

5W, AC-DC converter



RoHS

FEATURES

- Universal 85 - 264V AC and wide 100 - 370V DC Input
- Operating ambient temperature range -30°C to +70°C
- High I/O isolation test voltage of up to 4000VAC
- Regulated output, Low output 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

LHE05-20Dxx series is one of Mornsun's compact size multiple output power converters. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability and reinforce insulation. It offers good EMC performance, and is 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

Part No.*	Output Power	Nominal Output Voltage and Current		Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.	
		(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
LHE05-20D0505-01	5W	5V/900mA	5V/100mA	70	3400	400
LHE05-20D0512-01		5V/750mA	12V/100mA	72	2500	220
LHE05-20D0515-01		5V/700mA	15V/100mA	72	2200	220
LHE05-20D0524-01	5.4W	5V/600mA	24V/100mA	74	3100	100

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

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	--	
Recommended External Input Fuse		1A/250V Slow-blow required			
Hot Plug		Unavailable			


Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	Primary output	--	±2	--	%	
	Secondary output	--	±10	--		
Line Regulation	Full load	Primary output	--	±0.5		%
		Secondary output	--	±1.5		
Load Regulation	10%-100% load (balanced load)	Primary output	--	±2		%
		Secondary output	--	±5		
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	Primary output	--	50	mV	
		Secondary output	--	100		
Temperature Coefficient	Primary output	--	±0.02	--	%/°C	
Short Circuit Protection		Continuous, self-recovery				
Over-current Protection		150%-300% Io, self-recovery				

Over-voltage Protection	Primary output	5VDC Output	≤7.5VDC			
Minimum Load			10	--	--	%
Hold-up Time	115VAC input		10	15	--	ms
	230VAC input		65	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 Voltage	Input-output	4000	--	--	VAC
	Input- 	2500	--	--	
	Vo1- Vo2	500	--	--	VDC
Operating Temperature		-30	--	+70	°C
Storage Temperature		-40	--	+85	
Storage Humidity		--	--	95	%RH
Soldering Temperature	Wave-soldering	260 ± 5°C; time: 5 - 10s			
	Manual-welding	360 ± 10°C; time: 3 - 5s			
Power Derating	-30°C to -25°C	2.0	--	--	% / °C
	+55°C to +70°C	2.5	--	--	
	85VAC-100VAC	1.33	--	--	% / VAC
	240VAC-264VAC	0.83	--	--	
Safety Standard		IEC62368/EN62368/UL62368			
Safety Class		CLASS I			
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

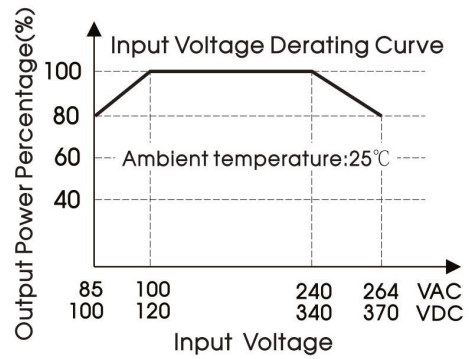
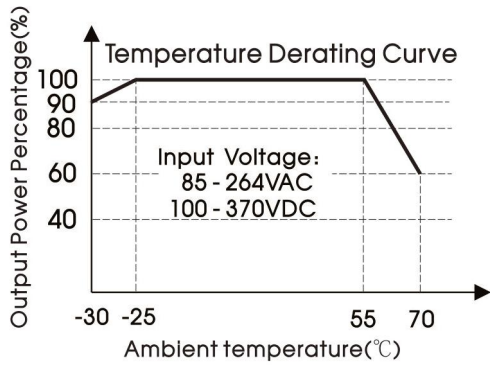
Mechanical Specifications

Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)	
Dimension	Horizontal package	48.50 x 36.00 x 20.50 mm
	A2 chassis mounting	96.10 x 54.00 x 29.00 mm
	A4 Din-Rail mounting	96.10 x 54.00 x 33.60 mm
Weight	Horizontal package	55g (Typ.)
	A2 chassis mounting	100g (Typ.)
	A4 Din-Rail mounting	140g (Typ.)
Cooling method	Free air convection	

Electromagnetic Compatibility (EMC)

