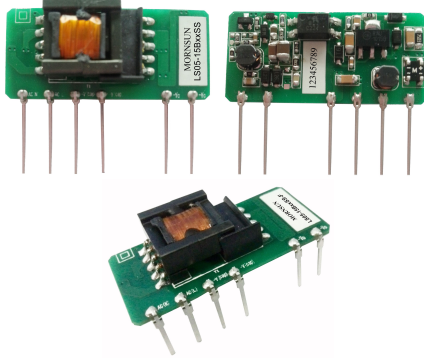


5W, AC/DC converter



FEATURES

- Wide input voltage range: 85 - 264VAC/100 - 400VDC
- Output short circuit, over-current, over-voltage protection
- High efficiency, 3KVAC high isolation voltage
- Compact size
- Industrial-grade design
- IEC60950, UL60950, EN60950 approval

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 (230VAC, %/Typ.)	Max. Capacitive Load (uF)
UL/CE/CB (beside "-F")	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: *The model of 90 degrees of corner is with "-F". For example the LS05-15B03SS of 90 degrees of corner product is LS05-15B03SS-F.

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	--	
	230VAC	--	10	--	
leakage Current	CY0 is 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	--	±0.1	±0.5	
Load Regulation	10% - 100% load	--	±1	±1.5	
Output Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	50	150	mVp-p
Temperature Drift Coefficient		--	±0.02	--	%/°C
Stand-by Power Consumption		--	--	0.5	W
Short Circuit Protection		Continuous, self-recovery			
Over-current Protection		≥110%Io self-recovery			
Over-voltage Protection		Zener clamp diode			

Min. Load		0	--	--	%
Hold-up Time	115VAC input	--	20	--	ms
	230VAC input	--	80	--	

Note: *Ripple and Noise measuring refer to "ripple and noise measure figure", please see *AC-DC Converter Application Notes* for specific operation methods.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	3000	--	--	VAC
Operating Temperature		-25	--	+85	°C
Storage Temperature		-40	--	+105	
Storage Humidity		--	--	85	%RH
Welding 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 to +0°C	0.8	--	--	% / °C
	+55°C to +85°C	1.33	--	--	
Safety Standard		IEC60950/EN60950/UL60950			
Safety-regulated Certification		IEC60950/EN60950/UL60950			
Safety Class		CLASS II			
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

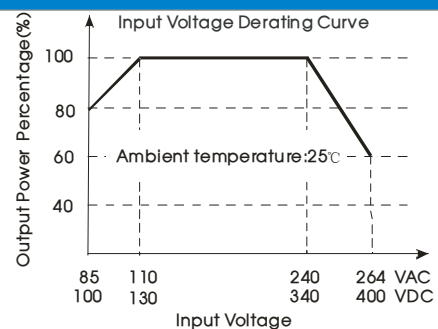
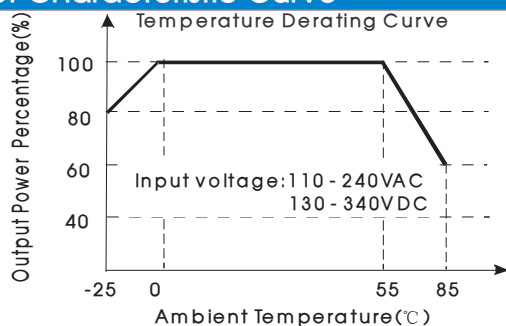
Physical Specifications

