

6W, AC/DC converter



## FEATURES

- 85 - 264V Universal AC or wide 100 - 370V DC Input
- Operating ambient temperature range: -40°C to +70°C
- High I/O isolation test voltage of up to 4000VAC
- Regulated output, Low output ripple & noise
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32 / EN55032 CLASS B
- IEC62368, UL62368, EN62368 approval

LDE06-20Bxx series is one of Mornsun's compact size power converters. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability, reinforced isolation. The converters are widely used in industrial, power, instrumentation, communication and civil applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

## Selection Guide

Certification	Part No.*	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
UL/CE/CB	LDE06-20B03	6W	3.3V/1250mA	70	4000
	LDE06-20B05		5V/1200mA	76	4000
	LDE06-20B09		9V/660mA	74	1000
	LDE06-20B12		12V/500mA	77	820
	LDE06-20B15		15V/400mA	77	820
	LDE06-20B24		24V/250mA	80	330

Note: \* Use suffix "A2S" for chassis and suffix "A4S" for 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	--	--	0.15	A
	230VAC	--	--	0.10	
Inrush Current	115VAC	--	10	--	
	230VAC	--	20	--	
Recommended External Input Fuse		1A/250V Slow-blow required			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	3.3V output	--	±3	--	%
	Other output	--	±2	--	
Line Regulation	Full load	--	±0.5	--	
Load Regulation	0%-100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	50	100	mV
Temperature Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		≥110%Io, self-recovery			

Over-voltage Protection	3.3/5VDC output	≤ 7.5V			
	9VDC output	≤ 15V			
	12/15 VDC output	≤ 20V			
	24 VDC output	≤ 30V			
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	8	--	ms
	230VAC input	--	60	--	

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 Voltage	Input-Output	Electric Strength Test for 1min., leakage current <5mA			VAC
Operating Temperature		-40	--	+70	°C
Storage Temperature		-40	--	+105	
Storage Humidity		--	--	95	%RH
Soldering 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 to -25°C	2.66	--	--	% / °C
	+55°C to +70°C	2.66	--	--	
	85 - 100VAC	1.0	--	--	%/VAC
Safety Standard		IEC62368/EN62368/UL62368			
Safety Certification		IEC62368/EN62368/UL62368			
Safety Class		CLASS II			
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

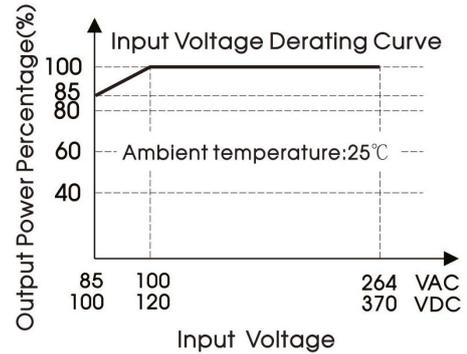
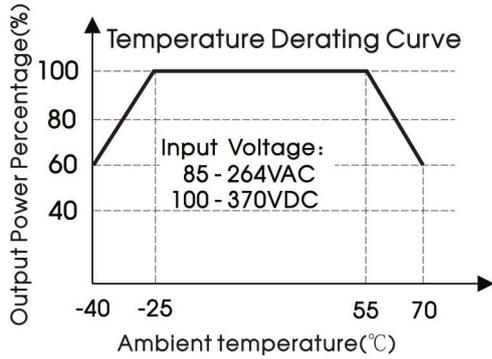
### Mechanical Specifications

Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)	
Dimension	DIP	50.80 x 25.40 x 15.36 mm
	A2S chassis mounting	76.00 x 31.50 x 24.16 mm
	A4S Din-Rail mounting	76.00 x 31.50 x 28.76 mm
Weight	DIP	31g (Typ.)
	A2S chassis mounting	52 g (Typ.)
	A4S Din-Rail mounting	70 g (Typ.)
Cooling Method	Free air convection	

