

20W, AC-DC converter



## FEATURES

- Universal input range:85~264VAC/120~370VDC
- AC and DC all in one (input from the same terminal)
- Meet UL60950,EN60950
- High efficiency, low power consumption, meet energy star standards
- low ripple & noise
- Urtal-slim SIP package
- Protection of output short circuit, over-current, over-voltage
- Three years product warranty
- PCB mounting, Chassis mounting, DIN-Rail mounting

LD20 series —— a 20W compact size power converter offered by MORNSUN, small volume. It features universal input voltage, taking both DC and AC input voltage, low power consumption, low ripple& noise, high efficiency, high reliability, 3000VAC 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. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

## Selection Guide

Certification	Model	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load (μF)
UL/CE	LD20-10B03	11.88W	3.3V/3600mA	74	10000
	LD20-10B05	18W	5V/3600mA	78	10000
	LD20-10B12	20W	12V/1660mA	82	5400
	LD20-10B15		15V/1330mA	83	2700
	LD20-10B24		24V/833mA	83	1500

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	264	VAC
	DC input	120	--	370	VDC
Input frequency		47	--	440	Hz
Input current	110VAC	--	370	--	mA
	230VAC	--	240	--	
Inrush current	110VAC	--	20	--	A
	230VAC	--	40	--	
Recommended External Input Fuse (Special package series include fuse)		3.15A/250V, slow fusing			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	0%-100%	--	±2(3.3V is ±3)	--	%
Line Regulation	Full load	--	±0.5	--	
Load Regulation	10%-100% load	--	±1	--	
Output Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	50	120	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	--	15	--	ms
	230VAC input	--	70	--	
Note: *Parallel line test method is adopted to test the ripple and noise, please see <i>AC-DC Converter Application Notes</i> for specific operation methods.					

## General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output Test time: 1min	3000	--	--	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	+40°C~+70°C	2.5	--	--	% / °C
	-25°C~0°C	1.0	--	--	
Safety Standard	IEC60950/EN60950/UL60950				
Safety-regulated Certification	EN60950/UL60950				
Safety Class	CLASS II				
Hot Plug	Unavailable				
MTBF	MIL-HDBK-217F@25°C > 300,000 h				

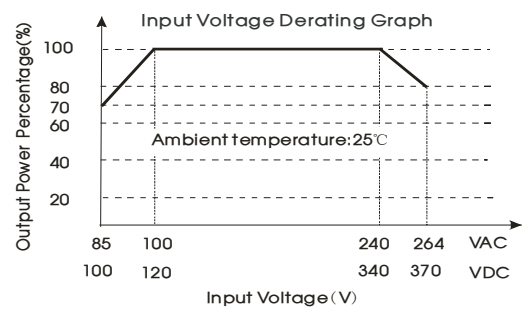
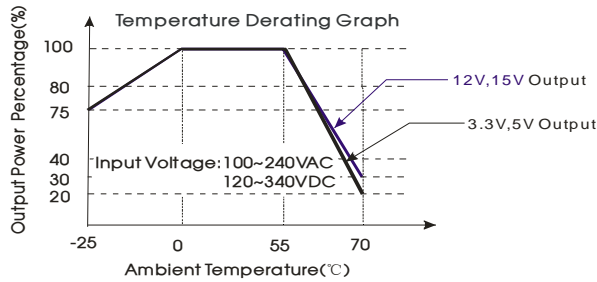
## Physical Specifications

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

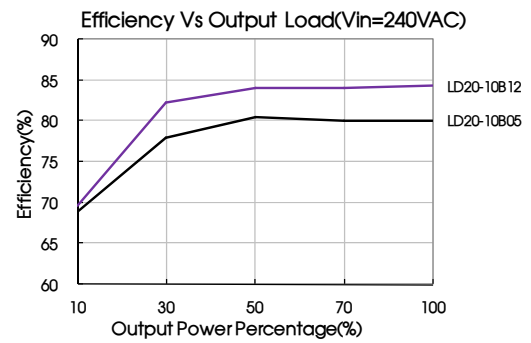
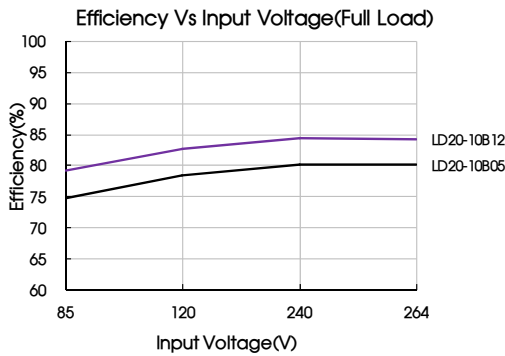
## EMC Specifications

