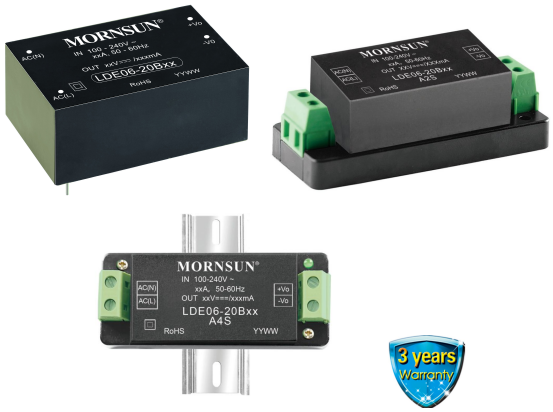
6W, AC/DC converter



FEATURES

- Universal Input : 85 - 264VAC/100 - 370VDC
- Operating temperature range: -40℃ to +70℃
- 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)

LDE06-20Bxx series---- is a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, and is UL & CE certified, 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)	LDE06-20B03	4.1W	3.3V/1250mA	70	4000
	LDE06-20B05	6W	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:*Part No. with suffix of "A2S" means chassis mounting and suffix of "A4S" means DIN-Rail mounting (e.g. LDE06-20B03A2S means chassis mounting; LDE06-20B03A4S 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	--	--	0.15	A
	230VAC	--	--	0.10	
Inrush Current	115VAC	--	10	--	
	230VAC	--	20	--	
Recommended External Input Fuse		1A/250V, slow fusing, necessary			
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-peak value)	--	50	100	mV
Temperature Coefficient		--	±0.02	--	%/℃
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			
Min. Load		0	--	--	%
Hold-up Time	115VAC input	--	8	--	ms
	230VAC input	--	60	--	
Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.					

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	Test time: 1min	4000	--	--	VAC
Operating Temperature			-40	--	+70	℃
Storage Temperature			-40	--	+105	
Storage Humidity			--	--	95	%RH
Welding Temperature		Wave-soldering	260 ± 5℃; time：5 - 10s			
		Manual-welding	360 ± 10℃; time：3 - 5s			
Switching Frequency			--	100	--	kHz
Power Derating		-40℃ to -25℃	2.66	--	--	%/℃
		+55℃ to +70℃	2.66	--	--	
		85 - 100VAC	1.0	--	--	%/VAC
Safety Standard			IEC62368/EN62368/UL62368			
Safety Certification			IEC62368/EN62368/UL62368 (Pending)			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25℃ > 300,000 h			

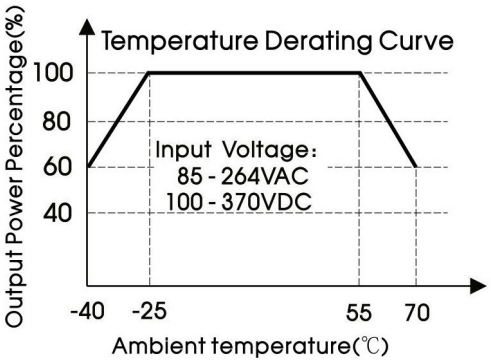
Physical Specifications

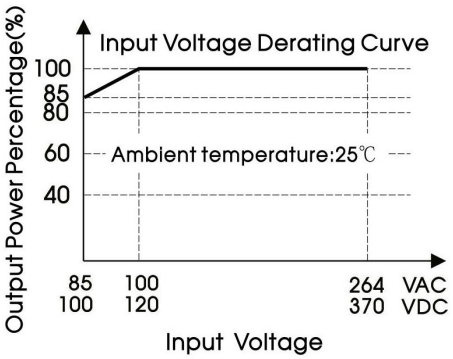
Casing Material		Black flame-retardant and heat-resistant plastic (UL94 V-0)
Dimension	DIP	50.80*25.40*15.36 mm
	A2S chassis mounting	76.00*31.50*24.16 mm
	A4S Din-Rail mounting	76.00*31.50*28.76 mm
Weight	DIP	31g (Typ.)
	A2S chassis mounting	52 g (Typ.)
	A4S Din-Rail mounting	70 g (Typ.)
Cooling Method		Free air convection

