

12W, AC-DC converter



UL **us** **CE** **RoHS**

FEATURES

- Universal input :85~264VAC/100~370VDC
- AC and DC dual-use(input from the same terminal)
- Ultra-slim SIP package
- 4000VAC safer isolation
- Low ripple & noise
- High efficiency, low power consumption, green environmental protection
- Output over voltage, short circuit and over current protection
- Meet UL60950 and EN60950 standards
- Three years warranty
- Mounting: PCB mounting, Chassis mounting, DIN-Rail mounting available

LD12 series —— are the 12W compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, low ripple& noise , high efficiency, high reliability, 4000VAC safer isolation. It offers good EMC performance, meet IEC/EN61000-4, CISPR22/EN55022, UL60950 and EN60950 standards, and widely used in industrial, electricity, instruments, telecommunication and civil applications.

Note: Please refer to Design Reference when module being used in a bad EMC environment.

Selection Guide

Certification	Model	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load (uF)
UL/CE	LD12-20B03	12W	3.3V/2400mA	74	10000
	LD12-20B05		5V/2400mA	78	10000
	LD12-20B12		12V/1000mA	82	5400
	LD12-20B15		15V/800mA	82	2700
	LD12-20B24		24V/500mA	83	1500

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	264	VAC
	DC input	100	--	370	VDC
Input frequency		47	--	440	Hz
Input current	115VAC	--	280	--	mA
	230VAC	--	190	--	
Inrush current	115VAC	--	10	--	A
	230VAC	--	20	--	
Recommended External Input Fuse (Special package series include fuse)		3.15A/250V, slow fusing			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	0%-100%	LD12-20B03	--	±3	%
		Other models	--	±2	
Line Regulation	Full load	--	±0.5	--	%
Load Regulation	10%-100% load	--	±1	--	
Output Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	--	100	mV

Temperature Drift Coefficient		--	±0.02	--	%/°C
Stand-by Power Consumption		--	--	0.3	W
Short Circuit Protection		Continuous, self-recovery			
Over-current Protection		≥110%Io self-recovery			
Over-voltage Protection		Zener clamp diode			
Min. Load		0	--	--	%
Hold-up Time	115VAC input	--	24	--	ms
	230VAC input	--	120	--	

Note: *Parallel line test method is adopted to test the ripple and noise, please see *AC-DC Converter Application Notes* for specific operation methods.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output Test time: 1min	4000	--	--	VAC
Operating Temperature		-25	--	+70	°C
Storage Temperature		-25	--	+105	
Storage Humidity		--	--	95	%RH
Welding Temperature	Wave-soldering	260±5°C; time:5~10s			
	Manual-welding	360±10°C; time:3~5s			
Switching Frequency		--	100	--	kHz
Power Derating	(+55°C~+70°C)	3.3	--	--	% / °C
	(-25°C~0°C)	1	--	--	
Safety Standard		IEC60950/EN60950/UL60950			
Safety-regulated Certification		EN60950/UL60950			
Safety Class		CLASS II			
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

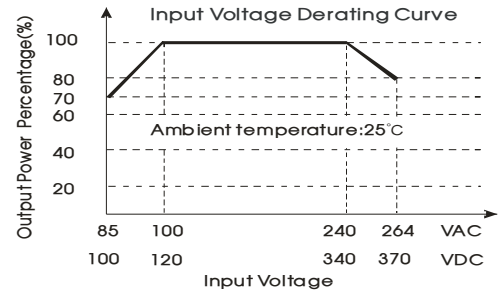
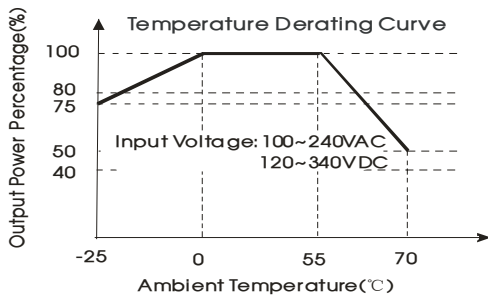
Physical Specifications

