Advanced Energy®

# ULTRAVOLT® M SERIES

## MINIATURE, MICRO-SIZED HIGH VOLTAGE BIASING SUPPLIES

# **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 $in^3$). Less than 12.7 mm (0.5″) high, these modules are ideal for low-profile applications.

## Features

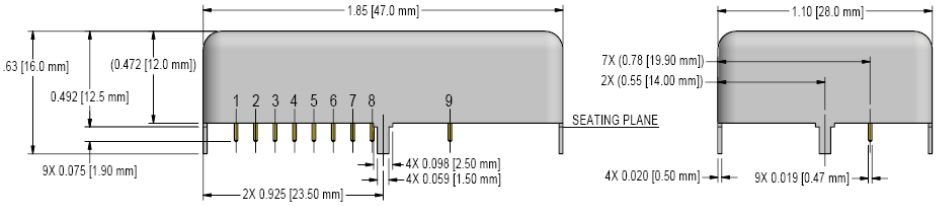
- Seven models from 0 to 600, 1000, 1250, 1500, 2000, 2500, or 3000 V
- Output power: 0.5, 0.8, or 1 W
- Tight line/load regulation
- Arc and continuous short circuit protection
- Self-restoring output voltage
- Low cost
- Miniature and lightweight
- Voltage monitoring
- Low ripple (0.01% peak to peak)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

