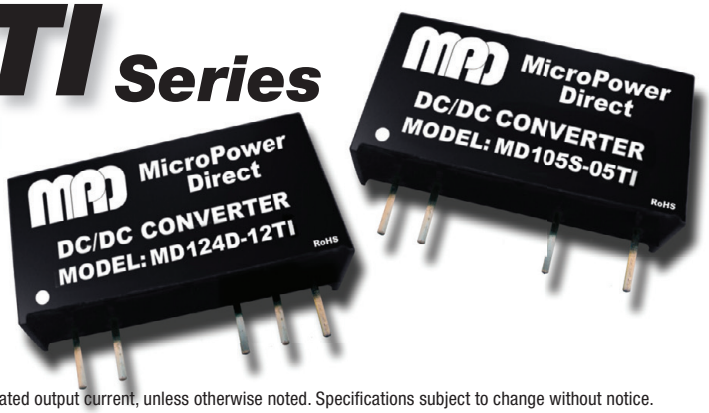
MD100x-xxTI Series

3 kVDC Isolation, 1W High Temperature, SIP DC/DC Converters



Key Features:

- 1W Output Power
- -40°C to +105°C Operation
- 3,000 VDC Isolation
- Short Circuit Protection
- Single & Dual Outputs
- 18 Standard Models
- Miniature SIP Case
- Low Cost

RoHS

A 1.5 kVDC Isolation Model is Available See the **MD100x-xxT**

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	4.5	5.0	5.5	VDC
	12 VDC Input	10.8	12.0	13.2	
	24 VDC Input	21.6	24.0	26.4	
Start Up Time			20		mS
Input Filter	Capacitor Filter				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±5.0		%
Line Regulation	For VIN Change of 1%		±1.2		%
Load Regulation, See Note 2	5 VDC Input Models		±10		%
	All Other Models		±7.5		
Ripple & Noise (20 MHz)	See Note 3		75		mV P - P
Temperature Coefficient				±0.02	%/°C
Output Short Circuit	Continuos (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Sec	3,000			VDC
Isolation Resistance	500 VDC		1,000		MΩ
Isolation Capacitance			50		pF
Switching Frequency	Variable		50		kHz

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions	EN55022		Class B
Conducted Emissions, See Note 4	EN55022		Class B
ESD	EN 61000-4-2	A	±15 kV Air
RS	EN 61000-4-3	A	30V/m
EFT	EN 61000-4-4	A	±2 kV
Surge, See Note 5	EN 61000-4-5	A	±1 kV
CS	EN 61000-4-6	A	10 Vrms
PFMF	EN 61000-4-8	A	30A/m

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+105	°C
	Case			+115	°C
Storage Temperature Range		-55		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	See Mechanical Diagram (Page 2)
Case Material	Non-Conductive Black Plastic (UL94-V0)
Weight	0.083 Oz (2.4g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	3.60			MHours

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (0.1 Sec)	5 VDC Input			9.0	VDC
	12 VDC Input			18.0	
	24 VDC Input			30.0	
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.

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Model Selection Guide

Model Number	Input				Output			Efficiency (%, Typ)	Reflected Ripple Current (mA Pk-Pk)	Capacitive Load (µF, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MD105S-05TI	5.0	4.5 - 5.5	253	40	5.0	200.00	0.0	80	15.0	220	500
MD105S-12TI	5.0	4.5 - 5.5	253	40	12.0	83.30	0.0	80	15.0	100	500
MD105S-15TI	5.0	4.5 - 5.5	253	40	15.0	66.70	0.0	80	15.0	100	500
MD105D-05TI	5.0	4.5 - 5.5	253	40	±5.0	±100.00	±0.0	80	15.0	±100	500
MD105D-12TI	5.0	4.5 - 5.5	253	40	±12.0	±41.67	±0.0	80	15.0	±47	500
MD105D-15TI	5.0	4.5 - 5.5	250	40	±15.0	±33.33	±0.0	81	15.0	±47	500
MD112S-05TI	12	10.8 - 13.2	105	18	5.0	200.00	0.0	80	15.0	220	200
MD112S-12TI	12	10.8 - 13.2	105	18	12.0	83.30	0.0	80	15.0	100	200
MD112S-15TI	12	10.8 - 13.2	104	18	15.0	66.70	0.0	81	15.0	100	200
MD112D-05TI	12	10.8 - 13.2	105	18	±5.0	±100.00	±0.0	80	15.0	±100	200
MD112D-12TI	12	10.8 - 13.2	105	18	±12.0	±41.67	±0.0	80	15.0	±47	200
MD112D-15TI	12	10.8 - 13.2	105	18	±15.0	±33.33	±0.0	80	15.0	±47	200
MD124S-05TI	24	21.6 - 26.4	53	9	5.0	200.00	0.0	80	15.0	220	100
MD124S-12TI	24	21.6 - 26.4	53	9	12.0	83.30	0.0	80	15.0	100	100
MD124S-15TI	24	21.6 - 26.4	53	9	15.0	66.70	0.0	80	15.0	100	100
MD124D-05TI	24	21.6 - 26.4	53	9	±5.0	±100.00	±0.0	80	15.0	±100	100
MD124D-12TI	24	21.6 - 26.4	53	9	±12.0	±41.67	±0.0	80	15.0	±47	100
MD124D-15TI	24	21.6 - 26.4	53	9	±15.0	±33.33	±0.0	80	15.0	±47	100

