

# MA1500RU Series

## 4:1 Input Range, 15W Single & Dual Output DC/DC Converters



### Key Features:

- 15W Output Power
- 4:1 Input Voltage Range
- 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



### 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			±1.0		%	
Line Regulation, VIN = Min to Max	Single Output			±0.2	%	
	Dual Output			±0.5		
Load Regulation, See Note 2	Single Output			±0.5	%	
	Dual Output			±1.0		
Cross Regulation, Dual Output	See Note 3		±5.0		%	
Ripple & Noise (20 MHz)	See Note 4			60	mV P - P	
Transient Recovery Time, See Note 5	25% Load Step Change		250		μSec	
Transient Response Deviation				±3.0	%	
Output Power Protection			150		% I <sub>OUT</sub>	
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		2,000		pF	
Switching Frequency			280		kHz	

Remote On/Off (See Page 2)						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Supply On	See Note On Page 3	3.0		12	VDC	
Supply Off		0.0		1.2		
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		
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	0.705 Oz (18g)					

Reliability Specifications						
Parameter	Conditions	Min.	Typ.	Max.	Units	
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	410			kHours	

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.

### MicroPower Direct

292 Page Street  
Suite D  
Stoughton, MA 02072  
USA

T: (781) 344-8226  
F: (781) 344-8481  
E: sales@micropowerelectronics.com  
W: www.micropowerelectronics.com



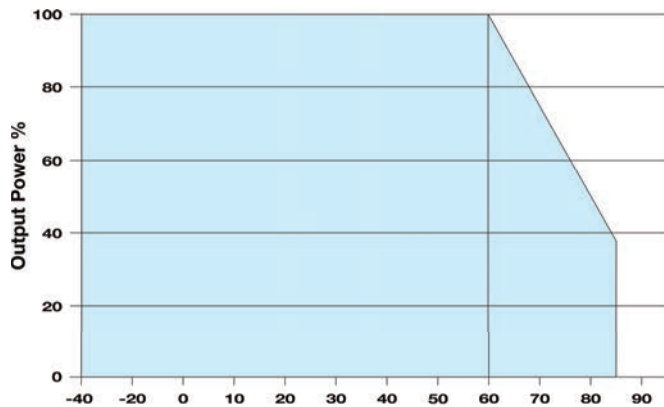
[www.micropowerelectronics.com](http://www.micropowerelectronics.com)

Model Number	Input				Output			Over Voltage Protection (VDC)	Max Capacitive Load ( $\mu$ 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							
MA1524S-03RU	24	9.0 - 36.0	640	15	3.3	4,000	0.0	3.9	4,700	88	3,000
MA1524S-051RU	24	9.0 - 36.0	724	15	5.1	3,000	0.0	6.2	3,300	90	3,000
MA1524S-12RU	24	9.0 - 36.0	710	15	12.0	1,250	0.0	15.0	1,250	90	3,000
MA1524S-15RU	24	9.0 - 36.0	710	15	15.0	1,000	0.0	18.0	1,000	90	3,000
MA1524D-05RU	24	9.0 - 36.0	744	15	$\pm$ 5.0	$\pm$ 1,500	$\pm$ 0.0	$\pm$ 15.0	1,500	86	3,000
MA1524D-12RU	24	9.0 - 36.0	718	15	$\pm$ 12.0	$\pm$ 625	$\pm$ 0.0	$\pm$ 15.0	625	89	3,000
MA1524D-15RU	24	9.0 - 36.0	710	15	$\pm$ 15.0	$\pm$ 500	$\pm$ 0.0	$\pm$ 18.0	500	90	3,000
MA1548S-03RU	48	18.0 - 75.0	316	15	3.3	4,000	0.0	3.9	4,700	89	1,500
MA1548S-051RU	48	18.0 - 75.0	366	15	5.1	3,000	0.0	6.2	3,300	89	1,500
MA1548S-12RU	48	18.0 - 75.0	355	15	12.0	1,250	0.0	15.0	1,250	90	1,500
MA1548S-15RU	48	18.0 - 75.0	355	15	15.0	1,000	0.0	18.0	1,000	90	1,500
MA1548D-05RU	48	18.0 - 75.0	372	15	$\pm$ 5.0	$\pm$ 1,500	$\pm$ 0.0	$\pm$ 15.0	1,500	86	1,500
MA1548D-12RU	48	18.0 - 75.0	359	15	$\pm$ 12.0	$\pm$ 625	$\pm$ 0.0	$\pm$ 15.0	625	89	1,500
MA1548D-15RU	48	18.0 - 75.0	355	15	$\pm$ 15.0	$\pm$ 500	$\pm$ 0.0	$\pm$ 18.0	500	90	1,500

