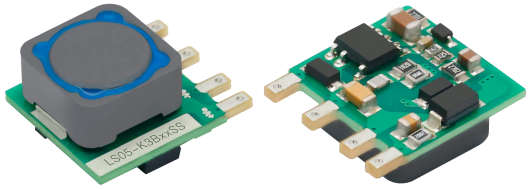
AC/DC Converter
LS05-K3BxxSS Series

MORNSUN®

5W, AC/DC converter



FEATURES

- Ultra-wide 85 - 305VAC and 70 - 430VDC input voltage range
- Operating ambient temperature range: -40℃ to +85℃
- Compact size, open frame
- Up to 77% efficiency
- Green power
- Industrial-grade design
- Flexible selection of EMC addtional circuits, simplify customer PCB layout
- Output short circuit, over-current protection
- EN62368 safety approval

LS05-K3BxxSS series is one of Mornsun's highly efficient green power AC-DC Converter series. It features wide input voltage range, accepting both DC and AC input voltage, high reliability and low power consumption. All models are widely used in industrial control instrumentation, electric power applications and smart home applications which have high requirement for dimension, the need to meet CE safety certifications and lower demand for EMC compliance levels. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
CE	LS05-K3B12SS	4W	12V/330mA	75	160
	LS05-K3B15SS	5W	15V/330mA	76	
	LS05-K3B18SS	5W	18V/280mA	77	
Warning: Non-isolated power supply, there is no insulation protection between output and input dangerous voltage, beware of electric shock!					

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	305	VAC
	DC input	70	--	430	VDC
Input Frequency		47	--	63	Hz
Input Current	115VAC	--	--	0.2	A
	230VAC	--	--	0.14	
Inrush Current	115VAC	--	25	--	
	230VAC	--	40	--	
Recommended External Input Fuse		1A/300V, slow-blow, required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	10% - 100% load		--	±5	--	%
Line Regulation	Rated load		--	±1.5	--	
Load Regulation			--	±3	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		--	50	100	mV
Temperature Coefficient			--	±0.1	--	%/°C
Stand-by Power Consumption	230VAC input	12V	--	0.07	0.1	W
		15V	--	0.12	0.16	
		18V	--	0.16	0.2	
Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			≥110%Io, self-recovery			
Min. Load			10	--	--	%

Note: * The "parallel cable" method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature		-40	--	+85	℃
Storage Temperature		-40	--	+105	
Storage Humidity		--	--	95	%RH
Power Derating	-40℃ to -20℃	2	--	--	%/℃
	+65℃ to +85℃	2.5	--	--	
	85VAC - 100VAC	1.33	--	--	%/VAC
	277VAC - 305VAC	1.1	--	--	
Safety Standard		EN62368			
Safety Certification		EN62368			
MTBF		MIL-HDBK-217F@25°C>1000,000 h			

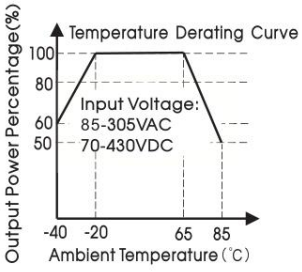
Mechanical Specifications

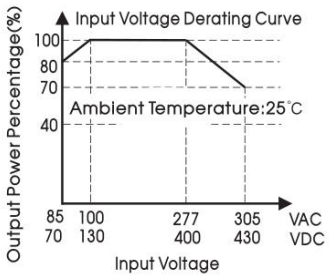
Dimension	16.13 x 15.10 x 9.50 mm
Weight	4.5g (Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

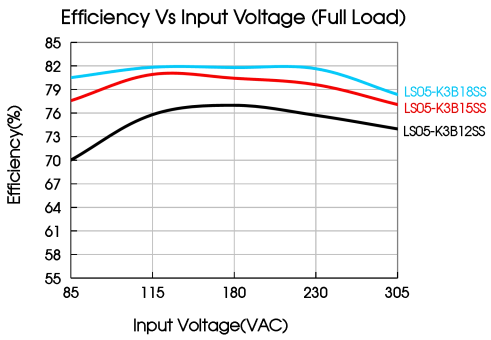
Emissions	CE	CISPR32/EN55032	CLASS A (See Fig. 1 for recommended circuit)	
		CISPR32/EN55032	CLASS B (See Fig. 2 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (See Fig. 1 for recommended circuit)	
		CISPR32/EN55032	CLASS B (See Fig. 1 or Fig. 2 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ± 6KV (See Fig. 1 or Fig. 2for recommended circuit)	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 recommended circuit)	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV (See Fig. 1 or Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s (See Fig. 2 for recommended circuit)	perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11	0%, 70% (See Fig. 2 for recommended circuit)	perf. Criteria B

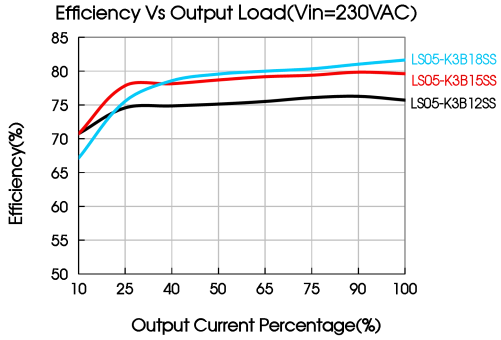
Product Characteristic Curve





Note:
① With an AC input between 85 - 100VAC/277- 305VAC and a DC input between 70 - 130VDC/400 - 430VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.





