MORNSUN®

LS03-R2 Series

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

RoHS

LS03-R2 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 refered application circuit.

FEATURES

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

PART NUMBER SYSTEM

LS03-15B15SR2

- Special Mark
- Output Voltage
- Output Style
- Input Voltage
- Isolation Voltage
- Output Power
- Package Style
- Product Series

SELECTION GUIDE

Model	Package (Typ.)	Power	Output (Vo/Io)	Ripple and Noise		Efficiency (%) (Typ.)
LS03-15B05SR2	34.0*26.0*10.5mm	2.5W	5V/500mA	120mV(Typ.)	240mV(Max.)	69
LS03-15B09SR2		3W	9V/333mA	100mV(Typ.)	150mV(Max.)	76
LS03-15B12SR2			12V/250mA	100mV(Typ.)	150mV(Max.)	78
LS03-15B15SR2			15V/200mA	120mV(Typ.)	240mV(Max.)	78
LS03-15B24SR2			24V/125mA	120mV(Typ.)	240mV(Max.)	78

INPUT SPECIFICATIONS

Input voltage range	100~400VDC(85~264VAC)	
Input current	120mA (Max.)	
Inrush current	40A	
External input fuse (recommended)	1A/250V	slow blow

OUTPUT SPECIFICATIONS

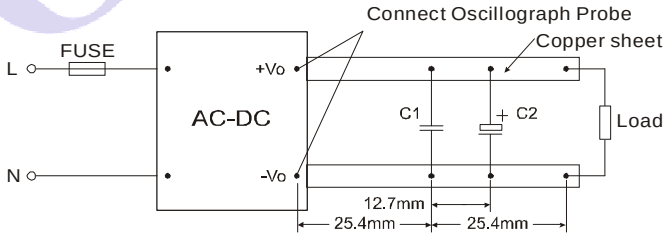
Voltage set accuracy	LS03-15B05SR2	-40℃~+85℃	±5% (-20℃~-40℃ and 55℃~85℃:Output filtering capacitance: 270μF/16V)	
	LS03-15B09SR2	-20℃~+55℃	±5%	
	LS03-15B12SR2	-40℃~+85℃	±8%	
	LS03-15B15SR2 LS03-15B24SR2	-40℃~+85℃	±5%	
Input variation			±1.5% (Typ.)	
Load variation (10%~100%)			±2.5% (Typ.)	
Ripple & noise(p-p) (20MHz Bandwidth) Note :Low frequency ripple is normal.	5 VDC output		120mV(Typ.)	240mV(Max.)
	9 VDC output		100mV(Typ.)	150mV(Max.)
	12VDC output		100mV(Typ.)	150mV(Max.)
	15VDC output		120mV(Typ.)	240mV(Max.)
	24VDC output		120mV(Typ.)	240mV(Max.)
Short circuit protection	Continuous, automatic resume			
Over temperature protection	No			

COMMON SPECIFICATIONS

Temperature ranges		Operating		-40℃～+85℃	
		Power derating	(55～85℃)	1.33%/ ℃	
			(-40℃～-20℃)	2%/ ℃	
		Storage		-40℃～+105℃	
		The Max. Case Temperature		+90℃ (Max.)	
Humidity				85% (Max.)	
Temperature coefficient				0.15%/℃	
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 Figure1）
				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℃	

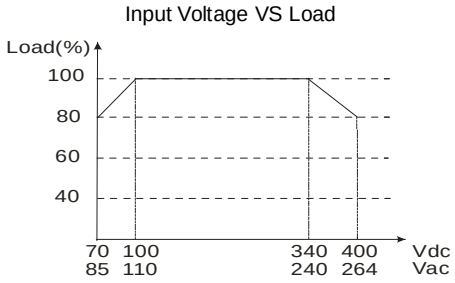
Note:
1. External electrolytic capacitor are required to models when AC input, more details refer to typical applications.
2. Ripple and Noise were measured by the method of anear measure (more details refer to the anear measure).
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on corporate standards.

