**DC-DC CONVERTER 8W**, Regulated Output, SIP Package

NEW

## FEATURES

- Smallest Encapsulated 8W Converter
- Industrial Standard SIP-8 Package
- Ultra-wide 4 : 1 Input Voltage Range
- Fully Regulated Output Voltage
- I/O Isolation 1500 VDC
- Wide Operating Temperature Range
- No Min. Load Requirement
- Very Low No Load Power Consumption
- Under-voltage, Overload and Short Circuit Protection
- Remote On/Off Control
- UL/cUL/IEC/EN 62368-1 Safety Approval

c UL us UL 62368-1 CB Scheme

## PRODUCT OVERVIEW

The MCWI08 series is a compact 8W isolated DC-DC converter designed in a high-density SIP-8 package, delivering a power density of 52W/in³. It features an ultra-wide 4:1 input voltage range with models supporting 4.5–18VDC, 9–36VDC, or 18–75VDC, offering design flexibility across various industrial and embedded applications.

The series provides precisely regulated output voltages of 5V, 12V, 15V, 24V, ±12V, and ±15V, with 1500VDC input-to-output isolation ensuring robust performance in demanding environments. Operation is supported over an extended temperature range with no minimum load requirement and ultra-low no-load and standby power consumption for high efficiency in energy-sensitive systems.

Integrated protection features include under Voltage Shutdown, output overload, and continuous short-circuit protection. A remote on/off control function enables flexible system-level power management.

Certified to UL/cUL/IEC/EN 62368-1 safety standards, the MCWI08 series is ideal for space-constrained industrial, control, and embedded system designs requiring reliable and efficient DC-DC power conversion.

### Model Selection Guide

| Model Number | Input Voltage (Range) | Output Voltage | Output Current | Input Current | | Max. capacitive Load | Efficiency (typ.) |
|---|---|---|---|---|---|---|---|
| | | | Max. | @Max. Load | @No Load | | @Max. Load |
| | VDC | VDC | mA | mA(typ.) | mA(typ.) | µF | % |
| **MCWI08-12S05** | 12 (4.5 ~ 18) | 5 | 1600 | 758 | 20 | 3300 | 88 |
| **MCWI08-12S12** | | 12 | 665 | 756 | | 560 | 88 |
| **MCWI08-12S15** | | 15 | 535 | 760 | | 390 | 88 |
| **MCWI08-12S24** | | 24 | 335 | 761 | | 150 | 88 |
| **MCWI08-12D12** | | ±12 | ±335 | 761 | | 330# | 88 |
| **MCWI08-12D15** | | ±15 | ±265 | 753 | | 180# | 88 |
| **MCWI08-24S05** | 24 (9 ~ 36) | 5 | 1600 | 379 | 10 | 3300 | 88 |
| **MCWI08-24S12** | | 12 | 665 | 378 | | 560 | 88 |
| **MCWI08-24S15** | | 15 | 535 | 380 | | 390 | 88 |
| **MCWI08-24S24** | | 24 | 335 | 381 | | 150 | 88 |
| **MCWI08-24D12** | | ±12 | ±335 | 381 | | 330# | 88 |
| **MCWI08-24D15** | | ±15 | ±265 | 376 | | 180# | 88 |
| **MCWI08-48S05** | 48 (18 ~ 75) | 5 | 1600 | 189 | 8 | 3300 | 88 |
| **MCWI08-48S12** | | 12 | 665 | 189 | | 560 | 88 |
| **MCWI08-48S15** | | 15 | 535 | 190 | | 390 | 88 |
| **MCWI08-48S24** | | 24 | 335 | 190 | | 150 | 88 |
| **MCWI08-48D12** | | ±12 | ±335 | 190 | | 330# | 88 |
| **MCWI08-48D15** | | ±15 | ±265 | 188 | | 180# | 88 |

