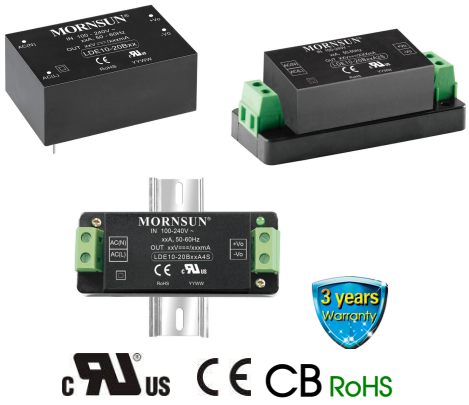
10W, AC/DC converter



FEATURES

- Universal 85 - 264V AC or 100-370VDC input voltage
- Operating ambient temperature range: -40℃ ~ +70℃
- High I/O isolation test voltage up to 4000VAC
- Regulated output, low ripple & noise
- Output short circuit, over-current and over-voltage protection
- High efficiency, high reliability
- Plastic case meets UL94V-0 flammability
- EMI performance CISPR32 / EN55032 CLASS B
- IEC/EN/UL62368 and IEC/EN60335 safety approval

LDE10-20Bxx 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 and double or reinforced insulation. It offers excellent EMC performance and for extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet. The converters meet IEC/EN61000-4, CISPR32/EN55032, UL62368, EN62368, IEC62368, IEC60335, EN60335 standards and are widely used in industrial, medical, electricity, instrumentation, telecommunications applications.

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	LDE10-20B03	6.6W	3.3V/2000mA	71	26400
	LDE10-20B05	10W	5V/2000mA	76	9440
	LDE10-20B09		9V/1100mA	80	3600
	LDE10-20B12		12V/900mA	81	2000
	LDE10-20B15		15V/700mA	81	1170
	LDE10-20B24		24V/450mA	83	370

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	--	--	0.23	A
	230VAC	--	--	0.15	
Inrush Current	115VAC	--	15	--	
	230VAC	--	30	--	
Recommended External Input Fuse		2A/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	--	%/℃
Short Circuit Protection		Hiccup, continuous, self-recovery			
Overcurrent Protection		110% - 300%Io, self-recovery			

Overvoltage protections	3.3VDC/5VDC	≤7.5VDC(Output voltage clamp or hiccup)			
	9VDC	≤15VDC(Output voltage clamp or hiccup)			
	12VDC/15VDC	≤20VDC(Output voltage clamp or hiccup)			
	24VDC	≤30VDC(Output voltage clamp or hiccup)			
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	15	--	ms
	230VAC input	--	80	--	
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	260 ± 5℃; time：5 - 10s			
		Manual-soldering	360 ± 10℃; time：3 - 5s			
Switching Frequency			--	100	--	KHz
Power Derating		-40℃ ~ -25℃	4.0	--	--	%/℃
		+55℃ ~ +70℃	2.5	--	--	
		85VAC-100VAC	1.0	--	--	%/VAC
Safety Standard			UL62368/EN62368/EN60335/IEC62368/IEC60335			
Safety Certification			UL62368/EN62368/EN60335/IEC62368/IEC60335			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25℃ > 300,000 h			

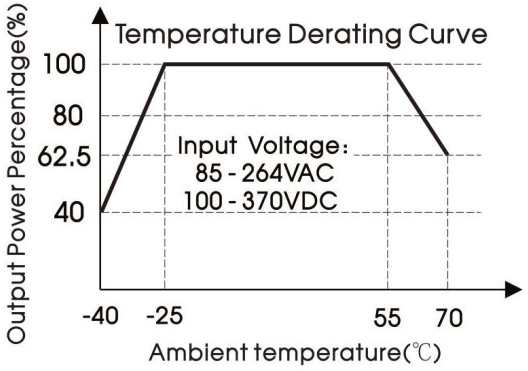
Mechanical Specifications

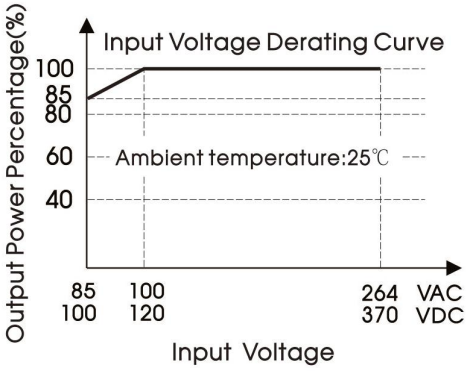
Case Material		Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	DIP	53.80 x 28.80 x 19.00mm
	A2S chassis mounting	76.00 x 31.50 x 27.80mm
	A4S Din-Rail mounting	76.00 x 31.50 x 32.40mm
Weight	DIP	48g (Typ.)
	A2S chassis mounting	68g (Typ.)
	A4S Din-Rail mounting	88g (Typ.)
Cooling Method		Free air convection

