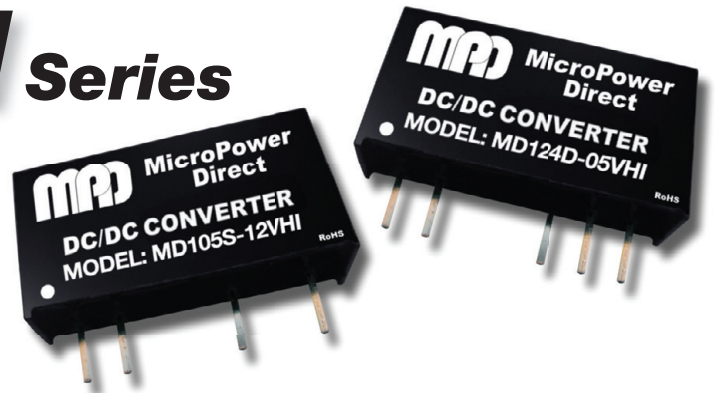


# MD100VHI Series

## Miniature 1W, SIP, Very High Isolation DC/DC Converters



### Key Features:

- 1W Output Power
- Miniature SIP Case
- 5,200 VDC Isolation
- Single & Dual Outputs
- >2.0 MHour MTBF
- -40°C to +85°C Operation
- Industry Standard Pin-Out

### 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 | 5 VDC Input        | 4.50  | 5.0  | 5.50  | VDC   |
|                     | 12 VDC Input       | 10.80 | 12.0 | 13.20 |       |
|                     | 15 VDC Input       | 13.50 | 15.0 | 16.50 |       |
|                     | 24 VDC Input       | 21.60 | 24.0 | 26.40 |       |
| Input Filter        | Internal Capacitor |       |      |       |       |

#### Output

| Parameter                           | Conditions                  | Min. | Typ.  | Max.  | Units    |
|-------------------------------------|-----------------------------|------|-------|-------|----------|
| Output Voltage Accuracy             |                             |      |       | ±5.0  | %        |
| Output Voltage Balance              | Dual Output, Balanced Loads |      | ±0.1  | ±1.0  | %        |
| Line Regulation                     | For $V_{IN}$ Change of 1%   |      | ±1.2  |       | %        |
| Load Regulation, See Note 1         | See Model Selection Guide   |      |       |       |          |
| Ripple & Noise (20 MHz), See Note 2 |                             |      |       | 100   | mV P - P |
| Temperature Coefficient             |                             |      | ±0.01 | ±0.02 | %/°C     |
| Output Short Circuit                | Momentary (0.5 Sec.)        |      |       |       |          |

#### General

| Parameter                      | Conditions  | Min.  | Typ. | Max. | Units |
|--------------------------------|-------------|-------|------|------|-------|
| Isolation Voltage              | 60 Seconds  | 5,200 |      |      | VDC   |
| Isolation Resistance           | 500 VDC     | 10    |      |      | GΩ    |
| Isolation Capacitance          | 100 kHz, 1V |       | 7    |      | pF    |
| Common Mode Transient Immunity |             | 15    |      |      | kV/μS |
| Switching Frequency            |             |       | 100  |      | kHz   |

#### Environmental

| Parameter                   | Conditions          | Min. | Typ. | Max. | Units |
|-----------------------------|---------------------|------|------|------|-------|
| Operating Temperature Range | Ambient             | -40  | +25  | +85  | °C    |
| Operating Temperature Range | Case                |      |      | +100 | °C    |
| Storage Temperature Range   |                     | -55  |      | +125 | °C    |
| Cooling, See Note 3         | Free Air Convection |      |      |      |       |
| Humidity                    | RH, Non-condensing  |      |      | 95   | %     |

#### Physical

|               |  |  |  |  |  |
|---------------|--|--|--|--|--|
| Case Size     | See Mechanical Drawing (Page 2)        |  |  |  |  |
| Case Material | Non-Conductive Black Plastic (UL-94V0) |  |  |  |  |
| Weight        | 0.076 Oz (2.4g)                        |  |  |  |  |

#### Reliability Specifications

| Parameter | Conditions                      | Min. | Typ. | Max. | Units  |
|-----------|---------------------------------|------|------|------|--------|
| MTBF      | MIL HDBK 217F, 25°C, Gnd Benign | 2.0  |      |      | MHours |

#### Absolute Maximum Ratings

| Parameter                   | Conditions                  | Min. | Typ. | Max. | Units |
|-----------------------------|-----------------------------|------|------|------|-------|
| Input Voltage Surge (1 Sec) | 5 VDC Input                 | -0.7 |      | 9.0  | VDC   |
|                             | 12 VDC Input                | -0.7 |      | 18.0 |       |
|                             | 15 VDC Input                | -0.7 |      | 20.0 |       |
|                             | 24 VDC Input                | -0.7 |      | 30.0 |       |
| 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.

