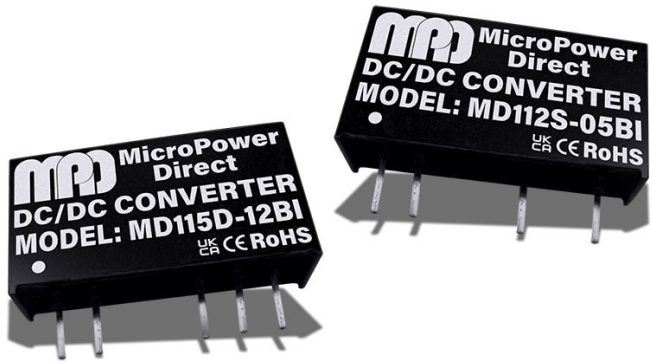
MD100BI

1W, High Isolation, Single & Dual Output DC/DC Converters



Key Features:

- 1W Output Power
- Miniature SIP Case
- -40°C to +105°C Temp
- 3000VDC Isolation
- Single & Dual Outputs
- Short Circuit Protection
- >3000 kHour MTBF
- 43 Standard Models
- 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, See Note 5	3.3 VDC Input	2.97	3.3	3.63	VDC
	5 VDC Input	4.5	5	5.5	
	12 VDC Input	10.8	12	13.2	
	15 VDC Input	13.5	15	16.5	
	24 VDC Input	21.6	24	26.4	
Reflected Ripple Current			15		mA
Input Filter			Capacitance Filter		

Output

Parameter	Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy	See Tolerance Graphs					
Line Regulation	Vin Change of 1%	3.3 VDC Output		±1.5		%
		Other Outputs		±1.2		
Load Regulation	10%-100% Load	3.3 VDC		10		%
		5 VDC		10		
		12 VDC		8		
		15 VDC		6		
		24 VDC		6		
Ripple & Noise, See Note 2	20 MHz bandwidth			45	100	mVp-p
Temperature Coefficient	Full load			±0.03		%/°C
Output Short Circuit	Continuous, self-recovery					

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 seconds	3000			VDC
Isolation Resistance	500 VDC	1000			MΩ
Isolation Capacitance	100 KHz /0. 1V		20		pF
Switching Frequency			220		kHz

Environmental

Parameter	Conditions	Min.	Typ	Max.	Units
Operating Temperature Range	See Fig. 5	-40		+105	°C
Storage Temperature Range		-55		+125	°C
Cooling	Free Air Convection				
Humidity, See Note 9	Non condensing			95	%RH

Physical

Case Size	0.77 x 0.24 x 0.4 in. (See Mechanical Diagrams on page 4)
Case Material	Back Plastic; flame-retardant and heat resistance (UL94V-0)
Weight	0.074 oz (2.1g) (See Mechanical Diagrams on page 4)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL-HDBK-217F@25°C	3000			kHours
Safety Standards	See Model Selection Guide				

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	3.3 VDC Input	-0.7		5	VDC
	5 VDC Input	-0.7		9	
	12 VDC Input	-0.7		18	
	15 VDC Input	-0.7		21	
	24 VDC Input	-0.7		30	
Lead Temperature	1.5 mm from Case for 10 Sec.			300	°C

