AC/DC Converter

LHE25-20Bxx Series

MORNSUN®

25W, AC-DC converter

CE Report EN62368-1 CB IEC62368-1 UK CA BS EN 62368-1 RoHS 3 years Warranty

FEATURES

- Universal Input : 85 - 264VAC/100 - 370VDC
- Operating temperature range: -40℃ to +85℃
- High isolation voltage up to 4K VAC
- Regulated output, Low ripple & noise
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Plastic case, meets UL94V-0
- EMI performance meets CISPR32/EN55032 CLASS B
- Design refer to UL62368 standard

LHE25-20Bxx 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, CISPR32/EN55032, UL/IEC/EN62368 standards, and it's 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 (230VAC, %/Typ.)	Max. Capacitive Load(μF)
IEC/EN	LHE25-20B03	13.53W	3.3V/4100mA	74	48000
	LHE25-20B05	20.5W	5V/4100mA	79	12240
	LHE25-20B09	25W	9V/2500mA	81	5600
	LHE25-20B12		12V/2100mA	83	5400
	LHE25-20B15		15V/1600mA	84	2400
	LHE25-20B24		24V/1100mA	85	1440
	LHE25-20B48		48V/500mA	87	600

Note: 1. *Part No. with suffix of "A2" means chassis mounting and suffix of "A4" means DIN-Rail mounting (e.g. LHE25-20B03A2 means chassis mounting; LHE25-20B03A4 means 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	--	264	VAC
	DC input	100	--	370	VDC
Input frequency		47	--	63	Hz
Input current	115VAC	--	--	0.6	A
	230VAC	--	--	0.34	
Inrush current	115VAC	--	20	--	
	230VAC	--	40	--	
Recommended External Input Fuse		3.15A/250V, slow blow, required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	3.3V output	--	±3	--	%
	Others output	--	±2	--	
Line Regulation	Full load	--	±0.5	--	
Load Regulation	0%-100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	50	100	mV
Temperature Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Hiccups, continuous, self-recover			
Over-current Protection		≥140% Io self-recover			

Over-voltage Protection	3.3 / 5VDC Output	≤7.5VDC			
	9VDC Output	≤15VDC			
	12 /15VDC Output	≤20VDC			
Over-voltage Protection	24VDC Output	≤30VDC			
	48VDC Output	≤60VDC			
Min. Load		0	--	--	%
Hold-up Time	115VAC input	--	10	--	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	Input-output	Test time: 1min (leakage current<5mA)	4000	--	--	VAC
	Input-⏚		2500	--	--	
Operating Temperature			-40	--	+85	℃
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	95	%RH
Soldering Temperature		Wave-soldering, Max. 10 seconds	255	260	265	℃
		Manual-welding, Max. 5 seconds	350	360	370	
Switching Frequency			--	65	--	kHz
Power Derating		-40℃ to -10℃	2.0	--	--	%/℃
		+50℃ to +70℃	3.0	--	--	
		+70℃ to +85℃	2.0	--	--	
		85 - 100VAC	1.0	--	--	%/VAC
		240 - 264VAC	0.83	--	--	
Safety Standard			IEC62368-1 safety approved & EN/BS EN62368-1(Report); Design refer to UL62368-1			
Safety Class			CLASS I			
MTBF			MIL-HDBK-217F@25℃ > 300,000 h			

Physical Specifications

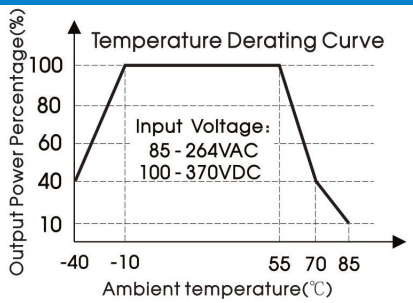
Casing Material		Black flame-retardant and heat-resistant plastic (UL94V-0)
Dimension	Horizontal package	70.00 x 48.00 x 23.50mm
	A2 chassis mounting	96.10 x 54.00 x 32.00mm
	A4 Din-Rail mounting	96.10 x 54.00 x 36.60mm
Weight	Horizontal package	120g (Typ.)
	A2 chassis mounting	170g (Typ.)
	A4 Din-Rail mounting	210g (Typ.)
Cooling method		Free air convection

