

5W, AC/DC converter



## FEATURES

- Ultra wide input voltage range: 90 - 528VAC/100 - 745VDC
- AC and DC dual-use(input from the same terminal)
- Working well with any two phases
- Operating temperature range: -40℃ to +85℃
- Compact size, high power density
- Isolation voltage: 4KVAC
- Used in such as electrical, instrumentation industries
- Output short circuit, over-current protection
- Meets IEC62368, UL62368, EN62368 standard (CE Pending)

LS05-26BxxSS (-F) series — a compact size power converter offered by Mornsun. It features ultra wide input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. Meets IEC62368, UL62368, EN62368 standard. Widely used in industrial control and instrumentation, such as electric power for demanding volume, the requirement of wide input voltage range, the need to meet CE certification and EMC less demanding applications. EMC application circuit must be added if the products need to be applied to EMC harsh environment.

## Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load (μF)
CE (Pending)	LS05-26B03SS(-F)*	2.805W	3.3V/850mA	63	2200
	LS05-26B05SS(-F)	4.250W	5V/850mA	67	1500
	LS05-26B09SS(-F)	5.000W	9V/560mA	70	680
	LS05-26B12SS(-F)		12V/420mA	76	470
	LS05-26B15SS(-F)		15V/340mA	76	330
	LS05-26B24SS(-F)		24V/210mA	76	100

Note: \*The model of 90 degrees of corner is with "-F". For example the LS05-26B03SS of 90 degrees of corner product is LS05-26B03SS-F.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC Input	90	--	528	VAC
	DC Input	100	--	745	VDC
Input Frequency		47	--	63	Hz
Input Current	115VAC	--	--	0.20	A
	230VAC	--	--	0.10	
	480 VAC	--	--	0.07	
Inrush Current	115VAC	--	10	--	
	230VAC	--	17	--	
	480 VAC	--	28	--	
Leakage current		0.25mA RMS typ. 230VAC/50Hz			
Recommended External Input Fuse		2.0A/500VAC, slow fusing, necessary			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	LS05-26B03SS(-F)	--	±6	--	%
	Others	--	±5	--	
Line Regulation	Full load	LS05-26B03SS(-F)		--	
		Others		--	
Load Regulation	10%-100% load	--	±2.5	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	--	180	mV

Temperature Coefficient		--	±0.15	--	%/°C
Stand-by Power Consumption	230VAC Input	--	--	0.3	W
	480VAC Input	--	--	0.5	
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		120 - 400%Io self-recovery			
Min. Load		10	--	--	%
Hold-up Time	230VAC input	--	35	--	ms
	400VAC input	--	100	--	
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	Test time: 1min		4000	--	--	VAC
Operating Temperature		Work in the power drop curve range		-40	--	+85	℃
Storage Temperature				-40	--	+105	
Storage Humidity				--	--	85	%RH
Welding Temperature		Wave-soldering		260±5℃; time:5 - 10s			
		Manual-welding		360±10℃; time:3 - 5s			
Switching Frequency				--	70	--	kHz
Power Derating		90 - 165VAC input	-40℃ to -20℃	3.0	--	--	% /℃
			+55℃ to +85℃	2.0	--	--	
		165 - 528VAC input	-40℃ to -20℃	0.0	--	--	
			+55℃ to +85℃	2.0	--	--	
		90 - 110VAC		2.0	--	--	% /VAC
		480 - 528VAC		0.42	--	--	
Safety Standard				IEC62368/UL62368/EN62368			
Safety Certification				IEC62368/UL62368/EN62368 (CE Pending)			
Safety Class				CLASS II			
MTBF		MIL-HDBK-217F@25℃		≥ 300,000 h			