Casing Material		Black flame-retardant and heat-resistant plastic (UL94-V0)
Package Dimensions	Horizontal package	53.80*28.80*23.50mm
	A2 chassis package	96.10*54.00*32.00mm
	A4 Din-Rail package	96.10*54.00*36.60mm
	A2S chassis package	76.00*31.50*32.30mm
	A4S Din-Rail package	76.00*31.50*36.90mm
Weight	Horizontal package/ A2 chassis package/ A4 Din-Rail package/ A2S chassis package/ A4S Din-Rail package	60g/110g/150g/80g/100g(Typ.)
Cooling method		Free air convection

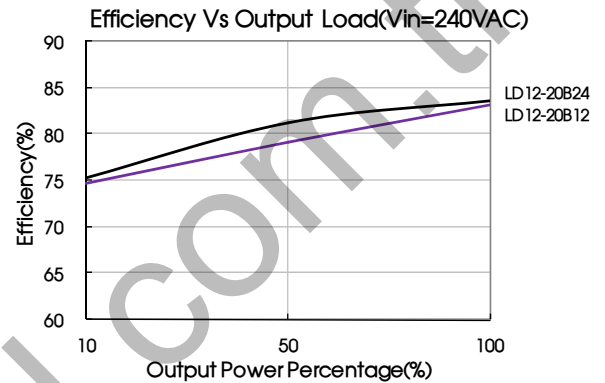
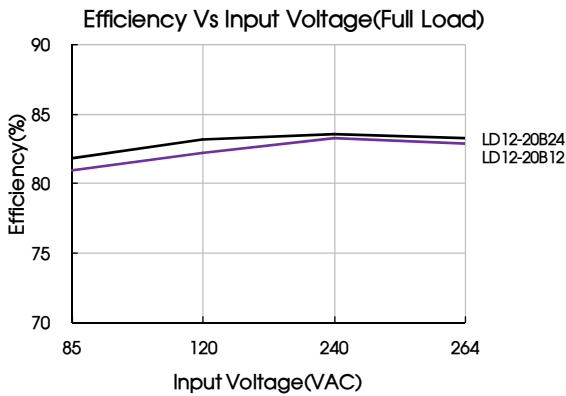
EMC Specifications

EMI	RE	CISPR22/EN55022, CLASS B
EMI	CE	CISPR22/EN55022, CLASS B
	RE	CISPR22/EN55022, CLASS B
EMS	ESD	IEC/EN61000-4-2 ±6KV /±8KV Perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m perf. Criteria A
	EFT	IEC/EN61000-4-4 ±4KV perf. Criteria B
	Surge	IEC/EN61000-4-5 ±2KV perf. Criteria B
		IEC/EN61000-4-5 ±4KV/6KV (See Fig. 2 for recommended circuit) perf. Criteria B
	CS	IEC/EN61000-4-6 10 Vr.m.s perf. Criteria A
	PFM	IEC/EN61000-4-8 10A/m perf. Criteria A
	Immunities of voltage dip, drop and short interruption	IEC/EN61000-4-11 0%-70% perf. Criteria B

Product Characteristic Curve



Note: ① Input voltage should be derated based on temperature derating when it is 85-100VAC/ 240-264VAC/ 100-120VDC/ 340-370VDC;
 ② This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.



Design Reference

1. Typical application circuit

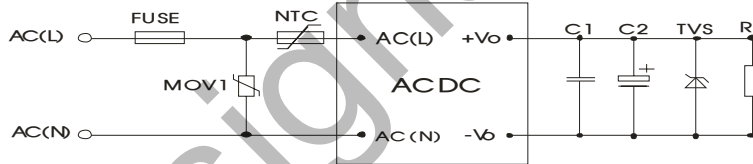


Fig. 1

Model	FUSE	NTC	MOV1	C1	C2	TVS
LD12-20B03	3.15A slow fusing	10D-11	S20K350	1μF/50V	220μF/10V	SMBJ7.0A
LD12-20B05					220μF/10V	SMBJ7.0A
LD12-20B12					120μF/25V	SMBJ20A
LD12-20B15					120μF/25V	SMBJ20A
LD12-20B24					68μF/50V	SMBJ30A

Note:
 Output filtering capacitor C2 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacturer's datasheet. Capacitance withstand voltage derating should be 80% or above. C1 is ceramic capacitor, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

