AC/DC Converter

LHE10-23Bxx Series

MORNSUN®

10W, AC/DC converter

CE Report EN62368-1 UKCA BS EN 62368-1 RoHS 3 year Warranty

FEATURES

- Wide 85-305V Universal AC or 100-430VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation test voltage up to 4000VAC
- Regulated output, low ripple & noise
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32 / EN55032 CLASS B

LHE10-23Bxx series AC-DC converters are highly efficient, environmental-friendly 10W power modules. 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 with an input to output isolation test voltage of 4000VAC. The converters meet IEC/EN61000-4, CISPR32/EN55032, UL/IEC/EN62368 standards, and are widely used in industrial, electricity, instrumentation, telecommunications 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.
EN	LHE10-23B03	6.6W	3.3VDC/2000mA	70	26000
	LHE10-23B05	10W	5VDC/2000mA	76	9400
	LHE10-23B09		9VDC/1100mA	78	3600
	LHE10-23B12		12VDC/900mA	80	2400
	LHE10-23B15		15VDC/700mA	81	1200
	LHE10-23B24		24VDC/450mA	82	370

Note: 1. * Use suffix "A2" for chassis mounting and suffix "A4" for DIN-Rail mounting.
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	--	305	VAC
	DC input	100	--	430	VDC
Input Frequency		47	--	63	Hz
Input Current	115VAC	--	--	0.26	A
	230VAC	--	--	0.16	
Inrush Current	115VAC	--	13	--	
	230VAC	--	23	--	
Leakage Current	305VAC/50Hz	0.25mA RMS Max.			
Recommended External Input Fuse		2A/300V, slow-blow, required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	All load range	3.3V Output	--	±3	--	%
		The others	--	±2	--	
Line Regulation	Rated load		--	±0.5	--	%
Load Regulation	0% - 100% load		--	±1	--	

Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	50	100	mV
Temperature Coefficient		--	±0.02	--	%/℃
Stand-by Power Consumption	24V Output	--	--	0.5	W
	Others	--	--	0.45	
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		110%-300%Io, self-recovery			
Over-voltage Protection	3.3V/5V Output	--	--	7.5	V
	9V Output	--	--	15	
	12V/15V Output	--	--	20	
	24V Output	--	--	30	
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	8	--	ms
	230VAC input	--	65	--	

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
	Input - PE			2500	--	--	
Operating Temperature				-40	--	+85	℃
Storage Temperature				-40	--	+105	
Storage Humidity				--	--	95	%RH
Soldering Temperature		Wave-soldering, Max. 10 seconds		255	260	265	℃
		Manual-welding, Max. 5 seconds		350	360	370	
Power Derating		-40℃ to -25℃	3.3V/5V/9V/24V Output	2.67	--	--	%/℃
			12/15V Output	3.33	--	--	
		+55℃ to +70℃		4.00	--	--	
		+70℃ to +85℃		2.00	--	--	
		85VAC-100VAC		1.67	--	--	%/VAC
		277VAC-305VAC		0.71	--	--	
Safety Standard				EN/BS EN62368-1(report) safety approved; Design refer to IEC/UL62368-1			
Safety Class				CLASS II			
MTBF				MIL-HDBK-217F@25℃ > 300,000 h			

Mechanical Specifications

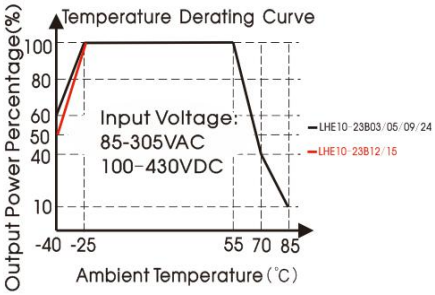
Case Material	Black flame-retardant and heat-resistant plastic (UL94V-0)	
Dimensions	Horizontal package	55.00 x 45.00 x 21.00 mm
	A2 chassis mounting	96.10 x 54.00 x 29.50 mm
	A4 Din-Rail mounting	96.10 x 54.00 x 34.10 mm
Weight	Horizontal package	75g (Typ.)
	A2 chassis mounting	125g (Typ.)
	A4 Din-Rail mounting	165g (Typ.)
Cooling Method	Free air convection	

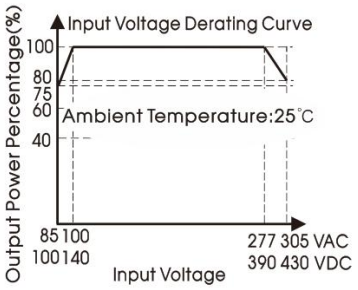
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B