RoHS



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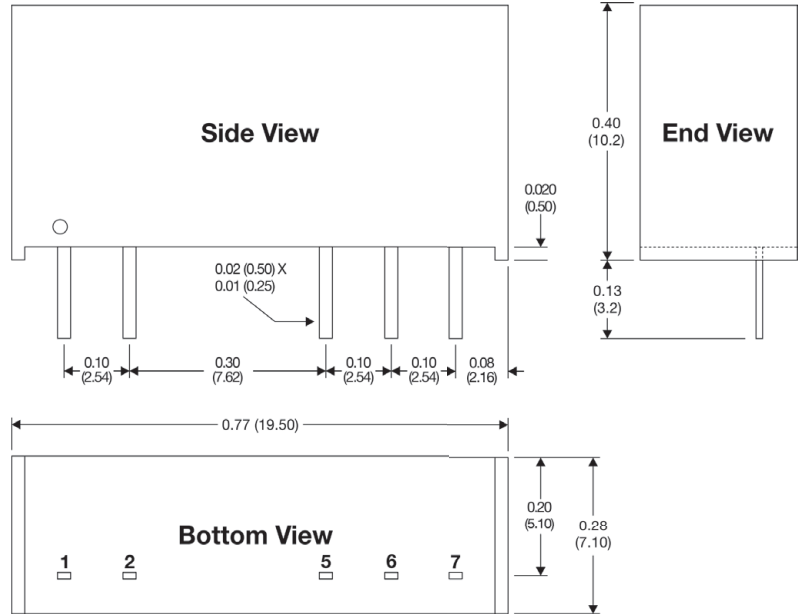