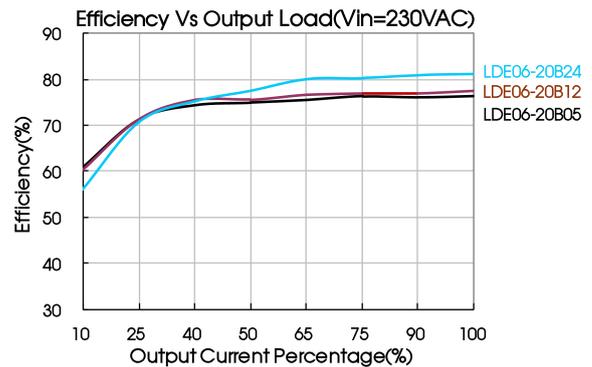
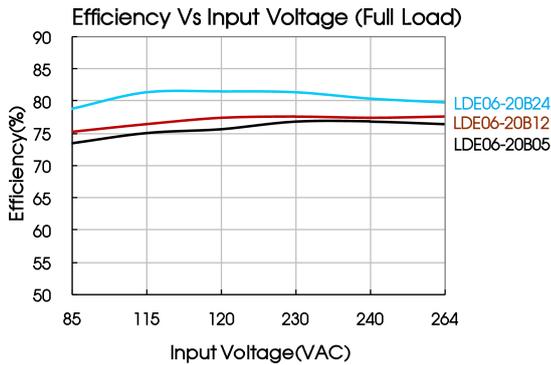
### Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/ Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN 61000-4-4	±2KV	perf. Criteria B
		IEC/EN 61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 61000-4-5	line to line ±1KV	perf. Criteria B
		IEC/EN 61000-4-5	line to line ±2KV/line to ground ±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
Voltage dips, short interruption and voltage variations	IEC/EN61000-4-11	0%, 70%	perf. Criteria B	

Product Characteristic Curve



Note: ① With an AC input between 85-100VAC and a DC input between 100-120VDC, 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 factory or one of our FAE.



Design Reference

1. Typical application

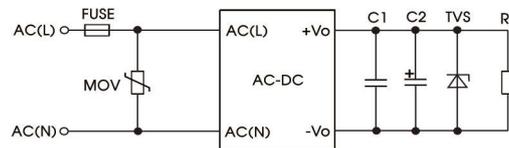


Fig. 1: Typical circuit diagram

Part No.	C1(μF)	C2(μF)	FUSE	MOV	TVS
LDE06-20B03	1	220	1A/250V, slow-blow required	S14K350	SMBJ7.0A
LDE06-20B05		220			SMBJ7.0A
LDE06-20B09		100			SMBJ12A
LDE06-20B12		100			SMBJ20A
LDE06-20B15		100			SMBJ20A
LDE06-20B24		47			SMBJ30A

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. EMC compliance recommended circuit

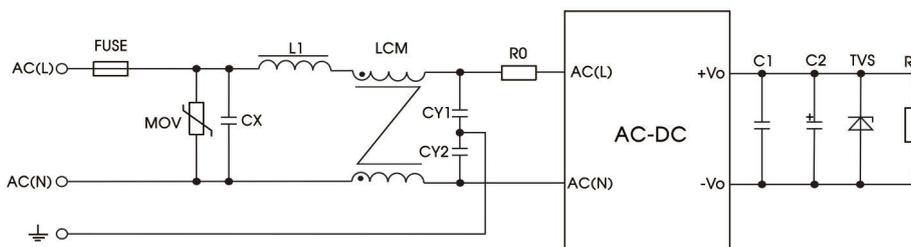
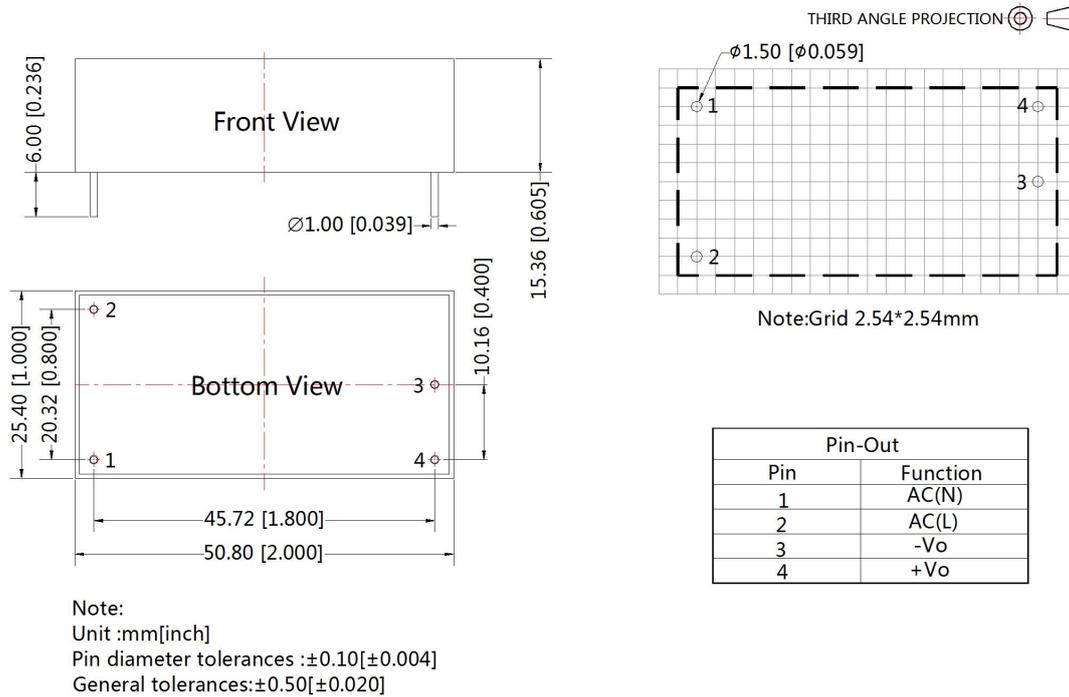


