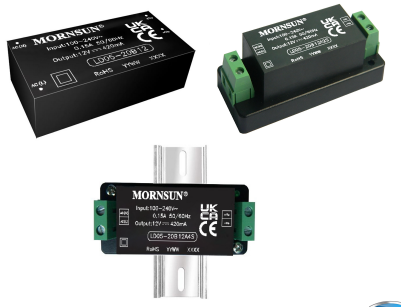
5W, AC/DC converter



Report EN62368-1 CB IEC62368-1 IEC60950-1 UKCA BS EN 62368-1 RoHS

FEATURES

- Universal 85-264VAC or 100-370VDC input voltage
- Accepts AC or DC input (dual-use of same terminal)
- High I/O isolation test voltage up to 4000VAC
- High efficiency, high power density
- Output short circuit, over-current, over-voltage protection
- Mounting: PCB mounting, Chassis mounting, Din-Rail mounting available

LD05-20Bxx 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. It offers good EMC performance, and is UL & CE certified. 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	LD05-20B03	4.2W	3.3V/1250mA	74	4000
IEC/EN	LD05-20B05	5W	5V/1000mA	78	4000
IEC/EN	LD05-20B09		9V/550mA	78	1000
IEC/EN	LD05-20B12		12V/420mA	80	820
IEC/EN	LD05-20B15		15V/333mA	82	820
EN	LD05-20B24	5.5W	24V/230mA	83	330

Note: 1. *Test without external circuit.
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	--	--	150	mA
	230VAC	--	--	70	
Inrush Current	115VAC	--	10	--	A
	230VAC	--	20	--	
Recommended External Input Fuse (Special package series include 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	10% - 100% load		--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	3.3V/5V output	--	60	120	mV
		Other output	--	50	100	
Temperature Coefficient			--	±0.02	--	%/℃
Stand-by Power Consumption			--	--	0.3	W

Short Circuit Protection		Hiccup, continuous, self-recover			
Over-current Protection		≥110%Io, self-recover			
Over-voltage Protection		Over-voltage shutdown			
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	12	--	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 1 min., leakage current < 5mA	4000	--	--	VAC
Operating Temperature			-25	--	+70	℃
Storage Temperature			-25	--	+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			--	--	85	KHz
Power Derating		+55℃ to +70℃	2.0	--	--	%/℃
		+0℃ to -25℃	2.0	--	--	
		85VAC - 110VAC	2.0	--	--	%/VAC
		240VAC - 264VAC	0.83	--	--	
Safety Standard		3V/24V	EN/BS EN62368-1 safety approved			
		5V/12V	IEC/EN/BS EN62368-1 safety approved & design refer to UL62368-1			
		9V/15V	IEC60950-1, EN/BS EN62368-1 safety approved & design refer to UL60950-1			
Safety Class			CLASS I I			
MTBF			MIL-HDBK-217F@25℃ >300,000 h			

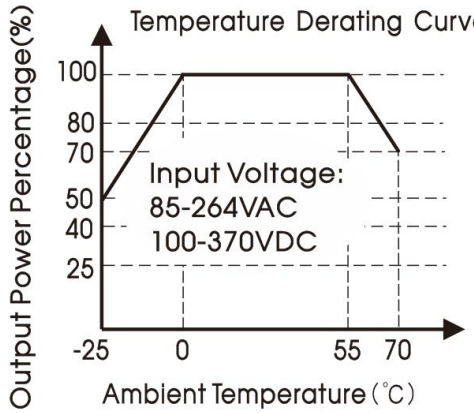
Mechanical Specifications

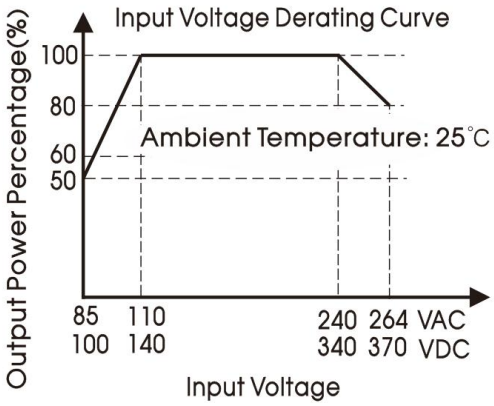
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)	
Dimension	Horizontal package/A2S chassis mounting/A4S Din-Rail mounting	Refer to the Dimensions
Weight	Horizontal package/A2S chassis mounting/A4S Din-Rail mounting	31g/52g/70g (Typ.)
Cooling Method	Free air convection	

