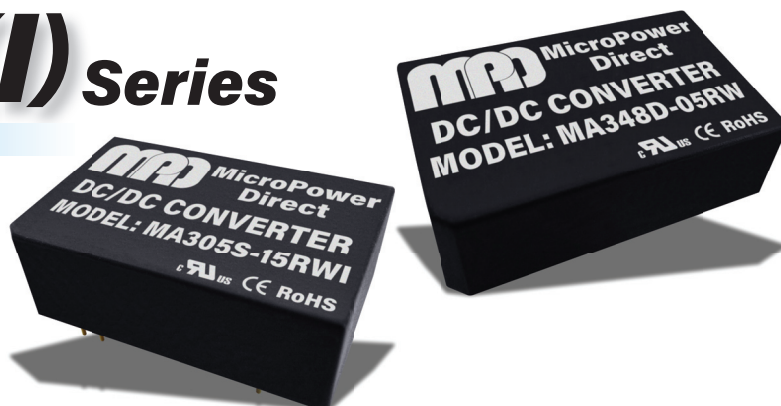


MA300RW(I) Series

Wide 2:1 Input, 3W, Single & Dual Output DC/DC Converters



Key Features:

- 3W Output Power
- 2:1 Input Voltage Range
- UL 62368 Approved
- Up To 3.0 kVDC Isolation
- 32 Standard Models
- Single & Dual Outputs
- Compact DIP Case
- -40°C to +85°C 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 Start Voltage	5 VDC Input			4.5	VDC
	12 VDC Input			9.0	
	24 VDC Input			18.0	
	48 VDC Input			36.0	
Under Voltage Shutdown	5 VDC Input			4.0	VDC
	12 VDC Input			8.5	
	24 VDC Input			17.5	
	48 VDC Input			35.5	
Input Filter	π (Pi) Filter				

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±2.0	%
Output Voltage Balance	Dual Output, Balanced Loads		±0.5	±2.0	%
Line Regulation	V _{IN} = Min to Max		±0.3	±1.0	%
Load Regulation	I _{OUT} = 0% to 100%		±0.3	±1.0	%
Ripple & Noise (20 MHz)	See Note 1			70	mV P - P
Transient Recovery Time, See Note 2	25% Load Step Change		300	500	µSec
Transient Response Deviation			±3.0	±5.0	%
Temperature Coefficient			±0.01	±0.02	%/°C
Output Overload Protection	Foldback	120	150		%
Output Short Circuit	Continuous (Autorecovery)				

General					
Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage, 60 Seconds		1,500			VDC
	"I" Version	3,000			
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz/1.0V			300	pF
Switching Frequency		90			kHz

Environmental					
Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Operating Temperature Range	Case			+100	°C
Storage Temperature Range		-50		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical					
Case Size and Weight	See Mechanical Drawing (Page 3)				
Case Material	Non-Conductive Black Plastic (UL94-V0)				

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1.0			MHours
Safety Standards	UL/cUL 62368 recognition (UL certificate)				

