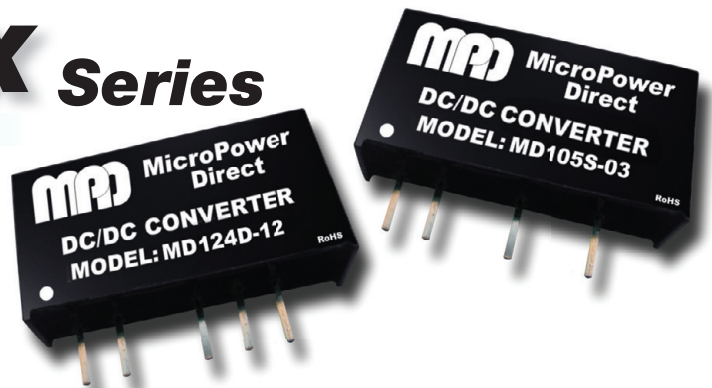


# MD100x-XX Series

## Isolated, 1W SIP, Single & Dual Output DC/DC Converters



### Key Features:

- 1W Output Power
- 1 kV to 6kV Isolation
- 96 Standard Models
- Miniature SIP Case
- Efficiency to 86%
- -40°C to +85°C Operation
- Industry Standard Pin-Out
- Low Cost

RoHS



### Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

| Input               |                  |      |      |      |       |  |
|---------------------|------------------|------|------|------|-------|--|
| Parameter           | Conditions       | Min. | Typ. | Max. | Units |  |
| Input Voltage Range | 3.3 VDC Input    | 2.97 | 3.3  | 3.63 | VDC   |  |
|                     | 5 VDC Input      | 4.5  | 5.0  | 5.5  |       |  |
|                     | 12 VDC Input     | 10.8 | 12.0 | 13.2 |       |  |
|                     | 15 VDC Input     | 13.5 | 15.0 | 16.5 |       |  |
|                     | 24 VDC Input     | 21.6 | 24.0 | 26.4 |       |  |
|                     | 48 VDC Input     | 43.2 | 48.0 | 52.8 |       |  |
| Input Filter        | Capacitor Filter |      |      |      |       |  |

| Output                  |                      |      |       |      |          |  |
|-------------------------|----------------------|------|-------|------|----------|--|
| Parameter               | Conditions           | Min. | Typ.  | Max. | Units    |  |
| Output Voltage Accuracy |                      |      | ±3.0  |      | %        |  |
| Line Regulation         | For VIN Change of 1% |      | ±1.2  |      | %        |  |
| Load Regulation         | See Note 1           |      | ±10   |      | %        |  |
| Ripple & Noise (20 MHz) |                      |      | 75    |      | mV P - P |  |
| Temperature Coefficient |                      |      | ±0.02 |      | %/°C     |  |
| Output Short Circuit    | Momentary (0.5 Sec)  |      |       |      |          |  |

| General                   |                  |       |       |      |       |  |
|---------------------------|------------------|-------|-------|------|-------|--|
| Parameter                 | Conditions       | Min.  | Typ.  | Max. | Units |  |
| Isolation Voltage, 60 Sec | 1xxx-xx Models   | 1,000 |       |      | VDC   |  |
|                           | 1xxx-xxl Models  | 3,000 |       |      |       |  |
|                           | 1xxx-xxl4 Models | 4,000 |       |      |       |  |
|                           | 1xxx-xxl5 Models | 5,200 |       |      |       |  |
|                           | 1xxx-xxl6 Models | 6,000 |       |      |       |  |
| Isolation Resistance      |                  |       | 1,000 |      | MΩ    |  |
| Isolation Capacitance     |                  |       | 60    |      | pF    |  |
| Switching Frequency       |                  |       | 80    |      | kHz   |  |

| EMI Characteristics |                         |          |            |  |  |  |
|---------------------|-------------------------|----------|------------|--|--|--|
| Parameter           | Standard                | Criteria | Level      |  |  |  |
| Radiated Emissions  | EN 55022                |          | Class B    |  |  |  |
| Conducted Emissions | See Note 3 EN 55022     |          | Class B    |  |  |  |
| ESD                 | EN 61000-4-2            | A        | ±6 kV/±8kV |  |  |  |
| RS                  | EN 61000-4-3            | A        | 10V/m      |  |  |  |
| EFT                 | See Note 4 EN 61000-4-4 | A        | ±2 kV      |  |  |  |
| Surge               | See Note 4 EN 61000-4-5 | A        | ±2 kV      |  |  |  |
| CS                  | EN 61000-4-6            | A        | 10 Vrms    |  |  |  |
| PFMF                | EN 61000-4-8            | A        | 1A/m       |  |  |  |

