



**ULTRAVOLT® E SERIES**  
PRECISION HIGH VOLTAGE POWER SUPPLIES





# Single-output precision high voltage power supply modules

The E series of precision high voltage power supplies has very low ripple, excellent linearity, and very stable temperature characteristics. Models in this series are offered at two levels of performance; the best delivers 10 ppm characteristics. This series is ideal for applications where system performance is directly linked to high voltage power quality and performance.

## Features

- › Precision output voltage from 0 to 1 kV through 0 to 15 kV
- › PPM level ripple, regulation, and stability
- › As low as 10 ppm temperature coefficient and reference
- › 0 to 4, 15/20, or 30 W of output power
- › Maximum load capability down to 0 V
- › Voltage and current regulation/limit capability
- › Precision output voltage and current monitors

## Typical Applications

- › Bias supplies
- › Mass spectrometry
- › SEM/FIB
- › Electron beams
- › Ion beams



| PARAMETER                            | CONDITIONS                          | MODELS                                                    |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | UNITS       |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------|------|------|-----------|------|------|-----------|------|------|-----------|------|------|------------|------|------|------------|------|------|-------------|
| Input                                |                                     | All Types                                                 |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      |             |
| Voltage Range                        | Full Power                          | +23 to 30                                                 |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | VDC         |
| Current                              | Standby/Disable                     | < 50                                                      |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | mA          |
| Current                              | No Load, Max Eout                   | < 325                                                     |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | mA          |
| Current                              | Full Load, Max Eout                 | 2.5                                                       |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | A           |
| AC Ripple Current                    | Nominal Input, Full Load            | < 10                                                      |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | mA pk to pk |
| Output                               |                                     | 1E                                                        |      |      | 2E        |      |      | 4E        |      |      | 6E        |      |      | 10E        |      |      | 15E        |      |      |             |
| Voltage Range                        | Nominal Input                       | 0 to 1000                                                 |      |      | 0 to 2000 |      |      | 0 to 4000 |      |      | 0 to 6000 |      |      | 0 to 10000 |      |      | 0 to 15000 |      |      | VDC         |
| Nominal Input Voltage/Model          |                                     | 24                                                        | 24   | 24   | 24        | 24   | 24   | 24        | 24   | 24   | 24        | 24   | 24   | 24         | 24   | 24   | 24         | 24   | 24   | VDC         |
| Power                                | Nominal Input, Max Eout             | 4                                                         | 20   | 30   | 4         | 20   | 30   | 4         | 20   | 30   | 4         | 20   | 30   | 4          | 15   | 30   | 4          | 15   | 30   | Watts       |
| Current                              | Iout Entire Output Voltage Range    | 4                                                         | 20   | 30   | 2         | 10   | 15   | 1         | 5    | 7.5  | 0.67      | 3.3  | 5    | 0.4        | 1.5  | 3    | 0.26       | 1    | 2    | mA          |
| Voltage Monitor                      | Normal Operating Conditions         | 0 to 10 ±0.5%                                             |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | VDC         |
| Current Monitor                      | Normal Operating Conditions         | 0 to 10 ±0.5%                                             |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | VDC         |
| Ripple                               | Full Load, Max Eout                 | ≤ 10                                                      | ≤ 10 | ≤ 10 | ≤ 10      | ≤ 10 | ≤ 10 | ≤ 10      | ≤ 10 | ≤ 10 | ≤ 10      | ≤ 10 | ≤ 10 | ≤ 10       | ≤ 10 | ≤ 10 | ≤ 10       | ≤ 10 | ≤ 10 | ppm         |
| Line Regulation                      | Nom Input, Max Eout, Full Power     | < 25 ppm or < 10 ppm                                      |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | VDC         |
| Static Load Regulation               | No Load to Full Load, Max Eout      | < 25 ppm or < 10 ppm                                      |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | VDC         |
| Stability                            | 30 Min Warmup, Per 8 h, Per Day     | < 25 ppm or < 10 ppm                                      |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | VDC         |
| Programming and Controls             |                                     | All Types                                                 |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      |             |
| Input Impedance                      | Nominal Input                       | 10                                                        |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | MΩ          |
| Adjust Accuracy and Adjust Linearity | 10 to 100%                          | ±0.05%                                                    |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | %           |
| Adjust Voltage                       | Differential                        | 0 to +10                                                  |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | VDC         |
| Output Voltage                       | T = +25°C, Initial Value            | +10.00 ±0.05%                                             |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | VDC         |
| Max Source Current                   | T = +25°C                           | 5                                                         |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | mA          |
| Output Impedance                     | Normal Operating Conditions         | Buffered, low impedance, 2 mA max for source/sink current |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | -           |
| Enable/Disable                       |                                     | 0 to +0.8 disable, +2.5 to 10 enable (default = disable)  |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | VDC         |
| Environmental                        |                                     | All Types                                                 |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      |             |
| Operating                            | Full Load, Max Eout, Case Temp.     | +10 to +45                                                |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | °C          |
| Temperature Coefficient              | Over the Specified Temperature      | ±25 or ±10                                                |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | ppm/°C      |
| Thermal Shock                        | Mil-Std-810, Method 504, Class 2    | -40 to +65                                                |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | °C          |
| Storage                              | Non-Operating, Case Temp.           | -55 to +105                                               |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | °C          |
| Humidity                             | All Conditions, Standard Package    | 0 to 95%, non-condensing                                  |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | -           |
| Altitude                             | Standard Package, All Conditions    | Sea level through 10,000                                  |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | ft          |
| Shock                                | Mil-Std-810, Method 516, Proc. 4    | 20                                                        |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | Gs          |
| Vibration                            | Mil-Std-810, Method 514, Fig. 514-3 | 10                                                        |      |      |           |      |      |           |      |      |           |      |      |            |      |      |            |      |      | Gs          |



