AC/DC Converter

LD03-10BxxR2 Series

MORNSUN®

3W, AC-DC converter

cULus CB CE RoHS

FEATURES

- Universal input range:85~264VAC/100~370VDC
- Excellent ripple and noise performance: 50mV (Typ.)
- Compact size, high power density
- Protection of output over-voltage, output short circuit, over-current
- Meets IEC60950, UL60950, EN60950 standards

LD03-10BxxR2 ---- a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, EMC and Safety specifications meet the international IEC61000, UL60950 and EN60950 standards, and widely used in medical treatment, industrial, electricity, instruments, telecommunication and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

Selection Guide

Certification	Model	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency (230VAC/%,Typ.)	Max. Capacitive Load (uF)
UL/CE	LD03-10B03R2	2.3W	3.3V/700mA	66	6000
	LD03-10B05R2	3W	5V/600mA	74	6000
	LD03-10B09R2		9V/330mA	75	1500
	LD03-10B12R2		12V/250mA	77	1500
	LD03-10B15R2		15V/200mA	77	1000
	LD03-10B24R2		24V/125mA	78	330

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	264	VAC
	DC input	100	--	370	VDC
Input frequency		47	--	63	Hz
Input current	110VAC	--	65	--	mA
	230VAC	--	30	--	
Inrush current	110VAC	--	10	--	A
	230VAC	--	20	--	
Leakage current		0.1mA RMS typ. 230VAC/50Hz			
Recommended External Input Fuse		1A/250V, slow fusing			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	3.3V output	--	±3	--	%
	Others	--	±2	--	
Line Regulation	Full load	--	±0.5	--	
Load Regulation	10%-100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	50	100	mV
Temperature Drift Coefficient		--	±0.02	--	%/°C
Stand-by Power Consumption		--	0.3	--	W
Short Circuit Protection		Continuous, self-recovery			
Over-current Protection		≥110%Io self-recovery			
Over-voltage Protection	3.3/5VDC output	≤7.5VDC			
	9VDC output	≤12VDC			

Over-voltage Protection	12/15VDC output	≤20VDC			
	24VDC output	≤30VDC			
Min. Load		1	--	--	%
Power-off Holding Time	230VAC input	--	50	--	ms
Note: *Parallel line test method is adopted to test the ripple and noise, please see *AC-DC Converter Application Notes* for specific operation methods.					

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	Test time: 1min	3000	--	--	VAC
Operating Temperature			-25	--	+70	°C
Storage Temperature			-25	--	+105	
Case Temperature			--	--	+95	
Storage Humidity			--	--	95	%RH
Welding Temperature		Wave-soldering	260±5℃; time:5~10s			
		Manual-welding	360±10℃; time:3~5s			
Switching Frequency			--	115	--	kHz
Power Derating		+55℃~+70℃	2.0	--	--	%/°C
Safety Standard			IEC60950,EN60950,UL60950			
Safety-regulated Certification			EN60950/UL60950			
Safety Class			CLASS Ⅱ			
MTBF			MIL-HDBK-217F@25°C > 300,000 h			

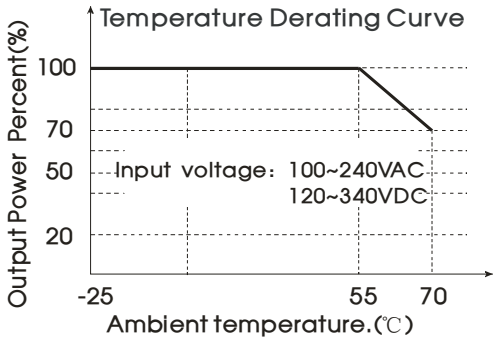
Physical Specifications

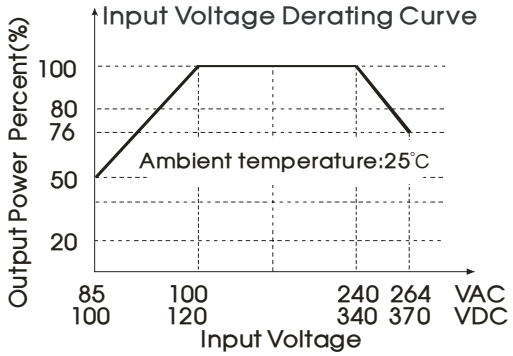
Casing Material	Black flame-retardant and heat-resistant plastic (UL94-V0)
Package Dimensions	37.00*24.50*18.00 mm
Weight	25g(Typ.)
Cooling method	Free convection