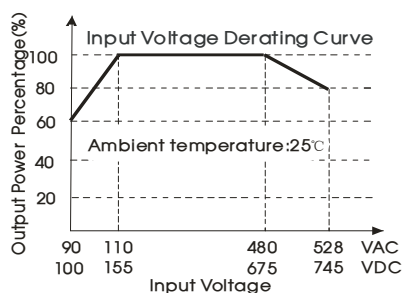
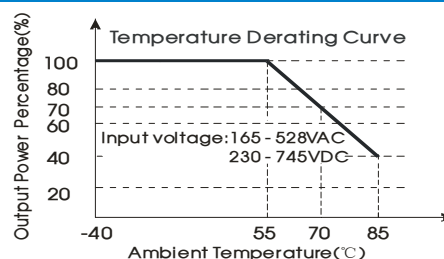
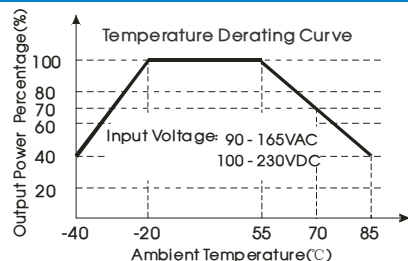
## Physical Specifications

Dimension	44.50*13.00*24.00mm
Weight	7.5g(Typ.)
Cooling Method	Free air convection

### EMC Specifications

EMI	CE	CISPR32/EN55032	CLASS A (See Fig. 1 for typical application circuit)	
		CISPR32/EN55032	CLASS B (See Fig. 2 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (See Fig. 1 for typical application circuit)	
		CISPR32/EN55032	CLASS B (See Fig. 2 for recommended circuit)	
EMS	ESD	IEC/EN 61000-4-2	Contact $\pm 4\text{KV}$	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m(See Fig. 2 for recommended circuit)	perf. Criteria A
	EFT	IEC/EN 61000-4-4	$\pm 2\text{KV}$ (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN 61000-4-4	$\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 61000-4-5	line to line $\pm 1\text{KV}$ (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN 61000-4-5	line to line $\pm 2\text{KV}$ / line to ground $\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3Vr.m.s (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

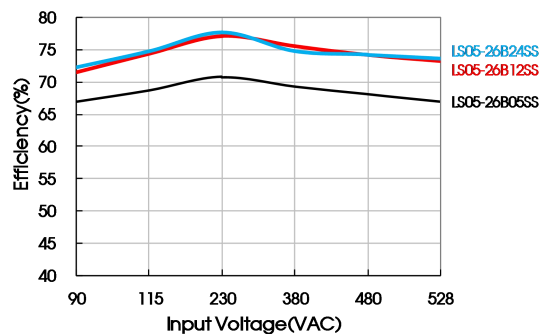


Note:

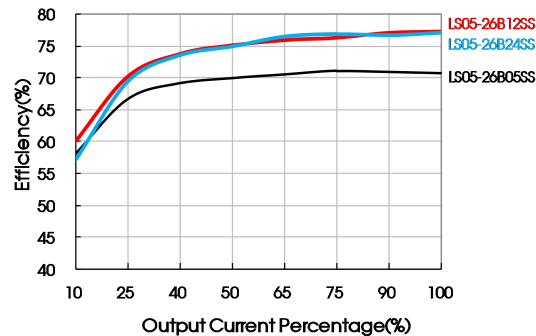
①When input 90 - 110VAC/480 - 528VAC/100 - 155VDC/675-745VDC, it need to be voltage derated on basis of temperature derating;Please refer to typical application circuit:

②This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.

Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load (Vin=230VAC)



## Design Reference

### 1. Typical application circuit

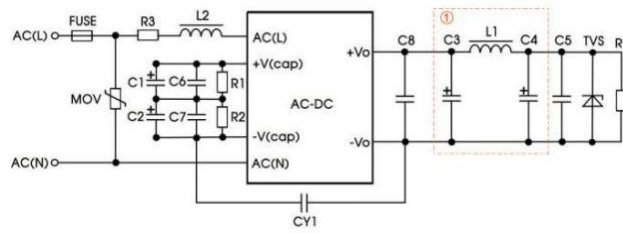


Fig. 1

Note: ① is PI filter circuit

Part No.	MOV	C6/C7 (necessa ry)	C1/C2 (necess ary)	L2	R1/R2 (nece ssary)	C8 (nec essary)	C3 (necess ary)	L1 (nec essary)	C4 (necess ary)	C5	CY1 (necess ary)	FUSE (neces sary)	R3 (nece ssary)	TVS
LS05-26B03SS(-F)	S14K625	/	33μF/ 450V	1.2 mH	3MΩ	/	470μF/16V (Solid Capacitor)	4.7μ H	470μF/ 35V	0.1μF /50V	470pF/ 500VAC	2.0A/5 00VA C, slow fusing, neces sary	20Ω /1W	SMBJ7.0A
LS05-26B05SS(-F)		/				/								SMBJ7.0A
LS05-26B09SS(-F)		/				/								SMBJ12A
LS05-26B12SS(-F)		/				/								SMBJ20A
LS05-26B15SS(-F)		0.068μF /630V				10μF/ 25V								SMBJ20A
LS05-26B24SS(-F)		/				/								SMBJ30A

