

40W, AC/DC converter



FEATURES

- Universal 85-305VAC or 100-430VDC input voltage
- Operating ambient temperature range: -40°C to +85°C
- High I/O isolation test voltage up to 4200VAC
- Up to 90% efficiency
- Compact size, high power density
- Output short circuit, over-current, over-voltage protection
- OVC III (meet EN62477, 5000m altitude)
- 5000m altitude application
- Meets Emissions CLASS B and surge ±2KV without additional circuits



LD40-23BxxR2 series AC-DC converters is one of Mornsun's new generation compact size power converters. 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/UL/EN62368, IEC/EN60335/62477, 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 (W)	Nominal Output Voltage and Current(Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
IEC/UL/EN	LD40-23B05R2	35	5V/7000mA	86	6600
	LD40-23B12R2	40	12V/3330mA	89	4400
	LD40-23B15R2		15V/2666mA	90	3000
	LD40-23B24R2		24V/1670mA	89	1500
	LD40-23B48R2		48V/833mA	90	470

Note: * Use suffix "A2S" for chassis mounting and suffix "A4S" for Din-Rail mounting.

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	--	--	1.0	A
	230VAC	--	--	0.6	
Inrush Current	115VAC	--	30	--	
	230VAC	--	60	--	
Leakage Current	277VAC/50Hz	0.1mA RMS Max.			
Recommended External Input Fuse		3.15A/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	5V	±2	--	
		12V/15V/24V/48V	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	100	150	mV

Temperature Coefficient		--	±0.02	--	%/°C
Stand-by Power Consumption		--	0.3	0.55	W
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		≥130% Io, self-recovery			
Over-voltage Protection	5 VDC output	≤6.3 VDC (Hiccup or clamp)			
	12 VDC output	≤16 VDC (Hiccup or clamp)			
	15 VDC output	≤25 VDC (Hiccup or clamp)			
	24 VDC output	≤35 VDC (Hiccup or clamp)			
	48 VDC output	≤60 VDC (Hiccup or clamp)			
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	8	--	ms
	230VAC input	--	50	--	
Note: *The "parallel cable" 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	°C	
Storage Temperature		-40	--	+85		
Storage Humidity		--	--	95	%RH	
Soldering Temperature	Wave-soldering	260 ± 5°C; time: 5 - 10s				
	Manual-welding	360 ± 10°C; time: 3 - 5s				
Power Derating	-40°C to -25°C (85-200VAC Input)	4	--	--	% / °C	
	+50°C to +70°C	2.5	--	--		
	+70°C to +85°C	1.67	--	--		
	85VAC - 100VAC	1.33	--	--	% / VAC	
	277VAC - 305VAC	0.71	--	--		
Altitude Derating	2000m - 5000m	6.67	--	--	%/Km	
Safety Standard		IEC/UL62368-1 safety approved & EN62368-1, BS EN 62368-1(Report); Design refer to IEC/EN60335-1, IEC/EN62477-1, EN61558-1				
Safety Class		CLASS II				
MTBF		MIL-HDBK-217F@25°C ≥500,000 h				

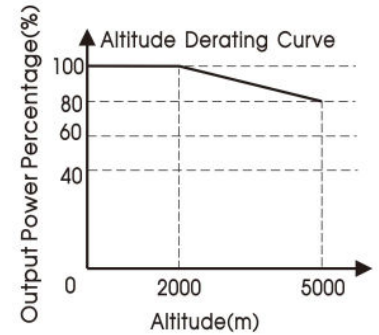
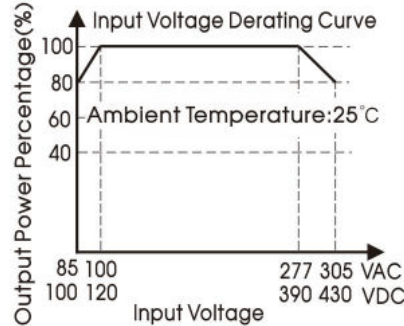
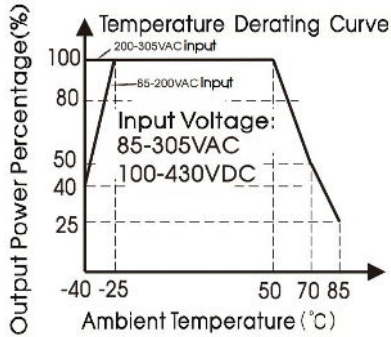
Mechanical Specifications

Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)	
Dimension	Horizontal package	69.50 x 39.00 x 24.00 mm
	A2 chassis mounting	96.10 x 54.00 x 31.00mm
	A4 Din-Rail mounting	96.10 x 54.00 x 35.60mm
Weight	Horizontal package	100g (Typ.)
	A2S chassis mounting	147g (Typ.)
	A4S Din-Rail mounting	190g (Typ.)
Cooling Method	Free air convection	

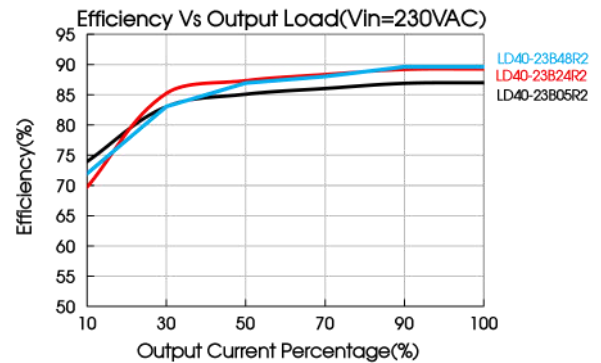
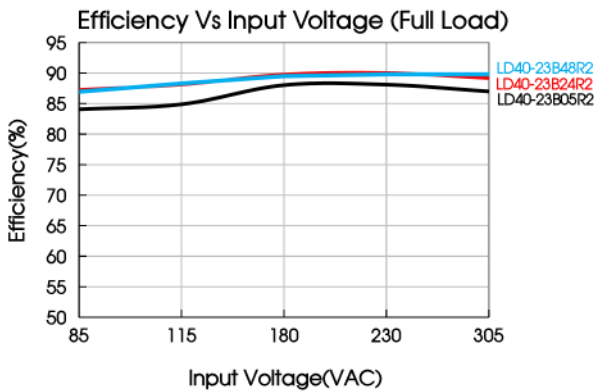
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact $\pm 6\text{KV}$ /Air $\pm 8\text{KV}$	perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2\text{KV}$	perf. Criteria A
		IEC/EN61000-4-4	$\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line $\pm 2\text{KV}$	perf. Criteria A
		IEC/EN61000-4-5	line to line $\pm 2\text{KV}$ /line to PE $\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	perf. Criteria A
	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 85-100VAC/277-305VAC and a DC input between 100-120VDC/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 Mornsun FAE.



Design Reference

1. Typical application

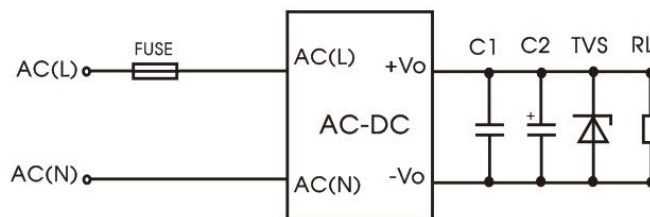


Fig. 1: Typical circuit diagram

Part No.	FUSE	C1	C2	TVS
LD40-23B05R2	3.15A/300V, slow-blow, required	1uF/50V	330uF/16V	SMBJ7.0A
LD40-23B12R2			330uF/16V	SMBJ20A
LD40-23B15R2			220uF/25V	SMBJ20A
LD40-23B24R2			100uF/35V	SMBJ30A
LD40-23B48R2			47uF/63V	SMBJ64A