EMC Specifications

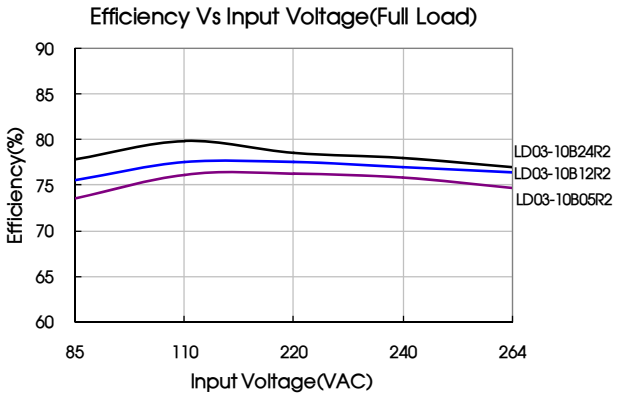
EMI	CE	CISPR22/EN55022, CLASS A	
		CISPR22/EN55022, CLASS B (See Fig. 2 for recommended circuit)	
	RE	CISPR22/EN55022, CLASS A	
		CISPR22/EN55022, CLASS B (See Fig. 2 for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2 Contact ±6 kV / Air ±8 kV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ± 2kV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN61000-4-4 ± 4kV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5 ±1 kV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN61000-4-5 ±2 kV /±4 kV(See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A
	PFM	IEC/EN61000-4-8 10A/m	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11 0%-70%	perf. Criteria B

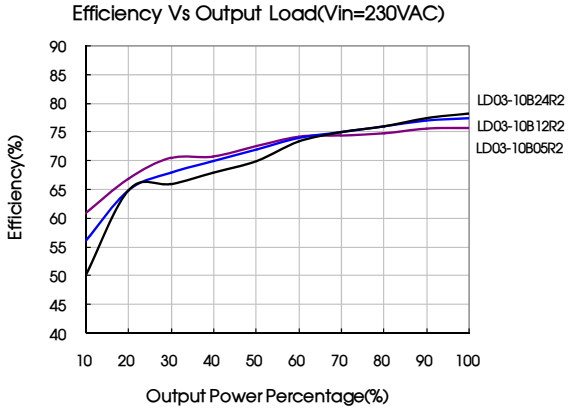
Product Characteristic Curve





Note: ①Input voltage should be derated based on temperature derating when it is 85~100VAC/240~264VAC/100~120VDC/340~370VDC;
②This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.





Design Reference

1. Typical application circuit

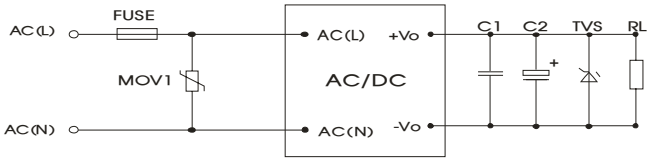


Fig. 1: Typical application circuit

Model	C1(μF)	C2(μF)	TVS tube
LD03-10B03R2	1	150	SMBJ7.0A
LD03-10B05R2		150	SMBJ7.0A
LD03-10B09R2		120	SMBJ12A
LD03-10B12R2		120	SMBJ20A
LD03-10B15R2		120	SMBJ20A
LD03-10B24R2		68	SMBJ30A

Note:
Output filtering capacitor C2 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitance withstand voltage derating should be 80% or above. C1 is ceramic capacitor, which is used to filter high-frequency noise. External input MOV1 is recommended to use S14K350. TVS is a recommended component to protect post-circuits if converter fails.