2. EMC solution-recommended circuit

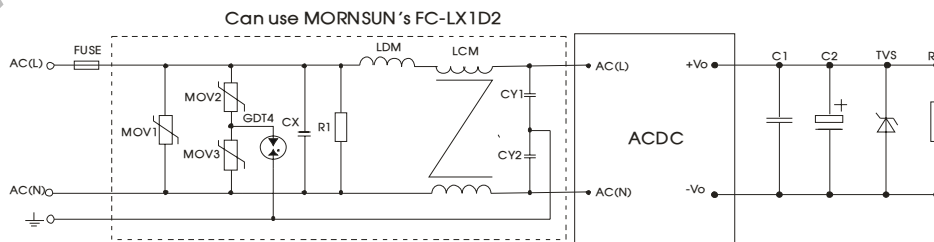


Fig 2

(Output external circuit refer to the typical application circuit)

EMC solution-recommended circuit PCB layout

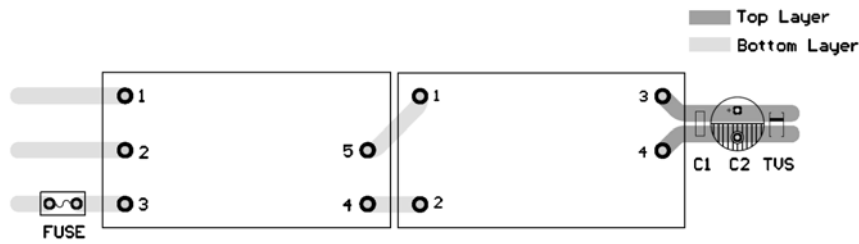


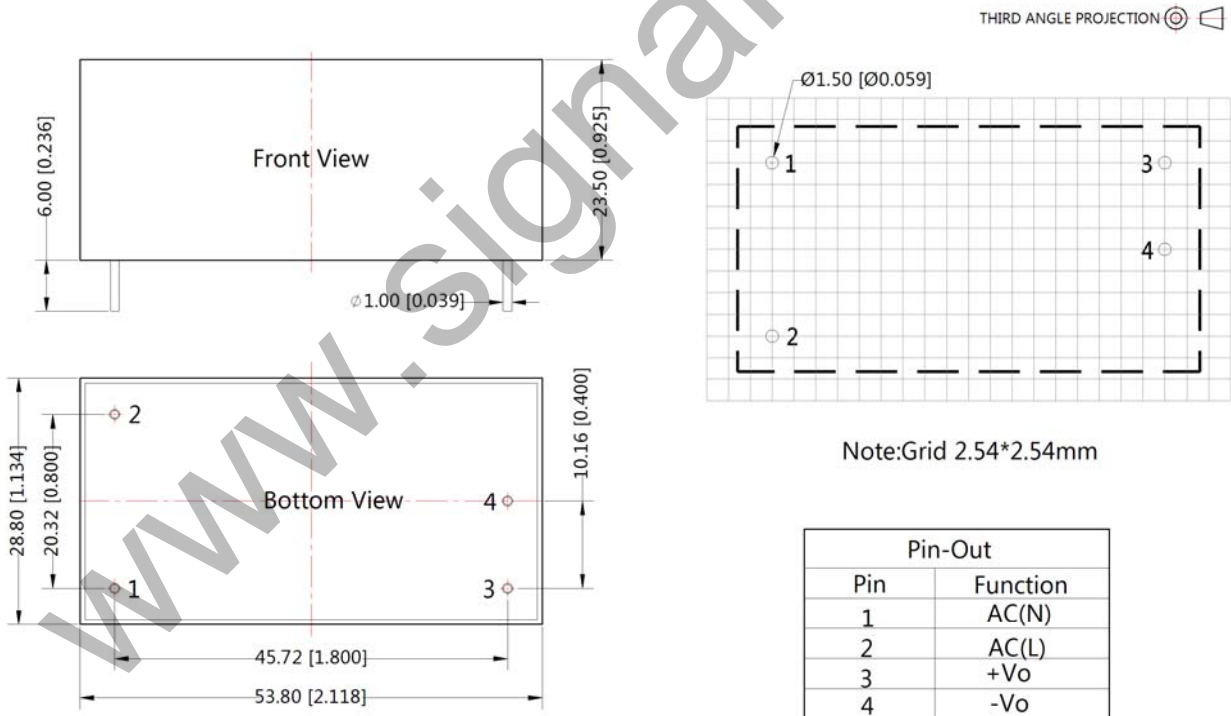
Fig 3

Suggestions for safety regulation and wiring width: wire width $\geq 3\text{mm}$, distance between wires $\geq 6\text{mm}$, and distance between wire and ground $\geq 6\text{mm}$

