



**ULTRAVOLT® M SERIES**  
MINIATURE, MICRO-SIZED  
HIGH VOLTAGE BIASING SUPPLIES





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# Single-output, micro-sized HV modules

The miniature, micro-sized M series is the ideal solution for applications requiring biasing voltage ranging from 0 to 3000 V and very small current—only 16.4 cc (1.00 in<sup>3</sup>). Less than 12.7 mm (0.5") high, these modules are ideal for low-profile applications.

## Features

- › Seven models from 0 to 600, 1000, 1250, 1500, 2000, 2500, or 3000 V
- › Output power: 0.5, 0.8, or 1 W
- › Tight line/load regulation
- › Arc and continuous short circuit protection
- › Self-restoring output voltage
- › Low cost
- › Miniature and lightweight
- › Voltage monitoring
- › Low ripple (0.01% peak to peak)
- › Optional flying lead for high voltage output

## Typical Applications

- › Bias supplies
- › Electrostatic chucks
- › Hand held x-ray fluorescence (XRF)
- › Avalanche photo diodes (APD)
- › Photomultiplier tubes (PMT)
- › Silicon detector (SiD)
- › X-ray flat panel detector (FPD)
- › Ionization chamber detector

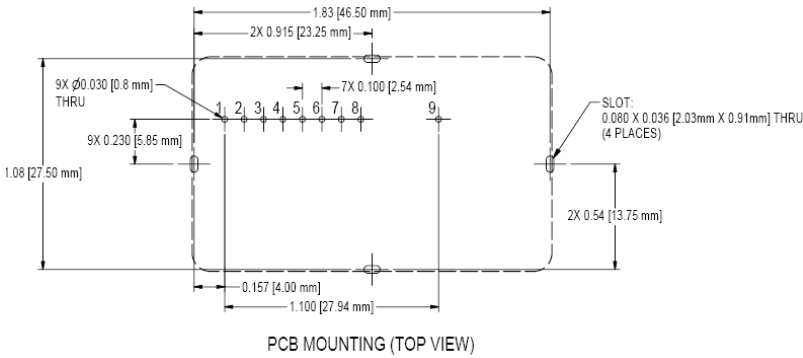




| PARAMETER   | SPECIFICATIONS  |      |      |                             |      |      | UNITS      |
|---|---|------|------|-----------------------------|------|------|------------|
| <b>Input Voltage Vin (Pins 1 and 2)</b>                 | 5 ±0.5 (2 to 3 kV ONLY), 12 ±1, 15 ±1 (600 V to 1.5 kV ONLY), or 24 ±2                    |      |      |                             |      |      | VDC        |
| <b>Input Voltage</b>                                    | 5 (2 to 3 kV ONLY)  |      |      | 12                          |      |      | V          |
| <b>Input Current</b>                                    | No load: 55, full load: 450   |      |      | No load: 45, full load: 200 |      |      | mA         |
| <b>Polarity</b>   | Fixed positive and fixed negative   |      |      |                             |      |      | -          |
| <b>Output Voltage</b>                                   | 0 to 600  |      |      | 0 to 1000                   |      |      | VDC        |
| <b>Input Voltage</b>                                    | 12  | 15   | 24   | 12                          | 15   | 24   | VDC        |
| <b>Output Power</b>                                     | 0.5   | 0.8  | 1    | 0.5                         | 0.8  | 1    | W          |
| <b>Output Current</b>                                   | 0.83  | 1.33 | 1.67 | 0.5                         | 0.8  | 1    | mA         |
| <b>Output Voltage</b>                                   | 0 to 1250   |      |      | 0 to 1500                   |      |      | VDC        |
| <b>Input Voltage</b>                                    | 12  | 15   | 24   | 12                          | 15   | 24   | VDC        |
| <b>Output Power</b>                                     | 0.5   | 0.8  | 1    | 0.5                         | 0.8  | 1    | W          |
| <b>Output Current</b>                                   | 0.4   | 0.64 | 0.8  | 0.33                        | 0.53 | 0.67 | mA         |
| <b>HV Setting</b>                                       | 10 to 100 K (potentiometer across Vref. and signal ground, wiper to adjust)               |      |      |                             |      |      | -          |
| <b>Load Voltage Regulation</b>                          | < 0.01% of full output voltage for no load to full load                                   |      |      |                             |      |      | VDC        |
| <b>Line Voltage Regulation</b>                          | < 0.01% of full output voltage over specified input voltage range                         |      |      |                             |      |      | VDC        |
| <b>Residual Ripple</b>                                  | < 0.01% at full load  |      |      |                             |      |      | V pk to pk |
| <b>Temperature Coefficient</b>                          | 100 ppm/°C for the max output voltage after starting and over temperature range 0 to 50°C |      |      |                             |      |      | -          |
| <b>Output Voltage Monitoring (600 to 1500 V)</b>        | +1 V/1 kV max or -1 V/-1 kV max according to model polarity output impedance = 200 kΩ ±1% |      |      |                             |      |      | -          |
| <b>Output Voltage Monitoring (2 to 3 kV)</b>            | 12 to 24 V input only: 0 to +5 V±2%   |      |      |                             |      |      | VDC        |
|   | 5 V inputs: 0 to +2.5 V±2%  |      |      |                             |      |      |            |
| <b>Reference Voltage</b>                                | 12 to 24 V input only: 5 V ±1%, TC: 100 ppm/°C, max output current: 1 mA                  |      |      |                             |      |      | -          |
|   | 5 V inputs: 2.5 V ±1%, TC: 100 ppm/°C, max output current: 1 mA                           |      |      |                             |      |      |            |
| <b>Operating Temperature</b>                            | -10 to +65, full load, max Eout, case temp  |      |      |                             |      |      | °C         |
| <b>Storage Temperature</b>                              | -40 to +70  |      |      |                             |      |      | °C         |
| <b>Safeguards</b>                                       | Arc and short circuit protection  |      |      |                             |      |      | -          |
| <b>Options</b>  | Flying lead for HV output   |      |      |                             |      |      | -          |
| <b>Enhanced Interface (-EI) Option (2 to 3 kV Only)</b> | Enable/disable (ON/OFF): 0 to +0.5 V enable, +2.4V to V_input disable (default = disable) |      |      |                             |      |      | -          |
|   | Output current monitor (5 V input only): 0 to +2.5 V ±2%                                  |      |      |                             |      |      |            |
|   | Output current monitor (12 to 24 V input): 0 to +5.0 V ±2%                                |      |      |                             |      |      | -          |