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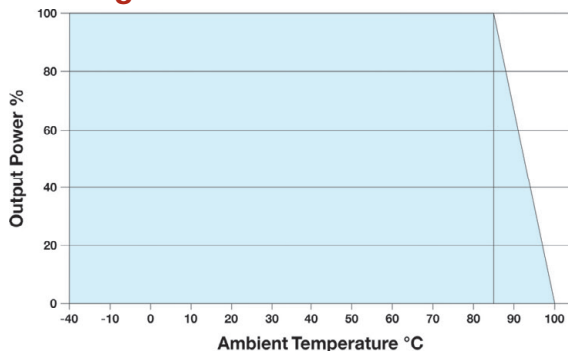
| Model Number | Input         |             |              |         | Output        |                   | Load Regulation (% Typ) | Output Capacitive Load (µF Max) | Efficiency (% Typ) | Fuse Rating Slow-Blow (mA) |
|--------------|---------------|-------------|--------------|---------|---------------|-------------------|-------------------------|---------------------------------|--------------------|----------------------------|
|              | Voltage (VDC) |             | Current (mA) |         | Voltage (VDC) | Current (mA, Max) |                         |                                 |                    |                            |
|              | Nominal       | Range       | Full-Load    | No-Load |               |                   |                         |                                 |                    |                            |
| MD105S-03VHI | 5             | 4.5 - 5.5   | 286          | 35      | 3.3           | 303               | 20.0                    | 1,000                           | 70                 | 600                        |
| MD105S-05VHI | 5             | 4.5 - 5.5   | 286          | 35      | 5.0           | 200               | 15.0                    | 470                             | 70                 | 600                        |
| MD105S-09VHI | 5             | 4.5 - 5.5   | 266          | 35      | 9.0           | 111               | 10.0                    | 470                             | 75                 | 600                        |
| MD105S-12VHI | 5             | 4.5 - 5.5   | 261          | 35      | 12.0          | 84                | 10.0                    | 220                             | 77                 | 600                        |
| MD105S-15VHI | 5             | 4.5 - 5.5   | 254          | 35      | 15.0          | 66                | 10.0                    | 220                             | 78                 | 600                        |
| MD105D-05VHI | 5             | 4.5 - 5.5   | 282          | 35      | ±5.0          | ±100              | 15.0                    | ±220                            | 71                 | 600                        |
| MD105D-09VHI | 5             | 4.5 - 5.5   | 269          | 35      | ±9.0          | ±56               | 10.0                    | ±220                            | 75                 | 600                        |
| MD105D-12VHI | 5             | 4.5 - 5.5   | 262          | 35      | ±12.0         | ±42               | 10.0                    | ±100                            | 77                 | 600                        |
| MD105D-15VHI | 5             | 4.5 - 5.5   | 254          | 35      | ±15.0         | ±33               | 10.0                    | ±100                            | 78                 | 600                        |
| MD112S-03VHI | 12            | 10.8 - 13.2 | 117          | 17      | 3.3           | 303               | 20.0                    | 1,000                           | 71                 | 250                        |
| MD112S-05VHI | 12            | 10.8 - 13.2 | 117          | 17      | 5.0           | 200               | 15.0                    | 470                             | 71                 | 250                        |
| MD112S-09VHI | 12            | 10.8 - 13.2 | 110          | 17      | 9.0           | 111               | 10.0                    | 470                             | 76                 | 250                        |
| MD112S-12VHI | 12            | 10.8 - 13.2 | 108          | 17      | 12.0          | 84                | 10.0                    | 220                             | 78                 | 250                        |
| MD112S-15VHI | 12            | 10.8 - 13.2 | 104          | 17      | 15.0          | 66                | 10.0                    | 220                             | 79                 | 250                        |
| MD112D-05VHI | 12            | 10.8 - 13.2 | 116          | 17      | ±5.0          | ±100              | 15.0                    | ±220                            | 72                 | 250                        |
| MD112D-09VHI | 12            | 10.8 - 13.2 | 111          | 17      | ±9.0          | ±56               | 10.0                    | ±220                            | 76                 | 250                        |
| MD112D-12VHI | 12            | 10.8 - 13.2 | 108          | 17      | ±12.0         | ±42               | 10.0                    | ±100                            | 78                 | 250                        |
| MD112D-15VHI | 12            | 10.8 - 13.2 | 104          | 17      | ±15.0         | ±33               | 10.0                    | ±100                            | 79                 | 250                        |
| MD115S-03VHI | 15            | 13.5 - 16.5 | 95           | 16      | 3.3           | 303               | 20.0                    | 1,000                           | 70                 | 200                        |
| MD115S-05VHI | 15            | 13.5 - 16.5 | 95           | 16      | 5.0           | 200               | 15.0                    | 470                             | 70                 | 200                        |
| MD115S-09VHI | 15            | 13.5 - 16.5 | 89           | 16      | 9.0           | 111               | 10.0                    | 470                             | 75                 | 200                        |
| MD115S-12VHI | 15            | 13.5 - 16.5 | 90           | 16      | 12.0          | 84                | 10.0                    | 220                             | 75                 | 200                        |
| MD115S-15VHI | 15            | 13.5 - 16.5 | 84           | 16      | 15.0          | 66                | 10.0                    | 220                             | 79                 | 200                        |
| MD115D-05VHI | 15            | 13.5 - 16.5 | 94           | 16      | ±5.0          | ±100              | 15.0                    | ±220                            | 71                 | 200                        |
| MD115D-09VHI | 15            | 13.5 - 16.5 | 90           | 16      | ±9.0          | ±56               | 10.0                    | ±220                            | 75                 | 200                        |
| MD115D-12VHI | 15            | 13.5 - 16.5 | 86           | 16      | ±12.0         | ±42               | 10.0                    | ±100                            | 78                 | 200                        |
| MD115D-15VHI | 15            | 13.5 - 16.5 | 84           | 16      | ±15.0         | ±33               | 10.0                    | ±100                            | 79                 | 200                        |
| MD124S-03VHI | 24            | 21.6 - 26.4 | 60           | 12      | 3.3           | 303               | 20.0                    | 1,000                           | 70                 | 125                        |
| MD124S-05VHI | 24            | 21.6 - 26.4 | 60           | 12      | 5.0           | 200               | 15.0                    | 470                             | 70                 | 125                        |
| MD124S-09VHI | 24            | 21.6 - 26.4 | 56           | 12      | 9.0           | 111               | 10.0                    | 470                             | 75                 | 125                        |
| MD124S-12VHI | 24            | 21.6 - 26.4 | 53           | 12      | 12.0          | 84                | 10.0                    | 220                             | 78                 | 125                        |
| MD124S-15VHI | 24            | 21.6 - 26.4 | 52           | 12      | 15.0          | 66                | 10.0                    | 220                             | 80                 | 125                        |
| MD124D-05VHI | 24            | 21.6 - 26.4 | 59           | 12      | ±5.0          | ±100              | 15.0                    | ±220                            | 71                 | 125                        |
| MD124D-09VHI | 24            | 21.6 - 26.4 | 56           | 12      | ±9.0          | ±56               | 10.0                    | ±220                            | 75                 | 125                        |
| MD124D-12VHI | 24            | 21.6 - 26.4 | 55           | 12      | ±12.0         | ±42               | 10.0                    | ±100                            | 77                 | 125                        |
| MD124D-15VHI | 24            | 21.6 - 26.4 | 53           | 12      | ±15.0         | ±33               | 10.0                    | ±100                            | 78                 | 125                        |

- Notes:
- Output load regulation is specified for a load change of 20% to 100%.
  - When measuring output ripple & noise, it is recommended that an external ceramic capacitor (0.33 µF typ.) be placed from the +Vout to the -Vout pins for single output units and from each output to common for dual output models.
  - Free air convection is typically 20 LFM. The units should not be operated in still air (0 LFM).
  - Operation at no load will not damage these units, however, they may not meet all specifications.
  - It is recommended that a fuse be used on the input of a power supply for protection. See the table above for the correct rating.

Mechanical Dimensions



Derating Curve



Pin Connections

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

- Notes:
- All dimensions are typical in inches (mm)
  - Tolerance x.xx = ±0.01 (±0.25)
  - Pin 1 is marked by a "dot" or indentation on the unit



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