Photomultiplier Tubes
- Piezo Devices
- Mass Spectrometry
- Sustaining Ion Pumps

OPTIONS

- 1 Watt and 1.5 Watt Versions Available (A/AH)
- Three Input Voltage Ranges: 0 to 5, 12, or 24VDC (5V only above 3KV)
- Polarity: Choose Positive or Negative Output (P/N)
- Extended Operating Temperature (A Models / 1.0W) (T Suffix)
- Alternate Input / Output Voltages (Consult Factory)
- See Ordering Information (Page 11)

PRODUCT SELECTION TABLE

| VDC | STANDARD 1 WATT - A MODEL | | 1.5 WATT OPTION - AH MODEL | |
|----------|---------------------------|--------------------------|----------------------------|--------------------------|
| | MODEL | MAXIMUM OUTPUT CURRENT*1 | MODEL | MAXIMUM OUTPUT CURRENT*1 |
| 100 VDC | A01 | 10 mA | AH01 | 15 mA |
| 200 VDC | A02 | 5 mA | AH02 | 7.5 mA |
| 250 VDC | A025 | 4 mA | AH025 | 6 mA |
| 300 VDC | A03 | 3.33 mA | AH03 | 5mA |
| 400 VDC | A04 | 2.5 mA | AH04 | 3.75 mA |
| 500 VDC | A05 | 2 mA | AH05 | 3 mA |
| 600 VDC | A06 | 1.67 mA | AH06 | 2.5 mA |
| 700 VDC | A07 | 1.43 mA | AH07 | 2.15 mA |
| 800 VDC | A08 | 1.25 mA | AH08 | 1.87 mA |
| 900 VDC | A09 | 1.1 mA | AH09 | 1.67 mA |
| 1000 VDC | A10 | 1 mA | AH10 | 1.5 mA |
| 1200 VDC | A12 | 0.83 mA | AH12 | 1.25 mA |
| 1500 VDC | A15 | 0.66 mA | AH15 | 1 mA |
| 2000 VDC | A20 | 0.5 mA | AH20 | 0.75 mA |
| 3000 VDC | A30 | 0.32 mA | AH30 | 0.5 mA |
| 4000 VDC | A40 | 0.24 mA | - | - |
| 5000 VDC | A50 | 0.2 mA | - | - |
| 6000 VDC | A60 | 0.167 mA | AH60 | 0.25 mA |

Complete List of Models on page 2

FEATURES

- Proportional Input/Output
- Low Noise Quasi-sinewave Oscillator
- Control Pin
- Low Leakage Current
- Low Input/Output Capacitance
- Input to Output Galvanic Isolation
- Short Circuit Protection, 1 Minute Minimum
- No Minimum Load Required²
- MTBF > 1,862,000 hours, per Bellcore TR 332
- No External Components Required
- RoHS Compliant
- UL Recognized



ELECTRICAL SPECIFICATIONS*3

| OUTPUT VOLTAGE*2 (To select polarity, see pg. 10 - How to Order) | STANDARD 1 WATT - A MODEL | | | 1.5 WATT OPTION - AH MODEL | | |
|---|---------------------------|--------------------------|--------------|----------------------------|--------------------------|--------------|
| | MODEL | MAXIMUM OUTPUT CURRENT*1 | RIPPLE P-P*4 | MODEL | MAXIMUM OUTPUT CURRENT*1 | RIPPLE P-P*4 |
| 0 to 100 VDC | A01 | 10 mA | 5% | AH01 | 15 mA | 2% |
| 0 to 200 VDC | A02 | 5 mA | 1% | AH02 | 7.5 mA | 3% |
| 0 to 250 VDC | A025 | 4 mA | .90% | AH025 | 6 mA | 1.2% |
| 0 to 300 VDC | A03 | 3.33 mA | .70% | AH03 | 5 mA | .70% |
| 0 to 400 VDC | A04 | 2.5mA | .50% | AH04 | 3.75 mA | .75% |
| 0 to 500 VDC | A05 | 2 mA | .50% | AH05 | 3 mA | .70% |
| 0 to 600 VDC | A06 | 1.67 mA | 1% | AH06 | 2.5 mA | 2% |
| 0 to 700 VDC | A07 | 1.43 mA | .50% | AH07 | 2.15 mA | 1.2% |
| 0 to 800 VDC | A08 | 1.25 mA | 1% | AH08 | 1.87 mA | 1.2% |
| 0 to 900 VDC | A09 | 1.1 mA | 1% | AH09 | 1.67 mA | 1.2% |
| 0 to 1000 VDC | A10 | 1 mA | .79% | AH10 | 1.5 mA | 1% |
| 0 to 1200 VDC | A12 | 0.83 mA | .50% | AH12 | 1.25 mA | .60% |
| 0 to 1500 VDC | A15 | 0.67 mA | .40% | AH15 | 1 mA | .60% |
| 0 to 2000 VDC | A20 | 0.5 mA | .30% | AH20 | 0.75 mA | .50% |
| 0 to 3000 VDC | A30 | 0.33 mA | .20% | AH30 | 0.5 mA | .20% |
| 0 to 4000 VDC | A40 | 0.25 mA | .12% | - | - | - |
| 0 to 5000 VDC | A50 | 0.2 mA | .15% | - | - | - |
| 0 to 6000 VDC | A60 | 0.167 mA | .15% | AH60 | 0.25 mA | .25% |