Design Reference

1. Recommended circuit 1

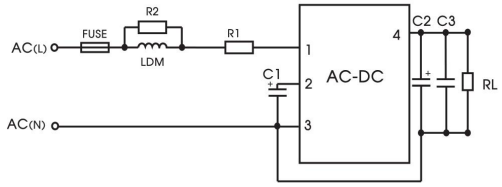


Fig. 1

Part No.	FUSE (required)	C1 (required)	C2 (required)	LDM (required))	R1 (wire-wound resistor, required)	C3	R2
LS05-K3B12SS	1A/300V (slow-blow)	10uF/400V (165-264VAC) 10uF/450V (165-305VAC) 22uF/400V (85-264VAC) 22uF/450V (85-305VAC)	470μF/16V (solid-state capacitor)	4.7mH/0.2A (C1=10uF) 2.2mH/0.24A (C1=22uF)	12Ω/3W (C1=10uF) 2Ω/2W (C1=22uF)	0.1uF/50V	8.2kΩ/0.25W
LS05-K3B15SS			470μF/35V				
LS05-K3B18SS							

Note:

1. C1 is used as input filter capacitor (required);
2. Output filter: We recommend using an electrolytic capacitor with high frequency, high ripple current and low ESR rating for C2 refer to manufacture's datasheet). Combined with LDM, they form a pi-type filter circuit. Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%;
3. Recommed R2 to use 1206 package chip resistor.

2. Recommended circuit 2

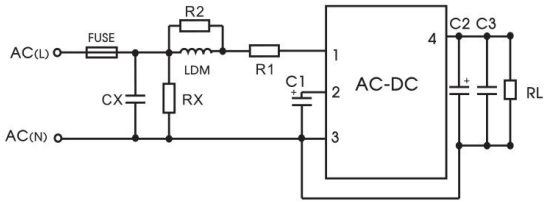


Fig 2

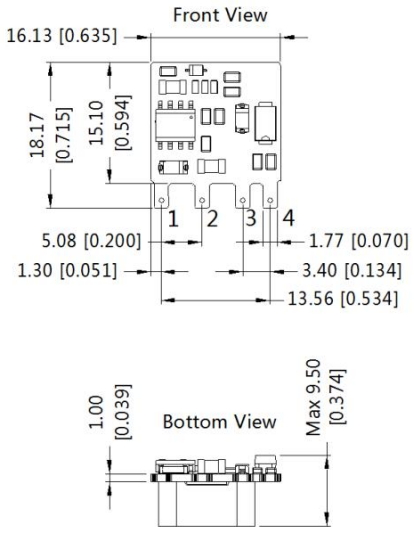
Part No.	FUSE (required)	C1 (required)	C2 (required)	LDM (required)	R1 (wire-wound resistor, required)	CX	RX*	C3	R2
LS05-K3B12SS	1A/300V (slow-blow)	10uF/400V (165-264VAC) 10uF/450V (165-305VAC) 22uF/400V (85-264VAC) 22uF/450V (85-305VAC)	470μF/16V (solid-state capacitor)	4.7mH/0.2A (C1=10uF) 2.2mH/0.24A (C1=22uF)	12Ω/3W (C1=10uF) 2Ω/2W (C1=22uF)	104K/ 310VAC	5MΩ~8MΩ	0.1uF/ 50V	8.2kΩ /0.25W
LS05-K3B15SS			470μF/35V						
LS05-K3B18SS									

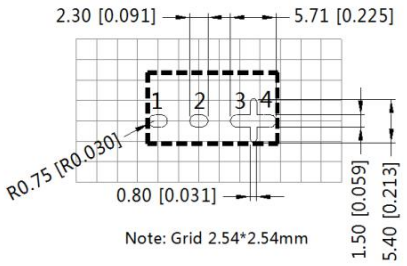
*Note: The X capacitor needs to be connected in parallel with the bleeder resistance (RX), the recommended resistance value is between 5MΩ~8MΩ, and the actual need to be selected as series-parallel connection according to the certification standard.

3. For additional information please refer to application notes on www.mornsun-power.com.

LS05-K3BxxSS Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Pin-Out	
Pin	Mark
1	AC(L)
2	+V(CAP)
3	-Vo
4	+Vo

Note:
Unit: mm[inch]
General tolerances: ±0.50[±0.020]
The layout of the device is for reference only, please refer to the actual product

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220098;
2. External electrolytic capacitors are required to modules, more details refer to typical applications;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%, nominal input voltage (115Vac and 230Vac) and rated output load;
4. In order to improve the efficiency at light load, there will be audible noise generated, but it does not affect product performance and reliability.
5. The module needs to be glued and fixed after assembly.
6. All index testing methods in this datasheet are based on our company corporate standards;
7. We can provide product customization service, please contact our technicians directly for specific information;
8. Products are related to laws and regulations: see "Features" and "EMC";
9. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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