

## LD20 SERIES 20W, AC-DC CONVERTER

**LD20 series** ---is 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, 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, this series of products must use the referred application circuit.

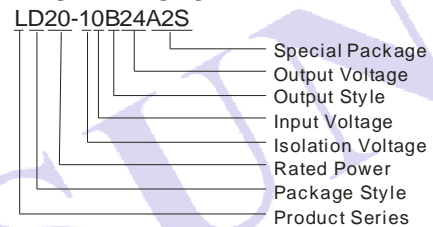


RoHS E235235

### PRODUCT FEATURES

1. Universal input range:85 ~ 264VAC/120~370VDC
2. AC and DC dual-use(input from the same terminal)
3. Meet UL60950,EN60950 standards
4. High efficiency, low loss, meet ENERGY STAR standards
5. Low ripple and noise
6. Super small volume
7. Output over voltage , short circuit and over current protection
8. Three years warranty
9. Mounting: PCB mounting, Chassis mounting with Screw Terminals, DIN-Rail mounting

### PART NUMBER SYSTEM



### SELECTION GUIDE

Approval	Model	Package	Power	Output (Vo/Io)	Ripple and Noise (typ.)	Efficiency (%) (typ.)	Standby Power (max.)
UL/CE	LD20-10B03	53.8X28.8X23.5mm	11.88W	3.3V/3600mA	50mV	74	0.3W
	LD20-10B05		18W	5V/3600mA		78	0.3W
	LD20-10B12		20W	12V/1660mA		82	0.3W
	LD20-10B15			15V/1330mA		83	0.3W
	LD20-10B24			24V/833mA		83	0.3W

### INPUT SPECIFICATIONS

Input voltage range	85~264VAC, 120~370VDC
Input frequency	47~440Hz
Input current	110VAC 230VAC 370mA, typ 240mA, typ
Inrush current	110VAC 230VAC 20A, typ 40A, typ
Recommended External Input Fuse (Special package series include fuse)	3.15A/250V Slow-Blow

### OUTPUT SPECIFICATIONS

Voltage set accuracy	±2%(3.3V: ±3%)
Input variation	±0.5% (typ)
Load variation (10% to 100%)	±1% (typ)
Ripple& noise(p-p)	(20MHz Bandwidth) 120mV (max)
Short circuit protection	Continuous, and auto resume
Over current protection	≥110% I <sub>o</sub> , and auto resume
Over voltage protection	Zener diode clamp

Max. Capacitive Load( $\mu$ F)	LD20-10B03	10000
	LD20-10B05	10000
	LD20-10B12	5400
	LD20-10B15	2700
	LD20-10B24	1500

