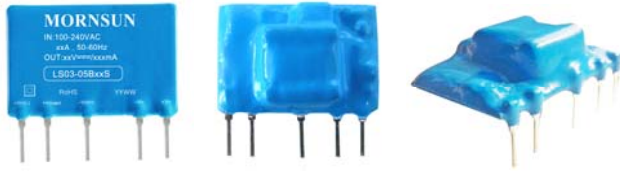


3W, AC/DC (High Voltage DC/DC) converter



## FEATURES

- Ultra wide input range: 85~264VAC/70~400VDC
- Output short circuit protection
- High efficiency, high density
- Low power consumption, green power
- 90 degree curved series, minimizing product height
- Industrial level specifications

*LS03-05BxxS(-F) series* —a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It's widely used in industrial, office and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

## Selection Guide

Part No.	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load (μF)
LS03-05B03S(-F)	1.65W	3.3V/500mA	70	5000
LS03-05B05S(-F)	2.5W	5V/500mA	70	2000
LS03-05B09S(-F)	3W	9V/330mA	75	1000
LS03-05B12S(-F)		12V/250mA	78	470
LS03-05B15S(-F)		15V/200mA	78	350
LS03-05B24S(-F)		24V/125mA	78	220

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	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	264	VAC
	DC input	70	--	400	VDC
Input Frequency		47	--	63	Hz
Input current	115VAC	--	--	0.12	A
	230VAC	--	--	0.04	
Inrush current	115VAC	--	15	--	
	230VAC	--	25	--	
Leakage current	CY is 1nF/400VAC	--	--	0.25	mA
Recommended External Input Fuse		1A/250V, slow fusing, necessary			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy		--	±2	--	%	
Line Regulation	Full load	--	±0.5	--		
Load Regulation	10%-100% load	--	±1	--		
Ripple & Noise*	20MHz bandwidth (peak-peak value)	3.3 / 5 / 9 VDC output	--	50	100	mV
		12VDC output	--	60	120	
		15VDC output	--	75	150	
		24VDC output	--	120	240	
Temperature Coefficient		--	±0.02	--	%/°C	
Short Circuit Protection		Hiccup, Continuous, self-recovery				
Min. Load	Single output models	0	--	--	%	

Note: \*Parallel line test method is adopted to test the ripple and noise, please see *AC-DC Converter Application Notes* for specific operation methods.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	2000	--	--	VAC
Operating Temperature		-40	--	+85	°C
Storage Temperature		-40	--	+105	
Storage Humidity		--	--	85	%RH
Welding Temperature	Wave-soldering	260±5°C; time:5~10s			
	Manual-welding	360±10°C; time:3~5s			
Switching Frequency		--	100	--	kHz
Power Derating	55°C~85°C	1.33	--	--	% / °C
	-20°C~-40°C	2	--	--	
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

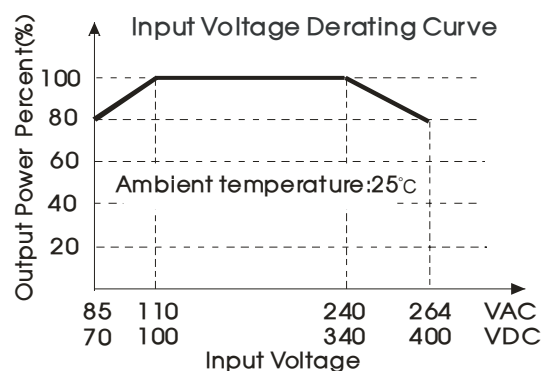
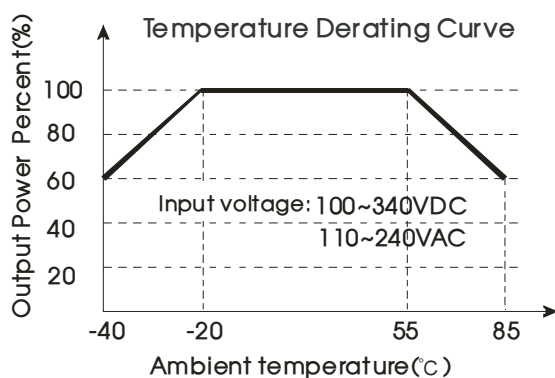
Physical Specifications

Package Dimensions	Refer to the Dimensions
Weight	10g(Typ.)
Cooling method	Free convection

