LS 03-R2 SERIES

3W, HIGH VOLTAGE AC-DC (DC-DC) CONVERTER

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 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 refered application circuit.

RoHS

Product features

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

Model selection

LS03-15B12SR2

- Special Package
- Output voltage
- Output style
- Input voltage
- Isolation voltage
- Rated power
- Package style
- Product series

PRODUCT							
RS STOCK NO.	MODEL NO.	PACKAGE (TYP.)	POWER	OUTPUT (Vo / Io)	RIPPLE & NOISE		EFFICIENCY % (TYP.)
771-9379	LS03-15B05SR2	34.0 x 26.0 x 10.5mm	2.5W	5V/500mA	120mV(Typ.)	240mV(Max.)	69%
771-9372	LS03-15B09SR2		3W	9V/333mA	100mV(Typ.)	150mV(Max.)	76%
771-9376	LS03-15B12SR2			12/250mA	100V(Typ.)	150mV(Max.)	78%
771-9385	LS03-15B24SR2			24V/125mA	120mV(Typ.)	240mV(Max.)	78%

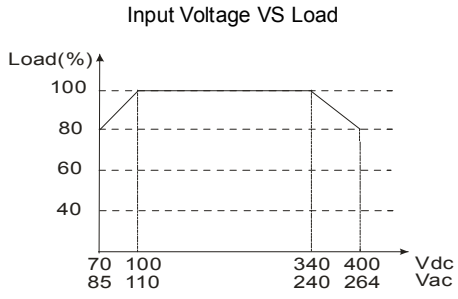
INPUT SPECIFICATIONS		
Input voltage range	85 ~ 264Vac (100 ~ 400Vdc)	
Input current	120mA (Max.)	
Inrush current	40A	
External input fuse (recomended)	1A/250V	slow blow

OUTPUT SPECIFICATIONS				
Voltage set accuracy	LS03-15B05SR2	-40ºC to +85ºC	± 5%	
	LS03-15B09SR2	-20ºC to +55ºC	± 5%	
	LS03-15B12SR2	-40ºC to +85ºC	± 8%	
	LS03-15B24SR2	-40ºC to +85ºC	± 5%	
Input variation			±1.5% (Typ.)	
Load variation (10% to 100%)			± 2.5% (Typ.)	
Ripple & noise (p-p) (20MHz bandwidth) Note: low frequency ripple is normal.	5Vdc output		120mV (Typ.)	240mV (Max.)
	9Vdc output		100mV (Typ.)	150mV (Max.)
	12Vdc output		100mV (Typ.)	150mV (Max.)
	24Vdc output		120mV (Typ.)	240mV (Max.)
Short circuit protection	Continuous, automatic resume			
Over temperature protection	No			

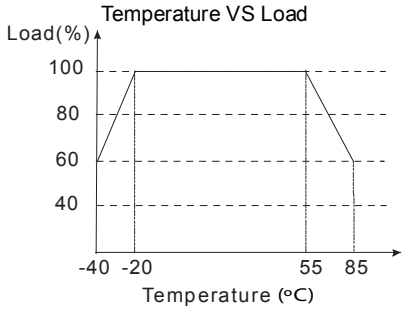
GENERAL SPECIFICATIONS				
Temperature ranges	Operating			-40°C to +85°C
	Power derating		(+55 to +85°C)	1.33% / °C
			(-40 to -20°C)	2% / °C
	Storage			-40°C to +105°C
	Max. case temperature			90°C (Max.)
Humidity				85% (Max.)
Temperature coefficient				0.15% / °C
Switching frequency				Variational 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. Criteria A
		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

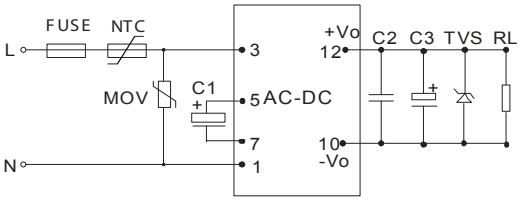


Figure 1 LS01-15BXXS

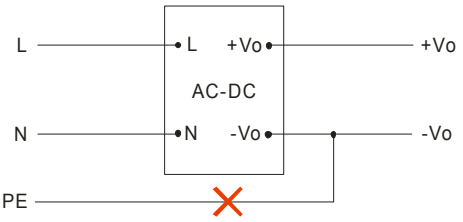


Figure 2 Note: This application is not supported for this series.

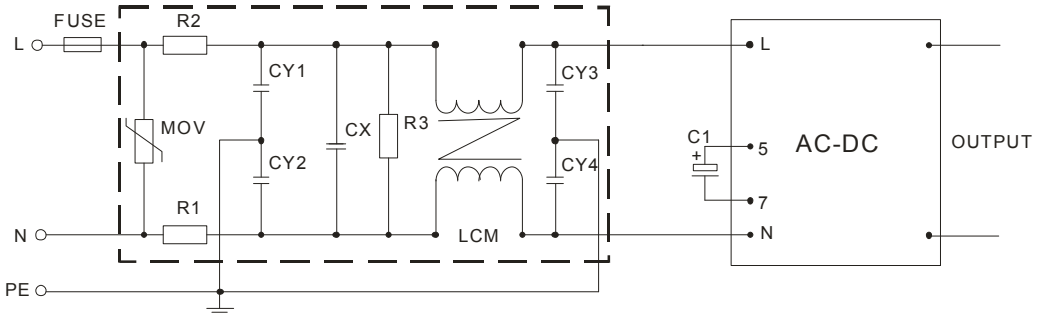


Figure 3 Improved EMC circuit protection (external circuit output as figure 1)

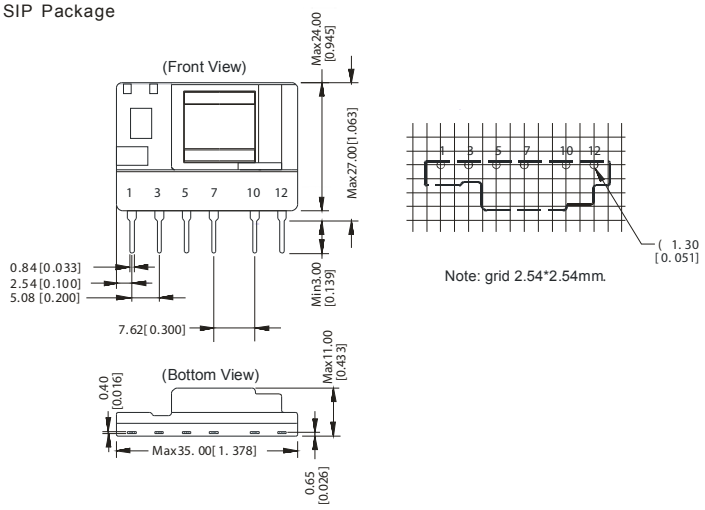
EXTERNAL CAPACITORS TYPICAL VALUE					
OUTPUT VOLTAGE	**C1**	**C2**	**C3**	**FUSE**	**TVS**
5V	22μF-22μF/400V	0.1μF/50V (Ceramic capacitor)	470μF/35V	1A/250V	SMBJ7.0A
9V			330μF/35V		SMBJ12A
12V					SMBJ20A
24V			150μF/35V		SMBJ30A

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