Electromagnetic Compatibility (EMC)

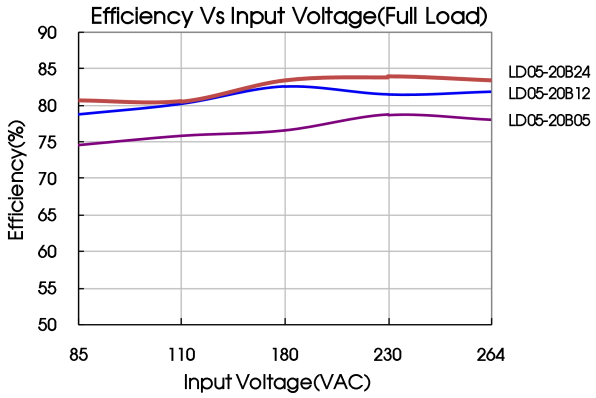
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge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

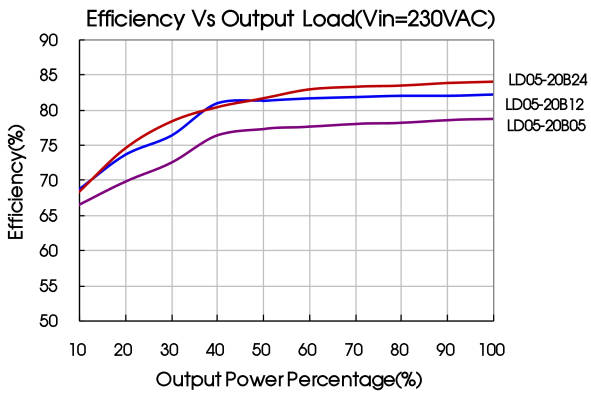
Product Characteristic Curve





Note: ① With an AC input between 85-110VAC/ 240-264VAC and a DC input between 100-140VDC/340-370VDC, 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 FAE.





Design Reference

1. Typical application

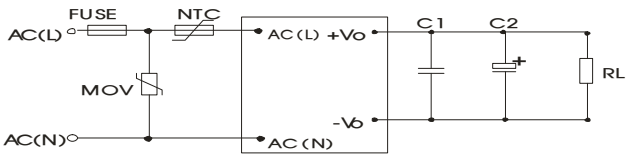


Fig. 1

Part No.	FUSE	MOV	NTC	C1(uF)	C2(uF)
LD05-20B03	1A/250V, slow-blow, required	S14K300	12D-5	1	220
LD05-20B05					220
LD05-20B09					100
LD05-20B12					100
LD05-20B15					100
LD05-20B24					47

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.

