

## LS03-05BxxS(-F) SERIES

### 3W, AC-DC (High Voltage DC-DC) CONVERTER

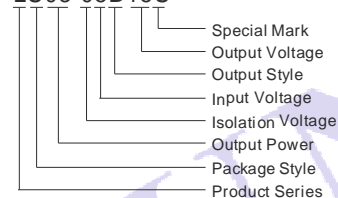
LS03 Series ----- high efficiency green power modules with miniature packaging offered by Mornsun. The features of this series are: wide input voltage, DC and AC all in one, high efficiency, high reliability, low loss, safety isolation etc., and it's widely used in industrial, office and civil equipments, as well as applications where no special requirement for EMC performance. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

#### PRODUCT FEATURES

1. Universal input range :85~264VAC(70~400VDC)
2. Protection of output short circuit, over temperature
3. High efficiency, high density
4. Low loss, green power
5. 90 degree curved series, minimizing product height
6. Multiple models available
7. Industrial level specifications

#### PART NUMBER SYSTEM

LS03-05B15S



#### SELECTION GUIDE

Model	Power	Output (Vo/Io)	Max. Capacitive Load	Ripple and Noise (Typ.)	Efficiency (Typ)
LS03-05B03S(-F)	1.65W	3.3V/500mA	5000uF	50mV	70%
LS03-05B05S(-F)	2.5W	5V/500mA	2000uF		70%
LS03-05B09S(-F)	3W	9V/330mA	1000uF	60mV	75%
LS03-05B12S(-F)		12V/250mA	470uF		78%
LS03-05B15S(-F)		15V/200mA	350uF		78%
LS03-05B24S(-F)		24V/125mA	220uF		120mV

Note: The model of 90 degrees of corner is with F. For example the LS03-05B12S of 90 degrees of corner product is LS03-05B12S-F.

#### INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC Input	85	--	264	V
	DC Input	70	--	400	
Input Current	115VAC	--	--	0.12	mA
	230VAC	--	--	0.04	
Leakage current		None			
External input fuse (recommended)		1A/250V,slow blow			

#### OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy		--	±2	--	%	
Input variation	Full Load	--	±0.5	--		
Load variation	10%~100% Load	--	±1	--		
Ripple& Noise	20MHz bandwidth(p-p)	3.3 /5 /9 VDC Output	--	50	100	mV
		12VDC Output	--	60	120	
		15VDC Output	--	75	150	
		24VDC Output	--	120	240	
Min Load		1	--	--	%	
Over temperature protection		--	--	150	°C	
Short Circuit Protection		Continuous, and auto recovery				

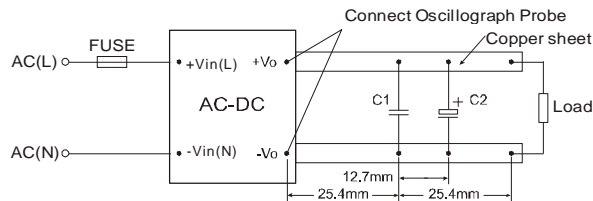
## COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Operating Temperature		-40	--	+85	°C
Storage Temperature		-40	--	+105	
Case Temperature		--	--	+90	
Storage Humidity		--	--	+85	%RH
Temperature coefficient		--	±0.02	--	%°C
Power derating	55°C~85°C	1.33	--	--	
	-40°C~-20°C	2	--	--	
Isolation Resistance	Input-Output    Tested for 1 minute	2000	--	--	VAC
Switching Frequency		--	100	--	kHz
Weight		--	10	--	g
Welding Temperature	Wave-soldering	260± 5°C; time:5~10s			
	Manual-welding	360± 10°C; time:3~5s			
Case Material Grade		UL 94V-0			
Install		PCB			
Note:					
1. External electrolytic capacitor are required to models when AC input, more details refer to typical applications.					
2. Ripple and Noise measuring refer to "RIPPLE AND NOISE MEASURE FIGURE".					
3. Unless otherwise specified, all specifications above are measured at rated input voltage and rated output load, Ta=25oC, humidity < 75%.					
4. In this datasheet, all the test setup and methods are based on our corporate standards.					
5. Module required dispensing fixed after assembled.					