Element model	Recommended value	Element model	Recommended value
MOV1	S20K350	LDM	4.7uH
MOV2	S10K300	LCM	10mH, recommended to use MORNSUN's FL2D-Z5-103
MOV3	S10K300	GDT4	EM3600XS
CX	0.15 μF /300VAC	FUSE	3.15A/250V, slow fusing
CY1, CY2	2.2nF/400VAC	FC-LX1D2	EMC filter
R1	1M Ω /2W	-	-

3. For more information Please find the application note on www.mornsun-power.com

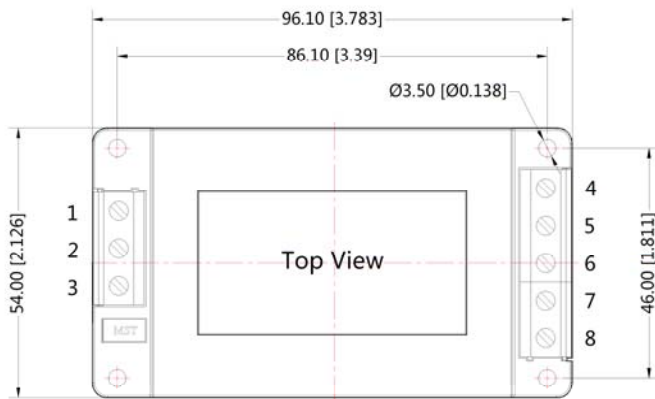
Dimensions and Recommended Layout



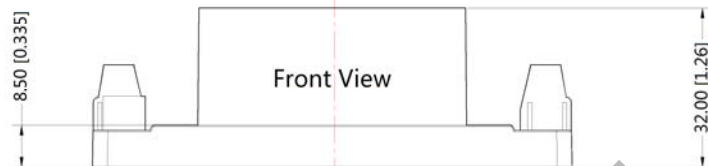
Note:
Unit :mm[inch]
Pin diameter tolerances : $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$

LD12-20BxxA2 Dimensions

THIRD ANGLE PROJECTION



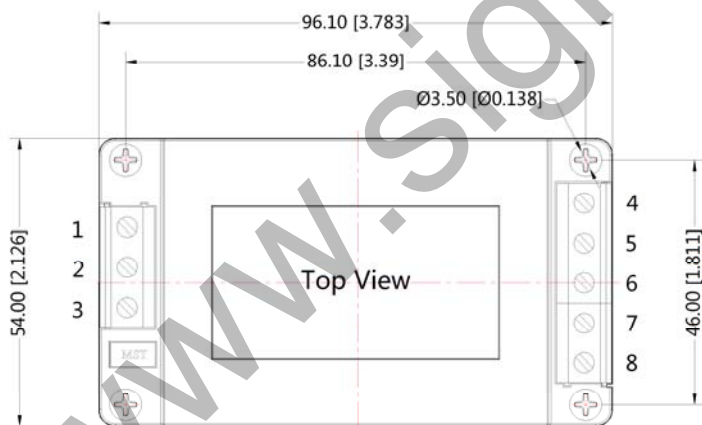
Pin	Function
1	NC
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	-Vo
7	NC
8	NC



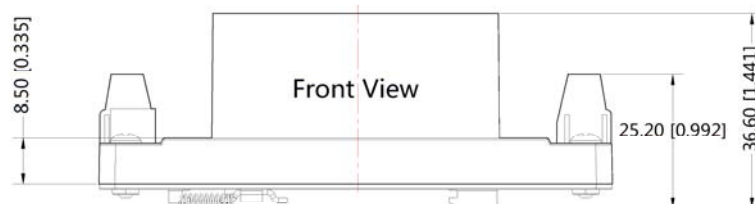
Note:
Unit:mm[inch]
Wire range : 24~12 AWG
General tolerances:±0.50[±0.020]

