AC/DC Converter

LD05-23BxxR2P Series

MORNSUN®

5W, AC-DC converter

RoHS

3 years Warranty

FEATURES

- Ultra-wide 85 - 305VAC and 100 - 430VDC input voltage range
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation test voltage up to 4200VAC
- Up to 82% efficiency
- No-load power consumption 0.1W
- Output short circuit, over-current protection
- 5000m altitude application
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32/EN55032 CLASS B
- Over-voltage category OVC III (meet IEC61558-1)

LD05-23BxxR2P series AC-DC converters is one of Mornsun's new generation compact size power converter. It features ultra-wide AC input and at the same time accepts DC input voltage, low power consumption, high power density, high efficiency, high reliability, reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets IEC/EN/UL62368/EN60335/EN61558 standards. The converters are widely used in industrial, power, home appliances, 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	Nominal Output Voltage and Current	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
EN (Pending)	LD05-23B03R2P	3.3W	3.3V/1000mA	71	4000
	LD05-23B05R2P	5W	5V/1000mA	77	4000
	LD05-23B09R2P		9V/555mA	79	1200
	LD05-23B12R2P		12V/416mA	80	1200
	LD05-23B15R2P		15V/333mA	81	680
	LD05-23B24R2P		24V/208mA	82	300

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	--	63	Hz
Input Current	115VAC	--	--	0.15	A
	230VAC	--	--	0.10	
Inrush Current	115VAC	--	10	--	
	230VAC	--	20	--	
Leakage Current	277VAC/50Hz	0.25mA RMS Max.			
Recommended External Input Fuse		1A/300V, slow-blow, required (The actual use needs to be selected according to the application enviroment)			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±5	--	%
Line Regulation	Full load	--	±1.5	--	
Load Regulation	10%-100% load	--	±3	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value), 10%-100% load	--	--	120	mV
Temperature Coefficient		--	±0.15	--	%/°C
Stand-by Power Consumption	230VAC	--	0.10	0.15	W

Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		⩾120%Io, self-recovery			
Minimum Load		10	--	--	%
Hold-up Time	115VAC input	--	12	--	ms
	230VAC input	--	65	--	

Note: 1. *The "Tip and barrel method" is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information;
2. The product is able to work with 0%-10% load and with stable output.

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output	Electric Strength Test for 1min, leakage current <5mA	4200	--	--	VAC
Impulse Withstand Voltage	Input - output	1.2/50 μs impulse waveform, three positive/ negative pulses, interval >= 5s. There is no breakdown discharge during the test.	6000	--	--	VDC
Insulation Resistance	Input - output	At 500VDC	100	--	--	MΩ
Operating Temperature			-40	--	+85	℃
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	95	%RH
Soldering Temperature		Wave-soldering	260 ± 5℃; time：5 - 10s			
		Manual-welding	360 ± 10℃; time：3 - 5s			
Power Derating		-40℃ to -25℃	2.67	--	--	%/℃
		+65℃ to +70℃	7.0	--	--	
		+70℃ to +85℃	1.67	--	--	
		85VAC - 100VAC	1.33	--	--	%/VAC
		277VAC - 305VAC	0.71	--	--	
Safety Standard			Design refer to IEC/EN/UL62368-1, IEC/EN60335-1, IEC/EN61558-1			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25°C > 1,000,000 h			

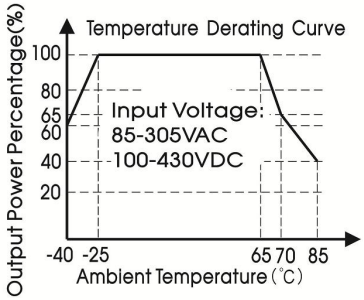
Mechanical Specifications

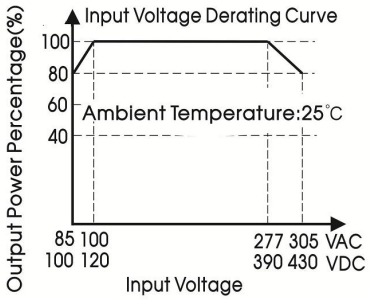
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	37.50 x 21.00 x 19.00mm
Weight	22g (Typ.)
Cooling method	Free air convection

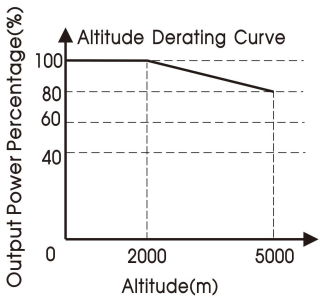
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B	
	RE	CISPR32/EN55032 CLASS B	
Immunity	ESD	IEC/EN 61000-4-2 Contact ±6KV/Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV	Perf. Criteria B
		IEC/EN61000-4-4 ±4KV (See Fig.2 for recommended circuit)	Perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±1KV	Perf. Criteria B
		IEC/EN61000-4-5 line to line ±2KV (See Fig.2 for recommended circuit)	Perf. Criteria B
	CS	IEC/EN61000-4-6 10Vr.m.s	Perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70%	Perf. Criteria B

