

LS01 Series

1W, HIGH VOLTAGE DC-DC(AC-DC) CONVERTER

LS01 Series ----- are high efficiency green power modules with miniature packaging provided by Mornsun. The features of this series are: wide input voltage, DC and AC all in one, high efficiency, high reliability, low loss, safety isolation etc, meet UL60950/EN60950 standards. All models are particularly suitable for the applications demanding on the volume, need to meet UL/CE standard, less demanding on EMC like industrial, electric power, instrumentation, smart home. For harsh EMC environment, this series of products must use the referred application circuit.



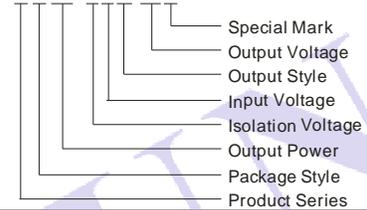
RoHS

FEATURES

1. Wide input voltage:100 ~ 400VDC(85 ~ 264VAC)
2. Over current protection and short circuit protection
3. High efficiency, high density
4. Low loss, green power
5. Industrial level
6. Ultra-Miniature package
7. Meet UL/CE standard

PART NUMBER SYSTEM

LS01-15B15S



SELECTION GUIDE

Model	Package (Typ.)	Power	Output (Vo/Io)	Ripple and Noise		Efficiency (%) (Typ.)
LS01-15B05S	34.0*26.0*10.5mm	1W	5V/200mA	100mV(Typ.)	150mV(Max.)	66
LS01-15B09S			9V/111mA	80mV(Typ.)	120mV(Max.)	67
LS01-15B12S			12V/83.3mA	80mV(Typ.)	120mV(Max.)	70
LS01-15B15S			15V/66.6mA	80mV(Typ.)	120mV(Max.)	69
LS01-15B24S			24V/41.6mA	100mV(Typ.)	150mV(Max.)	68

INPUT SPECIFICATIONS

Input voltage range	100~400VDC(85~264VAC)	
Input current	120mA (Max.)	
Inrush current	20A	
External input fuse (recommended)	1A/250V	slow blow

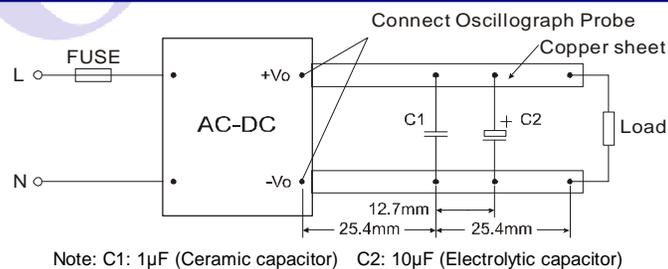
OUTPUT SPECIFICATIONS

Voltage set accuracy	LS01-15B05S	-25℃~+55℃	±5%
		-40℃~+85℃	±10%
	LS01-15B09S	-25℃~+55℃	±3%
			LS01-15B12S
	LS01-15B15S	-40℃~+85℃	±5%
LS01-15B24S	±5%		
Input variation			±1.5% (Typ.)
Load variation (5%~100%)			±2.5% (Typ.)
Ripple & noise(p-p) (20MHz Bandwidth) Note :Low frequency ripple is normal.	5 VDC output		100mV(Typ.) 150mV(Max.)
	9 VDC output		80mV(Typ.) 120mV(Max.)
	12VDC output		80mV(Typ.) 120mV(Max.)
	15VDC output		80mV(Typ.) 120mV(Max.)
	24VDC output		100mV(Typ.) 150mV(Max.)
Short circuit protection	Continuous, automatic resume		
Over temperature protection	No		

COMMON SPECIFICATIONS

Temperature ranges	Operating		-40°C ~ +85°C	
	Power derating	(55~85°C)	1.33%/°C	
		(-40°C~-20°C)	2%/°C	
	Storage		-40°C ~ +105°C	
The Max. Case Temperature		+90°C (Max.)		
Humidity		85% (Max.)		
Temperature coefficient		0.1%/°C		
Switching frequency		Variational Frequency 50KHz (Max.)		
I/O-isolation voltage		Input and Output 3000VAC/1Min		
EMC	EMI	CE	CISPR22/EN55022 CLASS A (External Circuit Refer to Figure 1)	
			CISPR22/EN55022 CLASS B (External Circuit Refer to Figure 3)	
		RE	CISPR22/EN55022 CLASS A (External Circuit Refer to Figure 1)	
			CISPR22/EN55022 CLASS B (External Circuit Refer to Figure 3)	
	EMS	ESD	IEC/EN61000-4-2 Contact ±4KV	perf. Criteria B
		RS	IEC/EN61000-4-3 10V/m	perf. Criteria A (External Circuit Refer to Figure 3)
		EFT	IEC/EN61000-4-4 ±2KV	perf. Criteria B (External Circuit Refer to Figure 1)
			IEC/EN61000-4-4 ±4KV	perf. Criteria B (External Circuit Refer to Figure 3)
		Surge	IEC/EN61000-4-5 ±2KV/±4KV	perf. Criteria B (External Circuit Refer to Figure 3)
		CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A (External Circuit Refer to Figure 3)
PFM	IEC/EN61000-4-8 10A/m	perf. Criteria A		
Voltage dips, short and interruptions immunity		IEC/EN61000-4-11 0%-70%	perf. Criteria B	
Case material		UL94V-0		
Install		PCB		
MTBF		>300,000h @25°C		
<p>Note:</p> <ol style="list-style-type: none"> 1. External electrolytic capacitor are required to models when AC input, more details refer to typical applications. 2. Ripple and Noise were measured by the method of anear measure (more details refer to the anear measure). 3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified. 4. In this datasheet, all the test methods of indications are based on corporate standards. 				

