

## "M" Series

PCB-mount miniature, microsize, regulated, high voltage DC-DC converter



**ULTRAVOLT®**  
MAKING HIGH VOLTAGE  
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**Vin : 12Vdc, 15Vdc or 24Vdc**  
**Vout : 0 to 600V, 1000V, 1250V or 1500V**  
**Pout : up to 1W**

*The miniature, microsize "M" Series is the ideal solution for PMTs that need a bias voltage ranging from 0 to 1500V, with very small current at only 1.28in<sup>3</sup> [20.9cc].*



- low cost
- tight line/load regulation
- arc and continuous short circuit protection
- miniature and lightweight
- voltage monitoring
- self restoring output voltage
- 5V reference
- low ripple (0.01% p. to p.)
- option : flying wire for HV output

| Parameters                                   | Specifications   |
|--|--|
| Input voltage Vin<br>(pins 1 & 2)            | 12Vdc ±0.5Vdc or 15Vdc ±0.5Vdc or 24Vdc ±1Vdc, according to type   |
| Input current                                | at no load : 15mA<br>at full load : from 65mA to 100mA   |
| HV output Vout<br>(pin 7 or wire - optional) | programmable nominal voltage,<br>refer to the Selection Guide for voltage ranges   |
| Polarity                                     | fixed positive and fixed negative  |
| HV setting<br>(pins 3,4 & 5)                 | via external potentiometer, minimum resistance 10kΩ or<br>via external voltage source 0/ 5V ±0.5% at full scale, and input<br>impedance >1MΩ<br>optional: via external voltage source 0/10V ±0.5% at full scale,<br>and input impedance >1MΩ |
| Max. output current Iout                     | refer to the Selection Guide   |
| Load voltage regulation                      | ±0.01% of full output voltage for no load to full load   |
| Line voltage regulation                      | ±0.01% of full output voltage over specified input voltage<br>range  |
| Residual ripple                              | between 50mV and 150mV peak-to-peak at full load   |
| Temperature coefficient                      | 100ppm/°C for the maximum output voltage after starting and<br>over temperature range 0 to 50°C  |
| Output HV monitoring<br>(pin 6)              | +1V/1kV max. or -1V/-1kV max. according to model polarity<br>output impedance = 200kΩ ±1%  |
| Output reference voltage<br>(pin 5)          | 5V ±0.5%, TC:50ppm/°C, max. output current:1mA   |
| Operating temperature                        | 0°C to +50°C   |
| Storage temperature                          | -20°C to +70°C   |
| Safeguards                                   | arc and short circuit protection   |
| Options                                      | ▪ flying wire for HV output instead of pin 7<br>▪ suitable for use with an external potentiometer  |

| Typical Applications   |
|--|
| <ul style="list-style-type: none"> <li>▪ Bias Supplies</li> <li>▪ Avalanche Photo Diodes (APD)</li> <li>▪ Photomultiplier Tubes (PMT)</li> </ul> |

| Package Configuration                            |   |
|--|---|
| Case material                                    | tin steel plate<br>thickness 0.5mm  |
| Case dimensions<br>LxHxW                         | 51.0x13.0x31.5mm  |
| Pins   | through Ø0.46 round<br>pins, length : 3mm,<br>spacing : 2.54mm,<br>option: flying wire for<br>HV output |
| PCB mounting<br>(raised mounting<br>models only) | through 4 mounting tabs<br>length: 5mm, width : 1,5<br>mm, thickness : 0,5mm                            |
| Weight   | 35g   |
| Lead (optional)                                  | coaxial cable (RG178),<br>diameter = 2mm,<br>length = 500mm   |
| Insulation                                       | fully potted in an epoxy<br>resin   |

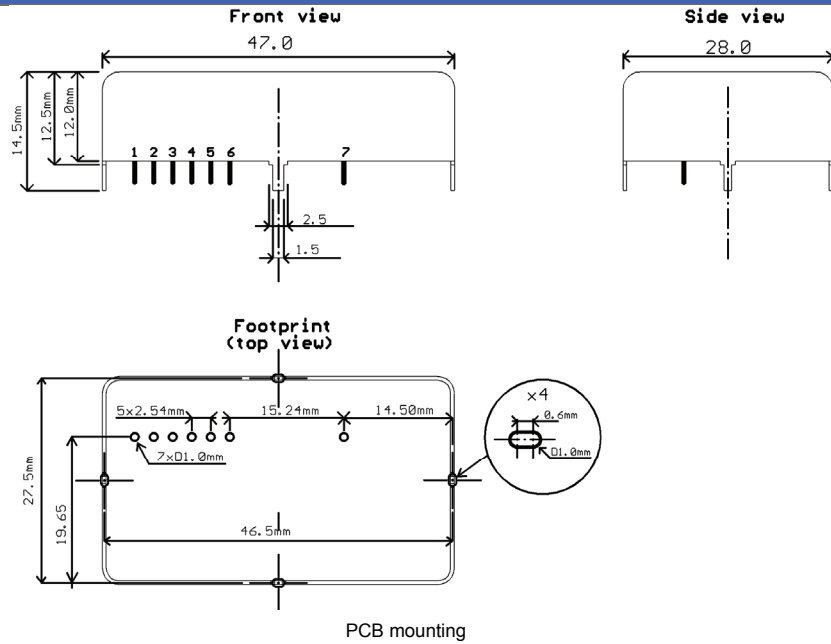
| Pin Connections |                       |
|-----------------|-----------------------|
| Line input :    | 1. Vin                |
|                 | 2. 0V supply ground   |
| HV setting :    | 3. 0V signal ground   |
|                 | 4. control input      |
|                 | 5. output reference   |
| HV monitoring : | 6. voltage monitoring |
| HV output :     | 7. Vout               |