| | INPUT CURRENT | | | |
|--------|-------------------|-----------|----------------------|-----------|
| | A MODELS – 1 Watt | | AH MODELS – 1.5 Watt | |
| VIN | NO-LOAD | FULL-LOAD | NO-LOAD | FULL-LOAD |
| 5 VDC | <300mA | <500mA | <300mA | <550mA |
| 12 VDC | <100mA | <185mA | <125mA | <250mA |
| 24 VDC | <25mA | <60mA | <40mA | <120mA |

0 TO 5V ONLY (FOR MODELS OVER 3kV)

ELECTRICAL SPECIFICATIONS*3

| PARAMETER | VALUE |
|---|---|
| INPUT VOLTAGE | 0 TO 5, 12, OR 24V (FOR MODELS UP TO 3KV) |
| | 0 TO 5V (FOR MODELS OVER 3KV) |
| TURN-ON VOLTAGE | <0.7 VDC |
| ISOLATION | < +/- 500V BIAS ON PIN 4 |
| OUTPUT VOLTAGE TOLERANCE | +10%, -10% FULL LOAD, MAX. INPUT VOLTAGE |
| INPUT/OUTPUT COUPLING CAPACITANCE | <250 pf TYPICAL |
| INPUT/OUTPUT LEAKAGE CURRENT | <100 nA TYPICAL |
| CONTROL PIN | 0 to MAX. INPUT VOLTAGE |
| INTERNAL OSCILLATOR FREQUENCY | 50kHz - 350kHz |
| STANDARD TEMPERATURE RANGES | OPERATING: -25° TO +75°C ⁶ (CASE) |
| | STORAGE: -55° TO +105°C |
| EXTENDED TEMPERATURE RANGES (-T OPTION) | OPERATING: -55 TO +85°C ⁶ (CASE) [A Models / 1.0W] |
| | STORAGE: -55° TO +105°C |

DETAILED PRODUCT DESCRIPTION

The A Series is a new line of ultra-miniature, DC to HV DC converters that set an industry standard in high voltage miniaturization. This unique package occupies less than one tenth of a cubic inch of volume⁵, and features an extremely low profile of only 0.250 inches (6.35mm)! Controllable output voltages range from 100 volts to 6000 volts. These component-sized converters are ideal for applications requiring minimal size and weight.

Turn-on voltage is very low at less than 0.7 volts, allowing for wide output voltage operating range. Use of a resonant, quasi-sinewave oscillator and fully shielded transformer result in clean, reliable high voltage conversion with inherently low ripple, EMI/RFI and input ripple current, making this product ideal for integration into noise sensitive equipment.

