AC/DC Converter
LD03-23BxxR2P Series

MORNSUN®

3W, AC-DC converter

CE RoHS 3 years Warranty

EN62368-1

FEATURES

- Ultra-wide 85 - 305VAC and 100 - 430VDC input voltage range
- Operating ambient temperature range: -40℃ to +85℃
- Up to 78% efficiency
- High power density
- No-load power consumption 0.1W
- Output short circuit, over-current protection
- Plastic case meets UL94V-0 flammability

LD03-23BxxR2P 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	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
EN	LD03-23B03R2P	2W	3.3V/600mA	70	1500
	LD03-23B05R2P	3W	5V/600mA	74	1500
EN (Pending)	LD03-23B06R2P		6V/500mA	76	1500
EN	LD03-23B09R2P		9V/340mA	76	300
	LD03-23B12R2P		12V/250mA	77	300
	LD03-23B15R2P		15V/200mA	78	300
	LD03-23B24R2P		24V/125mA	78	200

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	--	25	--	
Leakage Current	277VAC/50Hz	0.25mA RMS Max.			
Recommended External Input Fuse		1A, 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	3.3/5/6/9/12V	230VAC input	--	--	100	mV
			Others	--	--	120	
		15/24V		--	--	200	

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		⩾110%Io, self-recovery			
Minimum Load		10	--	--	%
Hold-up Time	230VAC input	--	30	--	ms

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	3600	--	--	VAC
Operating Temperature			-40	--	+85	°C
Storage Temperature			-40	--	+105	
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℃	1.33	--	--	%/℃
		+70℃ to +85℃ (3.3/5/6/9/12V)	4.0	--	--	
		+65℃ to +75℃ (15/24V)	5.0	--	--	
		+75℃ to +85℃ (15/24V)	1.0	--	--	
		85VAC - 100VAC (-25℃ to +85℃)	1.33	--	--	%/VAC
		85VAC - 115VAC (-40℃ to -25℃)	2.0	--	--	
		277VAC - 305VAC	0.71	--	--	
Safety Standard			Design refer to IEC/UL62368-1, IEC/EN60335-1, IEC/EN61558-1& EN62368-1 (Report)			
Safety Class			CLASS Ⅱ			
MTBF			MIL-HDBK-217F@25°C > 300,000 h			

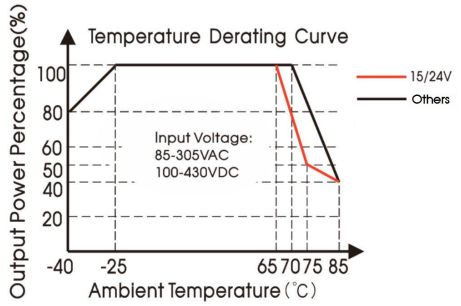
Mechanical Specifications

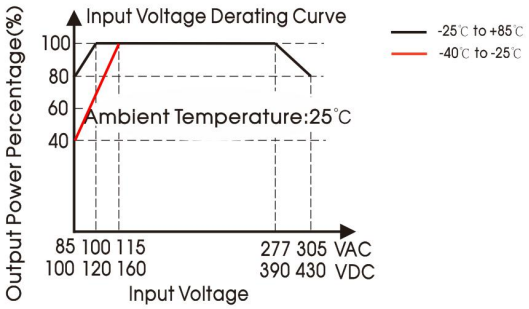
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	37.50 x 18.50 x 13.60 mm
Weight	14.5g (Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

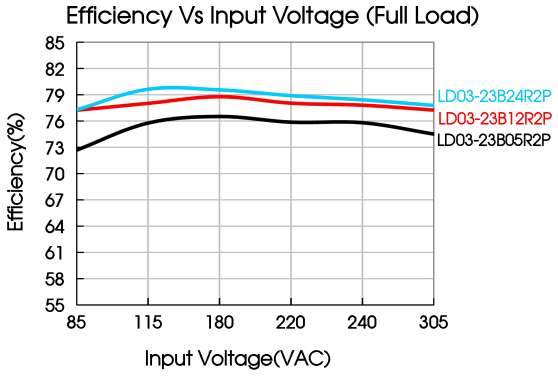
Emissions	CE	CISPR32/EN55032 CLASS A	
		CISPR32/EN55032 CLASS B (See Fig.2 for recommended circuit)	
	RE	CISPR32/EN55032 CLASS A	
		CISPR32/EN55032 CLASS B (See Fig.2 for recommended circuit)	
Immunity	ESD	IEC/EN 61000-4-2 Contact ±6KV/Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria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