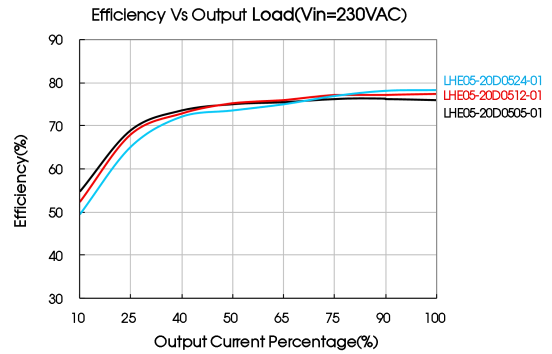
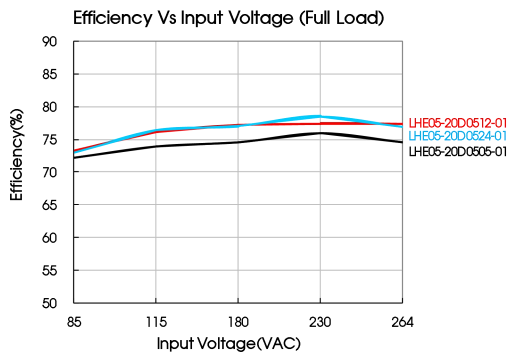
Emissions	CE	CISPR32/EN55032 CLASS B			
	RE	CISPR32/EN55032 CLASS B			
Immunity	ESD	IEC/EN 61000-4-2	Contact ±6KV / Air ±8KV	Perf. Criteria B	
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A	
	EFT	IEC/EN61000-4-4	±2KV		perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)		perf. Criteria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

Product Characteristic Curve



Note: ① With an AC input between 85-100V/240-264VAC and a DC input between 100-120V/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 factory or one of our FAE.



Design Reference

1. Typical application

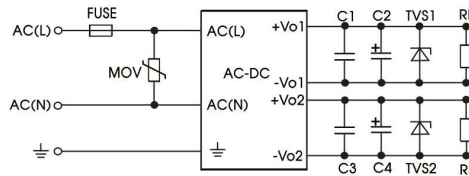


Fig. 1 LHE10-20Dxx(Dual Isolate Dual Output) series, typical circuit diagram

Part No.	FUSE	MOV	C1/C3	C2(μF)	C4(μF)	TVS1	TVS2
LHE05-20D0505-01	1A/250V slow-blow required	S14K300	0.1μF/50V	220	22	SMBJ7.0A	SMBJ7.0A
LHE05-20D0512-01						SMBJ7.0A	SMBJ20A
LHE05-20D0515-01						SMBJ7.0A	SMBJ20A
LHE05-20D0524-01						SMBJ7.0A	SMBJ30A

Output Filter Components:

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

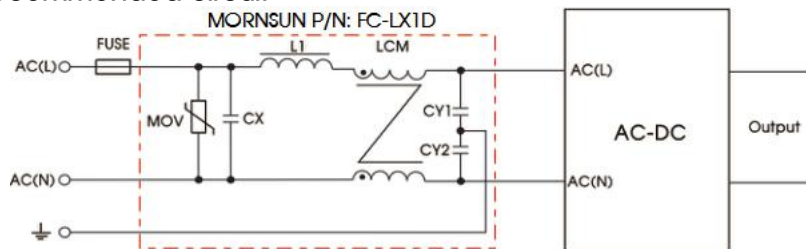
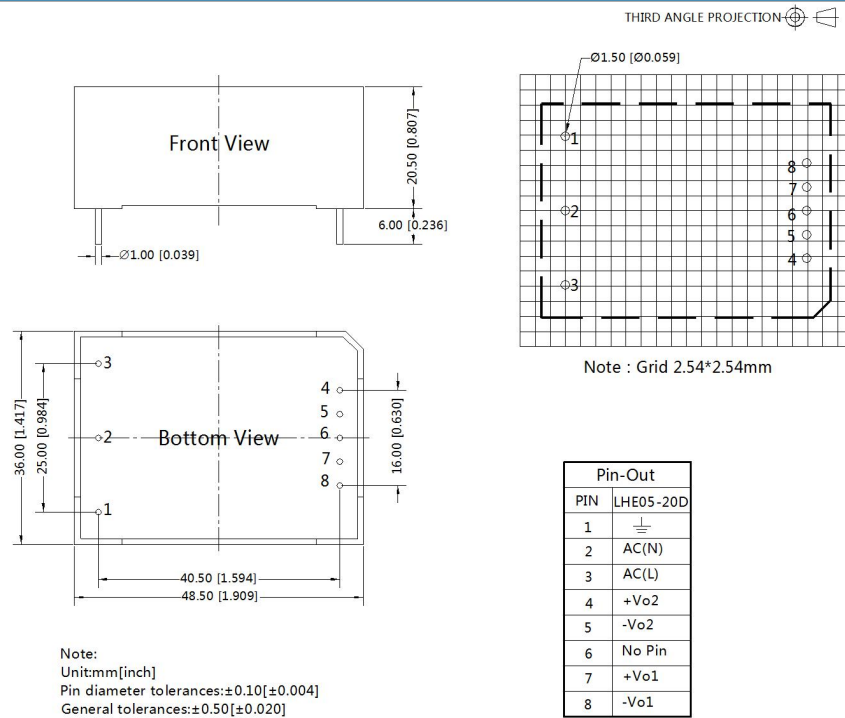


