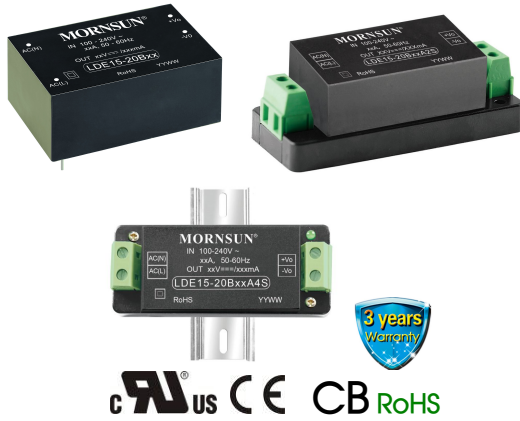


15W, AC-DC converter



## FEATURES

- Universal Input : 85 - 264VAC/100 - 370VDC
- Operating temperature range: -40°C to +70°C
- High isolation voltage up to 4K VAC
- Regulated output, Low ripple & noise
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Plastic case, meets UL94V-0
- EMI performance meets CISPR32 / EN55032 CLASS B
- Meets IEC62368, UL62368, EN62368 standards (Pending)

LDE15-20Bxx 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, 4000VAC safer isolation. It offers good EMC performance, meet IEC/EN61000-4, CISPR32/EN55032, UL62368 and EN62368 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	Part No.*	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load (μF)
UL/CE/CB (Pending)	LDE15-20B03	8.9W	3.3V/2700mA	72	10000
	LDE15-20B05	13.5W	5V/2700mA	76	6600
	LDE15-20B09	15W	9V/1660mA	77	4400
	LDE15-20B12		12V/1250mA	80	3000
	LDE15-20B15		15V/1000mA	81	2000
	LDE15-20B24		24V/625mA	81	800

Note:\*Part No. with suffix of "A2S" means chassis mounting and suffix of "A4S" means DIN-Rail mounting (e.g. LDE15-20B03A2S means chassis mounting; LDE15-20B03A4S means DIN-Rail mounting)

## 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	--	63	Hz
Input current	115VAC	--	0.27	0.32	A
	230VAC	--	0.17	0.20	
Inrush current	115VAC	--	12	--	
	230VAC	--	36	--	
Recommended External Input Fuse		3.15A/250V, slow fusing, necessary			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	0%-100%	3.3V output	--	±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	
Short Circuit Protection		Hiccups, Continuous, self-recovery				

Over-current Protection		≥ 130% I <sub>o</sub> , self-recovery			
Over-voltage Protection	3.3/5V output	≤ 7.5V			
	9V output	≤ 15V			
	12/15V output	≤ 20V			
	24V output	≤ 30V			
Min. Load		0	--	--	%
Hold-up Time	115VAC input	5	10	--	ms
	230VAC input	44	55	--	

Note: \* Ripple and noise tested with "parallel cable" method, Testing at rated load, 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 (leakage current < 5mA)	4000	--	--	VAC	
Operating Temperature			-40	--	+70	°C	
Storage Temperature			-40	--	+85		
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 to -10°C		2.0	--	--	% / °C	
	+45°C to +70°C	3.3/5V	3.0	--	--		
		Others	2.4	--	--		
	85 - 130VAC	5V	-25°C to +70°C	0.66	--	--	% / VAC
			-40°C to -25°C	1.33	--	--	
	85 - 100VAC	Others	-25°C to +70°C	2.0	--	--	
			-40°C to -25°C	4.0	--	--	
240 - 264VAC		0.83	--	--			
Safety Standard			IEC62368/EN62368/UL62368				
Safety-regulated Certification			IEC62368/EN62368/UL62368 (Pending)				
Safety Class			CLASS II				
MTBF			MIL-HDBK-217F@25°C > 300,000 h				