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

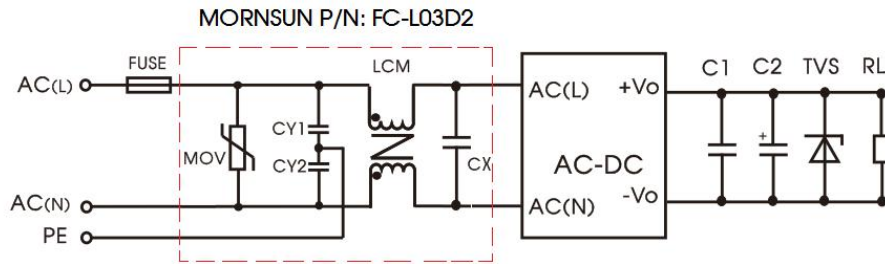
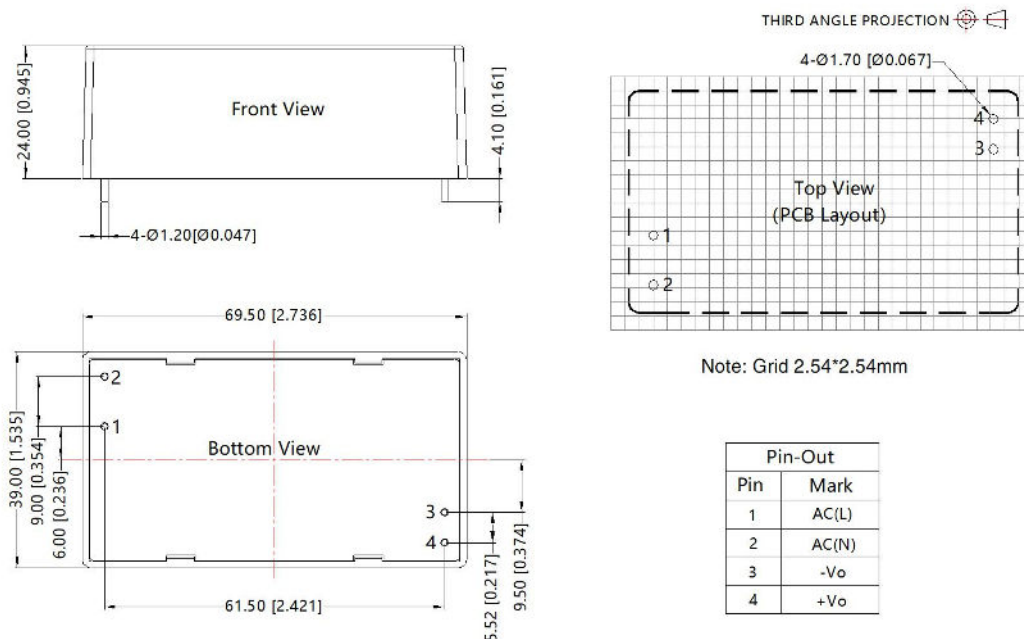


Fig. 2: EMC application circuit with higher requirements

Component	Recommended value
FUSE	3.15A/300V, slow-blow, required
MOV	S14K350
CY1/CY2	1nF/400VAC
CX	684K/310V
LCM	10mH, P/N: FL2D-30-103 (MORNSUN) is recommended

