

FEATURES

- ▶ Smallest Encapsulated 15W Converter
- ▶ Industrial Standard DIP-16 Package
- ▶ Ultra-wide 4:1 Input Voltage Range
- ▶ Fully Regulated Output Voltage
- ▶ I/O Isolation 1500 VDC
- ▶ Operating Ambient Temp. Range -40°C to +85°C
- ▶ Low No Load Power Consumption
- ▶ No Min. Load Requirement
- ▶ Under-voltage, Overload and Short Circuit Protection
- ▶ Shielded Metal Case with Insulated Baseplate
- ▶ Conducted EMI EN 55032 Class A Approved
- ▶ UL/cUL/IEC/EN 62368-1 Safety Approval & CE Marking

NEW

 UL 62368-1 CB Scheme
**PRODUCT OVERVIEW**

The MDWI15 series gives designers the flexibility to match the choice of converter to specific application requirements. The high power density of MDWI15 series, at 74W/in³, is expected to make it popular with manufacturers of industrial, transportation and renewable energy equipment where space-constrained is critical. This product offers a full 15Watt isolated DC-DC converter within a small encapsulated DIP-16 package which occupied only 0.5in² of PCB space. There are 14 models available for 24 & 48VDC with ultra-wide 4:1 input voltage range. Further features included under-voltage protection, overload protection, short circuit protection, very low no load power consumption, no min. load requirement and conducted EMI class A approved as well. High efficiency allows operating temperatures range of -40°C to 85°C. All models have been qualified per the CB scheme with safety approvals to UL/cUL/IEC/EN 62368-1.

Model Selection Guide

Model Number	Input Voltage (Range) VDC	Output Voltage VDC	Output Current Max. mA	Input Current		Max. capacitive Load μF	Efficiency (typ.) @Max. Load %
				@Max. Load mA(typ.)	@No Load mA(typ.)		
MDWI15-24S051	24 (9 ~ 36)	5.1	2940	726	10	1800	86
MDWI15-24S12		12	1250	718		820	87
MDWI15-24S15		15	1000	718		820	87
MDWI15-24S24		24	625	718		270	87
MDWI15-24D12		±12	±625	718		#560	87
MDWI15-24D15		±15	±500	718		#270	87
MDWI15-48S051	48 (18 ~ 75)	5.1	2940	363	7	1800	86
MDWI15-48S12		12	1250	359		820	87
MDWI15-48S15		15	1000	359		820	87
MDWI15-48S24		24	625	359		270	87
MDWI15-48D12		±12	±625	359		#560	87
MDWI15-48D15		±15	±500	359		#270	87

For each output

Input Specifications

Parameter	Conditions / 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	---	
Start Up Time (Power On)	Nominal Vin and Constant Resistive Load	---	30	---	mS
Input Filter	All Models	Internal Pi Type			

Output Specifications

Parameter	Conditions	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		Measured with a 2.2µF/50V MLCC	---	70	mV _{P-P}
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	110	160	---	%	
Short Circuit Protection	Continuous, Automatic Recovery (Hiccup Mode 0.3Hz typ.)					

