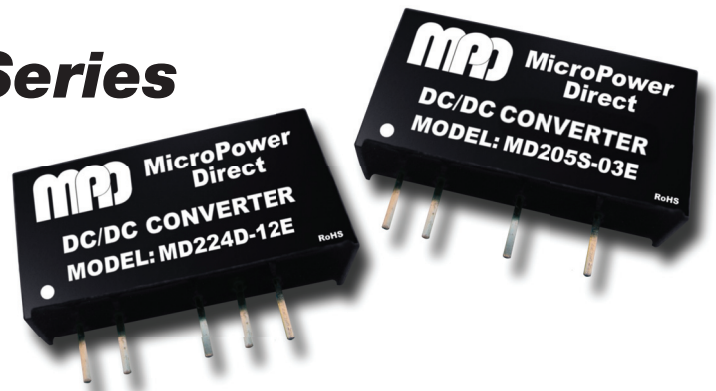


MD200xE Series

Low Cost, 2W Miniature SIP DC/DC Converters



Key Features:

- 2W Output Power
- Miniature SIP Case
- Short Circuit Protected
- 1,500 VDC Isolation
- 57 Standard Models
- Single and Dual Outputs
- >3.5 MHour MTBF
- -40°C to +105°C Operation
- LOW COST

3.0 kV Isolation
Models
Available

RoHS



Cost Cuts



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Electrical Specifications

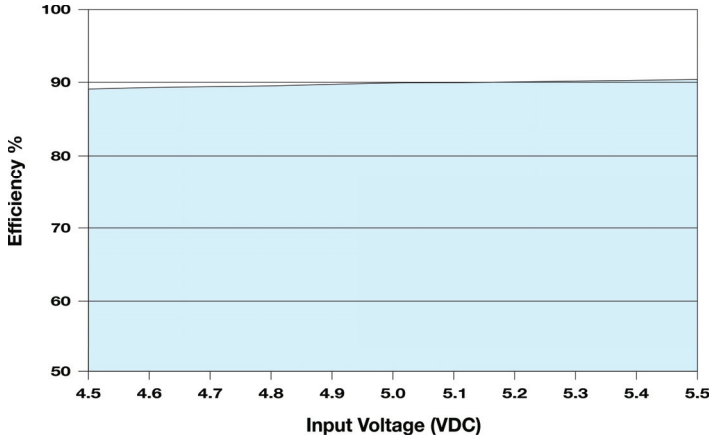
Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input		Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range			5 VDC Input	4.50	5.0	5.50	VDC
			9 VDC Input	8.10	9.0	9.90	
			12 VDC Input	10.80	12.0	13.20	
			15 VDC Input	13.50	15.0	16.50	
			24 VDC Input	21.60	24.0	26.40	
Input Filter			Internal Capacitor				
Output		Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy					±2.5		%
Line Regulation	3.3 VDC Output	For VIN Change of 1%				±1.5	%
	All Other Outputs					±1.2	
Load Regulation, See Note 1			See Model Selection Guide				
Ripple & Noise (20 MHz), See Note 2			Output Voltage ≤12 VDC		60		mV P - P
			15 VDC, 24 VDC Output		75		
Temperature Coefficient						±0.03	%/°C
Output Short Circuit			Continuous (Autorecovery)				
General		Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage			60 Seconds	1,500			VDC
Isolation Resistance			500 VDC	1,000			MΩ
Isolation Capacitance			100 kHz, 1V		20		pF
Switching Frequency					100	300	kHz
EMI Characteristics		Parameter	Conditions	Min.	Typ.	Max.	Units
EMI Compliance, See Note 4			Conducted				CISPR22/EN 55022 Level B
			Radiated				CISPR22/EN 55022 Level B
EMC Compliance, Single Output		Electrostatic Discharge (ESD)					EN 61000-4-2 Level B Contact ±8 kV
EMC Compliance, Dual Output							EN 61000-4-2 Level B Contact ±6 kV
Environmental		Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range			Ambient	-40	+25	+105	°C
Storage Temperature Range				-55		+125	°C
Cooling			Free Air Convection				
Humidity			RH, Non-condensing			95	%
Physical		Case Size	0.772 x 0.276 x 0.394 Inches (19.6 x 7.0 x 10.0 mm)				
Case Material			Non-Conductive Black Plastic (UL-94V0)				
Weight			0.08 Oz (2.4g)				
Reliability Specifications		Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF			MIL HDBK 217F, 25°C, Gnd Benign	3.5			MHours
Absolute Maximum Ratings		Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)			5 VDC Input	-0.7		9.0	VDC
			9 VDC Input	-0.7		12.0	
			12 VDC Input	-0.7		18.0	
			15 VDC Input	-0.7		21.0	
			24 VDC Input	-0.7		30.0	
Lead Temperature			1.5 mm From Case For 10 Sec			300	°C