Note:

1. C1/C2: filtering electrolytic capacitor (which is required), recommended the same brand, the same model, the same batch of electrolytic capacitors;
2. R1/R2: max operation voltage of R1/R2 should be above 450V. While using chip resistors, it is recommended to use several chip resistors in series to meet operation voltage;
3. R3(which is required): winding resistance;
4. C3, C4 are output filter capacitors (which is required), 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%. C5, C6, C7, C8 are a ceramic capacitor, which is used to filter high frequency noise. C3, C4 and L1 form a pi-type filter circuit. Current of L1 and L2 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);

### 2. EMC solution-recommended circuit

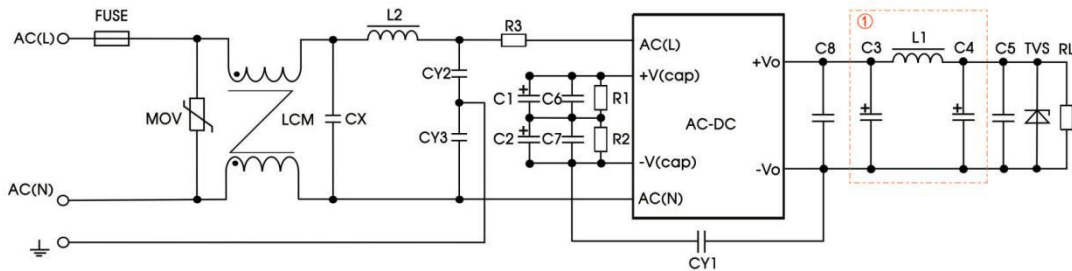


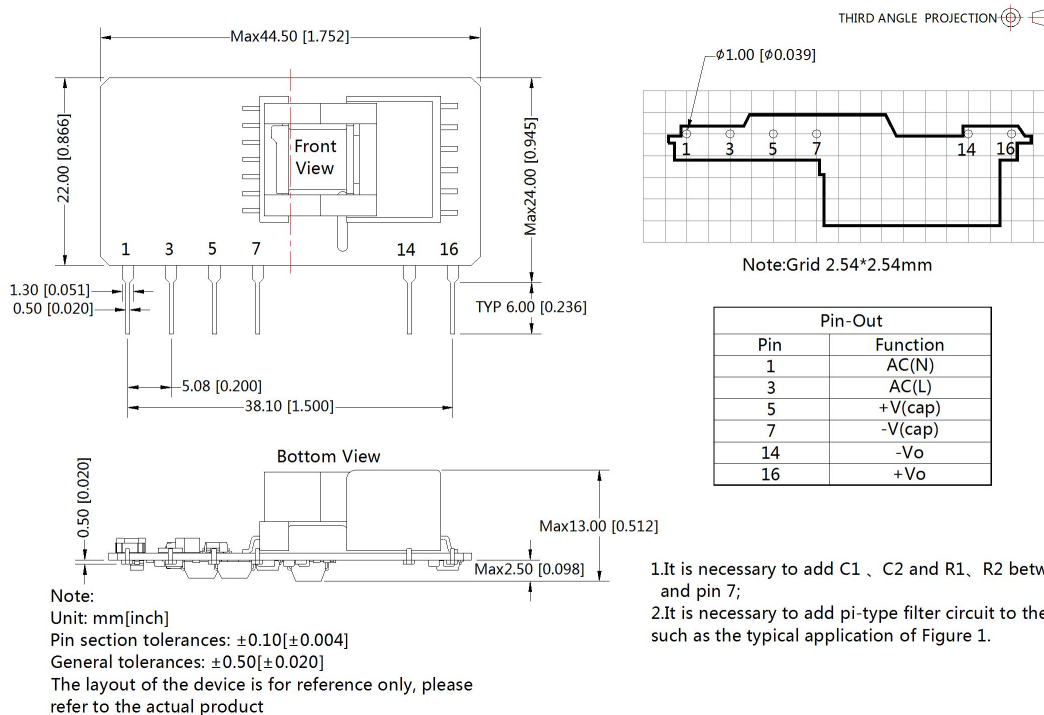
Fig. 2

Element model	Recommended value
MOV	S14K625
CY2、CY3	470pF/500VAC
CX	0.1μF/530VAC
LCM	4.5mH
L2	330uH
R3	20Ω/1W
FUSE	2.0A/500VAC, slow fusing, necessary

