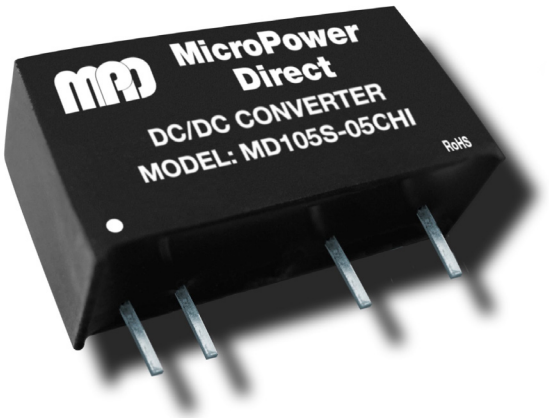
MD100CHI

1W, High Isolation, Compact, Single & Dual Outputs DC/DC Converters



Key Features:

- 1W Output Power
- Miniature SIP Case
- -40°C - +105°C Operating Temperature Range
- 6000VDC/5000VAC Isolation Voltage
- Single & Dual Outputs
- Short Circuit Protected
- Industry Standard Pin-Out
- Creepage & Clearance Distance > 5mm

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	5 VDC Input	4.5	5	5.5	VDC
	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	--	--	200	--	mA
Input Filter	Capacitance Filter				

Output

Parameter	Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy	See output regulation curve					%
Line Regulation	Input Voltage Variation ±1%	3.3V output	--	--	1.5	%
		Other output	--	--	1.2	
Load Regulation	10%-100% Load	3.3/5V Output	--	--	20	%
		Other output	--	--	15	
Ripple & Noise, See Note 1 & 3	20MHZ Bandwidth	3.3V output	--	100	150	mVp-p
		Other output	--	80	120	
Temperature Coefficient	Full load		--	±0.02		%/°C
Output Short Circuit	Continuous, self-recovery					

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 seconds	5000	--	--	VAC
		6000	--	--	VDC
Isolation Resistance	500 VDC	1000	--	--	MΩ
Patient Leakage Current (See Note 2)	--	--	--	2μA	--
Isolation Capacitance	100 KHz /0.1V	--	4	--	pF
Switching Frequency	5V input, 100% load	--	300	--	kHz
	12/15/24V input, 100% load	--	200	--	

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Derating when operating temperature >85°C (Fig. 2)	-40	--	+105	°C
Storage Temperature Range	--	-55	--	+125	°C
Cooling	Free air convection				
Humidity, See Note 8	Non condensing	5	--	95	%RH

Physical

Case Size	0.77 x 0.39 x 0.49 in (See mechanical diagrams on page 5)
Case Material	Black plastic; flame retardant and heat resistant (UL94V-0 rated)
Weight	0.14 oz (3.97g) Typ.

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL-HDBK-217F@25°C	1.936	--	--	MHours

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions	CISPR32/EN 55032	--	Class A/B (Fig. 4)
Conducted Emissions	CISPR32/EN 55032	--	Class A/B (Fig. 4)
ESD	EN 61000-4-2	B	±8 kV Contact, Air ±15kV

