

10W, AC/DC converter



FEATURES

- Universal 85 - 264V AC and wide 100 - 370V DC Input
- 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, overcurrent and overvoltage protection
- High efficiency, high reliability
- Plastic case meets flammability per UL94V-0
- EMI compliant to CISPR32 / EN55032 CLASS B
- IEC/EN/UL62368 and 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 this datasheet. The converters meet IEC/EN61000-4, CISPR32/EN55032, UL62368, EN62368, EN60335, IEC62368 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	10W	3.3V/2000mA	71	26400
	LDE10-20B05		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: *Part No. with suffix of "A2S" means chassis mounting and suffix of "A4S" means DIN-Rail mounting (e.g. LDE10-20B03A2S means chassis mounting; LDE10-20B03A4S 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	--	--	0.23	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	--	%/°C
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	°C
Storage Temperature		-40	--	+105	
Storage Humidity		--	--	95	%RH
Soldering Temperature	Wave-soldering	260 ± 5°C; time: 5 - 10s			
	Manual-soldering	360 ± 10°C; time: 3 - 5s			
Switching Frequency		--	100	--	KHz
Power Derating	-40°C to -25°C	4.0	--	--	% / °C
	+55°C to +70°C	2.5	--	--	
	85VAC-100VAC	1.0	--	--	%/VAC
Safety Standard		UL62368/EN62368/EN60335/IEC62368			
Safety Certification		UL62368/EN62368/EN60335/IEC62368			
Safety Class		CLASS II			
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

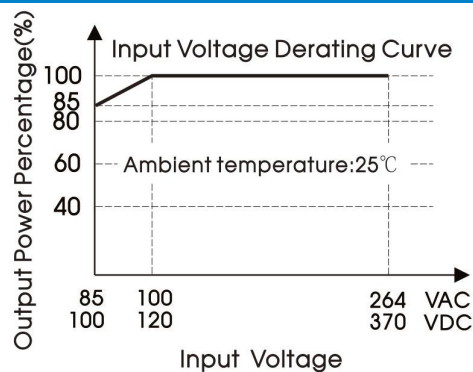
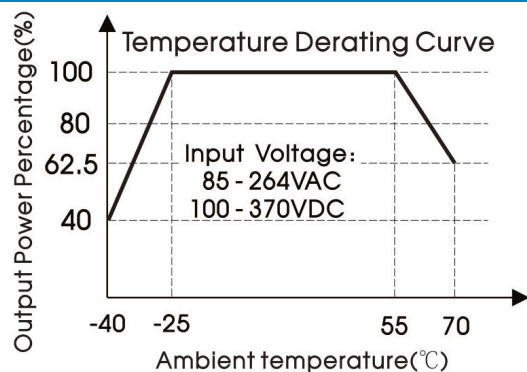
Mechanical Specifications

Casing 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

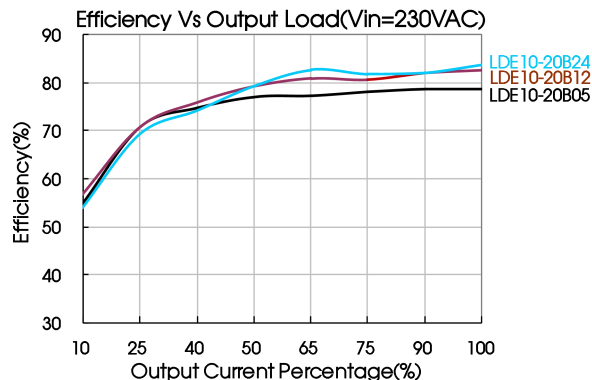
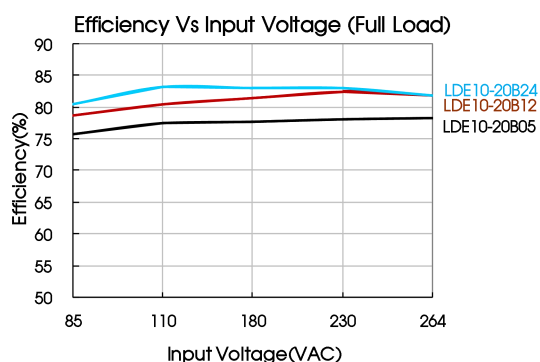
Electromagnetic Compatibility (EMC)