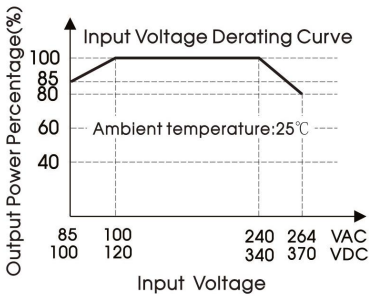
EMC Specifications

EMI	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
EMS	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 PE ±2KV	perf. Criteria B
		IEC/EN61000-4-5	line to line±2KV/ line to PE ±4KV (See Fig. 5 for recommended circuit)	perf. Criteria B

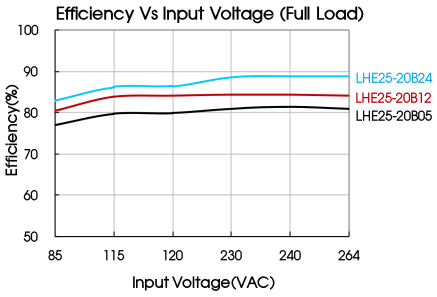
	CS	IEC/EN61000-4-6 10Vr.m.s	perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%,70%	perf. Criteria B

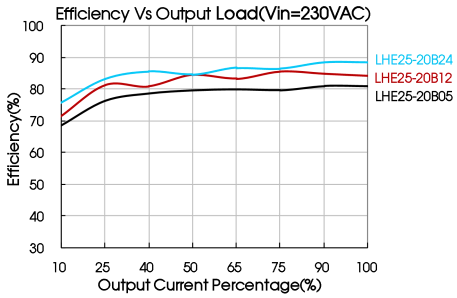
Product Characteristic Curve





Note: ① With an AC input between 85-100VAC/240-264VAC and a DC input between 100-120VDC/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 Mornsun FAE.





Design Reference

1. Typical application circuit

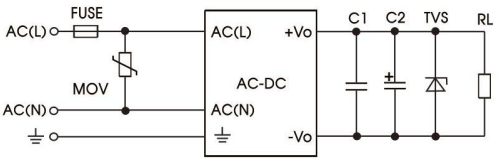


Fig. 1

Model	C2(μF)	FUSE	MOV	TVS
LHE25-20B03	330	3.15A/250V slow blow, requied	S14K300	SMBJ7.0A
LHE25-20B05	330			SMBJ7.0A
LHE25-20B09	330			SMBJ12A
LHE25-20B12	330			SMBJ20A
LHE25-20B15	330			SMBJ20A
LHE25-20B24	120			SMBJ30A
LHE25-20B48	68			SMBJ64A

Note:
Output filtering capacitors C2 is electrolytic capacitors, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor voltage reduced to at least 80%. C1 is ceramic capacitors, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

2. EMC solution-recommended circuit

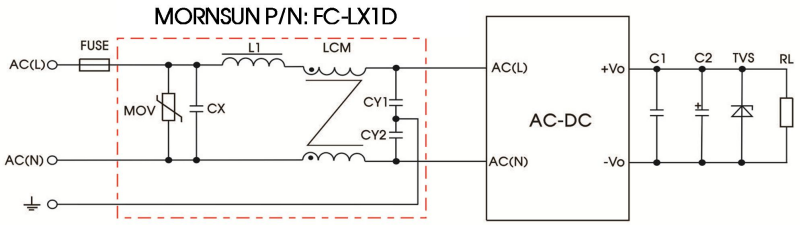
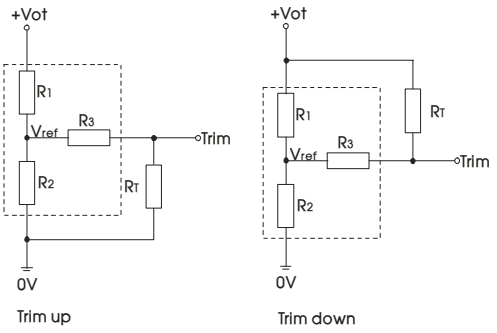


Fig. 2: EMC Recommended circuit with higher requirements

Element model	Recommended value
MOV	S14K300
CY1 , CY2	1000pF/400VAC
CX	0.1uF/275VAC
LCM	10mH, P/N: FL2D-Z5-103 (MORNSUN) is recommended
L1	4.7uH/2A
FC-LX1D	2KV/4KV EMC filter
FUSE	3.15A/250V, slow blow, required