Note: Downloadable drawings (complete with mounting and pin information) and 3D models are available online.

## PHYSICAL SPECIFICATIONS

### Construction

|          |                          |
|----------|--------------------------|
| Material | Aluminum alloy 5052-H32  |
| Finish   | Anodize MIL-A-8625E blue |

### Size

|        |                                   |
|--------|-----------------------------------|
| Volume | 561.9 cc (34.29 in <sup>3</sup> ) |
| Weight | 1.1 kg (2.4 lb)                   |

### Tolerance

|                        |                   |
|------------------------|-------------------|
| Overall                | ±1.27 mm (0.030") |
| Pin to Pin             | ±0.38 mm (0.015") |
| Mounting Hole Location | ±0.64 mm (0.025") |

### Connections

|              |                                  |
|--------------|----------------------------------|
| D-Sub        | 15-pin, female                   |
| HV Connector | LGH1/2L                          |
| HV Return    | #6-32 x 0.437 long threaded post |

## E SERIES INPUT CONNECTOR PINOUT AND FUNCTIONS

| Pin | Description            | Function                                                    |
|-----|------------------------|-------------------------------------------------------------|
| 1   | Reference Voltage      | (+)10.00 V PRECISION REFERENCE                              |
| 2   | Voltage Programming -  | 0 TO 10 V TO PROGRAM FULL OUTPUT VOLTAGE                    |
| 3   | Voltage Programming +  | PROGRAMMING INPUT IS DIFFERENTIAL BETWEEN PINS 2 AND 3.     |
| 4   | Voltage Monitor        | 0 TO +10 V REPRESENTS 0 TO FULL OUTPUT VOLTAGE              |
| 5   | Voltage Mode Indicator | OPEN DRAIN ACTIVE LOW WHEN IN VOLTAGE CONTROL               |
| 6   | Signal Ground          | REFERENCE ALL CONTROL SIGNALS HERE.                         |
| 7   | Input Power            | +23 TO +30 V                                                |
| 8   | Input Power            |                                                             |
| 9   | Power Ground           |                                                             |
| 10  | Power Ground           | INPUT POWER RETURN                                          |
| 11  | Enable                 |                                                             |
| 12  | Current Monitor        | 0 TO +10 V REPRESENTS 0 TO FULL OUTPUT CURRENT              |
| 13  | Current Programming    | 0 TO +10 V SETS CURRENT FROM 0 TO FULL RATED OUTPUT CURRENT |
| 14  | Current Mode Indicator | OPEN DRAIN ACTIVE LOW WHEN IN CURRENT CONTROL               |
| 15  | Signal Ground          | REFERENCE ALL CONTROL SIGNALS HERE.                         |

NOTE: Use stud next to high voltage output connector as HV return. A secure ground connection here is critical to safety and proper operation.

## ORDERING INFORMATION

|             |                                                               |            |
|-------------|---------------------------------------------------------------|------------|
| Type        | 0 to 1000 VDC Output                                          | 1E         |
|             | 0 to 2000 VDC Output                                          | 2E         |
|             | 0 to 4000 VDC Output                                          | 4E         |
|             | 0 to 6000 VDC Output                                          | 6E         |
|             | 0 to 10,000 VDC Output                                        | 10E        |
|             | 0 to 15,000 VDC Output                                        | 15E        |
| Input       | 24 V Input                                                    | 24         |
| Polarity    | Positive Output                                               | -P         |
|             | Negative Output                                               | -N         |
| Power       | 4 W Output                                                    | 4          |
|             | 15 W Output (10 and 15 kV only)                               | 15         |
|             | 20 W Output (1 to 6 kV only)                                  | 20         |
|             | 30 W Output                                                   | 30         |
| Performance |                                                               |            |
| Level       | 10 ppm Line/Load Regulation, Stability, and Temp. Coefficient | -10 ppm    |
|             | 25 ppm Line/Load Regulation, Stability, and Temp. Coefficient | -25 ppm    |
| Connectors  | LGH                                                           | (Standard) |
|             | 5 kV, SHV Type                                                | -SHV-5 kV  |
|             | 10 kV, BNC Type                                               | -BNC-10 kV |

Popular accessories ordered with this product include our full range of high voltage output connectors. (See Accessories and Connectors datasheet.)



Non-RoHS compliant units are available.  
Please contact the factory for more  
information.





For international contact information, visit  
[advanced-energy.com](http://advanced-energy.com).

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## JONHON

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