Electromagnetic Compatibility (EMC)

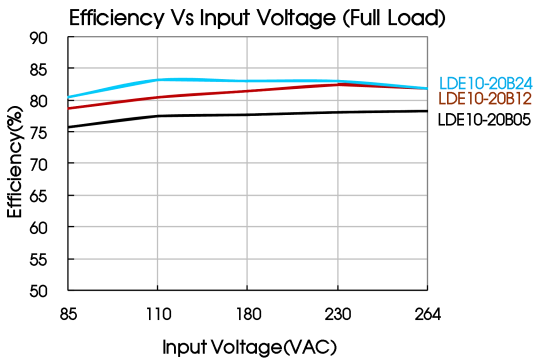
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2kV	perf. Criteria B
		IEC/EN61000-4-4	±4kV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN61000-4-5	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 dip, short interruptions and voltage variations	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

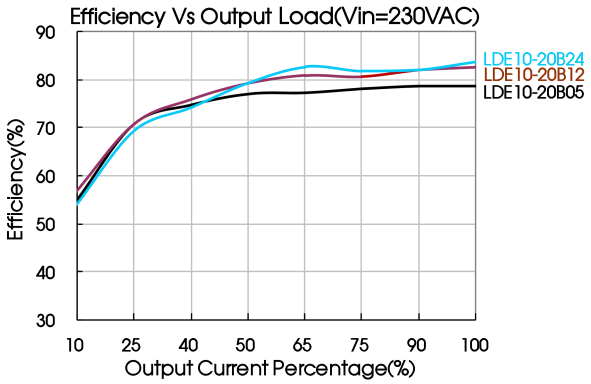
Product Characteristic Curve





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

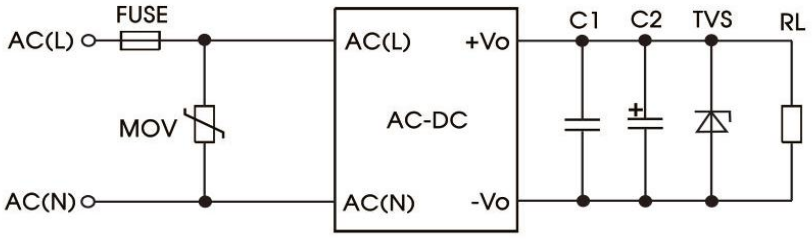


Fig. 1: Typical circuit diagram

Part No.	C1(μF)	C2(μF)	FUSE	MOV	TVS
LDE10-20B03	1μF/50V	220μF /10V	2A/250V slow-blow required	S14K300	SMBJ7.0A
LDE10-20B05		220μF /10V			SMBJ7.0A
LDE10-20B09		120μF /25V			SMBJ12A
LDE10-20B12		120μF /25V			SMBJ20A
LDE10-20B15		120μF /25V			SMBJ20A
LDE10-20B24		68μF /35V			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

