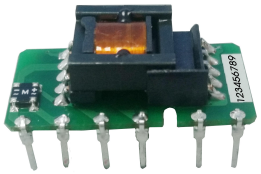
1W, AC/DC converter



FEATURES

- Ultra-wide 85 - 305VAC and 70 - 430VDC input voltage Range
- Accepts AC or DC input (dual-use of same terminal)
- Compact size, high power density
- Output short circuit, over-current protection
- IEC/EN/UL60950 safety approval

LS01-15BxxSS-F series is one of Mornsun's highly efficient green power AC-DC Converter series. They feature ultra-wide wide input range accepting either AC or DC voltage, high efficiency, low power consumption and CLASS II reinforced insulation. All models are particularly suitable for industrial control, electric power, instrumentation and smart home applications which don't have high requirement for dimension. A variety of EMC external circuits meet the needs of multiple industries.

Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
UL/CE/CB	LS01-15B05SS-F	1W	5V/200mA	66	220
	LS01-15B09SS-F		9V/111mA	67	100
	LS01-15B12SS-F		12V/83mA	70	100
	LS01-15B15SS-F		15V/67mA	69	100
	LS01-15B24SS-F		24V/42mA	68	100

Note: ① If the product is used in a severe vibration application, it needs to be glued and fixed.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	305	VAC
	DC input	70	--	430	VDC
Input frequency		47	--	63	Hz
Input current	115VAC	--	--	0.12	A
	277VAC	--	--	0.06	
Inrush current	115VAC	--	9	--	
	277VAC	--	15	--	
Recommended External Input Fuse		1A, slow-blow, required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	LS01-15B05SS-F		--	--	±8	%
	LS01-15B09SS-F		--	--	±5	
	LS01-15B12SS-F		--	--		
	LS01-15B15SS-F		--	--		
	LS01-15B24SS-F		--	--		
Line Regulation	Full load		--	±1.5	--	
Load Regulation	5% - 100% load	5V/9V/12V/15V	--	±3.0	--	
		24V	--	±6.0	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		--	50	120	mV
Temperature Coefficient			--	±0.15	--	%/°C
Stand-by Power Consumption	5V/9V/12V/15V		--	0.15	0.25	W
	24V		--	0.2	0.3	
Short Circuit Protection			Continuous, self-recovery			

Over-current Protection		110 - 500%Io, self-recovery			
Min. Load		5	--	--	%
Hold-up Time	230VAC input	150	180	--	ms

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	Test time: 1min	3000	--	--	VAC
Operating Temperature			-40	--	+85	℃
Storage Temperature			-40	--	+105	
Storage Humidity			--	--	85	%RH
Switching Frequency			--	--	100	kHz
Safety Standard			IEC60950/EN60950/UL60950			
Safety Certification			IEC60950/EN60950/UL60950			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25°C>200,000 h			

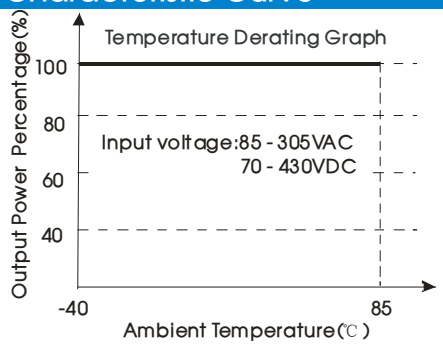
Mechanical Specifications

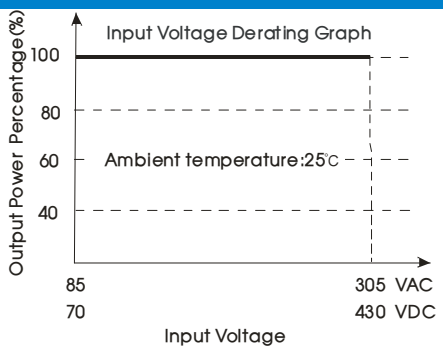
Package Dimensions	35.00 x 18.00 x 11.00 mm
Weight	6 g (Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

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

Product Characteristic Curve





Note: 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

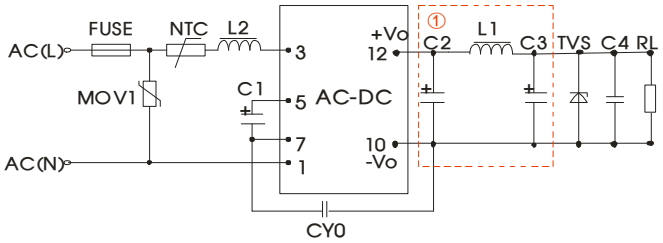


Fig. 1
Note: ① is Pi filter circuit.

