

6W, AC/DC converter



CE Report
EN62368-1

CB
IEC62368-1

UK
BS EN 62368-1

RoHS



FEATURES

- Universal 85-264VAC or 100-370VDC input voltage
- Operating ambient temperature range: -40°C to +70°C
- High I/O isolation test voltage up to 4000VAC
- Regulated output, low 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

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 (uF) Max.
EN/IEC	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: 1. * Use suffix "A2S" for chassis and suffix "A4S" for DIN-Rail mounting.

2. 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	--	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	--	mV
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	50	100	
Temperature Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Hiccup, continuous, self-recover			
Over-current Protection		≥110%Io, self-recover			

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	Input-output	Electric Strength Test for 1min., leakage current <5mA	4000	--	--	VAC
Operating Temperature			-40	--	+70	℃
Storage Temperature			-40	--	+105	
Storage Humidity			--	--	95	%RH
Soldering Temperature	Wave-soldering, Max. 10 seconds		255	260	265	℃
	Manual-welding, Max. 10 seconds		350	360	370	
Switching Frequency			--	100	--	kHz
Power Derating	-40℃ to -25℃		2.66	--	--	%/℃
	+55℃ to +70℃		2.66	--	--	
	85VAC - 100VAC		1.0	--	--	%/VAC
Safety Standard		IEC/EN/BS EN62368-1 safety approved; Design refer to UL62368-1				
Safety Class		CLASS II				
MTBF		MIL-HDBK-217F@25℃ > 300,000 h				

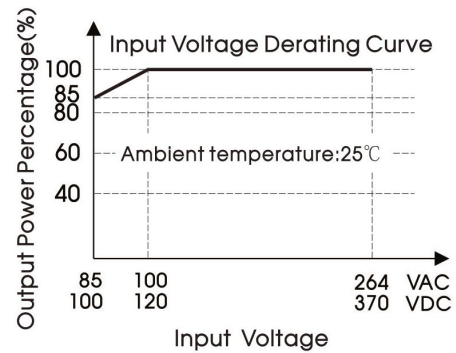
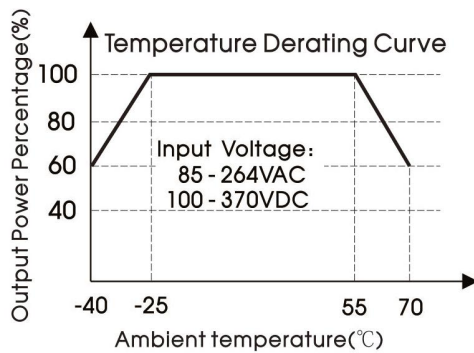
Mechanical Specifications

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	52g (Typ.)
	A4S Din-Rail mounting	70g (Typ.)
Cooling Method	Free air convection	

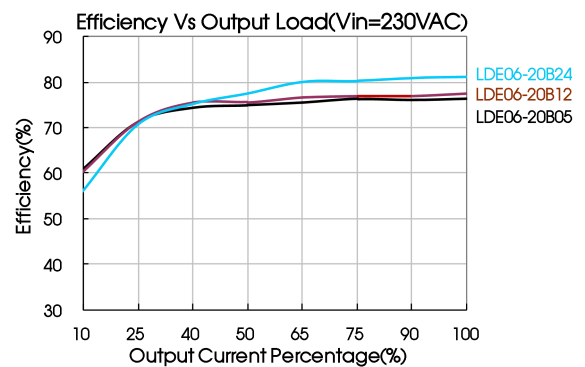
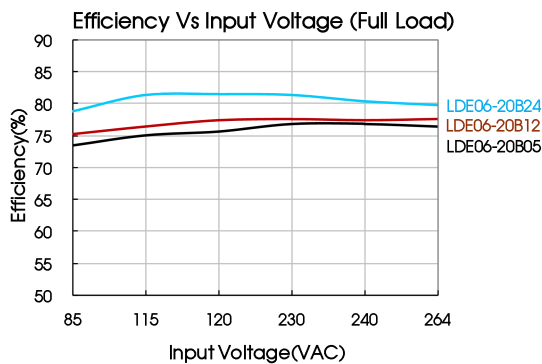
Electromagnetic Compatibility (EMC)

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 PE ±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	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 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 Mornsun our FAE.