CE

RoHS

MicroPower Direct
46 Eastman Street
Unit 1
Easton, MA 02375
USA

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

MICROPOWER DIRECT

Model Selection Guide

Model Number	Input				Output			Full Load Efficiency (%, Typ)	Reflected Ripple Current (mA Typ)	Capacitive Load (µF, Max) (See Note 4)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full Load (Typ)	No Load							
MD105S-05CHI	5	4.5-5.5	250	14	5	200	20	80	200	2200	600
MD105S-09CHI	5	4.5-5.5	250	14	9	111	11	80	200	1000	600
MD105S-12CHI	5	4.5-5.5	250	14	12	84	9	81	200	470	600
MD105S-15CHI	5	4.5-5.5	250	14	15	67	7	81	200	470	600
MD105S-24CHI	5	4.5-5.5	250	14	24	42	4	81	200	220	600
MD105D-03CHI	5	4.5-5.5	250	14	±3.3	±152	±15	75	200	1000	600
MD105D-05CHI	5	4.5-5.5	250	14	±5	±100	±10	80	200	1000	600
MD105D-09CHI	5	4.5-5.5	250	14	±9	±56	±6	80	200	470	600
MD105D-12CHI	5	4.5-5.5	250	14	±12	±42	±5	81	200	220	600
MD105D-15CHI	5	4.5-5.5	250	14	±15	±34	±4	81	200	220	600
MD112S-03CHI	12	10.8-13.2	106	10	3.3	303	31	76	200	2200	230
MD112S-05CHI	12	10.8-13.2	106	10	5	200	20	79	200	2200	230
MD112S-09CHI	12	10.8-13.2	106	10	9	111	12	81	200	680	230
MD112S-12CHI	12	10.8-13.2	106	10	12	84	9	83	200	470	230
MD112S-15CHI	12	10.8-13.2	106	10	15	67	7	83	20	470	230
MD112S-24CHI	12	10.8-13.2	106	10	24	42	4	82	200	220	230
MD112D-05CHI	12	10.8-13.2	106	10	±5	±100	±10	79	200	1000	230
MD112D-09CHI	12	10.8-13.2	106	10	±9	±56	±6	79	200	470	230
MD112D-12CHI	12	10.8-13.2	106	10	±12	±42	±5	81	200	200	230
MD112D-15CHI	12	10.8-13.2	106	10	±15	±34	±4	81	200	200	230
MD115D-05CHI	15	13.5-16.5	90	10	±5	±100	±10	77	200	1000	180
MD115D-12CHI	15	13.5-16.5	90	10	±12	±42	±5	79	200	220	180
MD115D-15CHI	15	13.5-16.5	90	10	±15	±33	±4	79	200	220	180
MD124S-05CHI	24	21.6-26.4	56	12	5	200	20	76	200	2200	120
MD124S-09CHI	24	21.6-26.4	56	12	9	111	12	76	200	680	120
MD124S-12CHI	24	21.6-26.4	56	12	12	84	9	76	200	470	120
MD124S-15CHI	24	21.6-26.4	56	12	15	67	7	76	200	470	120
MD124S-24CHI	24	21.6-26.4	56	12	24	42	4	76	200	220	120
MD124D-05CHI	24	21.6-26.4	56	12	±5	±100	±10	75	200	1000	120
MD124D-09CHI	24	21.6-26.4	56	12	±9	±56	±6	75	200	470	120
MD124D-12CHI	24	21.6-26.4	56	12	±12	±42	±5	76	200	220	120
MD124D-15CHI	24	21.6-26.4	56	12	±15	±34	±4	76	200	220	120

1. The "parallel cable" method is used for ripple & noise test.
2. Leakage current and reinforced insulation is based on 250 VAC, 50/60 Hz system input voltage.
3. Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig.3.
4. Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table1.
5. For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.
6. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet.
7. The maximum capacitive load offered were tested at input voltage range and full load.
8. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity < 75% with nominal input voltage and rated output load.
9. All index testing methods in this datasheet are based on our company corporate standards.
10. Products are related to laws and regulations: see "Features" and "EMC".

Typical Characteristic Curves

Output Regulation Curve (3.3VDC Output)

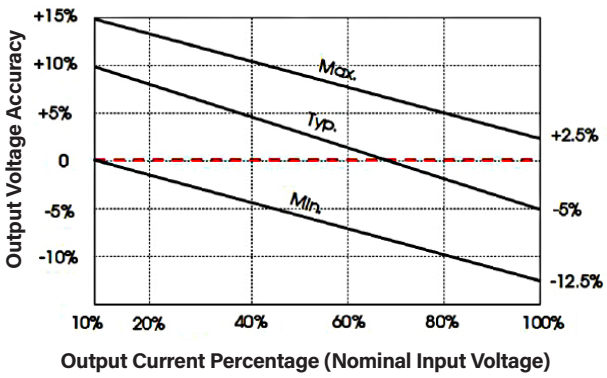


Fig. 1-1

Output Regulation Curve (5VDC Output)

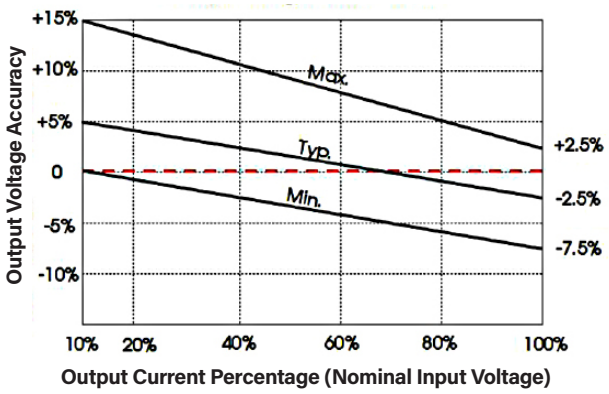


Fig.1-2

Output Regulation Curve (Other Output)

