

20W, AC-DC converter



## FEATURES

- Universal Input:85~264VAC/100~370VDC
- AC and DC dual-use(input from the same terminal)
- High efficiency, low power consumption, meet energy star standards
- Low ripple & noise
- Compact size
- Output short circuit, over-current, over-voltage protection
- Mounting: PCB mounting, Chassis mounting, DIN-Rail mounting available
- Design to meet UL60950

*LD20-10Bxx series* — a 20W compact size power converter offered by MORNSUN, ultra-slim 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 extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

## Selection Guide

Certification	Model	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency (230VAC,%/Typ.)	Max. Capacitive Load (uF)
EN	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

Note: 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	85	--	264	VAC
	DC input	100	--	370	VDC
Input frequency		47	--	440	Hz
Input current	115VAC	--	370	--	mA
	230VAC	--	240	--	
Inrush current	115VAC	--	10	--	A
	230VAC	--	20	--	
Recommended External Input Fuse (Special package series include fuse)		3.15A/250V, slow-blow, required			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	0%-100%	LD20-10B03	--	±3	--	%
		Other models	--	±2	--	
Line Regulation	Full load	--	±0.5	--	%	
Load Regulation	0%-100% load	--	±1	--		
Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	50	120	mV	
Temperature Coefficient		--	±0.02	--	%/°C	
Stand-by Power Consumption		--	--	0.3	W	

Short Circuit Protection		Continuous, self-recover			
Over-current Protection		110%-250%Io, self-recover			
Over-voltage Protection		Zener clamp diode			
Min. Load		0	--	--	%
Hold-up Time	115VAC input	--	10	--	ms
	230VAC input	--	55	--	

Note: \* The "parallel cable" method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information.

## General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output	Test time: 1min.	3000	--	--	VAC
Operating Temperature			-25	--	+70	°C
Storage Temperature			-25	--	+105	
Storage Humidity			--	--	95	%RH
Soldering Temperature	Wave-soldering, Max. 10 seconds		255	260	265	°C
	Manual-welding, Max. 5 seconds		350	360	370	
Switching Frequency			--	100	--	kHz
Power Derating	+40°C to +70°C	LD20-10B03/05	2.66	--	--	% / °C
		The others	2.33	--	--	
	-25°C ~ 0°C		1.0	--	--	
Safety Standard			EN60950-1 safety approved & EN/BS EN62368-1(Report); Design refer to IEC/UL60950-1			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25°C > 300,000 h			