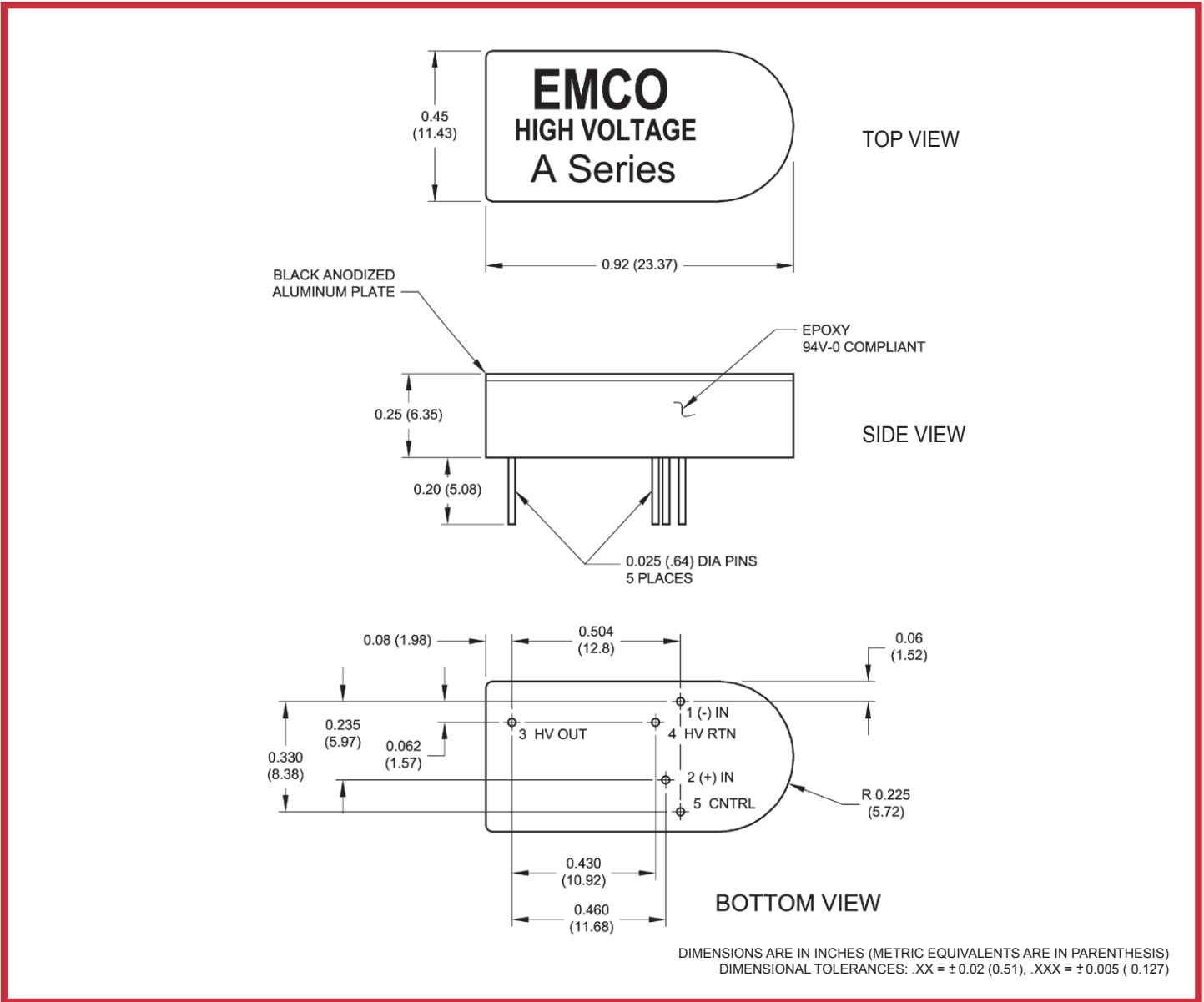
A separate high impedance control pin is standard and is designed for external error amplifier and/or DAC control in closed or open loop systems.

Or simply connect the control pin to the + input for proportional input to output operation (see schematic and performance charts below).

Output power is 1 watt standard, with 1.5 watts available as an option. No minimum load is required. A proprietary vacuum encapsulation process and custom 94V-0 listed, high performance formula are used to achieve excellent high voltage and thermal properties. Isolation is +/- 500V bias on the output return. Input to output leakage current is very low at less than 100 nA and coupling capacitance is also low at <250 pF.

The new A Series leverages XP EMCO's Best-in-Class long term reliability, utilizing proven DC to high voltage DC conversion technology, perfected by over four decades of high voltage design experience in the most demanding applications. Our extensive in-house capabilities enable us to meet specific customer requirements with standard, modified and custom solutions quickly, easily, and economically. Technical assistance is readily available.

