

5W, AC-DC converter



### FEATURES

- Universal input range:85~264VAC, 100~370VDC
- Regulated output, low ripple and noise
- Over-current, short circuit and over-voltage protection
- Plastic case, meets UL94V-0
- Meet UL60950,EN60950 standards
- 3 years product warranty
- PCB mounting, Chassis mounting, DIN-Rail mounting

**UL** **us** **CE** E235235 **RoHS**

*LH05 series* —a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, which meet IEC/EN61000-4, CISPR22/EN55022, UL60950 and EN60950 standards, and it's widely used in industrial, office and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

### Selection Guide

Certification	Part No.*	Output Power	Nominal Output Voltage and Current		Efficiency (230VAC, %/Typ.)	Max. Capacitive Load(μF)	
			(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
UL/CE	LH05-10B03	4W	3.3V/1250mA	--	70	8100	--
	LH05-10B05		5V/1000mA	--	75	6800	--
	LH05-10B09		9V/550mA	--	77	1200	--
	LH05-10B12		12V/420mA	--	79	1000	--
	LH05-10B15		15V/330mA	--	80	680	--
	LH05-10B24		24V/230mA	--	82	270	--
--	LH05-10A05	5W	+5V/500mA	-5V/500mA	75	1480	1480
	LH05-10A12		+12V/210mA	-12V/210mA	79	130	130
	LH05-10A15		+15V/160mA	-15V/160mA	79	110	110
	LH05-10A24		+24V/100mA	-24V/100mA	80	16	16
	LH05-10C0505-01	5W	5V/800mA	±5V/100mA	70	2400	370
	LH05-10C0512-01		5V/600mA	±12V/100mA	73	1600	170
	LH05-10C0515-01		5V/600mA	±15V/80mA	74	1760	80
	LH05-10C0524-01		5V/600mA	±24V/50mA	75	1170	50
	LH05-10D0505-01		5V/900mA	5V/100mA	71	3360	370
	LH05-10D0512-01		5V/750mA	12V/100mA	73	2400	170
	LH05-10D0515-01		5V/700mA	15V/100mA	73	2160	170
	LH05-10D0524-01		5V/600mA	24V/100mA	75	3000	100

Note: \*About LH05-10AXX, we use Vo2 as sampling feedback; and all others use Vo1 as sampling feedback.

### 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	--	--	0.125	A
	230VAC	--	--	0.08	
Inrush current	115VAC	--	10	--	
	230VAC	--	20	--	
Leakage current	0.3mA RMS typ./230VAC/50Hz				
Recommended External Input Fuse(Special package series include fuse)	1A/250V, slow fusing				
Hot Plug	Unavailable				

## Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Main circuit		--	±2	--	%
Line Regulation	Full load	Main circuit	--	±0.5	--	
		Auxiliary circuit	--	±1.5	--	
Load Regulation	10%-100% load	Single output	--	±1	--	
		Dual output(balanced load)		--	±2	--
		Isolated triple output (balanced load)	Main circuit	--	±3	--
			Auxiliary circuit	--	±5	--
		Isolated and separated twin output (balanced load)	Main circuit	--	±3	--
			Auxiliary circuit	--	±5	--
Ripple & Noise*	20MHz bandwidth (peak-peak value)		--	50	150	mV
Temperature Coefficient	Main circuit		--	±0.02	--	%/°C
Short Circuit Protection	Continuous, self-recovery					
Over-current Protection	≥110%Io self-recovery					
Over-voltage Protection	Main circuit	3.3 / 5VDC Output	≤7.5VDC			
		9VDC Output	≤13VDC			
		12 / 15VDC Output	≤20VDC			
		24VDC Output	≤30VDC			
Min. 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: \* Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.