EMI	Conducted Disturbance	CISPR22/EN55022, CLASS B (Without External Circuit)		
	Radiated Emission	CISPR22/EN55022, CLASS B (Without External Circuit)		
EMS	Electrostatic Discharge	IEC/EN61000-4-2	±6KV / ±8KV	Perf. Criteria B
	Radiation Immunity	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV (Without External Circuit)	perf. Criteria B
	Surge Immunity	IEC/EN61000-4-5	±2KV (Without External Circuit)	perf. Criteria B
		IEC/EN61000-4-5	±4KV/6KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Conducted Disturbance Immunity	IEC/EN61000-4-6	10 V <sub>r.m.s</sub>	perf. Criteria A
	Immunity for Power frequency magnetic field	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: Input voltage should be derated based on temperature derating when it is 85~100VAC/240~264VAC/100~120VDC/340~370VDC.



### Design Reference

#### 1. Typical application circuit

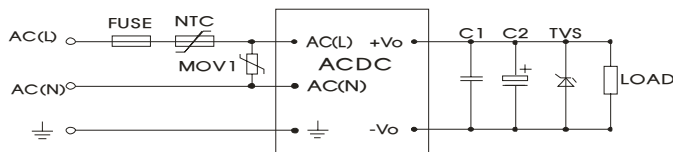


Fig. 1: Typical application circuit

Model	C1	C2	TVS
LD20-10B03	1μF/50V	220μF/10V	SMBJ7.0A
LD20-10B05		220μF/10V	SMBJ7.0A
LD20-10B12		120μF/25V	SMBJ20A
LD20-10B15		120μF/25V	SMBJ20A
LD20-10B24		68μF/35V	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 manufacture'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