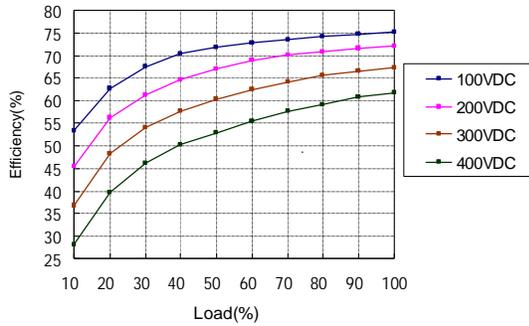
ANEAR MEASURE



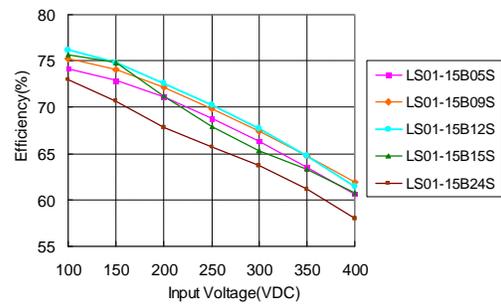
PRODUCT TYPICAL CURVE



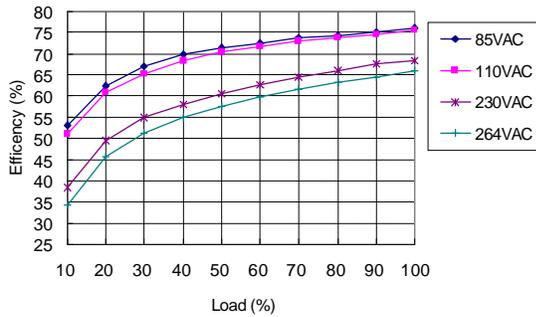
LS01 DC input efficiency cure



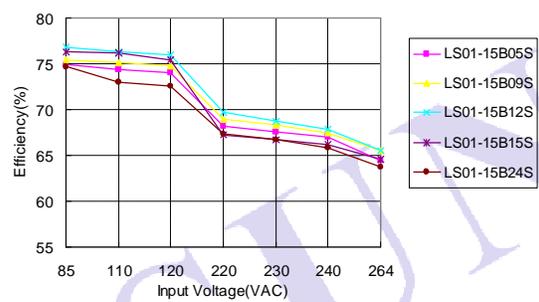
LS01 DC input rated load efficiency cure



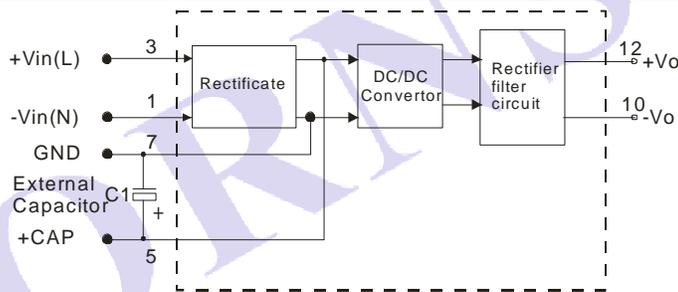
LS01 AC input efficiency cure



LS01 AC input rated load efficiency cure



STRUCTURE FIGURE



TYPICAL APPLICATIONS

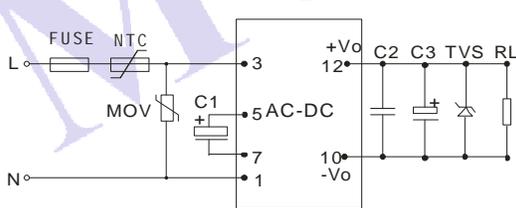


Figure 1: LS01-15BXXS

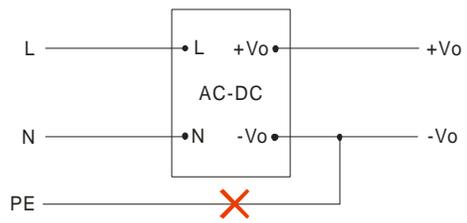


Figure 2: Note: This application is not supported for this series.