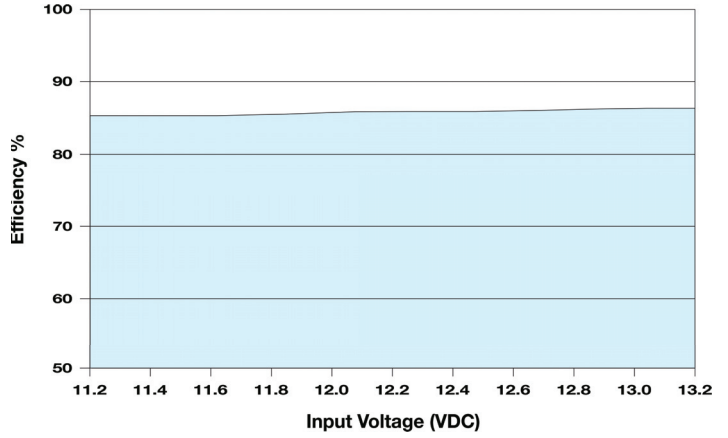
Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

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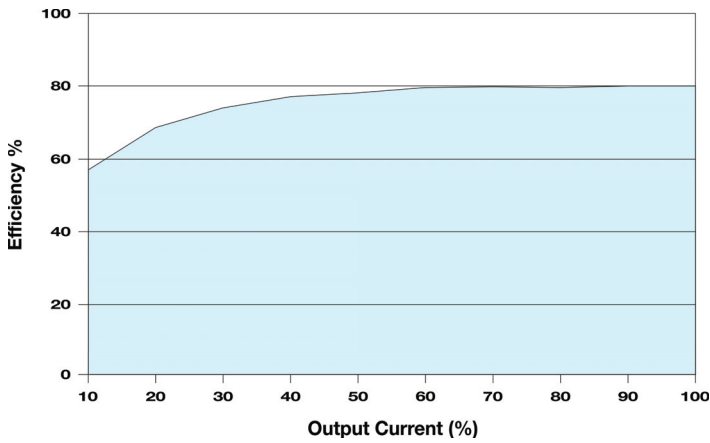
Typical Efficiency vs Input, 5 VIN Models



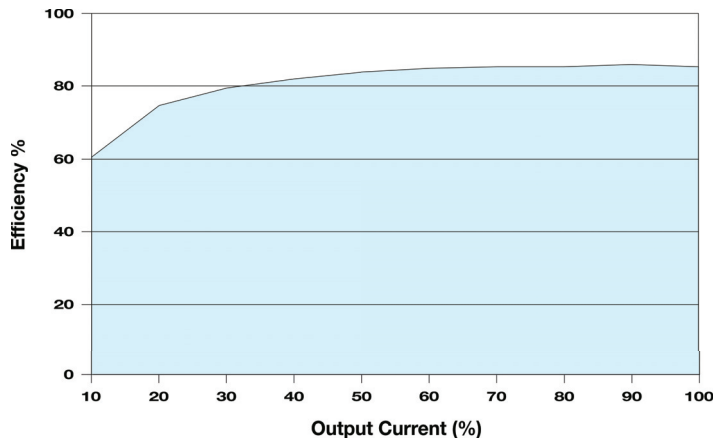
Typical Efficiency vs Input, 12 VIN Models