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


Dimensions and Recommended Layout

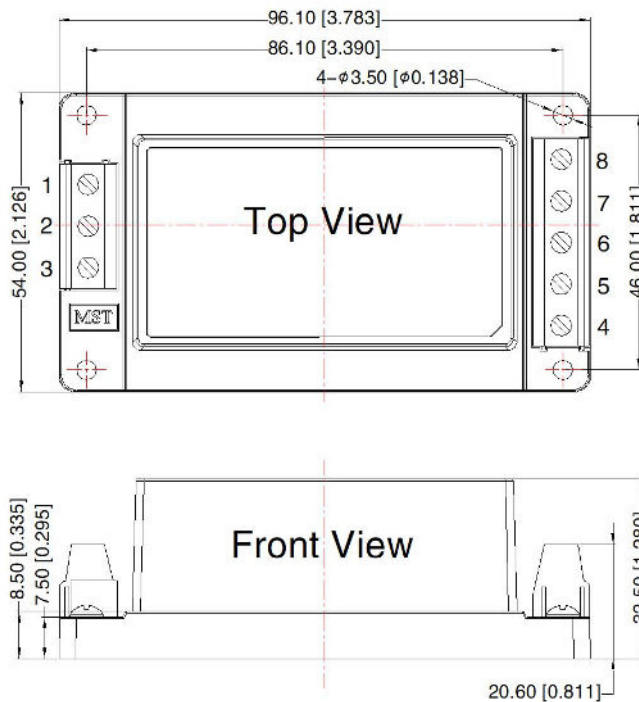


Note:
Unit: mm[inch]
Pin diameter tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$

Pin-Out	
Pin	Mark
1	AC(L)
2	AC(N)
3	-Vo
4	+Vo

A2S Dimensions

THIRD ANGLE PROJECTION 

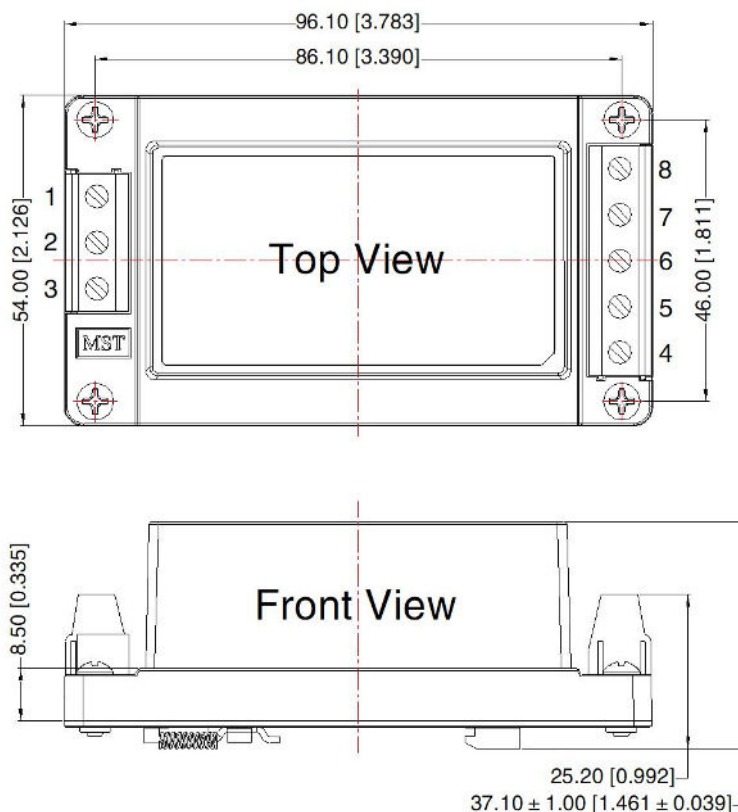


Pin-Out	
Pin	Function
1	NC
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	NC
7	NC
8	-Vo

Note:
Unit: mm[inch]
Wire range: 24-12AWG
Tightening torque: Max 0.4N · M
General tolerances: ± 1.00[± 0.039]

A4S Dimensions

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Function
1	NC
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	NC
7	NC
8	-Vo

Note:
Unit: mm[inch]
Mounting rail: TS35,rail needs to connect safety ground
Wire range: 24-12AWG
Tightening torque: Max 0.4N · M
General tolerances: ± 1.00[± 0.039]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220193; (Horizontal package); 58220019 (A2S/A4S package);
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 $T_a=25^{\circ}\text{C}$, 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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