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

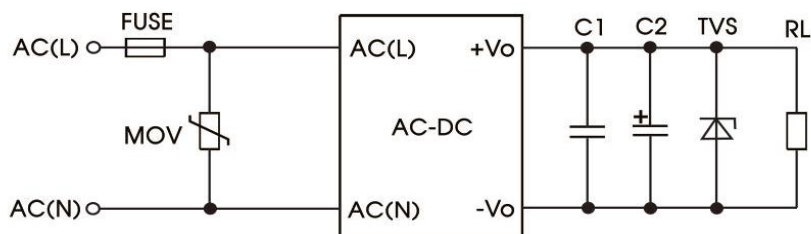


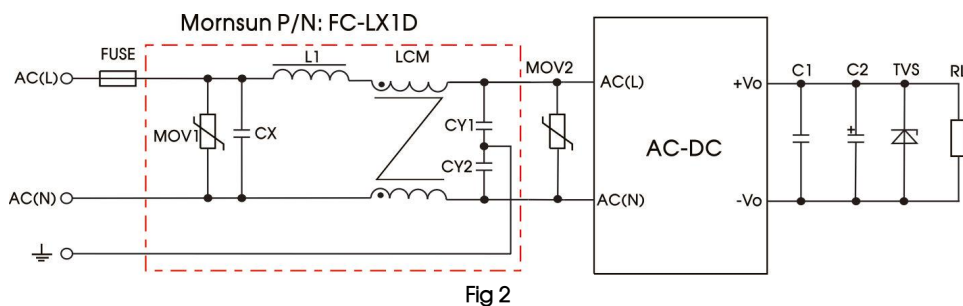
Fig. 1: Typical circuit diagram

Model	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.