EMC Specifications

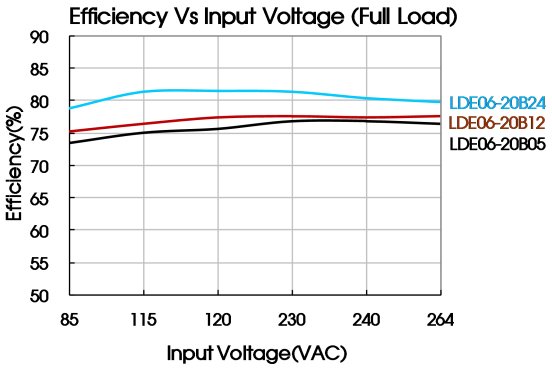
EMI	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV/ Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN 61000-4-4	±2KV	perf. Criteria B
		IEC/EN 61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 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 interruptions and voltage variations immunity	IEC/EN61000-4-11	0%,70%	perf. Criteria B

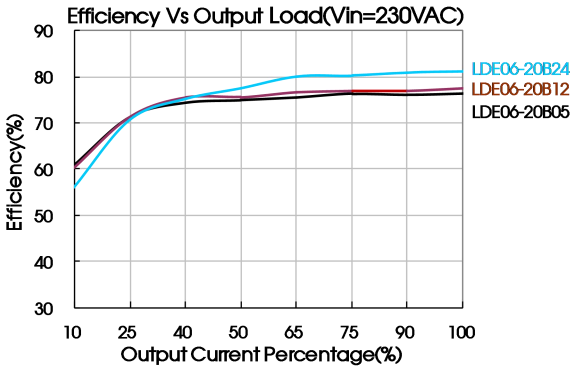
Product Characteristic Curve





Note: ①When input 85-100VAC/100-120VDC, it need to be voltage derated on basis of temperature derating;
②This 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

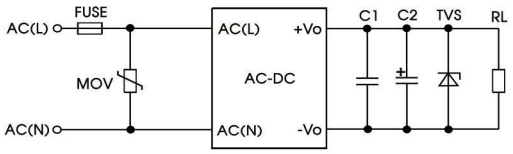


Fig. 1

Model	C1(μF)	C2(μF)	FUSE	MOV	TVS
LDE06-20B03	1	220	1A/250V, slow fusing, necessary	S14K350	SMBJ7.0A
LDE06-20B05		220			SMBJ7.0A
LDE06-20B09		100			SMBJ12A
LDE06-20B12		100			SMBJ20A
LDE06-20B15		100			SMBJ20A
LDE06-20B24		47			SMBJ30A

Note:
Output filtering capacitor C2 is a electrolytic capacitor, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacture's datasheet. Output 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. EMC solution-recommended circuit

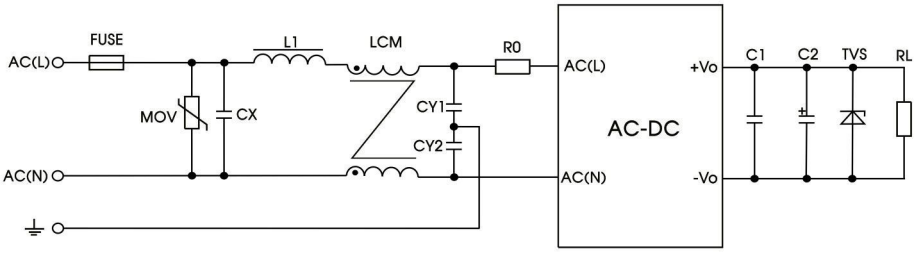
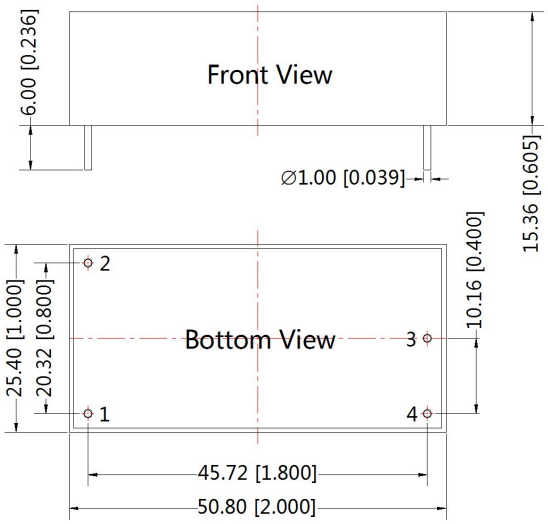


