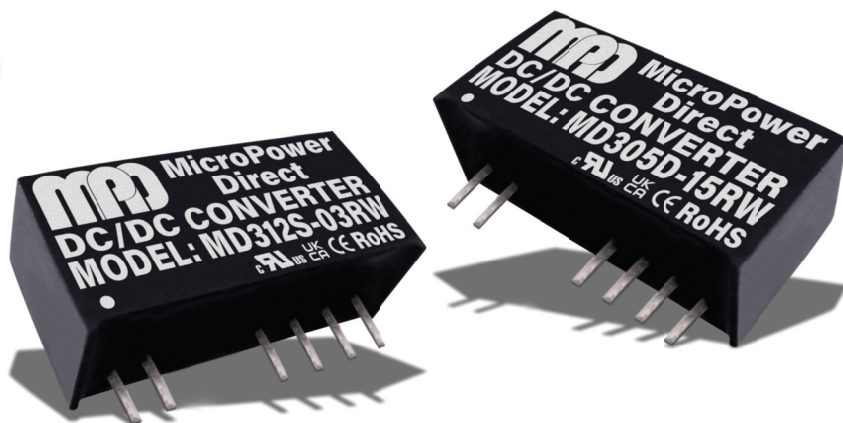


MD300RW

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



Key Features:

- 3W Output Power
- 2:1 Input Voltage Range
- EN 62368 Approved (UL)
- Tight Line/Load Regulation
- Short Circuit Protected
- 1,600 VDC Isolation
- 28 Standard Models
- Compact SIP Case
- -40°C to +85°C Operation
- Efficiency to 86%
- Industry Standard Pin-Out
- Remote ON/OFF Control



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	
Reflected Ripple Current	See Note 1		35		mA Pk - Pk	
Input Filter	Capacitor Filter					
Start Up Time			20		mS	

Output					
Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±1.0	%
Line Regulation	Full Load, V _{IN} = Min to Max			±0.5	%
Load Regulation	I _{OUT} = 25% to 100%			±1.0	%
Cross Regulation	Asymetrical Load 25%/100%			±5.0	%
Ripple & Noise, See Note 3	20 MHz Bandwidth			75	μV Pk-Pk
Transient Recovery Time, See Note 4	25% Load Step Change		300		μSec
Transient Response Deviation				±3.0	%
Temperature Coefficient			±0.02		%/°C
Output Short Circuit	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units	
Isolation Voltage	See Note 4	1,600			VDC	
Isolation Resistance		1,000			M Ω	
Isolation Capacitance			680		pF	
Switching Frequency		100		650	kHz	

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Storage Temperature Range		-55		+125	°C
Maximum Case Temperature				100	°C
Cooling	Natural Convection (30 - 60 LFM)				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	See Mechanical Drawing (Page 4)					
Case Material	Non-Conductive Black Plastic (UL94-V0)					
Weight	See Mechanical Drawing (Page 4)					

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1.34			MHours
Safety Standards	UL/cUL 62368-1 recognition (UL certificate)				

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units	
Input Voltage Surge (100 mSec)	5 VDC Input			15	VDC	
	12 VDC Input			36		
	24 VDC Input			50		
	48 VDC Input			100		
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