| Environmental               |                     |      |      |      |       |  |
|-----------------------------|---------------------|------|------|------|-------|--|
| Parameter                   | Conditions          | Min. | Typ. | Max. | Units |  |
| Operating Temperature Range | Ambient             | -40  | +25  | +85  | °C    |  |
|                             | Case                |      |      | +100 |       |  |
| Storage Temperature Range   |                     | -40  |      | +125 | °C    |  |
| Cooling                     | Free Air Convection |      |      |      |       |  |
| Humidity                    | RH, Non-condensing  |      |      | 95   | %     |  |

| Physical      |  |  |  |  |  |  |
|---------------|--|--|--|--|--|--|
| Case Size     | See Mechanical Diagram (Page 4)        |  |  |  |  |  |
| Case Material | Non-Conductive Black Plastic (UL94-V0) |  |  |  |  |  |
| Weight        | 0.08 Oz (2.3g)                         |  |  |  |  |  |

| Reliability Specifications |                                 |       |      |      |        |  |
|----------------------------|---------------------------------|-------|------|------|--------|--|
| Parameter                  | Conditions                      | Min.  | Typ. | Max. | Units  |  |
| MTBF                       | MIL HDBK 217F, 25°C, Gnd Benign | 1.121 |      |      | MHours |  |

| Absolute Maximum Ratings      |                             |      |      |      |       |  |
|-------------------------------|-----------------------------|------|------|------|-------|--|
| Parameter                     | Conditions                  | Min. | Typ. | Max. | Units |  |
| Input Voltage Surge (0.1 Sec) | 3.3 VDC Input               |      |      | 6.0  | VDC   |  |
|                               | 5 VDC Input                 |      |      | 7.0  |       |  |
|                               | 12 VDC Input                |      |      | 15.0 |       |  |
|                               | 15 VDC Input                |      |      | 18.0 |       |  |
|                               | 24 VDC Input                |      |      | 28.0 |       |  |
|                               | 48 VDC Input                |      |      | 54.0 |       |  |
| Lead Temperature              | 1.5 mm From Case for 10 Sec |      |      | 260  | °C    |  |

Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

### MicroPower Direct

292 Page Street  
Suite D  
Stoughton, MA 02072  
USA

T: (781) 344-8226  
F: (781) 344-8481  
E: sales@micropowerelectronics.com  
W: www.micropowerelectronics.com



