

Datasheet

LS 01 SERIES

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

High efficiency green power modules with miniature packaging.

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 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.

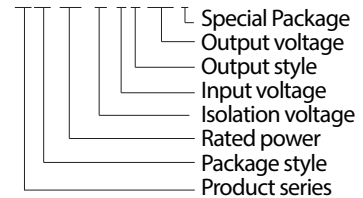
RoHS 

Product features

Wide input voltage:85 ~ 264Vac (100 ~ 400Vdc)
 Over current protection and short circuit protection
 High efficiency, high density
 Low loss, green power
 Industrial level
 Ultra-Miniature package
 Meets UL/CE standard

Model selection

LS01-15B05S



PRODUCT							
RS STOCK NO.	MODEL NO.	PACKAGE (TYP.)	POWER	OUTPUT (Vo / Io)	RIPPLE & NOISE		EFF. (TYP.)
771-9354	LS01-15B05S	34.0 x 26.0 x 10.5mm	1W	5V/200mA	100mV(Typ.)	150mV(Max.)	66%
771-9363	LS01-15B09S			9V/111mA	80mV(Typ.)	120mV(Max.)	67%
771-9366	LS01-15B12S			12/83.3mA	80mV(Typ.)	120mV(Max.)	70%
771-9360	LS01-15B24S			24V/41.6mA	100mV(Typ.)	150mV(Max.)	68%

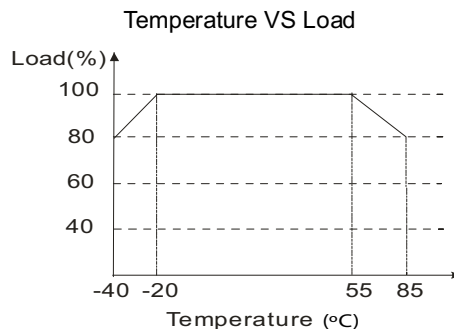
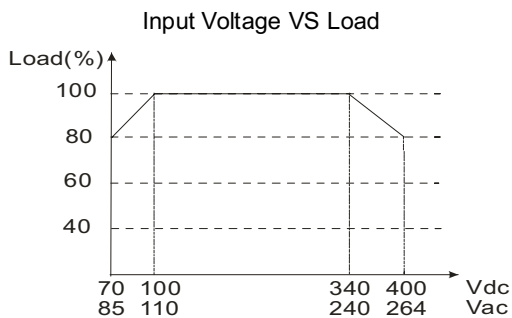
INPUT SPECIFICATIONS		
Input voltage range	85 ~ 264Vac (100 ~ 400Vdc)	
Input current	120mA (Max.)	
Inrush current	20A	
External input fuse (recomended)	2A/250V	slow blow

OUTPUT SPECIFICATIONS				
Voltage set accuracy	LS01-15B05S	-25°C to +55°C	± 5%	
		-40°C to +85°C	± 10%	
	LS01-15B09S	-25°C to +55°C		± 3%
		LS01-15B12S	-25°C to +55°C	
LS01-15B24S	-40°C to +85°C		± 5%	
Input variation			±1.5% (Typ.)	
Load variation (5% to 100%)			± 2.5% (Typ.)	
Ripple & noise (p-p) (20MHz bandwidth) Note: low frequency ripple is normal.			100mV (Typ.)	150mV (Max.)
			80mV (Typ.)	120mV (Max.)
			80mV (Typ.)	120mV (Max.)
			100mV (Typ.)	150mV (Max.)
Short circuit protection	Continuous, automatic resume			
Over temperature protection	No			

GENERAL SPECIFICATIONS			
Temperature ranges	Operating		-40°C to +85°C
	Power derating	(+55 to +85°C)	1.33% / °C
		(-40 to -20°C)	2% / °C
	Storage		-40°C to +105°C
Max. case temperature		90°C (Max.)	
Humidity			85% (Max.)
Temperature coefficient			0.1% / °C
Switching frequency			Variational frequency 50kHz (Max.)
Isolation voltage	Input and output		3000Vac / 1 min
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. CriteriaA		
Voltage dips, short & interruptions immunity		IEC/EN61000-4-11 0%-70% perf. Criteria B	
Case material	UL94V-0		
Installation	PCB		
MTBF	>300,000h @25°C		
Note: 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. 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.			