3. Application of Trim and calculation of Trim resistance



Calculation formula of Trim resistance:

$$\text{up: } R_T = \frac{aR_2}{R_2-a} - R_3 \qquad a = \frac{Vref}{Vot-Vref} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1-a} - R_3 \qquad a = \frac{Vot-Vref}{Vref} \cdot R_2$$

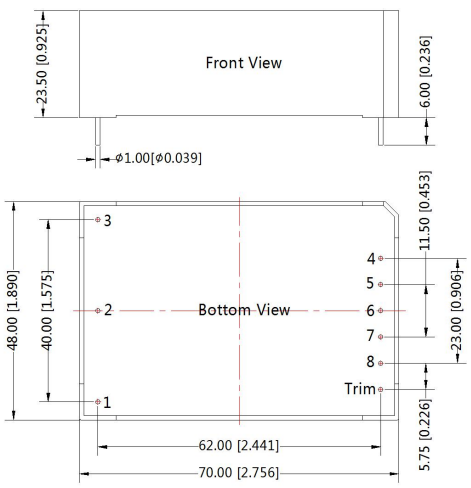
R_T is Trim resistance
a is a self-defined parameter, with no real meaning.

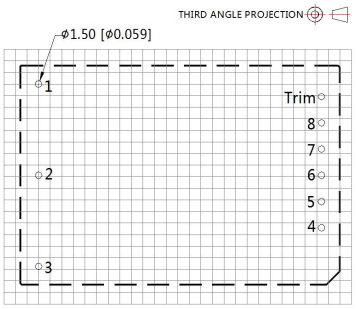
Applied circuits of Trim (Part in broken line is the interior of models):

Vout	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)	Vot(V)
3.3V	3.3	1.98	1	1.24	Output voltage after regulation, variation ≤ ±10%
5V	3.3	3.3	1	2.5	
9V	7.5	2.87	1	2.5	
12V	3.83	1	1	2.5	
15V	7.5	1.5	1	2.5	
24V	8.66	1	1	2.5	
48V	68	3.73	1	2.5	

4. For more information, Please find the application note on www.mornsun-power.com

Dimensions and Recommended Layout



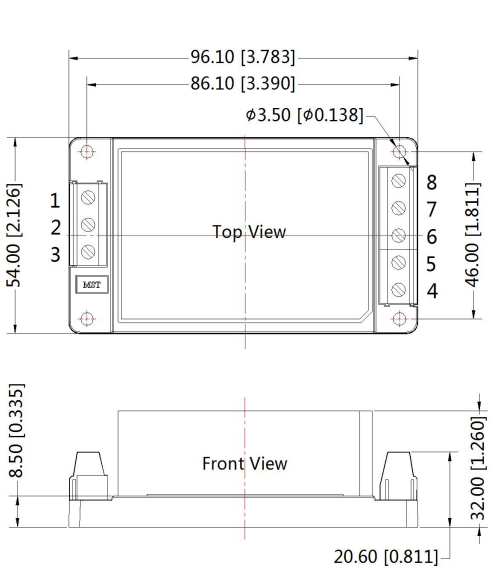


Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	No Pin
6	No Pin
7	No Pin
8	-Vo
Trim	Trim

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

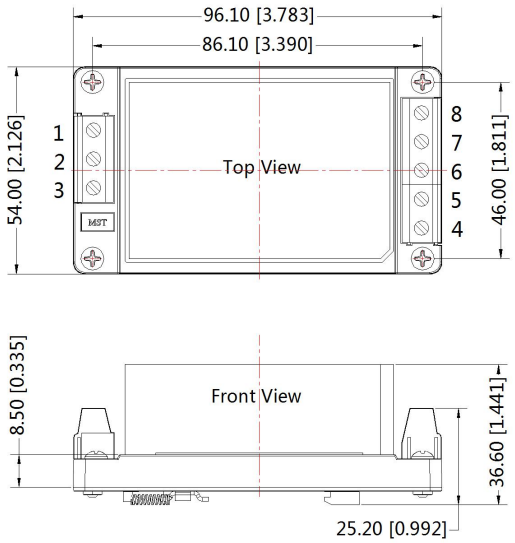
A2 Dimensions



Pin-Out	
Pin	Function
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	Trim
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 Dimensions



Pin-Out	
Pin	Function
1	⏚
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	Trim
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. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58220006(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 Ta=25℃, 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.

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