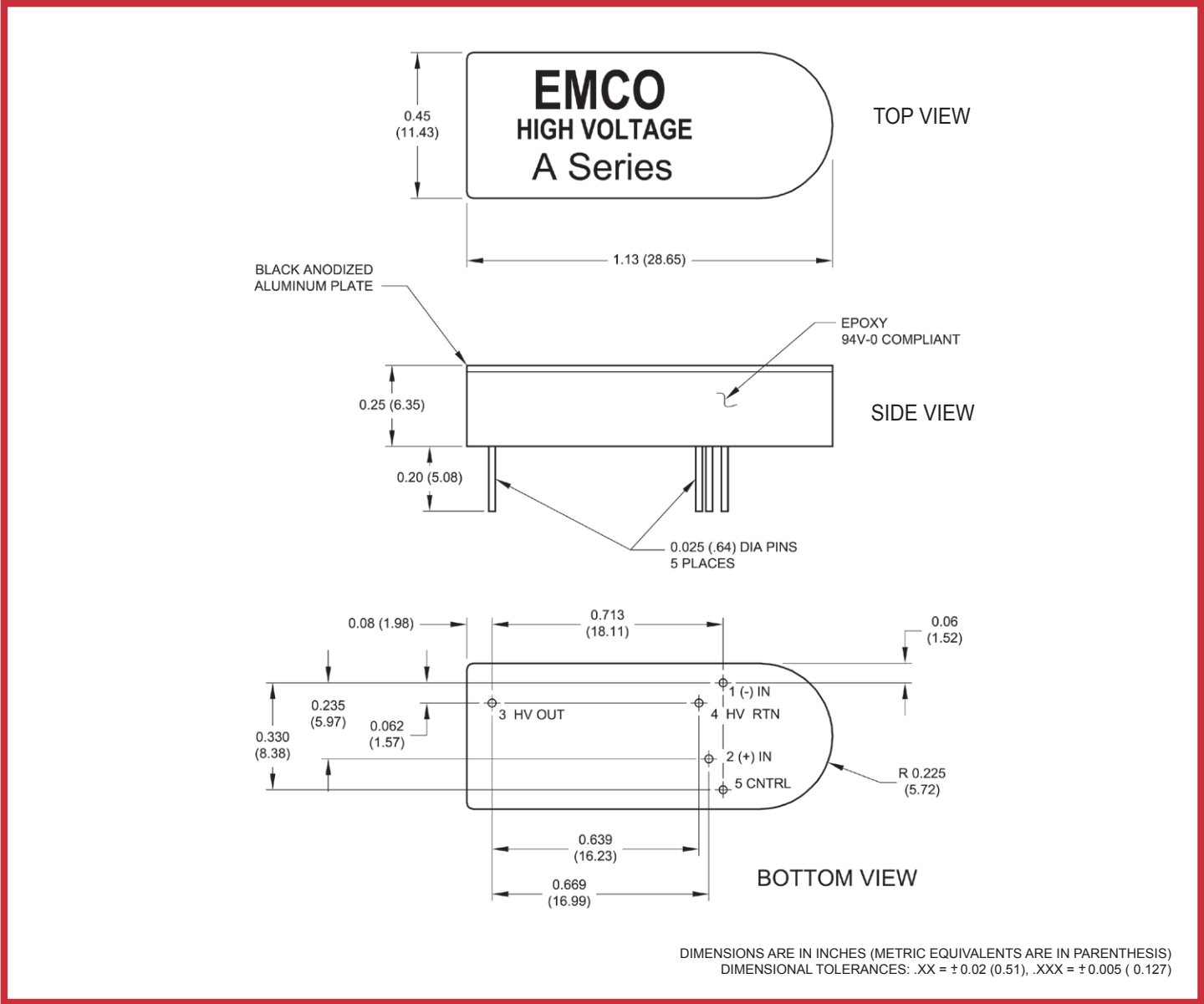
MECHANICAL SPECIFICATIONS (100V - 2,000V)



| PARAMETER | VALUE |
|------------|---|
| WEIGHT | < 0.20 OZ. (5.66 GRAMS) |
| VOLUME | < 0.10 CUBIC INCHES (1.696 CUBIC CENTIMETERS) |
| DIMENSIONS | 0.92L (23.37L) x 0.45W (11.43W) x 0.25H (6.35H) |

| PIN # | FUNCTION |
|-------|-----------|
| 1 | (-) INPUT |
| 2 | (+) INPUT |
| 3 | HV OUT |
| 4 | HV RTN |
| 5 | CONTROL |