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Model Selection Guide

UL	Model Number	Input				Output			Full Load Efficiency (%, Typ)	Reflected Ripple Current (mA Typ)	Capacitive Load (µF Max) (See Note 8)	Fuse Rating Slow-Blow (mA) (See Note 1)
		Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
		Nominal	Range	Full-Load	No-Load							
	MD103S-03BI	3.3	2.97 - 3.63	370	3	3.3	303	0.0	82	15	4000	750
	MD103S-05BI	3.3	2.97 - 3.63	370	3	5.0	200	0.0	83	15	4000	750
	MD103S-09BI	3.3	2.97 - 3.63	370	3	9.0	111	0.0	84	15	2000	750
	MD103S-12BI	3.3	2.97 - 3.63	370	3	12.0	84	0.0	85	15	1000	750
	MD105S-03BI	5	4.5 - 5.5	235	3	3.0	303	0.0	83	15	4000	500
▪	MD105S-05BI	5	4.5 - 5.5	235	3	5.0	200	0.0	86	15	4000	500
	MD105S-09BI	5	4.5 - 5.5	235	3	9.0	111	0.0	86	15	2000	500
▪	MD105S-12BI	5	4.5 - 5.5	235	3	12.0	84	0.0	88	15	1000	500
	MD105S-15BI	5	4.5 - 5.5	235	3	15.0	67	0.0	88	15	680	500
	MD105S-24BI	5	4.5 - 5.5	235	3	24.0	42	0.0	89	15	560	500
	MD105D-03BI	5	4.5 - 5.5	235	3	±3.3	±152	0.0	84	15	2000	500
	MD105D-05BI	5	4.5 - 5.5	235	3	±5.0	±100	0.0	86	15	2000	500
	MD105D-09BI	5	4.5 - 5.5	235	3	±9.0	±56	0.0	86	15	1000	500
	MD105D-12BI	5	4.5 - 5.5	235	3	±12.0	±42	0.0	88	15	560	500
	MD105D-15BI	5	4.5 - 5.5	235	3	±15.0	±34	0.0	88	15	220	500
	MD112S-03BI	12	10.8 – 13.2	99	3	3.3	303	0.0	84	15	4000	200
	MD112S-05BI	12	10.8 – 13.2	99	3	5.0	200	0.0	86	15	4000	200
	MD112S-09BI	12	10.8 – 13.2	99	3	9.0	111	0.0	87	15	2000	200
	MD112S-12BI	12	10.8 – 13.2	99	3	12.0	84	0.0	87	15	1000	200
	MD112S-15BI	12	10.8 – 13.2	99	3	15.0	67	0.0	88	15	680	200
	MD112S-24BI	12	10.8 – 13.2	99	3	24.0	42	0.0	89	15	560	200
	MD112D-03BI	12	10.8 – 13.2	99	3	±3.3	±152	0.0	84	15	2000	200
	MD112D-05BI	12	10.8 – 13.2	99	3	±5.0	±100	0.0	86	15	2000	200
	MD112D-09BI	12	10.8 – 13.2	99	3	±9.0	±56	0.0	87	15	560	200
	MD112D-12BI	12	10.8 – 13.2	99	3	±12.0	±42	0.0	87	15	220	200
	MD112D-15BI	12	10.8 – 13.2	99	3	±15.0	±34	0.0	88	15	220	200
	MD115S-05BI	15	13.5 – 16.5	85	3	5.0	200	0.0	86	15	2400	175
	MD115S-09BI	15	13.5 – 16.5	85	3	9.0	111	0.0	87	15	1000	175
	MD115S-12BI	15	13.5 – 16.5	85	3	12.0	84	0.0	87	15	560	175
	MD115S-15BI	15	13.5 – 16.5	85	3	15.0	67	0.0	88	15	560	175
	MD115D-05BI	15	13.5 – 16.5	85	3	±5.0	±100	0.0	86	15	1000	175
	MD115D-12BI	15	13.5 – 16.5	85	3	±12.0	±42	0.0	87	15	220	175
	MD115D-15BI	15	13.5 – 16.5	85	3	±15.0	±34	0.0	88	15	220	175
	MD124S-03BI	24	21.6 – 26.4	51	3	3.3	303	0.0	84	15	2400	100
	MD124S-05BI	24	21.6 – 26.4	51	3	5.0	200	0.0	87	15	2400	100
	MD124S-09BI	24	21.6 – 26.4	51	3	9.0	111	0.0	88	15	1000	100
	MD124S-12BI	24	21.6 – 26.4	51	3	12.0	84	0.0	88	15	560	100
	MD124S-15BI	24	21.6 – 26.4	51	3	15.0	67	0.0	88	15	560	100
	MD124S-24BI	24	21.6 – 26.4	51	3	24.0	42	0.0	89	15	220	100
	MD124D-05BI	24	21.6 – 26.4	51	3	±5.0	±100	0.0	87	15	1000	100
	MD124D-09BI	24	21.6 – 26.4	51	3	±9.0	±56	0.0	88	15	560	100
	MD124D-12BI	24	21.6 – 26.4	51	3	±12.0	±42	0.0	88	15	220	100
	MD124D-15BI	24	21.6 – 26.4	51	3	±15.0	±34	0.0	88	15	220	100

