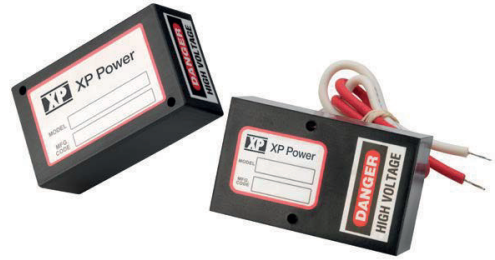


## 3 Watts

- Output Voltages from 100V to 12kV
- Output Voltage Proportional to Input
- Low Turn-on Voltage 0.7VDC
- Input to Output Isolation
- Dual Output
- No Minimum Load
- 3 Year Warranty



The E Series is a broad line of small, component level high voltage converters in a PCB mount package that provides up to 3 Watts continuous output power for models up to 7kV (2 Watts for models >7kV). These HV converters feature low ripple and noise, and low EMI/RFI by utilizing a quasi-sinewave oscillator, excellent filtering techniques and a fully enclosed pot-core transformer. The output voltage is directly proportional to the input voltage and is linear from approximately 0.7 volts to maximum input.

The galvanically isolated output allows for user selectable output polarity. Dual output models with a center-tap pin provide both positive and negative outputs from one module. Some models are provided with an external aluminum box for increased EMI/RFI shielding and rugged mounting. Proven design techniques, classic topology and custom encapsulation formula come together to provide engineers with a clean, reliable, low cost, and easy to integrate high voltage solution.

### Dimensions:

#### E Series:

2.50 x 1.5 x 0.85" (63.5 x 38.1 x 21.6mm)

### Key Applications:

- Mass Spectrometry
- Electrostatic Chucks
- Electrophoresis
- Capacitor Charging
- Particle Counter
- Ignition/Spark
- Sustaining Ion Pumps

### Input

| Characteristic           | Minimum | Typical | Maximum | Units | Notes & Conditions            |
|--------------------------|---------|---------|---------|-------|-------------------------------|
| Input Voltage            | 0.7     |         | 12, 15  | VDC   | See Models and Ratings Table. |
| Input Current, No Load   |         |         | 175     | mA    |                               |
| Input Current, Full Load |         |         | 400     | mA    |                               |

### Output

| Characteristic           | Minimum  | Typical | Maximum | Units | Notes & Conditions            |
|--------------------------|--|---------|---------|-------|-------------------------------|
| Output Voltage           |  |         | 12,000  | VDC   | See Models and Ratings Table  |
| Output Current           |  |         | 30      | mA    | See Models and Ratings Table  |
| Output Voltage Tolerance |  | +5, -5  |         | %     | At Max Vout, Full Load        |
| Minimum Load             | No minimum load required   |         |         |       |                               |
| Regulation               | Unregulated, Output is proportional to Input. See Application Notes. |         |         |       |                               |
| Ripple and Noise         | 0.05   |         | 1.5     | %     | See Models and Ratings Table. |
| Response Time            |  | 10      |         | msec  | 0 to Max Vout, Full Load      |

### Notes

1. Maximum rated output current is available at maximum rated output voltage and derates linearly as input voltage is decreased.
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 indicated.
4. Proper thermal management techniques are required to maintain safe case temperature at maximum power output.
5. Ripple specification for center-tapped units applies to the voltage between the positive and negative output terminals.

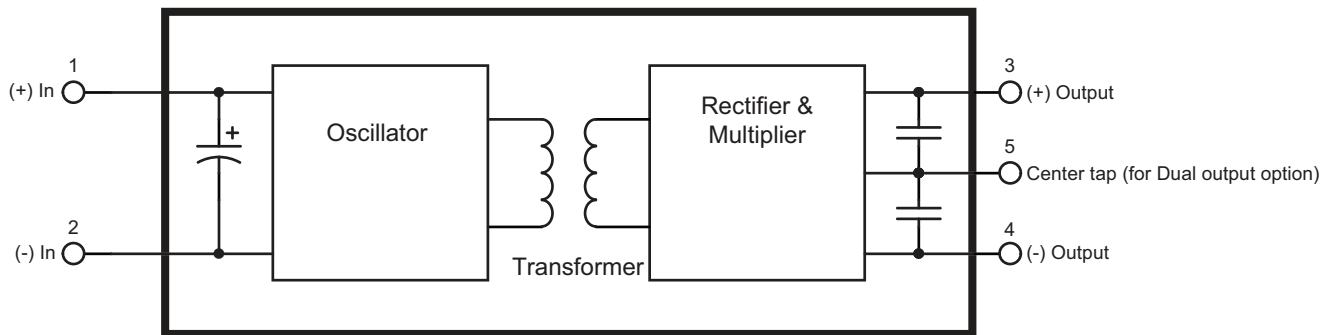
### Environmental

| Characteristic               | Minimum | Typical | Maximum | Units | Notes & Conditions |
|------------------------------|---------|---------|---------|-------|--------------------|
| Operating Temperature (case) | -10     |         | +60     | °C    | Models E01 to E60  |
| Operating Temperature (case) | -10     |         | +50     | °C    | Models E70 to E121 |
| Storage Temperature          | -25     |         | +90     | °C    |                    |
| Humidity                     |         |         | 95      | %RH   | Non-condensing     |
| Cooling                      |         |         |         |       | Natural Convection |

