AC/DC Converter

LD90-23BxxR2 Series

MORNSUN®

90W, AC/DC converter

RoHS

3 years Warranty

FEATURES

- Wide input voltage range: 80 - 305VAC/110 - 430VDC
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation test voltage up to 4200VAC
- Up to 93% efficiency
- No-load power consumption < 0.21W
- Compact size, high power density
- Output short circuit, over-current, over-voltage protection
- 4000m altitude application
- Plastic case meets UL94V-0 flammability
- Meets Emissions CLASS B and surge ±2KV without additional circuits
- Over-voltage category OVC Ⅲ (meet EN62368-1, EN61558-1) (2000m altitude)

LD90-23BxxR2 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, low ripple & noise, 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 (Pending)	LD90-23B12R2	80.4W	12V/6700mA	92	6800
	LD90-23B15R2	85.05W	15V/5670mA	92.5	4500
	LD90-23B24R2	90W	24V/3750mA	93	3000
	LD90-23B48R2		48V/1875mA	93	470

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	80	--	305	VAC
	DC input	110	--	430	VDC
Input Frequency		47	--	63	Hz
Input Current	115VAC	--	--	2	A
	230VAC	--	--	1.1	
Inrush Current	115VAC	--	35	--	
	230VAC	--	65	--	
Leakage Current	277VAC/50Hz	0.25mA RMS Max.			
Built In Fuse		3.15A/300V, slow-blow			
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)	12V/15V	--	--	120	mV
		24V	--	--	200	
		48V	--	--	240	
Temperature Coefficient			--	±0.02	--	%/℃
Stand-by Power Consumption			--	--	0.21	W
Short Circuit Protection		Hiccup, continuous, self-recovery				

Over-current Protection		≥110%Io, self-recovery			
Over-voltage protection	12VDC output	≤16VDC (Hiccup or clamp)			
	15VDC output	≤25VDC (Hiccup or clamp)			
	24VDC output	≤35VDC (Hiccup or clamp)			
	48VDC output	≤60VDC (Hiccup or clamp)			
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	10	--	ms
	230VAC input	--	30	--	

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	--	+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			
Switching Frequency			--	75	--	KHz
Power Derating		-40℃ to -30℃	5.0	--	--	%/℃
		+50℃ to +70℃	2.50	--	--	
		+70℃ to +85℃	1.66	--	--	
		80VAC-100VAC	1.0	--	--	%/VAC
		2000m - 4000m	10.0	--	--	%/Km
Safety Standard			Design refer to IEC/EN/UL62368-1, BS EN 62368-1, IEC/EN60335-1, IEC/EN61558-1			
Safety Class			CLASS II			
Vibration			10 ~ 500Hz, 2G 10min./1cycle, period for 60min. Each along X, Y, Z axes			
MTBF			MIL-HDBK-217F@25℃ >500,000 h			

Mechanical Specifications

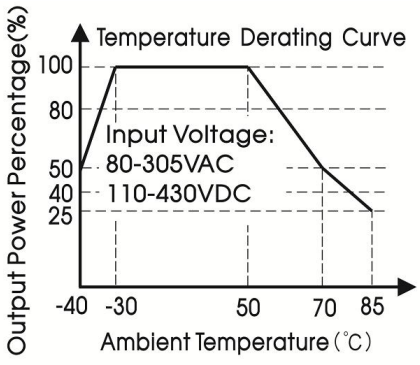
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	87.00 x 52.00 x 29.50 mm
Weight	200g (Typ.)
Cooling Method	Free air convection

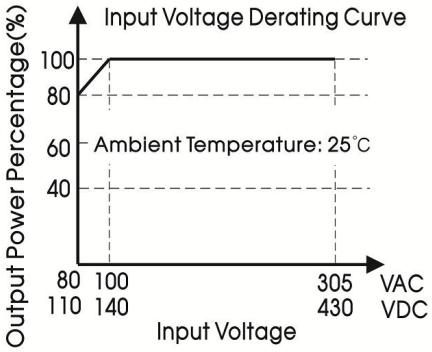
Electromagnetic Compatibility (EMC)

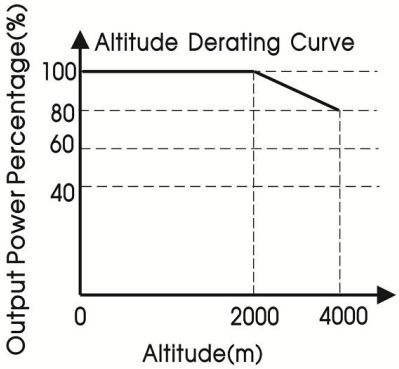
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
	Harmonic current	IEC/EN61000-3-2	CLASS A	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±2KV	perf. Criteria A
		IEC/EN61000-4-5	line to line ±2KV/ line to ground ±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	PFM	IEC/EN61000-4-8	30A/m	perf. Criteria A