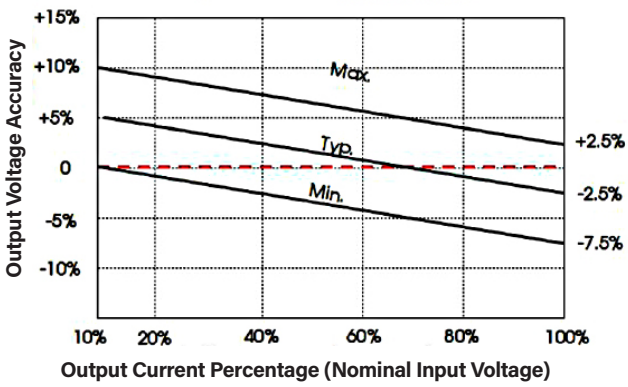


Fig.1-3

Temperature Derating Curve

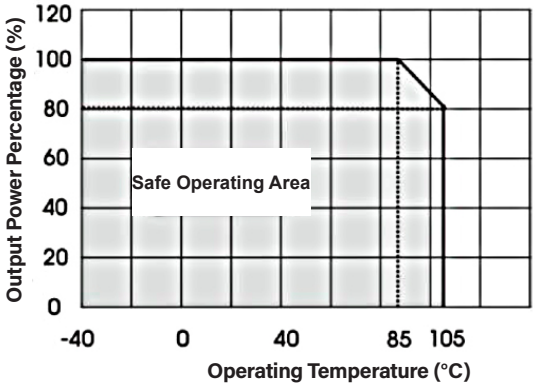


Fig. 2

Application Circuits

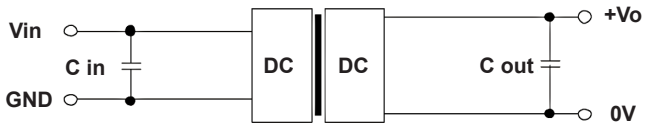


Fig. 3

Recommended input and output capacitor values					
Vin	Cin	Single Vout	Cout	Dual Vout	Cout
5VDC	10uF/10V	3.3/5VDC	10uF/16V	±3.3VDC	4.7uF/16V
12VDC	10uF/25V	9VDC	10uF/16V	±5/±9VDC	4.7uF/16V
15VDC	1uF/25V	12VDC	2.2uF/25V	±12/±15VDC	1uF/25V
24VDC	2.2uF/50V	15VDC	1uF/25V	--	--
--	--	24VDC	0.47uF/50V	--	--

Table. 1

Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC)	Emissions (EMI)	CE	Class A	MD105S - 15CHI ,MD105S - 24CHI, MD105D - 15CHI
			Class B	All Other Models
		RE	Class A	MD105S - 15CHI, MD105S - 24CHI, MD105D - 15CHI
			Class B	All Other Models

EMC compliance recommended circuit (5V Input)

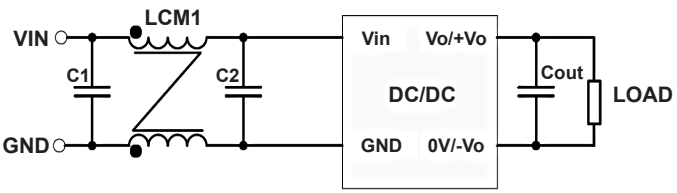


Fig. 4-1

Series		5VDC
Emissions	C1/C2	22uF/16V
	Cout	Refer to the Cout in table 1
	LCM1	22uH (Nickel Zinc Inductance)

EMC compliance recommended circuit (12V/15V input)

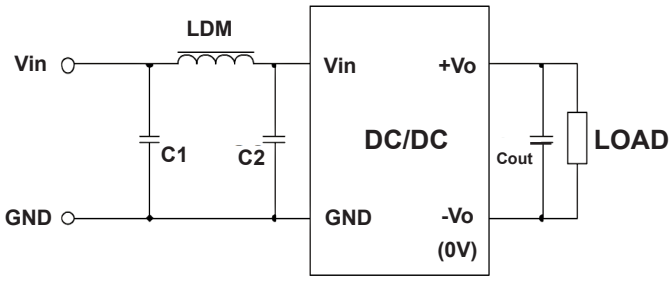


Fig. 4-2

Series		12/15 VDC
Emissions	C1/C2	4.7uF /25V
	Cout	Refer to the Cout in table 1
	LDM	22uH