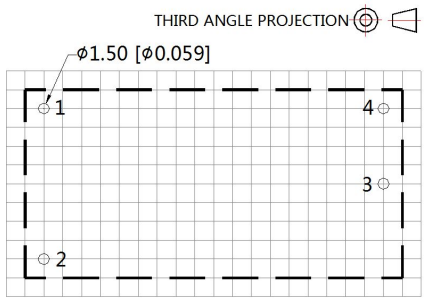
Fig 2

Element model	Recommended value
MOV	S14K350
CX	0.1μF/275VAC
L1	4.7uH/2.0A
CY1	1nF/400VAC
CY2	1nF /400VAC
LCM	2.2mH, recommended to use MORNSUN's FL2D-10-222
FUSE	2A/250V, slow fusing, necessary
R0	33Ω /3W

3.For more information Please find the application note on www.mornsun-power.com

Dimensions and Recommended Layout



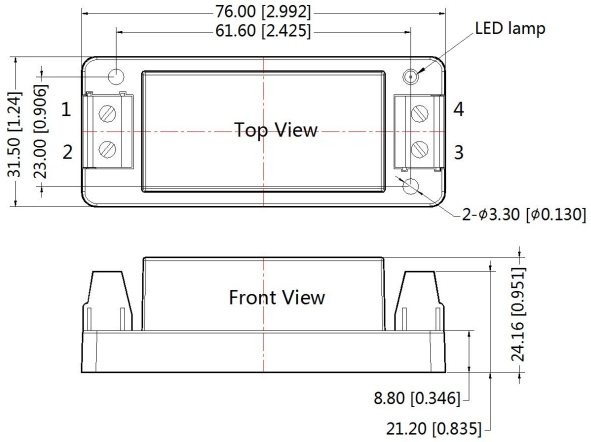


Note:Grid 2.54*2.54mm

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

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

A2S Dimensions

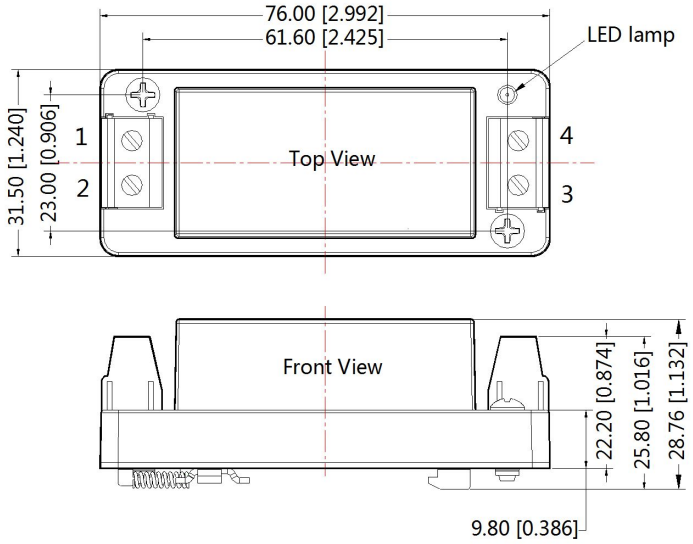


Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

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

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58220003 (DIP packing); 58220022 (A2S/A4S packing)
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, 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.

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