Typical Efficiency vs Output, 5 VIN Models

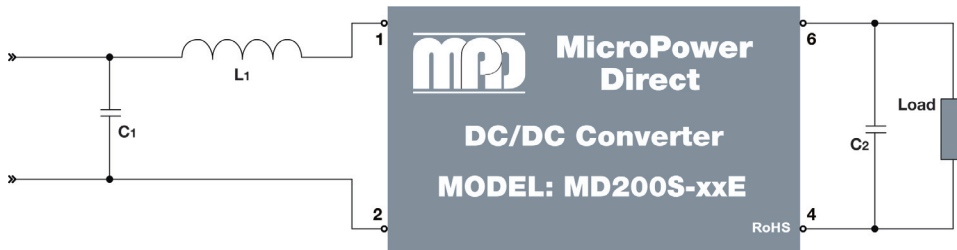


Typical Efficiency vs Output, 12 VIN Models



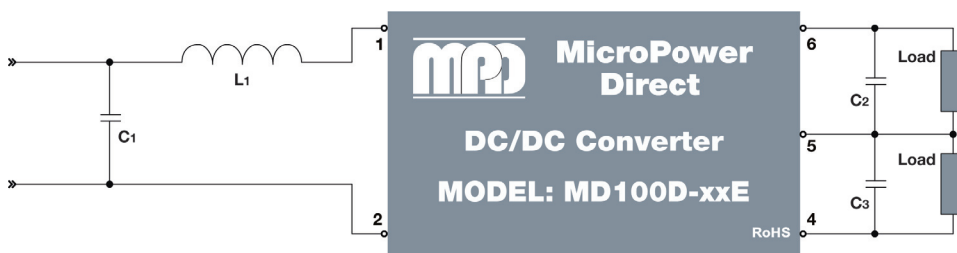
Efficiency vs input is plotted with the unit at full load. Efficiency vs output is plotted with the unit at nominal input.

Typical Connection, Single Output Models



VIN	C1	L1
3.3 VDC	4.7 μ F/50V	6.8 μ H
5 VDC	4.7 μ F/50V	6.8 μ H
12 VDC	4.7 μ F/50V	6.8 μ H
15 VDC	4.7 μ F/50V	6.8 μ H
24 VDC	4.7 μ F/50V	6.8 μ H

Typical Connection, Dual Output Models

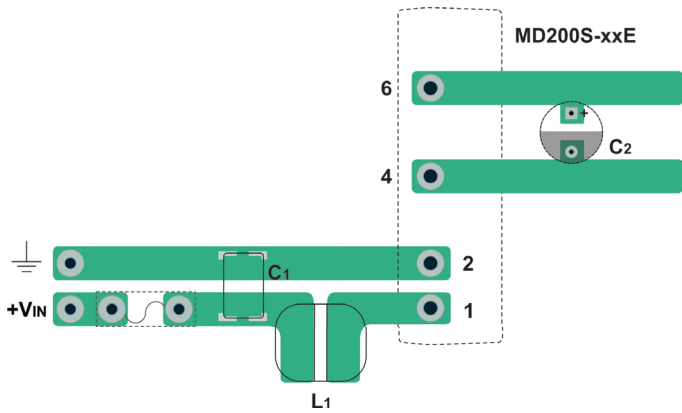


VOUT	C2	C3
3.3 VDC	10 μ F	10 μ F
5.0 VDC	10 μ F	10 μ F
9.0 VDC	2.2 μ F	2.2 μ F
12 VDC	2.2 μ F	2.2 μ F
15 VDC	1.0 μ F	1.0 μ F
24 VDC	1.0 μ F	1.0 μ F
\pm 3.3 VDC	4.7 μ F	4.7 μ F
\pm 5.0 VDC	4.7 μ F	4.7 μ F
\pm 9.0 VDC	1.0 μ F	1.0 μ F
\pm 12 VDC	1.0 μ F	1.0 μ F
\pm 15 VDC	0.47 μ F	0.47 μ F
\pm 24 VDC	0.47 μ F	0.47 μ F

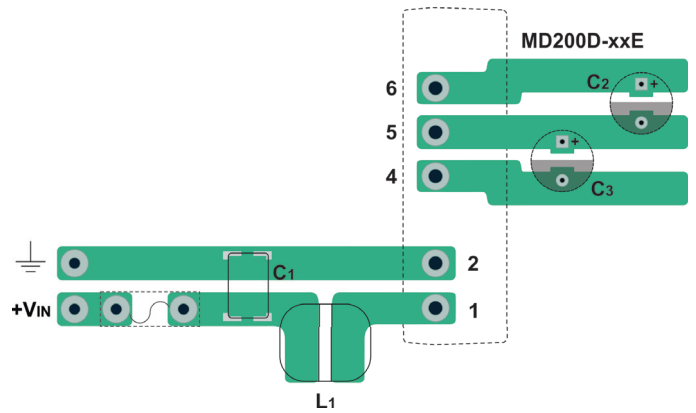
These converters are specified for operation without external components. However, in some applications the addition of input/output capacitors will enhance stability and reduce output ripple. For applications that require meeting EMC standards, the diagrams above illustrates a typical connection of the MD200x-xxE series. Suggested component values are given in the table at right.

Capacitors C2 and C3 are not required to meet specifications, but may be used if a lower level of output ripple is required.