EMC compliance recommended circuit (24V input)

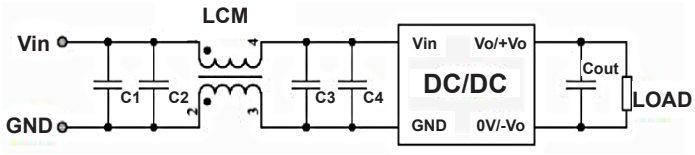
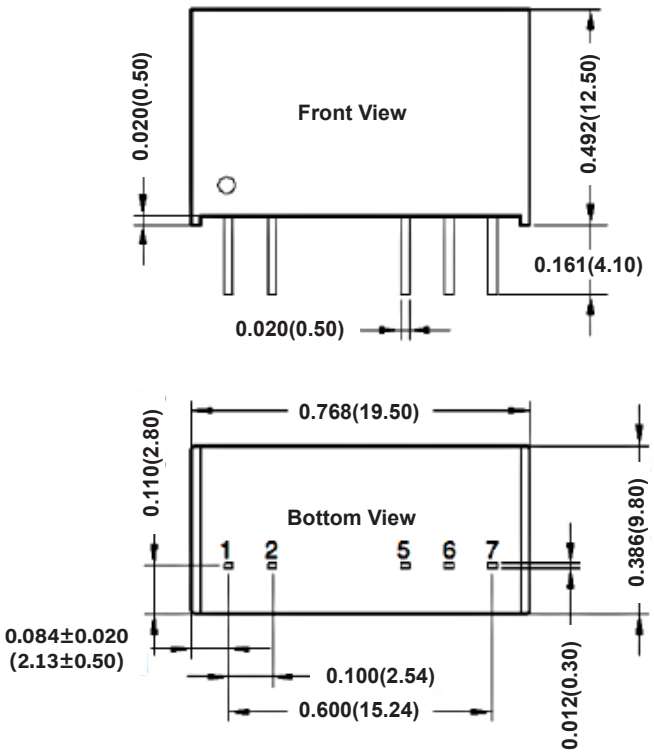


Fig. 4-3

Input Voltage			24 VDC
Emissions	C1/C2		4.7uF /50V
	C3	MD124D-xxCHI	100uF /50V
		Other Output	4.7uF /50V
	C4	MD124D-xxCHI	--
		Other Output	4.7uF /50V
	COUT		Refer to the Cout in table 1
	LCM		22uH (Nickel Zinc Inductance)

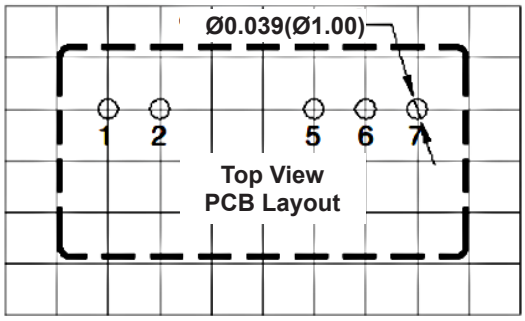
Mechanical Dimensions



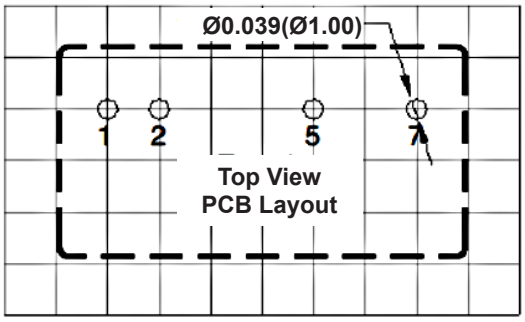
Note:
Unit: inches(mm)
Pin section tolerances: ±0.004(±0.10)
General tolerances: ±0.020(±0.50)

Third Angle Projection

Dual



Single



Note: The grid distance is 2.54mm*2.54mm

Pin-Out		
Pin	**Single**	**Dual**
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No Pin	0V
7	+Vo	+Vo