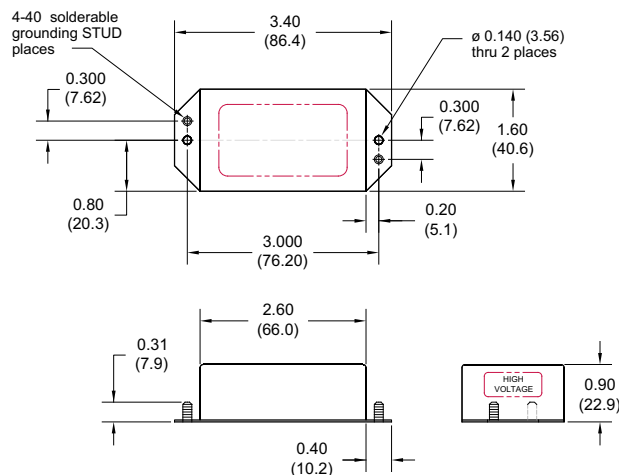
### General

| Characteristic             | Minimum   | Typical | Maximum | Units | Notes & Conditions                                 |
|----------------------------|---|---------|---------|-------|--|
| Isolation: Input to Output |   |         | 3,500   | V     | < $\pm 3500$ Bias for Models E01 to E60            |
| Isolation: Input to Output |   |         | 500     | V     | < $\pm 500$ Bias for Models E70 to E121            |
| Switching Frequency        | 30  |         | 100     | kHz   | Stable frequency over entire output voltage range. |
| Construction               | Case material is Diallyl Phthalate (DAP). UL 94 V-0 rated solid vacuum encapsulation. |         |         |       |  |
| Mean Time Between Failure  | 810   |         |         | kHrs  | Bellcore TR 332                                    |

### Block Diagram



### External EMI/RFI Shield



An AB suffix is used to indicate an added external EMI/RFI Shield as shown above. These five-sided aluminum enclosures feature a durable, non-conductive black anodized finish. On models with outputs of 3kV or higher, special care must be taken to ensure adequate spacing and insulation between the metal can and the high voltage output. Single sided layout, encapsulation, or conformal coating may be required. Case grounding studs must be connected to ground. Case ground is not connected to (-) Input.