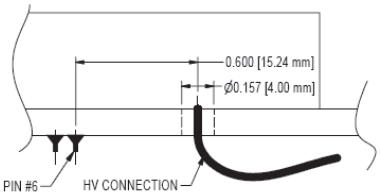
## Typical Applications

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

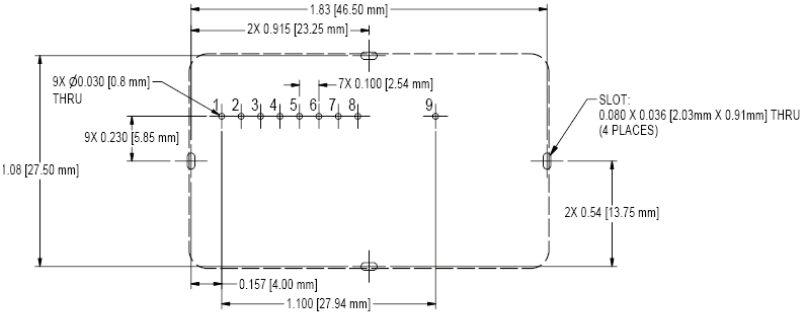
| PARAMETER | SPECIFICATIONS | | | | | | UNITS |
|---|---|---|---|---|---|---|---|
| **Input Voltage Vin (Pins 1 and 2)** | 5 ±0.5 (2 to 3 kV ONLY), 12 ±1, 15 ±1 (600 V to 1.5 kV ONLY), or 24 ±2 | | | | | | VDC |
| **Input Voltage** | 5 (2 to 3 kV ONLY) | | | 12 | | | V |
| **Input Current** | No load: 55, full load: 450 | | | No load: 45, full load: 200 | | | mA |
| **Polarity** | Fixed positive and fixed negative | | | | | | - |
| **Output Voltage** | 0 to 600 | | | 0 to 1000 | | | VDC |
| **Input Voltage** | 12 | 15 | 24 | 12 | 15 | 24 | VDC |
| **Output Power** | 0.5 | 0.8 | 1 | 0.5 | 0.8 | 1 | W |
| **Output Current** | 0.83 | 1.33 | 1.67 | 0.5 | 0.8 | 1 | mA |
| **Output Voltage** | 0 to 1250 | | | 0 to 1500 | | | VDC |
| **Input Voltage** | 12 | 15 | 24 | 12 | 15 | 24 | VDC |
| **Output Power** | 0.5 | 0.8 | 1 | 0.5 | 0.8 | 1 | W |
| **Output Current** | 0.4 | 0.64 | 0.8 | 0.33 | 0.53 | 0.67 | mA |
| **HV Setting** | 10 to 100 K (potentiometer across Vref. and signal ground, wiper to adjust) | | | | | | - |
| **Load Voltage Regulation** | < 0.01% of full output voltage for no load to full load | | | | | | VDC |
| **Line Voltage Regulation** | < 0.01% of full output voltage over specified input voltage range | | | | | | VDC |
| **Residual Ripple** | < 0.01% at full load | | | | | | V pk to pk |
| **Temperature Coefficient** | 100 ppm/°C for the max output voltage after starting and over temperature range 0 to 50°C | | | | | | - |
| **Output Voltage Monitoring (600 to 1500 V)** | +1 V/1 kV max or -1 V/-1 kV max according to model polarity output impedance = 200 kΩ ±1% | | | | | | - |
| **Output Voltage Monitoring (2 to 3 kV)** | 12 to 24 V input only: 0 to +5 V±2% | | | | | | VDC |
| | 5 V inputs: 0 to +2.5 V±2% | | | | | | |
| **Reference Voltage** | 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 | | | | | | |
| **Operating Temperature** | -10 to +65, full load, max Eout, case temp | | | | | | °C |
| **Storage Temperature** | -40 to +70 | | | | | | °C |
| **Safeguards** | Arc and short circuit protection | | | | | | - |
| **Options** | Flying lead for HV output | | | | | | - |
| **Enhanced Interface (-EI) Option (2 to 3 kV Only)** | 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 |
|---|---|---|---|---|---|---|---|
| **Input Voltage Vin (Pins 1 and 2)** | 5 ±0.5 (2 to 3 kV ONLY), 12 ±1, 15 ±1 (600 V to 1.5 kV ONLY), or 24 ±2 | | | | | | VDC |
| **Input Voltage** | 15 (600 V to 1.5 kV ONLY) | | | 24 | | | V |
| **Input Current** | No load: 40, full load: 190 | | | No load: 35,k full load: 160 | | | mA |
| **Polarity** | Fixed positive and fixed negative | | | | | | - |
| **Output Voltage** | 0 to 2000 | | | 0 to 2500 | | | VDC |
| **Input Voltage** | 5 | 12 | 24 | 5 | 12 | 24 | VDC |
| **Output Power** | 0.5 | 0.8 | 1 | 0.5 | 0.8 | 1 | W |
| **Output Current** | 0.25 | 0.40 | 0.50 | 0.20 | 0.32 | 0.40 | mA |
| **Output Voltage** | | | | 0 to 3000 | | | VDC |
| **Input Voltage** | | | | 5 | 12 | 24 | VDC |
| **Output Power** | | | | 0.5 | 0.8 | 1 | W |
| **Output Current** | | | | 0.167 | 0.267 | 0.333 | mA |
| **HV Setting** | 10 to 100 K (potentiometer across Vref. and signal ground, wiper to adjust) | | | | | | - |
| **Load Voltage Regulation** | < 0.01% of full output voltage for no load to full load | | | | | | VDC |
| **Line Voltage Regulation** | < 0.01% of full output voltage over specified input voltage range | | | | | | VDC |
| **Residual Ripple** | < 0.01% at full load | | | | | | V pk to pk |
| **Temperature Coefficient** | 100 ppm/°C for the max output voltage after starting and over temperature range 0 to 50°C | | | | | | - |
| **Output Voltage Monitoring (600 to 1500 V)** | +1 V/1 kV max or -1 V/-1 kV max according to model polarity output impedance = 200 kΩ ±1% | | | | | | - |
| **Output Voltage Monitoring (2 to 3 kV)** | 12 to 24 V input only: 0 to +5 V±2% | | | | | | VDC |
| | 5 V inputs: 0 to +2.5 V±2% | | | | | | |
| **Reference Voltage** | 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 | | | | | | |
| **Operating Temperature** | -10 to +65, full load, max Eout, case temp | | | | | | °C |
| **Storage Temperature** | -40 to +70 | | | | | | °C |
| **Safeguards** | Arc and short-circuit protection | | | | | | - |
| **Options** | Flying lead for HV output | | | | | | - |
| **Enhanced Interface (-EI) Option (2 to 3 kV Only)** | 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% | | | | | | - |




FLYING LEAD OPTION -WS




PCB MOUNTING (TOP VIEW)

*Note: Pins 7 and 8 are available for 2 k to 3 kV units with enhanced interface option ONLY.*

*Drawing views: third angle projections. Measurements are in inches (millimeters).*

## PHYSICAL SPECIFICATIONS

| | |
|---|---|
| **Construction** | Steel, tin-plated thickness 0.5 mm (0.02″)<br>Insulation: fully potted in an epoxy resin |
| **Volume** | 16.4 cc (1.00 in³) |
| **Weight** | 35 g (1.23 oz) |
| **Tolerance** | |
| **Overall** | ±0.76 mm (0.030″) |
| **Pin to Pin** | ±0.38 mm (0.015″) |
| **Pin to Tab** | ±0.51 mm (0.020″) |
| **Tab to Tab** | ±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

| | | |
|---|---|---|
| **Type** | 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 |
| **Input** | 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 |
| **Power** | 0.5 W Output | 0.5 |
| | 0.8 W Output | 0.8 |
| | 1 W Output | 1 |
| **Case** | Tin Steel Case | (Standard) |
| **Polarity** | Positive Output | -P |
| | Negative Output | -N |
| **Option** | 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 |

IEC-60950-1

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

Example: **1.5M24-P1-WS**

- Type
- Voltage
- Model
- Input
- Option
- Power
- Polarity

*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.

ENG-HV-Mseries-230-J 11.16

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Живое партнерство

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*ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703*

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