2. EMC compliance recommended circuit

MORNSUN P/N: FC-LX1D

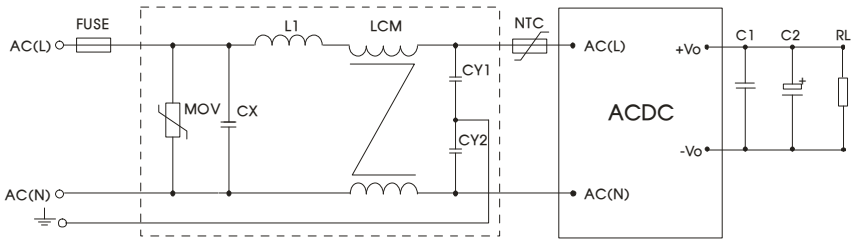


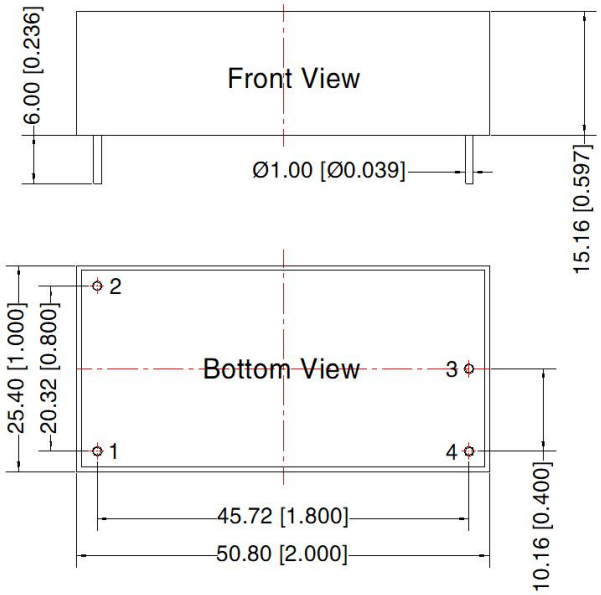
Fig. 2

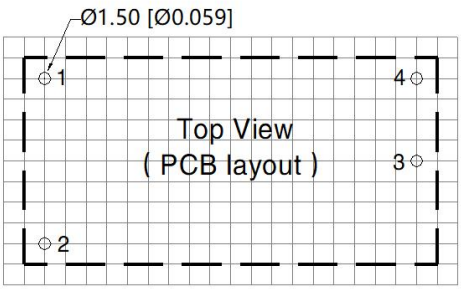
Component	Recommended value
MOV	S14K350
CX	0.1uF/275VAC
L1	4.7uH/2.0A
CY1	1nF/400VAC
CY2	1nF /400VAC
LCM	2.2mH, P/N: FL2D-10-222 (MORNSUN) is recommended
FUSE	2A/250V, slow-blow, required
FC-LX1D	EMC filter

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





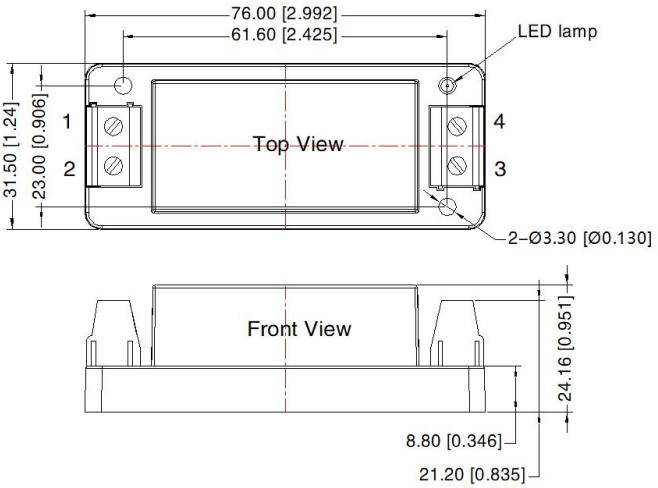
Note: Grid 2.54*2.54mm

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]

LD05-20BxxA2S Chassis mounting Dimensions

THIRD ANGLE PROJECTION

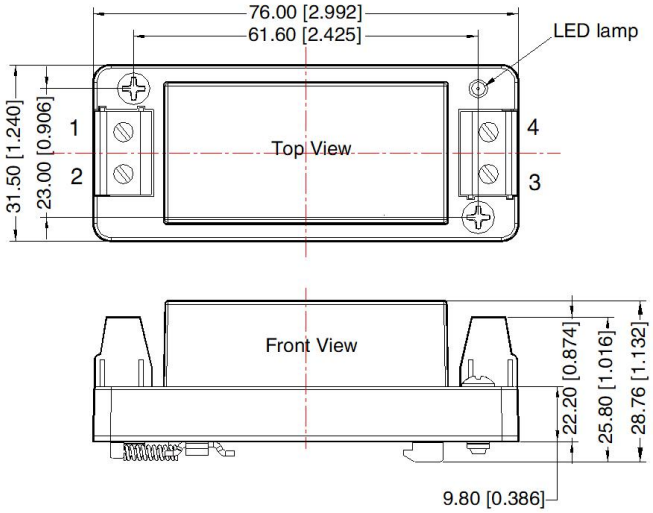


Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

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

LD05-20BxxA4S Din-Rail mounting 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]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220250 (Horizontal 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 Ta=25℃, 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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