## EMC SPECIFICATIONS

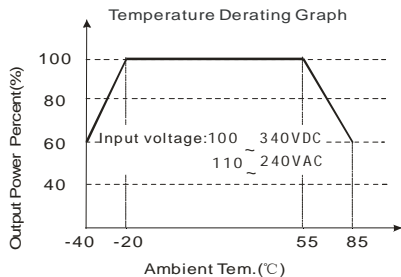
EMI	CE	CISPR22/EN55022	CLASS B (Recommended Circuit Refer to Figure 3)	
	RE	CISPR22/EN55022	CLASS B (Recommended Circuit Refer to Figure 3)	
EMS	ESD	IEC/EN61000-4-2	Contact ±2KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV(Without External Circuit )	perf. Criteria B
		IEC/EN61000-4-4	±4KV (Recommended Circuit Refer to Figure 3)	perf. Criteria B
	Surge	IEC/EN61000-4-5	±1KV/±2KV (Recommended Circuit Refer to Figure 3)	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
	PFM	IEC/EN61000-4-8	10A/m	perf. Criteria A
	Voltage dips, short and interruptions immunity	IEC/EN61000-4-29	0%-70%	perf. Criteria B

## RIPPLE AND NOISE MEASURE FIGURE



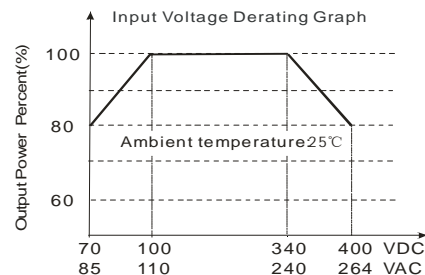
Note: C1: 1µF (Ceramic capacitor) C2: 10µF (Electrolytic capacitor)

## PRODUCT TYPICAL CURVE

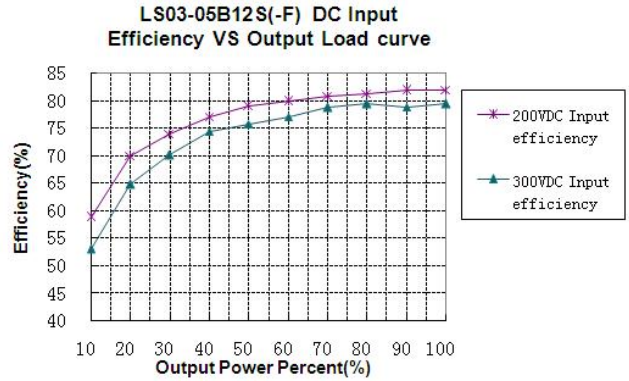
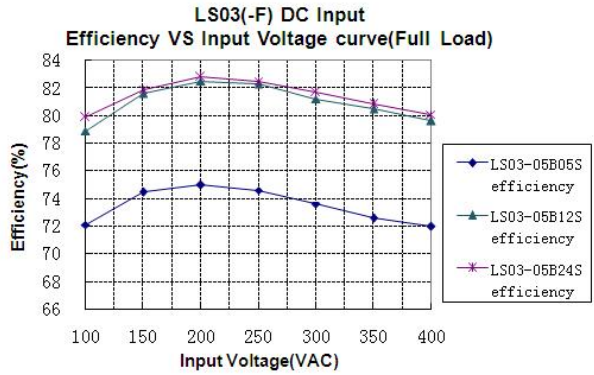
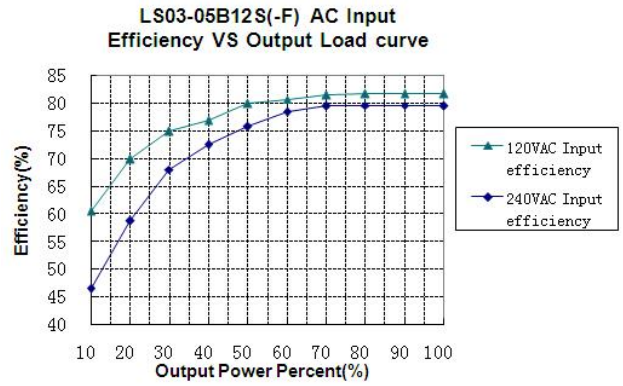
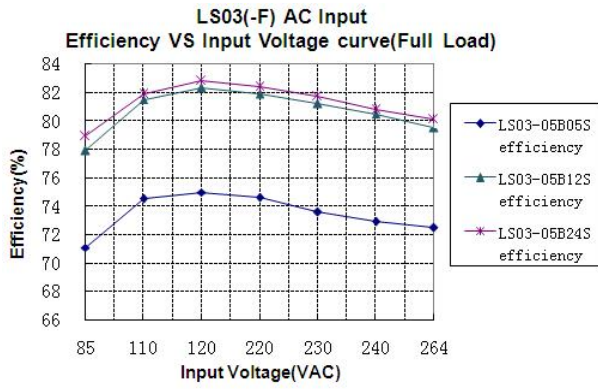


Note: When input 85~110VAC/240~264VAC/70~100VDC/340~400VDC, it need to be voltage derated on basis of temperature derating.