LD12-20BxxA4 Dimensions

THIRD ANGLE PROJECTION



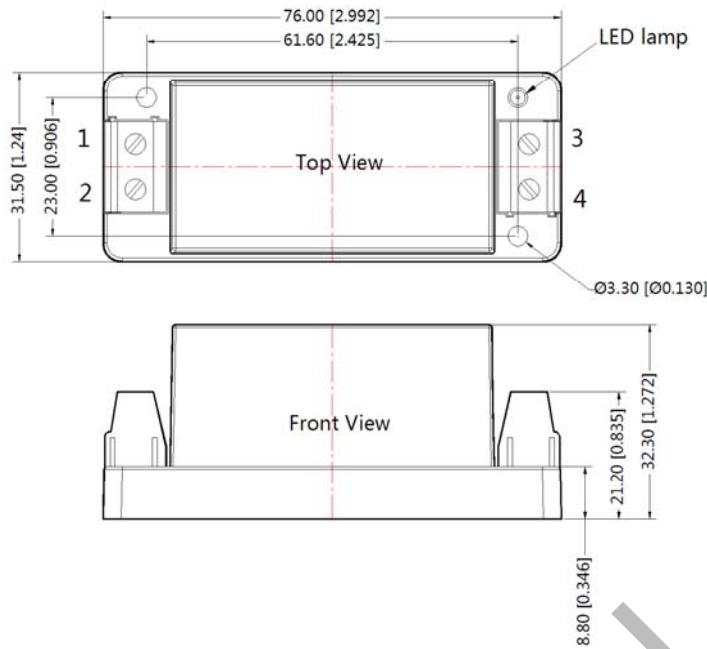
Pin	Function
1	NC
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	-Vo
7	NC
8	NC



Note:
Unit:mm[inch]
Wire range : 24~12 AWG
General tolerances:±0.50[±0.020]

LD12-20BxxA2S Dimensions

THIRD ANGLE PROJECTION 

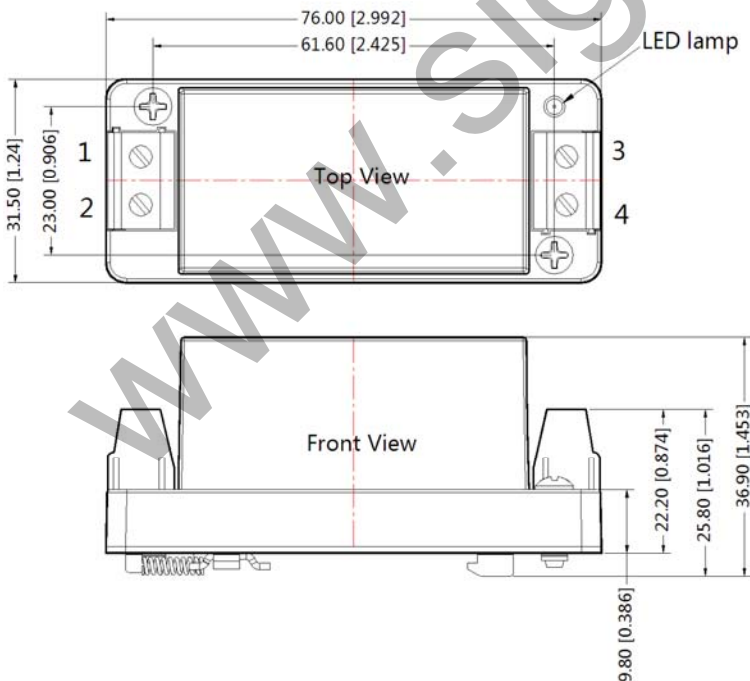


Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	+Vo
4	-Vo

Note:
Unit:mm[inch]
Wire range : 24~12 AWG
General tolerances:±0.50[±0.020]

LD12-20BxxA4S Dimensions

THIRD ANGLE PROJECTION 



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

Note:
Unit:mm[inch]
Wire range : 24~12 AWG
General tolerances:±0.50[±0.020]

Note:

1. Packing Information please refer to 'Product Packing Information'. The Packing bag number of Horizontal package : 58220011, the Packing bag number of A2/A4 package:58220010, the Packing bag number of A2S/ A4S package:58220022;
2. Unless otherwise specified, data in this datasheet should be tested under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75% when inputting nominal voltage and outputting rated load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
5. We can provide product customization service;
6. Specifications of this product are subject to changes without prior notice.

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