General Specifications

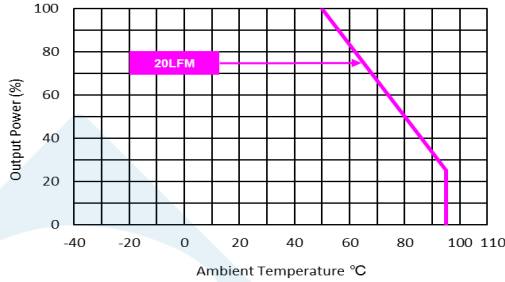
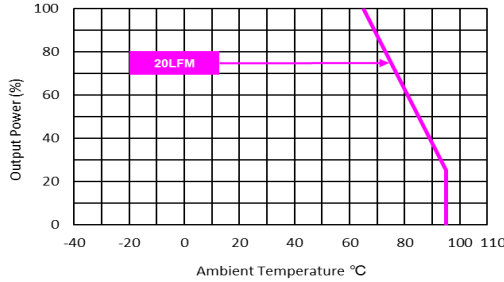
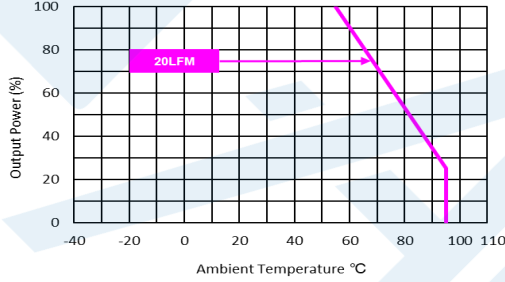
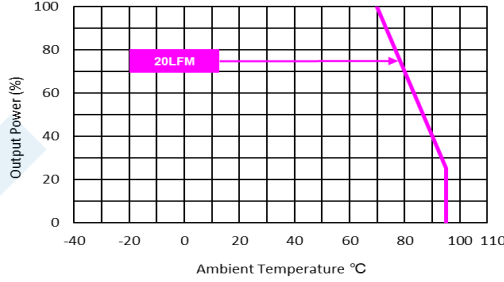
Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage	60 Seconds	1500	---	---	VDC
	1 Second	1800	---	---	VDC
Isolation Voltage Input/Output to case		1000	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100kHz, 1V	---	---	2200	pF
Switching Frequency		---	480	---	kHz
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	2,026,549	---	---	Hours
Safety Approvals	UL/cUL 62368-1 recognition(UL certificate), IEC/EN 62368-1(CB report)				

EMC Specifications

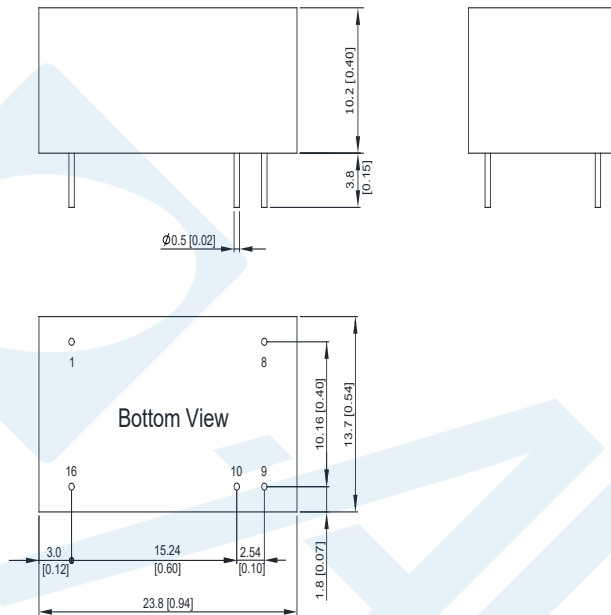
Parameter	Standards & Level			Performance
EMI	Conduction	EN 55032	Without external components	Class A ⁽⁵⁾
	Radiation		With external components	
EMS	EN 55024, EN 55035			
	ESD	Direct discharge	Indirect discharge HCP & VCP	A
		EN 61000-4-2 Air ± 8kV, Contact ± 6kV		
	Radiated immunity	EN 61000-4-3 20V/m		A
	Fast transient ⁽⁶⁾	EN 61000-4-4 ±2kV		A
	Surge ⁽⁶⁾	EN 61000-4-5 ±2kV		A
	Conducted immunity	EN 61000-4-6 10Vrms		A
PFMF	EN 61000-4-8 30A/m		A	

Environmental Specifications

Parameter	Model	Min.	Max.		Unit
			without Heatsink	with Heatsink	
Operating Temperature Range Nominal Vin, Load 100% Inom. (for Power Derating see relative Derating Curves)	MDWI15-24S051, MDWI15-48S051	-40	+50	+65	°C
	MDWI15-24S12, MDWI15-24S15, MDWI15-24S24, MDWI15-24D12, MDWI15-24D15, MDWI15-48S12, MDWI15-48S15, MDWI15-48S24, MDWI15-48D12, MDWI15-48D15		+55	+70	
Case Temperature		---	+110		°C
Storage Temperature Range		-50	+125		°C
Humidity (non condensing)		---	95		% rel. H
Lead Temperature (1.5mm from case for 10Sec.)		---	260		°C

