

MA1200RU Series

4:1 Input Range, 12W Single & Dual Output DC/DC Converters



Key Features:

- 12W Output Power
- 4:1 Input Voltage Range
- EN 60950 Approved
- Compact DIP Case
- 1,600 VDC I/O Isolation
- Meets EN 55032 "A"
- Single & Dual Outputs
- Remote On/Off Control
- 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	24 VDC Input	9.0	24.0	36.0	VDC	
	48 VDC Input	18.0	48.0	72.0		
Start Up Time	Nominal VIN & 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		±1.2			%	
Line Regulation	VIN = Min to Max			±0.2	%	
	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			85	mV P - P	
Ripple & Noise (20 MHz)	See Note 4		250		μSec	
Transient Recovery Time, See Note 5	25% Load Step Change			±3.0	%	
Transient Response Deviation					%	
Output Power Protection			170		% IOUT	
Temperature Coefficient			±0.02		%/°C	
Output Short Circuit Protection	Continuous (Autorecovery)					
General						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Isolation Voltage	Input/Output, 60 Seconds	1,600			VDC	
	Case/Input, Output, 60 Seconds	1,600				
Isolation Resistance	500 VDC	1,000			MΩ	
Isolation Capacitance	100 kHz/1V		1,500		pF	
Switching Frequency			270		kHz	
Remote On/Off (See Page 3)						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Supply On	See Note On Page 3	3.0		12	VDC	
Supply Off		0.0		1.2	VDC	
Standby Input Current			5.0		mA	
Control Common	Referenced to -Input (Pins 2, 3)					
Environmental						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Operating Temperature Range	Ambient	-40		+85	°C	
	Case			+105	°C	
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	0.63 Oz (18g)					
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)	24 VDC Input			50.0	VDC	
	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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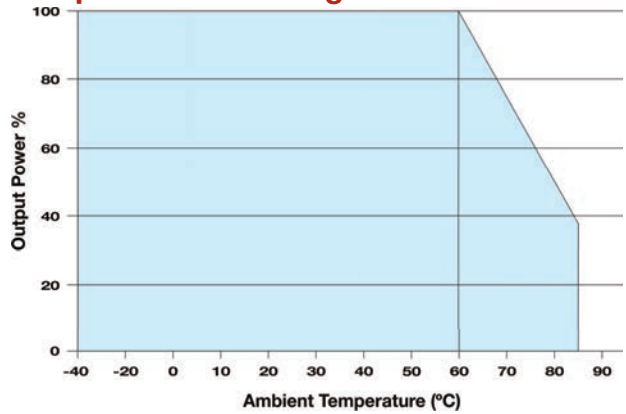
Model Number	Input				Output			Over Voltage Protection (VDC)	Max Capacitive Load (μ F Max)	Efficiency (% Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MA1224S-03RU	24	9.0 - 36.0	573	15	3.3	3,500	0.0	3.9	2,000	87	3,500
MA1224S-05RU	24	9.0 - 36.0	581	15	5.0	2,400	0.0	6.2	2,000	89	3,500
MA1224S-12RU	24	9.0 - 36.0	574	15	12.0	1,000	0.0	15.0	430	90	3,500
MA1224S-15RU	24	9.0 - 36.0	574	15	15.0	800	0.0	18.0	300	90	3,500
MA1224D-05RU	24	9.0 - 36.0	595	15	\pm 5.0	\pm 1,200	\pm 0.0	\pm 15.0	1,250	87	3,500
MA1224D-12RU	24	9.0 - 36.0	574	15	\pm 12.0	\pm 500	\pm 0.0	\pm 15.0	200	90	3,500
MA1224D-15RU	24	9.0 - 36.0	574	15	\pm 15.0	\pm 400	\pm 0.0	\pm 18.0	120	90	3,500
MA1248S-03RU	48	18.0 - 75.0	286	15	3.3	3,500	0.0	3.9	2,000	87	1,800
MA1248S-05RU	48	18.0 - 75.0	290	15	5.0	2,400	0.0	6.2	2,000	89	1,800
MA1248S-12RU	48	18.0 - 75.0	287	15	12.0	1,000	0.0	15.0	430	90	1,800
MA1248S-15RU	48	18.0 - 75.0	287	15	15.0	800	0.0	18.0	300	90	1,800
MA1248D-05RU	48	18.0 - 75.0	297	15	\pm 5.0	\pm 1,200	\pm 0.0	\pm 15.0	1,250	87	1,800
MA1248D-12RU	48	18.0 - 75.0	287	15	\pm 12.0	\pm 500	\pm 0.0	\pm 15.0	200	90	1,800
MA1248D-15RU	48	18.0 - 75.0	287	15	\pm 15.0	\pm 400	\pm 0.0	\pm 18.0	120	90	1,800