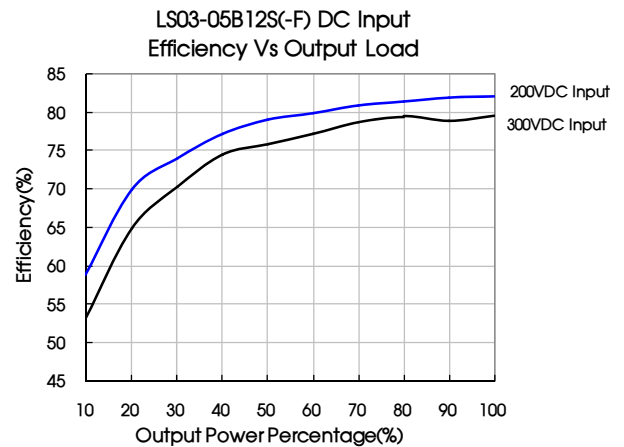
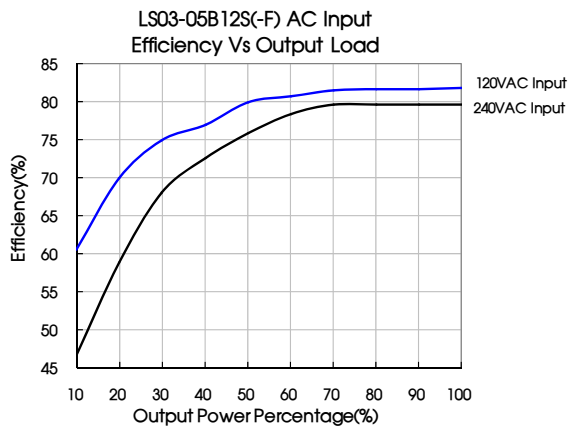
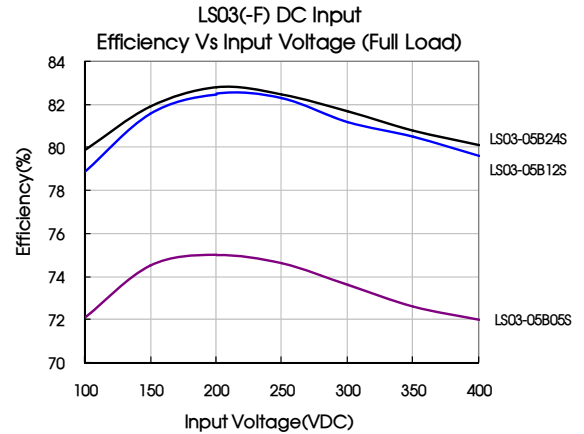
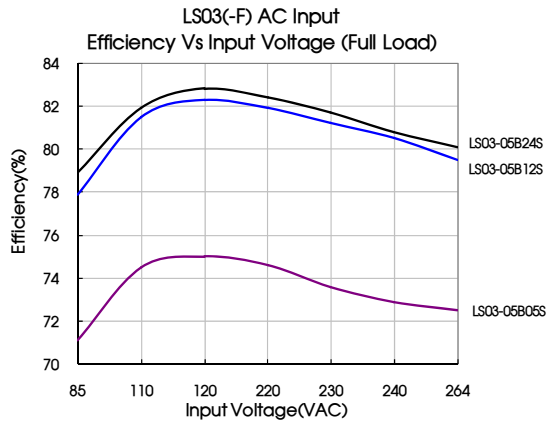
EMC Specifications

EMI	CE	CISPR22/EN55022, CLASS B (See Fig. 2 for recommended circuit)		
	RE	CISPR22/EN55022, CLASS B (See Fig. 2 for recommended circuit)		
EMS	ESD	IEC/EN61000-4-2	±2KV	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
		IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	±1KV/±2KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s (See Fig. 2 for recommended circuit)	perf. Criteria A
	PFM	IEC/EN61000-4-8	10A/m (See Fig. 2 for recommended circuit)	perf. Criteria A
Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	0%-70% (See Fig. 2 for recommended circuit)	perf. Criteria B	

Product Characteristic Curve



Note: ① Input voltage should be derated based on temperature derating when it is 85~110VAC/240~264VAC/70~100VDC/340~400VDC;  
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