Design Reference

1. Typical application

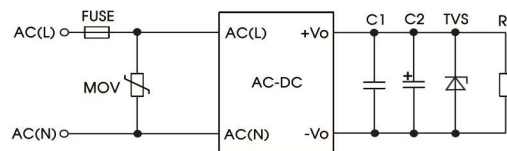


Fig. 1: Typical circuit diagram

Part No.	C1(uF)	C2(uF)	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

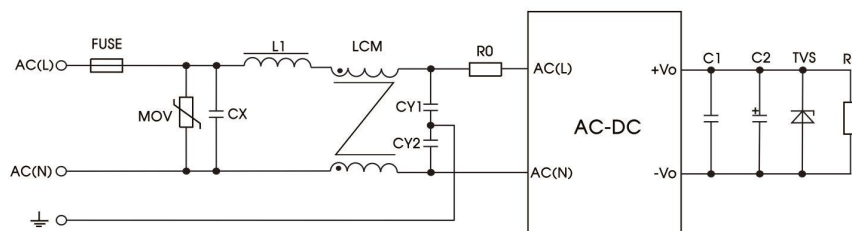
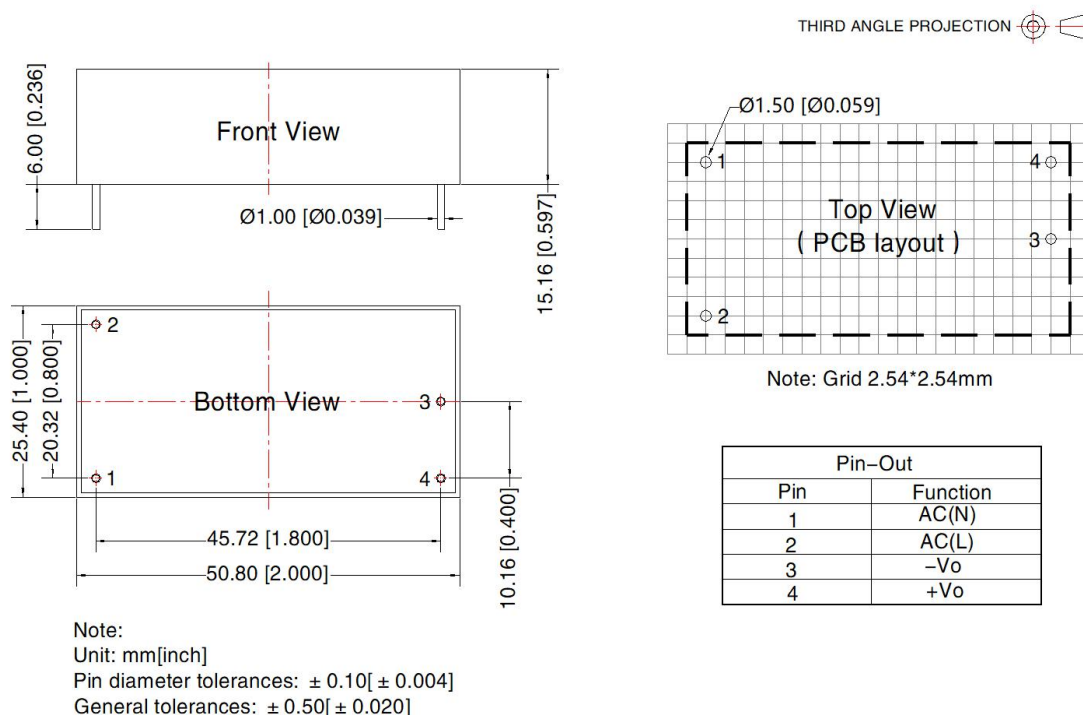