Temperature vs load

Input voltage vs load



Typical applications

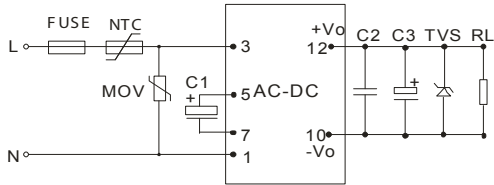


Figure 1 LS01-15BXXS

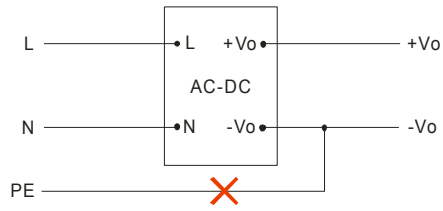


Figure 2 Note: This application is not supported for this series.

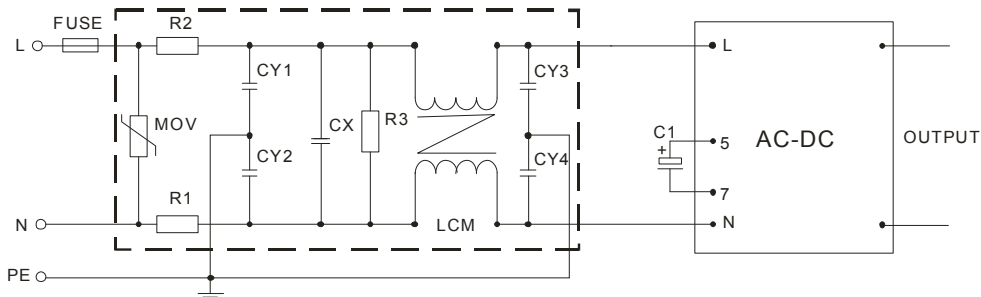


Figure 3 Improved EMC circuit protection (external circuit output as figure 1)

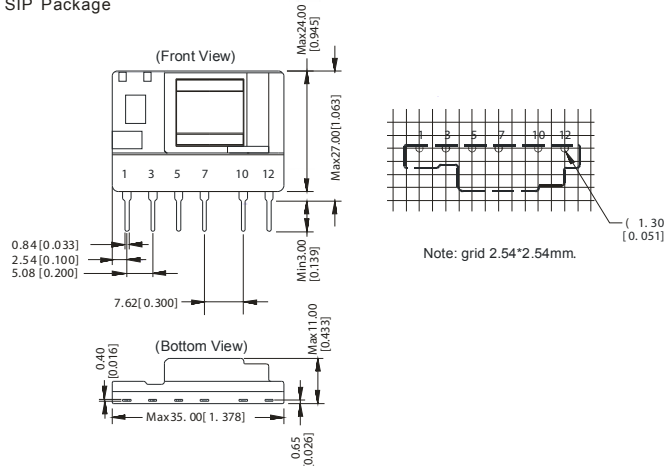
EXTERNAL CAPACITORS TYPICAL VALUE					
OUTPUT VOLTAGE	C1	C2	C3	FUSE	TVS
5V	10µF-22µF/400V	0.1µF/50V (Ceramic capacitor)	470µF/35V	1A/250V	SMBJ7.0A
9V			150µF/35V		SMBJ12A
12V			100µF/35V		SMBJ20A
24V					SMBJ30A

Note:
 1. C1:ac input, is filtering electrolytic capacitor (which is required), when input voltage is below 100Vac, and the value of C1 is 10µF-22µF/400V. dc input, is a filtering capacitor in EMC Filter, the value of C1 is 10µF/400V(when input voltage is above 370VDC, and the value of C1 is 10µF/450V), if EMC performance is not required, C1 is not needed.
 2. 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.
 3. 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; R1R2: 2Ω/3W Winding resistor: R3 1MΩ/2W: CY1 CY2 CY3 CY4 1nF/400VAC: CZ X: 0.22µF /275Vac: LCM: 10mH-30mH: FC-L01D: 2KV/4KV Surge protector.
 4. FUSE: 1A/250V

Outline dimensions & footprint details

MECHANICAL DIMENSIONS & RECOMMENDED FOOTPRINT

SIP Package



Note:
 Unit: mm[inch]
 Pin section tolerances: ±0.10mm[±0.004inch]
 General tolerances: ±0.50mm[±0.020inch]

FOOTPRINT DETAILS	
PIN	FUNCTION
1	-Vin(N)
2	No pin
3	+Vin (L)
4	No pin
5	+CAP
6	No pin
7	GND
8	No pin
9	No pin
10	-Vo
12	+Vo