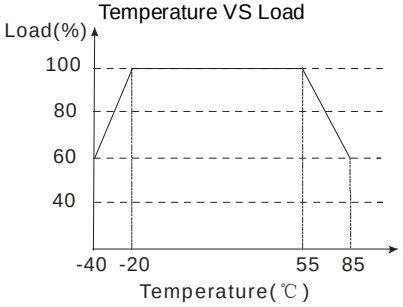
ANEAR MEASURE



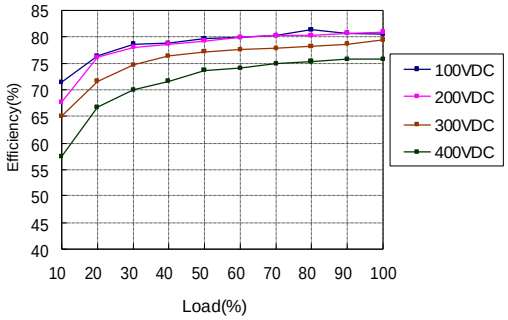
Note: C1: 1μF (Ceramic capacitor) C2: 10μF (Electrolytic capacitor)

PRODUCT TYPICAL CURVE

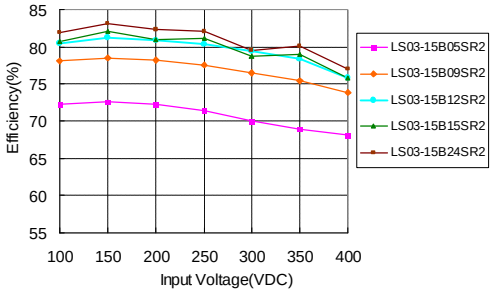




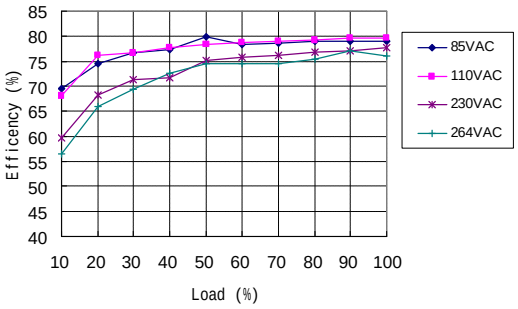
LS03 DC input efficiency cure



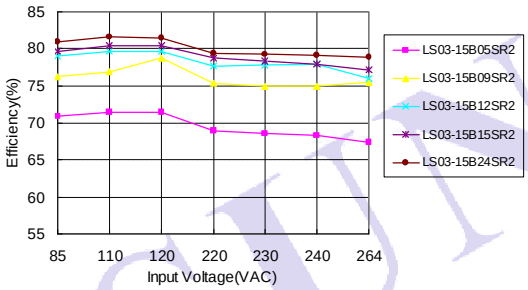
LS03 DC input rated load efficiency cure



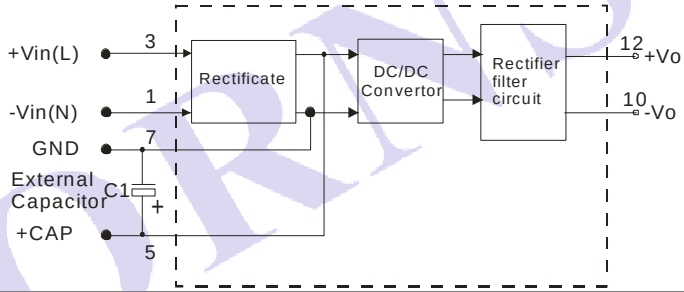
LS03 AC input efficiency cure



LS03 AC input rated load efficiency cure



STRUCTURE FIGURE



TYPICAL APPLICATIONS

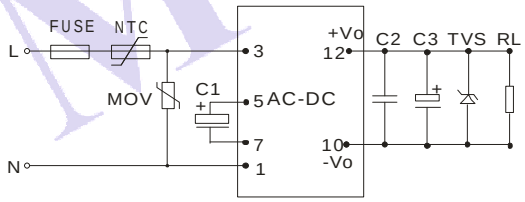


Figure 1：LS03-15BXXSR2

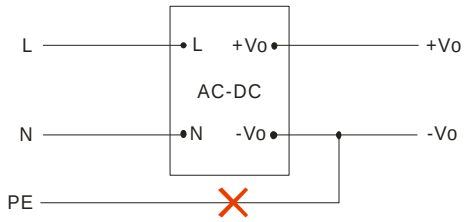


Figure 2：Note: This application is not supported for this series.

