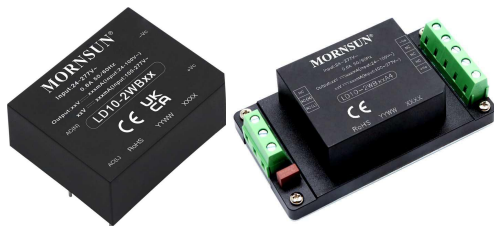


10W, AC-DC converter



FEATURES

- Ultra-low, ultra-wide input voltage: 21.6 - 305VAC and 18 - 430VDC
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation test voltage up to 4000VAC
- Up to 81% efficiency
- Output short circuit, over-current, over-voltage protection
- 5000m altitude application

LD10-2WBxx series AC-DC converters is one of Mornsun's ultra-low, ultra-wide input 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/EN/UL62368/EN60335/EN61558 standards. The converters are compatible with a variety of common input voltage application environments such as 24VDC, 48VDC, 24VAC, 110VAC, 220VAC, 230VAC, 277VAC, and they are widely used in low voltage switch, industrial, 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.
EN	LD10-2WB05	10.00	5V/2000mA	76	5000
	LD10-2WB09	9.90	9V/1100mA	78	3600
	LD10-2WB12	9.96	12V/830mA	80	2000
	LD10-2WB15	10.05	15V/670mA	80	820
	LD10-2WB24	10.08	24V/420mA	81	400

Note: 1. * Use suffix "A4" for Din-Rail mounting.

2. 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	21.6	--	305	VAC
	DC Input	18	--	430	VDC
Input Frequency		47	--	63	Hz
Input Current	24VDC/24VAC	--	--	0.6	A
	115VAC	--	--	0.35	
	230VAC	--	--	0.25	
Inrush Current	115VAC	--	25	--	
	230VAC	--	40	--	
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	--	
Minimum Load		0	--	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	--	100	mV
Stand-by Power Consumption	230VAC	--	--	0.75	W
Temperature Coefficient		--	±0.02	--	%/℃

Hold-up Time	115VAC Input	--	8	--	ms
	230VAC Input	--	40	--	
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		≥ 110% Io, self-recovery			
Over-voltage Protection	5VDC Output	≤7.5VDC (Output voltage Hiccup)			
	9VDC Output	≤ 15VDC (Output voltage Hiccup)			
	12VDC/15VDC Output	≤20VDC (Output voltage Hiccup)			
	24VDC Output	≤35VDC (Output voltage Hiccup)			
Note: *The "Tip and barrel method" is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 0.1uF 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	--	+85	
Storage Humidity			--	--	95	%RH
Soldering Temperature	Wave-soldering, Max. 10 seconds		255	260	265	℃
	Manual-welding, Max. 5 seconds		350	360	370	
Power Derating	-40℃ to -25℃	<100VAC/140VDC input	2.33	--	--	% / ℃
	+50℃ to +70℃	5V	2.5	--	--	
	+55℃ to +70℃	9V/12V/15V/24V	3.33	--	--	
	+70℃ to +85℃		0.66	--	--	
	24VAC - 85VAC		0.66	--	--	% / VAC
	85VAC - 100VAC		1.33	--	--	
	18VDC - 24VDC		1.67	--	--	
	24VDC - 100VDC		0.39	--	--	
	100VDC - 140VDC		0.5	--	--	
	2000m - 5000m		6.67	--	--	% / Km
Safety Standard			EN/BS EN62368-1 (Report) Safety Approval; Design refer to IEC/UL62368-1, EN60335-1, EN61558-1, IS13252 (Part 1)			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25℃ >300,000 h			

Mechanical Specifications

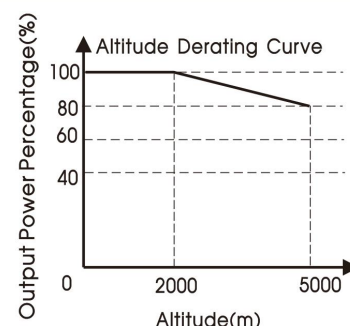
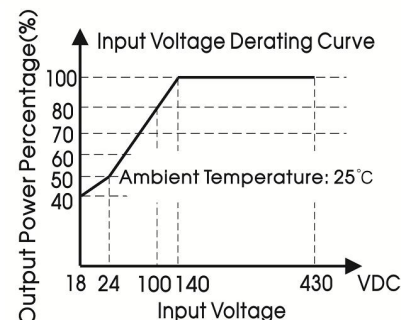
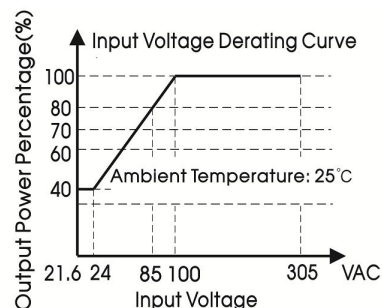
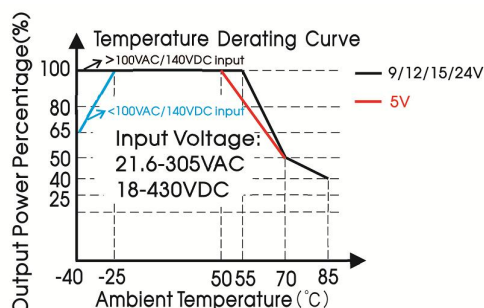
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)	
Dimension	Horizontal package	55.00 x 45.00 x 21.00 mm
	A4 Din-Rail mounting	96.10 x 54.00 x 34.10 mm
Weight	Horizontal package/A4 DIN-rail package	
		65g (Typ.)/155g (Typ.)
Cooling method	Free air convection	