Part No.	FUSE (required)	MOV1	C1 (required)	L2	NTC	C2 (required)	L1 (required)	C3 (required)	C4	CY0	TVS
LS01-15B05SS-F	1A/ 300V	S14K350	4.7μF/450V	1mH	15D-5	100μF/ 16V (Solid Capacitor)	2.2μH	68μF/35V	0.1μF /50V	1nF/400 VAC	SMBJ7.0A
LS01-15B09SS-F						150μF/ 35V					SMBJ12A
LS01-15B12SS-F						100μF/ 35V					SMBJ20A
LS01-15B15SS-F											SMBJ20A
LS01-15B24SS-F											SMBJ30A

Note:
C1: C1 is used as filter capacitor with AC input and as EMC filter capacitor with DC input;
We recommend using an electrolytic capacitor with high frequency and low ESR rating for C2, C3 (refer to manufacture's datasheet). Combined with C2, L1, L2, 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. A suppressor diode (TVS) is a recommended to protect the application in case of a converter failure.

2. EMC compliance recommended circuit

MORNSUN P/N: FC-L01DV1

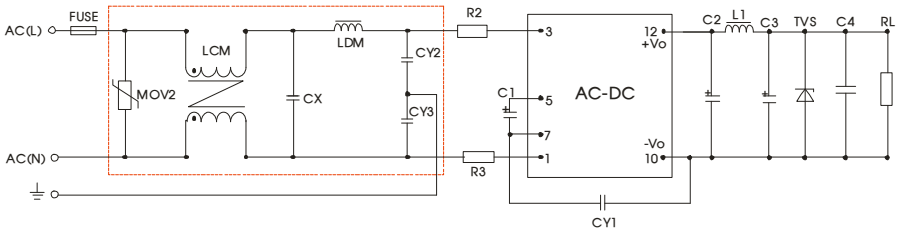


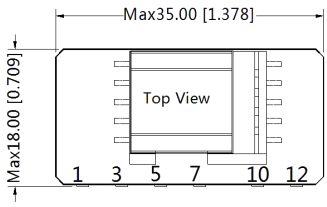
Fig 2

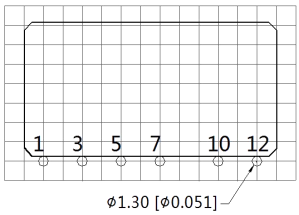
Components	Recommend Parameter
MOV2	S14K350
CY1/CY2/CY3	1nF/400VAC
CX	0.1μF/275VAC
LCM	3.5mH
LDM	0.33mH
R2/R3	33Ω/3W
FUSE(required)	1A/300V, slow-blow
MORNSUN P/N: FC-L01DV1	

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

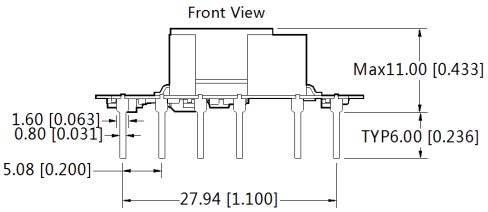
LS01-15BxxSS –F Dimensions and Recommended Layout

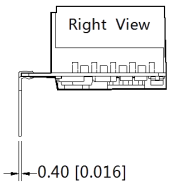
THIRD ANGLE PROJECTION





Note:Grid 2.54*2.54mm





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

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

1.It is necessary to add C1 between pin5 and Pin7 ;
2.It is necessary to add pi-type filter circuit to the output,such as the typical application of Figure 1.

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number:58220025;
2. External electrolytic capacitors are required to modules, more details refer to typical applications;
3. This part is open frame, at least 6.4mm safety distance between 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 Ta=25℃, humidity<75%, nominal input voltage (115V and 230V) and rated output load;
5. In order to increase the conversion efficiency of the product with light load in the design, the product will have audio noise when it is operating, but don't affect the product's reliability and performance;
6. All index testing methods in this datasheet are based on our company corporate standards;
7. We can provide product customization service, please contact our technicians directly for specific information;
8. Products are related to laws and regulations: see "Features" and "EMC";
9. 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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