46 Eastman Street
Unit 1
Easton, MA 02375
USA

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

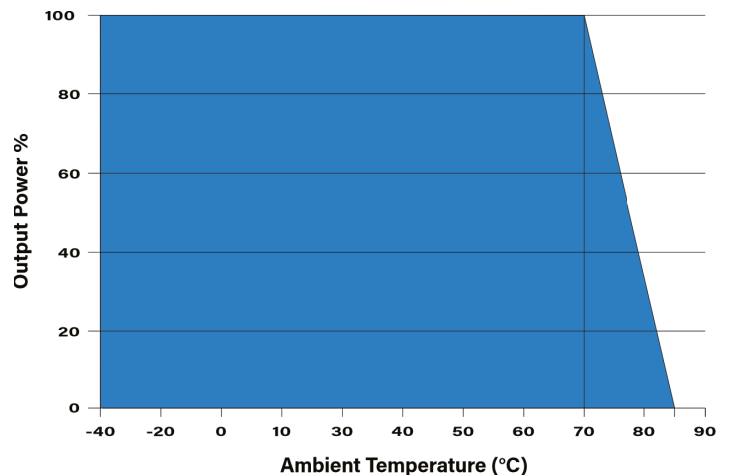


www.micropowereirect.com

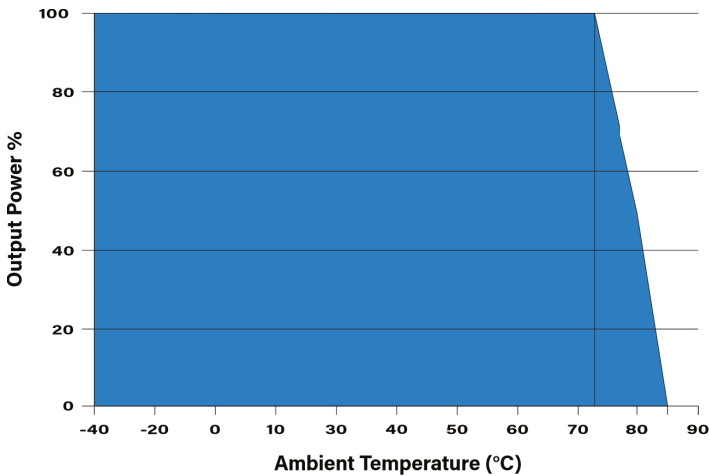
Model Number	Input				Output			Efficiency (% Typ)	Capacitive Load (μF, Max)	Fuse Rating Slow-Blow (A)
	Voltage (VDC)		Current (mA, Typ)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)			
	Nominal	Range	Full-Load	No-Load						
MD305S-03RW(C)	5	4.5 - 9.0	608	70	3.3	700	175.0	76	2,200	1.60
MD305S-05RW(C)	5	4.5 - 9.0	750	85	5.0	600	150.0	80	1,000	1.60
MD305S-12RW(C)	5	4.5 - 9.0	732	80	12.0	250	62.5	82	470	1.60
MD305S-15RW(C)	5	4.5 - 9.0	732	85	15.0	200	50.0	82	220	1.60
MD305D-05RW(C)	5	4.5 - 9.0	769	100	±5.0	±300	±75.0	78	±470	1.60
MD305D-12RW(C)	5	4.5 - 9.0	723	100	±12.0	±125	±31.25	83	±220	1.60
MD305D-15RW(C)	5	4.5 - 9.0	698	100	±15.0	±100	±25.0	86	±100	1.60
MD312S-03RW(C)	12	9.0 - 18.0	244	25	3.3	700	175.0	79	2,200	0.80
MD312S-05RW(C)	12	9.0 - 18.0	305	25	5.0	600	150.0	82	1,000	0.80
MD312S-12RW(C)	12	9.0 - 18.0	297	25	12.0	250	62.5	84	470	0.80
MD312S-15RW(C)	12	9.0 - 18.0	301	35	15.0	200	50.0	83	220	0.80
MD312D-05RW(C)	12	9.0 - 18.0	309	55	±5.0	±300	±75.0	81	±470	0.80
MD312D-12RW(C)	12	9.0 - 18.0	291	45	±12.0	±125	±31.25	86	±220	0.80
MD312D-15RW(C)	12	9.0 - 18.0	301	60	±15.0	±100	±25.0	83	±100	0.80
MD324S-03RW(C)	24	18.0 - 36.0	127	15	3.3	700	175.0	76	2,200	0.50
MD324S-05RW(C)	24	18.0 - 36.0	154	15	5.0	600	150.0	81	1,000	0.50
MD324S-12RW(C)	24	18.0 - 36.0	151	25	12.0	250	62.5	83	470	0.50
MD324S-15RW(C)	24	18.0 - 36.0	145	25	15.0	200	50.0	86	220	0.50
MD324D-05RW(C)	24	18.0 - 36.0	152	20	±5.0	±300	±75.0	82	±470	0.50
MD324D-12RW(C)	24	18.0 - 36.0	151	25	±12.0	±125	±31.25	83	±220	0.50
MD324D-15RW(C)	24	18.0 - 36.0	149	25	±15.0	±100	±25.0	84	±100	0.50
MD348S-03RW(C)	48	36.0 - 72.0	63	10	3.3	700	175.0	76	2,200	0.315
MD348S-05RW(C)	48	36.0 - 72.0	78	6	5.0	600	150.0	80	1,000	0.315
MD348S-12RW(C)	48	36.0 - 72.0	76	15	12.0	250	62.5	82	470	0.315
MD348S-15RW (C)	48	36.0 - 72.0	75	20	15.0	200	50.0	83	220	0.315
MD348D-05RW(C)	48	36.0 - 72.0	79	20	±5.0	±300	±75.0	79	±470	0.315
MD348D-12RW(C)	48	36.0 - 72.0	76	25	±12.0	±125	±31.25	82	±220	0.315
MD348D-15RW(C)	48	36.0 - 72.0	76	20	±15.0	±100	±25.0	82	±100	0.315

