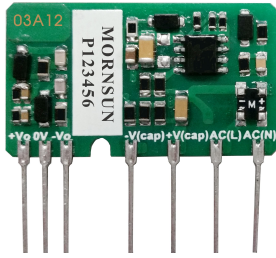


2.4W, AC/DC converter



RoHS

Model marking with number, such as "03A12" means "LS03-15A12SR2S"

LS03-15A12SR2S is a high efficiency green power module provided by Mornsun. The features of this series are: Accept either AC or DC input, wide input voltage, high efficiency, low power consumption, safety isolation etc. All models are particularly suitable for the applications such as industrial, electric power, instrumentation, smart home which do not have high requirement on EMC. EMC application circuit must be added if the products need to be applied to EMC harsh environment.

FEATURES

- Input voltage range: 85 - 264VAC/100 - 370VDC
- Output short circuit, over-current protection
- High efficiency, high power density
- Low power consumption, green power
- Industrial-grade design
- Open frame, Compact size
- Flexible design of peripheral circuit reduces layout problems
- Meets IEC60950, UL60950, EN60950 standards

Selection Guide

Model	Output Power	Nominal Output Voltage and Current		Efficiency (230VAC, %/Typ.)	Max. Capacitive Load (uF)	
		(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
LS03-15A12SR2S	2.4W	+12V/150mA	-12V/50mA	74	100	100

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	264	VAC
	DC input	100	--	370	VDC
Input frequency		47	--	63	Hz
Input current	115VAC	--	--	0.12	A
	230VAC	--	--	0.06	
Inrush current	115VAC	--	13	--	A
	230VAC	--	23	--	
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	10%-100% load(balanced load)	Vo1	±5	--	%
		Vo2	±10	--	
Line Regulation	Full load	--	±2.5	--	%
Load Regulation	10%-100% load	--	±2.5	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	70	150	mV
Temperature Coefficient		--	±0.15	--	%/°C
Short Circuit Protection		Continuous, self-recovery			
Over-current Protection		≥110%Io self-recovery			
Min. Load		10	--	--	%

Note:* Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	Test time: 1min	3000	--	--	VAC
Operating Temperature			-40	--	+85	°C
Storage Temperature			-40	--	+105	
Storage Humidity			--	--	85	%RH
Power Derating	-40°C to -20°C		2.0	--	--	% / °C
	+55°C to +85°C		1.33	--	--	
Safety Standard			Meets IEC60950/EN60950/UL60950			
Safety Class			CLASS II			
MTBF	MIL-HDBK-217F@25°C		> 300,000 h			

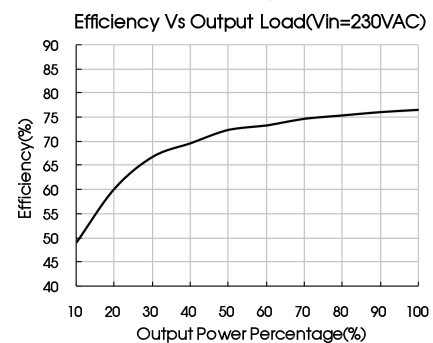
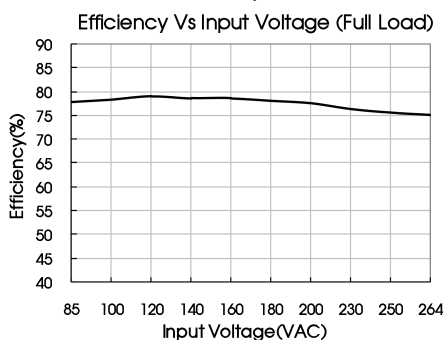
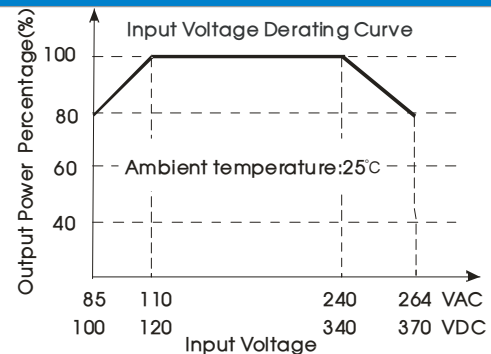
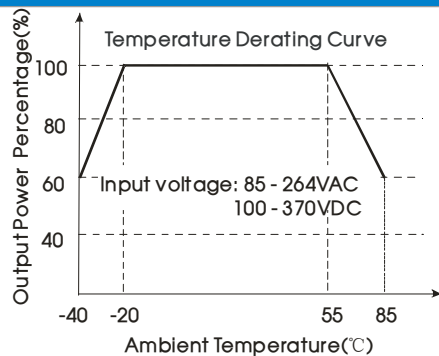
Physical Specifications

Package Dimensions	35.00*21.00*13.00 mm
Weight	6.5 g(Typ.)
Cooling method	Free air convection

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS A (See Fig. 1 for typical application circuit)	
	RE	CISPR22/EN55022	CLASS A (See Fig. 1 for typical application circuit)	
EMS	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
	Surge	IEC/EN61000-4-5	line to line ±1KV (See Fig. 1 for typical application circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s (See Fig. 2 for recommended circuit)	perf. Criteria A

Product Characteristic Curve



Note: ① Input voltage should be derated based on temperature derating when it is 85 - 110VAC/240 - 264VAC/100 - 120VDC/340 - 370VDC;
② This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.