Electromagnetic Compatibility (EMC)

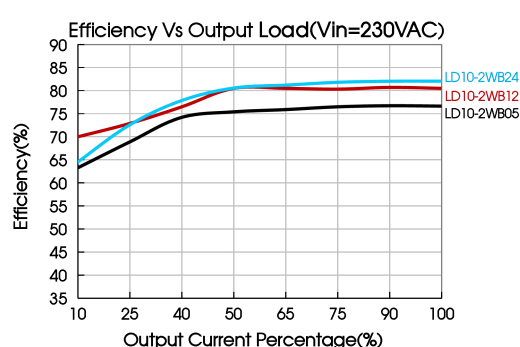
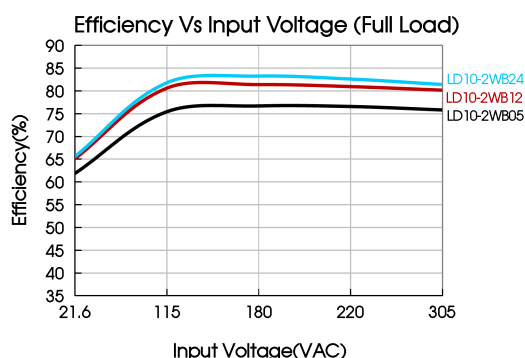
Emissions	CE	CISPR32/EN55032 CLASS A
		CISPR32/EN55032 CLASS B (See Fig. 2 for recommended circuit)
	RE	CISPR32/EN55032 CLASS A
		CISPR32/EN55032 CLASS B (See Fig. 2 for recommended circuit)

Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV/Air ±15KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 3 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV	perf. Criteria B
		IEC/EN61000-4-5	line to line ±1KV/line to PE ±1KV (See Fig. 3 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	Voltage variations	IEC61000-6-2/IEC61000-4-11	70% Un, 25/30 cycle(50/60Hz) 40% Un, 10/12 cycle(50/60Hz) 0% Un, 1 cycle (Un is the maximum input nominal voltage)	perf. Criteria B
	Voltage interruptions	IEC61000-6-2/IEC61000-4-11	0% Un, 250/300 cycle(50/60Hz) (Un is the maximum input nominal voltage)	perf. Criteria C

Product Characteristic Curve



Note: ① With an AC input between 21.6-100VAC and a DC input between 18-140VDC, 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

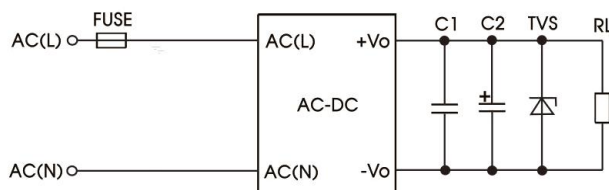


Fig. 1: Typical circuit diagram

Part No.	FUSE	C1	C2	TVS
LD10-2WB05	2A/300V, slow-blow, required	1uF/50V	220uF/16V	SMBJ7.0A
LD10-2WB09			100uF/25V	SMBJ12A
LD10-2WB12			100uF/25V	SMBJ20A
LD10-2WB15			100uF/25V	SMBJ20A
LD10-2WB24			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.

2. EMC compliance recommended circuit

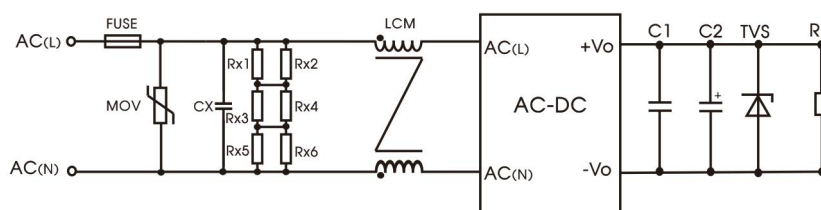


Fig. 2: EMC application circuit with higher requirements

Component	Recommended value
FUSE	2A/300V, slow-blow, required
MOV	S14K350
CX	0.33uF/310VAC
LCM	25uH/2A

Note: Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX, and the recommended resistance value is 1M Ω /150VDC.

