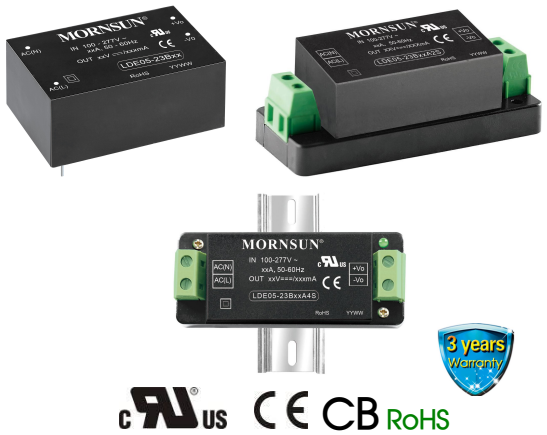
5W, AC/DC converter



FEATURES

- Universal 85 - 305V AC and wide 100 - 430V DC Input
- Operating ambient temperature range: -40℃ to +70℃
- High I/O isolation test voltage up to 4000VAC
- Regulated output, low output ripple & noise
- High efficiency, high power density
- Output short circuit, over-current, over-voltage protection
- Plastic case meets flammability per UL94V-0
- EMI performance meets CISPR32 / EN55032 CLASS B
- IEC/EN/UL62368 safety approval

LDE05-23Bxx 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 LED, street lamp control, industry, office 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 (μF) Max.
UL/CE/CB	LDE05-23B03	4.2W	3.3V/1250mA	70	4000
	LDE05-23B05	5W	5V/1000mA	76	4000
	LDE05-23B09		9V/550mA	74	1000
	LDE05-23B12		12V/420mA	77	820
	LDE05-23B15		15V/333mA	77	820
	LDE05-23B24	5.5W	24V/230mA	80	470

Note: * Part No. with suffix of "A2S" means chassis mounting and suffix of "A4S" means DIN-Rail mounting.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	305	VAC
	DC input	100	--	430	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/300V, 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	Rated load	--	±0.5	--	
Load Regulation	0%-100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	--	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			
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 Test	Input - Output	Electric Strength Test for 1min., leakage current <5mA	4000	--	--	VAC
Operating Temperature			-40	--	+70	℃
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	95	%RH
Soldering Temperature		Wave-soldering	260 ± 5℃; time：5 - 10s			
		Manual-welding	360 ± 10℃; time：3 - 5s			
Switching Frequency			--	100	--	kHz
Power Derating		-40℃ to -25℃	2.67	--	--	%/℃
		+55℃ to +70℃	2.67	--	--	
		85 - 100VAC	1.00	--	--	%/VAC
		277 - 305VAC	0.54	--	--	
Safety Standard			IEC62368/EN62368/UL62368			
Safety Certification			IEC62368/EN62368/UL62368			
Safety Class			CLASS I I			
MTBF			MIL-HDBK-217F@25℃ > 300,000 h			

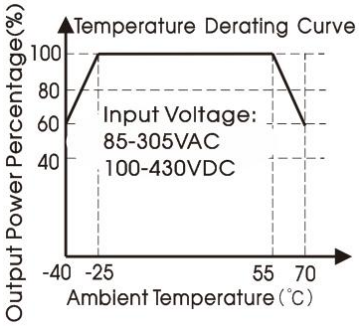
Mechanical Specifications

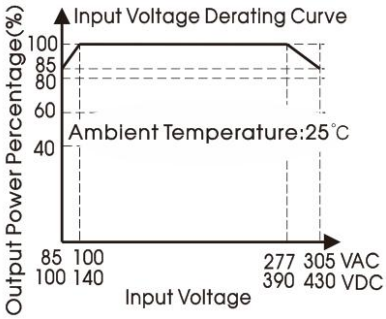
Case Material		Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	DIP	50.80 x 25.40 x 15.36 mm
	A2S chassis mounting	76.00 x 31.50 x 24.16 mm
	A4S Din-Rail mounting	76.00 x 31.50 x 28.76 mm
Weight	DIP	31g (Typ.)
	A2S chassis mounting	52g (Typ.)
	A4S Din-Rail mounting	70g (Typ.)
Cooling Method		Free air convection