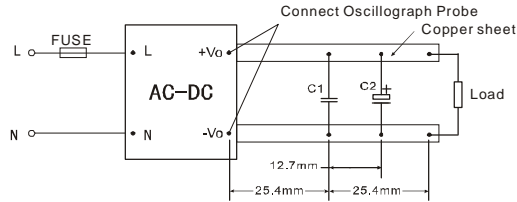
## COMMON SPECIFICATIONS

Temperature ranges	Operating	-40°C ~ +70°C		
	Power derating	(+55°C ~ +70°C)	2.5% / °C	
		(-40°C ~ 0°C)	1% / °C	
	Storage	-40°C ~ +105°C		
	Case temperature	+95°C max		
Hold-up time	(Vin=230VAC)	50ms(typ)		
	(Vin=115VAC)	10ms(typ)		
Humidity	95%(max)			
Temperature coefficient	$\pm 0.02\%/^{\circ}\text{C}$			
Switching frequency	100kHz(typ)			
Isolation voltage( Input-Output )	3000VAC/1Min			
EMC	EMI	CE	CISPR22/EN55022, CLASS B(without external circuit)	
		RE	CISPR22/EN55022, CLASS B(without external circuit)	
	EMS	ESD	IEC/EN 61000-4-2 Contact $\pm 6\text{KV}$ / Air $\pm 8\text{KV}$	perf. Criteria B
		RS	IEC/EN 61000-4-3 10V/m	perf. Criteria A
		EFT	IEC/EN 61000-4-4 $\pm 4\text{KV}$ (without external circuit)	perf. Criteria B
		Surge	IEC/EN 61000-4-5 $\pm 2\text{KV}$ (without external circuit)	perf. Criteria B
			IEC/EN 61000-4-5 $\pm 4\text{KV}$ (with typical applications Figure 3)	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 dips, short and interruptions immunity	IEC/EN61000-4-11 0%-70%	perf. Criteria B
Safety standards	IEC60950/EN60950/UL60950			
Safety approvals	EN60950/UL60950			
Safety class	CLASS II			
Case material	UL94V-0			
Install	PCB mounting, Chassis mounting with Screw Terminals, DIN-Rail mounting			
Cooling	Free air convection			
MTBF	>300,000H @25°C			
Package	PCB mounting	53.8x28.8x23.5mm		
	A2 Chassis mounting with Screw Terminals	96.1X54.0X32.0mm		
	A4DIN-Rail mounting	96.1X54.0X36.6mm		
	A2S Chassis mounting with Screw Terminals	76.0X31.5X32.3mm		
	A4S DIN-Rail mounting	76.0X31.5X36.9mm		
Weight	50g(PCB mounting) 100g(A2Chassis mounting with Screw Terminals) 140g(A4DIN-Rail mounting) 70g(A2SChassis mounting with Screw Terminals) 90g(A4SDIN-Rail mounting)			

Note:

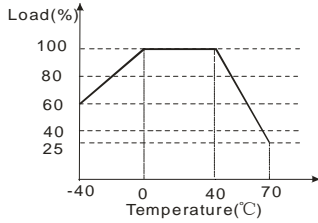
- Ripple and Noise were measured by the method of anear measure;
- All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.

# ANEAR MEASURE

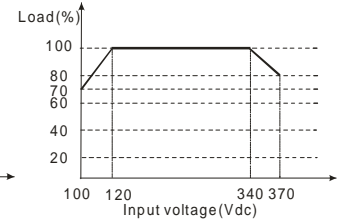
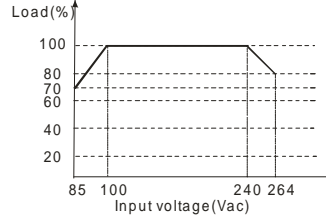


Note: C1: 1 $\mu$ F (Ceramic capacitor) C2: 10 $\mu$ F (Electrolytic capacitor)

## TEMPERATURE VS LOAD



## INPUT VOLTAGE VS LOAD



## TYPICAL APPLICATIONS

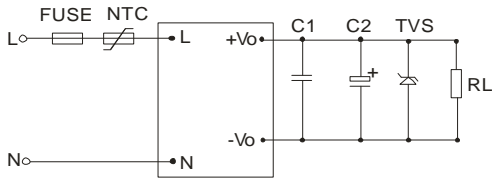


Figure 1: LD20-10BXX EMC application circuit

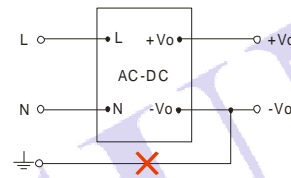


Figure 2: Note: This application is not supported for this series.

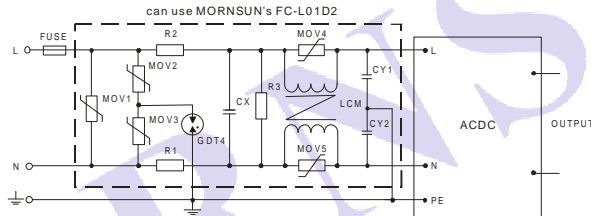


Figure 3: LD20 series Recommended circuit for application require higher EMC standard (external circuit output same as above)

