

MA1000RW Series

2:1 Input Range, 10W Single & Dual Output DC/DC Converters



Key Features:

- 10W Output Power
- EN 60950 Approved
- 2:1 Input Voltage Range
- Compact DIP Case
- 1,500 VDC I/O Isolation
- Meets EN 55032 "A"
- Single & Dual Outputs
- Wide Temperature Operation
- Industry Standard Pin-Out



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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	12 VDC Input	9.0	12.0	18.0	VDC	
	24 VDC Input	18.0	24.0	36.0		
	48 VDC Input	36.0	48.0	72.0		
Start Up Time	Nominal V_{IN} & Constant Resistive Load		20		mS	
Input Filter	π (Pi) Filter					
Input Reflected Ripple Current			20.0		mA P - P	
Output						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Output Voltage Accuracy			± 1.0		%	
Line Regulation	V_{IN} = Min to Max			± 0.5	%	
	Single Output			± 0.5	%	
Load Regulation, See Note 2	Dual Output			± 1.0	%	
	See Note 3		± 5.0		%	
Cross Regulation, Dual Output	See Note 4			75	mV P - P	
Ripple & Noise (20 MHz)	See Note 5		200		μ Sec	
Transient Recovery Time, See Note 5	25% Load Step Change			± 3.0	%	
Transient Response Deviation				150	% I_{OUT}	
Output Power Protection				± 0.02	%/°C	
Temperature Coefficient					Continuous (Autorecovery)	
Output Short Circuit Protection						
General						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Isolation Voltage	Input/Output, 60 Seconds	1,500			VDC	
	Case/Input, Output, 60 Seconds	1,000				
Isolation Resistance	500 VDC		1,000		M Ω	
Isolation Capacitance	100 kHz/1V		1,000		pF	
Switching Frequency			330		kHz	
Environmental						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Operating Temperature Range	Ambient	-40		+85	°C	
	Case			+100		
Storage Temperature Range		-40		+125	°C	
Cooling	Free Air Convection					
Humidity	RH, Non-condensing		95		%	
Physical						
Case Size	See Mechanical Diagram (Page 3)					
Case Material	Copper With Nickel Coating (UL94V-0)					
Weight	0.60 Oz (17g)					
Reliability Specifications						
Parameter	Conditions	Min.	Typ.	Max.	Units	
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1.0			MHours	
Safety Standards	UL 60950, EN 62368, EN 60950					
Absolute Maximum Ratings						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Input Voltage Surge (1 Sec)	12 VDC Input			25.0	VDC	
	24 VDC Input			50.0		
	48 VDC Input			100.0		
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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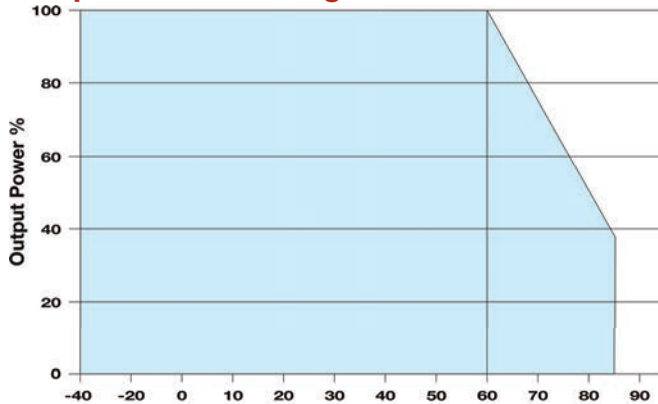
Model Number	Input				Output			Over Voltage Protection (VDC)	Max Capacitive Load (μ F Max)	Efficiency (% Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MA1012S-02RW	12	9.0 - 18.0	791	10	2.5	3,000	0.0	3.9	2,200	81	2,500
MA1012S-03RW	12	9.0 - 18.0	1,006	10	3.3	3,000	0.0	3.9	2,200	84	2,500
MA1012S-05RW	12	9.0 - 18.0	992	10	5.0	2,000	0.0	6.2	2,200	86	2,500
MA1012S-12RW	12	9.0 - 18.0	980	10	12.0	833	0.0	15.0	820	87	2,500
MA1012S-15RW	12	9.0 - 18.0	958	10	15.0	667	0.0	18.0	470	89	2,500
MA1012D-12RW	12	9.0 - 18.0	980	10	\pm 12.0	\pm 416	\pm 0.0	\pm 15.0	220	87	2,500
MA1012D-15RW	12	9.0 - 18.0	969	10	\pm 15.0	\pm 333	\pm 0.0	\pm 18.0	150	88	2,500
MA1024S-02RW	24	18.0 - 36.0	381	10	2.5	3,000	0.0	3.9	2,200	84	1,200
MA1024S-03RW	24	18.0 - 36.0	497	10	3.3	3,000	0.0	3.9	2,200	85	1,200
MA1024S-05RW	24	18.0 - 36.0	479	10	5.0	2,000	0.0	6.2	2,200	89	1,200
MA1024S-12RW	24	18.0 - 36.0	485	10	12.0	833	0.0	15.0	820	88	1,200
MA1024S-15RW	24	18.0 - 36.0	485	10	15.0	667	0.0	18.0	470	88	1,200
MA1024D-12RW	24	18.0 - 36.0	485	10	\pm 12.0	\pm 416	\pm 0.0	\pm 15.0	220	88	1,200
MA1024D-15RW	24	18.0 - 36.0	474	10	\pm 15.0	\pm 333	\pm 0.0	\pm 18.0	150	90	1,200
MA1048S-02RW	48	36.0 - 75.0	191	10	2.5	3,000	0.0	3.9	2,200	84	750
MA1048S-03RW	48	36.0 - 75.0	249	10	3.3	3,000	0.0	3.9	2,200	85	750
MA1048S-05RW	48	36.0 - 75.0	242	10	5.0	2,000	0.0	6.2	2,200	88	750
MA1048S-12RW	48	36.0 - 75.0	245	10	12.0	833	0.0	15.0	820	87	750
MA1048S-15RW	48	36.0 - 75.0	242	10	15.0	667	0.0	18.0	470	88	750
MA1048D-12RW	48	36.0 - 75.0	245	10	\pm 12.0	\pm 416	\pm 0.0	\pm 15.0	220	87	750
MA1048D-15RW	48	36.0 - 75.0	245	10	\pm 15.0	\pm 333	\pm 0.0	\pm 18.0	150	87	750

