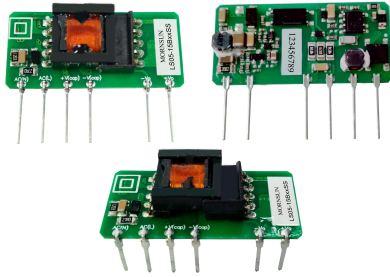


5W, AC/DC converter



### FEATURES

- Wide 85 - 264VAC and 100 - 400VDC input voltage range
- High I/O isolation test voltage of up to 4000VAC
- High efficiency
- Compact size
- Industrial-grade design
- Output short circuit, over-current, over-voltage protection
- IEC/UL/EN62368 safety approval



RoHS



LS05-15BxxSS (-F) series is a high efficiency green power modules provided by Mornsun. The features of this series are: Accept either AC or DC input, wide input voltage, high efficiency, low loss, safety isolation etc. All models are particularly suitable for the applications such as industrial, electric power, instrumentation, smart home which do not have high requirement on EMC. EMC application circuit must be added if the products need to be applied to EMC harsh environment.

### Selection Guide

Certification	Model	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
UL/CE/CB	LS05-15B03SS(-F)*	5W	3.3V/1A	67	2200
	LS05-15B05SS(-F)		5V/1A	74	1500
	LS05-15B09SS(-F)		9V/0.56A	75	680
	LS05-15B12SS(-F)		12V/0.42A	76	470
	LS05-15B15SS(-F)		15V/0.34A	77	330
	LS05-15B24SS(-F)		24V/0.21A	79	100

Note: \*An "-F" suffix designates horizontal package vs. standard vertical mounting.

### Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	Conventional	100	--	240	VAC
	AC input	85	--	264	
	DC input	100	--	400	VDC
Input Frequency		47	--	63	Hz
Input Current	115VAC	--	--	0.2	A
	230VAC	--	--	0.1	
Inrush Current	115VAC	--	5	--	A
	230VAC	--	10	--	
leakage Current	CY0: 1nF/400VAC	--	--	0.25	mA
Hot Plug				Unavailable	

### Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	LS05-15B03SS(-F)	--	±2	±3	%
	LS05-15B05/09/12/15/24SS(-F)	--	±1	±2	
Line Regulation	Full load	--	±0.5	--	%
Load Regulation	10% - 100% load	--	±1	±1.5	
Output Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	50	150	mV
Temperature Coefficient		--	±0.02	--	%/°C
Stand-by Power Consumption		--	--	0.5	W
Short Circuit Protection		Continuous, self-recovery			
Over-current Protection		≥150%Io self-recovery			

Over-voltage Protection	3.3/5V output	≤ 7.5 V (Output voltage clamp)			
	9V output	≤ 15 V (Output voltage clamp)			
	12/15V output	≤ 20 V (Output voltage clamp)			
	24V output	≤ 30 V (Output voltage clamp)			
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	10	15	--	ms
	230VAC input	65	75	--	

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 Electric Strength Test for 1min., leakage current ≤5mA	4000	--	--	VAC
Operating Temperature		-25	--	+85	°C
Storage Temperature		-40	--	+105	
Storage Humidity		--	--	85	%RH
Soldering Temperature	Wave-soldering	260 ± 5°C; time: 5 - 10s			
	Manual-welding	360 ± 10°C; time: 3 - 5s			
Switching Frequency		--	100	--	kHz
Power Derating	-25°C ~ +0°C	0.8	--	--	% / °C
	+55°C ~ +85°C	1.33	--	--	
	85VAC - 110VAC	0.8	--	--	% / VAC
	240VAC - 264VAC	1.67	--	--	
Safety Standard		IEC62368/EN62368/UL62368			
Safety Certification		IEC62368/EN62368/UL62368			
Safety Class		CLASS II			
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

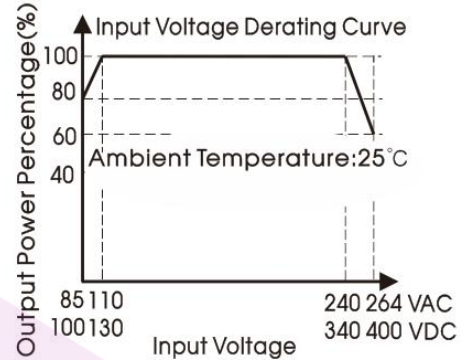
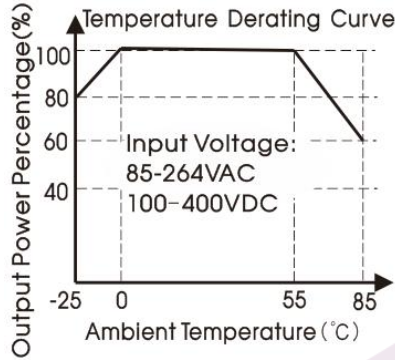
### Physical Specifications

Dimensions	Refer to the dimensions
Weight	7g (Typ.)
Cooling method	Free air convection

### EMC Specifications

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

Product Characteristic Curve



Note:

- ① With an AC input between 85-110VAC/240-264VAC and a DC input between 100-130VDC/340-400VDC, 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 circuit

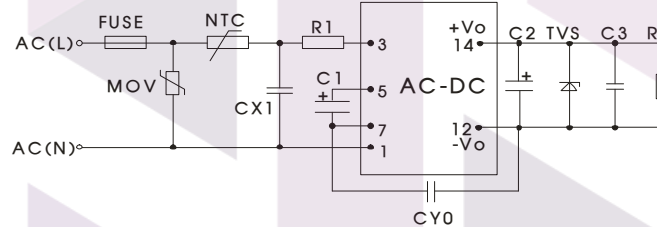


Fig. 1: Typical application circuit

Model	C1 (required)	C2 (required)	R1	C3	CX1	CY0	NTC	MOV	FUSE (required)	TVS
LS05-15B03SS(-F)	10μF/400V	220μF/35V	12Ω/2W	100nF/50V	0.1μF/275VAC	1nF/400VAC	13D-5	S14K350	1A/250V	SMBJ7.0A
LS05-15B05SS(-F)										SMBJ12A
LS05-15B09SS(-F)										SMBJ20A
LS05-15B12SS(-F)										SMBJ20A
LS05-15B15SS(-F)										SMBJ30A
LS05-15B24SS(-F)	150μF/35V									

Note:

- 1. C1 is used as filter capacitor with AC input and as EMC filter capacitor with DC input. The recommended value of C1 is 10μF/400V (10μF/450V for DC input >370VDC);
- 2. We recommend using an electrolytic capacitor with high frequency and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C3 is a ceramic capacitor used for filtering high-frequency noise.

2. EMC solution-recommended circuit

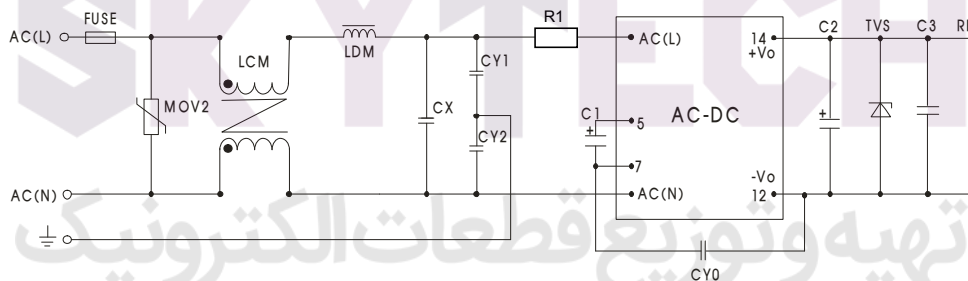


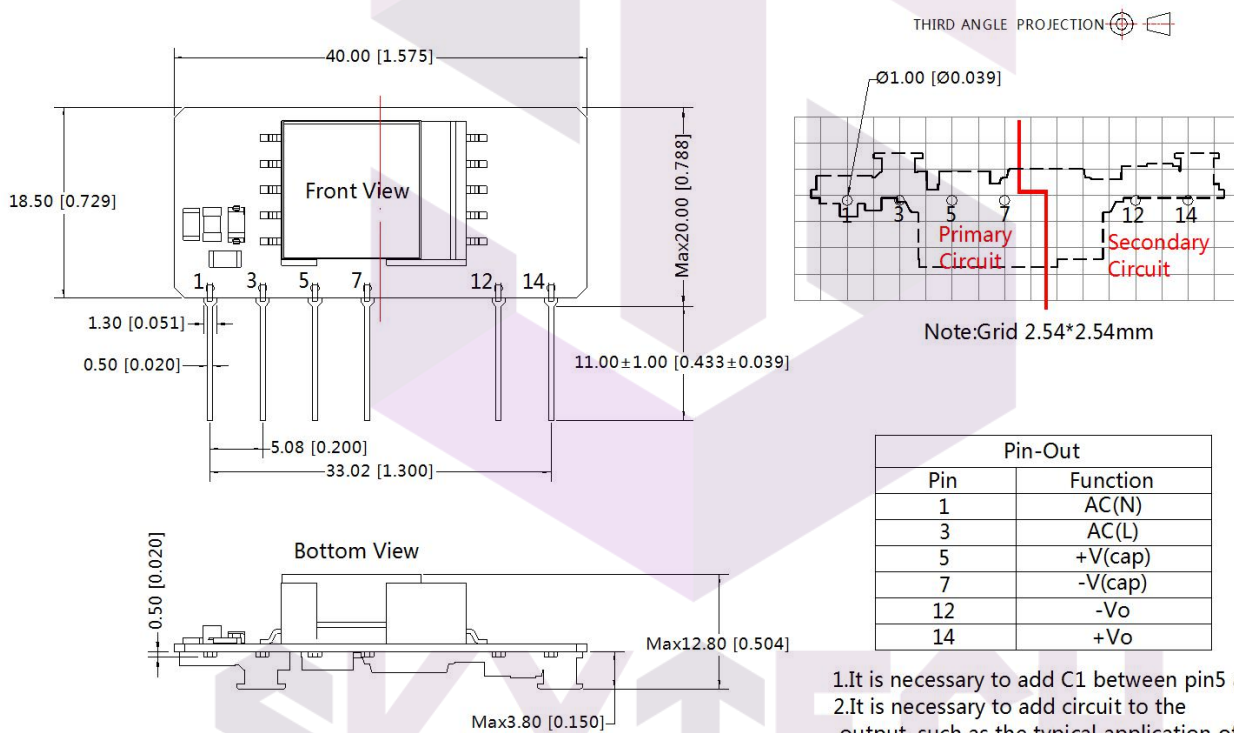
Fig 2: EMC application circuit with higher requirements