www.micropowerelectronics.com

| Model Number | Input         |             |              |         | Output        |                   |                   | Efficiency (% Typ) | Reflected Ripple Current (mA Pk-Pk) | Capacitive Load (µF Max) | Fuse Rating Slow-Blow (mA) |
|--------------|---------------|-------------|--------------|---------|---------------|-------------------|-------------------|--------------------|-------------------------------------|--------------------------|----------------------------|
|              | Voltage (VDC) |             | Current (mA) |         | Voltage (VDC) | Current (mA, Max) | Current (mA, Min) |                    |                                     |                          |                            |
|              | Nominal       | Range       | Full-Load    | No-Load |               |                   |                   |                    |                                     |                          |                            |
| MD103S-03xx  | 3.3           | 2.97 - 3.63 | 399          | 28      | 3.3           | 303               | 0.0               | 76                 | 20.0                                | 220                      | 1,000                      |
| MD103S-05xx  | 3.3           | 2.97 - 3.63 | 389          | 22      | 5.0           | 200               | 0.0               | 78                 | 20.0                                | 220                      | 1,000                      |
| MD103S-07xx  | 3.3           | 2.97 - 3.63 | 389          | 25      | 7.2           | 139               | 0.0               | 78                 | 20.0                                | 220                      | 1,000                      |
| MD103S-09xx  | 3.3           | 2.97 - 3.63 | 379          | 35      | 9.0           | 111               | 0.0               | 80                 | 20.0                                | 220                      | 1,000                      |
| MD103S-12xx  | 3.3           | 2.97 - 3.63 | 394          | 30      | 12.0          | 83                | 0.0               | 77                 | 20.0                                | 220                      | 1,000                      |
| MD103S-15xx  | 3.3           | 2.97 - 3.63 | 389          | 30      | 15.0          | 67                | 0.0               | 78                 | 20.0                                | 220                      | 1,000                      |
| MD103S-18xx  | 3.3           | 2.97 - 3.63 | 415          | 30      | 18.0          | 56                | 0.0               | 73                 | 20.0                                | 220                      | 1,000                      |
| MD103S-24xx  | 3.3           | 2.97 - 3.63 | 415          | 30      | 24.0          | 42                | 0.0               | 73                 | 20.0                                | 220                      | 1,000                      |
| MD103D-03xx  | 3.3           | 2.97 - 3.63 | 459          | 30      | ±3.3          | ±152              | ±0.0              | 66                 | 20.0                                | ±100                     | 1,000                      |
| MD103D-05xx  | 3.3           | 2.97 - 3.63 | 433          | 30      | ±5.0          | ±100              | ±0.0              | 70                 | 20.0                                | ±100                     | 1,000                      |
| MD103D-07xx  | 3.3           | 2.97 - 3.63 | 421          | 30      | ±7.2          | ±69               | ±0.0              | 72                 | 20.0                                | ±100                     | 1,000                      |
| MD103D-09xx  | 3.3           | 2.97 - 3.63 | 404          | 26      | ±9.0          | ±56               | ±0.0              | 75                 | 20.0                                | ±100                     | 1,000                      |
| MD103D-12xx  | 3.3           | 2.97 - 3.63 | 384          | 30      | ±12.0         | ±42               | ±0.0              | 77                 | 20.0                                | ±100                     | 1,000                      |
| MD103D-15xx  | 3.3           | 2.97 - 3.63 | 389          | 25      | ±15.0         | ±33               | ±0.0              | 78                 | 20.0                                | ±100                     | 1,000                      |
| MD103D-18xx  | 3.3           | 2.97 - 3.63 | 404          | 25      | ±18.0         | ±28               | ±0.0              | 75                 | 20.0                                | ±100                     | 1,000                      |
| MD103D-24xx  | 3.3           | 2.97 - 3.63 | 404          | 25      | ±24.0         | ±21               | ±0.0              | 75                 | 20.0                                | ±100                     | 1,000                      |
| MD105S-03xx  | 5             | 4.5 - 5.5   | 256          | 15      | 3.3           | 303               | 0.0               | 78                 | 20.0                                | 220                      | 500                        |
| MD105S-05xx  | 5             | 4.5 - 5.5   | 247          | 17      | 5.0           | 200               | 0.0               | 81                 | 20.0                                | 220                      | 500                        |
| MD105S-07xx  | 5             | 4.5 - 5.5   | 247          | 16      | 7.2           | 139               | 0.0               | 81                 | 20.0                                | 220                      | 500                        |