Notes:

1. Measured with a simulated source inductance of 12 μ H and a source capacitor C_{IN} (47 μ F, ESR < 1.0 Ω at 100 Hz).
2. When measuring output ripple & noise, it is recommended that a 0.1 μ F MLCC and 10 μ F electrolytic capacitor be placed from the +VOUT to the -VOUT pins for single output units and from each output to common for dual output models.
3. Transient recovery is measured to within a 1% error band for a load step change of 25%.
5. Isolation voltage is specified for a period 60S.
6. Operation at no-load will not damage the unit, but 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 Model Selection table above for the correct rating.
8. For the Remote ON/OFF feature add a "C" to the end of the part number (see above).

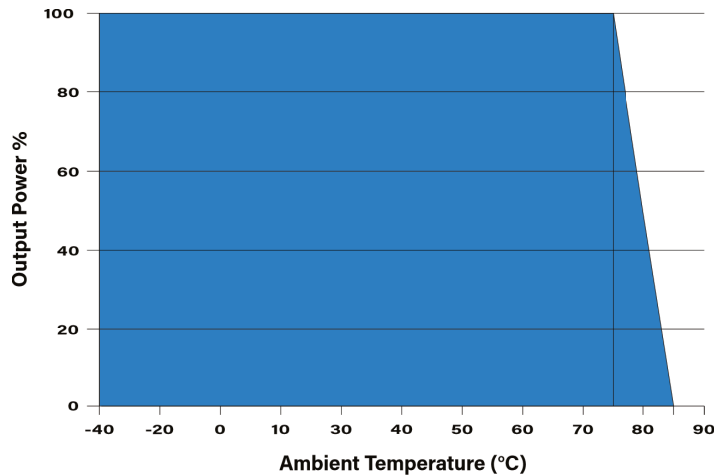
Output Power Derating**5V Output Models**

Output Power Derating



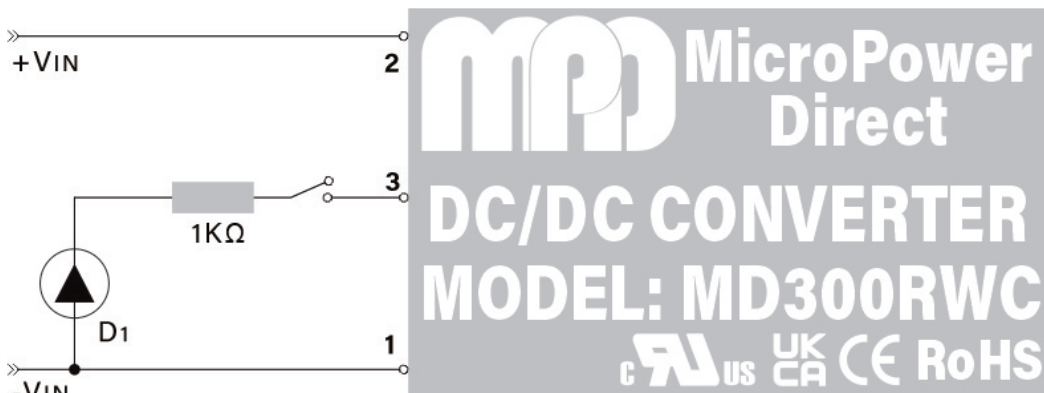
3.3V Output Models & Models with 81% to 83% Efficiency

Output Power Derating



Models with 84% to 86% Efficiency

Remote ON/OFF Control



The MD300RWC may be started or shutdown by the control pin input (pin 3). This input is current controlled. The unit operates when pin 3 is left open. When the input is "high" (current flowing into the pin), the converter shuts down.

