

# AC/DC Converter

## LD05-23Bxx Series

# MORNSUN®

5W, AC-DC converter



## FEATURES

- Universal 85-305VAC or 100-430VDC input voltage
- Accepts AC or DC input (dual-use of same terminal)
- High efficiency, high power density
- Output short circuit, over-current, over-voltage protection

LD05-23Bxx series is one of Mornsun's compact size power converters. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, reinforced isolation. It offers good EMC performance, and are widely used in LED, street lamp control, instrumentation, communication and civil applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

## Selection Guide

Certification	Part No.	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
UL/EN/IEC	LD05-23B03	4.2	3.3V/1250mA	74	4000
	LD05-23B05	5	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	24V/230mA	83	470

Note: \*Test without external circuit.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	305	VAC
	DC input	100	--	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-blow, required			
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-to-peak value)	3.3V/5V output		60	mV
		Others		50	
Temperature Coefficient		--	±0.02	--	%/°C
Stand-by Power Consumption		--	--	0.3	W

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Short Circuit Protection		Continuous, self-recovery			
Over-current Protection		$\geq 110\%I_o$ , self-recovery			
Over-voltage Protection		Over-voltage shutdown			
Minimum Load		0	--	--	%
Hold-up Time	110VAC input	--	12	--	ms
	230VAC input	--	80	--	

Note: \* The "parallel cable" method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information.

## General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output	Electric Strength Test for 1min.	4000	--	--	VAC
Operating Temperature			-25	--	+70	℃
Storage Temperature			-25	--	+105	
Storage Humidity			--	--	95	%RH
Soldering Temperature		Wave-soldering	260±5℃; time: 5 - 10s			
		Manual-welding	360±10℃; time: 3 - 5s			
Switching Frequency			--	--	140	kHz
Power Derating		+55℃ to +70℃	2	--	--	% /℃
		-25℃ to 0℃	2	--	--	
Safety Standard		IEC/UL60590-1 safety approval & EN60590-1 (Report)				
Safety Class		CLASS II				
MTBF		MIL-HDBK-217F@25℃ >300,000 h				

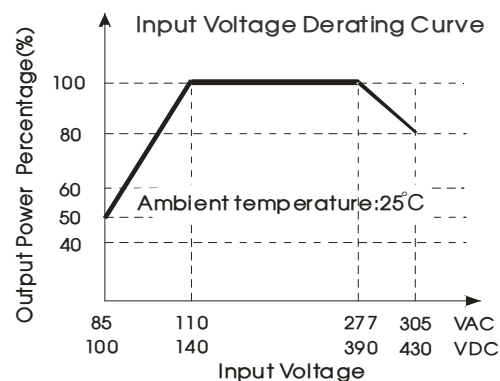
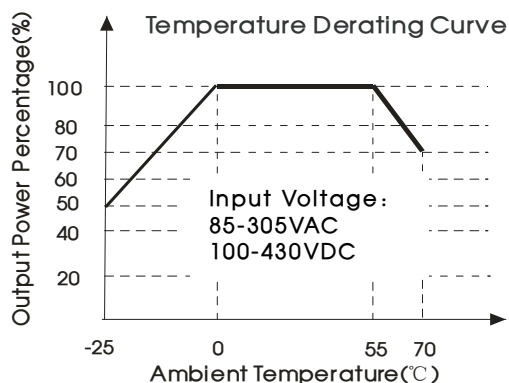
## Mechanical Specifications

Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimensions	50.80 x 25.40 x 15.16 mm
Weights	32g (Typ.)
Cooling Method	Free air convection