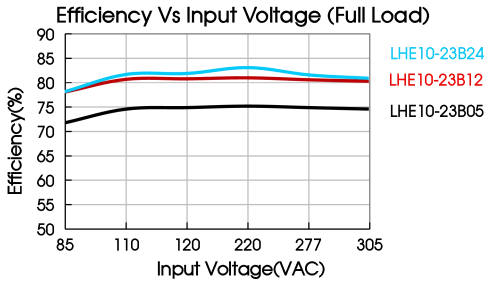
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV/ line to PE ±2KV	perf. Criteria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

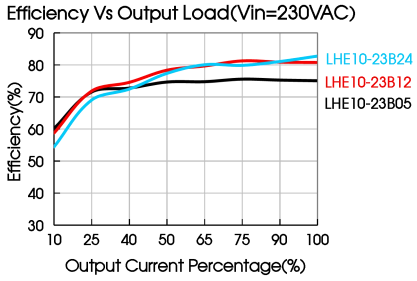
Product Characteristic Curve





Note: ① With an AC input between 85 - 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 Mornsun FAE.





Design Reference

1. Typical application

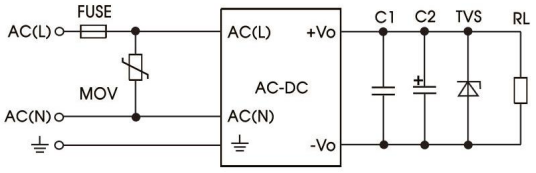


Fig.1: Typical circuit diagram

Part No.	C1 (uF)	C2 (uF)	FUSE	MOV	TVS
LHE10-23B03	1	470	2A/300V, slow-blow, required	S14K350	SMBJ7.0A
LHE10-23B05		330			SMBJ7.0A
LHE10-23B09		120			SMBJ12A
LHE10-23B12		120			SMBJ20A
LHE10-23B15		120			SMBJ20A
LHE10-23B24		68			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

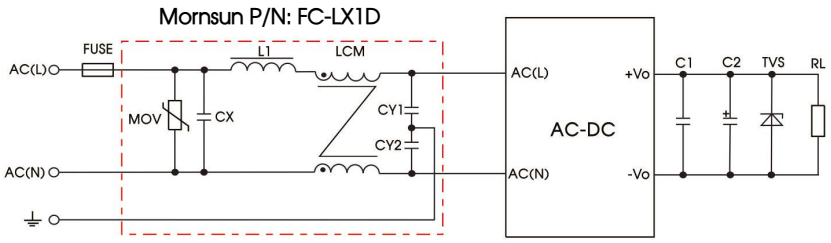


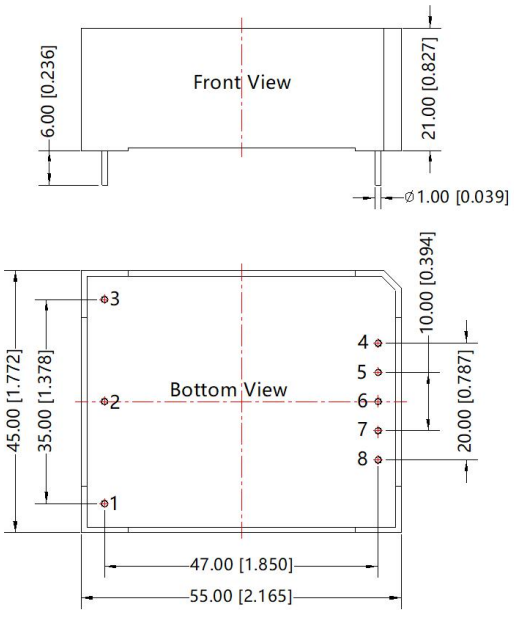
Fig. 2: (Output external circuit refer to the typical application circuit)

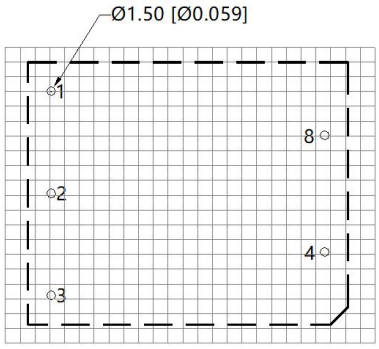
Component	Recommended value
MOV	S14K350
CY1, CY2	1000pF/400VAC
CX	0.1uF/310VAC
LCM	10mH, P/N: FL2D-Z5-103 (MORNSUN) is recommended
FC-LX1D	EMC Filter
FUSE	2A/300V, slow-blow, required
L1	4.7uH/2A