* MD105S-05BI, -12BI have UL/cUL 62368 recognition (UL certificate). Contact factory for safety standard status of other models.

Notes:

1. 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.
2. To further reduce input and output ripple, a capacitor filtering network can be connected at the input and output terminals. The application circuit is shown in Figure 6. However, care should be taken to select a suitable filter capacitor. If the capacitance is too large, it is likely to cause start-up problems.
3. For EMC typical recommended circuit. See Figure 7.
4. In order to ensure that the module can work efficiently and reliably, the minimum output load should not be less than 10% of the rated load when used. If the power required is really small, connect a resistor in parallel to the output end (the sum of the power consumed by the resistance and the power actually used is greater than or equal to 10% of the rated power).
5. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage.
6. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product.
7. Suggested dual output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance meets all performance indicators in this manual.
8. The maximum capacitive load is tested within the input voltage range and under full load conditions.
9. Unless otherwise specified, all indicators in this manual are measured at Ta=25 °C, humidity<75% RH, nominal input voltage, and output rated load.
10. All indicator testing methods in this manual are based on our company's corporate standards.
11. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel.
12. Product specifications are subject to change without prior notice.

Output Regulation (Other Models)

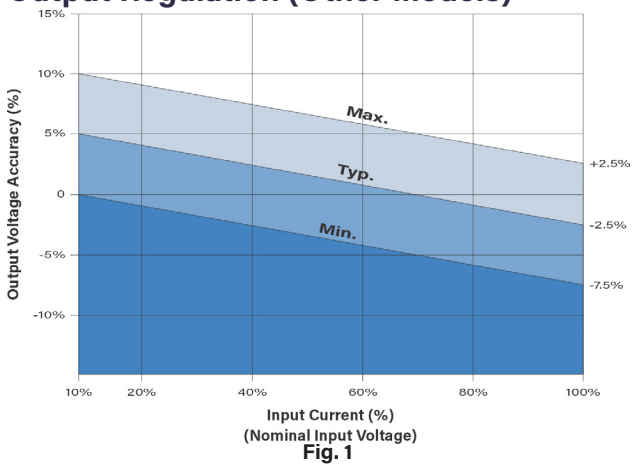


Fig. 1

Output Regulation (3.3V Output)

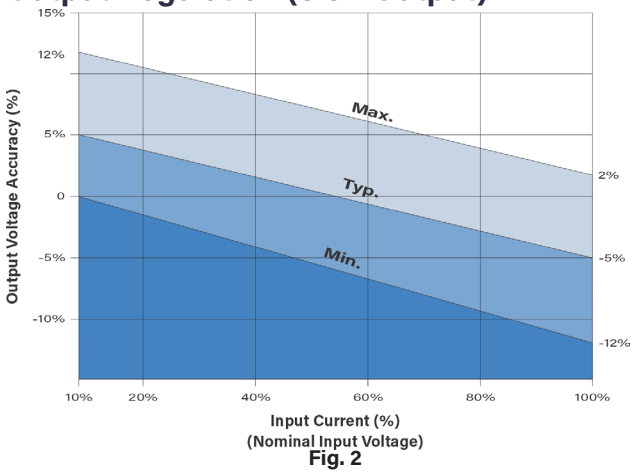


Fig. 2

Efficiency vs Input Voltage (Full Load)

