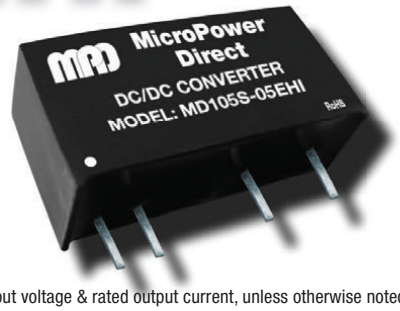
MD100xEHI Series

Low Cost, 1W 6 kV Isolation, SIP DC/DC Converters



Key Features:

- 1W Output Power
- Miniature SIP Case
- Short Circuit Protected
- 6,000 VDC Isolation
- Single and Dual Outputs
- >3.5 MHour MTBF
- -40°C to +105°C Operation
- **LOW COST**

RoHS

Cost Cutter

MicroPower Direct
292 Page Street
Suite D
Stoughton, MA 02072
USA

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

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
	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	For VIN Change of 1%			±1.2	%
Load Regulation, See Note 1	See Model Selection Guide				
Ripple & Noise (20 MHz), See Note 2	Output Voltage ≤12 VDC		100		mV P - P
	15 VDC, 24 VDC Output		150		
Temperature Coefficient				±0.03	%/°C
Output Short Circuit	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Seconds	6,000			VDC
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz, 0.1V		10		pF
Switching Frequency			50		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,	Electrostatic Discharge (ESD)	EN 61000-4-2 Level B Contact ±8 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	0.768 x 0.386 x 0.492 Inches (19.5 x 9.8 x 12.5 mm)
Case Material	Non-Conductive Black Plastic (UL-94V0)
Weight	0.14 Oz (4.2g)

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	
	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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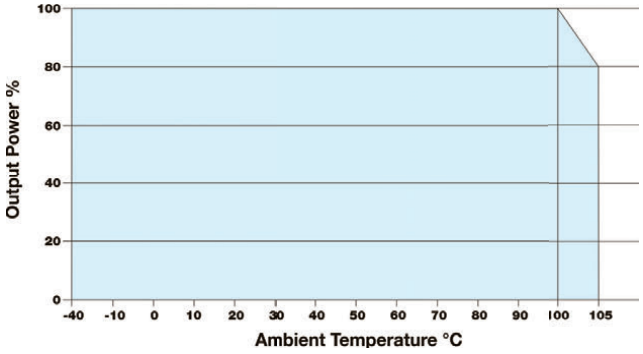
Model Selection Guide

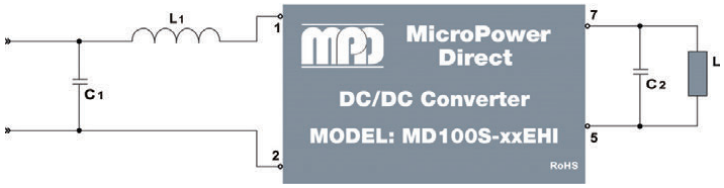
Model Number	Input				Output			Load Regulation	Output Capacitive Load	Efficiency	Fuse Rating Slow-Blow
	Voltage (VDC)		Current (mA)		Voltage	Current	Current				
	Nominal	Range	Full-Load	No-Load	(VDC)	(mA, Max)	(mA, Min)	% Typ.	(µF Max)	(%, Typ)	(mA)
MD105S-03EHI	5	4.5 - 5.5	278	30	3.3	303	30.0	15.0	220	72	500
MD105S-05EHI	5	4.5 - 5.5	256	30	5.0	200	20.0	12.0	220	78	500
MD105S-09EHI	5	4.5 - 5.5	253	30	9.0	111	12.0	8.0	220	79	500
MD105S-12EHI	5	4.5 - 5.5	253	30	12.0	84	9.0	7.0	220	79	500
MD105S-15EHI	5	4.5 - 5.5	253	30	15.0	67	7.0	6.0	220	79	500
MD105S-24EHI	5	4.5 - 5.5	250	30	24.0	42	4.0	5.0	220	80	500
MD105D-05EHI	5	4.5 - 5.5	256	30	±5.0	±100	±10.0	12.0	220	78	500
MD105D-07EHI	5	4.5 - 5.5	256	30	±7.2	±70	±7.0	8.0	220	78	500
MD105D-09EHI	5	4.5 - 5.5	253	30	±9.0	±56	±6.0	8.0	220	79	500
MD105D-12EHI	5	4.5 - 5.5	253	30	±12.0	±42	±5.0	7.0	220	79	500
MD105D-15EHI	5	4.5 - 5.5	253	30	±15.0	±33	±4.0	6.0	220	79	500
MD112S-05EHI	12	10.8 - 13.2	104	20	5.0	200	20.0	12.0	220	80	250
MD112S-07EHI	12	10.8 - 13.2	104	20	7.2	139	14.0	8.0	220	80	250
MD112S-09EHI	12	10.8 - 13.2	102	20	9.0	111	12.0	8.0	220	82	250
MD112S-12EHI	12	10.8 - 13.2	103	20	12.0	84	9.0	7.0	220	81	250
MD112S-15EHI	12	10.8 - 13.2	102	20	15.0	67	7.0	6.0	220	82	250
MD112D-05EHI	12	10.8 - 13.2	104	20	±5.0	±100	±10.0	12.0	220	80	250
MD112D-07EHI	12	10.8 - 13.2	104	20	±7.2	±70	±7.0	8.0	220	80	250
MD112D-09EHI	12	10.8 - 13.2	102	20	±9.0	±56	±6.0	8.0	220	82	250
MD112D-12EHI	12	10.8 - 13.2	103	20	±12.0	±42	±5.0	7.0	220	81	250
MD112D-15EHI	12	10.8 - 13.2	102	20	±15.0	±33	±4.0	6.0	220	82	250
MD115S-05EHI	15	13.5 - 16.5	82	15	5.0	200	20.0	12.0	220	80	200
MD115S-15EHI	15	13.5 - 16.5	82	15	9.0	111	12.0	8.0	220	80	200
MD115D-05EHI	15	13.5 - 16.5	82	15	±5.0	±100	±10.0	12.0	220	80	200
MD115D-15EHI	15	13.5 - 16.5	81	15	±15.0	±33	±4.0	6.0	220	81	200
MD124S-03EHI	24	21.6 - 26.4	58	10	3.3	303	30.0	15.0	220	72	125
MD124S-05EHI	24	21.6 - 26.4	52	10	5.0	200	20.0	12.0	220	80	125
MD124S-12EHI	24	21.6 - 26.4	52	10	12.0	84	9.0	7.0	220	80	125
MD124S-15EHI	24	21.6 - 26.4	52	10	15.0	67	7.0	6.0	220	80	125
MD124D-12EHI	24	21.6 - 26.4	52	10	±12.0	±42	±5.0	7.0	220	80	125