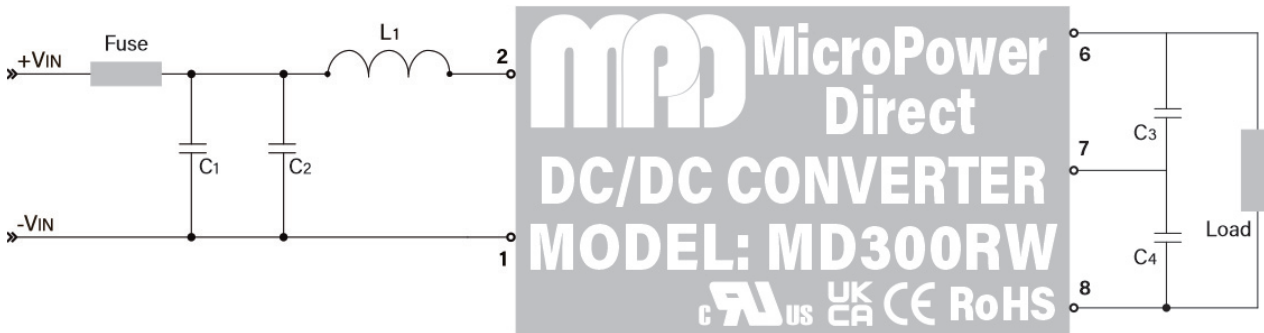
If used, the input current to this pin should be kept between 3 mA to 6 mA. Exceeding 20 mA on this input or connecting it directly to ground could damage the converter.

EMI Characteristics

Parameter	Standard		Criteria	Level
Radiated Emissions	CISPR 32/EN 55032			Class A (See Typical Connection on Pg 4)
Conducted Emissions	CISPR 32/EN 55032			Class A (See Typical Connection on Pg 4)
ESD	EN 61000-4-2		A	±6 kV Indirect
			A	±8 kV Air
RS	EN 61000-4-3		A	20V/m
EFT	See Note 2	EN 61000-4-4	A	±2 kV
Surge	See Note 3	EN 61000-4-5	A	±1 kV
CS	EN 61000-4-6		A	10 Vrms
PFMF	EN 61000-4-8		A	1A/m

Notes:

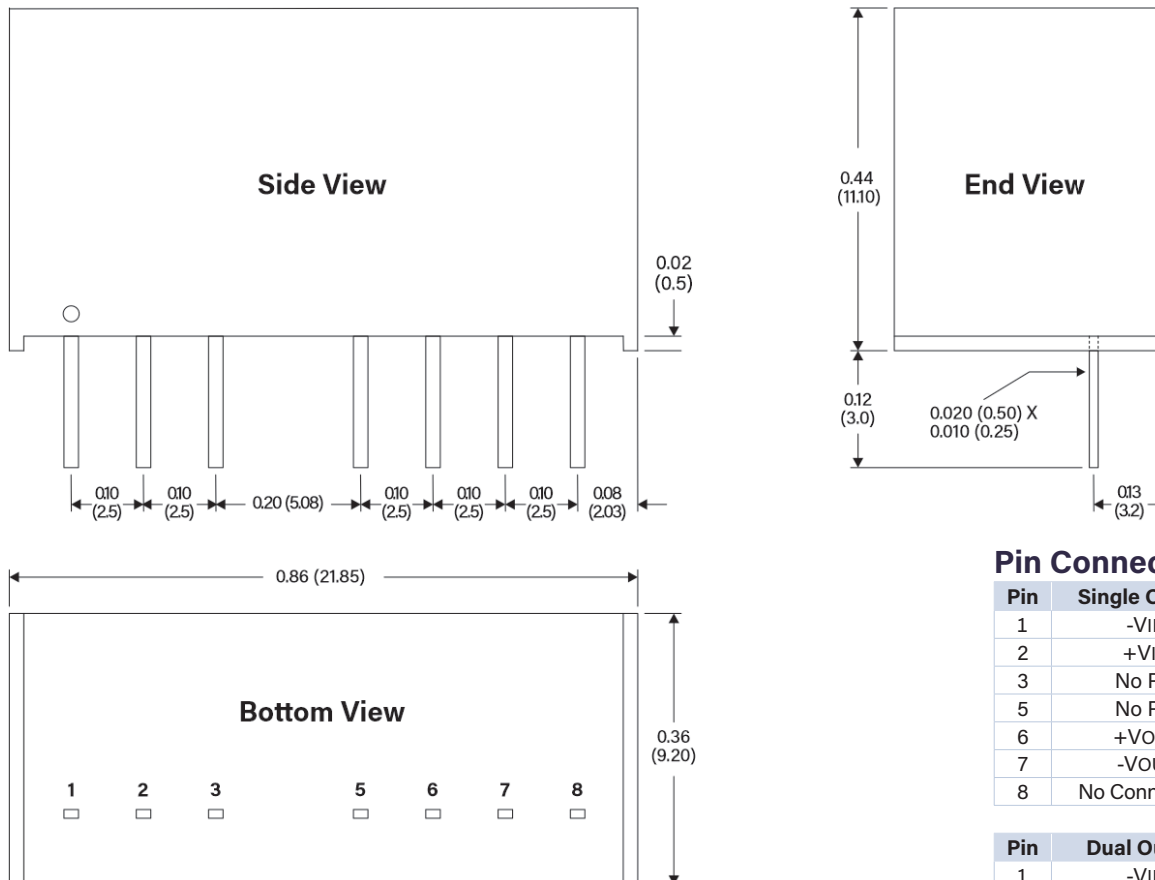
1. If the application does not require emissions to meet international standards, simply adding capacitors to the input and output circuits may be sufficient to reduce ripple & noise. See the Typical Connection diagram and notes on page 4.
2. To meet the requirements of EN 61000-4-4, external components are needed. The Typical Connection diagram on page 4 shows an external input filter that would typically achieve this. Contact the factory for more information.
3. To meet the requirements of EN 61000-4-5, external components are needed. This can be done as shown in the Typical Connection diagram on page 4. Contact the factory for more information.



The diagram above illustrates a simple connection of the **MD300RW** for applications that require the circuit to meet Surge/EFT testing (C1) and EMI/EMC specifications (C2, L1). The output capacitors (C3, C4) will reduce input/output ripple and improve the converter stability over time and temperature. The recommended component values are:

Component	5 VIN	12 VIN/SOUT	12 VIN/DOUT	24 VIN	48 VIN
C1	470 μ F/100V Chemi CON KY Series	470 μ F/100V Chemi CON KY Series	470 μ F/100V Chemi CON KY Series	470 μ F/100V Chemi CON KY Series	470 μ F/100V Chemi CON KY Series
C2	220 μ F/25V Chemi CON KY Series	100 μ F/100 Chemi CON KY Series	2.2 μ F/100V MLCC	10 μ F/50V MLCC	100 μ F/100V Chemi CON KY Series
L1	5.6 μ H	18 μ H	18 μ H	18 μ H	56 μ H

Mechanical Dimensions



Notes:

- All dimensions are typical in inches (mm)
- Pin 1 is marked by a "dot" or indentation on the unit
- General Tolerance = ± 0.02 (± 0.50)
- Pin Tolerance = ± 0.002 (± 0.05)
- Recommended pin hole size (on the application PC Board) is $\varnothing 0.031$ ($\varnothing 0.80$)
- Weight (Typ) = 0.158 Oz (4.5g)

Pin Connections

Pin	Single Output	Single Output (C)
1	-VIN	-VIN
2	+VIN	+VIN
3	No Pin	CTRL
5	No Pin	No Connection
6	+VOUT	+VOUT
7	-VOUT	-VOUT
8	No Connection	No Connection

Pin	Dual Output	Dual Output (C)
1	-VIN	-VIN
2	+VIN	+VIN
3	No Connection	CTRL
5	No Connection	No Connection
6	+VOUT	+VOUT
7	Common	Common
8	-VOUT	-VOUT