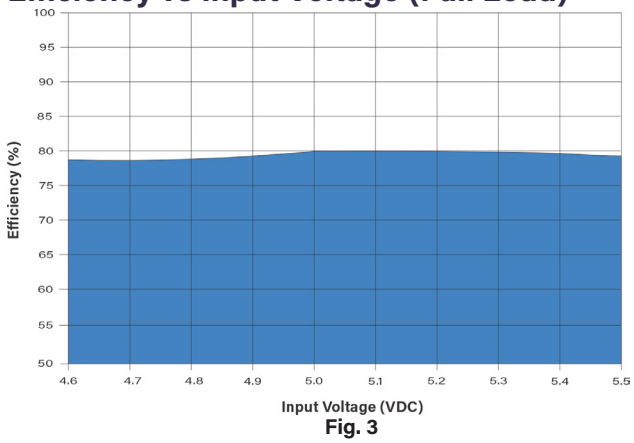


Fig. 3

Efficiency vs Output Load (5V Input)

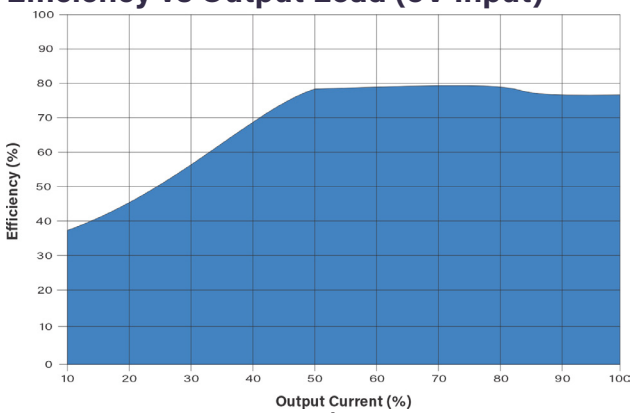


Fig. 4

Temperature Derating

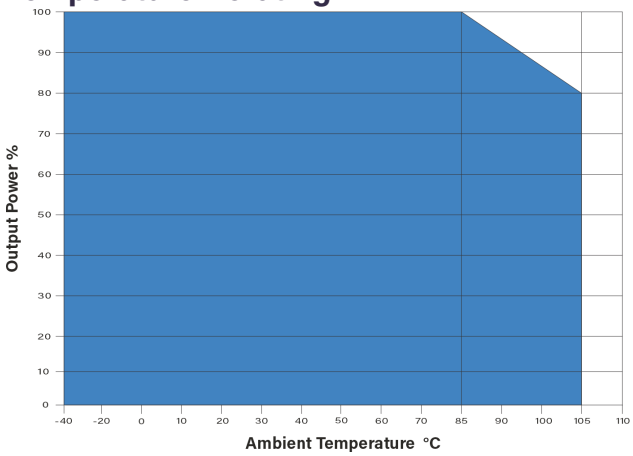


Fig. 5

Circuit Design and Application

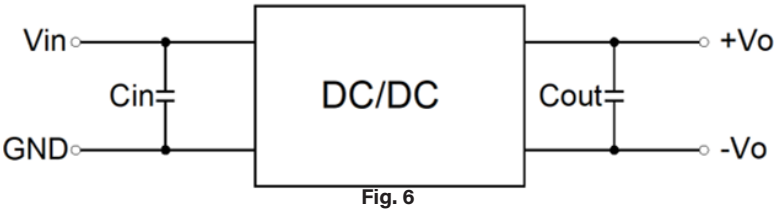


Fig. 6

Recommended Capacitive Load Values			
Vin	Cin	Vo	Cout (uF)
3.3/5 VDC	4.7uF/16V	3.3/5 VDC	10
12 VDC	2.2uF/25V	12 VDC	2.2
15 VDC	2.2uF/25V	15 VDC	1
24 VDC	1uF/50V	24 VDC	0.47