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

EMC Specifications

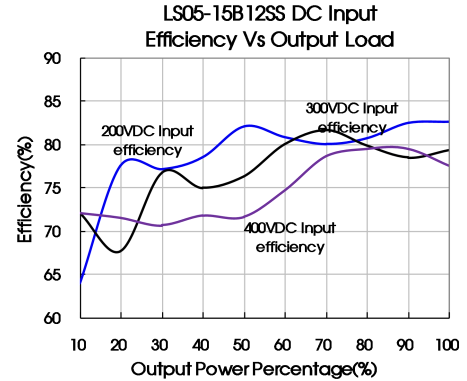
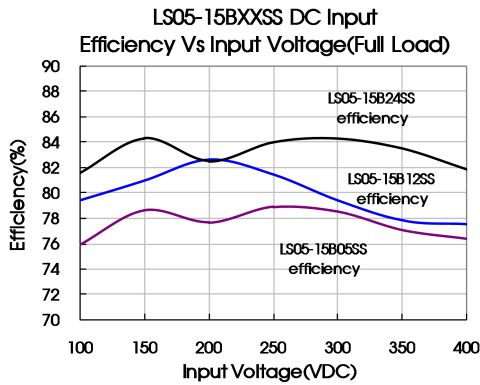
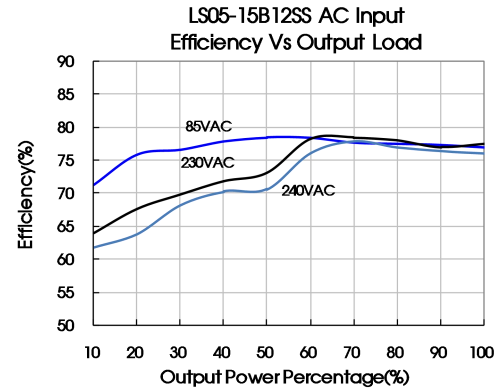
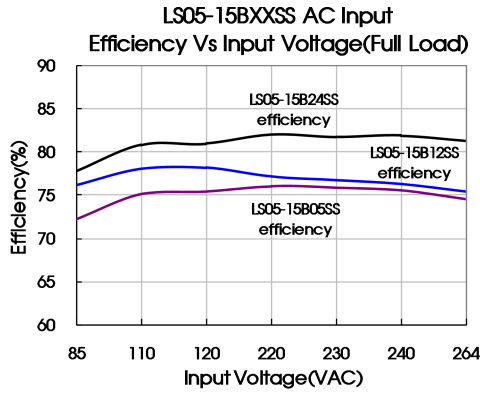
EMI	CE	CISPR22/EN55022	CLASS A (See Fig. 1 for typical application circuit)	
	RE	CISPR22/EN55022	CLASS B (See Fig. 2 for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2	Contact ±4KV Perf. Criteria B	
	RS	IEC/EN61000-4-3	10V/m perf. Criteria A	
	EFT	IEC/EN61000-4-4	±2KV (See Fig. 1 for typical application 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 (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s (See Fig. 2 for recommended circuit)	perf. Criteria A
	PFM	IEC/EN61000-4-8	10A/m 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 Input voltage should be derated based on temperature derating when it is 85-110VAC/240-264VAC/100-130VDC/340-400VDC;
- ② This 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

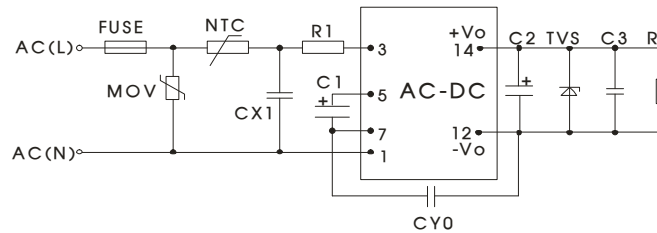


Fig. 1: Typical application circuit

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

- Note:
- C1: When AC input, C1 is used as filter capacitor, the value of C1 is recommended to be 10 μ F /400V. When DC input, C1 is used as EMC filter capacitor, the value of C1 is recommended to be 10 μ F/400V(when the input voltage is above 370VDC, the recommended value of C1 is 10 μ F/450V).
 - Output filtering capacitor C2 is electrolytic capacitor. C2 is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitance withstand voltage derating should be 80% or above. C3 is ceramic capacitor, which is used to filter high-frequency noise.