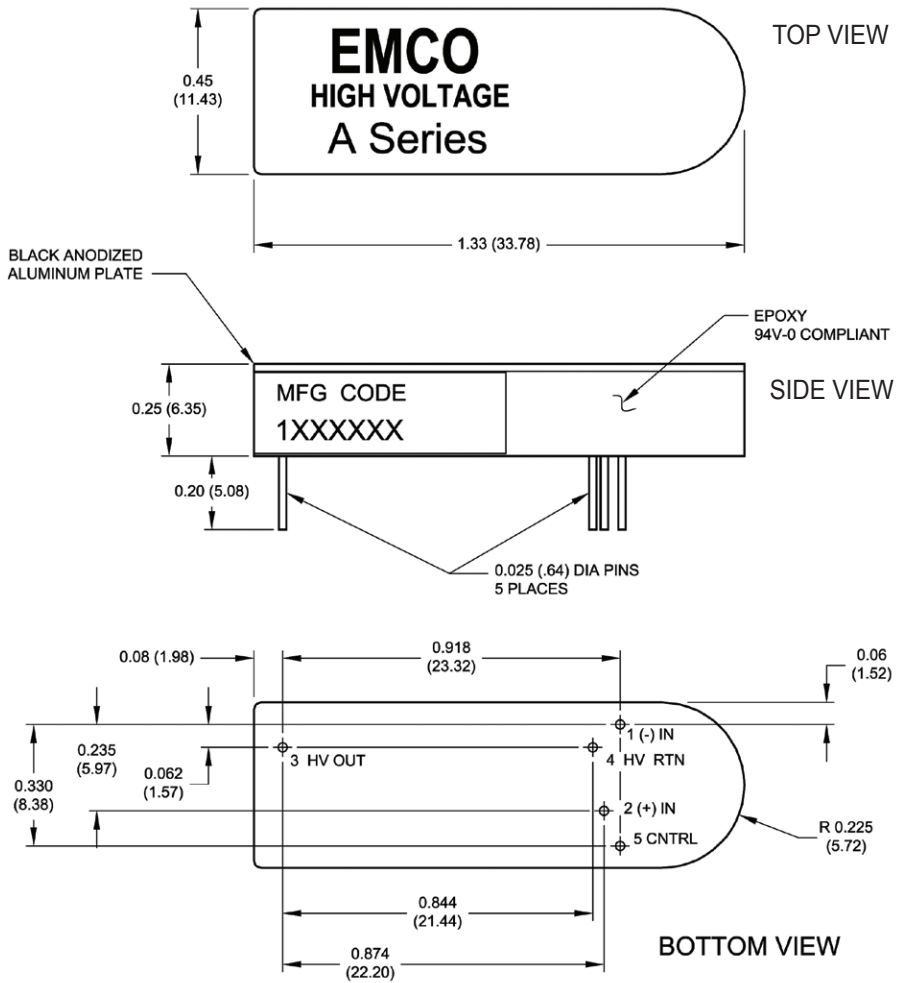
MECHANICAL SPECIFICATIONS (3,000V - 5,000V)



| PARAMETER | VALUE |
|------------|--|
| WEIGHT | < 0.25OZ (7.09 GRAMS) |
| VOLUME | < 0.12 CUBIC INCHES (2.082 CUBIC CENTIMETERS) |
| DIMENSIONS | 1.129L (28.69L) x 0.45W (11.43W) x 0.25H (6.35H) |

| PIN # | FUNCTION |
|-------|-----------|
| 1 | (-) INPUT |
| 2 | (+) INPUT |
| 3 | HV OUT |
| 4 | HV RTN |
| 5 | CONTROL |

MECHANICAL SPECIFICATIONS (6,000V)