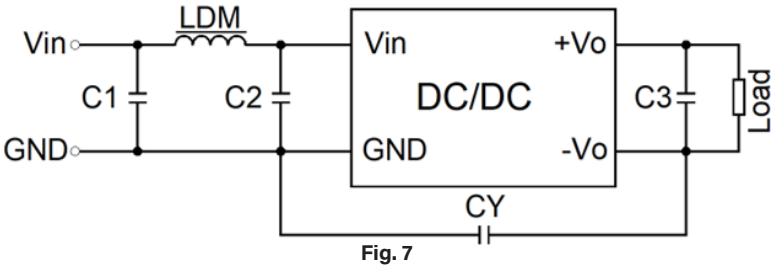


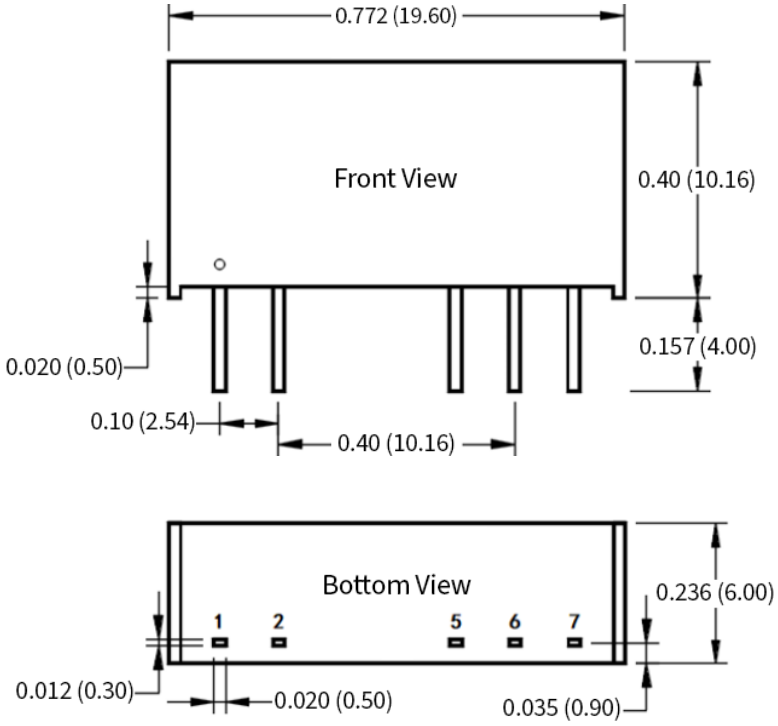
Fig. 7

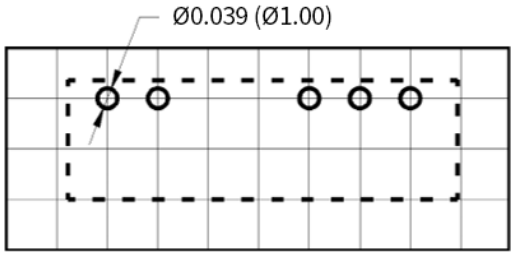
EMI Recommended Parameters	
C1	4.7uF/50V
C2	4.7uF/50V
C3	Refer to Cout in Fig. 6
CY	1000pF/2kV
LDM	6.8uH

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions	CISPR32/EN 55032		Class B (Fig. 7)
Conducted Emissions	CISPR32/EN 55032		Class B (Fig. 7)
ESD	EN 61000-4-2	B	±8 kV Contact

Mechanical Dimensions





Grid distance is 2.54 x 2.54 mm

Pin	Function Single	Function Dual
1	Vin	Vin
2	GND	GND
5	-Vo	-Vo
6	No Pin	COM
7	+Vo	+Vo
NC: Pin to be isolated from circuitry		

Notes:

- All dimensions are typical in inches (mm)
- Pin section tolerances: ±0.004 (±0.10)
- General tolerances: ±0.020 (±0.50)