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





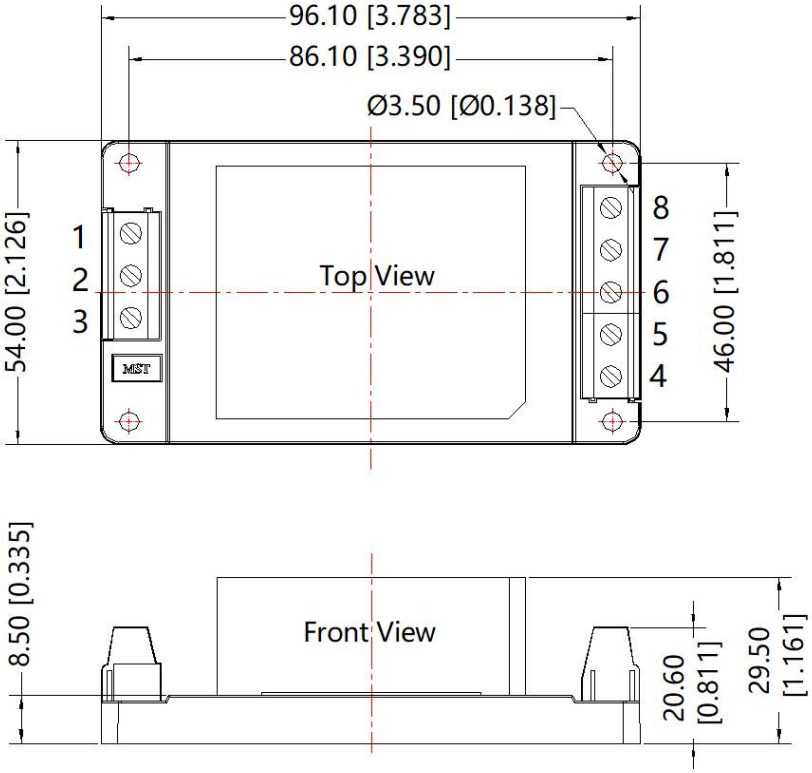
Note: grid 2.54*2.54mm

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

Pin-Out	
PIN	LHE10-23B
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	No Pin
6	No Pin
7	No Pin
8	-Vo

A2 Chassis Package Dimensions

THIRD ANGLE PROJECTION

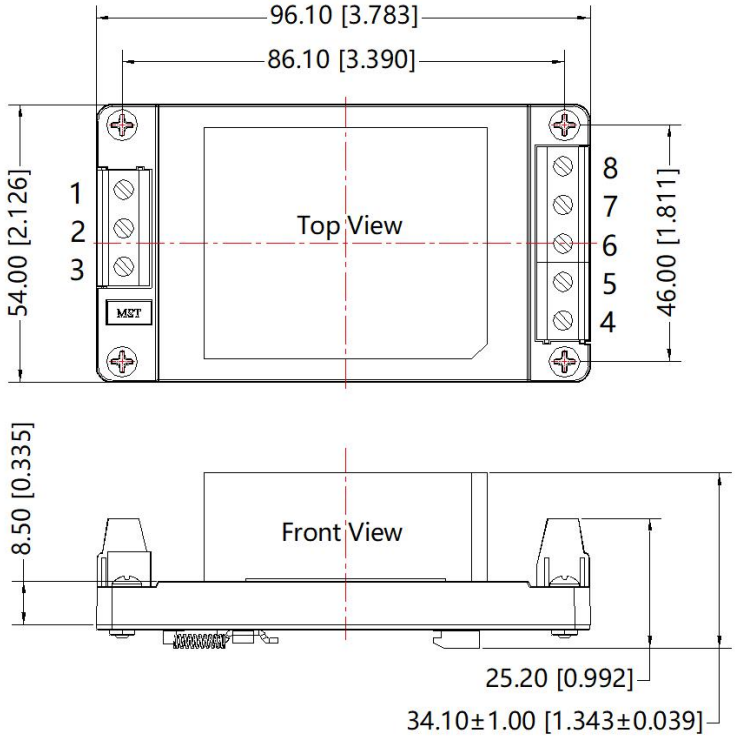


Pin-Out	
Pin	LHE10-23B
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	NC
7	NC
8	-Vo

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

A4 DIN-rail Package Dimensions

THIRD ANGLE PROJECTION



Pin-Out	
Pin	LHE10-23B
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	NC
7	NC
8	-Vo

Note:
Unit: mm[inch]
Mounting rail: TS35, rail needs to connect safety ground
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220006 (Horizontal package); 58220010 (A2/A4 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.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No.8 Nanyun 4th Road, Huangpu District, Guangzhou, China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com