

10W, AC-DC converter



FEATURES

- Universal 85-264VAC or 100-370VDC input voltage
- Regulated output, low ripple & noise
- Output short circuit, over-current, over-voltage protection
- Plastic case meets UL94V-0 flammability
- UL60950, EN60950 safety approval
- 3 years product warranty
- Mounting: PCB mounting, chassis mounting, DIN-Rail mounting available



LH10 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 reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets UL/EN60950 standards. The converters are widely used in industrial, 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		Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.	
			(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
UL/CE	LH10-10B03	6.6 W	3.3V/2000mA	--	70	26400	--
	LH10-10B05		5V/2000mA	--	76	9440	--
	LH10-10B09		9V/1100mA	--	78	3600	--
	LH10-10B12		12V/900mA	--	80	2400	--
	LH10-10B15		15V/700mA	--	81	1170	--
	LH10-10B24		24V/450mA	--	82	370	--
	LH10-10A05**	10W	+5V/1000mA	-5V/1000mA	76	8800	8800
	LH10-10A12**		+12V/450mA	-12V/450mA	80	1970	1970
	LH10-10A15**		+15V/350mA	-15V/350mA	81	1970	1970
	LH10-10A24**		+24V/200mA	-24V/200mA	84	660	660
--	LH10-10C0512-02		5V/1000mA	±12V/200mA	75	3200	260
	LH10-10C0515-02		5V/900mA	±15V/200mA	75	2160	80
UL/CE	LH10-10D0505-02		5V/1800mA	5V/200mA	75	8000	540
	LH10-10D0512-02		5V/1500mA	12V/200mA	79	4400	260
	LH10-10D0515-02		5V/1400mA	15V/200mA	79	4400	170
	LH10-10D0524-02		5V/1000mA	24V/200mA	81	4000	170

Note: * Use suffix "A2" for chassis mounting and suffix "A4" for DIN-Rail mounting.

** Only LH10-10Axx series use both outputs(positive and negative) as sampling feedback, the others use Vo1 and defined as first output.

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	--	--	0.26	A
	230VAC	--	--	0.16	
Inrush Current	115VAC	--	10	--	
	230VAC	--	20	--	

Leakage Current		0.3mA RMS typ./230VAC/50Hz
Recommended External Input Fuse(Special package series include fuse)		2A/250V, slow-blow
Hot Plug		Unavailable

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	Vo1		--	±2	--		
	Vo1 (3.3V Output voltage)		--	±3	--		
Line Regulation	Full load	Vo1	--	±0.5	--		
		Vo2	--	±1.5	--		
Load Regulation	10%-100% load	Single output		--	±1	--	%
		Dual output (balanced load)		--	±2	--	
		Isolated triple output (balanced load)	Vo1	--	±3	--	
			±Vo2	--	±5	--	
		Isolated and separated twin output (balanced load)	Vo1	--	±3	--	
Vo2	--		±5	--			
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		--	50	100	mV	
Temperature Coefficient	Vo1		--	±0.02	--	%/°C	
Short Circuit Protection			Continuous, self-recovery				
Over-current Protection			≥110%Io, self-recovery				
Over-voltage Protection	Vo1	3.3 / 5VDC output		≤7.5VDC			
		9VDC output		≤13VDC			
		12 / 15VDC output		≤20VDC			
		24VDC output		≤30VDC			
Minimum Load	Single output models		0	--	--	%	
	Dual output models (balanced load)		10	--	--		
	Isolated and separated twin output (balanced load)		10	--	--		
	Isolated triple output (balanced load)		10	--	--		
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	Test time: 1min	3000	--	--	VAC
Operating Temperature	LH10-10A24		-25	--	+70	°C
	Others		-40	--	+70	
Storage Temperature	LH10-10A24		-25	--	+105	
	Others		-40	--	+105	
Storage Humidity			--	--	95	%RH
Soldering Temperature	Wave-soldering		260±5°C; time: 5-10s			
	Manual-welding		360±10°C; time: 3-5s			
Switching Frequency	LH10-10A/LH10-10C/LH10-10D series		--	65	--	kHz
	LH10-10B series		--	100	--	
Power Derating	-40°C to -10°C		2.0	--	--	%/°C
	+55°C to +70°C		4.0	--	--	
	85VAC - 100VAC		1.67	--	--	%/VAC
	240VAC - 264VAC		0.83	--	--	
Safety Standard			IEC60950/EN60950/UL60950			
Safety Certification			EN60950/UL60950			

