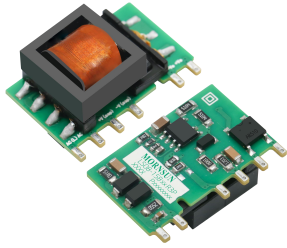


8W, DIY AC/DC converter



## FEATURES

- Ultra-wide 176 - 418VAC and 250 - 590VDC input voltage range
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40°C to +85°C
- Multi application, flexible layout
- Compact size, high power density, green power
- No-load power consumption as low as 0.1W
- Output short circuit, over-current protection

LS08-15BxxR3P series is one of Mornsun's highly efficient green power AC-DC Converter series. They feature wide input range accepting either AC or DC voltage, low power consumption, high reliability and reinforced isolation. All models are particularly suitable for industrial control, electric power, instrumentation and smart home applications which have high requirement for dimension and don't have high requirement on EMC. 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 (uF) Max.
EN	LS08-15B03R3P	8W	3.3V/1.6A	72	1500
	LS08-15B05R3P		5V/1.6A	75	1500
	LS08-15B09R3P		9V/0.88A	79	1000
	LS08-15B12R3P		12V/0.67A	82	680
	LS08-15B15R3P		15V/0.53A	83	470
	LS08-15B24R3P		24V/0.33A	83	330

Note: 1. \*The nominal output voltage refers to the voltage applied to the load terminal after adding external circuits.  
 2. If the product is used in a severe vibration application, it needs to be glued and fixed;  
 3. 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	176	--	418	VAC
	DC input	250	--	590	VDC
Input Certified Voltage Range	AC input	176	--	277	VAC
Input Frequency		47	--	63	Hz
Input Current	230VAC	--	--	0.15	A
Inrush Current	230VAC	--	30	--	
Recommended External Input Fuse		1A, slow-blow, required (The actual use needs to be selected according to the application environment)			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	10% - 100% load	--	±2.5	±5	%
Line Regulation	Full load	--	±0.75	±1.5	
Load Regulation	10% - 100% load	--	±1.5	±3	
Ripple & Noise <sup>①</sup>	20MHz bandwidth (peak-to-peak value), 10% - 100% load	--	80	150	mV
Temperature Coefficient		--	±0.2	--	%/°C
Stand-by Power Consumption	230VAC input	--	0.1	0.15	W
Short Circuit Protection		Hiccup, continuous, self-recover			
Over-current Protection		≥110%Io, self-recover			

Anti-ground Fault Protection	Full load	Input 418VAC for 4 hours without damage			
Minimum Load <sup>②</sup>		10	--	--	%
Hold-up Time	230VAC input	--	40	--	ms
Note:					
1. <sup>①</sup> The "parallel cable" method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information;					
2. <sup>②</sup> The product is able to work with 0%-10% load and with stable output;					
3. When applied at -20°C to -40°C, short circuit or over-current protection needs to be shut down and restarted.					

## General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output	Electric Strength Test for 1min., leakage current <5mA	3600	--	--	VAC
Operating Temperature			-40	--	+85	°C
Storage Temperature			-40	--	+105	
Storage Humidity			--	--	95	%RH
Soldering Temperature		Wave-soldering	260 ± 5°C; time: 5 - 10s			
		Manual-welding	360 ± 10°C; time: 3 - 5s			
Power Derating		-40°C to -20°C	1	--	--	% / °C
		+55°C to +85°C	1.67	--	--	
		305VAC - 418VAC	0.177	--	--	%/VAC
Safety Standard			BS EN/EN62368-1(report) safety approved			
Safety Class			Meets CLASS II structure			
MTBF		MIL-HDBK-217F@25°C	≥1000,000 h			

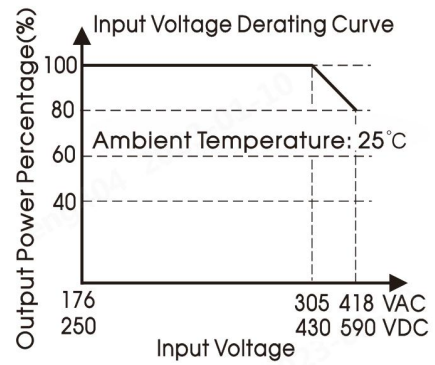
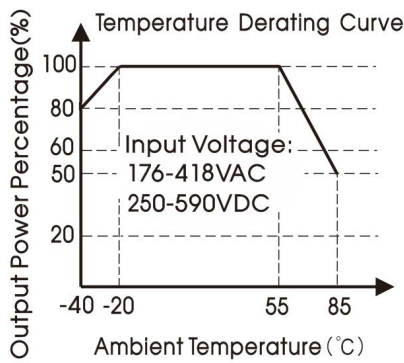
## Mechanical Specifications