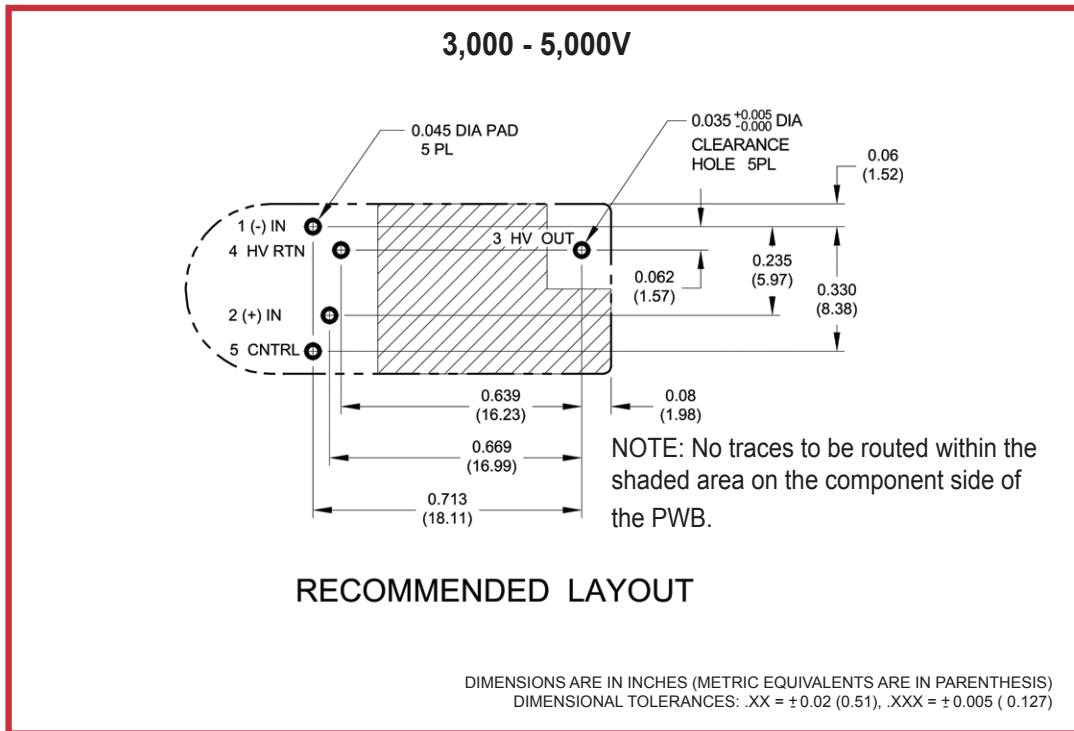
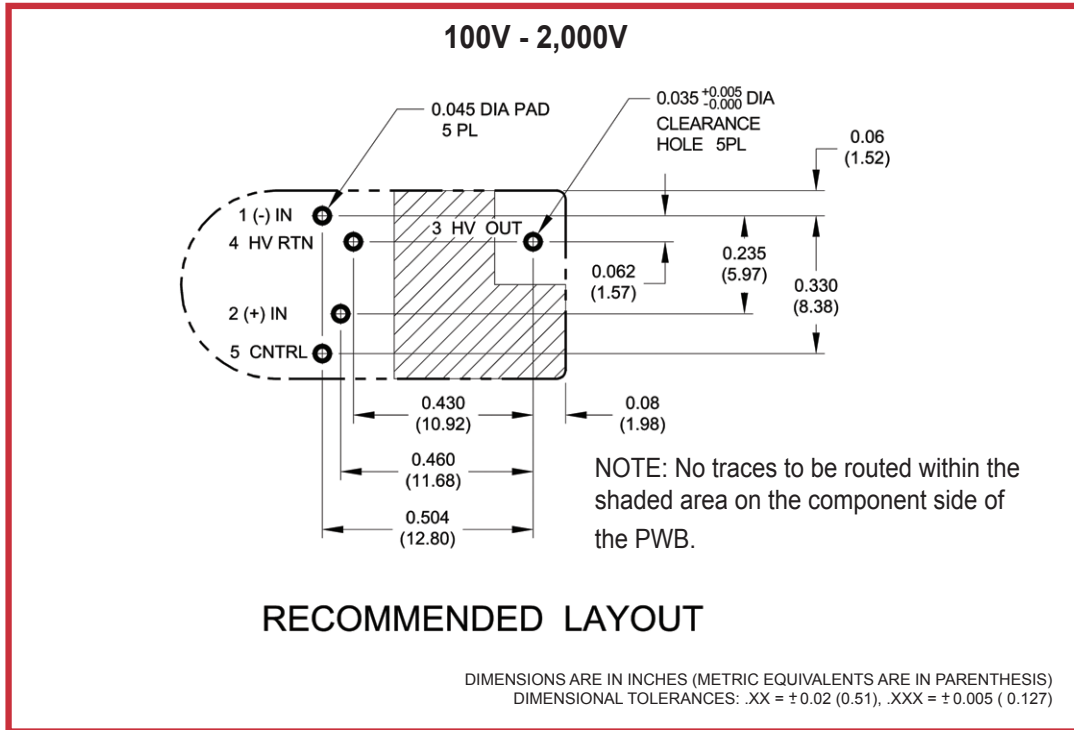


DIMENSIONS ARE IN INCHES (METRIC EQUIVALENTS ARE IN PARENTHESIS)
 DIMENSIONAL TOLERANCES: .XX = ± 0.02 (0.51), .XXX = ± 0.005 (0.127)