Safety Class	CLASS I
MTBF	MIL-HDBK-217F@25°C > 300,000 h

Mechanical Specifications

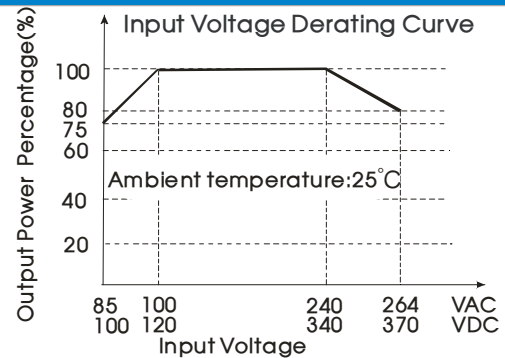
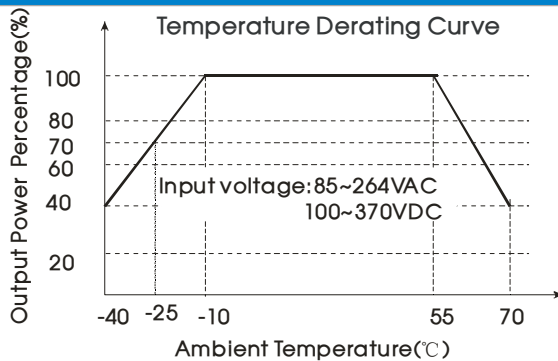
Case Material	Black flame-retardant and heat-resistant plastic (UL94V-0)	
Dimension	Horizontal package	55.00 x 45.00 x 21.00 mm
	A2 chassis mounting	96.10 x 54.00 x 29.50 mm
	A4 Din-Rail mounting	96.10 x 54.00 x 34.10 mm
Weight	Horizontal package/A2 chassis mounting/A4 Din-Rail mounting	80g/130g/170g(Typ.)
Cooling method*	Free air convection	

Note: *This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.

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. 5 for recommended circuit) perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV/line to ground ±2KV perf. Criteria B
		IEC/EN61000-4-5	line to line ±2KV/line to ground ±4KV (See Fig. 5 for recommended circuit) perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.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	

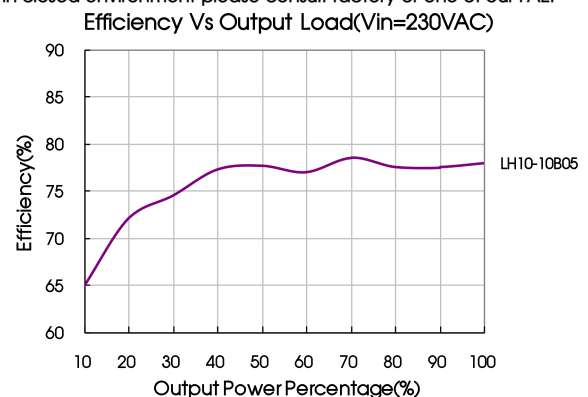
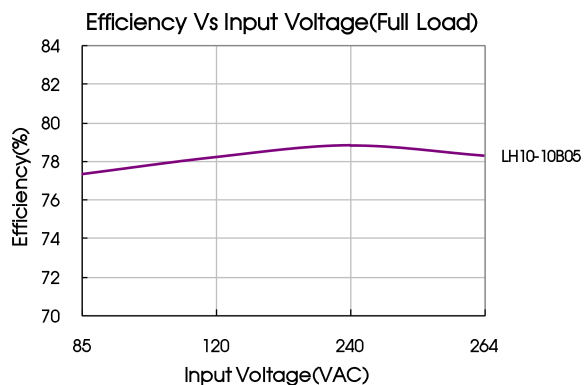
Product Characteristic Curve