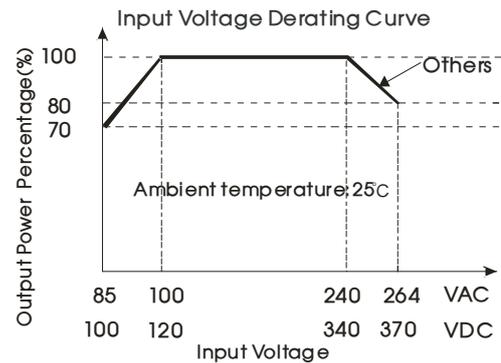
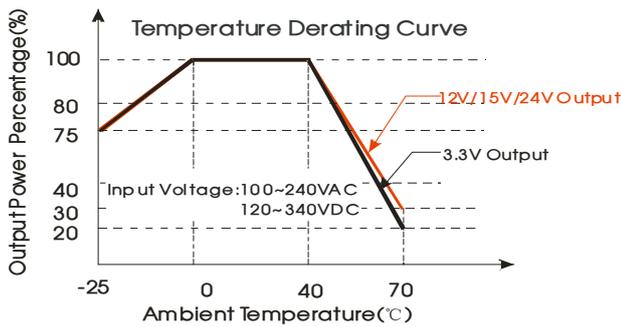
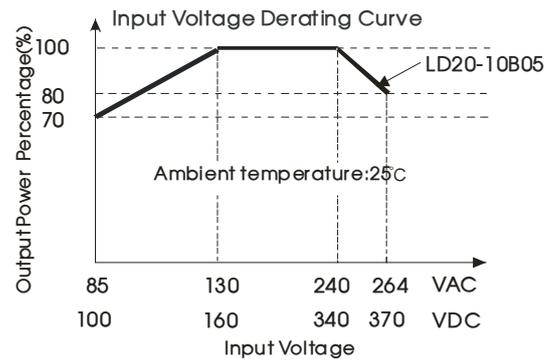
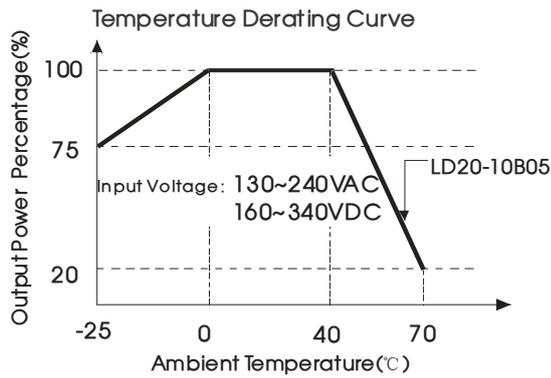
## Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94V-0)	
Package Dimensions	Horizontal package	53.80 x 28.80 x 23.50 mm
	A2 chassis package	96.10 x 54.00 x 32.00 mm
	A4 Din-Rail package	96.10 x 54.00 x 36.60 mm
	A2S chassis package	76.00 x 31.50 x 32.30 mm
	A4S Din-Rail package	76.00 x 31.50 x 36.90 mm
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 convection	

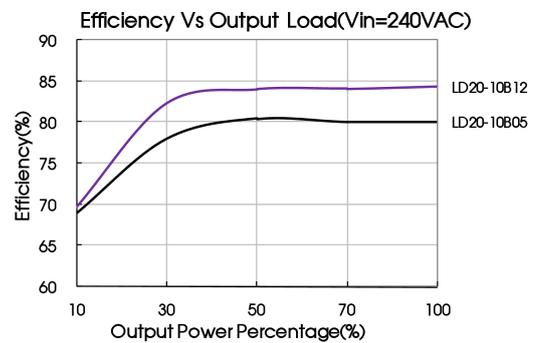
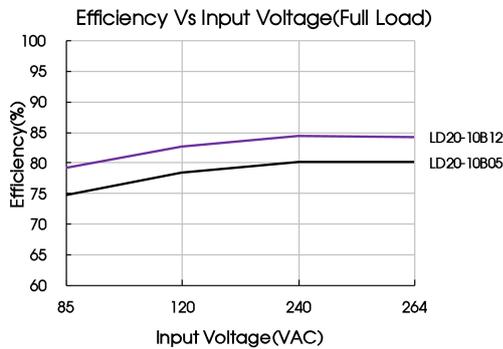
## EMC Specifications

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
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/240-264VAC and a DC input between 100-120VDC/340-370VDC, 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 circuit

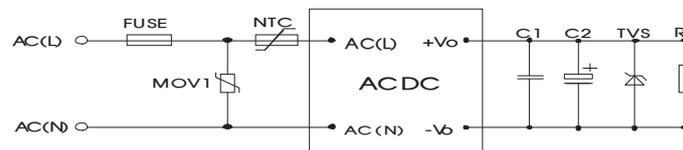


Fig. 1

Model	FUSE	NTC	MOV1	C1	C2	TVS
LD20-10B03	3.15A/250V, slow fusing, necessary	10D-11	S20K300	1UF/50V	220uF/16V	SMBJ7.0A
LD20-10B05					220uF/16V	SMBJ7.0A
LD20-10B12					120uF/25V	SMBJ20A
LD20-10B15					120uF/25V	SMBJ20A
LD20-10B24					68uF/35V	SMBJ30A

Note: ① 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.