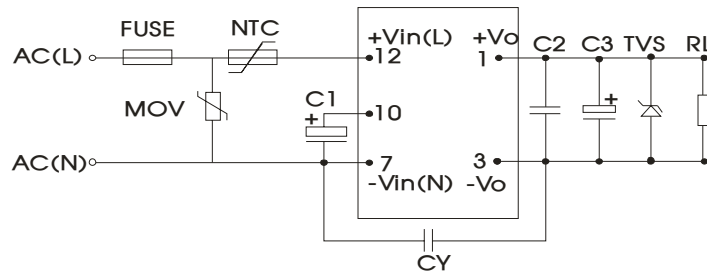


Fig. 1

Model	C1	C2	C3	FUSE	CY	TVS
LS03-05B03S(-F)	10 $\mu$ F/400V	1 $\mu$ F/50V (Ceramic capacitor)	150 $\mu$ F/25V	1A/250V	1nF/400V AC	SMBJ7.0A
LS03-05B05S(-F)						SMBJ7.0A
LS03-05B09S(-F)						SMBJ12A
LS03-05B12S(-F)			100 $\mu$ F/35V			SMBJ20A
LS03-05B15S(-F)			SMBJ20A			
LS03-05B24S(-F)			SMBJ30A			

Note:

- C1: AC input, is filtering electrolytic capacitor (which is required), when input voltage is below 100VAC, and the value of C1 is 22 $\mu$ F/400V. DC input, is a filtering capacitor in EMC Filter, the value of C1 is 10 $\mu$ F/400V (when input voltage is above 370VDC, and the value of C1 is 10 $\mu$ F/450V).
- 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 manufacturer'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 recommended to use 5D-9. External input MOV model is recommended to use S14K350.

2. EMC solution-recommended circuit

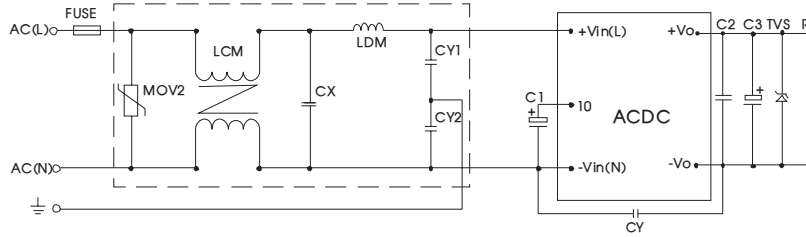


Fig 2

EMC solution-recommended circuit PCB layout

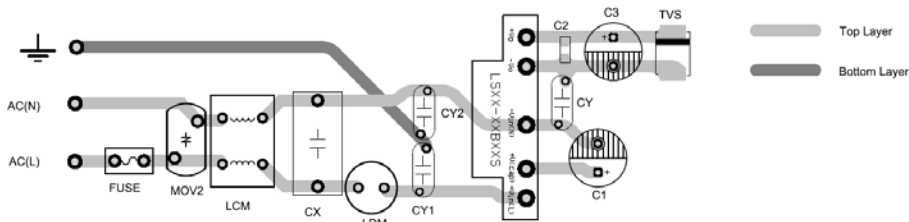


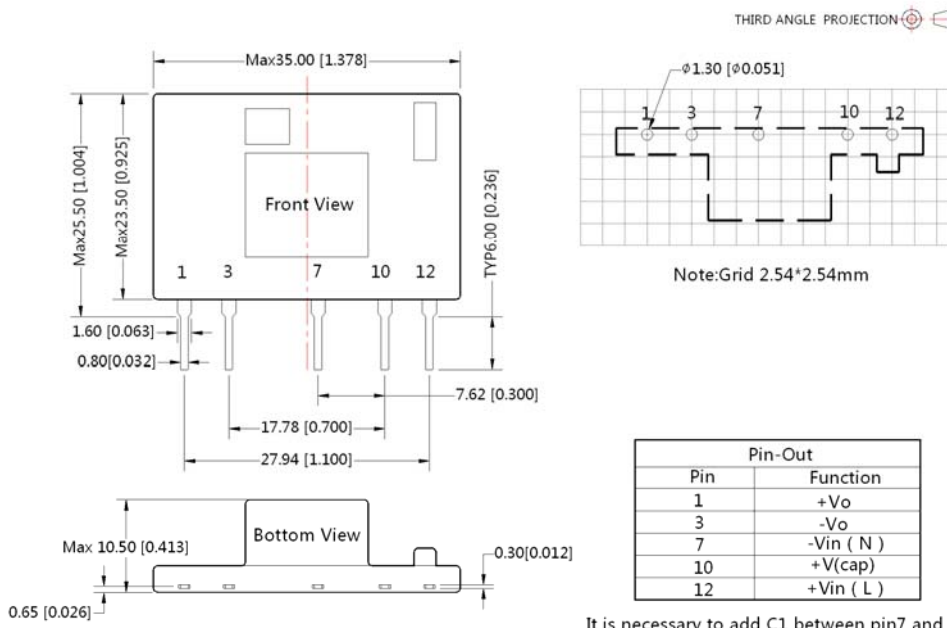
Fig 3

Suggestions for safety regulation and wiring width: wire width  $\geq 3\text{mm}$ , distance between wires  $\geq 6\text{mm}$ , and distance between wire and ground  $\geq 6\text{mm}$ , external components between primary circuit and secondary circuit  $\geq 6.4\text{mm}$ . Module required dispensing fixed after assembled