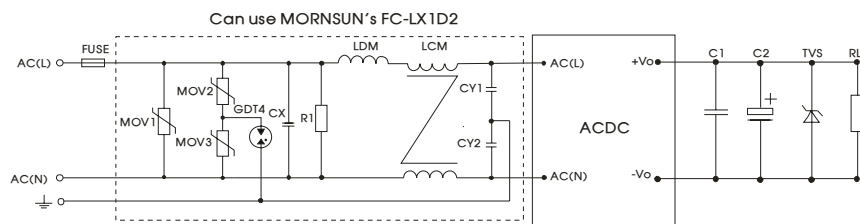


Fig 2: EMC application circuit with higher requirements

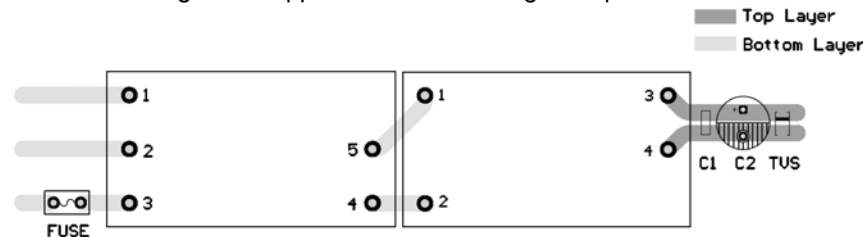


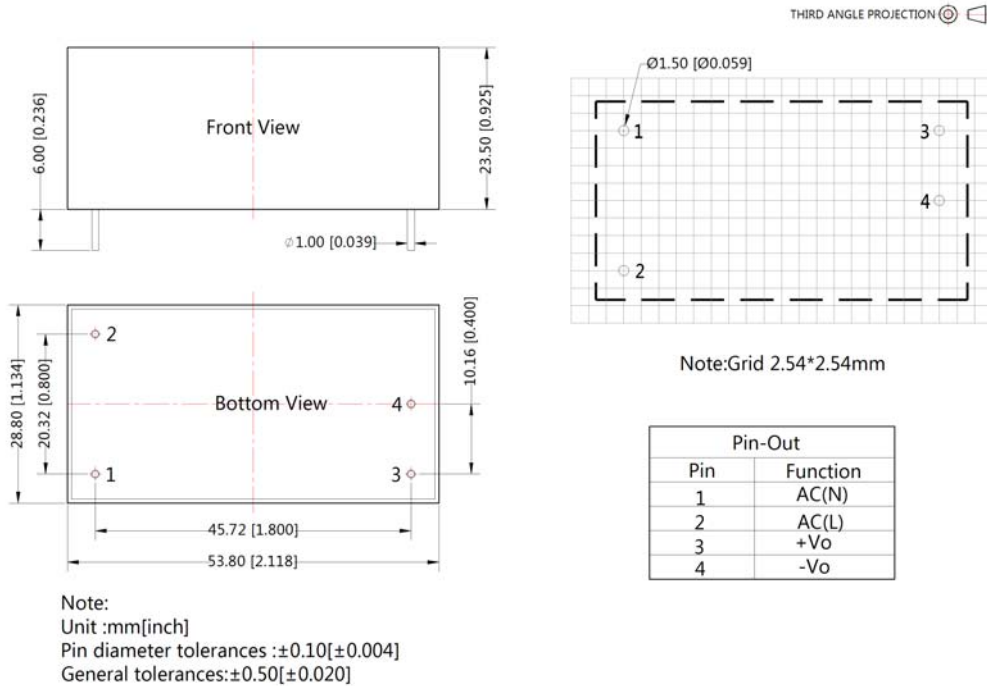
Fig 3: Recommended EMC circuit-PCB layout

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  $\geq 6\text{mm}$

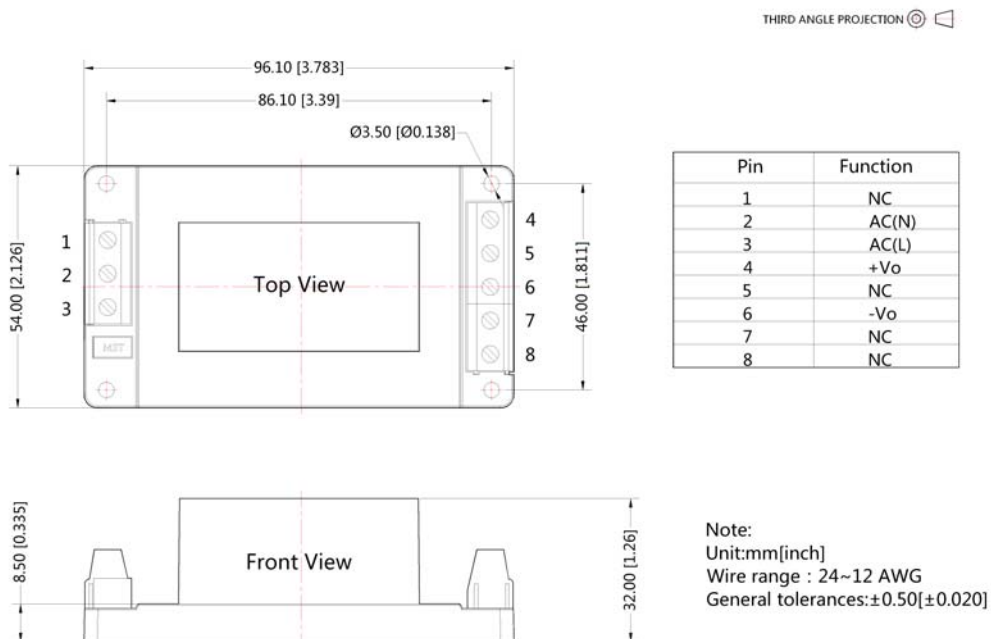
Element model	Recommended value	Element model	Recommended value
MOV1	S20K350	LDM	5uH
MOV2	S10K300	LCM	10mH, recommended to use MORNSUN's FL2D-Z5-103
MOV3	S10K300	GDT4	EM3600XS
CX	0.15μF/300VAC	FUSE	3.15A/250V, slow fusing,
CY1, CY2	2.2nF/400VAC	FC-LX1D2	4KV/6KV EMC filter
R1	1MΩ/2W	--	--