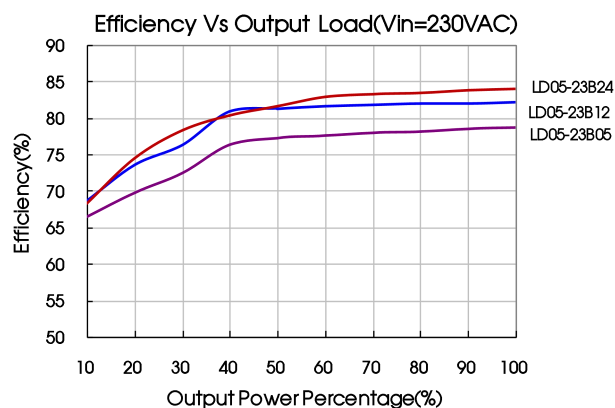
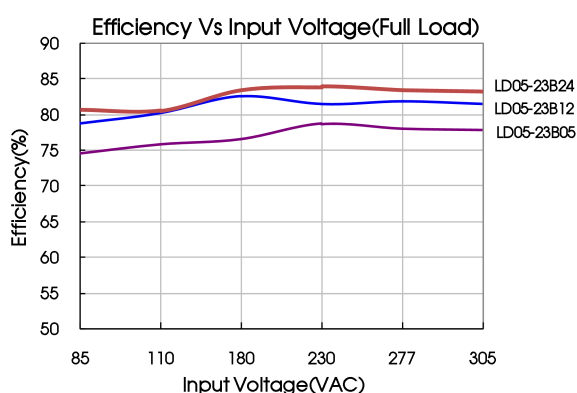
## Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	$\pm 6\text{KV}/\pm 8\text{KV}$	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2\text{KV}$	perf. Criteria B
		IEC/EN61000-4-4	$\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	$\pm 1\text{KV}$	perf. Criteria B
		IEC/EN61000-4-5	$\pm 2\text{KV}/\pm 4\text{KV}$ (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 dip, short interruption and voltage variation	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

## Product Characteristic Curve



- Note: 1. With an AC input between 85-110V/277-305VAC and a DC input between 100-140VDC/390-430VDC, the output power must be derated as per temperature derating curves;  
2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun our FAE.



## Design Reference

### 1. Typical application

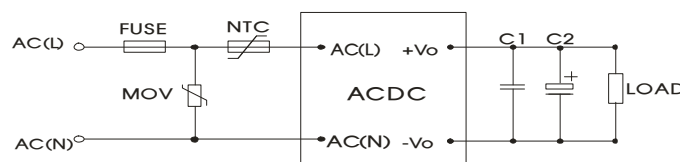


Fig. 1

Part No.	C1(uF)	C2(uF)	MOV	NTC	FUSE
LD05-23B03	1	220	S14K350	12D-5	1A/300V, slow-blow, required
LD05-23B05		220			
LD05-23B09		100			
LD05-23B12		100			
LD05-23B15		100			
LD05-23B24		47			

Note:  
We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet ). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise.