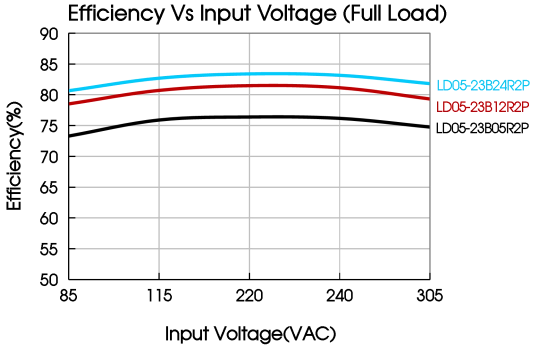
Product Characteristic Curve

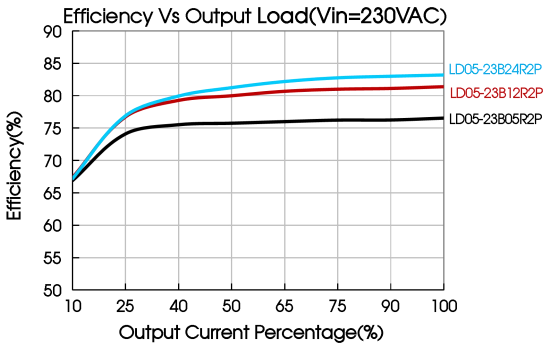






Note: ① With an AC input between 85-100V/277-305VAC and a DC input between 100-120V/390-430VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.





Design Reference

1. Typical application

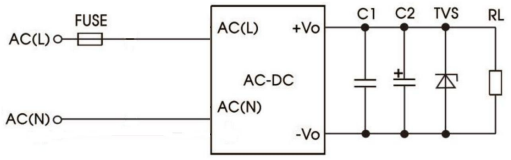


Fig. 1: Typical circuit diagram

Part No.	C1	C2	FUSE	TVS
LD05-23B03R2P	1uF/50V	150uF/16V	1A/300V, slow-blow, required	SMBJ7.0A
LD05-23B05R2P		150uF/16V		SMBJ7.0A
LD05-23B09R2P		120uF/25V		SMBJ12A
LD05-23B12R2P		120uF/25V		SMBJ20A
LD05-23B15R2P		120uF/25V		SMBJ20A
LD05-23B24R2P		68uF/35V		SMBJ30A

Output Filter Components:
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 and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. EMC compliance recommended circuit

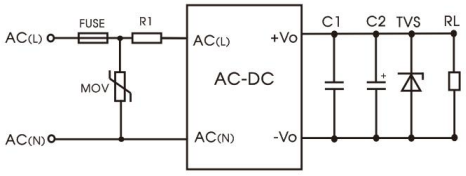
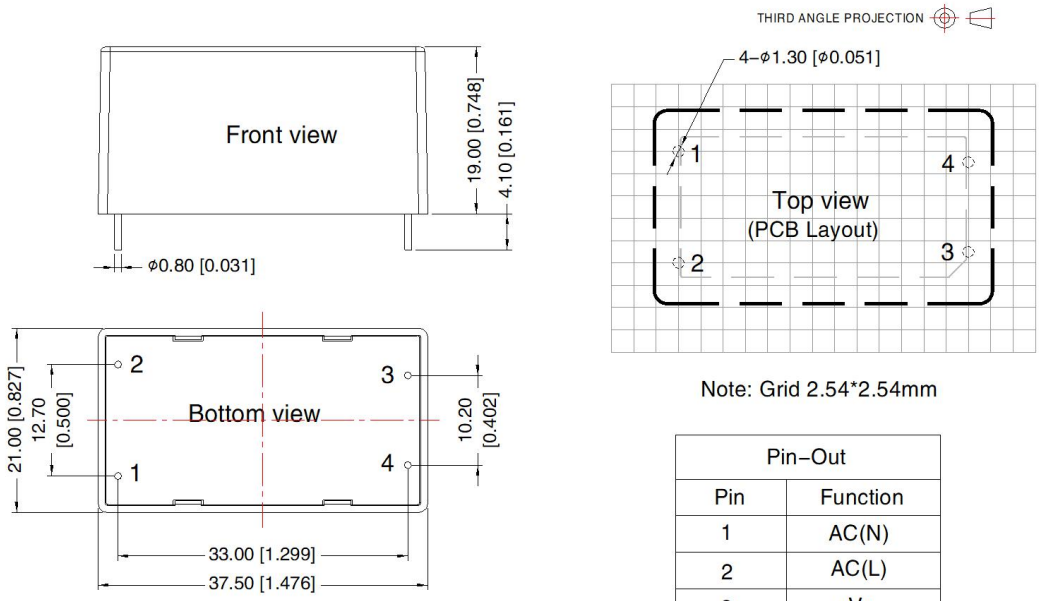


Fig 2: EMC application circuit with higher requirements

Component	Recommended value
MOV	S14K350
R1	33Ω/5W (wire-wound resistor)
FUSE	2A/300V, slow-blow, required

3. For additional information please refer to application notes on www.mornsun-power.com.

Dimensions and Recommended Layout



Note: Grid 2.54*2.54mm

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. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220058 ;
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 Ta=25℃, 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 www.mornsun-power.com