AC/DC Converter

LD05-23BxxR2-M Series

MORNSUN®

5W, AC-DC converter



CE Report EN62368-1 UKCA Report BS EN 62368-1 RoHS

FEATURES

- Ultra-wide 85 - 305VAC and 100 - 430VDC input voltage range
- Operating ambient temperature range: -40℃ to +85℃
- Up to 81.5% efficiency
- No-load power consumption 0.1W
- 5000m altitude application
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32/EN55032 CLASS B, EN55014
- Design to meet IEC/UL62368, EN60335, EN61558 standards

LD05-23BxxR2-M series AC-DC converters is one of Mornsun's compact size power converter. It features ultra-wide AC input and at the same time accepts DC input voltage, low power consumption, 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 (Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
EN/BS EN	LD05-23B05R2-M	5.00W	5V/1000mA	77.5	3000
	LD05-23B09R2-M	5.04W	9V/560mA	80.5	1200
	LD05-23B12R2-M	5.04W	12V/420mA	80.5	1200
	LD05-23B24R2-M	5.52W	24V/230mA	81.5	220

Note: The product picture is for reference only. For details, please refer to the actual product.

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	--	--	0.13	A
	230VAC	--	--	0.07	
Inrush Current	115VAC	--	15	--	
	230VAC	--	30	--	
Leakage Current	277VAC/50Hz	0.25mA RMS Max.			
Built In Fuse		1A/300V, slow-blow			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±2	--	%
Line Regulation	Full load	--	±0.3	±0.5	
Load Regulation	0%-100% load	--	±0.5	±1.0	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	50	100	mV
Stand-by Power Consumption	230VAC	--	0.1	0.15	W
Temperature Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Hiccup, continuous, self-recover			
Over-current Protection		≥120%Io, self-recover			
Over-voltage Protection	5VDC output	≤7.5VDC			
	9VDC output	≤15VDC			
	12VDC output	≤16VDC			

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	24VDC output	≤30VDC				
Minimum Load		0	--	--	%	
Hold-up Time	115VAC input	--	18	--	ms	
	230VAC input	--	100	--		

Note: *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.

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output	Electric Strength Test for 1min., leakage current <5mA		4000	--	--	VAC
Insulation Resistance	Input -output	At 500VDC		100	--	--	MΩ
Operating Temperature				-40	--	+85	℃
Storage Temperature				-40	--	+105	
Storage Humidity				--	--	95	%RH
Soldering Temperature		Wave-soldering, Max. 10 seconds		255	260	265	℃
		Manual-welding, Max. 5 seconds		350	360	370	
Switching Frequency				--	65	--	kHz
Power Derating		+50℃ to +70℃		1.75	--	--	%/℃
		+70℃ to +85℃		1.67	--	--	
		2000m - 5000m		0.67	--	--	%/km
Safety Standard				EN/BS EN62368-1(report) safety approved; Design refer to IEC/UL62368-1, EN60335-1, EN61558-1			
Safety Class				CLASS II			
MTBF		MIL-HDBK-217F@25℃		>1,080,000 h			
Vibration				10 - 500Hz, 5G, 10min./1cycle, period for 60min. Each along X, Y, Z axes			
Designed Life		230VAC	Ta：25℃ 100% load	>130x10^3 h			
			Ta：50℃ 100% load	>41x10^3 h			

Mechanical Specifications

Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	45.70 x 25.40 x 21.50 mm
Weight	36g (Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B	
		EN55014-1	
	RE	CISPR32/EN55032 CLASS B	
		EN55014-1	
Immunity	ESD	IEC/EN 61000-4-2 Contact ±6KV / Air ±8KV	perf. Criteria A
		EN55014-2	perf. Criteria A
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
		EN55014-2	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV	perf. Criteria A
		IEC/EN61000-4-4 ±4KV (See Fig.2 for recommended circuit)	perf. Criteria A
		EN55014-2	Perf. Criteria A
	Surge	IEC/EN61000-4-5 line to line ±1KV	perf. Criteria A
		IEC/EN61000-4-5 line to line ±2KV (See Fig.2 for recommended circuit)	perf. Criteria A
		EN55014-2	Perf. Criteria A