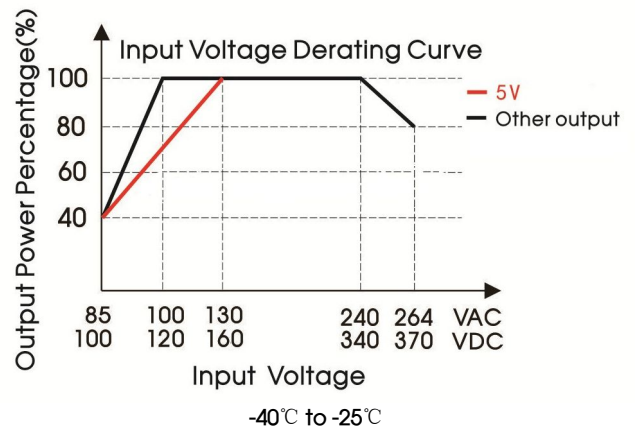
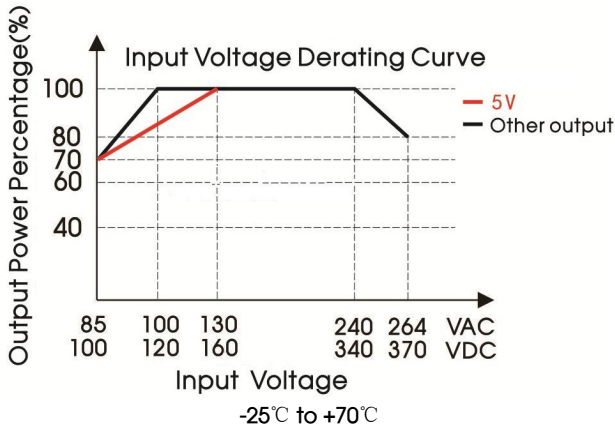
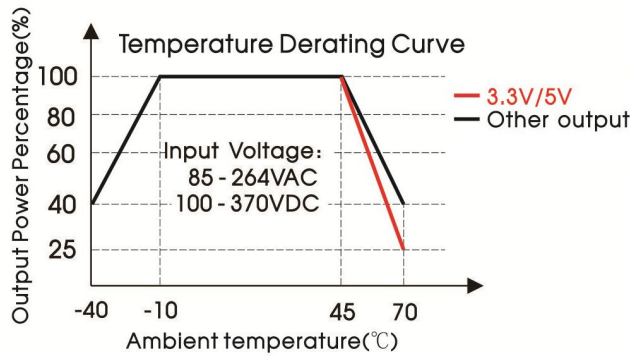
## Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)	
Package Dimensions	DIP	53.80*28.80*23.50 mm
	A2S chassis mounting	76.00*31.50*32.30 mm
	A4S Din-Rail mounting	76.00*31.50*36.90 mm
Weight	DIP	60g (Typ.)
	A2S chassis mounting	80g(Typ.)
	A4S Din-Rail mounting	100g(Typ.)
Cooling method	Free air convection	

EMC Specifications

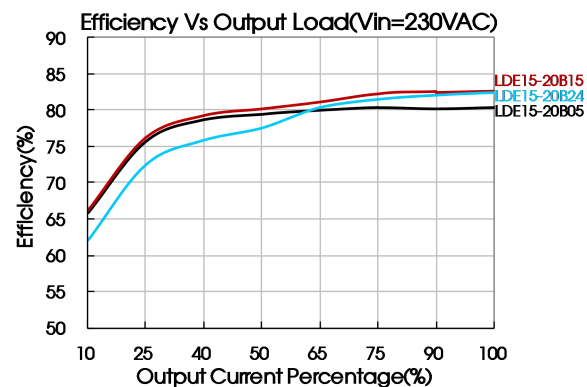
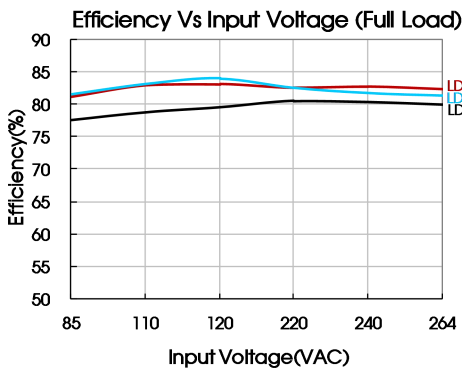
EMI	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV /Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV	perf. Criteria B
			line to line ±4KV/line to ground ±6KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
Voltage dips, short interruptions and voltage variations immunity		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/100-140VDC/340-370VDC (LDE15-20B05:85-130VAC/240-264VAC/100-160VDC/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