## General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	Test time: 1min	3000	--	--	VAC
Operating Temperature			-25	--	+70	°C
Storage Temperature			-25	--	+105	
Storage Humidity			--	--	95	%RH
Welding Temperature	Wave-soldering		260±5°C; time:5~10s			
	Manual-welding		360±10°C; time:3~5s			
Switching Frequency	LH05-10A24		--	65	--	kHz
	Others		--	--	140	
Power Derating	-25°C~-10°C		2.0	--	--	%/°C
	55°C~+70°C		4.0	--	--	
Safety Standard	IEC60950/EN60950/UL60950					
Safety Certification	EN60950/UL60950					

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

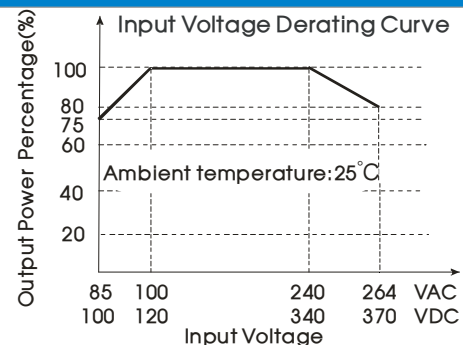
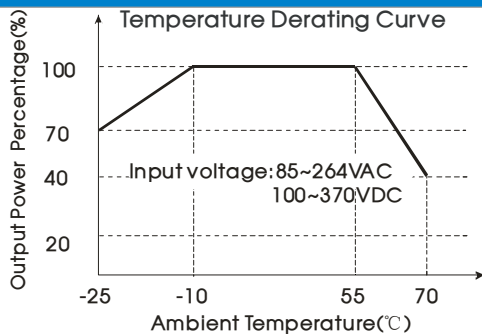
### Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94-V0)	
Dimension	Horizontal package	48.50*36.00*20.50 mm
	A2 chassis mounting	96.10*54.00*29.00 mm
	A3 chassis mounting	99.00*54.00*29.00 mm
	A4 Din-Rail mounting	96.10*54.00*33.60 mm
Weight	Horizontal package/A2 chassis mounting /A3 chassis mounting/A4 Din-Rail mounting	55g/100g/100g/140g(Typ.)
Cooling method	Free air convection	

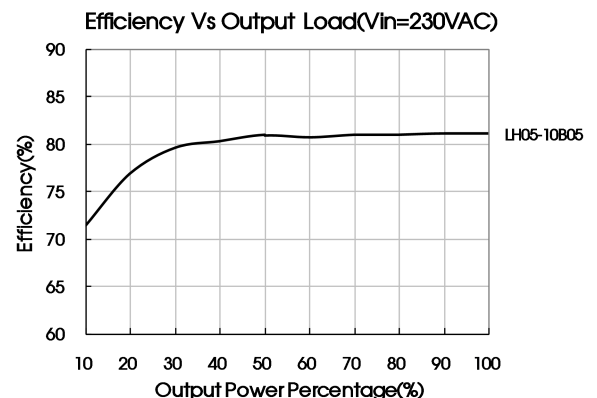
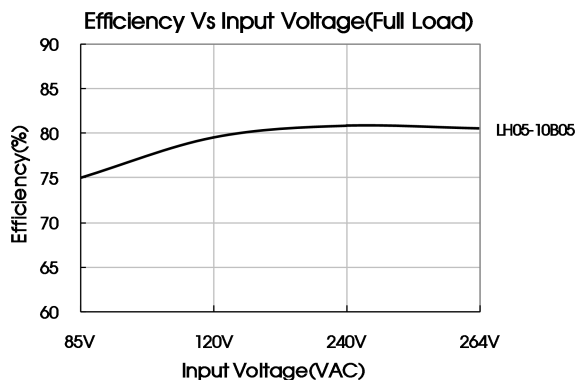
### EMC Specifications

EMI	CE	CISPR22/EN55022, CLASS B		
	RE	CISPR22/EN55022, CLASS B		
EMS	ESD	IEC/EN61000-4-2	±6KV/±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	±1KV/±2KV	perf. Criteria B
IEC/EN61000-4-5		±2KV/4KV (See Fig. 5 for recommended circuit)	perf. Criteria B	
EMS	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
	PFM	IEC/EN61000-4-8	10A/m	perf. Criteria A
	Immunities of voltage dip, drop and short interruption	IEC/EN61000-4-11	0%-70%	perf. Criteria B

### Product Characteristic Curve



Note: ①When input 85~100VAC/240~264VAC/100~120VDC/340~370VDC, it need to be voltage derated on basis of temperature derating;  
②This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.