- ②The product in the application must connect external electrolytic capacitors C2, to achieve lower ripple noise and better dynamic load performance.
- ③When the product's output terminal is connected to high frequency switch type load, electrolytic capacitor C2's selection is as following:

Model	C2
LD20-10B03	470uF/16V (Solid capacitor)
LD20-10B05	470uF/16V (Solid capacitor)
LD20-10B12	390uF/25V
LD20-10B15	390uF/25V
LD20-10B24	220uF/35V

### 2. EMC solution-recommended circuit

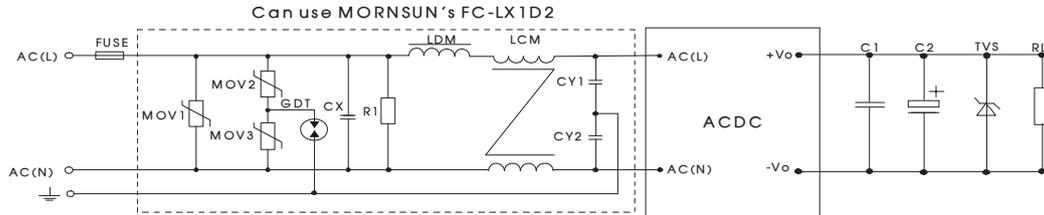


Fig. 2

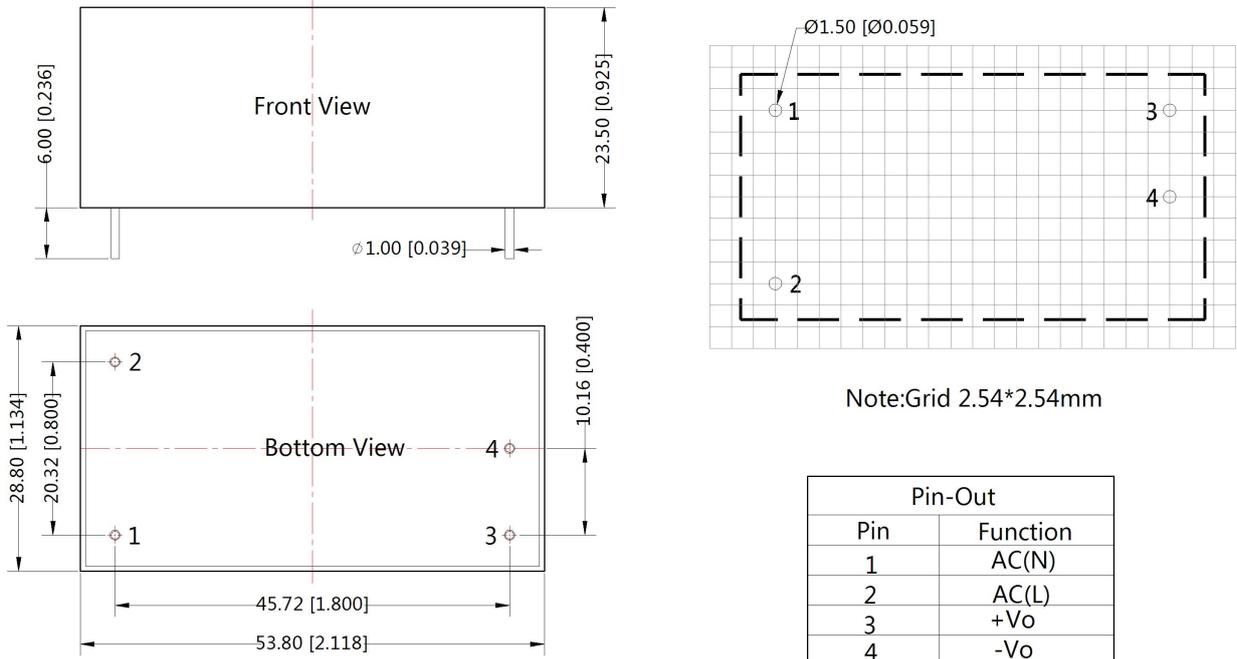
Note: Output external circuit refer to the typical application circuit