Power Derating Curve	
	
MDWI15-24S051, MDWI15-48S051 Derating Curve without Heatsink	MDWI15-24S051, MDWI15-48S051 Derating Curve with Heatsink
	
MDWI15-24S12, MDWI15-24S15, MDWI15-24S24, MDWI15-24D12, MDWI15-24D15, MDWI15-48S12, MDWI15-48S15, MDWI15-48S24, MDWI15-48D12, MDWI15-48D15 Derating Curve without Heatsink	MDWI15-24S12, MDWI15-24S15, MDWI15-24S24, MDWI15-24D12, MDWI15-24D15, MDWI15-48S12, MDWI15-48S15, MDWI15-48S24, MDWI15-48D12, MDWI15-48D15 Derating Curve with Heatsink

Notes
1 Specifications typical at Ta=+25°C, 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 To meet EN 55032 Class A with an external filter, please contact MINMAX.
6 To meet EN61000-4-4 & EN61000-4-5 an external capacitor across the input pins is required, please contact MINMAX.
7 Specifications are subject to change without notice.

Package Specifications
Mechanical Dimensions

Pin Connections

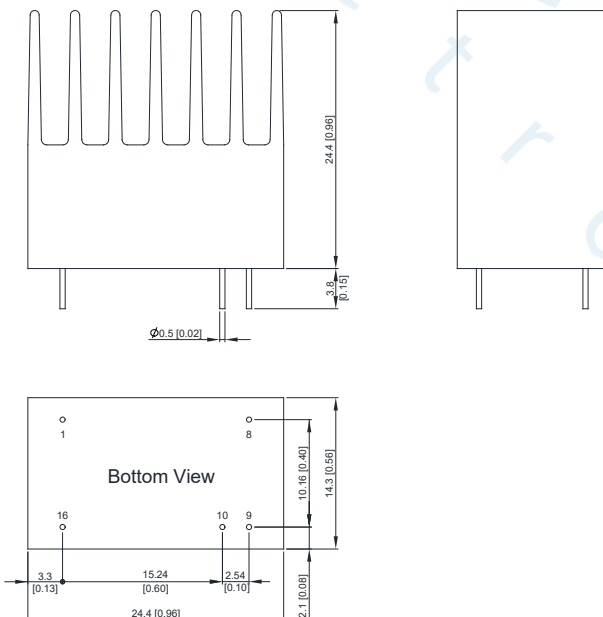
Pin	Single Output	Dual Output
1	-Vin	-Vin
8	NC	Common
9	+Vout	+Vout
10	-Vout	-Vout
16	+Vin	+Vin

NC: No Connection

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.5 (X.XX±0.02)
X.XX±0.25 (X.XXX±0.01)
- ▶ Pin diameter $\varnothing 0.5 \pm 0.05$ (0.02±0.002)

Physical Characteristics

Case Size	: 23.8x13.7x10.2 mm (0.94x0.54x0.40 inches)
Case Material	: Aluminium Alloy, Black Anodized Coating
Pin Material	: Copper Alloy with Tin Plate Over Nickel Subplate
Weight	: 8.77g

Heatsink (Option –HC7)

Physical Characteristics

Heatsink Material	: Aluminum
Finish	: Black Anodized Coating
Weight	: 14.2g

Order Code Table	
Standard	With heatsink
MDWI15-24S051	MDWI15-24S051-HC7
MDWI15-24S12	MDWI15-24S12-HC7
MDWI15-24S15	MDWI15-24S15-HC7
MDWI15-24S24	MDWI15-24S24-HC7
MDWI15-24D12	MDWI15-24D12-HC7
MDWI15-24D15	MDWI15-24D15-HC7
MDWI15-48S051	MDWI15-48S051-HC7
MDWI15-48S12	MDWI15-48S12-HC7
MDWI15-48S15	MDWI15-48S15-HC7
MDWI15-48S24	MDWI15-48S24-HC7
MDWI15-48D12	MDWI15-48D12-HC7
MDWI15-48D15	MDWI15-48D15-HC7