Note: ① With an AC input between 85-100VAC/ 240-264VAC and a DC input between 100-120VDC/340-370VDC, the output power must be derated as per temperature derating curves;

② LH10-10A24 lowest temperature is -25°C;

③ 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

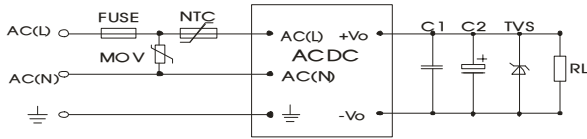


Fig. 1: LH10-10Bxx (Single Output) series typical circuit diagram

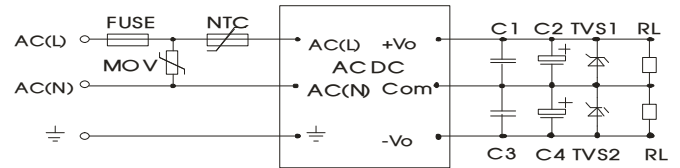


Fig. 2: LH10-10Axx (Dual Output) series typical circuit diagram

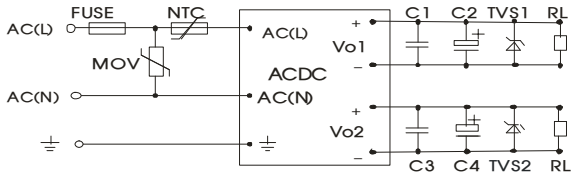


Fig. 3: LH10-10Dxx (Isolated Dual Output) series typical circuit diagram

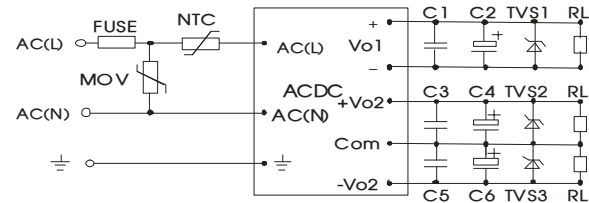


Fig. 4: LH10-10Cxx (Triple Output) series typical circuit diagram

Part No.	FUSE	MOV	NTC	C2(μF)	C4(μF)	C6(μF)	TVS1	TVS2	TVS3
LH10-10B03	1A/250V slow-blow	S14K300	5D-9	470	--	--	SMBJ7.0A	--	--
LH10-10B05				330	--	--	SMBJ7.0A	--	--
LH10-10B09				120	--	--	SMBJ12A	--	--
LH10-10B12				120	--	--	SMBJ20A	--	--
LH10-10B15				120	--	--	SMBJ20A	--	--
LH10-10B24				68	--	--	SMBJ30A	--	--
LH10-10A05				220	220	--	SMBJ7.0A	SMBJ7.0A	--
LH10-10A12				120	120	--	SMBJ20A	SMBJ20A	--
LH10-10A15				47	47	--	SMBJ20A	SMBJ20A	--
LH10-10A24				33	33	--	SMBJ30A	SMBJ30A	--
LH10-10C0512-02				220	68	68	SMBJ7.0A	SMBJ20A	SMBJ20A
LH10-10C0515-02				220	47	47	SMBJ7.0A	SMBJ20A	SMBJ20A
LH10-10D0505-02				220	68	--	SMBJ7.0A	SMBJ7.0A	--
LH10-10D0512-02				220	68	--	SMBJ7.0A	SMBJ20A	--
LH10-10D0515-02				220	47	--	SMBJ7.0A	SMBJ20A	--
LH10-10D0524-02	220	47	--	SMBJ7.0A	SMBJ30A	--			

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2, C4, C6 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1, C3, C5 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