Notes:

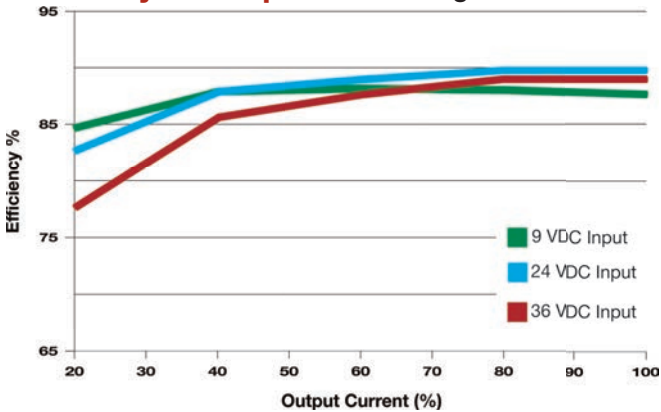
1. The specified maximum capacitive load is for each output.
2. Load regulation is specified for a load change of 0% to 100%. Load regulation for 3.3V output models is \pm 1.0% max for a load change of 0% to 100%.
3. When measuring cross regulation, the load on one output is varied from 25% to 100% while the other output is held at 100%.
4. Output ripple is measured with a 1.0 μ F capacitor connected from the +V_{out} to the -V_{out} 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.

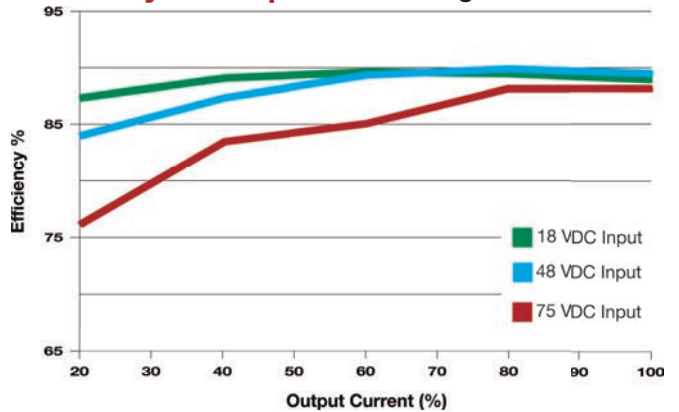
Temperature Derating Curve



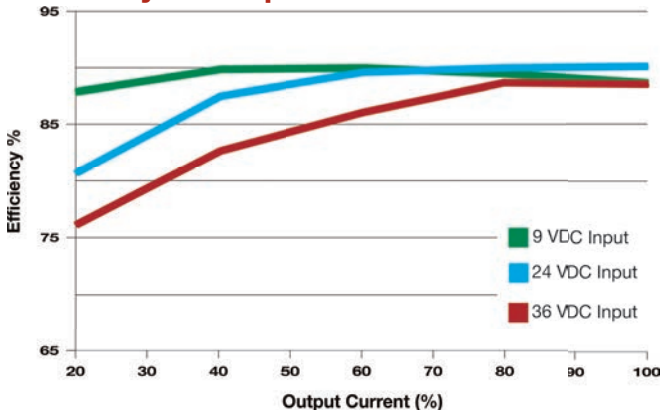
Efficiency vs Output Load: Single 24 VIN Models