Dimension	29.82 x 17.20 x 14.05 mm
Weight	8.2g (Typ.)
Cooling method	Free air convection

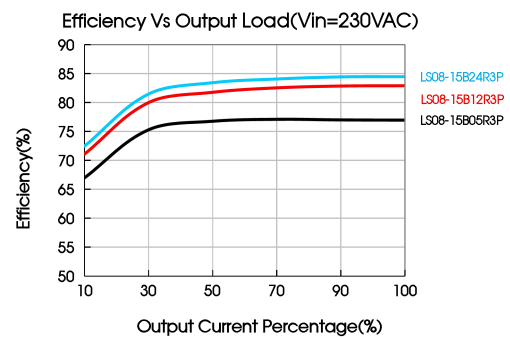
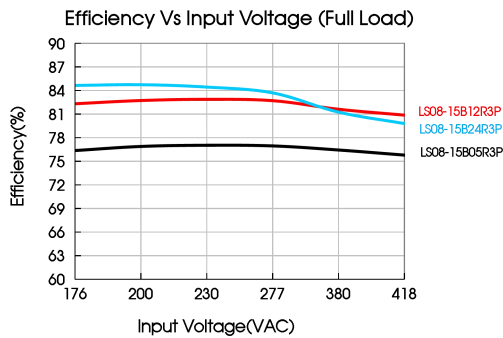
## Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (Application circuit 1, 4)	
		CISPR32/EN55032	CLASS B (Application circuit 2, 3)	
	RE	CISPR32/EN55032	CLASS A (Application circuit 1, 4)	
		CISPR32/EN55032	CLASS B (Application circuit 2, 3)	
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	±1KV (Application circuit 1, 2)	perf. Criteria B
		IEC/EN61000-4-4	±2KV (Application circuit 3, 4)	
	Surge	IEC/EN61000-4-5	line to line ±1KV (Application circuit 1, 2)	perf. Criteria B
		IEC/EN61000-4-5	line to line ±2KV (Application circuit 3, 4)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	PFMF	IEC/EN61000-4-8	30A/m	perf. Criteria A
Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11	0%, 70%	perf. Criteria B	

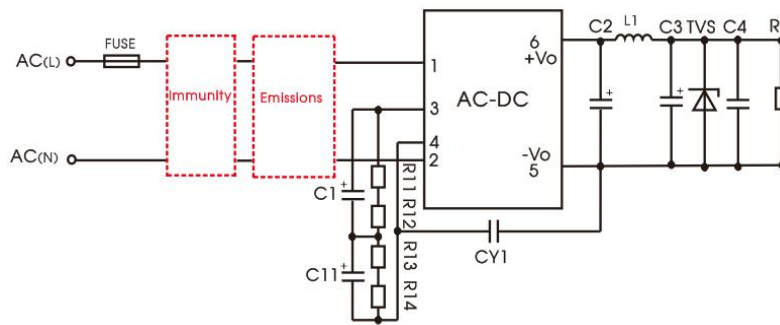
Product Characteristic Curve



Note: ① With an AC input between 305-418VAC and a DC input between 430-590VDC, 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.



Additional Circuits Design Reference



LS series additional circuits design reference

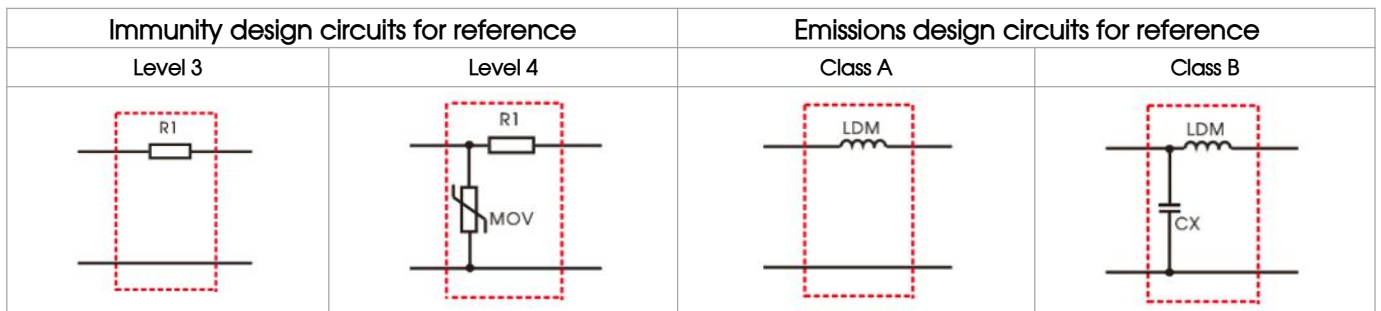
LS08 series additional components selection guide (No EMC devices)