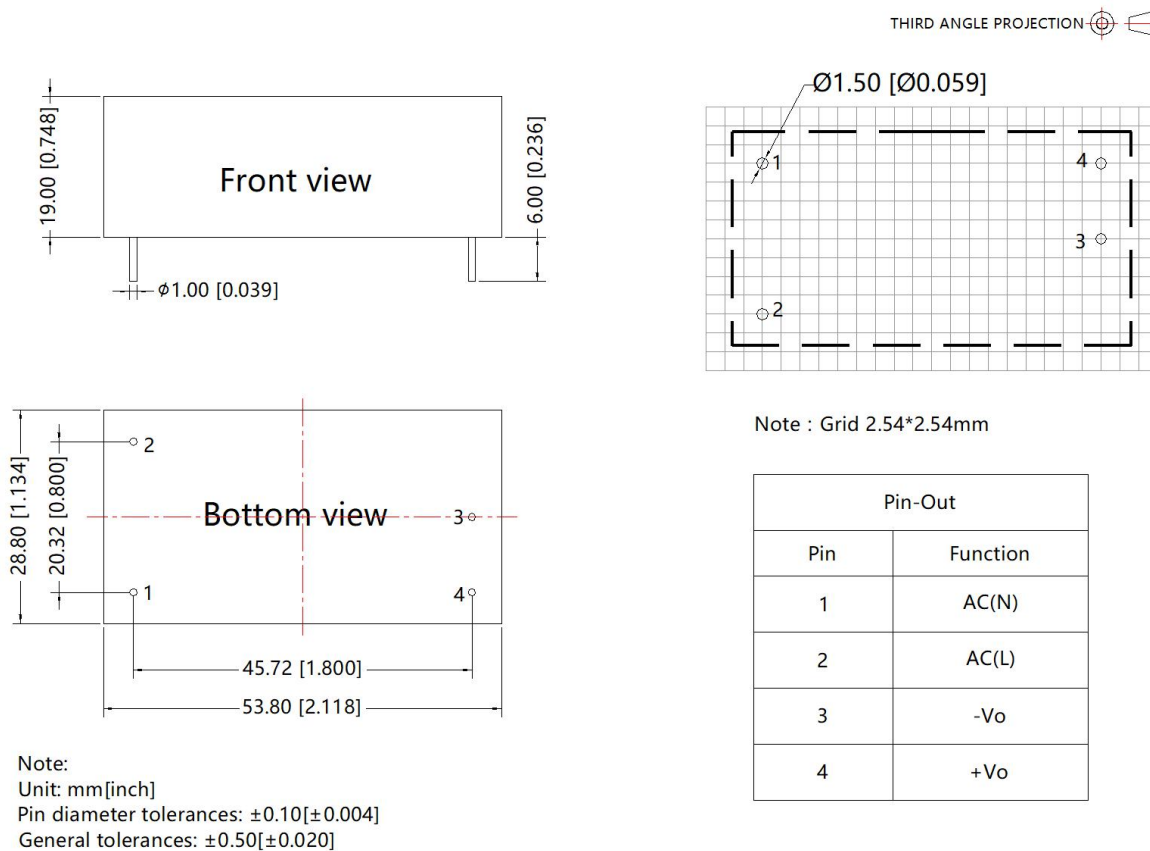
2. EMC compliance recommended circuit



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		S14K300

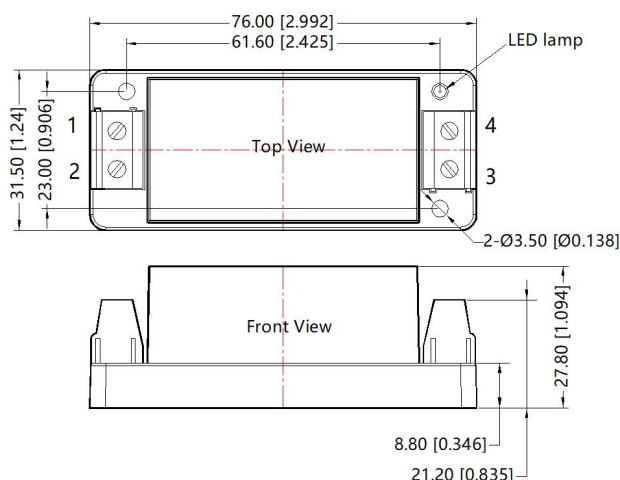
3. For additional information please refer to application notes on www.mornsun-power.com

Dimensions and Recommended Layout



A2S Dimensions

THIRD ANGLE PROJECTION

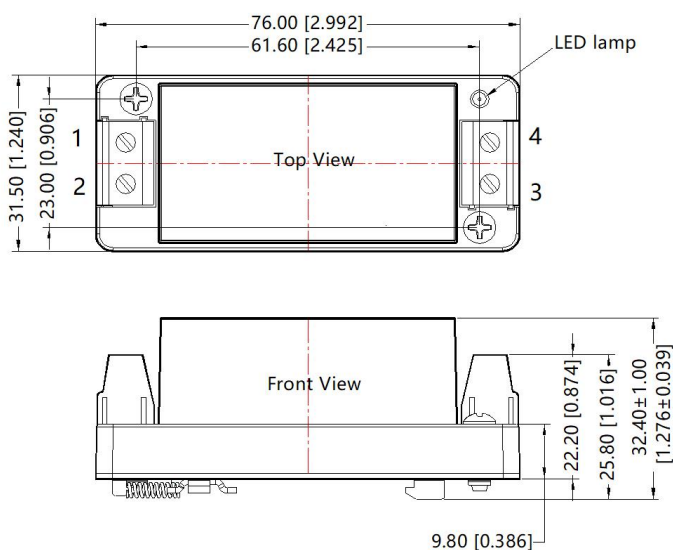


Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

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

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: $\pm 0.50[\pm 0.020]$

Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220005 (DIP package); 58220022 (A2S/A4S package);
- 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;
- All index testing methods in this datasheet are based on our Company's corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- 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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