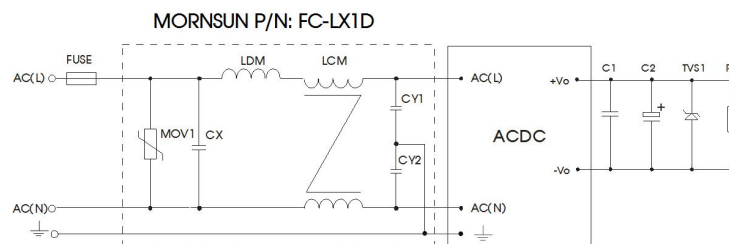
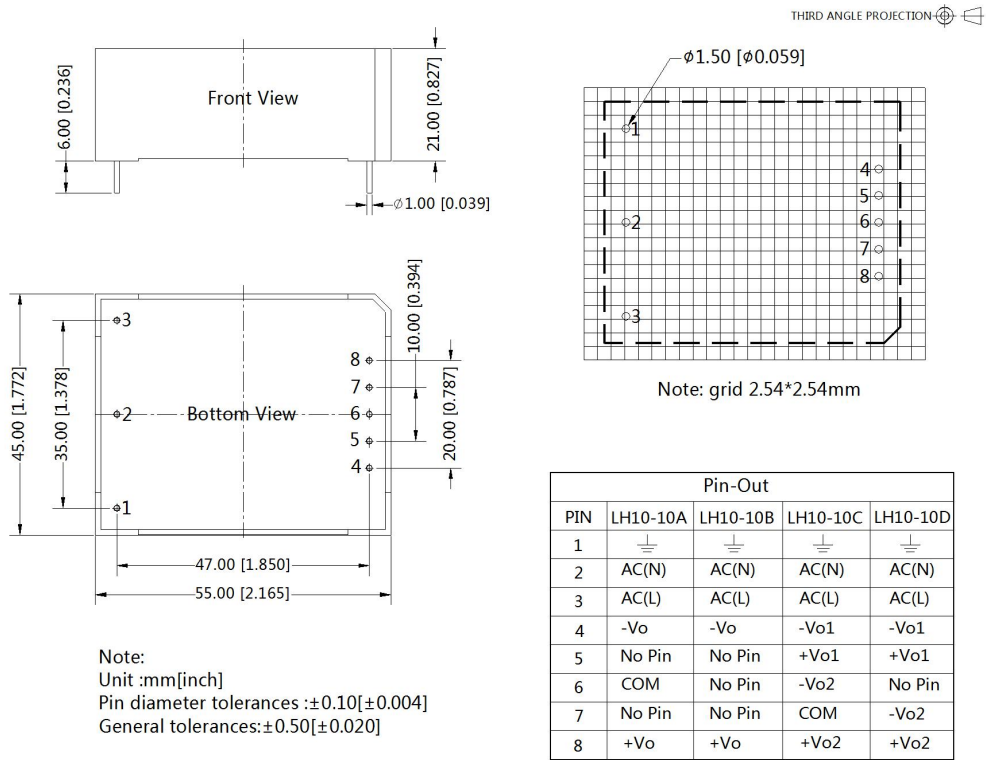


