10W, AC-DC converter

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

FEATURES

- Ultra-wide 85 - 305VAC and 100 - 430VDC input voltage range
- Operating ambient temperature range: -40℃ to +80℃
- High I/O isolation voltage up to 4200VAC
- Output short circuit, over-current, over-voltage protection
- Plastic case meets UL94V-0 flammability
- OVC Ⅲ (meet EN62477-1)
- EMI performance meets CISPR32/EN55032 CLASS B

LD10-23BxxR2-RC series is one of Mornsun's compact AC-DC power converters. It features ultra-wide AC input voltage ranges and compatible with DC input voltage, low power consumption, low ripple & noise, high efficiency, high reliability, reinforced insulation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets safety standard UL/IEC/EN62368, EN60335, EN62477. The converters are widely used in industrial, electric automation, home appliances and EV charging applications. For extremely harsh EMC environment, we recommend to use the application circuit shown 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	LD10-23B03R2-RC	8.6W	3.3V/2600mA	74	10000
	LD10-23B05R2-RC	10W	5V/2000mA	80	8000
	LD10-23B12R2-RC		12V/830mA	84	1500
	LD10-23B15R2-RC		15V/660mA	84	1000
	LD10-23B24R2-RC		24V/410mA	85	470

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	--	--	0.23	A
	230VAC	--	--	0.15	
Inrush Current	115VAC	--	15	--	
	230VAC	--	30	--	
Leakage Current	277VAC/50Hz	0.1mA RMS Max.			
Recommended External Input Fuse		2A/300V, slow-blow, required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±2	--	%
Line Regulation	Full load	--	±0.5	--	
Load Regulation	0% - 100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	--	100	mV
Stand-by Power Consumption	230VAC	--	--	0.25	W
Temperature Coefficient		--	±0.02	--	%/℃
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		≥150% Io, self-recovery			
Over-voltage Protection	3.3V/5V output	≤7.5VDC (Output voltage clamp)			
	12V/15V output	≤20VDC (Output voltage clamp)			
	24V output	≤30VDC (Output voltage clamp)			

Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	10	--	ms
	230VAC input	--	60	--	

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	4200	--	--	VAC
Insulation Resistance	Input-output	At 500VDC	100	--	--	MΩ
Operating Temperature			-40	--	+80	℃
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	95	%RH
Soldering Temperature		Wave-soldering	260 ± 5℃; time: 5 - 10s			
		Manual-welding	360 ± 10℃; time: 3 - 5s			
Switching Frequency			--	65	--	kHz
Power Derating		+65℃ to +80℃	3.33	--	--	%/℃
		85VAC - 90VAC	2	--	--	%/VAC
		2000m - 5000m	6.67	--	--	%/Km
Safety Standard			BS EN62368-1/EN62368-1(report) safety approval and design refer to UL/IEC62368-1, EN60335-1, EN62477-1			
Safety Class			CLASS II			
MTBF		MIL-HDBK-217F@25℃	≥1,000,000 h			

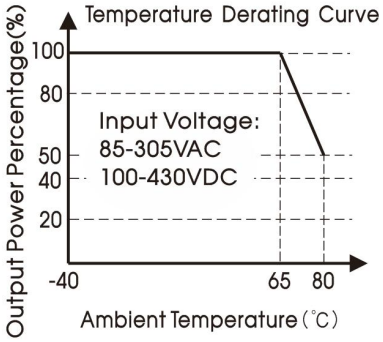
Mechanical Specifications

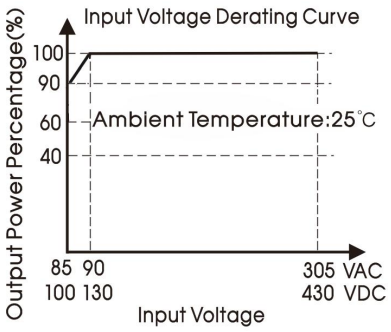
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	52.40 x 27.20 x 24.00 mm
Weight	50g (Typ.)
Cooling method	Free air convection

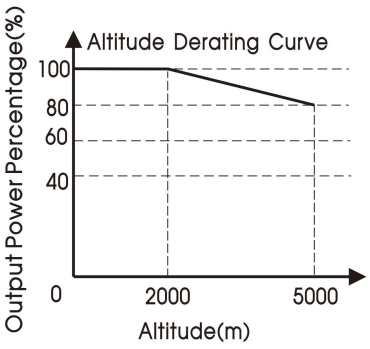
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	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
	Surge	IEC/EN61000-4-5	line to line ±1KV	perf. Criteria A
		IEC/EN61000-4-5	line to line ±2KV/line to PE ±4KV (See Fig. 2 for recommended circuit)	perf. Criteria A
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	PFMF	IEC/EN6100-4-8	10A/m	perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