| MD105S-09xx  | 5             | 4.5 - 5.5   | 244          | 15      | 9.0           | 111               | 0.0               | 82                 | 20.0                                | 220                      | 500                        |
| MD105S-12xx  | 5             | 4.5 - 5.5   | 253          | 17      | 12.0          | 83                | 0.0               | 79                 | 20.0                                | 220                      | 500                        |
| MD105S-15xx  | 5             | 4.5 - 5.5   | 233          | 17      | 15.0          | 67                | 0.0               | 86                 | 20.0                                | 220                      | 500                        |
| MD105S-18xx  | 5             | 4.5 - 5.5   | 241          | 16      | 18.0          | 56                | 0.0               | 83                 | 20.0                                | 220                      | 500                        |
| MD105S-24xx  | 5             | 4.5 - 5.5   | 244          | 20      | 24.0          | 42                | 0.0               | 82                 | 20.0                                | 220                      | 500                        |
| MD105D-03xx  | 5             | 4.5 - 5.5   | 299          | 20      | ±3.3          | ±152              | ±0.0              | 67                 | 20.0                                | ±100                     | 500                        |
| MD105D-05xx  | 5             | 4.5 - 5.5   | 270          | 20      | ±5.0          | ±100              | ±0.0              | 74                 | 20.0                                | ±100                     | 500                        |
| MD105D-07xx  | 5             | 4.5 - 5.5   | 253          | 15      | ±7.2          | ±69               | ±0.0              | 79                 | 20.0                                | ±100                     | 500                        |
| MD105D-09xx  | 5             | 4.5 - 5.5   | 247          | 15      | ±9.0          | ±56               | ±0.0              | 81                 | 20.0                                | ±100                     | 500                        |
| MD105D-12xx  | 5             | 4.5 - 5.5   | 250          | 20      | ±12.0         | ±42               | ±0.0              | 80                 | 20.0                                | ±100                     | 500                        |
| MD105D-15xx  | 5             | 4.5 - 5.5   | 244          | 20      | ±15.0         | ±33               | ±0.0              | 82                 | 20.0                                | ±100                     | 500                        |
| MD105D-18xx  | 5             | 4.5 - 5.5   | 247          | 22      | ±18.0         | ±28               | ±0.0              | 81                 | 20.0                                | ±100                     | 500                        |
| MD105D-24xx  | 5             | 4.5 - 5.5   | 247          | 22      | ±24.0         | ±21               | ±0.0              | 81                 | 20.0                                | ±100                     | 500                        |
| MD112S-03xx  | 12            | 10.8 - 13.2 | 111          | 12      | 3.3           | 303               | 0.0               | 75                 | 20.0                                | 220                      | 300                        |
| MD112S-05xx  | 12            | 10.8 - 13.2 | 105          | 14      | 5.0           | 200               | 0.0               | 79                 | 20.0                                | 220                      | 300                        |
| MD112S-07xx  | 12            | 10.8 - 13.2 | 111          | 14      | 7.2           | 139               | 0.0               | 75                 | 20.0                                | 220                      | 300                        |
| MD112S-09xx  | 12            | 10.8 - 13.2 | 104          | 9       | 9.0           | 111               | 0.0               | 80                 | 20.0                                | 220                      | 300                        |
| MD112S-12xx  | 12            | 10.8 - 13.2 | 105          | 13      | 12.0          | 83                | 0.0               | 79                 | 20.0                                | 220                      | 300                        |
| MD112S-15xx  | 12            | 10.8 - 13.2 | 102          | 10      | 15.0          | 67                | 0.0               | 82                 | 20.0                                | 220                      | 300                        |
| MD112S-18xx  | 12            | 10.8 - 13.2 | 103          | 11      | 18.0          | 56                | 0.0               | 81                 | 20.0                                | 220                      | 300                        |
| MD112S-24xx  | 12            | 10.8 - 13.2 | 110          | 20      | 24.0          | 42                | 0.0               | 76                 | 20.0                                | 220                      | 300                        |
| MD112D-03xx  | 12            | 10.8 - 13.2 | 123          | 13      | ±3.3          | ±152              | ±0.0              | 68                 | 20.0                                | ±100                     | 300                        |