Fig. 2: EMC application circuit with higher requirements

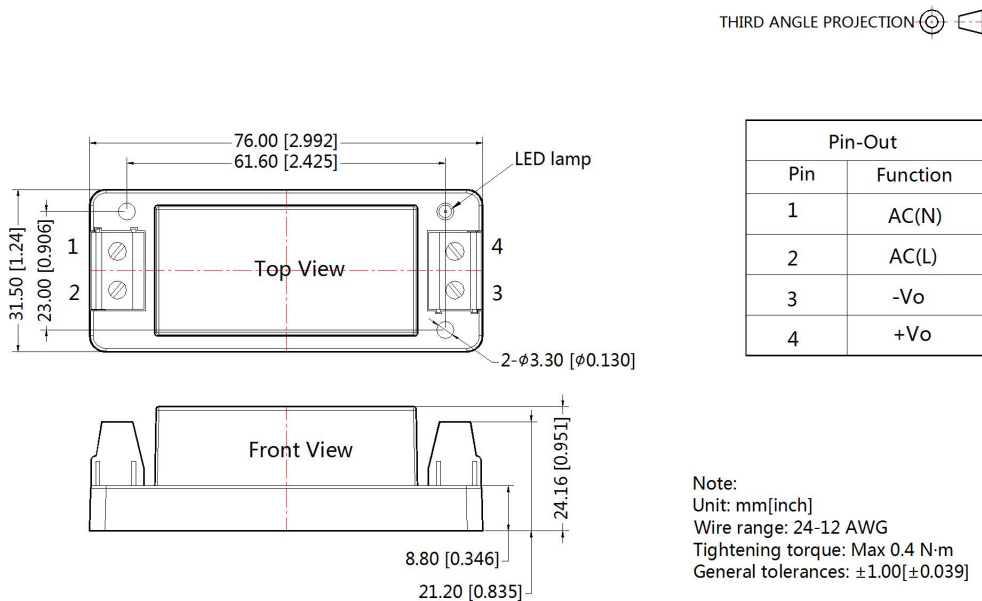
Component	Recommended value
MOV	S14K350
CX	0.1uF/275VAC
L1	4.7uH/2.0A
CY1	1nF/400VAC
CY2	1nF/400VAC
LCM	2.2mH, P/N: FL2D-10-222 (MORNSUN) is recommended
FUSE	2A/250V, slow-blow, required
R0	33 Ω /3W

3. For additional information please refer to application notes on www.mornsun-power.com

Dimensions and Recommended Layout

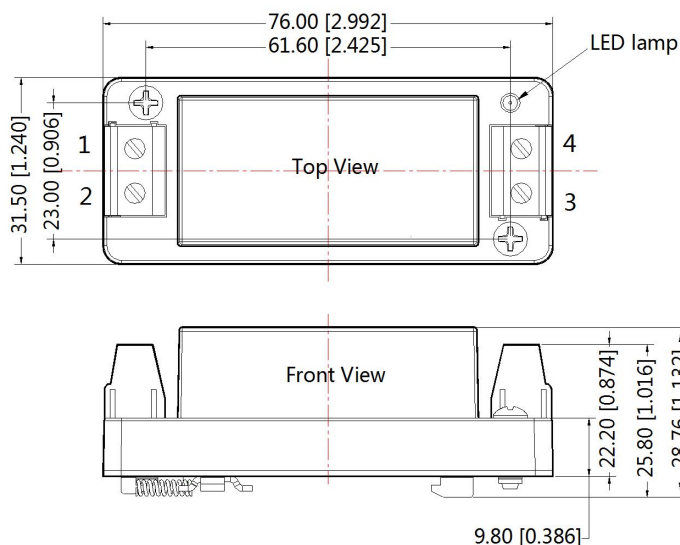


A2S Dimensions



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. Packaging bag number: 58220250 (DIP package); 58220022 (A2S/A4S package);
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. 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;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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