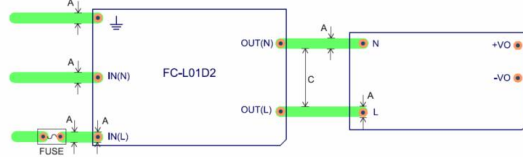


Figure 4: EMC application circuit PCB layout  
Safety and recommend wiring: line width  $A \geq 3\text{mm}$ ,  $C \geq 9\text{mm}$

## EXTERNAL CAPACITORS TYPICAL VALUE

Model	C1	C2	TVS
LD20-10B03	1 $\mu$ F/50V	220 $\mu$ F/10V	SMBJ7.0A
LD20-10B05	1 $\mu$ F/50V	220 $\mu$ F/10V	SMBJ7.0A
LD20-10B12	1 $\mu$ F/50V	120 $\mu$ F/25V	SMBJ20A
LD20-10B15	1 $\mu$ F/50V	120 $\mu$ F/25V	SMBJ20A
LD20-10B24	1 $\mu$ F/50V	68 $\mu$ F/35V	SMBJ30A

Note:

- Output filtering capacitors C1 is ceramic capacitor, it is used to filter high frequency noise. C2 is electrolytic capacitors, It is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to manufacture's datasheet. Voltage derating of capacitor should be 80% or above. TVS is a recommended component to protect post-circuits (if converter fails). External input NTC model is recommended to use 5D-9.
- For standard EMC requirement, please refer to figure 1, if higher EMC requirement, please refer to figure 3.

MOV1: 561KD20;

MOV2、MOV3: 561KD14;

MOV4、MOV5: 561KD07;

GDT4: B5G3600;

CX: 0.15 $\mu$ F/300VAC;

CY1、CY2: 2200pF/400VAC;

R1、R2: 2 $\Omega$ /3W Winding resistor;

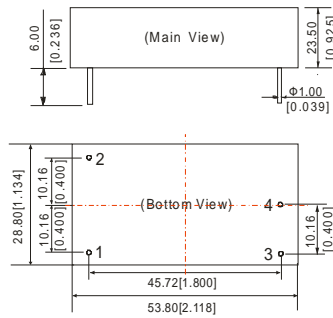
R3: 1M $\Omega$ /2W;

LCM: 10mH-30mH, can use MORNSUN's FL2D-z5-103;

FC-L01D2: 4KV/6KV Surge protector.

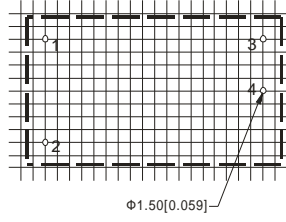
- FUSE: It must be connected to FUSE,LD20 is recommended to use 3.15A/250V.

## PCB MOUNTING WITH SOLDER PINS



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

### RECOMMENDED FOOTPRINT



Note: grid 2.54\*2.54mm.

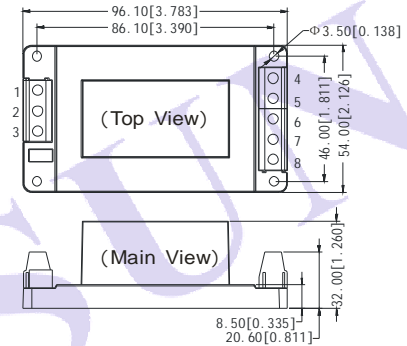
### FOOTPRINT DETAILS

PIN	FUNCTION
1	N
2	L
3	+Vo
4	-Vo

## LD20XXA2 CHASSIS MOUNTING WITH SCREW TERMINALS

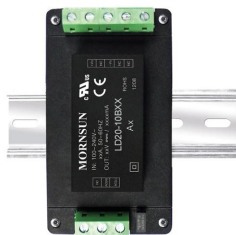


Pin	1	2	3	4	5	6	7	8
Function	NC	AC(N)	AC(L)	+Vo	NC	-Vo	NC	NC

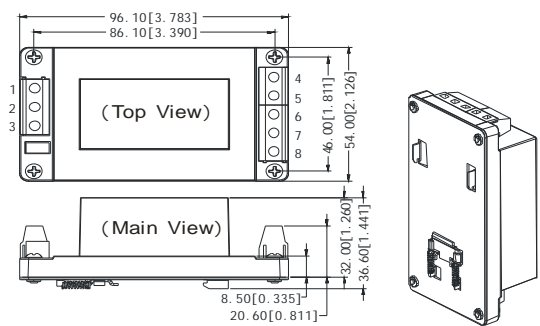


Note:  
Unit: mm[inch]  
General tolerances:  $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$