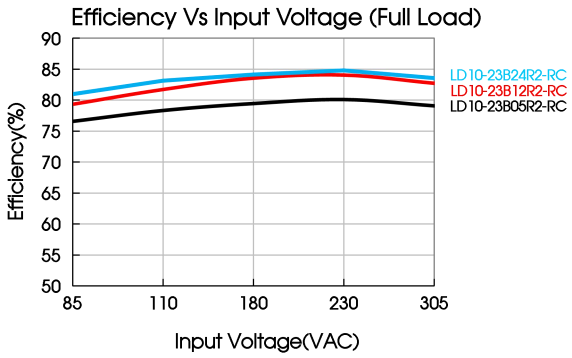
Product Characteristic Curve

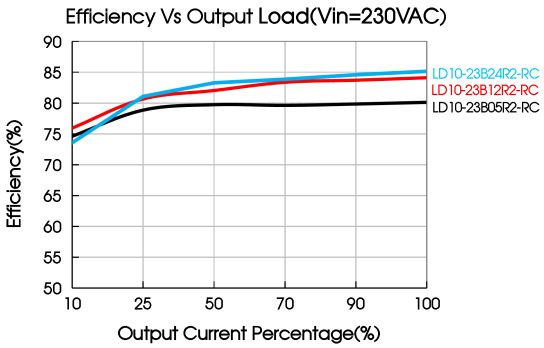






Note: ① With an AC input between 85-90VAC and a DC input between 100-130VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.





Design Reference

1. Typical application

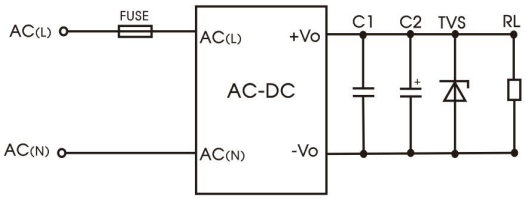


Fig.1: Typical circuit diagram

Part No.	FUSE	C1	C2	TVS
LD10-23B03R2-RC	2A/300V, slow-blow, required	1uF/50V	220uF/16V	SMBJ7.0A
LD10-23B05R2-RC			220uF/16V	SMBJ7.0A
LD10-23B12R2-RC			100uF/25V	SMBJ20A
LD10-23B15R2-RC			100uF/25V	SMBJ20A
LD10-23B24R2-RC			100uF/35V	SMBJ30A

Output Filter Components:
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

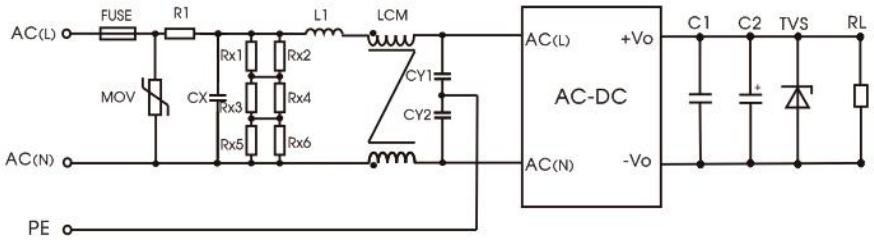


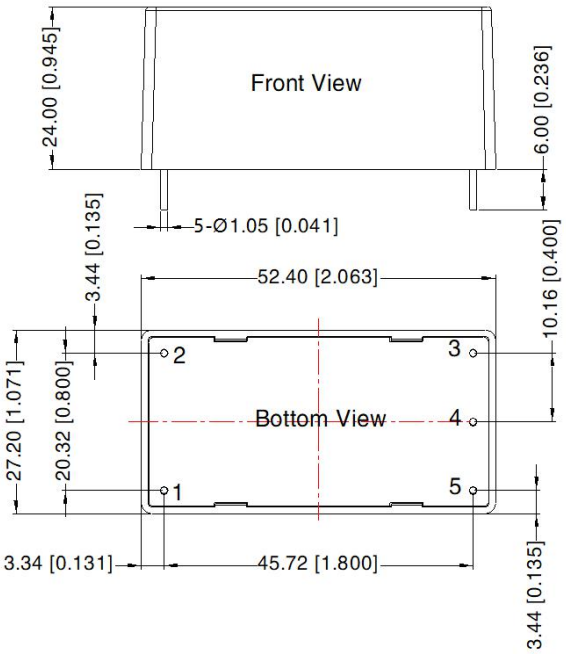
Fig. 2: EMC application circuit with higher requirements (Class Ⅰ)

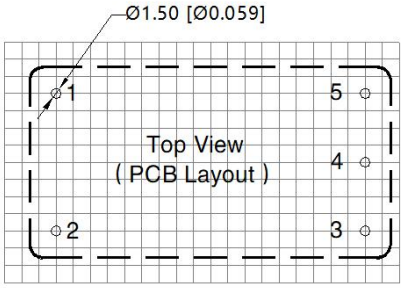
Component	Recommended value
FUSE	2A/300V, slow-blow, required
MOV	S14K350
R1	12Ω/5W (wire-wound resistor, required)
CX	0.1uF/310VAC
L1	4.7uH/2A
LCM	10mH, P/N: FL2D-Z5-103(MORNSUN) is recommended
CY1/CY2	1000pF/400VAC
Note: Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX, and the recommended resistance value is 1.5MΩ/150VDC.	

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	No Pin
4	-Vo
5	+Vo

Note:
Unit: mm[inch]
PIN1/2/3/4/5: ϕ 1.0mm
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. If product involves multi-brand materials and there are differences in color etc, please refer to the standards of each manufacturer;
8. 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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