# "M" Series

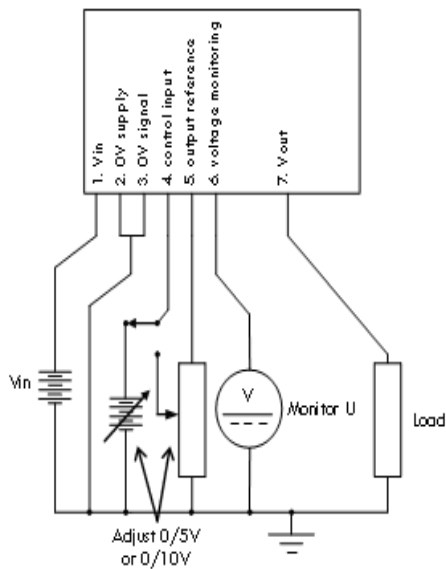
PCB-mount miniature, microsize, regulated, high voltage DC-DC converter



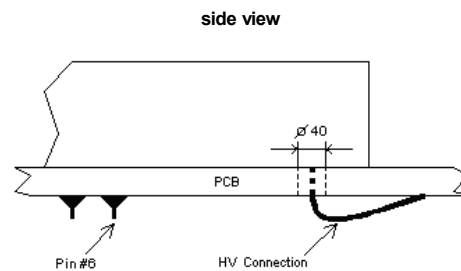
## Mechanical Dimension



## Functional Diagram



## Option : flying wire for HV output



## "M" Series Overview\*

|            | Vin (Vdc) |                       |                       |                     |
|------------|-----------|-----------------------|-----------------------|---------------------|
|            | 12        | 15                    | 24                    |                     |
| Vout (Vdc) | 600       | (0.2W)<br>330 $\mu$ A | (0.3W)<br>500 $\mu$ A | (0.6W)<br>1mA       |
|            | 1000      | (0.4W)<br>400 $\mu$ A | (0.6W)<br>600 $\mu$ A | (1W)<br>1mA         |
|            | 1250      | (0.5W)<br>400 $\mu$ A | (0.8W)<br>640 $\mu$ A | (1W)<br>800 $\mu$ A |
|            | 1500      | (0.5W)<br>330 $\mu$ A | (0.7W)<br>460 $\mu$ A | (1W)<br>660 $\mu$ A |

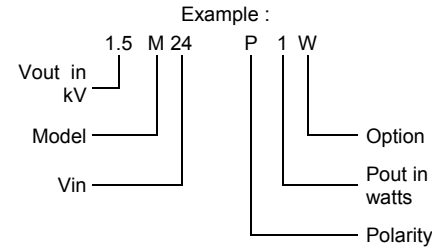
# "M" Series

PCB-mount vertical, microsize, regulated, high voltage DC-DC converter



## Ordering Information

|          |                                      |                   |
|----------|--------------------------------------|-------------------|
| Model    | name of the series                   | M                 |
| Vin      | 12Vdc nominal                        | 12                |
|          | 15Vdc nominal                        | 15                |
|          | 24Vdc nominal                        | 24                |
| Polarity | positive output voltage              | -P                |
|          | negative output voltage              | -N                |
| Vout     | HV output voltage                    | see Ordering Code |
| Iout     | output power                         | see Ordering Code |
| Option   | flying wire to collect the HV output | -W                |
|          | 10Vdc control and monitor            | -10               |



+1500V@1W psu under 24Vdc with the optional flying wire for the HV output

## "M" Series Selection Guide

| Vout  | Iout / Pout    | Vin | Polarity | Model        |
|-------|----------------|-----|----------|--------------|
| 1500V | 0.66mA / 1.0W  | 24V | +        | 1.5M24-P1    |
|       |                |     | -        | 1.5M24-N1    |
|       | 0.46mA / 0.70W | 15V | +        | 1.5M15-P0.7  |
|       |                |     | -        | 1.5M15-N0.7  |
|       | 0.33mA / 0.50W | 12V | +        | 1.5M12-P0.5  |
|       |                |     | -        | 1.5M12-N0.5  |
| 1250V | 0.8mA / 1.00W  | 24V | +        | 1.25M24-P1   |
|       |                |     | -        | 1.25M24-N1   |
|       | 0.64mA / 0.80W | 15V | +        | 1.25M15-P0.8 |
|       |                |     | -        | 1.25M15-N0.8 |
|       | 0.4mA / 0.50W  | 12V | +        | 1.25M12-P0.5 |
|       |                |     | -        | 1.25M12-N0.5 |
| 1000V | 1.0mA / 1.00W  | 24V | +        | 1M24-P1      |
|       |                |     | -        | 1M24-N1      |
|       | 0.6mA / 0.60W  | 15V | +        | 1M15-P0.6    |
|       |                |     | -        | 1M12-N0.6    |
|       | 0.4mA / 0.40W  | 12V | +        | 1M12-P0.4    |
|       |                |     | -        | 1M12-P0.4    |
| 600V  | 1.0mA / 0.60W  | 24V | +        | 0.6M24-P0.6  |
|       |                |     | -        | 0.6M24-N0.6  |
|       | 0.5mA / 0.30W  | 15V | +        | 0.6M15-P0.3  |
|       |                |     | -        | 0.6M15-N0.3  |
|       | 0.4mA / 0.24W  | 12V | +        | 0.6M12-P0.24 |
|       |                |     | -        | 0.6M12-N0.24 |