Notes:

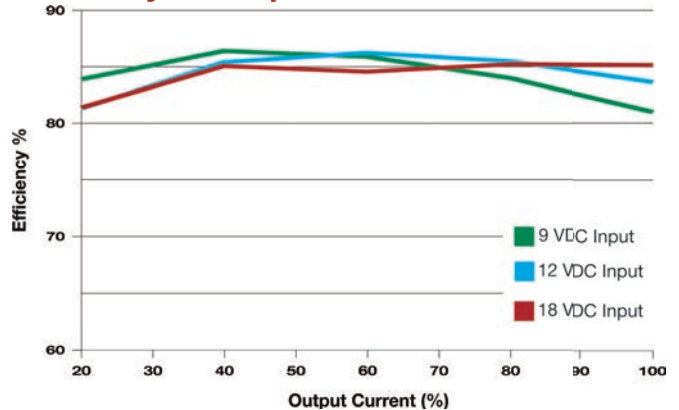
1. The specified maximum capacitive load is for each output.
2. Load regulation is specified for a load change of 0% to 100%. Load regulation for 3.3V output models is \pm 1.0% max for a load change of 0% to 100%.
3. When measuring cross regulation, the load on one output is varied from 25% to 100% while the other output is held at 100%.
4. Output ripple is measured with a 1.0 μ F capacitor connected from the +Vout to the -Vout pins for single output units and from each output to common for dual output models. See the typical connection diagram & notes on page 3.
5. Transient recovery is measured to within a 1% error band for a load step change of 75% to 50% to 25%.
6. Operation at no-load will not damage these units. However, they may not meet all specifications.
7. 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.

MPD offers a wide range of DC/DC converters in the standard 24 pin DIP package. Models range from 1W to 15W and offer wide input ranges, high isolation & tight regulation. Many are approved to EN 60950. For full information, go to our website or contact the factory.