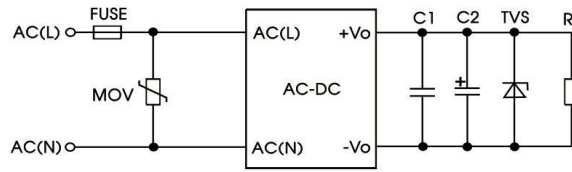


Fig. 1

Model	FUSE	MOV	C1	C2	TVS
LDE15-20B03	3.15A/250V, slow fusing, necessary	S20K300	1μF/50V	220μF/16V	SMBJ7.0A
LDE15-20B05				220μF/16V	SMBJ7.0A
LDE15-20B09				120μF/25V	SMBJ12A
LDE15-20B12				120μF/25V	SMBJ20A
LDE15-20B15				120μF/25V	SMBJ20A
LDE15-20B24				68μF/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. Capacitor voltage reduced to at least 80%. 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 The product in the application must connect external electrolytic capacitors C2, to achieve lower ripple noise and better dynamic load performance.
  - ③ When the product’s output terminal is connected to high frequency switch type load, electrolytic capacitor C2’s selection is as following:

Model	C2
LDE15-20B03	470μF/16V (Solid capacitor)
LDE15-20B05	470μF/16V (Solid capacitor)
LDE15-20B09	470μF/16V (Solid capacitor)
LDE15-20B12	390μF/25V
LDE15-20B15	390μF/25V
LDE15-20B24	220μF/35V

2. EMC solution-recommended circuit

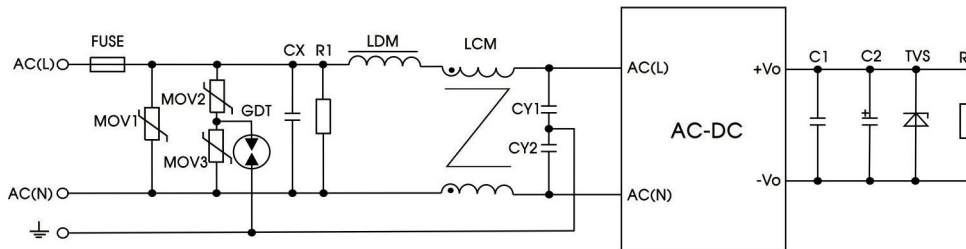


Fig 2

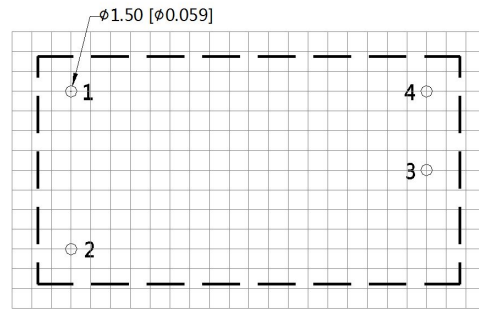
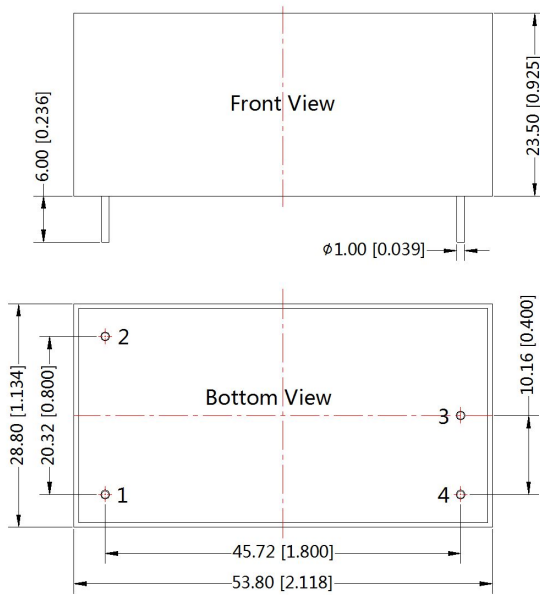
Note: Output external circuit refer to the typical application circuit.