Design Reference

1. Typical application circuit

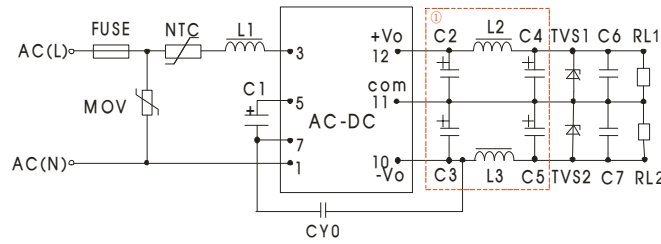


Fig. 1

Model	FUSE (necessary)	C1 (necessary)	L1	L2, L3	C2, C3	C4, C5	C6, C7	CY0	TVS1, TVS2
LS03-15A12SR2S	1A/250V	10uF/450V	4.7mH	2.2uH	150uF/35V	68uF/35V	0.1uF/50V	1nF/400VAC	SMBJ20A

Note:
C2, C3, C4, C5 are output filter capacitors (which is required), C2, C3, C4, C5 and L2, L3 form a pi-type filter circuit, they are recommended to be high frequency and low impedance electrolytic capacitors. Capacitance and rated ripple current of capacitors refer to the datasheets provided by the manufactures. Capacitor voltage reduced to at least 80%. C6, C7 are a ceramic capacitors, which is used to filter high frequency noise. Current of L1, L2, L3 refer to the datasheets provided by the manufactures, current derating to at least 80%. TVS is a recommended component to protect post-circuits (if converter fails). External input NTC model is recommended to use 13D-5. External input MOV model is recommended to use S14K320.

2. EMC solution-recommended circuit

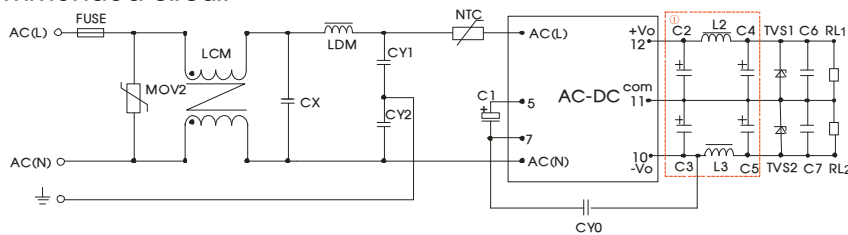


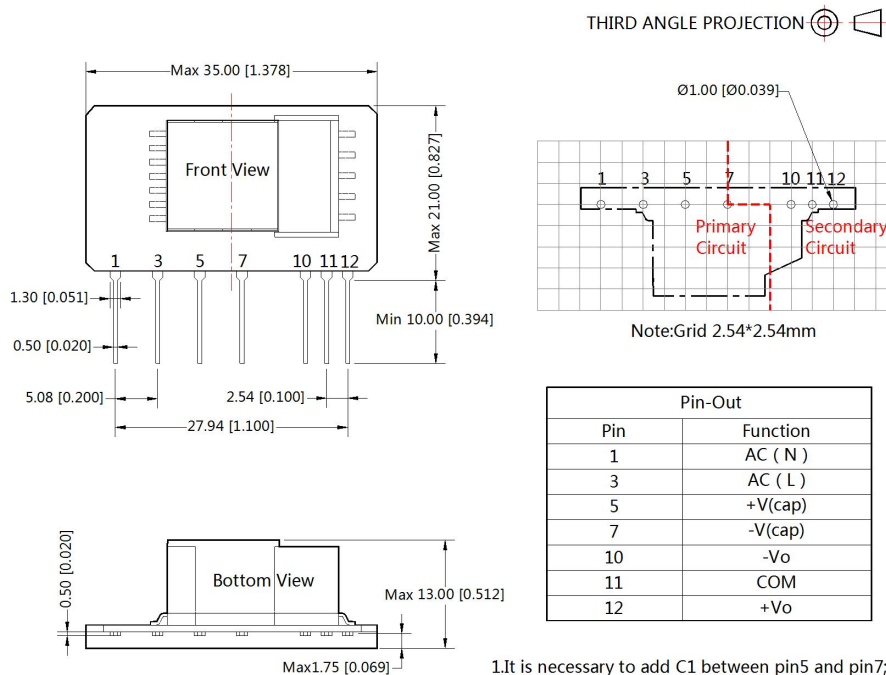
Fig. 2

Element model	Recommended value
MOV2	S14K320
CY1	1nF/400VAC
CY2	1nF/400VAC
CX	0.1μF/275VAC
LCM	3.5mH
LDM	0.33mH
NTC	13D-5
FUSE	1A/250V, slow fusing, necessary

Note: The recommended value of other components refers to typical application circuit.

3. For more information Please find the application note on www.mornsun-power.com

Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin section tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$
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;
3.It is needed to have distance $\geq 6.4\text{mm}$ for safety between external componets in primary circuit and secondary circuit.

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58220032;
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 the primary and secondary external components of the module is needed to meet the safety requirement;
4. All specifications were measured at $T_a=25^\circ\text{C}$, humidity<75%, nominal input voltage (115VAC or 230VAC)and rated output load unless otherwise specified;
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. Module required dispensing fixed after assembled;
7. All index testing methods in this datasheet are based on our Company's corporate standards;
8. We can provide product customization service;
9. Specifications of this product are subject to changes without prior notice.

Mornsun Guangzhou 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: 86-20-38601850-8801 Fax: 86-20-38601272 E-mail: info@mornsun.cn