| PARAMETER   | SPECIFICATIONS  |      |      |                             |       |       | UNITS      |
|---|---|------|------|-----------------------------|-------|-------|------------|
| <b>Input Voltage Vin (Pins 1 and 2)</b>                 | 5 ±0.5 (2 to 3 kV ONLY), 12 ±1, 15 ±1 (600 V to 1.5 kV ONLY), or 24 ±2                    |      |      |                             |       |       | VDC        |
| <b>Input Voltage</b>                                    | 15 (600 V to 1.5 kV ONLY)   |      |      | 24                          |       |       | V          |
| <b>Input Current</b>                                    | No load: 40, full load: 190   |      |      | No load: 35, full load: 160 |       |       | mA         |
| <b>Polarity</b>   | Fixed positive and fixed negative   |      |      |                             |       |       | -          |
| <b>Output Voltage</b>                                   | 0 to 2000   |      |      | 0 to 2500                   |       |       | VDC        |
| <b>Input Voltage</b>                                    | 5   | 12   | 24   | 5                           | 12    | 24    | VDC        |
| <b>Output Power</b>                                     | 0.5   | 0.8  | 1    | 0.5                         | 0.8   | 1     | W          |
| <b>Output Current</b>                                   | 0.25  | 0.40 | 0.50 | 0.20                        | 0.32  | 0.40  | mA         |
| <b>Output Voltage</b>                                   |   |      |      | 0 to 3000                   |       |       | VDC        |
| <b>Input Voltage</b>                                    |   |      |      | 5                           | 12    | 24    | VDC        |
| <b>Output Power</b>                                     |   |      |      | 0.5                         | 0.8   | 1     | W          |
| <b>Output Current</b>                                   |   |      |      | 0.167                       | 0.267 | 0.333 | mA         |
| <b>HV Setting</b>                                       | 10 to 100 K (potentiometer across Vref. and signal ground, wiper to adjust)               |      |      |                             |       |       | -          |
| <b>Load Voltage Regulation</b>                          | < 0.01% of full output voltage for no load to full load                                   |      |      |                             |       |       | VDC        |
| <b>Line Voltage Regulation</b>                          | < 0.01% of full output voltage over specified input voltage range                         |      |      |                             |       |       | VDC        |
| <b>Residual Ripple</b>                                  | < 0.01% at full load  |      |      |                             |       |       | V pk to pk |
| <b>Temperature Coefficient</b>                          | 100 ppm/°C for the max output voltage after starting and over temperature range 0 to 50°C |      |      |                             |       |       | -          |
| <b>Output Voltage Monitoring (600 to 1500 V)</b>        | +1 V/1 kV max or -1 V/-1 kV max according to model polarity output impedance = 200 kΩ ±1% |      |      |                             |       |       | -          |
| <b>Output Voltage Monitoring (2 to 3 kV)</b>            | 12 to 24 V input only: 0 to +5 V±2%   |      |      |                             |       |       | VDC        |
|   | 5 V inputs: 0 to +2.5 V±2%  |      |      |                             |       |       |            |
| <b>Reference Voltage</b>                                | 12 to 24 V input only: 5 V ±1%, TC: 100 ppm/°C, max output current: 1 mA                  |      |      |                             |       |       | -          |
|   | 5 V inputs: 2.5 V ±1%, TC: 100 ppm/°C, max output current: 1 mA                           |      |      |                             |       |       |            |
| <b>Operating Temperature</b>                            | -10 to +65, full load, max Eout, case temp  |      |      |                             |       |       | °C         |
| <b>Storage Temperature</b>                              | -40 to +70  |      |      |                             |       |       | °C         |
| <b>Safeguards</b>                                       | Arc and short-circuit protection  |      |      |                             |       |       | -          |
| <b>Options</b>  | Flying lead for HV output   |      |      |                             |       |       | -          |
| <b>Enhanced Interface (-EI) Option (2 to 3 kV Only)</b> | Enable/disable (ON/OFF): 0 to +0.5 V enable, +2.4V to V_input disable (default = disable) |      |      |                             |       |       | -          |
|   | Output current monitor (5 V input only): 0 to +2.5 V ±2%                                  |      |      |                             |       |       |            |
|   | Output current monitor (12 to 24 V input): 0 to +5.0 V ±2%                                |      |      |                             |       |       | -          |