Components	Recommend Parameter
MOV2	S14K320
CY1, CY2	1nF/400VAC
CX	0.1 $\mu$ F/275VAC
LCM	3.5mH
LDM	330 $\mu$ H
R1	12 $\Omega$ /2W
FUSE	1A/250V, slow-blow, required

Note: The recommended value of other components refers to typical application circuit.

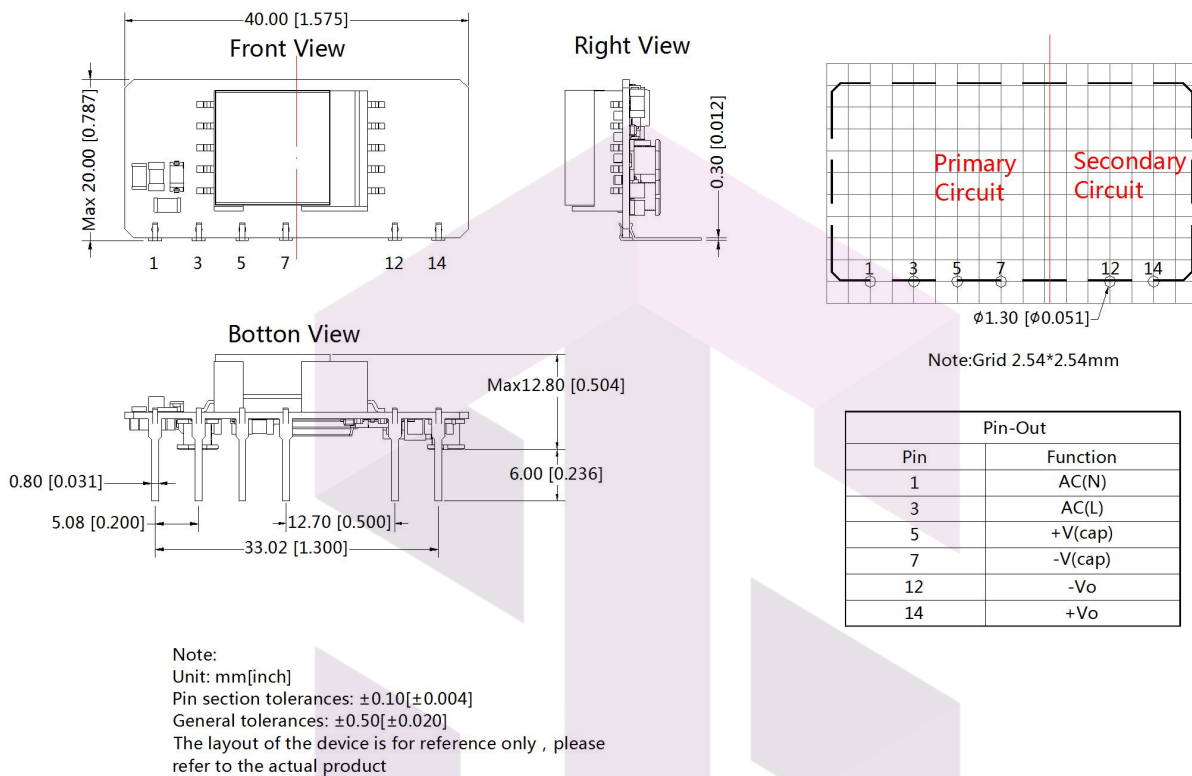
3. For additional information, please refer to application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

### LS05-15BxxSS Dimensions and Recommended Layout



Note:  
Unit: mm[inch]  
Pin section tolerances:  $\pm 0.10[\pm 0.004]$   
General tolerances:  $\pm 0.50[\pm 0.020]$   
The layout of the device is for reference only, please refer to the actual product

1. It is necessary to add C1 between pin5 and pin7.
2. It is necessary to add circuit to the output, such as the typical application of Figure 1.
3. It is needed to have distance  $\geq 6.4$ mm for safety between external components in primary circuit and secondary circuit.



Note:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220032(LS05-15BxxSS); 58220026(LS05-15BxxSS-F);
- Module required dispensing fixed after assembled;
- This part is open frame, at least 6.4mm safety distance between the the primary and secondary external components of the module is needed to meet the safety requirement;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°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.

تهیه و توزیع قطعات الکترونیک

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