2. EMC solution-recommended circuit

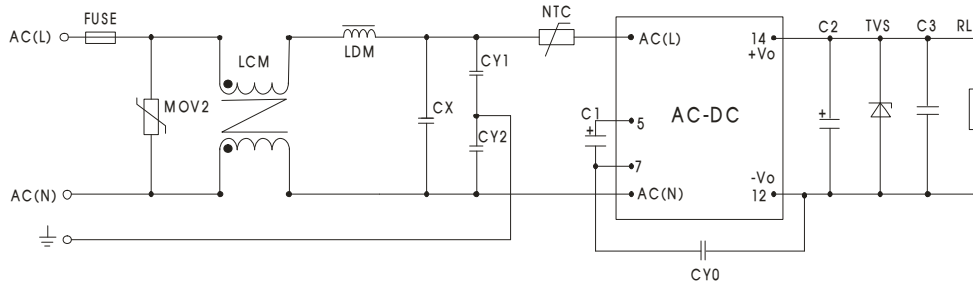


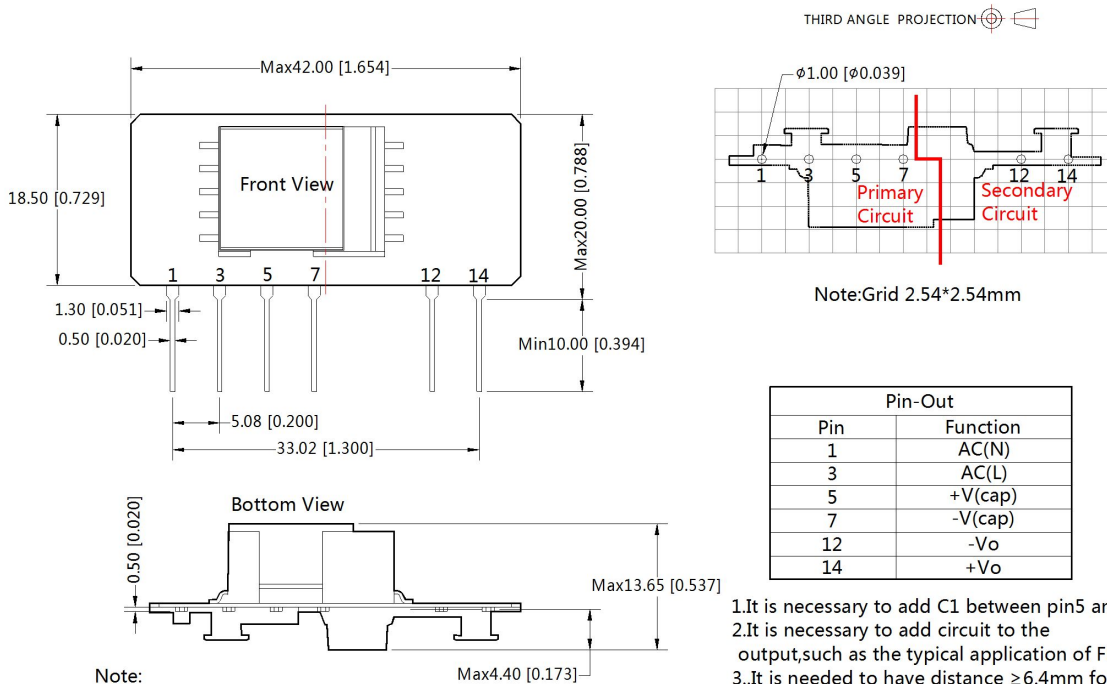
Fig 2: EMC application circuit with higher requirements

Components	Recommend Parameter
MOV2	S14K320
CY1, CY2	1nF/400VAC
CX	0.1μF/275VAC
LCM	3.5mH
LDM	330μH
NTC	13D-5
FUSE	1A/250V, slow fusing, required

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

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

LS05-15BxxSS Dimensions and Recommended Layout



THIRD ANGLE PROJECTION

Note: Grid 2.54*2.54mm

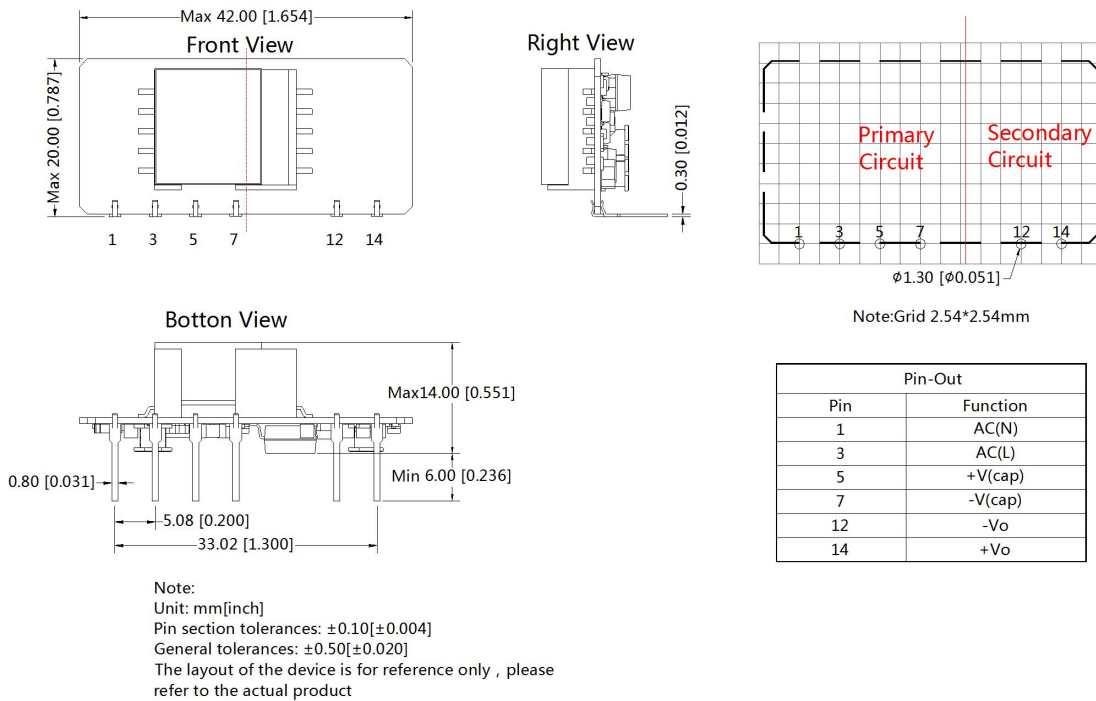
Pin-Out	
Pin	Function
1	AC(N)
3	AC(L)
5	+V(cap)
7	-V(cap)
12	-Vo
14	+Vo

- 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 ≥6.4mm for safety between external componets in primary circuit and secondary circuit.

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

LS05-15BxxSS-F Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com.
Packing bag number: 58220032(LS05-15BxxSS); 58220026(LS05-15BxxSS-F);
2. Module required dispensing fixed after assembled;
3. 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;
4. 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;
5. All index testing methods in this datasheet are based on our Company's corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Specifications are subject to change without prior notice.

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