Fig 2: EMC circuit for harsh requirements

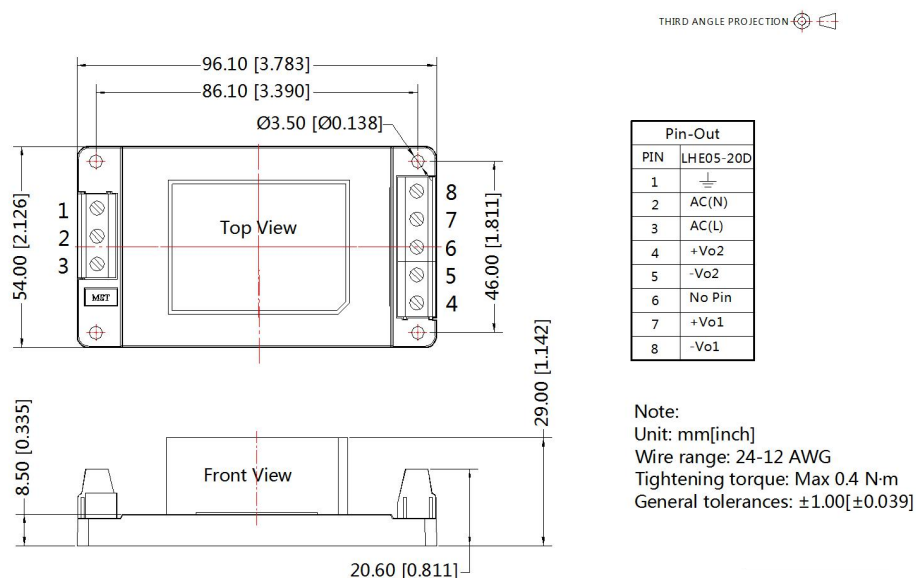
Component	Recommended value
MOV	S14K300
CY1 , CY2	1000pF/400VAC
CX	0.1μF/275VAC
LCM	10mH, we recommend using part no FL2D-Z5-103 (MORNSUN)
L1	4.7μH/2A
FC-LX1D	2KV/4KV EMC filter
FUSE	2A/250V slow-blow required

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

Dimensions and Recommended Layout

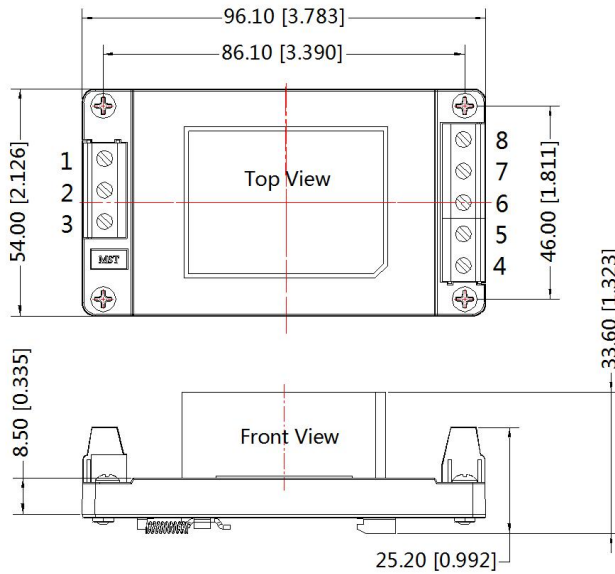


A2 Dimensions



A4 Dimensions

THIRD ANGLE PROJECTION



Pin-Out	
PIN	LHE05-20D
1	⊥
2	AC(N)
3	AC(L)
4	+Vo2
5	-Vo2
6	No Pin
7	+Vo1
8	-Vo1

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]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220007 (Horizontal package); 58220010 (A2/A4 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 $T_a=25^{\circ}\text{C}$, 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. 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.

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 Fax: 86-20-38601272 E-mail:sales@mornsun.cn www.mornsun-power.com