# For each output

## Input Specifications

| Parameter | Conditions / Model | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Input Surge Voltage (1 sec. max.) | 12V Input Models | -0.7 | --- | 25 | VDC |
| | 24V Input Models | -0.7 | --- | 50 | |
| | 48V Input Models | -0.7 | --- | 100 | |
| Start-Up Threshold Voltage | 12V Input Models | --- | --- | 4.5 | |
| | 24V Input Models | --- | --- | 9 | |
| | 48V Input Models | --- | --- | 18 | |
| Under Voltage Shutdown | 12V Input Models | --- | 4 | --- | |
| | 24V Input Models | --- | 8 | --- | |
| | 48V Input Models | --- | 16 | --- | |
| Start Up Time (Power On) | Nominal Vin and Constant Resistive Load | --- | 30 | --- | ms |
| Input Filter | All Models | Internal Capacitor | | | |

## Remote On/Off Control

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Converter On | 3.5V ~ 12V or Open Circuit | | | | |
| Converter Off | 0V ~ 1.2V or Short Circuit | | | | |
| Control Input Current (on) | Vctrl = 5.0V | --- | --- | 0.5 | mA |
| Control Input Current (off) | Vctrl = 0V | --- | --- | -0.5 | mA |
| Control Common | Referenced to Negative Input | | | | |
| Standby Input Current | Nominal Vin | --- | 2.5 | --- | mA |

## Output Specifications

| Parameter | Conditions / Model | | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage Setting Accuracy | | | | --- | --- | ±1.0 | %Vnom. |
| Output Voltage Balance | Dual Output, Balanced Loads | | | --- | ±1.0 | ±2.0 | % |
| Line Regulation | Vin=Min. to Max. @Full Load | | | --- | ±0.2 | ±0.8 | % |
| Load Regulation | Io=0% to 100% | | | --- | --- | ±1.0 | % |
| Load Cross Regulation (Dual Output Models) | Asymmetrical Load 25/100% Full Load | | | --- | --- | ±5.0 | % |
| Minimum Load | No minimum Load Requirement | | | | | | |
| Ripple & Noise | 0-20 MHz Bandwidth | 5V Output | Measured with a 1μF/50V MLCC | --- | 80 | 100 | mV P-P |
| | | Other Output | | --- | 100 | 140 | mV P-P |
| Transient Recovery Time | 25% Load Step Change(2) | | | --- | --- | 500 | μs |
| Transient Response Deviation | | | | --- | ±3 | ±5 | % |
| Temperature Coefficient | | | | --- | ±0.01 | ±0.02 | %/°C |
| Over Load Protection | Hiccup | | | 110 | --- | 180 | % |
| Overshoot | | | | --- | --- | 5 | % |
| Short Circuit Protection | Continuous, Automatic Recovery (Hiccup Mode 1 Hz typ.) | | | | | | |

## General Specifications

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| I/O Isolation Voltage | 60 Seconds | 1500 | --- | --- | VDC |
| | 1 Second | 1800 | --- | --- | VDC |
| I/O Isolation Resistance | 500 VDC | 1000 | --- | --- | MΩ |
| I/O Isolation Capacitance | 100kHz, 1V | --- | --- | 1500 | pF |
| Switching Frequency | | --- | 350 | --- | kHz |
| MTBF (calculated) | MIL-HDBK-217F@25°C, Ground Benign | 2,001,209 | --- | --- | Hours |
| Safety Approvals | UL/cUL 62368-1 recognition (UL certificate), IEC/EN 62368-1 (CB-report) | | | | |