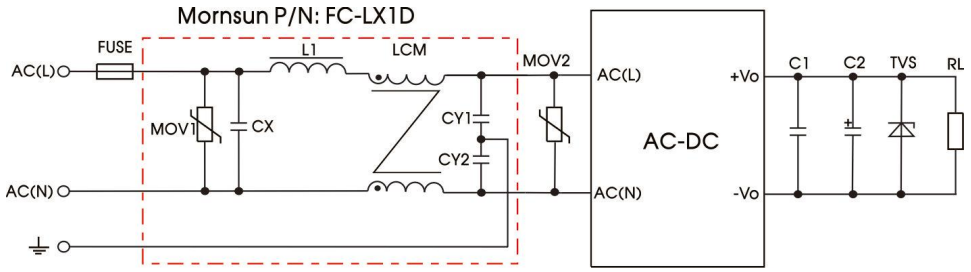


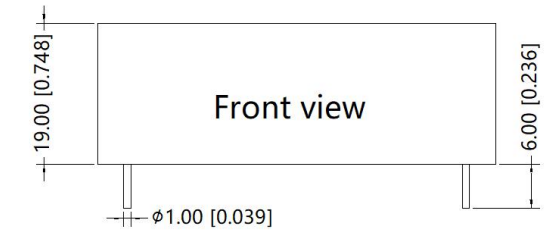
Fig 2

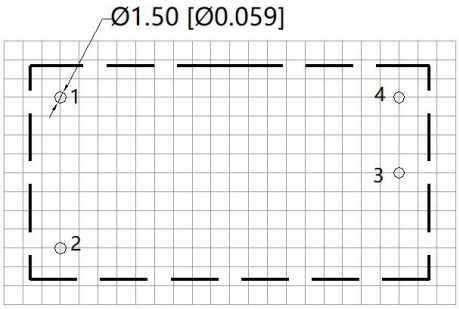
Component		Recommended value
FUSE		3.15A/250V slow-blow required
MOV1	FC-LX1D (2KV/4KV EMC Filter)	S14K350
CY1, CY2		1000pF/400VAC
CX		0.1uF/275VAC
L1		4.7uH/2A
LCM		10mH, recommended to use MORNSUN's FL2D-Z5-103
MOV2		S10K300

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

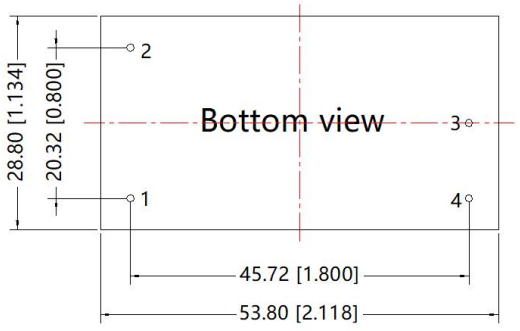
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note : Grid 2.54*2.54mm

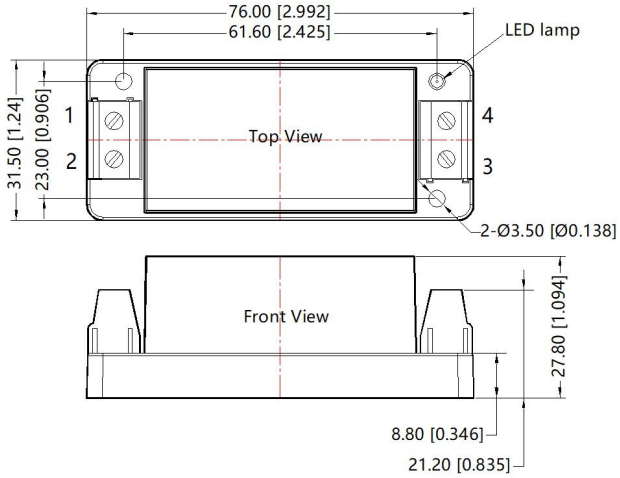


Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

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

A2S Dimensions

THIRD ANGLE PROJECTION

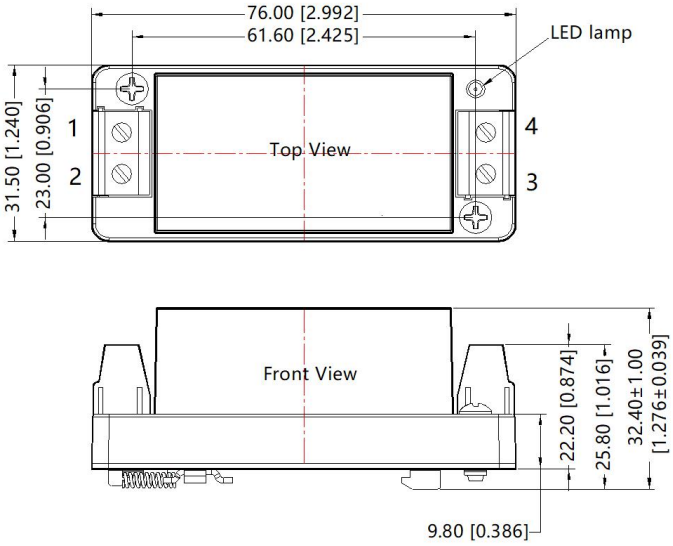


Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

Note:
Unit: mm[inch]
Wire range: 24~12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±0.50[±0.020]

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
Installed on DIN RAIL TS35
General tolerances: ±0.50[±0.020]

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220005 (DIP package); 58220022 (A2S/A4S package);
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 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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