Note: Pins 7 and 8 are available for 2 kV to 3 kV units with enhanced interface option ONLY.  
Drawing views: third angle projections. Measurements are in inches (millimeters).

## PHYSICAL SPECIFICATIONS

|                     |  |
|---------------------|--|
| <b>Construction</b> | Steel, tin-plated thickness 0.5 mm (0.02")<br>Insulation: fully potted in an epoxy resin |
| <b>Volume</b>       | 16.4 cc (1.00 in <sup>3</sup> )  |
| <b>Weight</b>       | 35 g (1.23 oz)   |
| <b>Tolerance</b>    |  |
| <b>Overall</b>      | ±0.76 mm (0.030")  |
| <b>Pin to Pin</b>   | ±0.38 mm (0.015")  |
| <b>Pin to Tab</b>   | ±0.51 mm (0.020")  |
| <b>Tab to Tab</b>   | ±0.25 mm (0.010")  |

Notes: 0.47 mm (0.019") round pins, length: 3 mm (0.12"), spacing: 2.54 mm (0.1")

PCB mounting through 4 mounting tabs, length: 5 mm (0.2"), width: 1.5 mm (0.059"), thickness: 0.5 mm (0.02")

Optional flying lead for HV output: coaxial cable (RG178), diameter: 2 mm (0.079"), length: 500 mm (19.685")

## CONNECTIONS

| Pin | Function   |
|-----|--|
| 1   | POSITIVE POWER INPUT                             |
| 2   | POWER GROUND                                     |
| 3   | SIGNAL GROUND                                    |
| 4   | REMOTE ADJUST INPUT                              |
| 5   | REFERENCE VOLTAGE                                |
| 6   | VOLTAGE MONITOR                                  |
| 7   | CURRENT MONITOR (available with -EI option only) |
| 8   | ENABLE (available with -EI option only)          |
| 9   | HV OUTPUT  |

Note: Mounting tabs must be connected to ground.



## ORDERING INFORMATION

|                 |  |            |
|-----------------|--|------------|
| <b>Type</b>     | 0 to 600 VDC Output                                  | 0.6 M      |
|                 | 0 to 1000 VDC Output                                 | 1 M        |
|                 | 0 to 1250 VDC Output                                 | 1.25 M     |
|                 | 0 to 1500 VDC Output                                 | 1.5 M      |
|                 | 0 to 2000 VDC Output                                 | 2 M        |
|                 | 0 to 2500 VDC Output                                 | 2.5 M      |
|                 | 0 to 3000 VDC Output                                 | 3 M        |
| <b>Input</b>    | 5 VDC Nominal (2 to 3 kV only)                       | 5          |
|                 | 12 VDC Nominal                                       | 12         |
|                 | 15 VDC Nominal (600 V to 1.5 kV only)                | 15         |
|                 | 24 VDC Nominal                                       | 24         |
| <b>Power</b>    | 0.5 W Output   | 0.5        |
|                 | 0.8 W Output   | 0.8        |
|                 | 1 W Output   | 1          |
| <b>Case</b>     | Tin Steel Case                                       | (Standard) |
| <b>Polarity</b> | Positive Output                                      | -P         |
|                 | Negative Output                                      | -N         |
| <b>Option</b>   | Shielded Flying Lead for HV Output (600 V to 1.5 kV) | -WS        |
|                 | Flying Lead for HV Output (2 to 3 kV only)           | -W         |
|                 | Current Monitor/Enable Pin (2 to 3 kV only)          | -EI        |



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



Popular accessories ordered with this product include the PCB-CONN-M/V.

The M series is not available in all territories. Please contact Advanced Energy for details concerning sales in your area.



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