Element model	Recommended value
MOV1	S20K300
MOV2	S10K300
MOV3	S10K300
CX	0.22uF/275VAC
CY1/CY2	2.2nF/400VAC
R1	1MΩ/2W
LDM	4.7uH
LCM	10mH, P/N: FL2D-Z5-103 (MORNSUN) is recommended
GDT4	EM3600XS
FUSE	3.15A/250V, slow-blow, required
FC-LX1D2	EMC filter

- 3. For additional information please refer to application notes on [www.mornsun-power.com](http://www.mornsun-power.com).

Dimensions and Recommended Layout

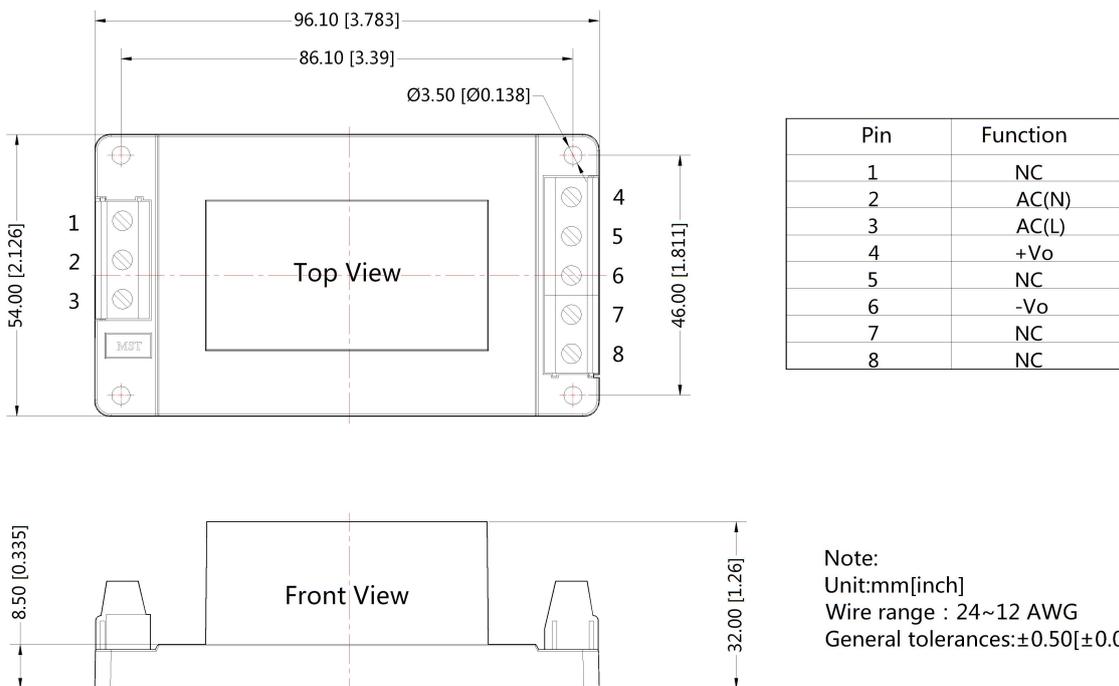
THIRD ANGLE PROJECTION



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

LD20-10BxxA2 Dimensions

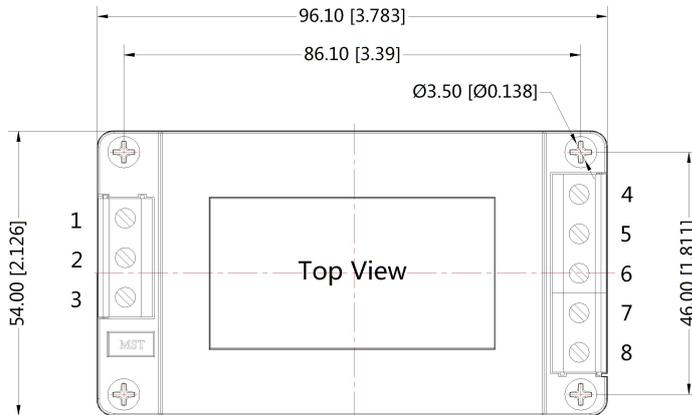
THIRD ANGLE PROJECTION



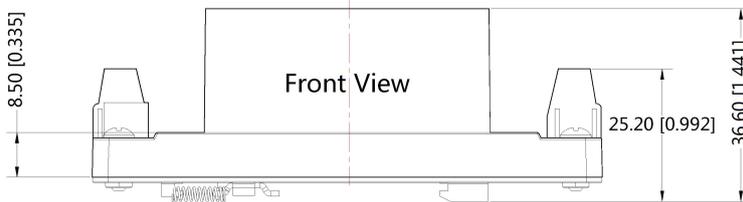
Note:  
Unit:mm[inch]  
Wire range : 24~12 AWG  
General tolerances:±0.50[±0.020]

LD20-10BxxA4 Dimensions

THIRD ANGLE PROJECTION



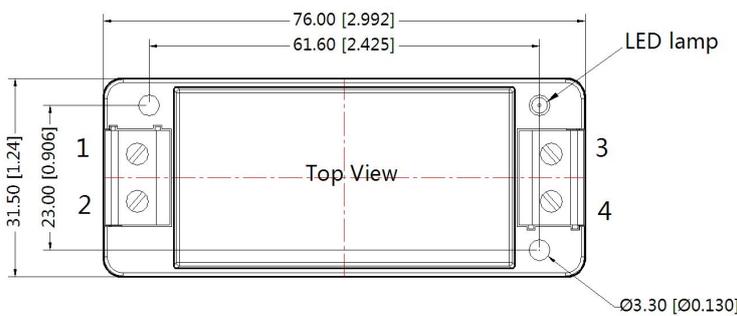
Pin	Function
1	NC
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	-Vo
7	NC
8	NC