| MD112D-05xx  | 12            | 10.8 - 13.2 | 113          | 10      | ±5.0          | ±100              | ±0.0              | 74                 | 20.0                                | ±100                     | 300                        |
| MD112D-07xx  | 12            | 10.8 - 13.2 | 110          | 10      | ±7.2          | ±69               | ±0.0              | 76                 | 20.0                                | ±100                     | 300                        |
| MD112D-09xx  | 12            | 10.8 - 13.2 | 107          | 13      | ±9.0          | ±56               | ±0.0              | 78                 | 20.0                                | ±100                     | 300                        |
| MD112D-12xx  | 12            | 10.8 - 13.2 | 102          | 10      | ±12.0         | ±42               | ±0.0              | 82                 | 20.0                                | ±100                     | 300                        |
| MD112D-15xx  | 12            | 10.8 - 13.2 | 102          | 10      | ±15.0         | ±33               | ±0.0              | 82                 | 20.0                                | ±100                     | 300                        |
| MD112D-18xx  | 12            | 10.8 - 13.2 | 102          | 10      | ±18.0         | ±28               | ±0.0              | 82                 | 20.0                                | ±100                     | 300                        |
| MD112D-24xx  | 12            | 10.8 - 13.2 | 111          | 20      | ±24.0         | ±21               | ±0.0              | 75                 | 20.0                                | ±100                     | 300                        |
| MD115S-03xx  | 15            | 13.5 - 16.5 | 83           | 10      | 3.3           | 303               | 0.0               | 80                 | 20.0                                | 220                      | 200                        |
| MD115S-05xx  | 15            | 13.5 - 16.5 | 82           | 7       | 5.0           | 200               | 0.0               | 81                 | 20.0                                | 220                      | 200                        |
| MD115S-07xx  | 15            | 13.5 - 16.5 | 85           | 10      | 7.2           | 139               | 0.0               | 78                 | 20.0                                | 220                      | 200                        |
| MD115S-09xx  | 15            | 13.5 - 16.5 | 85           | 10      | 9.0           | 111               | 0.0               | 78                 | 20.0                                | 220                      | 200                        |
| MD115S-12xx  | 15            | 13.5 - 16.5 | 83           | 8       | 12.0          | 83                | 0.0               | 80                 | 20.0                                | 220                      | 200                        |
| MD115S-15xx  | 15            | 13.5 - 16.5 | 84           | 12      | 15.0          | 67                | 0.0               | 79                 | 20.0                                | 220                      | 200                        |
| MD115S-18xx  | 15            | 13.5 - 16.5 | 83           | 10      | 18.0          | 56                | 0.0               | 80                 | 20.0                                | 220                      | 200                        |
| MD115S-24xx  | 15            | 13.5 - 16.5 | 80           | 5       | 24.0          | 42                | 0.0               | 83                 | 20.0                                | 220                      | 200                        |
| MD115D-03xx  | 15            | 13.5 - 16.5 | 89           | 20      | ±3.3          | ±152              | ±0.0              | 75                 | 20.0                                | ±100                     | 200                        |
| MD115D-05xx  | 15            | 13.5 - 16.5 | 89           | 20      | ±5.0          | ±100              | ±0.0              | 75                 | 20.0                                | ±100                     | 200                        |
| MD115D-07xx  | 15            | 13.5 - 16.5 | 89           | 18      | ±7.2          | ±69               | ±0.0              | 75                 | 20.0                                | ±100                     | 200                        |
| MD115D-09xx  | 15            | 13.5 - 16.5 | 87           | 18      | ±9.0          | ±56               | ±0.0              | 77                 | 20.0                                | ±100                     | 200                        |
| MD115D-12xx  | 15            | 13.5 - 16.5 | 87           | 20      | ±12.0         | ±42               | ±0.0              | 77                 | 20.0                                | ±100                     | 200                        |
| MD115D-15xx  | 15            | 13.5 - 16.5 | 87           | 20      | ±15.0         | ±33               | ±0.0              | 77                 | 20.0                                | ±100                     | 200                        |
| MD115D-18xx  | 15            | 13.5 - 16.5 | 89           | 15      | ±18.0         | ±28               | ±0.0              | 75                 | 20.0                                | ±100                     | 200                        |
| MD115D-24xx  | 15            | 13.5 - 16.5 | 89           | 15      | ±24.0         | ±21               | ±0.0              | 75                 | 20.0                                | ±100                     | 200                        |