Electromagnetic Compatibility (EMC)

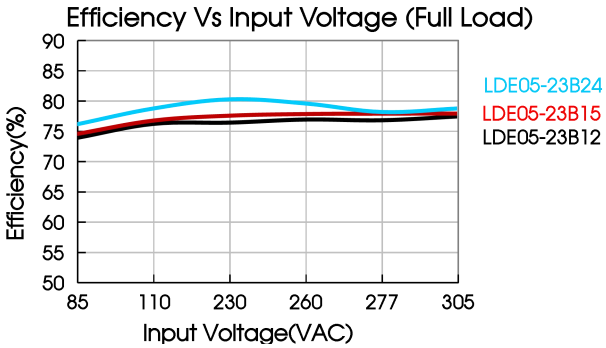
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/ Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN 61000-4-4	±2KV	perf. Criteria B
		IEC/EN 61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 61000-4-5	line to line ±1KV	perf. Criteria B
		IEC/EN 61000-4-5	line to line ±2KV/line to 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 interruption and voltage variations immunity	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

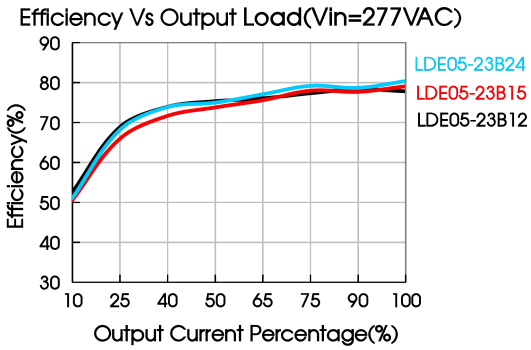
Product Characteristic Curve





Note: ① With an AC input between 85-100VAC/277-305VAC and a DC input between 100-140VDC/390-430VDC, 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

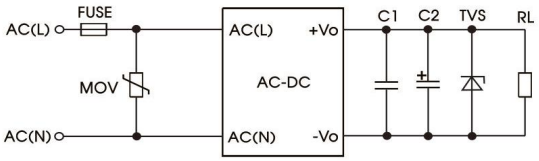


Fig. 1: Typical circuit diagram

Part No.	C1(μF)	C2(μF)	FUSE	MOV	TVS
LDE05-23B03	1	220	1A/300V, slow-blow, required	S14K350	SMBJ7A
LDE05-23B05		220			SMBJ7A
LDE05-23B09		100			SMBJ12A
LDE05-23B12		100			SMBJ20A
LDE05-23B15		100			SMBJ20A
LDE05-23B24		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

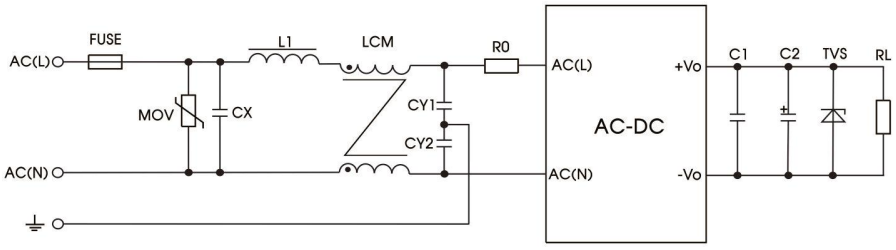
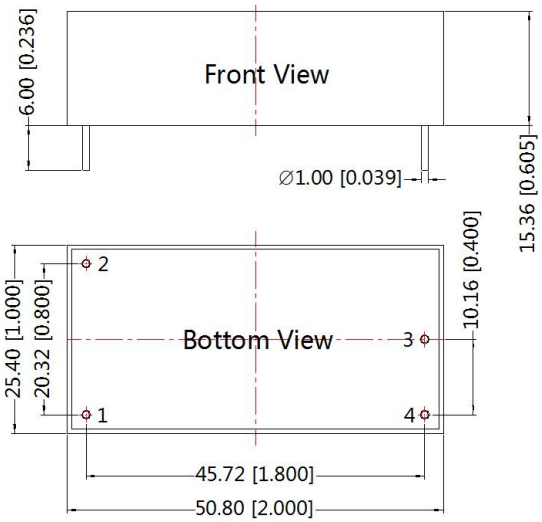