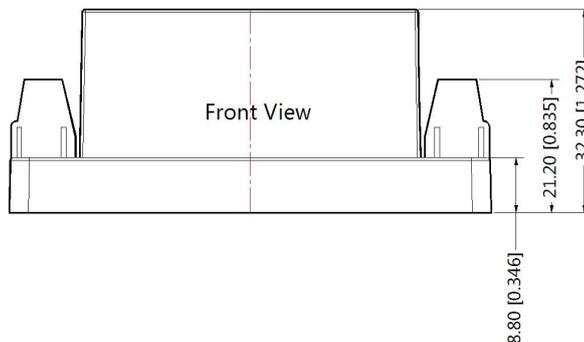
Note:  
Unit:mm[inch]  
Wire range : 24~12 AWG  
General tolerances:±0.50[±0.020]

LD20-10BxxA2S Dimensions

THIRD ANGLE PROJECTION



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



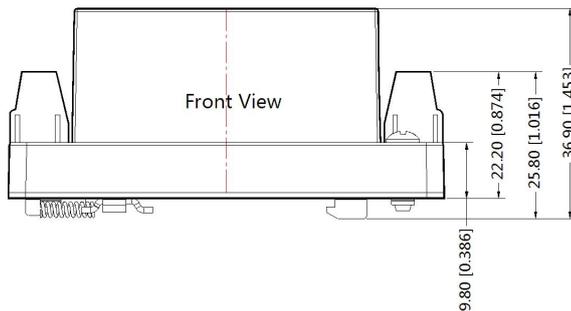
Note:  
Unit:mm[inch]  
Wire range : 24~12 AWG  
General tolerances:±0.50[±0.020]

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:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220011 (Horizontal package), 58220010(A2/A4 package), 58220022(A2S/A4S package);
- 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;
- All index testing methods in this datasheet are based on our company corporate standards;
- 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;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
- Specifications of this product are subject to changes without prior notice.

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