Fig 2: EMC circuit for harsh requirements

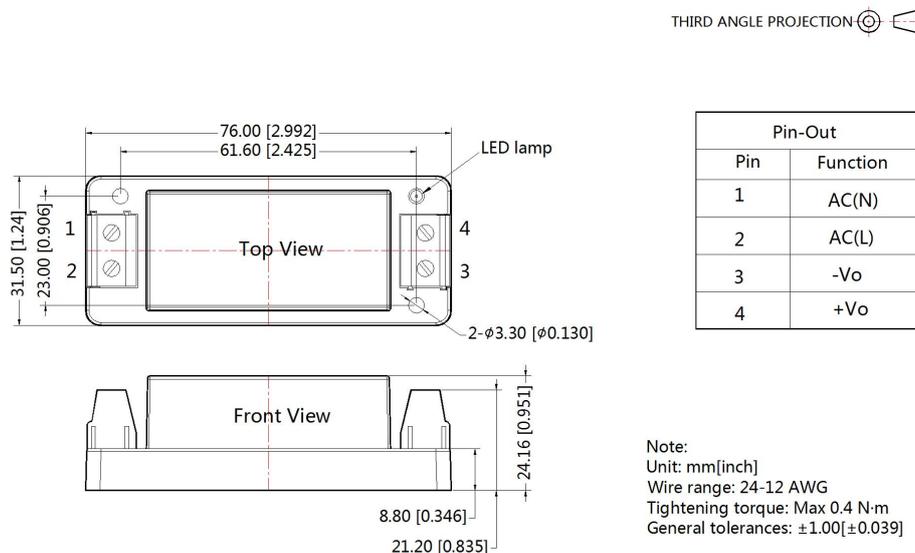
Component	Recommended value
MOV	S14K350
CX	0.1 $\mu$ F/275VAC
L1	4.7uH/2.0A
CY1	1nF/400VAC
CY2	1nF /400VAC
LCM	2.2mH, we recommend using part no. FL2D-10-222 (MORNSUN)
FUSE	2A/250V, slow-blow required
RO	33 $\Omega$ /3W

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

## Dimensions and Recommended Layout

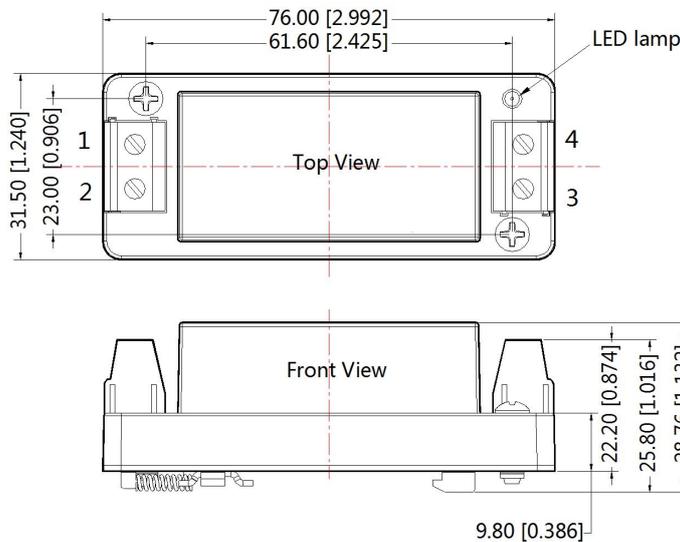


## A2S Dimensions



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. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220003 (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 Fax: 86-20-38601272 E-mail: sales@mornsun.cn www.mornsun-power.com