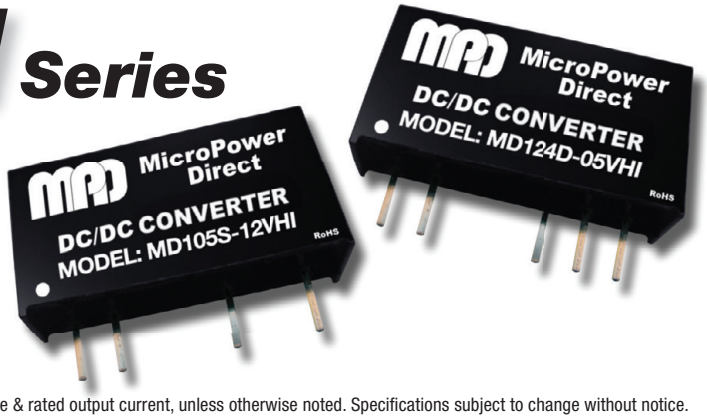
# MD100VHI Series

# 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

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 | 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 VIN 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.


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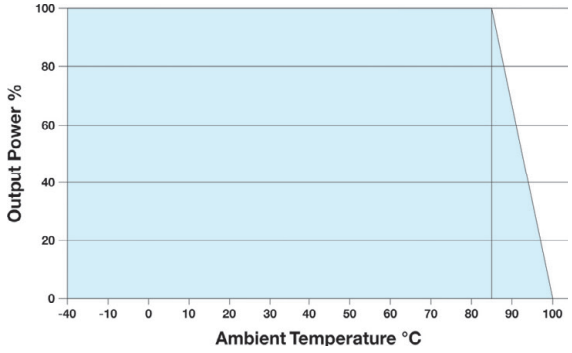
## Model Selection Guide



| 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:
1. Output load regulation is specified for a load change of 20% to 100%.
2. 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.
3. Free air convection is typically 20 LFM. The units should not be operated in still air (0 LFM).
4. Operation at no load will not damage these units, however, they may not meet all specifications.
5. 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.

## Derating Curve

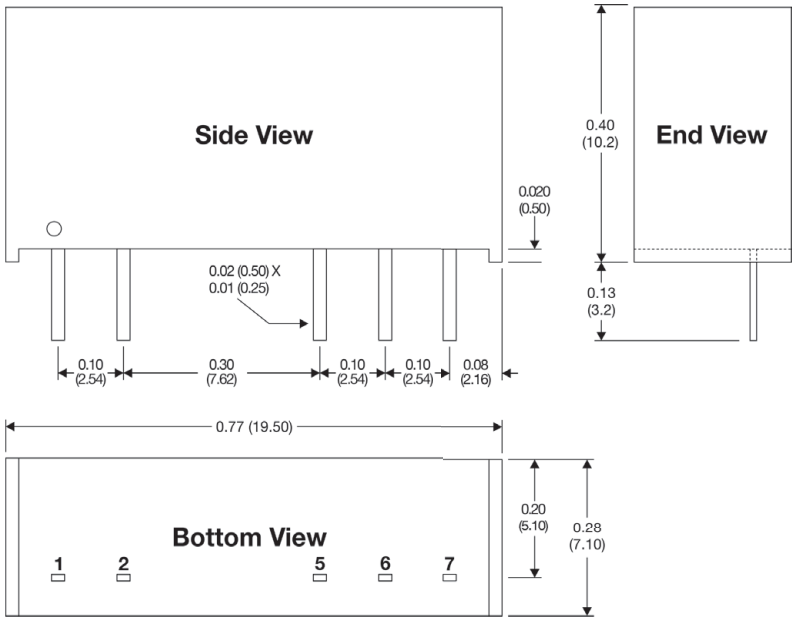



## Pin Connections

| Pin | Single | Dual |
|---|---|---|
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 5 | -Vout | -Vout |

| Pin | Single | Dual |
|---|---|---|
| 6 | No Pin | Common |
| 7 | +Vout | +Vout |

## Mechanical Dimensions




**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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