can use MORNSUN's FC-L01D

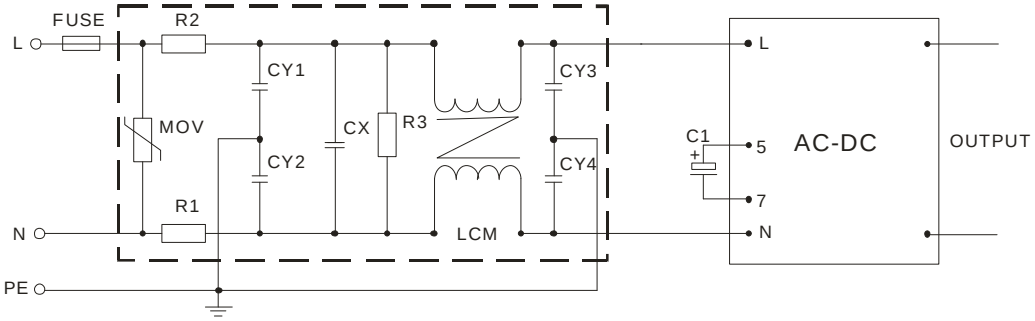


Figure 3：LS03-R2 series Recommended circuit for application require higher EMC standard (external circuit output same as above)

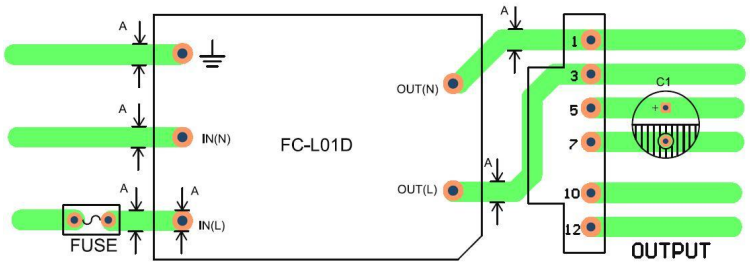


Figure 4：EMC application circuit PCB layout
Safety and recommend wiring: linewidth A≥3mm

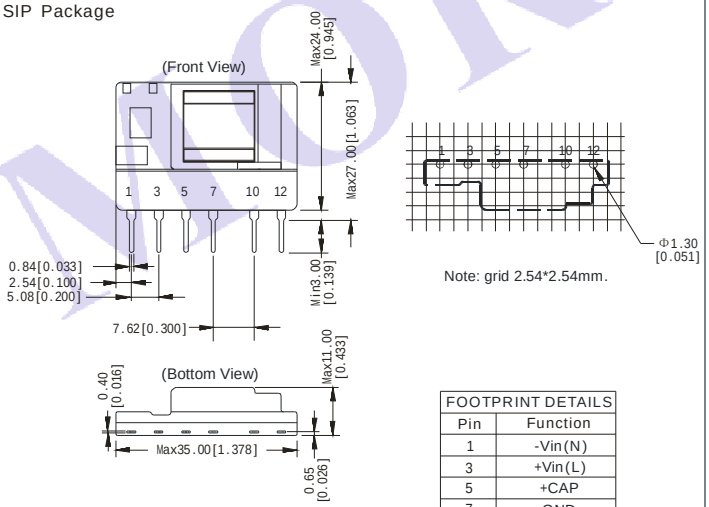
EXTERNAL CAPACITORS TYPICAL VALUE					
Output Voltage	C1	C2	C3	FUSE	TVS
5V	22μF/400V	1μF/50V (Ceramic apacitor)	470μF/35V	1A/250V	SMBJ7.0A
9V			330uF/35V		SMBJ12A
12V			150μF/35V		SMBJ20A
15V					
24V					SMBJ30A

Note:
1. C1:AC input, is filtering electrolytic capacitor (which is required), when input voltage is below 100VAC, and the value of C1 is 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 22μF/450V), If EMC performance is not required,C1 could not need.
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;
   R1 、R2：2Ω/3W Winding resistor；
   R3：1MΩ/2W；
   CY1、CY2、CY3、CY4：1nF/400VAC；
   CX：0.22μF /275VAC；
   LCM：10mH-30mH；
   FC-L01D：Mornsun's 2KV/4KV Surge protector.
4. FUSE: 1A/250V

OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS & RECOMMENDED FOOTPRINT

SIP Package



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

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

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

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