### Design Reference

#### 1. Typical application circuit

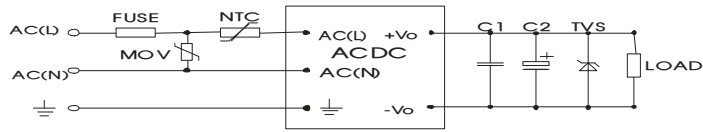


Fig. 1: Typical application circuit

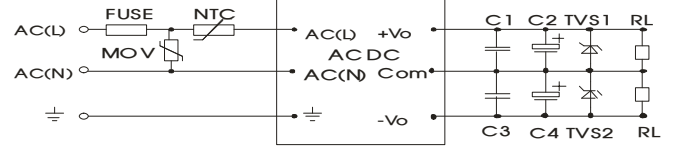


Fig. 2: LH05-10Axx (Dual Output) series typical application circuit

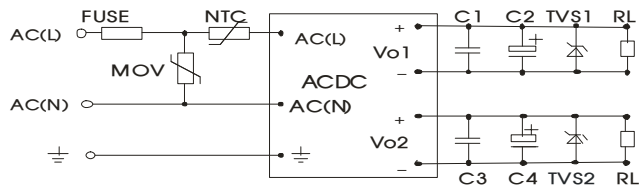


Fig. 3: LH05-10Dxx (Isolate Twin Output) series typical application circuit

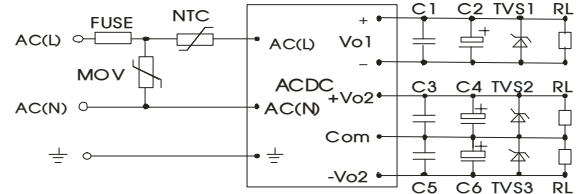


Fig. 4: LH05-10Cxx (Triple Output) series typical application circuit

Model	C2( $\mu$ F)	C4( $\mu$ F)	C6( $\mu$ F)	TVS1	TVS2	TVS3
LH05-10B03	330			SMBJ7.0A		
LH05-10B05	330			SMBJ7.0A		
LH05-10B09	120			SMBJ12A		
LH05-10B12	120			SMBJ20A		
LH05-10B15	68			SMBJ20A		
LH05-10B24	68			SMBJ30A		
LH05-10A05	120	120		SMBJ7.0A	SMBJ7.0A	
LH05-10A12	68	68		SMBJ20A	SMBJ20A	
LH05-10A15	47	47		SMBJ20A	SMBJ20A	
LH05-10A24	10	10		SMBJ30A	SMBJ30A	
LH05-10C0505-01	220	22	22	SMBJ7.0A	SMBJ7.0A	SMBJ7.0A
LH05-10C0512-01	120	22	22	SMBJ7.0A	SMBJ20A	SMBJ20A
LH05-10C0515-01	120	22	22	SMBJ7.0A	SMBJ20A	SMBJ20A
LH05-10C0524-01	120	22	22	SMBJ7.0A	SMBJ30A	SMBJ30A
LH05-10D0505-01	220	22		SMBJ7.0A	SMBJ7.0A	
LH05-10D0512-01	220	22		SMBJ7.0A	SMBJ20A	
LH05-10D0515-01	120	22		SMBJ7.0A	SMBJ20A	
LH05-10D0524-01	120	22		SMBJ7.0A	SMBJ30A	

Note:  
 Note: Output filtering capacitors C2, C4, C6 are electrolytic capacitors, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacturer's datasheet. Capacitor withstand voltage derating should be 80% or above. C1, C3, C5 are ceramic capacitors, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails. External input NTC is recommended to use 5D-9. External input FUSE model is recommended to use 1A/250V slow fusing. External input MOV model is recommended to use S14K300.