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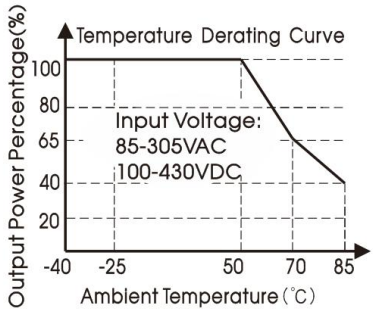
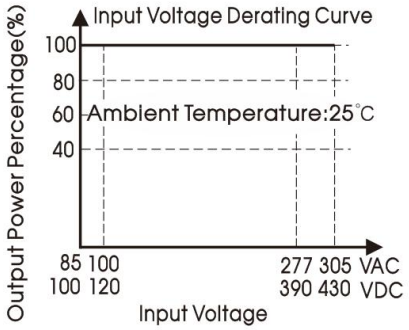
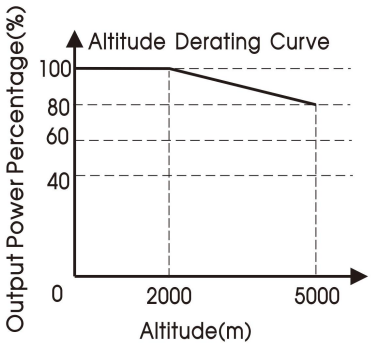
	CS	IEC/EN61000-4-6 10Vr.m.s	perf. Criteria A
		EN55014-2	perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70%	perf. Criteria B
		EN55014-2	Perf. Criteria B

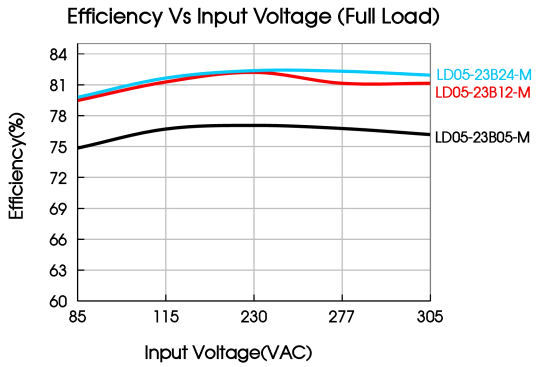
Product Characteristic Curve

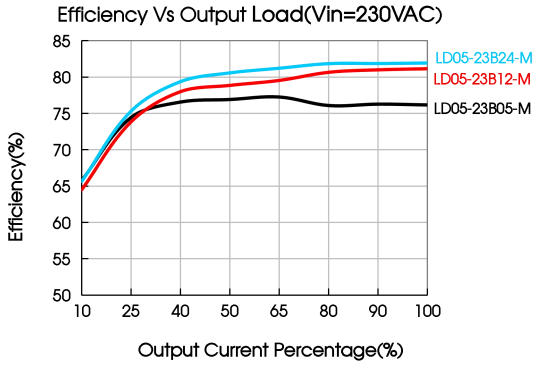






Note: This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.





Design Reference

1. Typical application

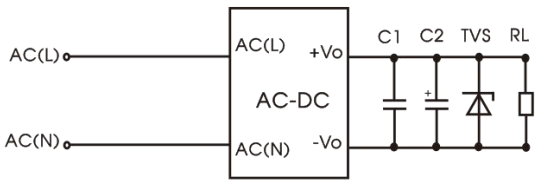


Fig. 1: Typical circuit diagram

Part No.	C1	C2	TVS
LD05-23B05R2-M	1uF/50V	220uF/16V	SMBJ7.0A
LD05-23B09R2-M		100uF/25V	SMBJ12A
LD05-23B12R2-M		100uF/25V	SMBJ20A
LD05-23B24R2-M		100uF/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.

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2. EMC compliance recommended circuit

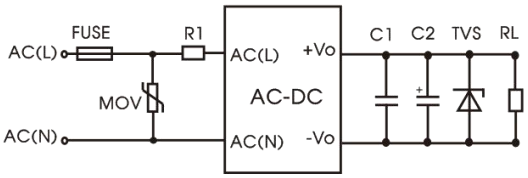


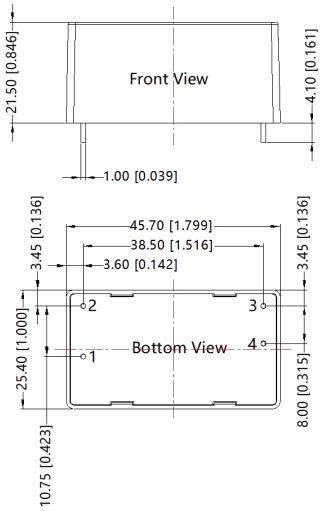
Fig. 2: EMC application circuit with higher requirements

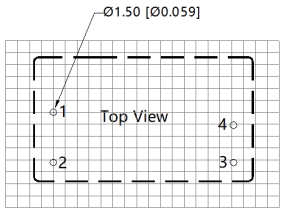
Component	Recommended value
FUSE	2A/300V, slow-blow, required
MOV	S14K350
R1	12Ω/3W (wire-wound resistor, required)

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
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: 58220011;
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.

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