3. For more information Please find application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout

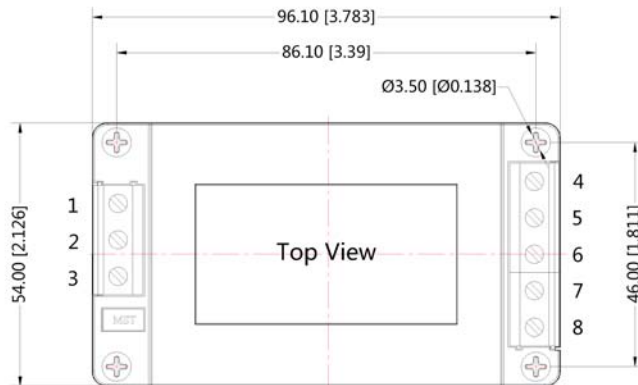


LD20-10BXXA2 Dimensions

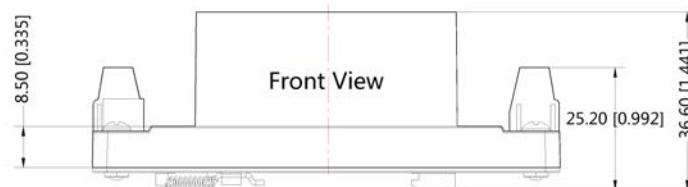


LD20-10BXXA4 Dimensions

THIRD ANGLE PROJECTION



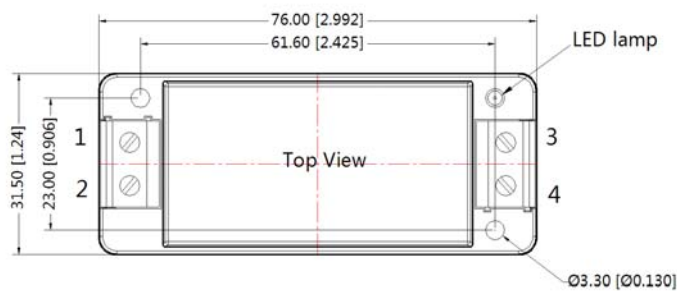
Pin	Function
1	NC
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	-Vo
7	NC
8	NC



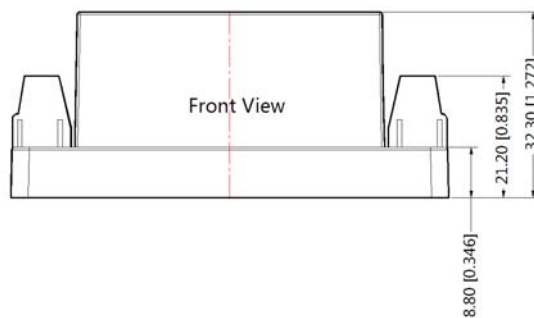
Note:  
Unit:mm[inch]  
Wire range : 24~12 AWG  
General tolerances:±0.50[±0.020]

LD20-10BXXA2S Dimensions

THIRD ANGLE PROJECTION



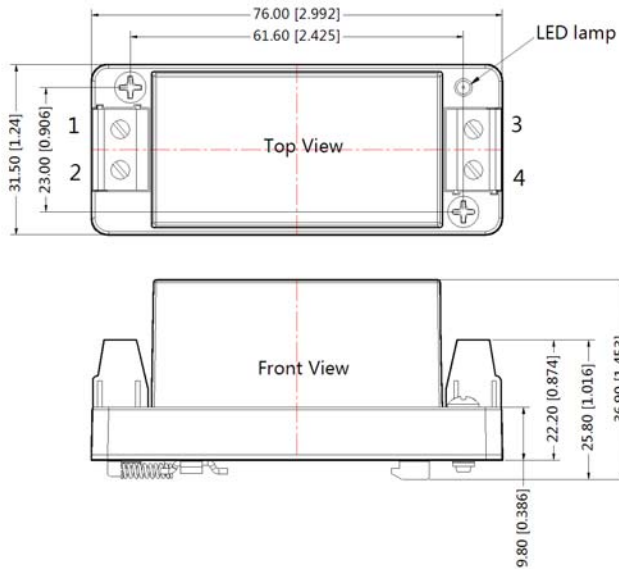
Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	+Vo
4	-Vo



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

LD20-10BXXA4S 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 Packaging Information'. The Packing bag number of Horizontal package : 58220021, the Packing bag number of A2/A4 package:58220010, the Packing bag number of A2S/ A4S package:58220010;
  2. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25°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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