Part No.	C1/C11 (required)	R11/R12/R13/R14 (SMD resistor, required)	C2 (required)	L1(required)	C3 (required)	C4	CY1 (required)	TVS	
LS08-15B03R3P	47uF/400V	1.5MΩ /1206/ (1/4W)	1500uF/6.3V (solid-state capacitor)	2.2uH/ 15mΩ Max /6.5A	330uF/25V	0.1uF/ 50V	2.2nF/ 400VAC	SMBJ7.0A	
LS08-15B05R3P			820uF/16V (solid-state capacitor)		470uF/25V				SMBJ12A
LS08-15B09R3P			470uF/16V (solid-state capacitor)		150uF/35V			SMBJ20A	
LS08-15B12R3P			470uF/35V		220uF/35V				
LS08-15B15R3P									
LS08-15B24R3P									

- Note:
1. C1/C11 is used as filter capacitor with AC input (must be connected externally) and as EMC filter capacitor with DC input (must be connected), and it is recommended to use the capacitor with ripple current >200mA@100KHz.
  2. R11, R12, R13, R14 are the voltage equalizing resistors of C1, C11 electrolytic capacitors (must be connected), and SMD anodes can be used;
  3. We recommend using an electrolytic capacitor with high frequency and low ESR (ESR of C3 at low temperature of  $-40^{\circ}\text{C} \leq 1.1 \Omega$ ) rating for C3 (refer to manufacture's datasheet), electrolytic capacitor can be used for C2 when applied in normal and high temperature environments. Combined with C2, L1, they form a pi-type filter circuit. Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C4 is a ceramic capacitor, used for filtering high frequency noise.
  4. A suppressor diode (TVS) is recommended to protect the application in case of converter failure and specification should be 1.2 times of the output voltage.
  5. LDM (1.2mH, P/N: 12050314), L1 ( 2.2uH, P/N: 12050504) Mornsun quotation is available.

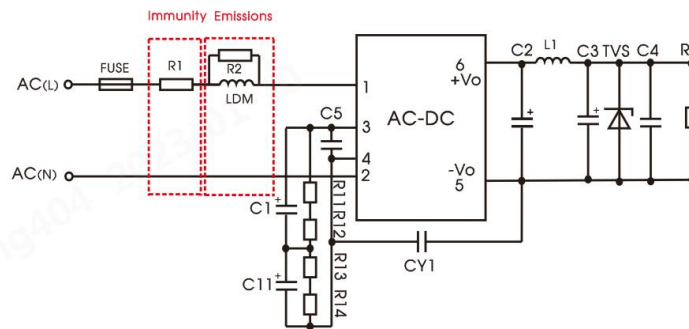
## Environmental Application EMC Solution

Recommended circuit	Application environmental	Typical industry	Input voltage range	Environment temperature	Emissions	Immunity
1	Basic application	None	176 - 418VAC	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	Class A	Level 3
2	Indoor civil environment	Smart home/Home appliances (2Y)		$-20^{\circ}\text{C}$ to $+55^{\circ}\text{C}$	Class B	Level 3
	Indoor general environment	Intelligent building/Intelligent agriculture		$-20^{\circ}\text{C}$ to $+55^{\circ}\text{C}$	Class B	Level 4
3	Indoor industrial environment	Manufacturing workshop		$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	Class A	Level 4