## 2. EMC solution-recommended circuit

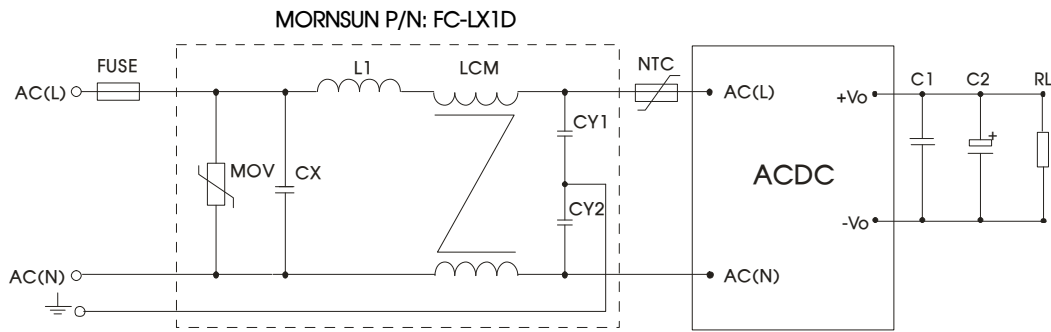


Fig. 2

## EMC compliance circuit

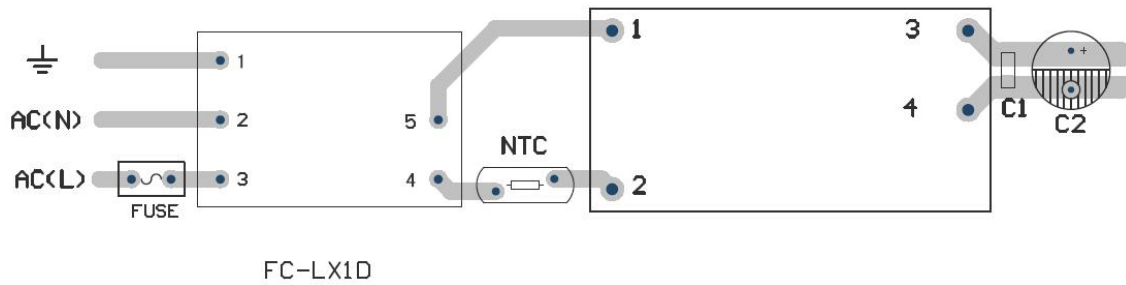


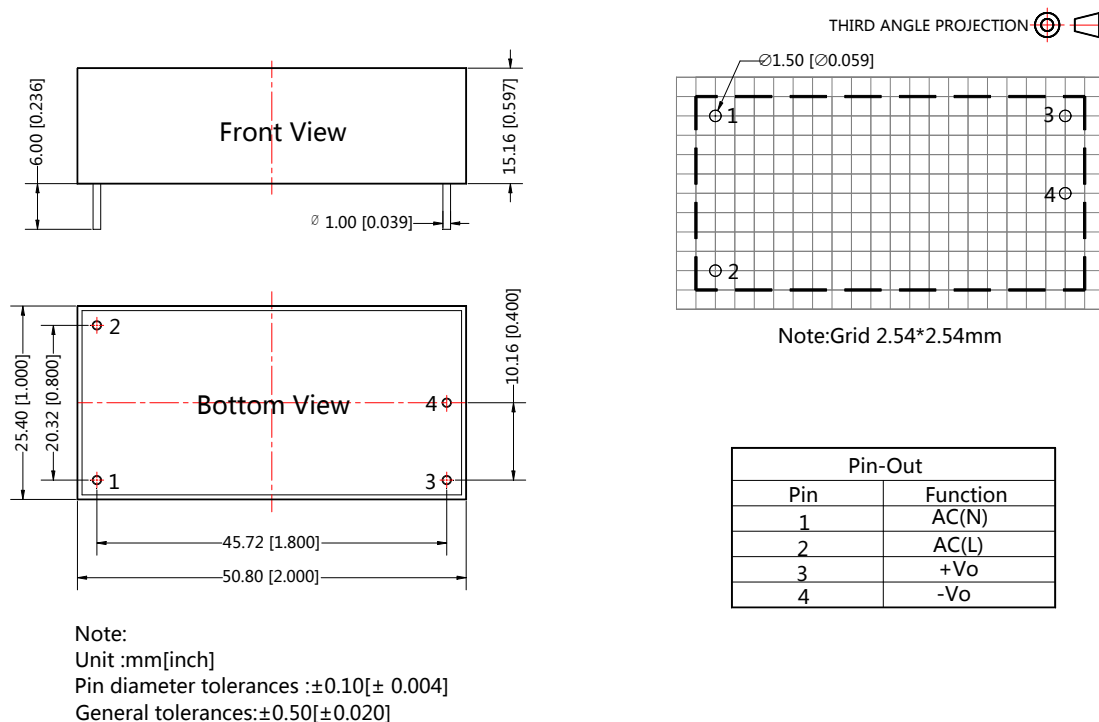
Fig. 3

Suggestions for safety regulation and wiring width: wire width  $\geq 3\text{mm}$ , distance between wires  $\geq 6\text{mm}$ , and distance between wire and ground  $\geq 6\text{mm}$

Element model	Recommended value
MOV	S14K350
CX	0.1uF/310VAC
L1	4.7uH/2.0A
CY1	1nF/400VAC
CY2	1nF /400VAC
NTC	12D-5
LCM	2.2mH, P/N: FL2D-10-222 (MORNSUN) is recommended
FUSE	1A/300V, slow-blow, required
FC-LX1D	EMC filter

3. For additional information please refer to application notes on [www.mornsun-power.com](http://www.mornsun-power.com).

## Dimensions and Recommended Layout



### Note:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220250;
2. 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;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

## MORNSUN Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China  
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: [info@mornsun.cn](mailto:info@mornsun.cn) [www.mornsun-power.com](http://www.mornsun-power.com)