

**FEATURES**

- ▶ Smallest Encapsulated 8W Converter
- ▶ Industrial Standard DIP-16 Package
- ▶ Ultra-wide 4:1 Input Voltage Range
- ▶ Fully Regulated Output Voltage
- ▶ I/O Isolation 1500VDC
- ▶ Operating Ambient Temp. Range -40°C to +80°C
- ▶ Low No Load Power Consumption
- ▶ No Min. Load Requirement
- ▶ Overload and Short Circuit Protection
- ▶ Shielded Metal Case with Insulated Baseplate
- ▶ Designed-in Conducted EMI meets EN55032/22 Class A & FCC Level A
- ▶ UL/cUL/IEC/EN 62368-1 (60950-1) Safety Approval & CE Marking



**PRODUCT OVERVIEW**

The MINMAX MDWI08 Series is the latest generation of high performance dc-dc converter modules setting a new standard concerning power density. The product offers a full 8W isolated dc-dc converter within an encapsulated DIP-16 package which occupied only 0.5in<sup>2</sup> of PCB space. There are 14 models available for 24 & 48VDC with ultra-wide 4:1 input voltage range. Further features included overload protection, short circuit protection, low no load power consumption and no min. load requirement as well. An high efficiency allows operating temperatures range of -40°C to 80°C. These DC-DC Converters offer an economical solution for many cost critical application in battery-powered equipment, instrumentation, distributed power architectures in communication, industrial electronics, energy facilities and many other critical applications where PCB space is limited.

**Model Selection Guide**

Model Number	Input Voltage (Range)	Output Voltage	Output Current	Input Current		Max. capacitive Load	Efficiency (typ.)
				Max.	@No Load		
	VDC	VDC	mA	mA(typ.)	mA(typ.)	μF	%
MDWI08-24S033	24 (9 ~ 36)	3.3	2000	353	10	680	78
MDWI08-24S05		5	1600	407		680	82
MDWI08-24S12		12	665	391		330	85
MDWI08-24S15		15	535	393		330	85
MDWI08-24S24		24	335	390		150	86
MDWI08-24D12		±12	±335	394		150#	85
MDWI08-24D15		±15	±265	385		150#	86
MDWI08-48S033		48 (18 ~ 75)	3.3	2000		176	8
MDWI08-48S05	5		1600	206	680	81	
MDWI08-48S12	12		665	196	330	85	
MDWI08-48S15	15		535	197	330	85	
MDWI08-48S24	24		335	195	150	86	
MDWI08-48D12	±12		±335	195	150#	86	
MDWI08-48D15	±15		±265	193	150#	86	

# For each output

**Input Specifications**

Parameter	Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	24V Input Models	-0.7	---	50	VDC
	48V Input Models	-0.7	---	100	
Start-Up Threshold Voltage	24V Input Models	---	---	9	
	48V Input Models	---	---	18	
Under Voltage Shutdown	24V Input Models	---	8	---	
	48V Input Models	---	16	---	
Input Filter	All Models	Internal Pi Type			

**Output Specifications**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Setting Accuracy		---	---	±2.0	%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%	---	±0.5	±1.0	%
Minimum Load	No minimum Load Requirement				
Ripple & Noise	0-20 MHz Bandwidth	---	---	55	mV <sub>P-P</sub>
Transient Recovery Time	25% Load Step Change	---	---	500	μsec
Transient Response Deviation		---	±3	±5	%
Temperature Coefficient		---	±0.01	±0.02	%/°C
Over Load Protection	Hiccup	---	150	---	%
Short Circuit Protection	Hiccup Mode 0.3 Hz typ., Automatic Recovery				

**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	---	500	---	pF
Switching Frequency		---	370	---	kHz
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	2,358,263	---	---	Hours
Safety Approvals	UL/cUL 60950-1 recognition (UL certificate), IEC/EN 60950-1(CB-report)				
	UL/cUL 62368-1 recognition (UL certificate), IEC/EN 62368-1(CB-report)				

**Environmental Specifications**

Parameter	Conditions	Min.	Max.	Unit
Operating Ambient Temperature Range (See Power Derating Curve)	Natural Convection	-40	+80	°C
Case Temperature		---	+105	°C
Storage Temperature Range		-50	+125	°C
Humidity (non condensing)		---	95	% rel. H
Cooling	Natural Convection			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	°C

**EMC Specifications**

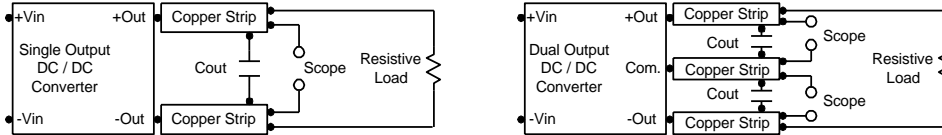
Parameter	Standards & Level		Performance
EMI	Conduction	EN55032, EN55022, FCC part 15	Class A
	EN55024		
EMS	ESD	EN61000-4-2 Air ± 8kV , Contact ± 6kV	A
	Radiated immunity	EN61000-4-3 20V/m	A
	Fast transient (e)	EN61000-4-4 ±2kV	A
	Surge (e)	EN61000-4-5 ±1kV	A
	Conducted immunity	EN61000-4-6 10Vrms	A
	PFMF	EN61000-4-8 100A/m, 1000A/m(1sec.)	A



### Test Setup

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

Use a Cout 0.47 $\mu$ F 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.



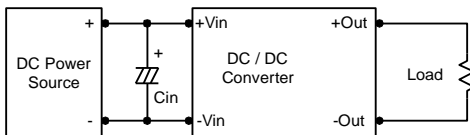
### Technical Notes

#### Overload 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.

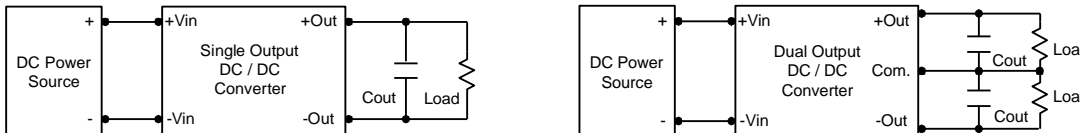
#### Input Source Impedance

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 recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0 $\Omega$  at 100 KHz) capacitor of a 2.2 $\mu$ F for the 24V and 48V 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 3.3 $\mu$ F capacitors at the output.



#### Maximum Capacitive Load

The MDWI08 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.

#### 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.