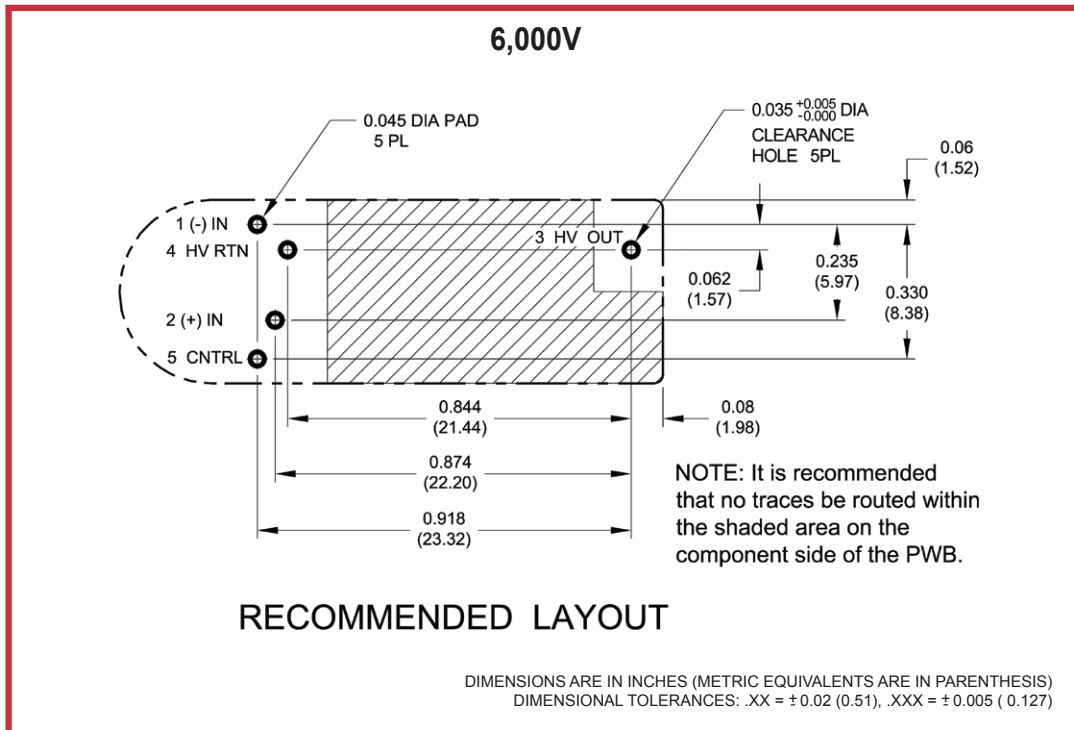
| PARAMETER | VALUE |
|------------|---|
| WEIGHT | < 0.30 OZ. (8.49 GRAMS) |
| VOLUME | < 0.15 CUBIC INCHES (2.45 CUBIC CENTIMETERS) |
| DIMENSIONS | 1.33L (33.78L) x 0.45W (11.43W) x 0.25H (6.35H) |

| PIN # | FUNCTION |
|-------|-----------|
| 1 | (-) INPUT |
| 2 | (+) INPUT |
| 3 | HV OUT |
| 4 | HV RTN |
| 5 | CONTROL |