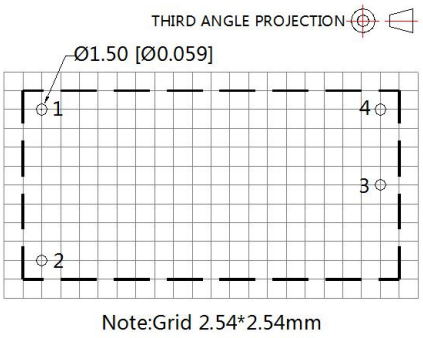
Fig 2: EMC circuit for harsh requirements

Component	Recommended value
MOV	S14K350
CX	0.1μF/310VAC
L1	4.7uH/2.0A
CY1	1nF/400VAC
CY2	1nF /400VAC
LCM	2.2mH, we recommend using part no. FL2D-10-222 (MORNSUN)
FUSE	2A/300V, slow-blow, required
R0	33Ω /3W

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

Dimensions and Recommended Layout



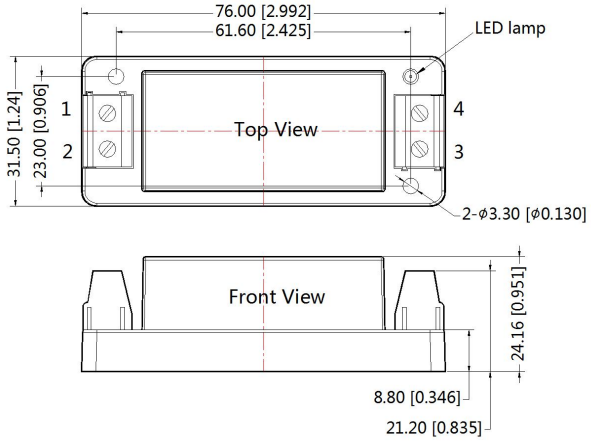


Note:Grid 2.54*2.54mm

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

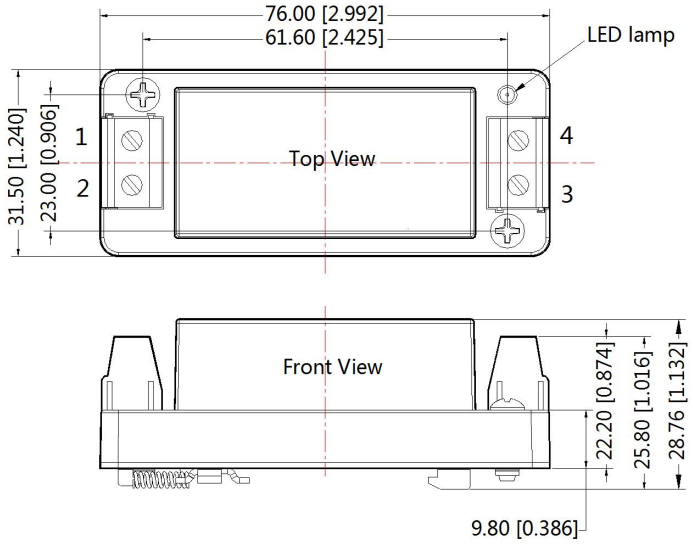


Pin-Out	
Pin	Function
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

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]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220003 (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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