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	5 VDC Input			11.0	VDC
	12 VDC Input			25.0	
	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			Efficiency (% Typ)	Reflected Ripple Current (mA Typ)	Capacitive Load (μF, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MA305S-03RW(I)	5	4.5 - 9.0	514	65	3.3	600.0	0.0	77	100.0	680	1,500
MA305S-05RW(I)	5	4.5 - 9.0	641	65	5.0	500.0	0.0	78	100.0	470	1,500
MA305S-12RW(I)	5	4.5 - 9.0	732	65	12.0	250.0	0.0	82	100.0	330	1,500
MA305S-15RW(I)	5	4.5 - 9.0	732	65	15.0	200.0	0.0	82	100.0	220	1,500
MA305S-24RW(I)	5	4.5 - 9.0	741	65	24.0	125.0	0.0	81	100.0	100	1,500
MA305D-05RW(I)	5	4.5 - 9.0	649	65	±5.0	±250.0	±0.0	77	100.0	±220	1,500
MA305D-12RW(I)	5	4.5 - 9.0	741	65	±12.0	±125.0	±0.0	81	100.0	±150	1,500
MA305D-15RW(I)	5	4.5 - 9.0	741	65	±15.0	±100.0	±0.0	81	100.0	±100	1,500
MA312S-03RW(I)	12	9.0 - 18.0	209	35	3.3	600.0	0.0	79	30.0	680	600
MA312S-05RW(I)	12	9.0 - 18.0	257	35	5.0	500.0	0.0	81	30.0	470	600
MA312S-12RW(I)	12	9.0 - 18.0	294	35	12.0	250.0	0.0	85	30.0	330	600
MA312S-15RW(I)	12	9.0 - 18.0	294	35	15.0	200.0	0.0	85	30.0	220	600
MA312S-24RW(I)	12	9.0 - 18.0	298	35	24.0	125.0	0.0	84	30.0	100	600
MA312D-05RW(I)	12	9.0 - 18.0	260	35	±5.0	±250.0	±0.0	80	30.0	±220	600
MA312D-12RW(I)	12	9.0 - 18.0	298	35	±12.0	±125.0	±0.0	84	30.0	±150	600
MA312D-15RW(I)	12	9.0 - 18.0	298	35	±15.0	±100.0	±0.0	84	30.0	±100	600
MA324S-03RW(I)	24	18.0 - 36.0	104	20	3.3	600.0	0.0	79	15.0	680	300
MA324S-05RW(I)	24	18.0 - 36.0	129	20	5.0	500.0	0.0	81	15.0	470	300
MA324S-12RW(I)	24	18.0 - 36.0	147	20	12.0	250.0	0.0	85	15.0	330	300
MA324S-15RW(I)	24	18.0 - 36.0	147	20	15.0	200.0	0.0	85	15.0	220	300
MA324S-24RW(I)	24	18.0 - 36.0	149	20	24.0	125.0	0.0	84	15.0	100	300
MA324D-05RW(I)	24	18.0 - 36.0	130	20	±5.0	±250.0	±0.0	80	15.0	±220	300
MA324D-12RW(I)	24	18.0 - 36.0	149	20	±12.0	±125.0	±0.0	84	15.0	±150	300
MA324D-15RW(I)	24	18.0 - 36.0	149	20	±15.0	±100.0	±0.0	84	15.0	±100	300
MA348S-03RW(I)	48	36.0 - 72.0	52	15	3.3	600.0	0.0	79	10.0	680	150
MA348S-05RW(I)	48	36.0 - 72.0	64	15	5.0	500.0	0.0	81	10.0	470	150
MA348S-12RW(I)	48	36.0 - 72.0	74	15	12.0	250.0	0.0	85	10.0	330	150
MA348S-15RW(I)	48	36.0 - 72.0	74	15	15.0	200.0	0.0	85	10.0	220	150
MA348S-24RW(I)	48	36.0 - 72.0	74	15	24.0	125.0	0.0	84	10.0	100	150
MA348D-05RW(I)	48	36.0 - 72.0	65	15	±5.0	±250.0	±0.0	80	10.0	±220	150
MA348D-12RW(I)	48	36.0 - 72.0	74	15	±12.0	±125.0	±0.0	84	10.0	±150	150
MA348D-15RW(I)	48	36.0 - 72.0	74	15	±15.0	±100.0	±0.0	84	10.0	±100	150

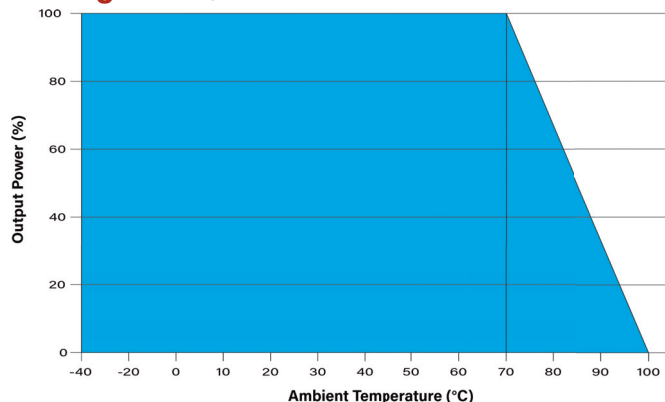
For the 3.0 kVDC isolated version, add an "I" to the model number: **MA3xxx-xxRWI**