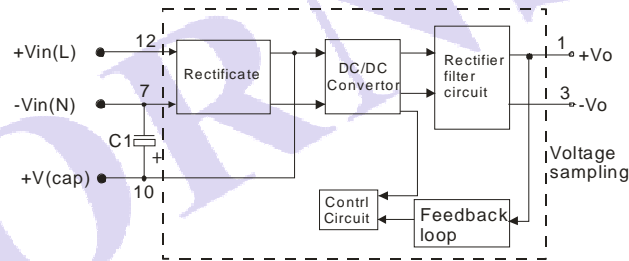
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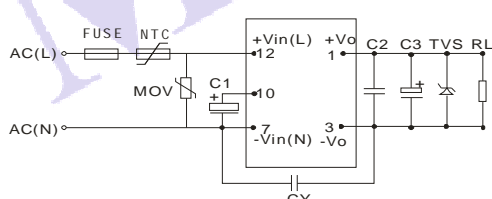
Specifications subject to change without notice.  
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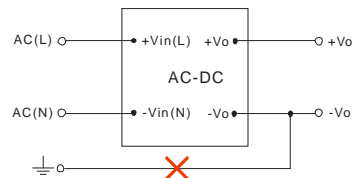
## STRUCTURE FIGURE



## TYPICAL APPLICATIONS



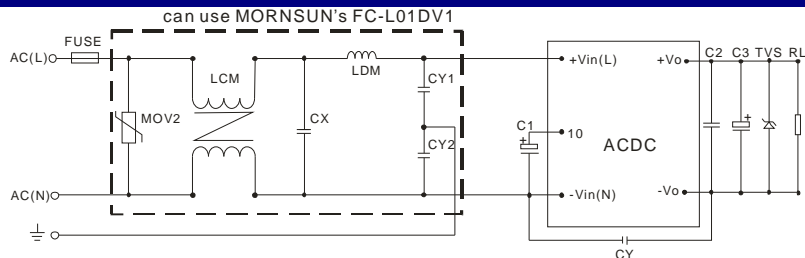
(Figure 1): Typical application circuit



(Figure 2): Because of the surge protection, this application is not available for this series.

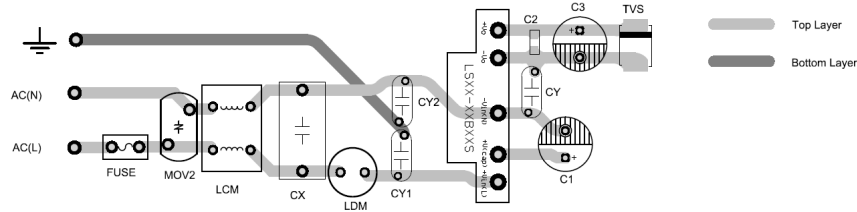
Note: If you have such application, please consult to our FAE department

## EMC RECOMMENDED CIRCUIT



(Figure 3): Recommended circuit for applications which require higher EMC standard

## EMC RECOMMENDED CIRCUIT PCB LAYOUT



(figure 4):EMC application circuit PCB layout

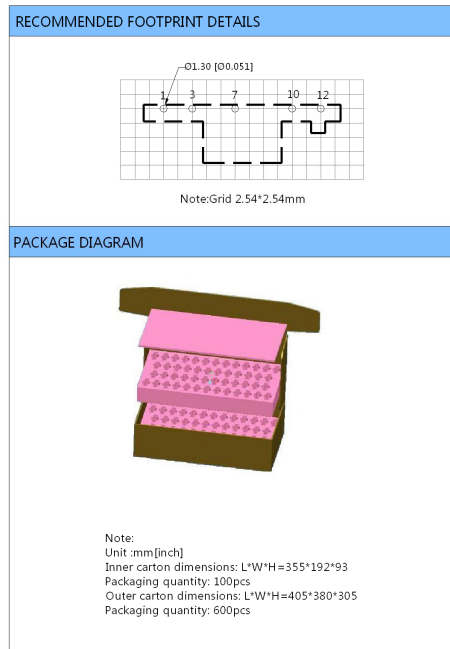
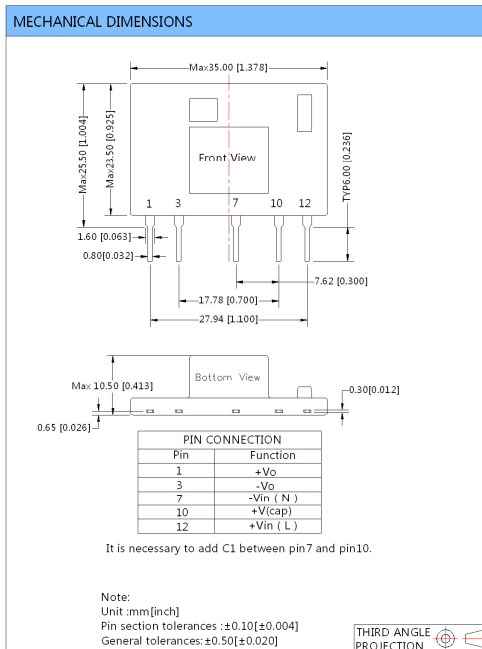
Safety and recommend wiring: linewidth  $\geq 3\text{mm}$ , line-line distance  $\geq 6\text{mm}$ , line-ground distance  $\geq 6\text{mm}$ , external components between primary circuit and secondary circuit  $\geq 6.4\text{mm}$ . Module required dispensing fixed after assembled