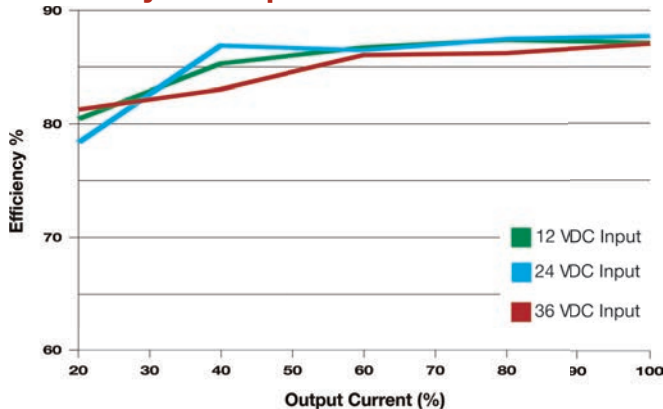
Temperature Derating Curve



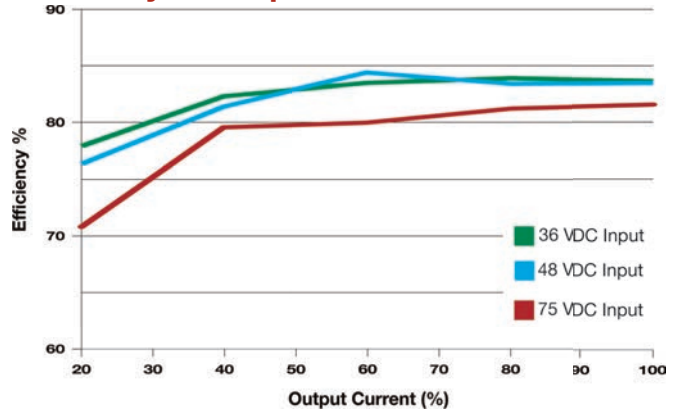
Efficiency vs Output Load: 12 VIN Models



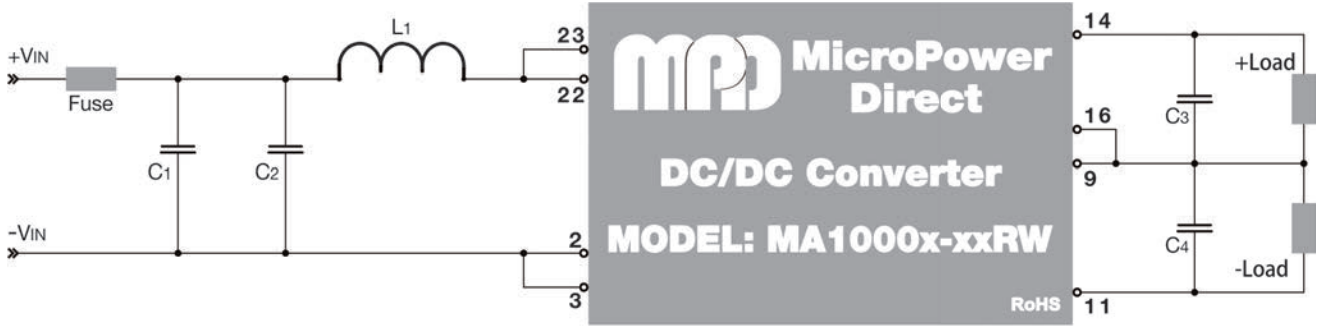
Efficiency vs Output Load: 24 VIN Models