**I/O Isolation**

Models are available with input/output isolation levels ranging from 1 kVDC to 6 kVDC. To order units with higher isolation levels an "x" is added to the Model number, as shown in the table at right.

| Model No    | Isolation Level |
|-------------|-----------------|
| MD1xxx-xx   | 1 kVDC          |
| MD1xxx-xx1  | 3 kVDC          |
| MD1xxx-xx14 | 4 kVDC          |
| MD1xxx-xx15 | 5.2 kVDC        |
| MD1xxx-xx16 | 6 kVDC          |

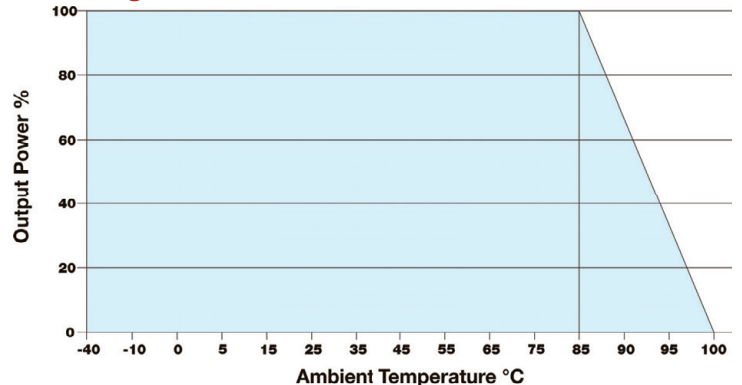


| Model Number | Input         |             |              |         | Output        |                   |                   | Efficiency (% Typ) | Reflected Ripple Current (mA Pk-Pk) | Capacitive Load (µF, Max) | Fuse Rating Slow-Blow (mA) |
|--------------|---------------|-------------|--------------|---------|---------------|-------------------|-------------------|--------------------|-------------------------------------|---------------------------|----------------------------|
|              | Voltage (VDC) |             | Current (mA) |         | Voltage (VDC) | Current (mA, Max) | Current (mA, Min) |                    |                                     |                           |                            |
|              | Nominal       | Range       | Full-Load    | No-Load |               |                   |                   |                    |                                     |                           |                            |
| MD124S-03xx  | 24            | 21.6 - 26.4 | 56           | 8       | 3.3           | 303               | 0.0               | 74                 | 20.0                                | 220                       | 100                        |
| MD124S-05xx  | 24            | 21.6 - 26.4 | 54           | 6       | 5.0           | 200               | 0.0               | 77                 | 20.0                                | 220                       | 100                        |
| MD124S-07xx  | 24            | 21.6 - 26.4 | 57           | 6       | 7.2           | 139               | 0.0               | 73                 | 20.0                                | 220                       | 100                        |
| MD124S-09xx  | 24            | 21.6 - 26.4 | 55           | 6       | 9.0           | 111               | 0.0               | 76                 | 20.0                                | 220                       | 100                        |
| MD124S-12xx  | 24            | 21.6 - 26.4 | 53           | 6       | 12.0          | 83                | 0.0               | 78                 | 20.0                                | 220                       | 100                        |
| MD124S-15xx  | 24            | 21.6 - 26.4 | 52           | 5       | 15.0          | 67                | 0.0               | 80                 | 20.0                                | 220                       | 100                        |
| MD124S-18xx  | 24            | 21.6 - 26.4 | 51           | 5       | 18.0          | 56                | 0.0               | 82                 | 20.0                                | 220                       | 100                        |
| MD124S-24xx  | 24            | 21.6 - 26.4 | 52           | 8       | 24.0          | 42                | 0.0               | 80                 | 20.0                                | 220                       | 100                        |
| MD124D-03xx  | 24            | 21.6 - 26.4 | 62           | 7       | ±3.3          | ±152              | ±0.0              | 67                 | 20.0                                | ±100                      | 100                        |
| MD124D-05xx  | 24            | 21.6 - 26.4 | 56           | 6       | ±5.0          | ±100              | ±0.0              | 74                 | 20.0                                | ±100                      | 100                        |
| MD124D-07xx  | 24            | 21.6 - 26.4 | 53           | 7       | ±7.2          | ±69               | ±0.0              | 78                 | 20.0                                | ±100                      | 100                        |
| MD124D-09xx  | 24            | 21.6 - 26.4 | 53           | 7       | ±9.0          | ±56               | ±0.0              | 78                 | 20.0                                | ±100                      | 100                        |
| MD124D-12xx  | 24            | 21.6 - 26.4 | 52           | 6       | ±12.0         | ±42               | ±0.0              | 80                 | 20.0                                | ±100                      | 100                        |
| MD124D-15xx  | 24            | 21.6 - 26.4 | 52           | 8       | ±15.0         | ±33               | ±0.0              | 80                 | 20.0                                | ±100                      | 100                        |
| MD124D-18xx  | 24            | 21.6 - 26.4 | 51           | 6       | ±18.0         | ±28               | ±0.0              | 81                 | 20.0                                | ±100                      | 100                        |
| MD124D-24xx  | 24            | 21.6 - 26.4 | 51           | 8       | ±24.0         | ±21               | ±0.0              | 82                 | 20.0                                | ±100                      | 100                        |
| MD148S-03xx  | 48            | 43.2 - 52.8 | 29           | 5       | 3.3           | 303               | 0.0               | 73                 | 20.0                                | 220                       | 75                         |
| MD148S-05xx  | 48            | 43.2 - 52.8 | 29           | 5       | 5.0           | 200               | 0.0               | 73                 | 20.0                                | 220                       | 75                         |
| MD148S-07xx  | 48            | 43.2 - 52.8 | 28           | 5       | 7.2           | 139               | 0.0               | 75                 | 20.0                                | 220                       | 75                         |
| MD148S-09xx  | 48            | 43.2 - 52.8 | 27           | 5       | 9.0           | 111               | 0.0               | 76                 | 20.0                                | 220                       | 75                         |
| MD148S-12xx  | 48            | 43.2 - 52.8 | 27           | 5       | 12.0          | 83                | 0.0               | 76                 | 20.0                                | 220                       | 75                         |
| MD148S-15xx  | 48            | 43.2 - 52.8 | 27           | 5       | 15.0          | 67                | 0.0               | 77                 | 20.0                                | 220                       | 75                         |
| MD148S-18xx  | 48            | 43.2 - 52.8 | 28           | 5       | 18.0          | 56                | 0.0               | 75                 | 20.0                                | 220                       | 75                         |
| MD148S-24xx  | 48            | 43.2 - 52.8 | 27           | 6       | 24.0          | 42                | 0.0               | 76                 | 20.0                                | 220                       | 75                         |
| MD148D-03xx  | 48            | 43.2 - 52.8 | 34           | 6       | ±3.3          | ±152              | ±0.0              | 62                 | 20.0                                | ±100                      | 75                         |
| MD148D-05xx  | 48            | 43.2 - 52.8 | 31           | 5       | ±5.0          | ±100              | ±0.0              | 68                 | 20.0                                | ±100                      | 75                         |
| MD148D-07xx  | 48            | 43.2 - 52.8 | 29           | 5       | ±7.2          | ±69               | ±0.0              | 72                 | 20.0                                | ±100                      | 75                         |
| MD148D-09xx  | 48            | 43.2 - 52.8 | 29           | 5       | ±9.0          | ±56               | ±0.0              | 73                 | 20.0                                | ±100                      | 75                         |
| MD148D-12xx  | 48            | 43.2 - 52.8 | 28           | 6       | ±12.0         | ±42               | ±0.0              | 74                 | 20.0                                | ±100                      | 75                         |
| MD148D-15xx  | 48            | 43.2 - 52.8 | 27           | 5       | ±15.0         | ±33               | ±0.0              | 77                 | 20.0                                | ±100                      | 75                         |
| MD148D-18xx  | 48            | 43.2 - 52.8 | 28           | 5       | ±18.0         | ±28               | ±0.0              | 75                 | 20.0                                | ±100                      | 75                         |
| MD148D-24xx  | 48            | 43.2 - 52.8 | 28           | 6       | ±24.0         | ±21               | ±0.0              | 74                 | 20.0                                | ±100                      | 75                         |