## Electromagnetic Compatibility Solution--Recommended Circuit

### 1. Application circuit 1—Basic application



Recommended circuit 1

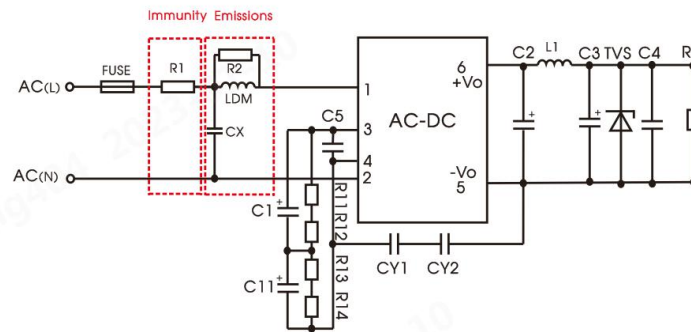
Application environmental	Ambient temperature range	Immunity level	Emissions class
Basic application	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	Level 3	Class A

Component	Recommended value
FUSE	1A/500V, slow-blow, required
R1	6.8Ω /3W (wire-wound resistor, required)
R2	10KΩ /1206
C5	2.2nF/1000V/1206
LDM	1.2mH/Max: 2.5Ω /Min: 0.35A

Note:

1. R1 is the input plug-in resistor, this resistor needs to be a wire-wound resistor (required), please do not select SMD resistor or carbon film resistor.
2. C5 is a ceramic capacitor.

2. Application circuit 2—Universal system recommended circuits for indoor general environment



Recommended circuit 2

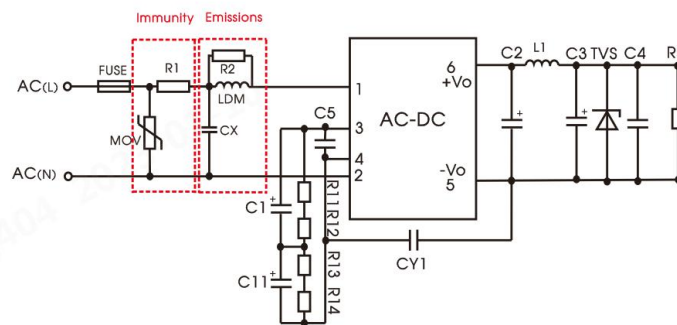
Application environmental	Ambient temperature range	Immunity level	Emissions class
Indoor civil /general	-20℃ to +55℃	Level 3	Class B

Component	Recommended value
R1	6.8Ω /3W (wire-wound resistor, required)
R2	10KΩ /1206
C5	2.2nF/1000V/1206
LDM	1.2mH/Max: 2.5Ω /Min: 0.35A
CX	0.1uF/480VAC
FUSE	1A/500V, slow-blow, required

Note:

1. In the home appliance application environment, the two Y capacitors of the primary and secondary need to be externally connected (CY1/CY2, value at 4.7nF/250VAC), which can meet the EN60335 certification;
2. According to the certification requirements, the CX capacitor needs to be connected in parallel with the bleeder resistance, the recommended resistance value is less than 3.8MΩ, and the actual need to be selected according to the certification standard;
3. R1 is the input plug-in resistor, this resistor needs to be a wire-wound resistor (required), please do not select SMD resistor or carbon film resistor;
4. C5 is a ceramic capacitor.

3. Application circuit 3—Universal system recommended circuits for indoor industrial environment



Recommended circuit 3

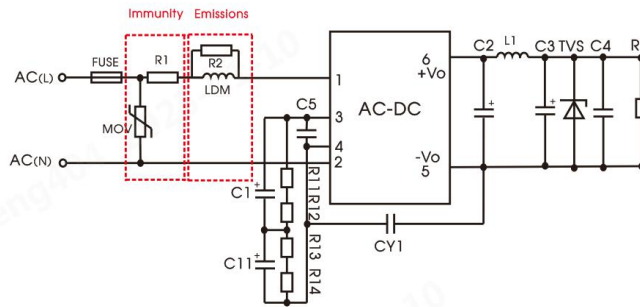
Application environmental	Ambient temperature range	Immunity level	Emissions class
Indoor industrial	-20℃ to +55℃	Level 4	Class B

Component	Recommended value
MOV	S14K460
CX	0.1uF/480VAC
R2	10K $\Omega$ /1206
C5	2.2nF/1000V/1206
LDM	1.2mH/Max: 2.5 $\Omega$ /Min: 0.35A
R1	6.8 $\Omega$ /3W (wire-wound resistor, required)
FUSE	1A/500V, slow-blow, required

Note:

1. According to the certification requirements, the CX capacitor needs to be connected in parallel with the bleeder resistance, the recommended resistance value is less than 3.8M $\Omega$ , and the actual need to be selected according to the certification standard;
2. R1 is the input plug-in resistor, this resistor needs to be a wire-wound resistor (required), please do not select SMD resistor or carbon film resistor;
3. C5 is a ceramic capacitor.