2. EMC solution-recommended circuit

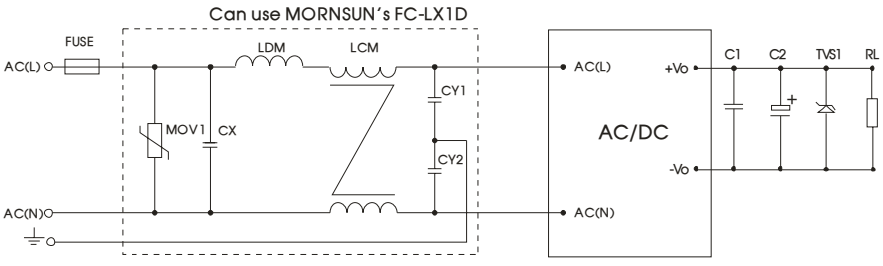


Fig 2: EMC application circuit with higher requirements

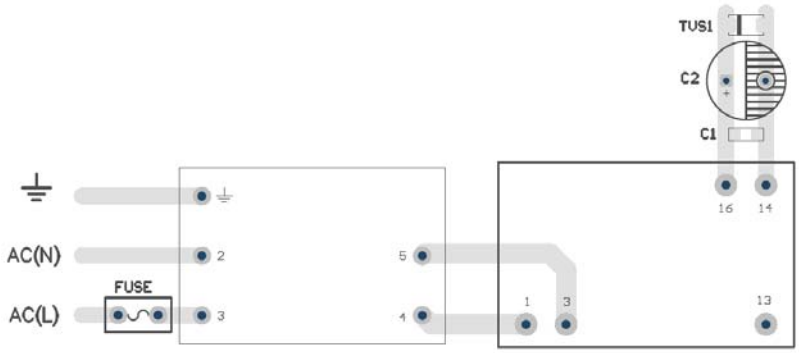


Fig 3: Recommended EMC circuit-PCB layout

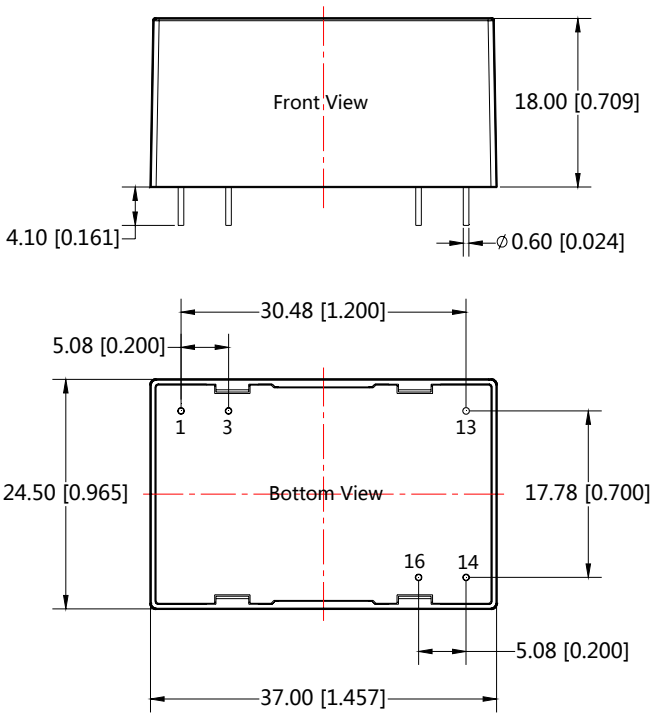
Suggestions for safety regulation and wiring width: wire width ≥3mm, distance between wires ≥6mm, and distance between wire and ground ≥6mm

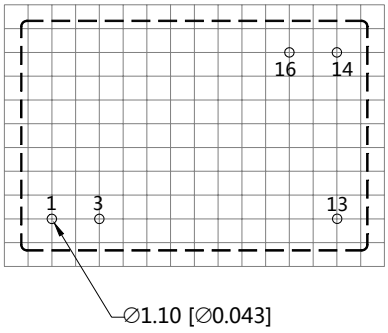
Element model	Recommended value
MOV1	S14K350
CX	0.1μF/275VAC
LDM	4.7uH/2.0A
LCM	10mH ~30mH,recommended to use MORNSUN's FL2D-Z5-103
CY1	1nF/400VAC
CY2	1nF/400VAC
FUSE	1A/250V, slow fusing, necessary
FC-LX1D	2KV/4KV EMC filter

3. For more information please find the application note on www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note:Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	AC(L)
3	AC(N)
13	NC
14	-Vo
16	+Vo

Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances:±0.50[±0.020]

Note:

1. Packing Information please refer to 'Product Packing Information'. Packing bag number: 58200055;
2. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
5. We can provide product customization service;
6. The product specification may be changed at any time without prior notice.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Luogang District, Guangzhou, P. R. China
Tel: 86-20-38601850-8801 Fax: 86-20-38601272 E-mail: info@mornsun.cn