Element model	Recommended value
MOV2	S14K350
CY1 , CY2	1nF/400VAC
CX	0.1 $\mu$ F/275VAC
LCM	3.5mH
LDM	4.7mH
FUSE	1A/250V, slow blow, it must be connected to FUSE
Can use MORNSUN's FC-L01DV1 EMC model	

3. For more information about Mornsun EMC Filter products, please visit [www.mornsun-power.com](http://www.mornsun-power.com) to download the Selection Guide of EMC Filter

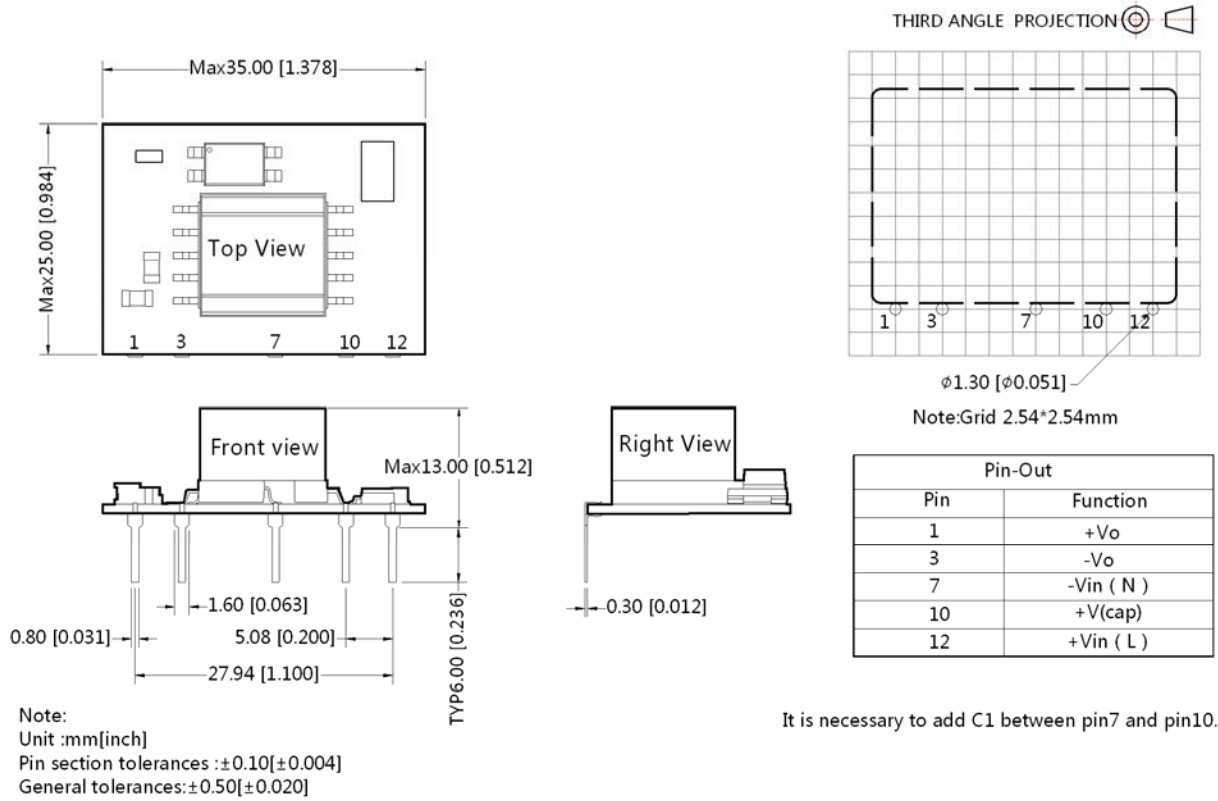
LS03-05BxxS Dimensions and Recommended Layout



It is necessary to add C1 between pin7 and pin10.

Note:  
Unit :mm[inch]  
Pin section tolerances : $\pm 0.10[\pm 0.004]$   
General tolerances: $\pm 0.50[\pm 0.020]$

LS03-05BxxS-F Dimensions and Recommended Layout



Note:

1. Packing Information please refer to 'Product Packing Information'. The packing bag number of LS03-05BxxS package : 58220018,the packing bag number of LS03-05BxxS-F package : 58220025;
2. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
5. We can provide product customization service;
6. 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