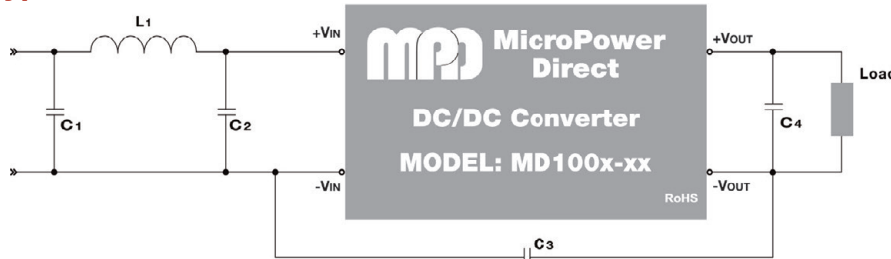
Notes:

1. Load regulation is measured over a range of 20% load to 100% load. Load regulation for 3.3 VDC output models is specified at ±20% typical.
2. Operation at no-load will not damage the unit, but they may not meet all specifications.
3. With the addition of input filter components, all models will meet EN 55022 class B. A suggested circuit is shown in the connection diagram below. Contact the factory for more information.
4. To meet the requirements of EN 61000-4-4 and EN 61000-4-5, external components are needed. The diagram below shows a typical connection. Contact the factory for more information.
5. It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection tables for the correct rating.

Derating Curve



Typical Connection



For applications that require meeting EMC standards, the diagram above illustrates a typical connection of the MD100x-xx series. The units do not require external components to operate as specified. All components should be mounted as close to the unit as possible.

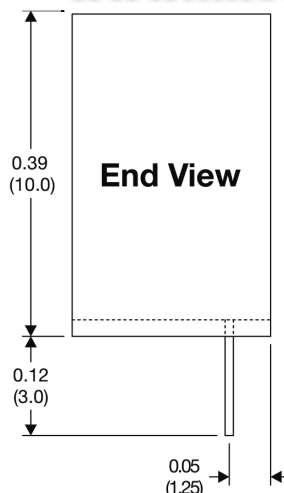
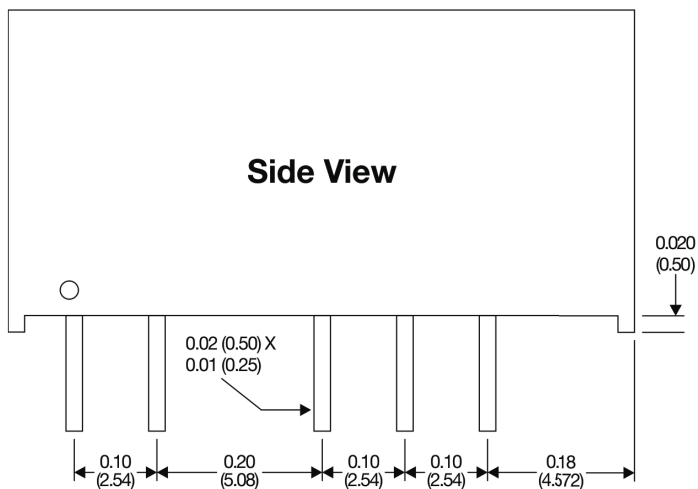
The voltage rating on capacitor C3 needs to be greater than the isolation voltage rating of the unit. To meet the requirements of EN 61000-4-4 and EN 61000-4-5, the value of capacitor C1 should be changed to 470 µF/100V.

Capacitor C4 is not required to meet specifications, but may be used if a lower level of output ripple is required.