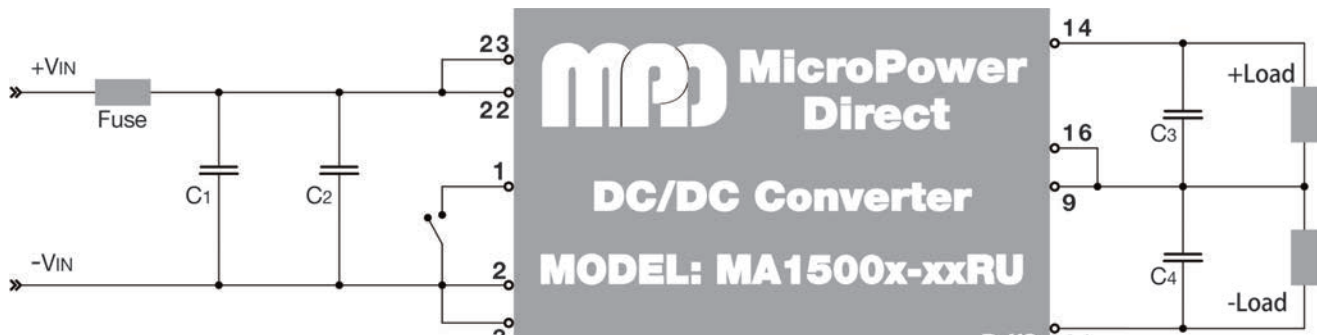
**Notes:**

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  $\mu$ F capacitor connected from the +V<sub>OUT</sub> to the -V<sub>OUT</sub> 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.

**Temperature Derating Curve**



**Typical Connection**



To meet the requirements of EN 61000-4-4 & EN 61000-4-5, the external filter capacitors (C1 & C2) in the diagram above) are required. The recommended value for C1 & C2 is 330  $\mu$ F/100V. A single 680  $\mu$ F/100V capacitor may also be used.

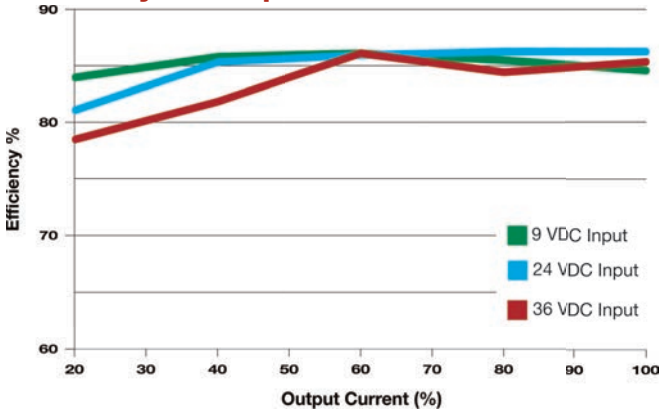
When measuring output ripple, it is recommended that an external 1.0  $\mu$ F ceramic capacitor be placed from the +V<sub>OUT</sub> pin to the -V<sub>OUT</sub> pin for single output units and from each output to common for dual output units. For noise sensitive applications, the use of 3.3  $\mu$ F capacitors 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.

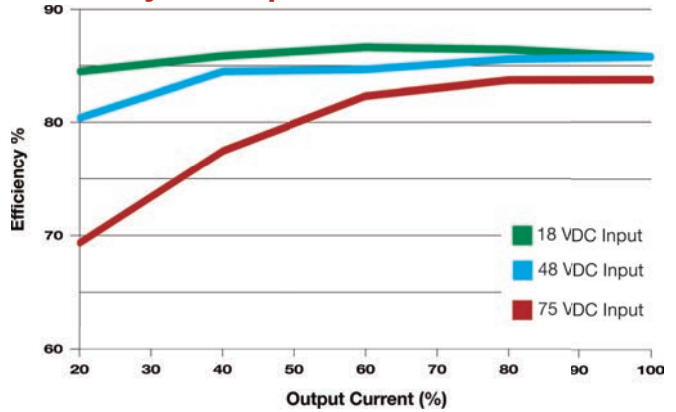
**EMI Characteristics**

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	B
Surge	EN 61000-4-5	B
CS	EN 61000-4-6	A
PFM	EN 61000-4-8	A

