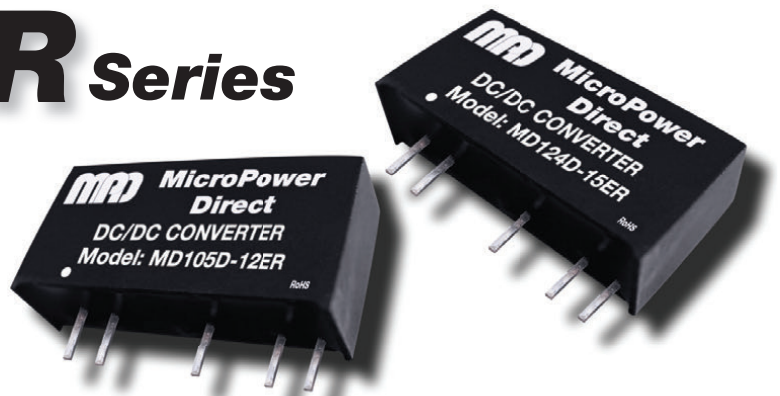


# MD100DER Series

## Dual Output, 1W SIP Tightly Regulated DC/DC Converters



### Key Features:

- 1W Output Power
- Tight Regulation
- Miniature SIP Case
- 1,000 VDC Isolation
- 12 Dual Output Models
- >3.5 MHour MTBF
- -40°C to +85°C Operation
- **LOW COST**

**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	4.75	5.0	5.25	VDC
	12 VDC Input	11.40	12.0	12.60	
	24 VDC Input	22.80	24.0	25.20	
Input Filter	Internal Capacitor				

#### Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±3.0	%
Line Regulation	For VIN Min to Max			±0.25	%
Load Regulation	For IOUT = 10% to 100%			±1.0	%
Ripple (20 MHz)	See Note 2		10	20	mV P - P
Noise (20 MHz)			50	100	mV P - P
Temperature Coefficient				±0.03	%/°C
Output Short Circuit	±5 VDC Output Models	Continuous (Autorecovery)			
	All Other Models	Momentary (1.0 Sec)			

#### General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Seconds	1,000			VDC
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz, 1V		60		pF
Switching Frequency	See Note 3		100		kHz

#### Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Storage Temperature Range		-55		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

#### Physical

Case Size	1.083 x 0.374 x 0.472 Inches (27.5 x 9.5 x 12.0 mm)				
Case Material	Non-Conductive Black Plastic (UL-94V0)				
Weight	0.173 Oz (5.2g)				

#### 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
	12 VDC Input	-0.7		18.0	
	24 VDC Input	-0.7		30.0	
Lead Temperature	1.5 mm From Case For 10 Sec			300	°C

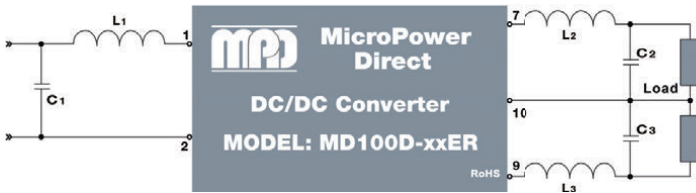
Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

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Model Number	Input				Output			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					
MD105D-05ER	5	4.75 - 5.25	289	30	±5.0	±100	±10.0	69	600
MD105D-09ER	5	4.75 - 5.25	317	30	±9.0	±56	±6.0	63	600
MD105D-12ER	5	4.75 - 5.25	317	30	±12.0	±42	±5.0	63	600
MD105D-15ER	5	4.75 - 5.25	307	30	±15.0	±33	±4.0	65	600
MD112D-05ER	12	11.4 - 12.6	116	15	±5.0	±100	±10.0	72	250
MD112D-09ER	12	11.4 - 12.6	116	15	±9.0	±56	±6.0	62	250
MD112D-12ER	12	11.4 - 12.6	128	15	±12.0	±42	±5.0	65	250
MD112D-15ER	12	11.4 - 12.6	126	15	±15.0	±33	±4.0	66	250
MD124D-05ER	24	22.8 - 25.2	58	12	±5.0	±100	±10.0	72	150
MD124D-09ER	24	22.8 - 25.2	67	12	±9.0	±56	±6.0	62	150
MD124D-12ER	24	22.8 - 25.2	65	12	±12.0	±42	±5.0	64	150
MD124D-15ER	24	22.8 - 25.2	63	12	±15.0	±33	±4.0	66	150

Notes:

1. Operation at no load will not damage these units. However, they may not meet all specifications.
2. These converters will operate without external components. However, when measuring output ripple, it is recommended that an external 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. An input capacitor will enhance stability over temperature and input line variations. For applications requiring very low output noise levels, a simple LC filter, as shown in the connection diagram below, should be effective. Recommended component values are given in the table below the diagram.