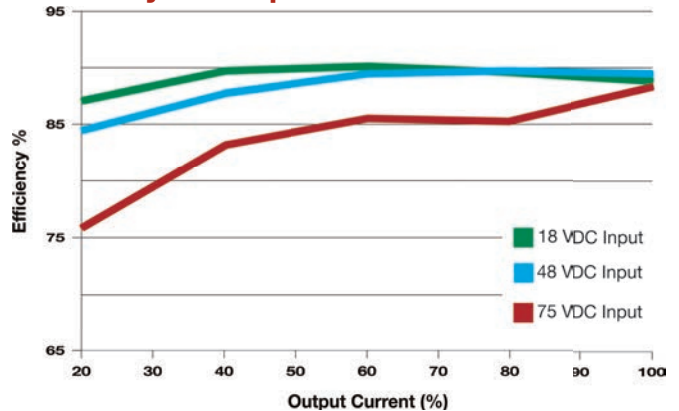
Efficiency vs Output Load: Single 48 VIN Models



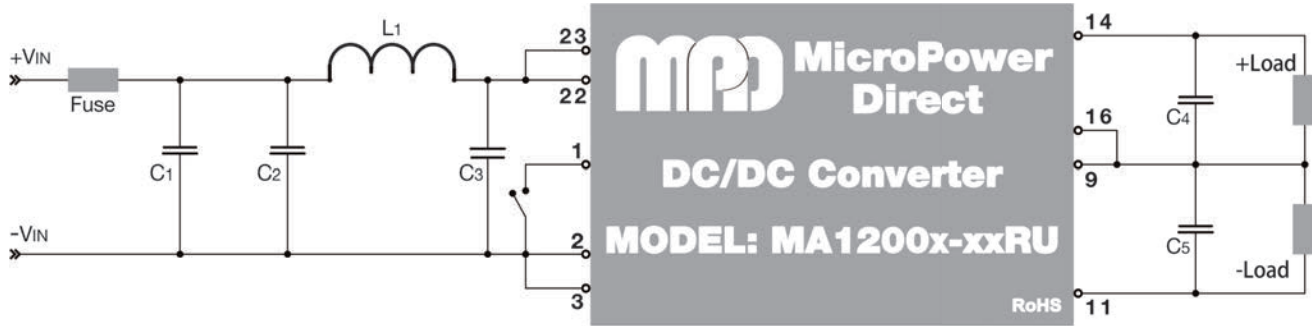
Efficiency vs Output Load: Dual 24 VIN Models



Efficiency vs Output Load: Dual 48 VIN Models



Typical Connection



To help meet conducted emissions requirements, the filter components (C2, C3 & L1) in the diagram above should be used. The recommended values are 2.2 μ F/100V for C2 & C3 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 & EN 61000-4-5, an external filter capacitor (C1 in the diagram above) is required. The recommended value for C1 is 330 μ F/100V.