Fig. 5: EMC application circuit with higher requirements

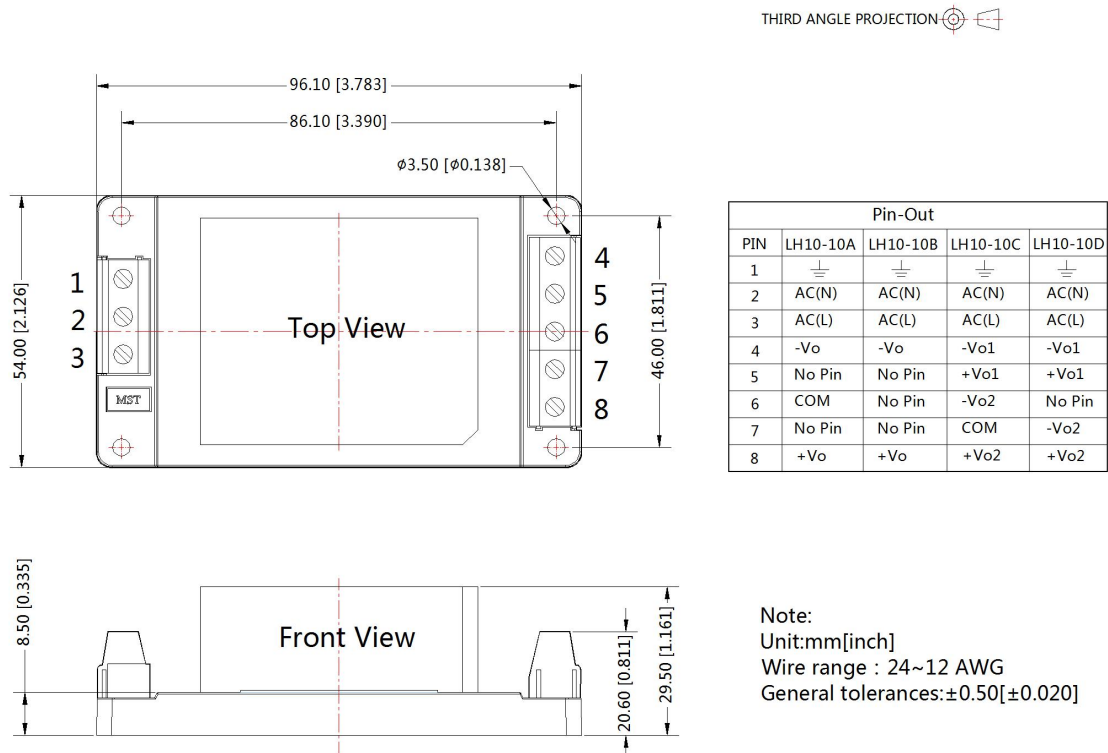
Component	Recommended value	Component	Recommended value
MOV1	S14K300	FC-LX1D	2KV/4KV EMC filter
CY1/CY2	1000pF/400VAC	LDM	4.7μH/2A
CX	0.1μF/275VAC	FUSE	2A/250V, slow-blow, required
LCM	10mH, we recommended using part no. FL2D-Z5-103 (MORNSUN)		

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

Dimensions and Recommended Layout

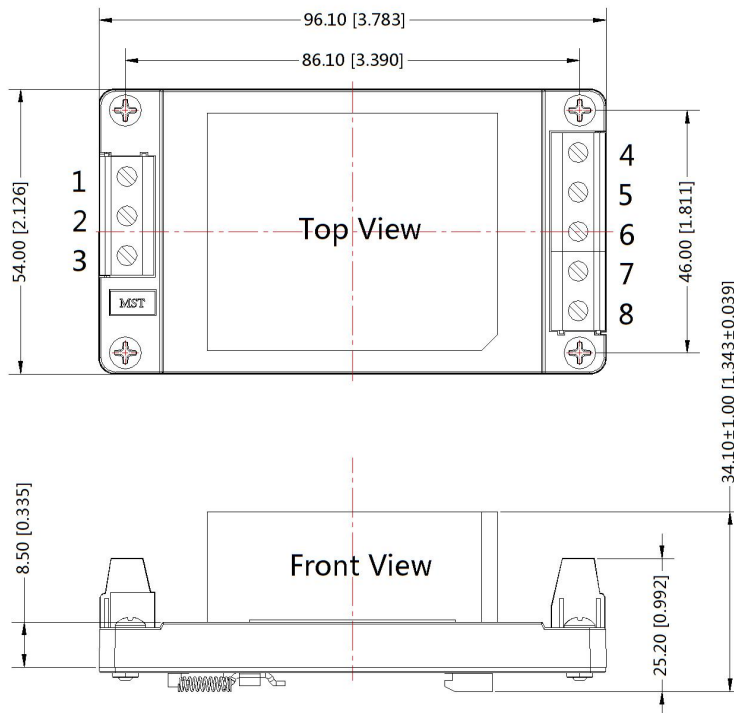


LHXXA2 Dimensions



LHXXA4 Dimensions

THIRD ANGLE PROJECTION 



Pin-Out				
PIN	LH10-10A	LH10-10B	LH10-10C	LH10-10D
1	⏏	⏏	⏏	⏏
2	AC(N)	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1	-Vo1
5	No Pin	No Pin	+Vo1	+Vo1
6	COM	No Pin	-Vo2	No Pin
7	No Pin	No Pin	COM	-Vo2
8	+Vo	+Vo	+Vo2	+Vo2

Note:
Unit:mm[inch]
Installed on DIN rail TS35
Wire range : 24~12 AWG
General tolerances:±0.50[±0.020]

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