	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70%	perf. Criteria B

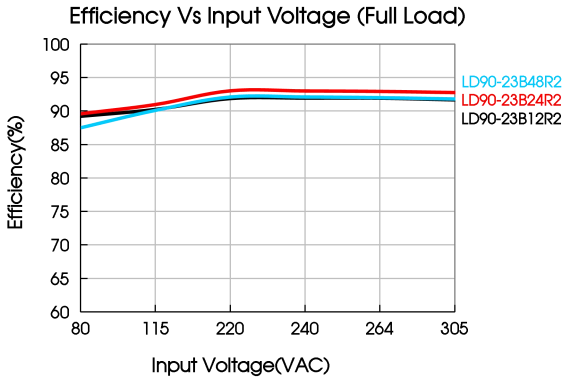
Product Characteristic Curve

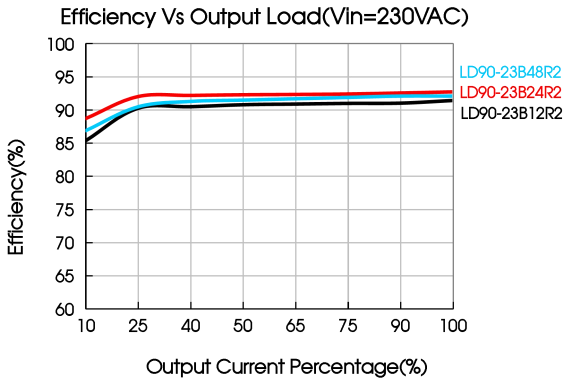






Note: ① With an AC input between 80-100VAC and a DC input between 110-140DC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.





Design Reference

1. Typical application

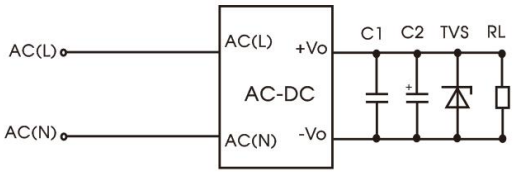


Fig. 1: Typical circuit diagram

Part No.	C1	C2	TVS
LD90-23B12R2	1uF/100V	330uF/35V	SMBJ20A
LD90-23B15R2		330uF/35V	SMBJ20A
LD90-23B24R2		200uF/35V	SMBJ30A
LD90-23B48R2		100/63V	SMBJ60A

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

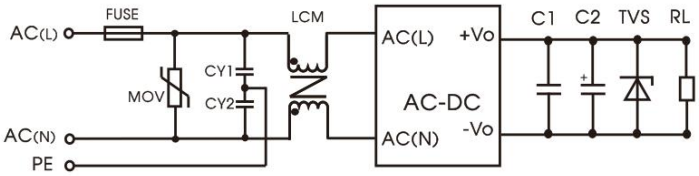


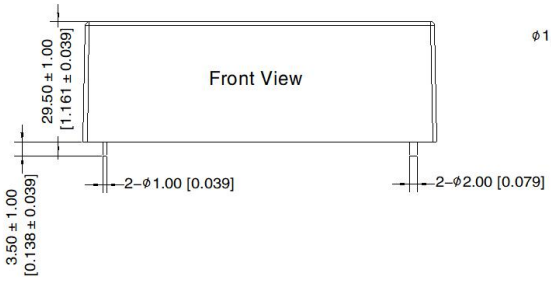
Fig. 2: EMC application circuit with higher requirements

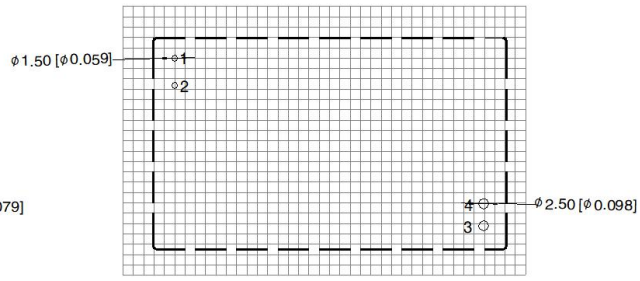
Component	Recommended value
FUSE	6.3A/300V, slow-blow, required
MOV	S14K350
CY1/CY2	1nF/400VAC
LCM	10mH, P/N: FL2D-Z5-103 (MORNSUN) is recommended

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

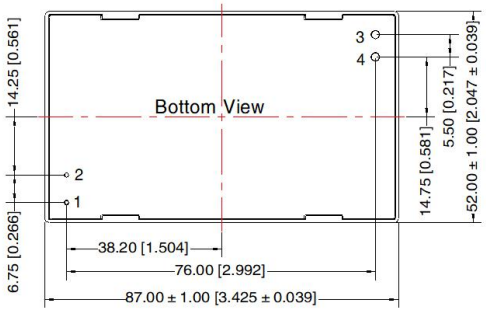
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm



Pin-Out	
Pin	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: 58220019;
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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