Recommended values for components are:

| Component   | C1          | L1    | C2                | C3               | C4    |
|-------------|-------------|-------|-------------------|------------------|-------|
| MD103x-xxxx | 2.2 µF/100V | 18 µH |                   |                  | 10 µF |
| MD105x-xxxx | 2.2 µF/100V | 18 µH |                   |                  | 10 µF |
| MD112x-xxxx | 2.2 µF/100V | 18 µH |                   |                  | 10 µF |
| MD115x-xxxx | 2.2 µF/100V | 18 µH |                   |                  | 10 µF |
| MD124x-xxxx | 2.2 µF/100V | 18 µH | 1210, 2.2 µF/100V | 1206, 470 pF/2kV | 10 µF |
| MD148x-xxxx | 2.2 µF/100V | 18 µH | 1210, 2.2 µF/100V | 1206, 470 pF/2kV | 10 µF |

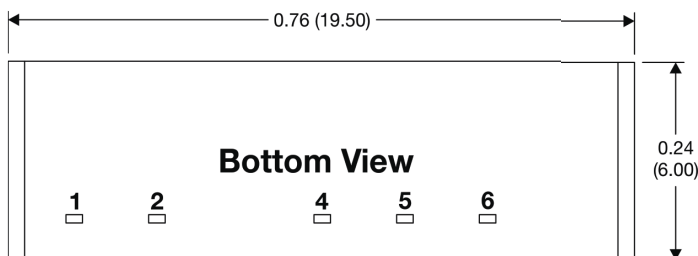
**Mechanical Dimensions, MD100X-xx Models**



**Pin Connections**

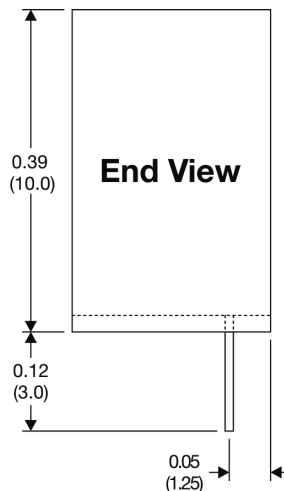
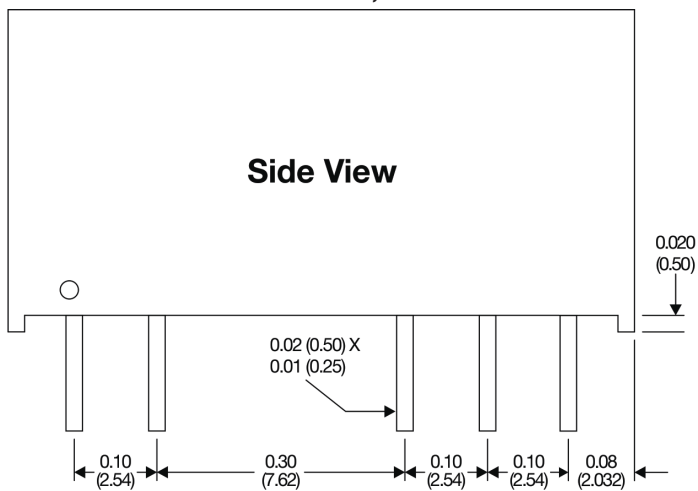
| Pin | Single Output |
|-----|---------------|
| 1   | +VIN          |
| 2   | -VIN          |
| 4   | -VOUT         |
| 5   | No Pin        |
| 6   | +VOUT         |

| Pin | Dual Output |
|-----|-------------|
| 1   | +VIN        |
| 2   | -VIN        |
| 4   | -VOUT       |
| 5   | Common      |
| 6   | +VOUT       |



The width of 48 VDC input units is 0.28 (7.20). All other dimensions remain the same.

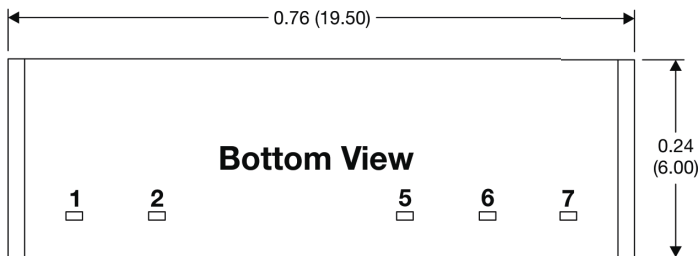
**Mechanical Dimensions, MD100X-xxlx Models**



**Pin Connections**

| Pin | Single Output |
|-----|---------------|
| 1   | +VIN          |
| 2   | -VIN          |
| 5   | -VOUT         |
| 6   | No Pin        |
| 7   | +VOUT         |

| Pin | Dual Output |
|-----|-------------|
| 1   | +VIN        |
| 2   | -VIN        |
| 5   | -VOUT       |
| 6   | Common      |
| 7   | +VOUT       |



The width of 48 VDC input units is 0.28 (7.20). All other dimensions remain the same.

**Notes:**

- All dimensions are typical in inches (mm)
- General Tolerance x.xx = ±0.02 (±0.5)
- Pin 1 is marked by a "dot" or indentation on the unit