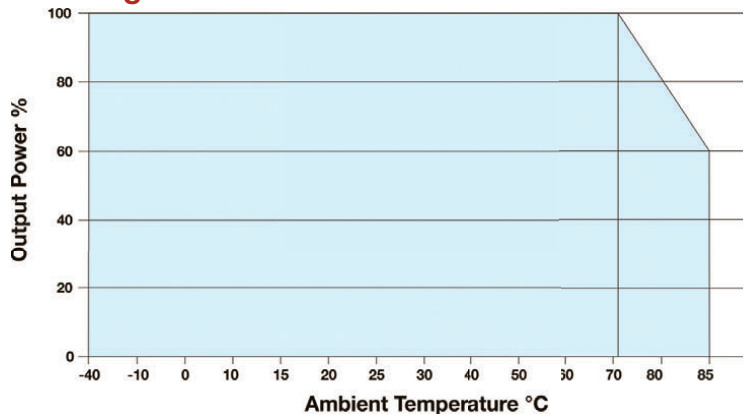
VIN	C1	L1	VOUT	L2, L3	C2, C3
5 VDC	4.7 μF/50V	4.7 - 10 μH	±5 VDC	4.7 - 10 μH	10 μF
12 VDC	4.7 μF/50V	4.7 - 10 μH	±9 VDC	4.7 - 10 μH	4.7 μF
24 VDC	1.0 μF/50V	4.7 - 10 μH	±12 VDC	4.7 - 10 μH	2.2 μF
			±15 VDC	4.7 - 10 μH	1.0 μF

3. The typical switching frequency for the MD105D-15ER is 250 kHz. For the MD124D-15ER the typical switching frequency is 300 kHz.
4. 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.

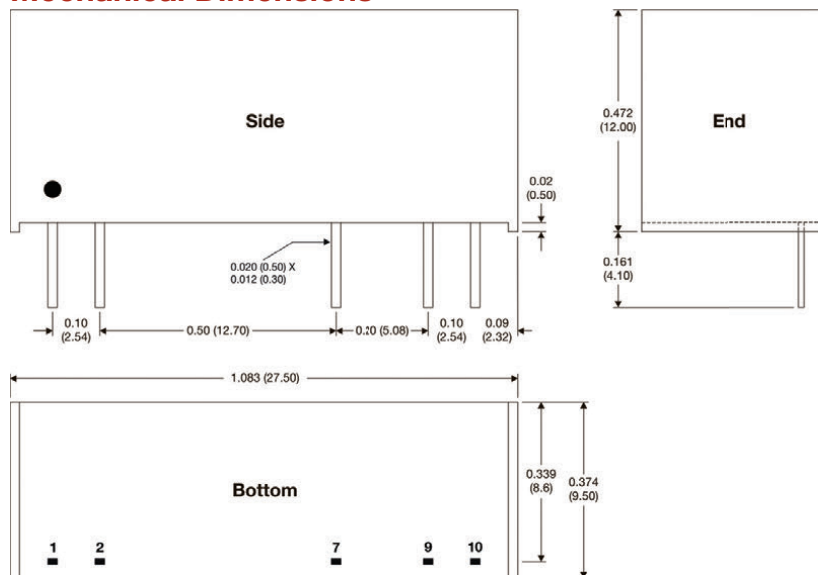
Pin Connections

Pin	Function
1	+VIN
2	-VIN
7	+VOUT
9	-VOUT
10	Common

Derating Curve



Mechanical Dimensions



Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.02 (±0.50)
- Pin 1 is marked by a "dot" or indentation on the unit



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