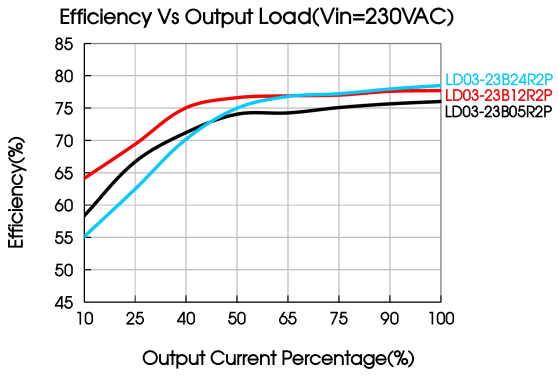
Product Characteristic Curve





Note: ① With an AC input between 85-100V(115V)/277-305VAC and a DC input between 100-120V(160V)/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

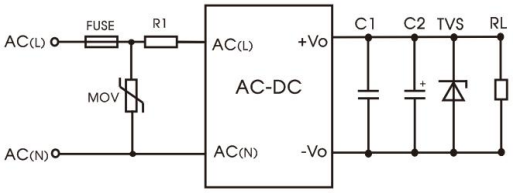


Fig. 1: Typical circuit diagram

Part No.	C1(uF)	C2(uF)	FUSE	R1	TVS	MOV
LD03-23B03R2P	1	150	1A/300V, slow-blow, required	24Ω/5W (wire-wound resistor)	SMBJ7.0A	S10K350
LD03-23B05R2P		150			SMBJ7.0A	
LD03-23B06R2P		150			SMBJ7.0A	
LD03-23B09R2P		120			SMBJ12A	
LD03-23B12R2P		120			SMBJ20A	
LD03-23B15R2P		120			SMBJ20A	
LD03-23B24R2P		68			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

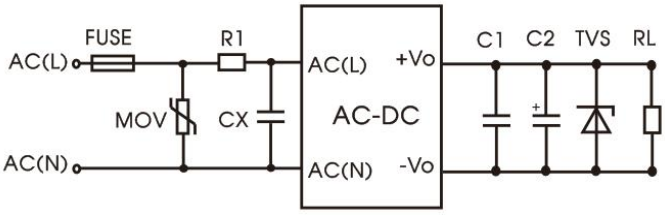


Fig 2: EMC application circuit with higher requirements

Component	Recommended value
MOV	S10K350
R1	24Ω/5W (wire-wound resistor)
FUSE	2A/300V, slow-blow, required
CX	0.1uF/400VAC

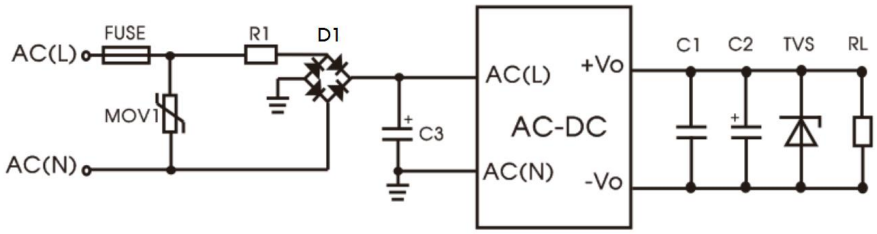
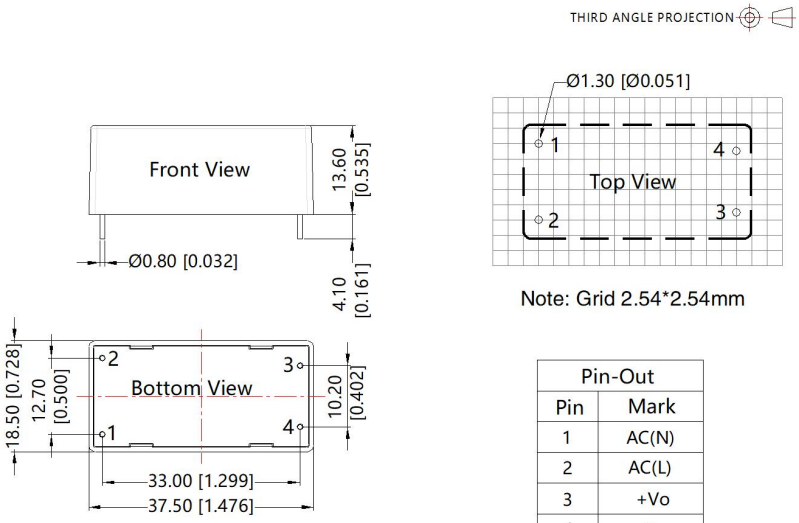


Fig 3: EMC application circuit with higher requirements

Component	Recommended value
MOV1	S14K350
R1	24Ω/5W (wire-wound resistor)
FUSE	2A/300V, slow-blow, required
D1	1000V/1A
C3	10uF/450V

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	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: 58200055 ;
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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