AC/DC Converter

LD05-23BXX Series

5W, AC-DC converter

FEATURES

- Universal input range:85~305VAC/110~430VDC
- AC and DC all in one (input from the same terminal)
- High efficiency, high power density
- Protection of output short circuit output over -current, over –voltage
- Meets IEC60950/EN60950/UL60950

LD05-23BXX series is 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, and widely used in LED, street lamp control, instruments, telecommunication and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load*(μF)
UL/CE	LD05-23B03	4.2 W	3.3V/1250mA	74	4000
	LD05-23B05	5 W	5V/1000mA	78	4000
	LD05-23B09		9V/550mA	78	1000
	LD05-23B12		12V/420mA	80	820
	LD05-23B15		15V/333mA	82	820
	LD05-23B24	5.5 W	24V/230mA	83	680

Note: *Test without external circuit.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	305	VAC
	DC input	110	--	430	VDC
Input frequency		47	--	440	Hz
Input current	110VAC	--	--	0.12	A
	230VAC	--	--	0.07	
Inrush current	110VAC	--	10	--	
	230VAC	--	20	--	
Recommended External Input Fuse		1A/300V, slow fusing			

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	--	
Output 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		TVS clamp			
Min. Load		1	--	--	%
Hold-up Time	110VAC input	--	12	--	ms
	230VAC input	--	80	--	
Note: * Ripple and noise tested with "parallel cable" method, 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	4000	--	--	VAC
Operating Temperature			-25	--	+70	°C
Storage Temperature			-25	--	+105	
Casing Temperature			--	--	+95	
Storage Humidity			--	--	95	%RH
Welding Temperature		Wave-soldering	260±5℃; time:5~10s			
		Manual-welding	360±10℃; time:3~5s			
Switching Frequency			--	100	--	kHz
Power Derating		+55°C to +70°C	2	--	--	%/°C
		-25°C to 0°C	2	--	--	
Safety Standard		IEC60950/EN60950/UL60950				
Safety-regulated Certification		IEC60950/EN60950/UL60950				
Safety Class		CLASS I I				
Hot Plug		Unavailable				
MTBF		MIL-HDBK-217F@25°C >300,000 h				

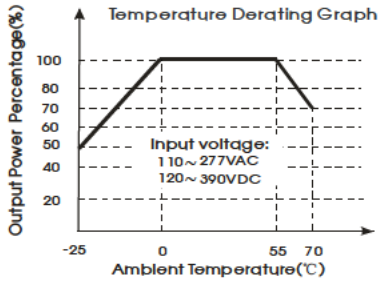
Physical Specifications

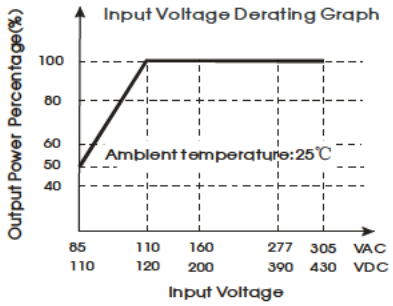
Casing Material	Black flame-retardant and heat-resistant plastic (UL94-V0)
Package Dimensions	50.80*25.40*15.16 mm
Weight	32 g(Typ.)
Cooling method	Free air convection

EMC Specifications

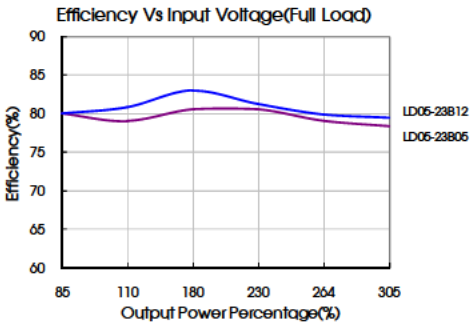
EMI	Conducted Disturbance	CISPR22/EN55022, CLASS B (Without External Circuit)	
	Radiated Emission	CISPR22/EN55022, CLASS B (Without External Circuit)	
EMS	Electrostatic Discharge	IEC/EN61000-4-2 ±6KV/8KV	Perf. Criteria B
	Radiation Immunity	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV (Without External Circuit)	perf. Criteria B
		IEC/EN61000-4-4 ±4KV (See Fig. 3 for recommended circuit)	perf. Criteria B
	Surge Immunity	IEC/EN61000-4-5 ±1KV (Without External Circuit)	perf. Criteria B
		IEC/EN61000-4-5 ±2KV/4KV (See Fig. 3 for recommended circuit)	perf. Criteria B
	Conducted Disturbance immunity	IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A
	Immunity for Power frequency magnetic field	IEC/EN61000-4-8 10A/m	perf. Criteria A
	Immunities of voltage dip, drop and short interruption	IEC/EN61000-4-11 0%-70%	perf. Criteria B

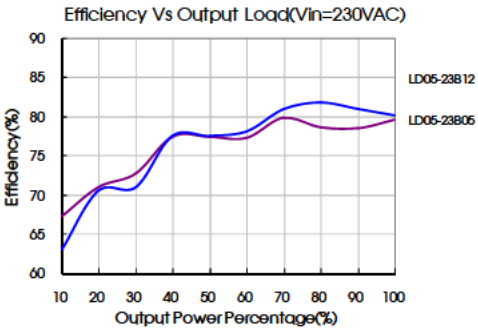
Product Characteristic Curve





Note: Input voltage should be derated based on temperature derating when it is 85~110VAC/277~305VAC/110~120VDC/390~430VDC.