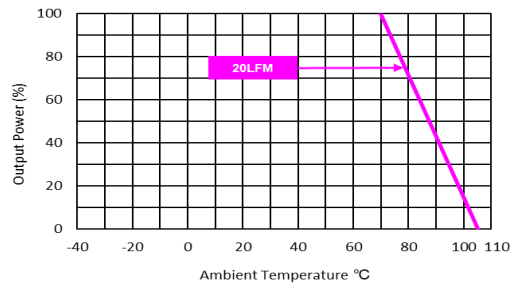
## EMC Specifications

| Parameter | Standards & Level | | | Performance |
|---|---|---|---|---|
| $EMI_{(6)}$ | Conduction | EN 55032 | With external components | Class A |
| | Radiation | | | |
| $EMS_{(6)}$ | EN 55035 | | | |
| | ESD | Direct discharge | Indirect discharge HCP & VCP | A |
| | | EN 61000-4-2 Air ± 8kV | Contact ± 6kV | |
| | Radiated immunity | EN 61000-4-3 10V/m | | A |
| | Fast transient | EN 61000-4-4 ±2kV | | A |
| | Surge | EN 61000-4-5 ±2kV | | A |
| | Conducted immunity | EN 61000-4-6 10Vrms | | A |
| | PFMF | EN 61000-4-8 100A/m for Continuous; 1000 A/m for 1 s | | A |

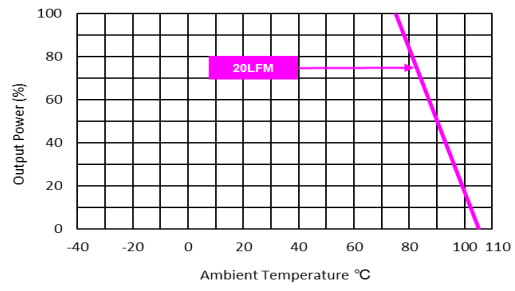
## Environmental Specifications

| Parameter | Model | Min. | Max. | Unit |
|---|---|---|---|---|
| Operating Ambient Temperature Range<br>Nominal Vin, Load 100% Inom.<br>(for Power Derating see relative Derating Curves) | 5V Output | -40 | +70 | ℃ |
| | Other Output | | +75 | |
| Case Temperature | | --- | +105 | ℃ |
| Storage Temperature Range | | -50 | +125 | ℃ |
| Humidity (non condensing) | | --- | 95 | % rel. H |
| Lead Temperature (1.5mm from case for 10Sec.) | | --- | 260 | ℃ |

## Power Derating Curve




5V Output Models



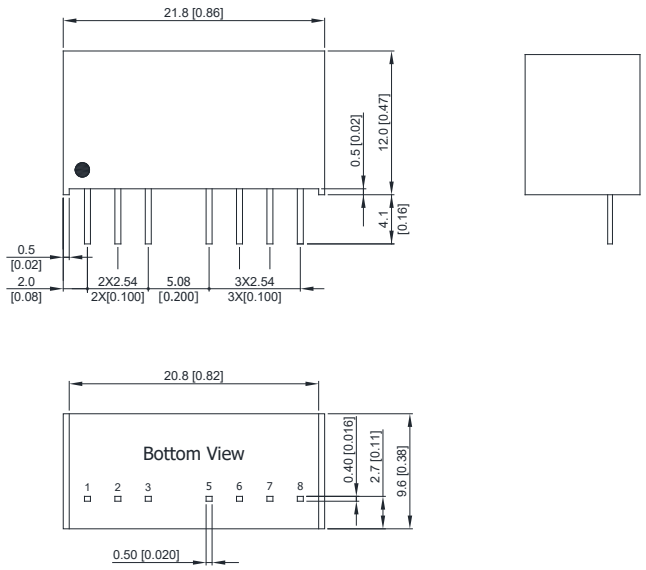

Other Output Models

## Notes

1. Specifications typical at Ta=+25℃, resistive load, nominal input voltage and rated output current unless otherwise noted.
2. Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%.
3. We recommend to protect the converter by a slow blow fuse in the input supply line.
4. Other input and output voltage may be available, please contact MINMAX.
5. It is necessary to parallel a capacitor across the input pins under hot-swap operation. Minimum Capacitance: 68μF/ 100V KZE.
6. The external components might be required to meet EMI/EMS standard for some of test items. Please contact MINMAX for the solution in detail.
7. Specifications are subject to change without notice.
8. The repeated high voltage isolation testing of the converter can degrade isolation capability, to a lesser or greater degree depending on materials, construction, environment and reflow solder process. Any material is susceptible to eventual chemical degradation when subject to very high applied voltages thus implying that the number of tests should be strictly limited. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage. Furthermore, the high voltage isolation capability after reflow solder process should be evaluated as it is applied on system.