Notes:

1. The specified maximum capacitive load is for each output.
2. Load regulation is measured over a range of 10% to 100% I_{OUT}.
3. When measuring output ripple, it is recommended that an external 0.1 µF ceramic capacitor be placed from the +Vout pin to the -Vout pin, as shown in the typical connection diagram at right.
4. With the addition of input filter components, all models will meet EN 55022 class B. A suggested circuit is shown in the connection diagram at right (components C_2, L_1). Contact the factory for more information.
5. To meet the requirements of EN 61000-4-5, external components are needed. The typical connection at right shows the external components C_1 and D_1 that would typically achieve this. Contact the factory for more information.
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 tables for the correct rating.

Typical Connection



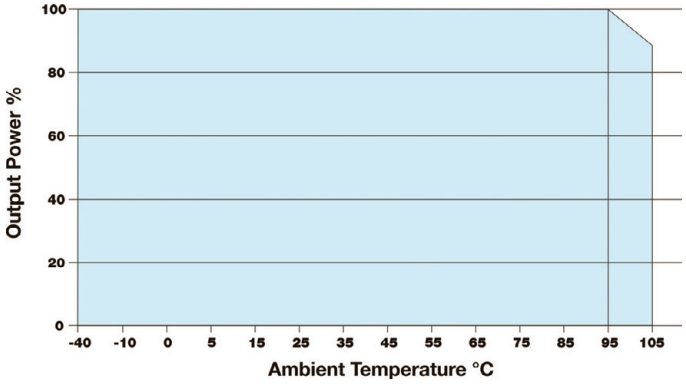
For applications that require meeting EMC standards, the diagram above illustrates a typical connection of the **MD100x-xxTI** series. The units do not require external components to operate as specified. All components should be mounted as close to the unit as possible.

Capacitors C_3 & C_4 are not required to meet specifications, but may be used if a lower level of output ripple is required. Capacitor C_3 is a high frequency ceramic capacitor and C_4 is an electrolytic.

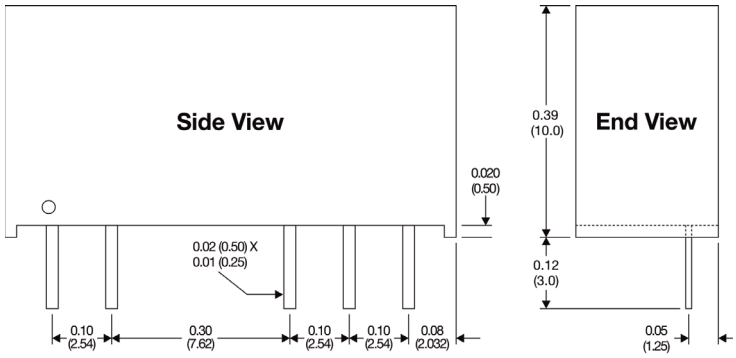
Recommended values for components are:

Component	C_1	D_1	C_2	L_1	C_3	C_4
MD105x-xxTI	1,000 µF/35V	3.0SMCJ9.0AG	1206, 4.7 µF/50V	6.8 µH	0.1 µF	10 µF
MD112x-xxTI	1,000 µF/35V	3.0SMCJ18AG	1206, 4.7 µF/50V	6.8 µH	0.1 µF	10 µF
MD124x-xxTI	330 µF/50V	3.0SMCJ28AG	1206, 4.7 µF/50V	6.8 µH	0.1 µF	10 µF

Derating Curve



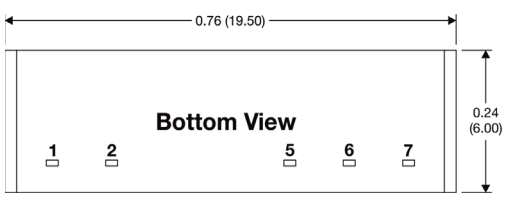
Mechanical Dimensions, MD100X-xx Models



Pin Connections

Pin	Single Output
1	+Vin
2	-Vin
5	-Vout
6	No Pin
7	+Vout

Pin	Dual Output
1	+Vin
2	-Vin
5	-Vout
6	Common
7	+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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