Design Reference

1. Typical application circuit

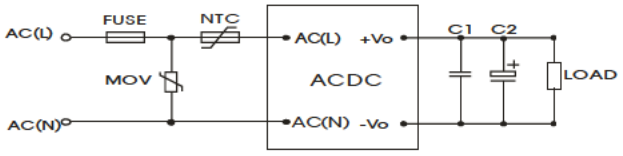


Fig. 1: Typical application circuit

Model	C1(μF)	C2(μF)
LD05-23B03	1	220
LD05-23B05		220
LD05-23B09		100
LD05-23B12		100
LD05-23B15		100
LD05-23B24		47

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 NTC is recommended to use 13D-5.

2. EMC solution-recommended circuit

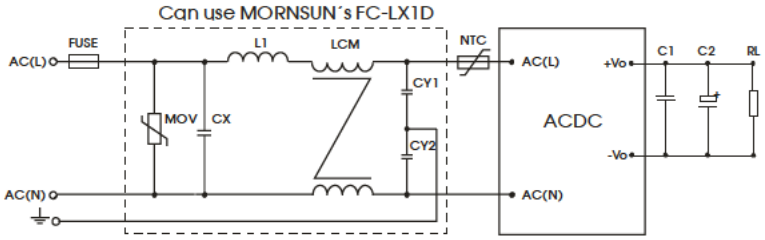


Fig 2: EMC application circuit with higher requirements

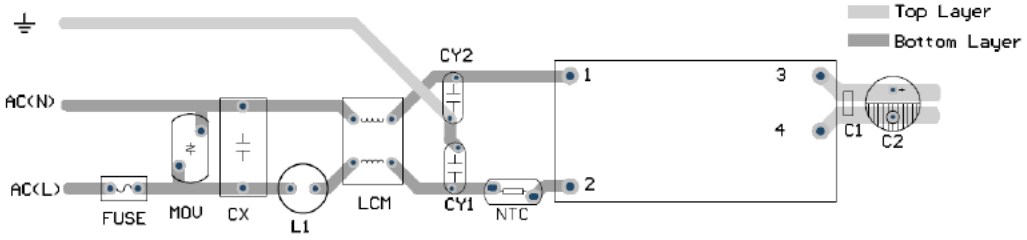


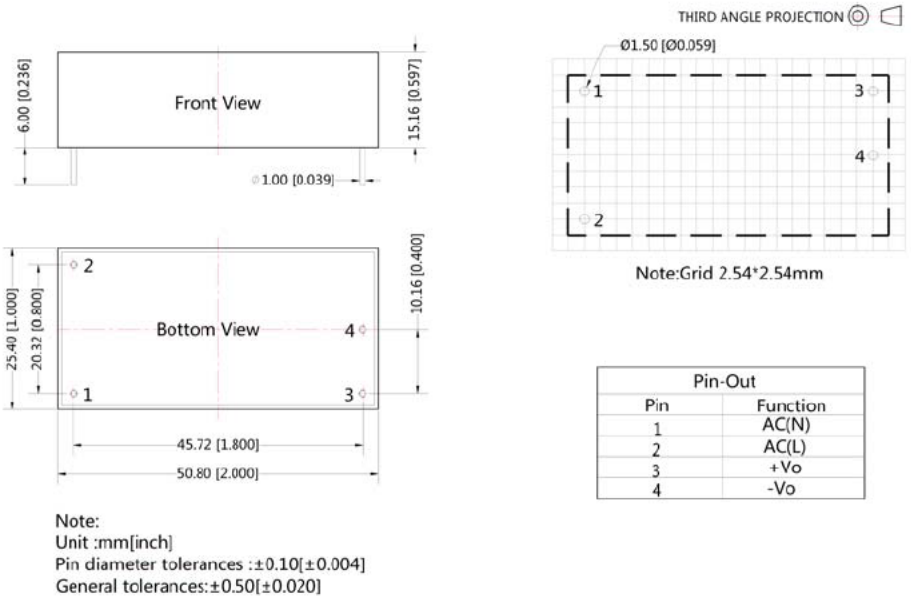
Fig 3: Recommended EMC circuit-PCB layout

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
MOV	S14K350
CX	0.1μF/310VAC
L1	4.7uH/2.0A
CY1	1nF/400VAC
CY2	1nF /400VAC
LCM	2.2mH, recommended to use MORNSUN's FL2D-10-222
FUSE	1A/300V, slow fusing, necessary

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

Dimensions and Recommended Layout



Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	+Vo
4	-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: 58220003;
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. Specifications of this product are subject to changes without prior notice.

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