## Package Specifications

Mechanical Dimensions







Pin Connections

| Pin | Single Output | Dual Output |
|---|---|---|
| 1 | -Vin | -Vin |
| 2 | +Vin | +Vin |
| 3 | Remote On/Off | Remote On/Off |
| 5 | NC | NC |
| 6 | +Vout | +Vout |
| 7 | -Vout | Common |
| 8 | NC | -Vout |

NC: No Connection

- All dimensions in mm (inches)
- Tolerance: X.X±0.5 (X.XX±0.02)
  X.XX±0.25 (X.XXX±0.010)
- Pins ±0.1(±0.004)

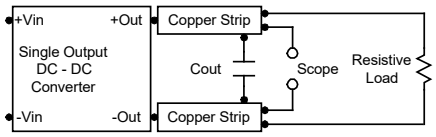
## Physical Characteristics

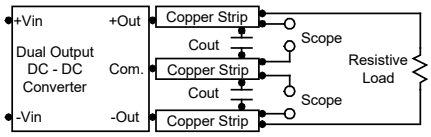
| | | |
|---|---|---|
| Case Size | : | 21.8x9.6x12.0 mm (0.86x0.38x0.47 inches) |
| Case Material | : | Plastic resin (flammability to UL 94V-0 rated) |
| Pin Material | : | Phosphor Bronze |
| Weight | : | 7g |

## Test Setup

### Peak-to-Peak Output Noise Measurement Test

Use a Cout 1μF ceramic capacitor. Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20 MHz. Position the load between 50 mm and 75 mm from the DC-DC Converter.




## Technical Notes

### Remote On/Off

Positive logic remote on/off turns the module on during a logic high voltage on the remote on/off pin, and off during a logic low. To turn the power module on and off, the user must supply a switch to control the voltage between the on/off terminal and the -Vin terminal. The switch can be an open collector or equivalent.
A logic high is 3.5V to 12V. A logic low is 0V to 1.2 V. The maximum sink current at on/off terminal during a logic low is -500μA. The maximum allowable leakage current of the switch at on/off terminal (0V to 1.2 V) is 500μA.

### Maximum Capacitive Load

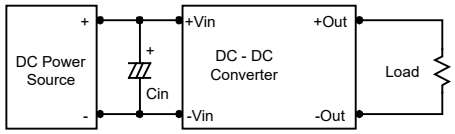
The MCWI08 series has limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. The maximum capacitance can be found in the data sheet.

### Overcurrent Protection

To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specified range.

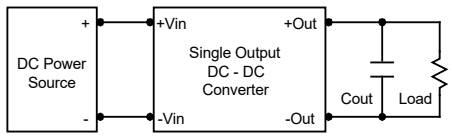
### Input Source Impedance

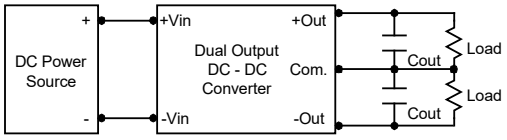
The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.
Capacitor mounted close to the power module helps ensure stability of the unit, it is commended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100 kHz) capacitor of a 68μF for the 12V, 24V and 48V input devices.

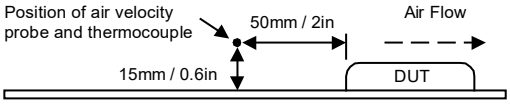



### Output Ripple Reduction

A good quality low ESR capacitor placed as close as practicable across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 1μF capacitors at the output.




### Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 105°C. The derating curves are determined from measurements obtained in a test setup.