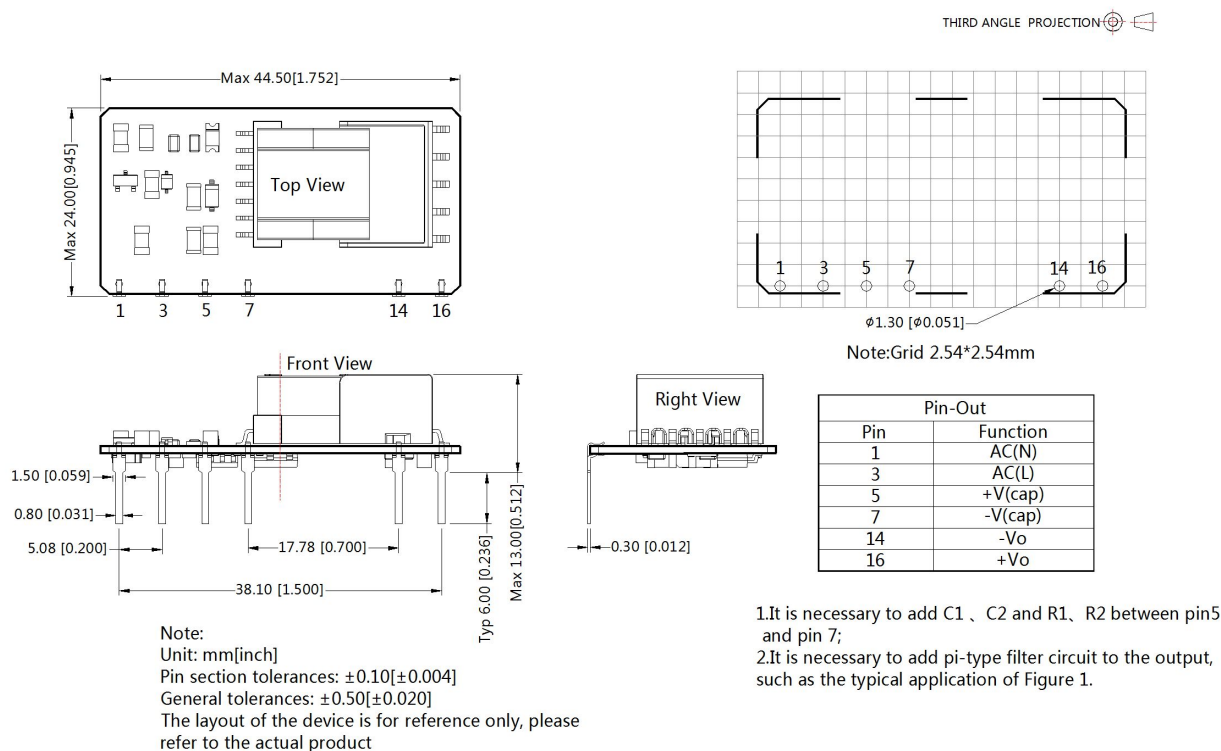
Note: The recommended value of other components refers to typical application circuit.

3. For more information Please find the application note on [www.mornsun-power.com](http://www.mornsun-power.com)

### LS05-26BxxSS Dimensions and Recommended Layout



### LS05-26BxxSS-F Dimensions and Recommended Layout



Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from [www.mornsun-power.com](http://www.mornsun-power.com).  
LS05-26BxxSS packing bag number: 58220032; LS05-26BxxSS-F packing bag number: 58220026;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. This part is open frame, at least 10mm safety distance between the primary and secondary external components of the module is needed to meet the safety requirement;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75% with nominal input voltage and rated output load;
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, please contact our technicians directly for specific information;
9. Products are related to laws and regulations: see "Features" and "EMC";
10. 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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