## Models &amp; Ratings

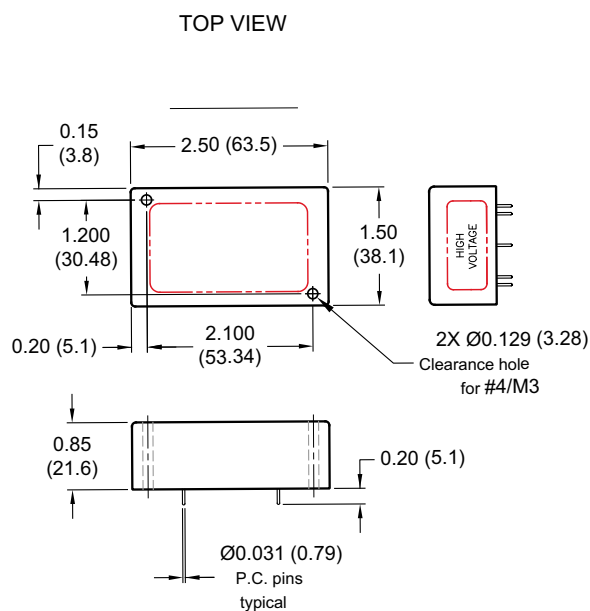
| Output Voltage | Output Current | Input Voltage | Ripple | Model Number |
|----------------|----------------|---------------|--------|--------------|
| 0 to 100V      | 30mA           | 0 to 12V      | <0.2%  | E01          |
| 0 to 200V      | 15mA           | 0 to 12V      | <0.25% | E02          |
| 0 to 300V      | 10mA           | 0 to 12V      | <1%    | E03          |
| 0 to 300V      | 10mA           | 0 to 12V      | <1%    | E03AB        |
| 0 to +/-150V   | 10mA           | 0 to 12V      | <1%    | E03CTR       |
| 0 to 500V      | 6mA            | 0 to 12V      | <0.1%  | E05          |
| 0 to +/-250V   | 6mA            | 0 to 12V      | <0.1%  | E05CT        |
| 0 to 600V      | 5mA            | 0 to 12V      | <0.1%  | E06          |
| 0 to +/-300V   | 5mA            | 0 to 12V      | <0.1%  | E06CT        |
| 0 to +/-300V   | 5mA            | 0 to 12V      | <0.1%  | E06CTAB      |
| 0 to 800V      | 3.7mA          | 0 to 12V      | <0.1%  | E08          |
| 0 to +/-400V   | 3.7mA          | 0 to 12V      | <0.1%  | E08CTR       |
| 0 to 1000V     | 3mA            | 0 to 12V      | <0.05% | E10          |
| 0 to +/-500V   | 3mA            | 0 to 12V      | <0.05% | E10CT        |
| 0 to +/-500V   | 3mA            | 0 to 12V      | <0.05% | E10CTAB      |
| 0 to 1200V     | 2.5mA          | 0 to 12V      | <0.05% | E12R         |
| 0 to +/-600V   | 2.5mA          | 0 to 12V      | <0.05% | E12CT        |
| 0 to 1500V     | 2mA            | 0 to 12V      | <0.05% | E15          |
| 0 to +/-750V   | 2mA            | 0 to 12V      | <0.05% | E15CT        |
| 0 to 2000V     | 1.5mA          | 0 to 12V      | <0.25% | E20          |
| 0 to 3000V     | 1mA            | 0 to 15V      | <0.25% | E30          |
| 0 to +/-1500V  | 1mA            | 0 to 15V      | <0.25% | E30CT        |
| 0 to 4000V     | 0.75mA         | 0 to 15V      | <0.5%  | E40          |
| 0 to 5000V     | 0.6mA          | 0 to 15V      | <0.5%  | E50          |
| 0 to +/-2500V  | 0.6mA          | 0 to 15V      | <0.5%  | E50CT        |
| 0 to 6000V     | 0.5mA          | 0 to 15V      | <0.5%  | E60          |
| 0 to 6000V     | 0.5mA          | 0 to 15V      | <0.5%  | E60RAB       |
| 0 to +/-3000V  | 0.5mA          | 0 to 15V      | <0.5%  | E60CT        |
| 0 to 7000V     | 0.43mA         | 0 to 15V      | <1%    | E70          |
| 0 to 7000V     | 0.43mA         | 0 to 15V      | <1%    | E70RAB       |
| 0 to +/-3500V  | 0.43mA         | 0 to 15V      | <1%    | E70CT        |
| 0 to 8000V     | 0.25mA         | 0 to 15V      | <1.25% | E80          |
| 0 to +/-4000V  | 0.25mA         | 0 to 15V      | <1.25% | E80CT        |
| 0 to 10kV      | 0.2mA          | 0 to 15V      | <1.5%  | E101         |
| 0 to 12kV      | 0.16mA         | 0 to 15V      | <1.5%  | E121         |
| 0 to 12kV      | 0.16mA         | 0 to 15V      | <1.5%  | E121RAB      |

## Notes

1. All orderable part numbers are listed above.
2. CT indicates dual output, center tap. Negative side will be ~10% larger than positive side w.r.t. the center tap pin.
3. AB suffix indicates external shield, see Mechanicals.
4. R suffix is used as a RoHS indicator for legacy models.