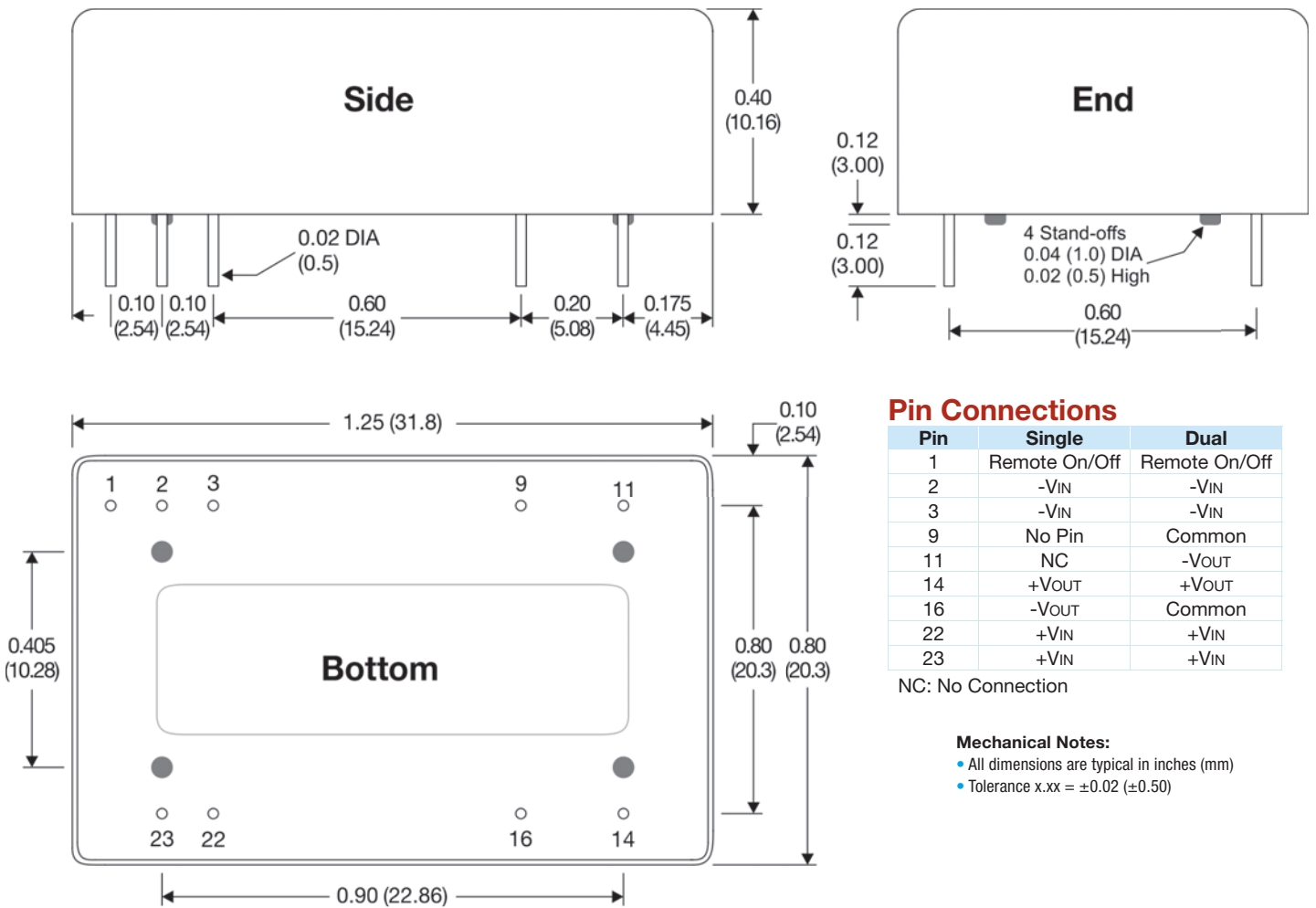
Efficiency vs Output Load: 24 VIN Models



Efficiency vs Output Load: 48 VIN Models



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)

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.