For the 4:1 input models, see the datasheet for the: **MA3xxx-xxRU** series

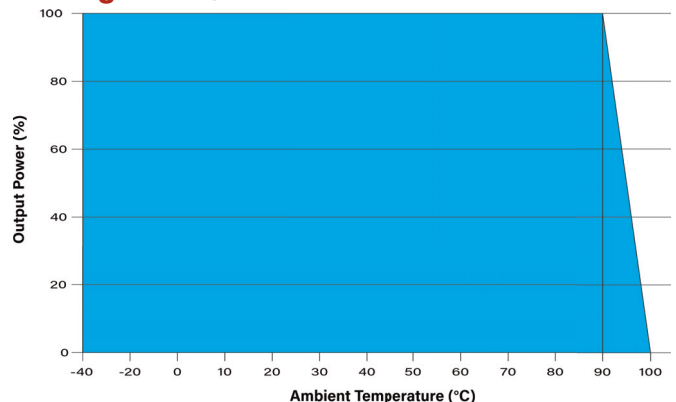
Notes:

- When measuring output ripple, it is recommended that an external 3.3 μF 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.
- Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
- Operation at no-load will not damage these units.
- An external 220μF/100V capacitor connected across the input pins is required to meet EN61000-4-4 and EN61000-4-5.
- Dual output units may be connected to provide a 10, 24 or 30 VDC output. To do this, connect the load across the positive (+V_{OUT}) and negative (-V_{OUT}) outputs and float the output common.
- The converter should be connected to a low ac-impedance source. An input source with a highly inductive impedance may affect the stability of the converter. In applications where the converter output loading is high and input power is supplied over long lines, it may be necessary to use a capacitor on the input to insure start-up. In this case, it is recommended that a low ESR (ESR <1.0V at 100 kHz) capacitor be mounted close to the converter. For 5V input units a 8.2 μF is recommended, for 12V input units, a 3.3 μF; and for 24V & 48V units a 1.5 μF.
- 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.

Derating Curve, 20 LFM



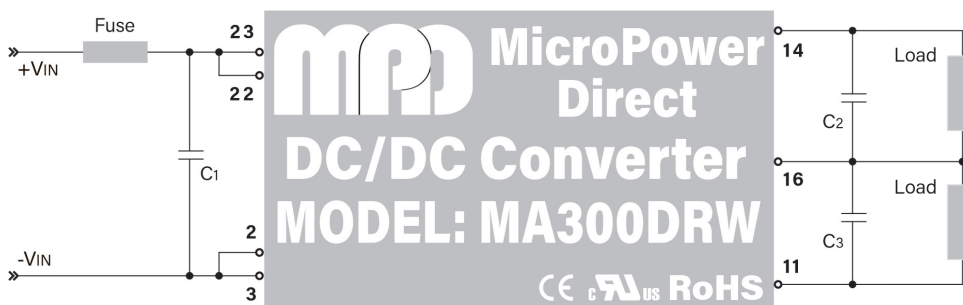
Derating Curve, 400 LFM



Parameter	Standard	Criteria	Level
Radiated Emissions	EN 55032		Class A
Conducted Emissions	EN 55032		Class A
ESD	EN 61000-4-2	A	±6 kV Contact ±8kV Air
RS	EN 61000-4-3	A	10V/m
EFT, See note at left	EN 61000-4-4	A	±2 kV
Surge, See note at left	EN 61000-4-5	A	±1 kV
CS	EN 61000-4-6	A	10 Vrms

To meet the specified EN 61000-4-4 and EN 61000-4-5 limits, an external capacitor must be connected across the input pins of the module (C₁). A 220 μ F/100V capacitor is recommended. This capacitor should be mounted as close to the module as possible.