## LD20XXA4 DIN-RAIL MOUNTING



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

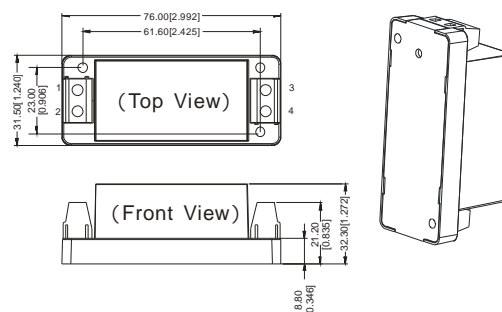


Note:  
Unit: mm[inch]  
General tolerances:  $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$

## LD20XXA2S CHASSIS MOUNTING WITH SCREW TERMINALS

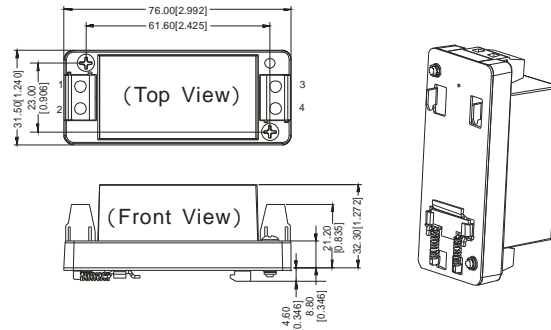


Pin	1	2	3	4
Function	AC(N)	AC(L)	+Vo	-Vo



Note:  
Unit: mm[inch]  
General tolerances:  $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$

## LD20XXA4S DIN-RAIL MOUNTING

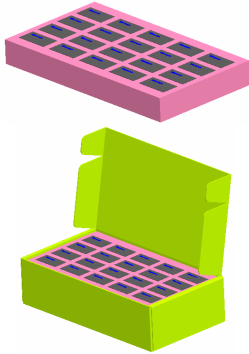


Footprint Details				
Pin	1	2	3	4
Function	AC(N)	AC(L)	+Vo	-Vo

Note:  
Unit: mm[inch]  
General tolerances:  $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$

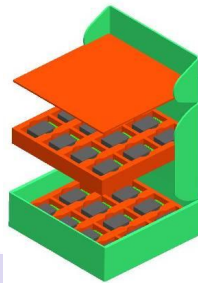
## PACKAGE DIAGRAM

PCB mounting Series



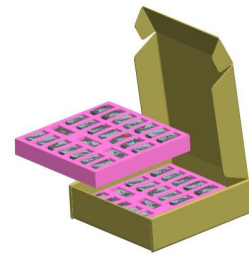
Inner packaging dimensions:  
L\*W\*H=355\*192\*93mm  
Packaging quantity: 40pcs  
Outer packaging dimensions:  
L\*W\*H=405\*380\*305mm  
Packaging quantity: 240pcs

Special Package Series(A2/A4)



Inner packaging box dimensions:  
L\*W\*H=365\*350\*105mm  
Packaging quantity: 24pcs  
Outer packaging box dimensions:  
L\*W\*H=390\*360\*245mm  
Packaging quantity: 48pcs

Special Package Series(A2S/A4S)



Inner packaging box dimensions:  
L\*W\*H=365\*350\*105mm  
Packaging quantity: 48pcs  
Outer packaging box dimensions:  
L\*W\*H=390\*360\*245mm  
Packaging quantity: 96pcs

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