can use MORNSUN's FC-L01D

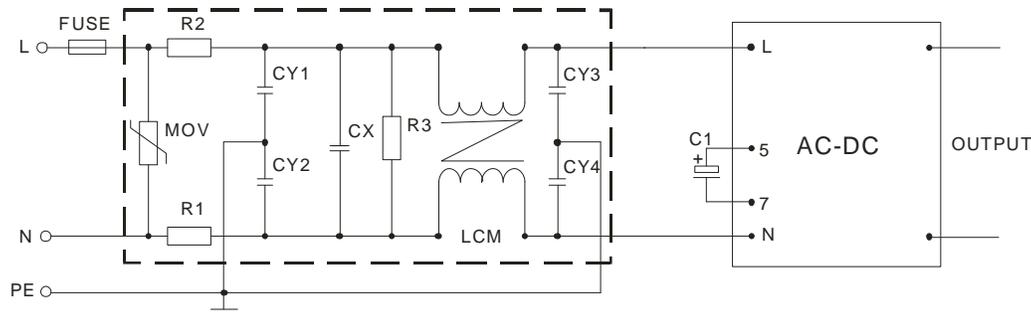


Figure 3: LS01 series Recommended circuit for application require higher EMC standard (external circuit output same as above)

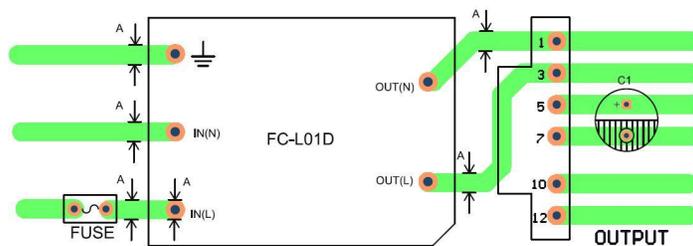


Figure 4: EMC application circuit PCB layout
Safety and recommend wiring: linewidth $A \geq 3\text{mm}$

EXTERNAL CAPACITORS TYPICAL VALUE

Output Voltage	C1	C2	C3	FUSE	TVS
5V	10 μF -22 μF / 400V	1 μF /50V (Ceramic capacitor)	470 μF /35V	1A/250V	SMBJ7.0A
9V			150 μF /35V		SMBJ12A
12V					SMBJ20A
15V					SMBJ30A
24V			100 μF /35V		

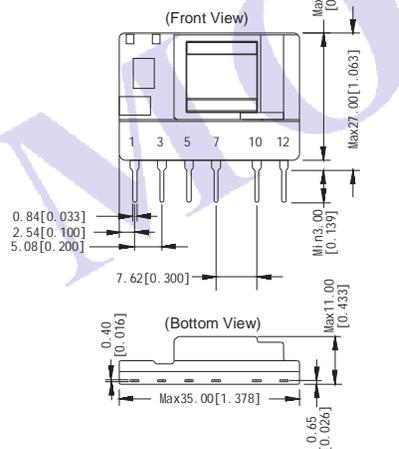
Note:

- C1: AC input, is filtering electrolytic capacitor (which is required), when input voltage is below 100VAC, and the value of C1 is 10 μF -22 μF /400V. DC input, is a filtering capacitor in EMC Filter, the value of C1 is 10 μF /400V (when input voltage is above 370VDC, and the value of C1 is 10 μF /450V), If EMC performance is not required, C1 could not need.
- Output filtering capacitor C2 (which is required when AC input or DC input) is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to manufacture's datasheet. Voltage derating of capacitor should be 80% or above. C3 is ceramic capacitor, it is used to filter high frequency noise. TVS is a recommended component to protect post-circuits (if converter fails). External input NTC is recommended to use 5D-9.
- For standard EMC requirement, please refer to figure 1, if higher EMC requirement, please refer to figure 3.
MOV: Varistor, model: 561KD14, it is used to protect the device under surge;
R1、R2: 2 Ω /3W Winding resistor;
R3: 1M Ω /2W;
CY1、CY2、CY3、CY4: 1nF/400VAC;
CX: 0.22 μF /275VAC;
LCM: 10mH-30mH;
FC-L01D: Mornsun's 2KV/4KV Surge protector.
- FUSE: 1A/250V

OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS & RECOMMENDED FOOTPRINT

SIP Package



Note:
Unit: mm[inch]
Pin section tolerances: $\pm 0.10\text{mm} [\pm 0.004\text{inch}]$
General tolerances: $\pm 0.50\text{mm} [\pm 0.020\text{inch}]$

FOOTPRINT DETAILS

Pin	Function
1	-Vin (N)
3	+Vin (L)
5	+CAP
7	GND
10	-Vo
12	+Vo

PACKAGING DIAGRAM



Inner box dimensions: L*W*H=355*192*93mm
Packaging quantity: 100pcs
Outer box dimensions: L*W*H=405*380*305mm
Packaging quantity: 600pcs

MORNSUN Science & Technology Co.,Ltd.

Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Luogang district, Guangzhou, P.R.China.

Tel: 86-20-28203030

Fax: 86-20-38601272

[Http://www.mornsun-power.com](http://www.mornsun-power.com)