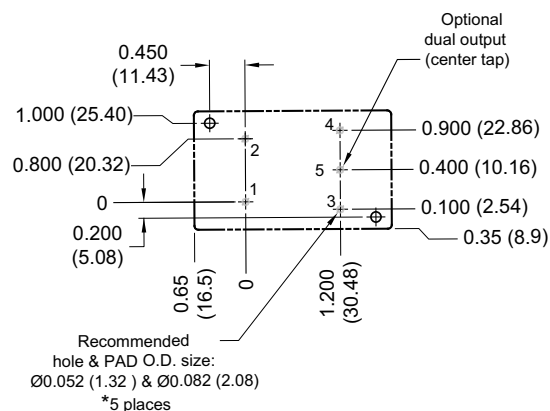
### Mechanical Details

#### E01-E60

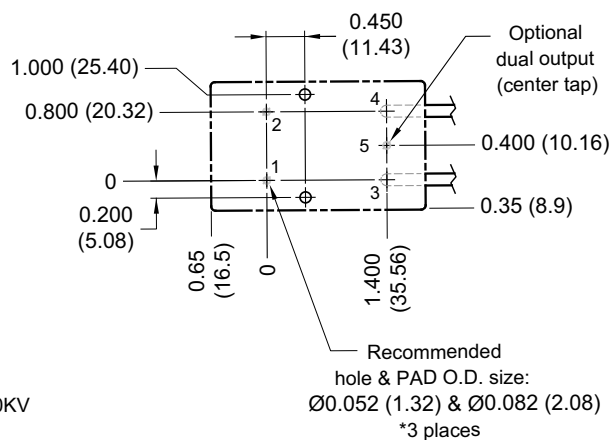
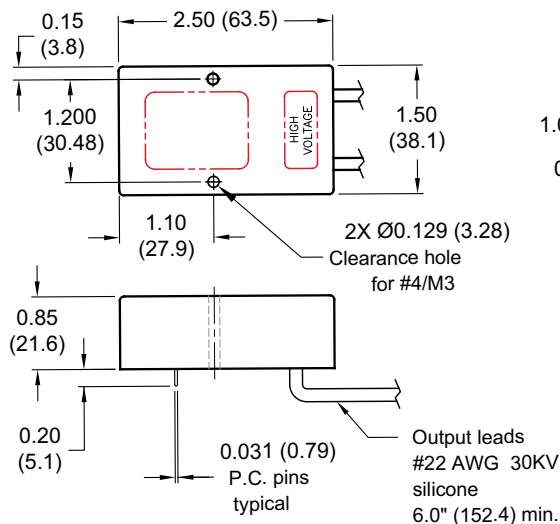


#### RECOMMENDED PCB LAYOUT

**TOP VIEW**



#### E70-E121



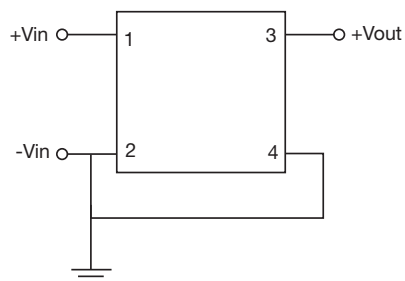
| Pin # | Function                          |
|-------|-----------------------------------|
| 1     | (+) Input                         |
| 2     | (-) Input                         |
| 3     | (+) Output                        |
| 4     | (-) Output                        |
| 5     | Dual Output/Center Tap (Optional) |

#### Notes

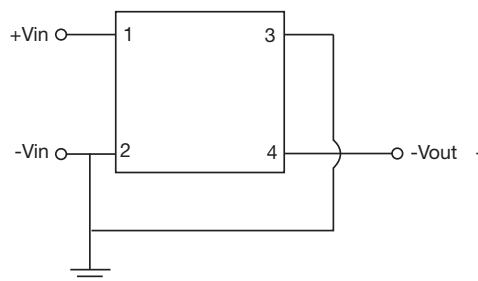
- All dimensions are in inches (mm)
- Weight 3oz (85g)
- Tolerance: X.XX±0.02 (0.51)
- Pin Tolerance: ±0.005 (0.127)

### Application Notes

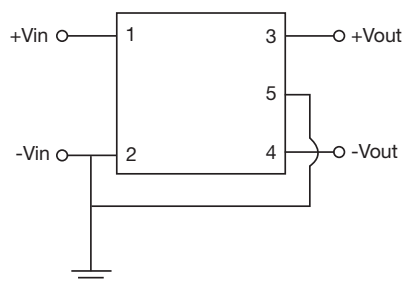
#### Positive Output



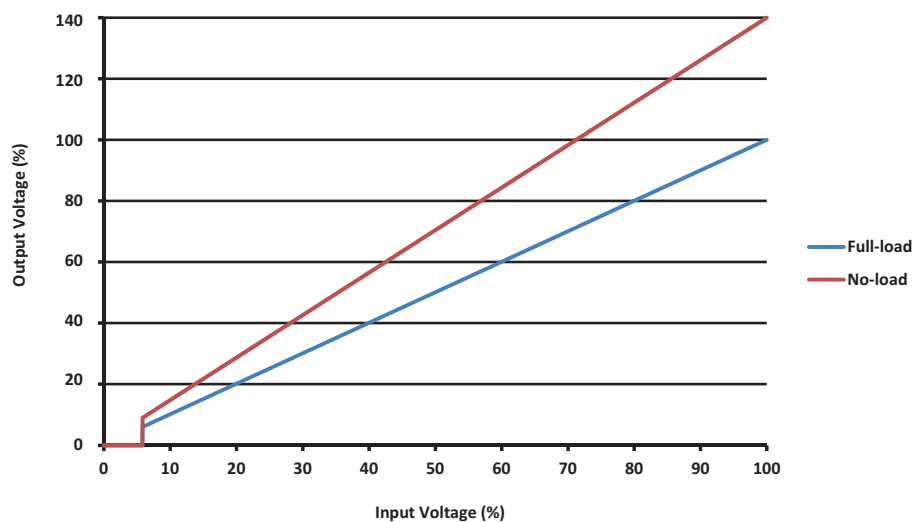
#### Negative Output



#### Dual Output



#### Output Voltage vs. Input Voltage



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