Notes:
1. Output load regulation is specified for a load change of 10% to 100%.
2. Operation at no load will not damage these units, however, they may not meet all specifications.
3. 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. The simple connection shown below will typically meet EN 55022 Class B. For dual output units, a capacitor should be connected from each output to common.
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.

Derating Curve

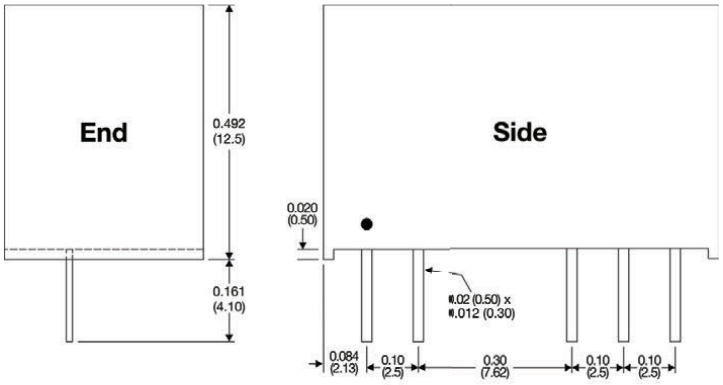


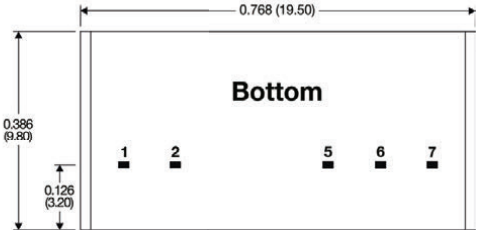
Typical Connection



VIN	C1	L1	VOUT	C2
5 VDC	4.7 µF/50V	6.8 µH	3.3 VDC	10 µF
12 VDC	2.2 µF/50V	6.8 µH	5 VDC	10 µF
15 VDC	2.2 µF/50V	6.8 µH	7.2 VDC	4.7 µF
24 VDC	1.0 µF/50V	6.8 µH	9 VDC	4.7 µF
			12 VDC	2.2 µF
			15 VDC	1.0 µF
			24 VDC	1.0 µF
			±5 VDC	4.7 µF
			±7.2 VDC	2.2 µF
			±9 VDC	2.2 µF
			±12 VDC	2.2 µF
			±15 VDC	1.0 µF

Mechanical Dimensions





Pin Connections

Pin	Single	Dual
1	+VIN	+VIN
2	-VIN	-VIN
5	-VOUT	-VOUT

Pin	Single	Dual
6	No Pin	Common
7	+VOUT	+VOUT

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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292 Page Street Ste D Stoughton, MA 02072 • TEL: (781) 344-8226 • FAX: (781) 344-8481 • E-Mail: sales@micropowerdirect.com