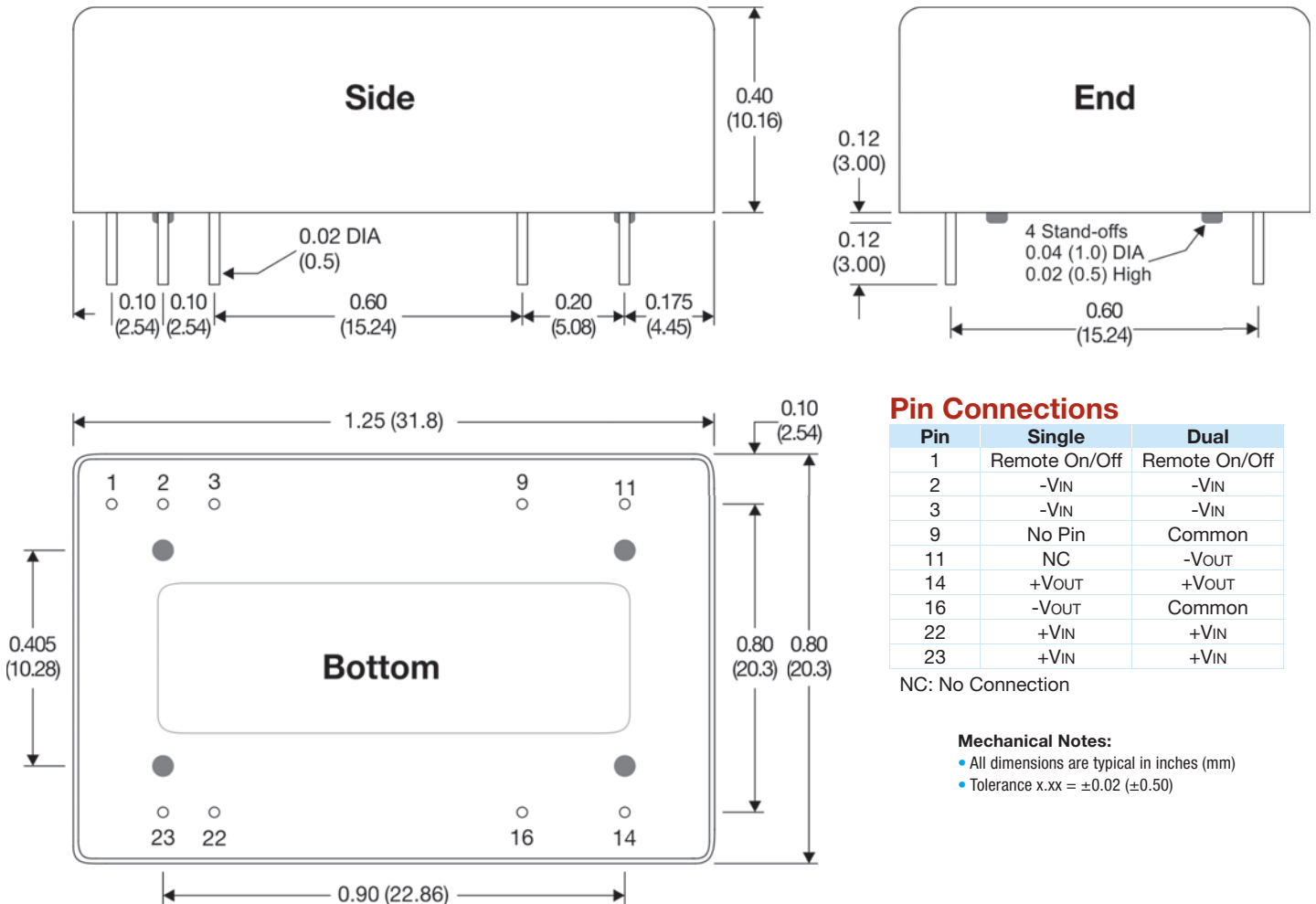
When measuring output ripple, it is recommended that an external 1.0 μ F ceramic capacitor be placed from the +Vout pin to the -Vout pin for single output units and from each output to common for dual output units. For noise sensitive applications, the use of 3.3 μ F capacitors will reduce the output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

The Remote On/Off circuit is referenced to the minus input of the unit (pins 2 & 3). If the On/Off input (pin 1) is connected to the minus input, the unit is shut off. If pin 1 is left open, the unit operates normally.

EMI Characteristics

Parameter	Standard	Criteria/Level
Radiated Emissions	EN 55032	Class A
Conducted Emissions	EN 55032	Class A
ESD	EN 61000-4-2	B
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
1	Remote On/Off	Remote On/Off
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)