4. Application circuit 4—Universal system recommended circuits for outdoor general environment



Recommended circuit 4

Application environmental	Ambient temperature range	Immunity level	Emissions class
Outdoor general environment	-40 $^{\circ}$ C to +85 $^{\circ}$ C	Level 4	Class A

Component	Recommended value
MOV	S14K460
LDM	1.2mH/Max: 2.5 $\Omega$ /Min: 0.35A
R1	6.8 $\Omega$ /3W (wire-wound resistor, required)
R2	10K $\Omega$ /1206
C5	2.2nF/1000V/1206
FUSE	1A/500V, slow-blow, required

Note:

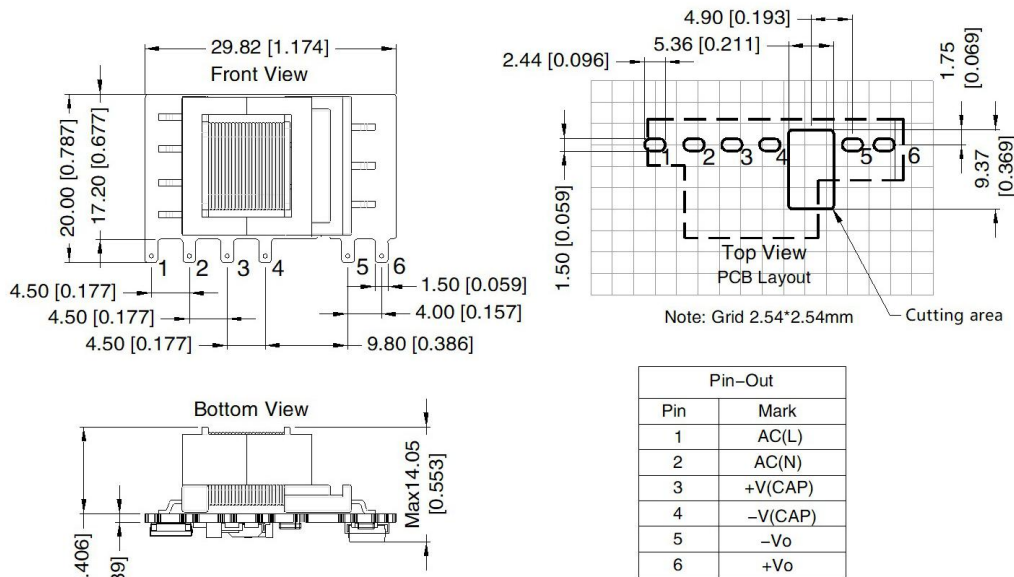
1. R1 is the input plug-in resistor, this resistor needs to be a wire-wound resistor (required), please do not select SMD resistor or carbon film resistor;
2. C5 is a ceramic capacitor.

5. For additional information please refer to application notes on [www.mornsun-power.com](http://www.mornsun-power.com).

Dimensions and Recommended Layout

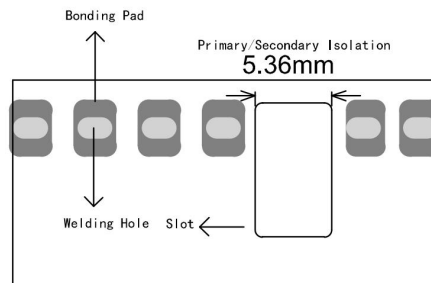
LS08-15BxxR3P series dimensions

THIRD ANGLE PROJECTION



Note:  
Unit: mm[inch]  
Pin section tolerances:  $\pm 0.10[\pm 0.004]$   
General tolerances:  $\pm 1.00[\pm 0.039]$   
The layout of the device is for reference only,  
please refer to the actual product

LS08-15BxxR3P series recommended pad



Note: There is a slot(non-metallic hole) between pin 4/5; For details, please refer to the recommended dimensions or pad.

- Note:
- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220134;
  - External electrolytic capacitors are required to modules, more details refer to typical applications;
  - This part is open frame, at least 8.4 mm creepage distance between the primary and secondary external components of the module is needed to meet the safety requirement, refer to the recommended welding hole design in the external dimension drawing;
  - Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^\circ\text{C}$ , humidity<75%, nominal input voltage(230V) 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";
  - If product involves multi-brand materials and there are differences in color etc, please refer to the standards of each manufacturer.
  - 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.

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