Element model	Recommended value
MOV1	S20K300
MOV2	S10K300
MOV3	S10K300
CX	0.22μF/275VAC
CY1, CY2	1nF/400VAC
R1	1MΩ /2W
LDM	4.7μH
LCM	2mH
GDT	EM3600XS
FUSE	6.3A/250V, slow fusing, necessary

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



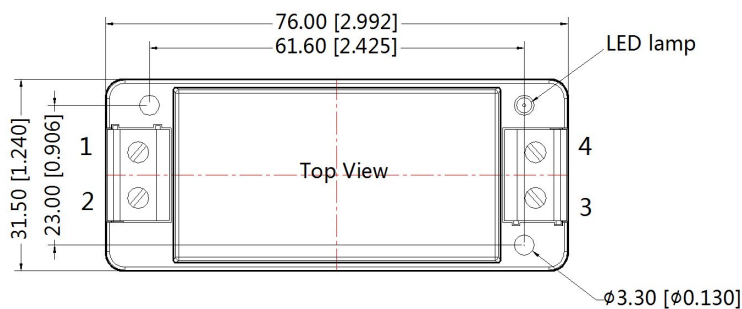
Note: Grid 2.54\*2.54mm

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

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

A2S Dimensions

THIRD ANGLE PROJECTION

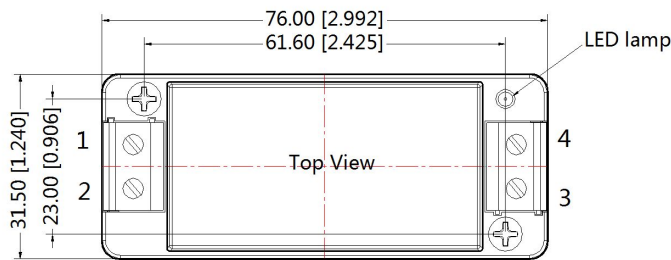


Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

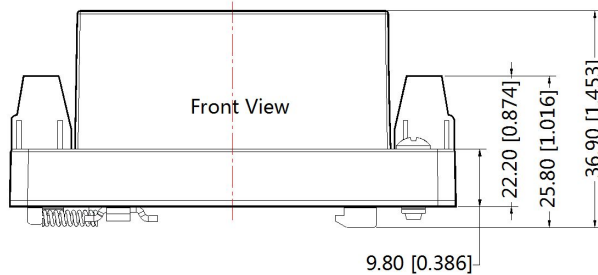
Note:  
Unit: mm[inch]  
Wire range: 24-12 AWG  
Tightening torque: Max 0.4 N·m  
General tolerances:  $\pm 1.00$ [ $\pm 0.039$ ]

A4S 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  
Tightening torque: Max 0.4 N·m  
Mounting rail: TS35, rail needs to connect safety ground  
General tolerances:  $\pm 1.00[\pm 0.039]$

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from [www.mornsun-power.com](http://www.mornsun-power.com). Packing bag number: 58220011(DIP package); 58220022(A2S/ A4S package);
2. 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;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

Mornsun Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Luogang District, Guangzhou, P. R. China  
Tel: 86-20-38601850-8801 Fax: 86-20-38601272 E-mail: info@mornsun.cn