#### 2. EMC solution-recommended circuit

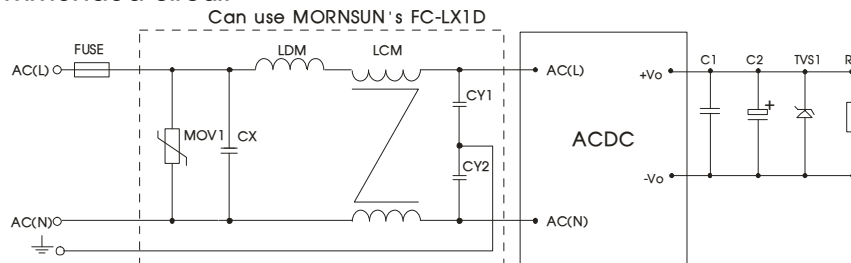
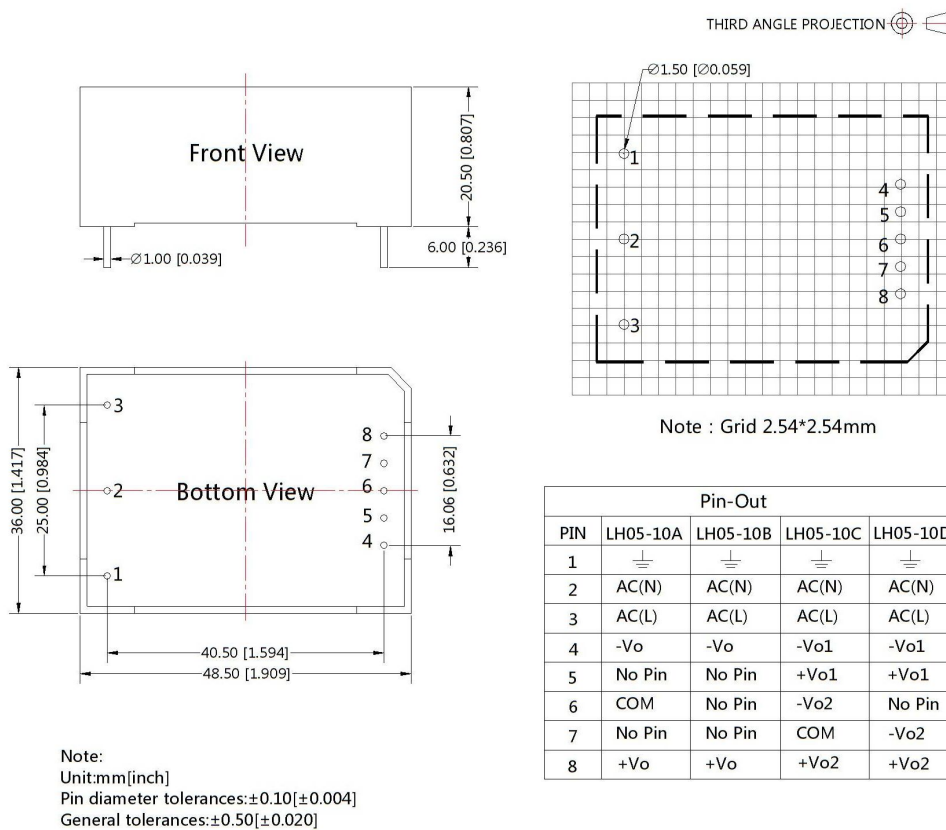


Fig 5: EMC Recommended circuit with higher requirements

Element model	Recommended value
MOV1	S14K300
CY1 , CY2	1000pF/400VAC
CX	0.1μF/275VAC
LCM	10mH, recommended to use MORNSUN's FL2D-Z5-103
LDM	4.7μH/2A
FC-LX1D	2KV/4KV EMC filter
FUSE	2A/250V slow fusing, necessary

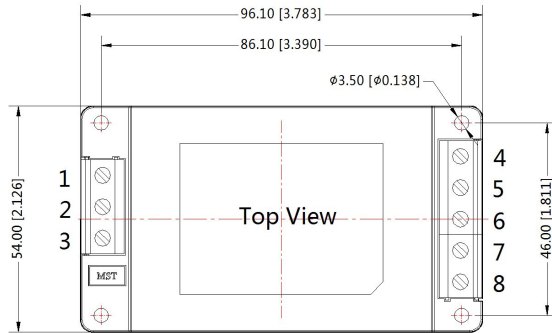
3. For more information about Mornsun EMC Filter products, please visit [www.mornsun-power.com](http://www.mornsun-power.com) to download the Selection Guide of EMC Filter