Efficiency vs Output Load: 48 VIN Models



Typical Connection



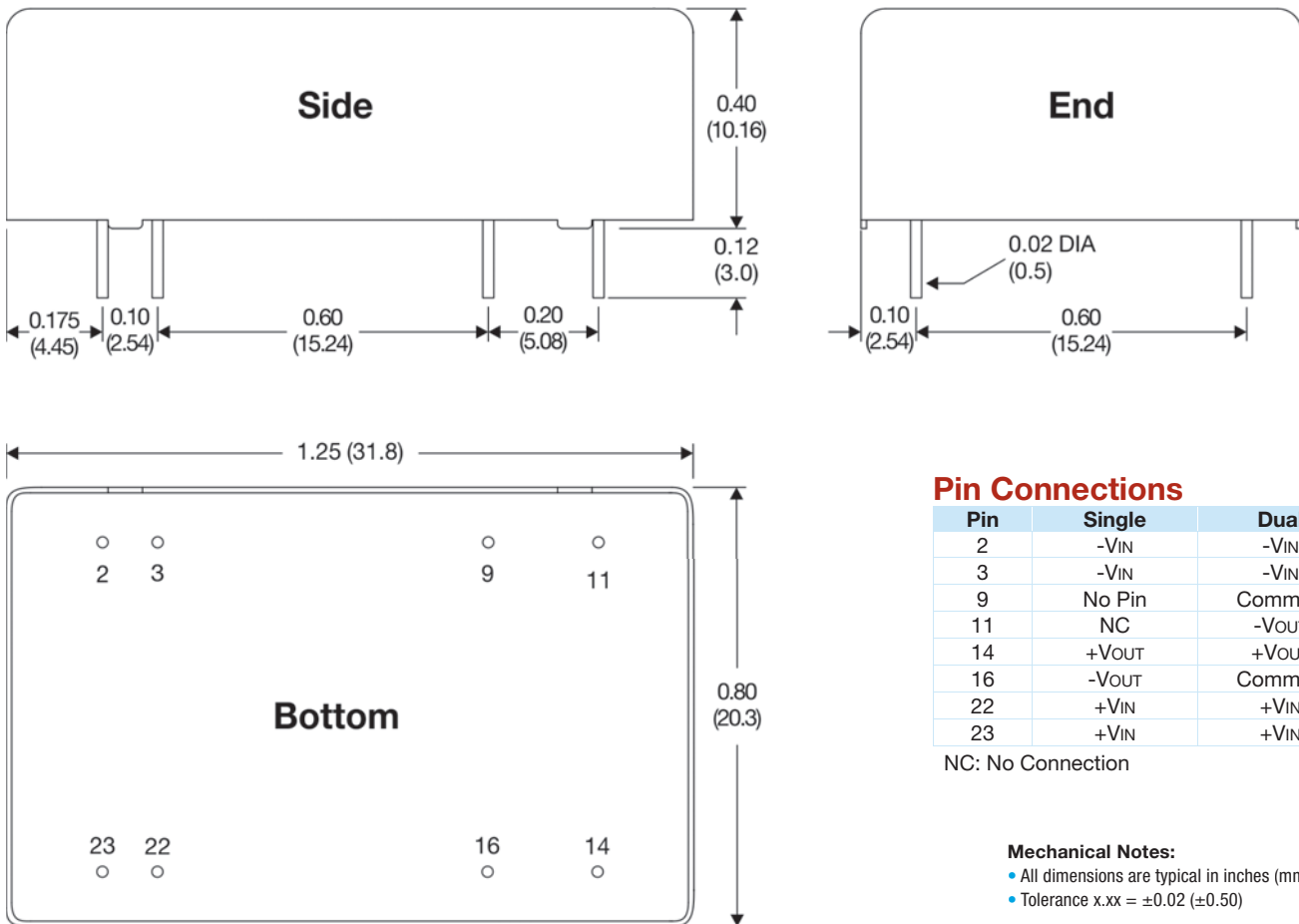
To help meet conducted emissions requirements, the filter components (C₂ & L₁) in the diagram above should be used. The recommended values are 100 μ F/100V for C₂ and 12 μ H for L₁. These components should be mounted as close to the module as possible. To meet the requirements of EN 61000-4-4 and EN 61000-4-5, an external filter capacitor (C₁ in the diagram above) is required. The recommended value for C₁ is 220 μ F/100V.

When measuring output ripple, it is recommended that an external 1.0 μ F ceramic capacitor be placed from the +V_{out} pin to the -V_{out} pin for single output units and from each output to common for dual output units. For noise sensitive applications, the use of 3.3 μ F capacitors will reduce the output ripple.

EMI Characteristics

Parameter	Standard	Criteria/Level
Radiated Emissions	EN 55032	Class A
Conducted Emissions	EN 55032	Class A
ESD	EN 61000-4-2	A
RS	EN 61000-4-3	A
EFT	EN 61000-4-4	A
Surge	EN 61000-4-5	A
CS	EN 61000-4-6	A
PFM	EN 61000-4-8	A

Mechanical Dimensions



Pin Connections

Pin	Single	Dual
2	-VIN	-VIN
3	-VIN	-VIN
9	No Pin	Common
11	NC	-VOUT
14	+VOUT	+VOUT
16	-VOUT	Common
22	+VIN	+VIN
23	+VIN	+VIN

NC: No Connection

Mechanical Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ± 0.02 (± 0.50)