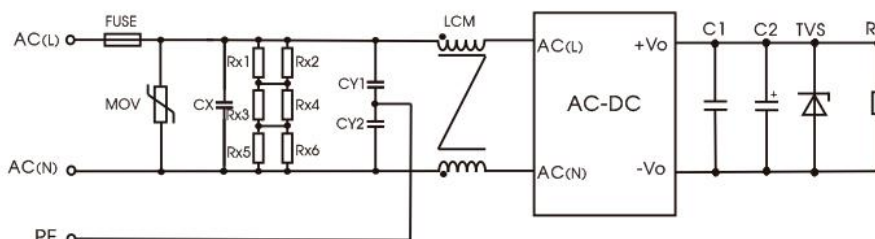


Fig 3: Recommended circuit for class I equipment

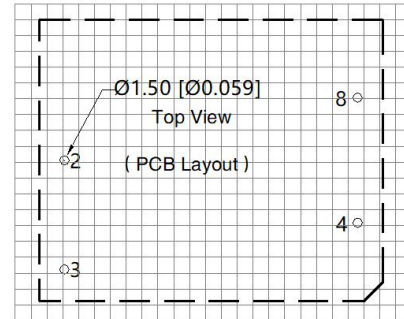
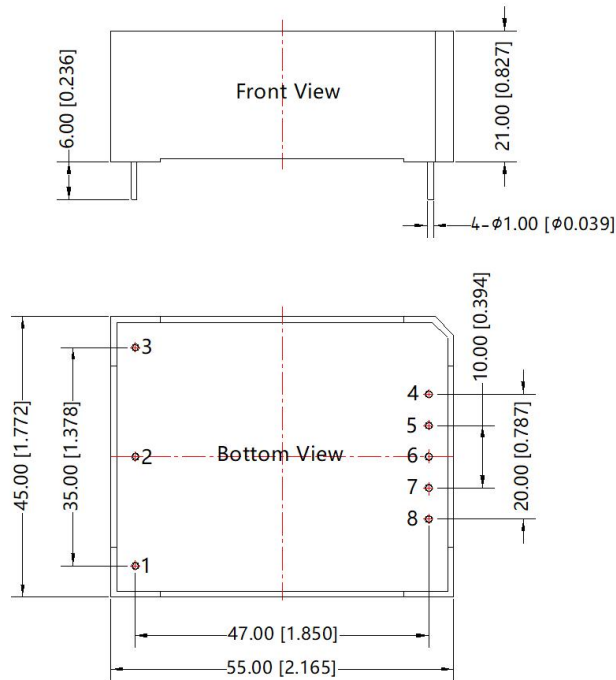
Component	Recommended value
FUSE	2A/300V, slow-blow, required
MOV	S14K350
CY1/CY2	1000pF/400VAC
CX	0.33uF/310VAC
LCM	25uH/2A

Note: Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX, and the recommended resistance value is 1M Ω /150VDC.

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



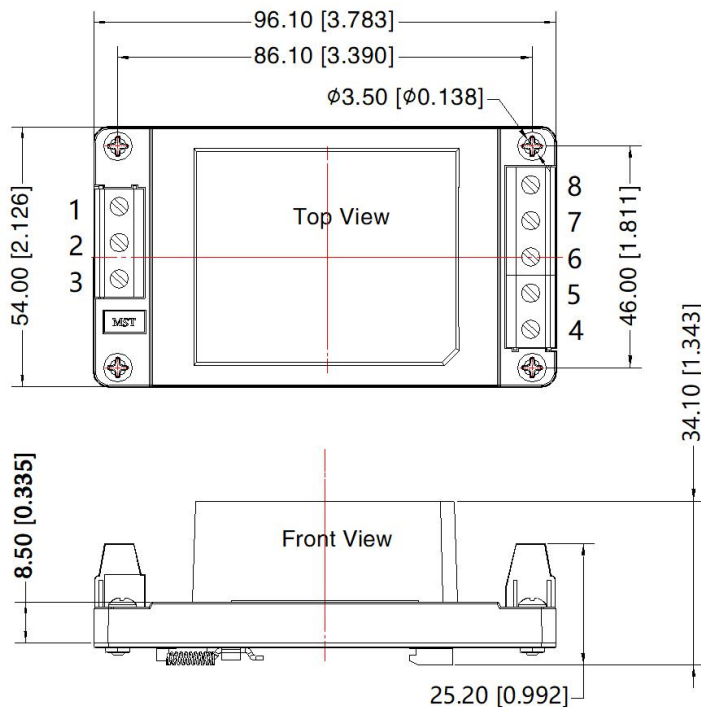
Note: grid 2.54*2.54mm

Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.50 [± 0.020]

Pin-Out	
Pin	Mark
1	No Pin
2	AC(N)
3	AC(L)
4	+Vo
5	No Pin
6	No Pin
7	No Pin
8	-Vo

A4 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: 58220006 (Horizontal package); 58220010 (A4 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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