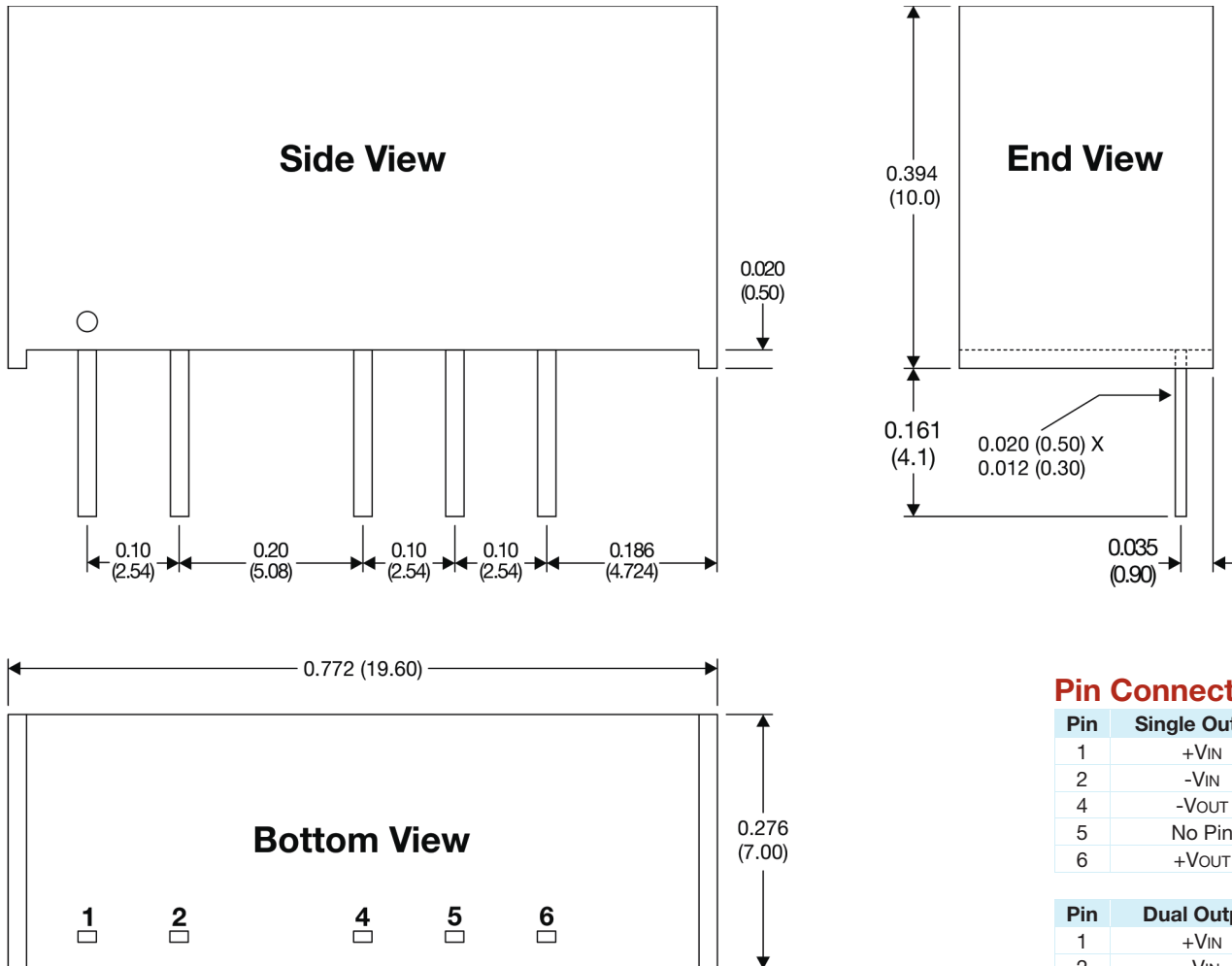
Typical Board Layout, Single Output Models



Typical Board Layout, Dual Output Models



Mechanical Dimensions



Pin Connections

Pin	Single Output
1	+VIN
2	-VIN
4	-VOUT
5	No Pin
6	+VOUT

Pin	Dual Output
1	+VIN
2	-VIN
4	-VOUT
5	Common
6	+VOUT

Notes:

- All dimensions are typical in inches (mm)
- General Tolerance x.xx = ± 0.02 (± 0.5)
- Pin 1 is marked by a "dot" or indentation on the unit



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