MECHANICAL SPECIFICATIONS

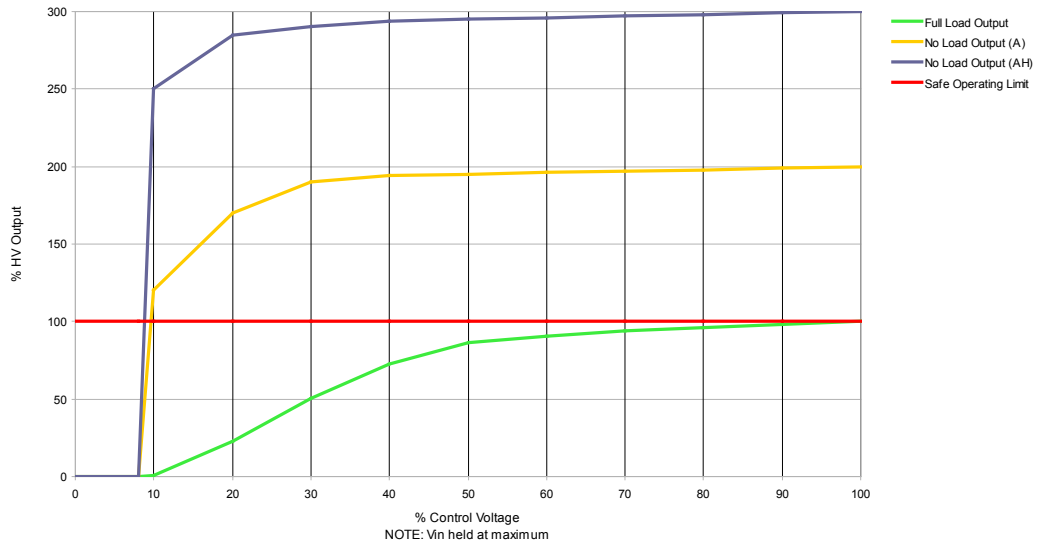


MECHANICAL SPECIFICATIONS

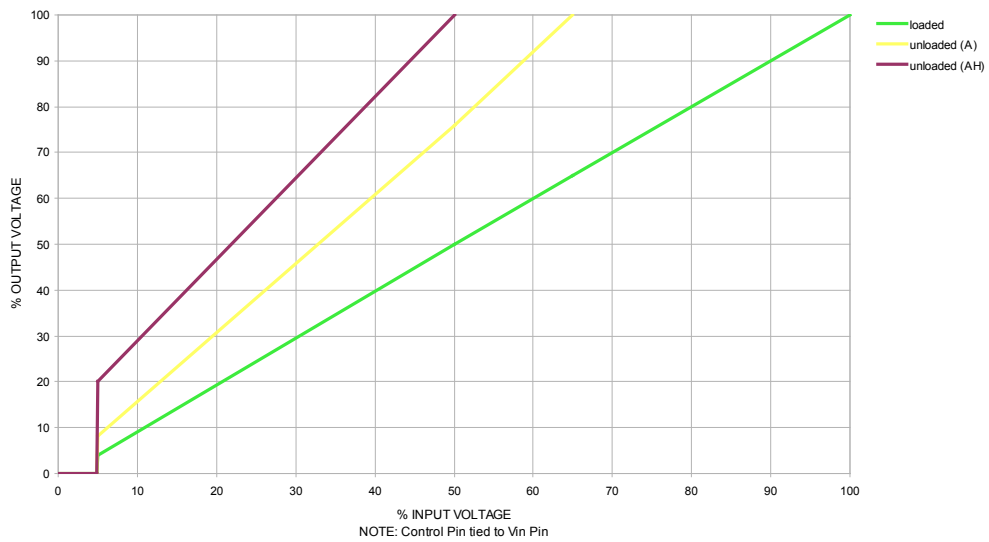


APPLICATION NOTES

Typical HV Output vs. Control Voltage



Typical Input vs. Output Voltage



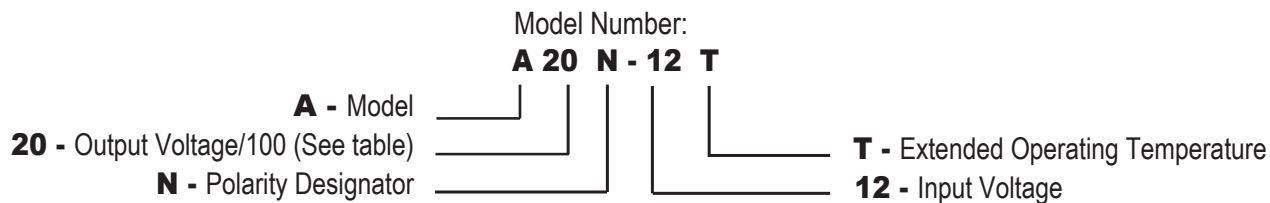
Output Voltage is load dependent. Under light or no-load conditions, reduce the Input Voltage so maximum rated Output Voltage is not exceeded.

OPTION CODES

| ORDERING INFORMATION | | ORDER CODE |
|-----------------------------|---|------------|
| OUTPUT VOLTAGE | 1 WATT | A |
| | 1.5 WATT | AH |
| POLARITY DESIGNATOR | POSITIVE OUTPUT | P |
| | NEGATIVE OUTPUT | N |
| INPUT VOLTAGE | 5 VDC | 5 |
| | 12 VDC | 12 |
| | 24 VDC | 24 |
| STANDARD TEMPERATURE RANGES | OPERATING: -25 TO +75°C ⁶ (CASE) | BLANK |
| | STORAGE: -55 TO +105°C | BLANK |
| EXTENDED TEMPERATURE RANGES | OPERATING: -55 TO +85°C ⁶ (CASE) [A Models / 1.0W] | T |
| | STORAGE: -55 TO +105°C | T |

HOW TO ORDER

PART NUMBER SELECTOR:



EXAMPLE: **A20N-12T** (**A** - Model, **20** - Output Voltage, **N** - Negative, **12** - Input Voltage, **T** - Extended Operating Temperature)

- *Note:
1. At maximum rated output voltage
 2. Output Voltage is load dependent. Under light or no-load conditions, reduce the Input Voltage so maximum rated Output Voltage is not exceeded.
 3. Specifications after 30 minute warm-up, full-load, at 25°C, unless otherwise noted.
 4. Ripple may be reduced substantially by the addition of an external RC filter.
 5. Volume will vary depending on package size.
 6. Proper thermal management techniques are required to maintain safe case temperature at maximum power output.

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