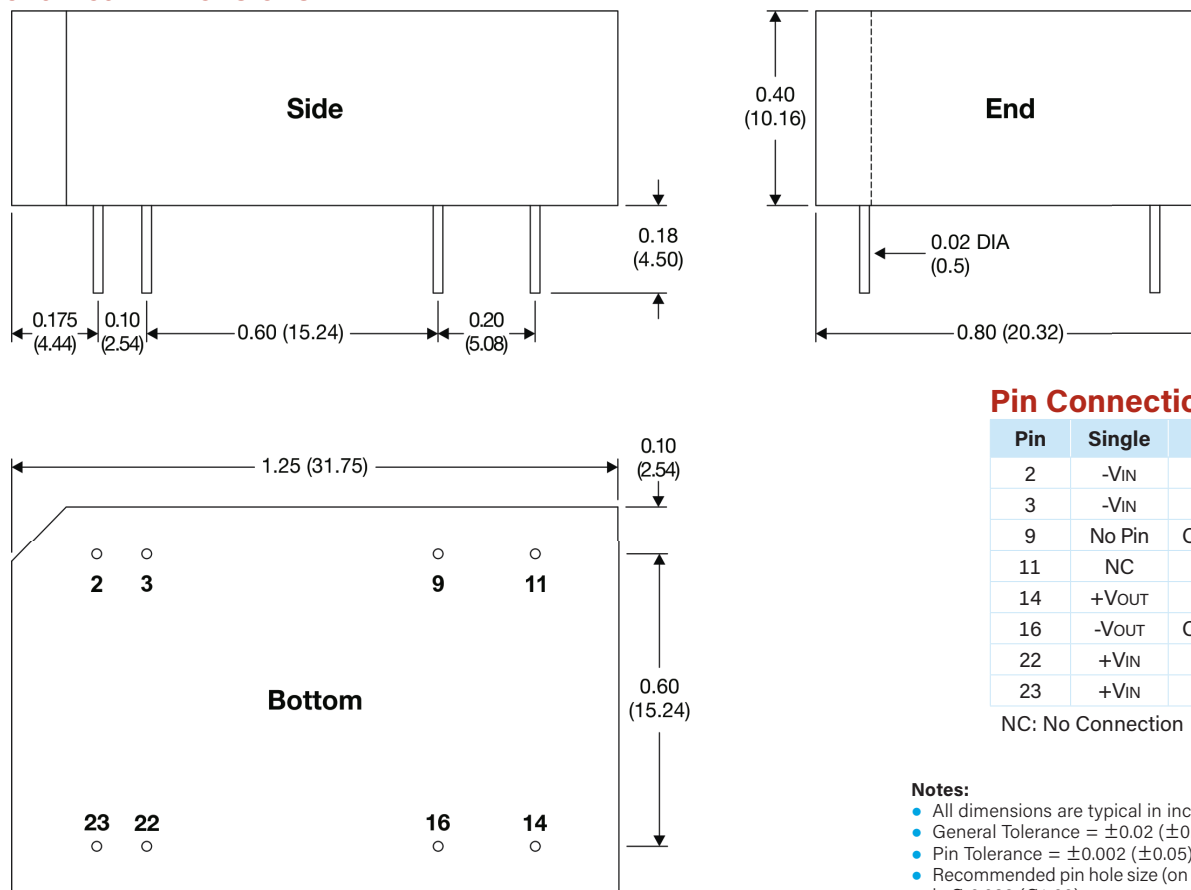
Typical Connection



These converters are specified for operation without external components. However, in some applications the addition of input/output capacitors, as shown in the typical connection diagram at right, will enhance stability and reduce output ripple. This simple connection includes a low ESR (<1 Ω at 100 kHz) capacitor connected across the input. The recommended values are given in note 6 on page 2.

To improve the output ripple performance, a 3.3 μ F is connected across the output. For dual output units (as shown), a 3.3 μ F capacitor should be connected from each output to common.

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

Notes:

- All dimensions are typical in inches (mm)
- General Tolerance = ± 0.02 (± 0.5)
- Pin Tolerance = ± 0.002 (± 0.05)
- Recommended pin hole size (on the application PC Board) is $\varnothing 0.039$ ($\varnothing 1.00$)
- Pin 2 is marked by an angle on the unit case
- Weight: 0.45 Oz (12.8g)