EXTERNAL CIRCUIT PARAMETERS						
Output Voltage	C1	C2	C3	FUSE	CY	TVS
3.3V	10 $\mu\text{F}$ /400V	1 $\mu\text{F}$ /50V (Ceramic capacitor)	150 $\mu\text{F}$ /25V	1A/250V	1nF/400VAC	SMBJ7.0A
5V						SMBJ12A
9V			SMBJ20A			
12V			SMBJ30A			
15V						
24V		100 $\mu\text{F}$ /35V				

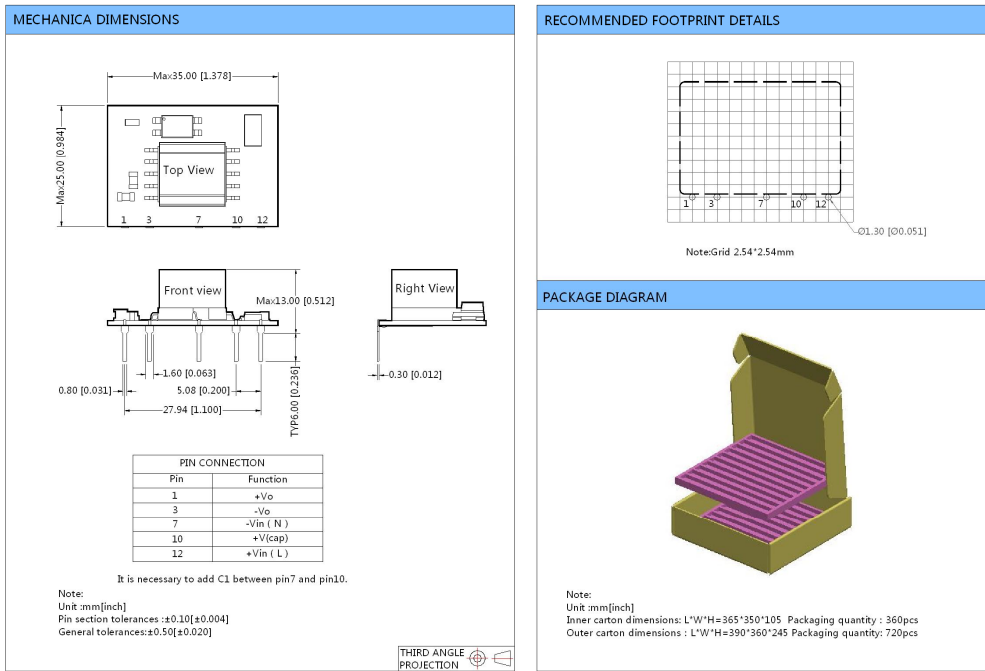
- Note: 1. C1:AC input, is filtering electrolytic capacitor (which is required), when input voltage is below 100VAC, and the value of C1 is 22 $\mu\text{F}$ /400V. DC input, is a filtering capacitor in EMC Filter, the value of C1 is 10 $\mu\text{F}$ /400V(when input voltage is above 370VDC, and the value of C1 is 10 $\mu\text{F}$ /450V), If EMC performance is not required, C1 could not need.
2. C2 is ceramic capacitor, it is used to filter high frequency noise. Output filtering capacitor C3 (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. TVS is a recommended component to protect post-circuits (if converter fails). External input NTC model is recommended to use 5D-9. External input MOV model is recommended to use S14K350.
3. For standard EMC requirement, please refer to figure 1.If higher EMC requirement ,please refer to figure 3, recommended parameters are shown in the table below.

Recommend Parameter For Higher EMC Standard Circuit	
Components	Recommend Parameter
MOV2	S10K300
CY1, CY2	1nF/400VAC
CX	0.1 $\mu\text{F}$ /275VAC
LCM	3.5mH
LDM	5mH
FC-L01DV1	MORNSUN's 1KV/2KV Surge protector
FUSE	1A/250V, slow blow, it must be connected to FUSE

## LS03 DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING



# LS03-F DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING



## 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: 86-20-38601850

Fax: 86-20-38601272

E-mail: [info@mornsun.cn](mailto:info@mornsun.cn)

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