## Dimensions and Recommended Layout

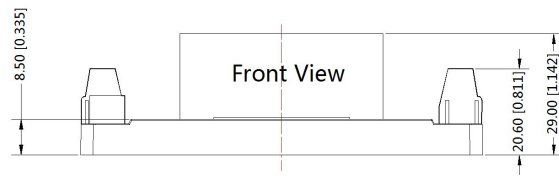


LHXXA2 Dimensions

THIRD ANGLE PROJECTION



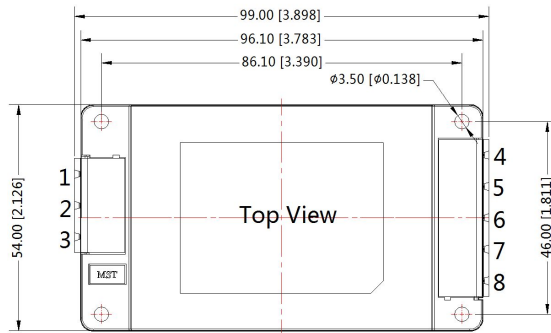
Pin-Out				
PIN	LH05-10A	LH05-10B	LH05-10C	LH05-10D
1	⏏	⏏	⏏	⏏
2	AC(N)	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1	-Vo1
5	No Pin	No Pin	+Vo1	+Vo1
6	COM	No Pin	-Vo2	No Pin
7	No Pin	No Pin	COM	-Vo2
8	+Vo	+Vo	+Vo2	+Vo2



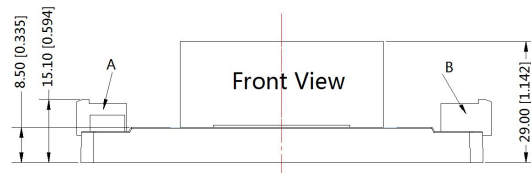
Note:  
Unit:mm[inch]  
Wire range : 24~12 AWG  
General tolerances:±0.50[±0.020]

LHXXA3 Dimensions

THIRD ANGLE PROJECTION



Pin-Out				
PIN	LH05-10A	LH05-10B	LH05-10C	LH05-10D
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

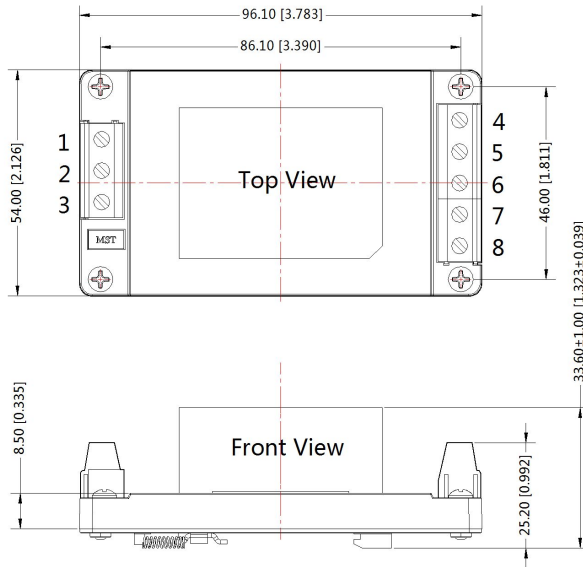


Note:  
Unit:mm[inch]  
General tolerances:±0.50[±0.020]  
A:DEGSON P/N:  
2EDGRC-7.5-03P-14-100A ( H )  
B:DEGSON P/N:  
2EDGRC-7.5-05P-14-100A ( H )



LHXXA4 Dimensions

THIRD ANGLE PROJECTION



Pin-Out				
PIN	LH05-10A	LH05-10B	LH05-10C	LH05-10D
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:

1. Packing information please refer to Product Packing Information which can be downloaded from [www.mornsun-power.com](http://www.mornsun-power.com). Packing bag number of Horizontal package : 58220007 (LH05), the Packing bag number of A2/A3/A4 package:58220010;
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  $T_a=25\text{ }^\circ\text{C}$ , humidity<75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
6. We can provide product customization service;
7. Specifications are subject to change without prior notice.

Mornsun Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Luogang District, Guangzhou, P. R. China  
Tel: 86-20-38601850-8801 Fax: 86-20-38601272 E-mail: info@mornsun.cn