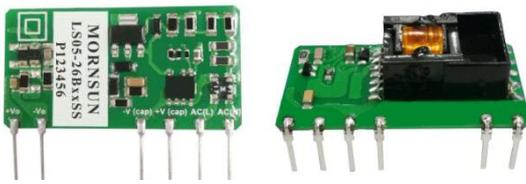


5W, AC/DC converter



FEATURES

- Ultra-wide 90 - 528VAC and 100 - 745VDC input voltage range
- Accepts AC and/or DC input (dual-use of same terminal)
- Working well with any two phases
- Operating ambient temperature range: -40°C to +85°C
- Compact size and high power density
- I/O isolation test voltage up to 4000VAC
- Used in electricity, instrumentation industries
- Output short circuit, over-current protection
- EN62368 safety approval

LS05-26BxxSS (-F) series is one of Mornsun's compact size power converters. It features ultra-wide input voltage, accepting both DC and AC input voltage, low power consumption, high efficiency, high reliability, reinforced isolation. The products meet IEC62368, UL62368, EN62368 standard and are widely used in industrial control instrumentation and electric power applications with the requirement for wide input voltage ranges, 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	LS05-26B03SS(-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: *An "-F" suffix designates horizontal package vs. standard vertical mounting.

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	230VAC/50Hz	0.25mA RMS typ.			
Recommended External Input Fuse		2.0A/500VAC, slow-blow, required			
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)	--	±2.5		
		Others	--	±1.5		
Load Regulation	10%-100% load	--	±2.5	--		

Ripple & Noise*	20MHz bandwidth (peak-to-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: * 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
Isolation Voltage	Input-output	Electric Strength Test for 1min., leakage current <5mA	4000	--	--	VAC
Operating Temperature	Refer to derating curve		-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			--	70	--	kHz
Power Derating	90VAC - 165VAC input	-40°C to -20°C	3.0	--	--	% / °C
		+55°C to +85°C	2.0	--	--	
	165VAC - 528VAC input	-40°C to -20°C	0.0	--	--	
		+55°C to +85°C	2.0	--	--	
	90VAC - 110VAC		2.0	--	--	% / VAC
480VAC - 528VAC		0.42	--	--		
Safety Standard			IEC62368/UL62368/EN62368			
Safety Certification			EN62368			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25°C ≥ 300,000 h			

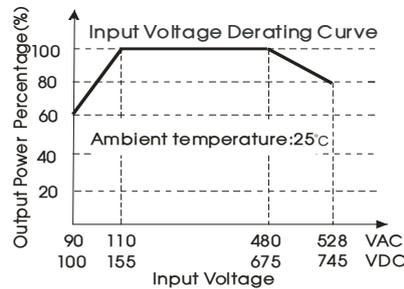
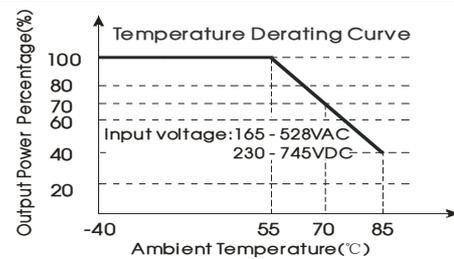
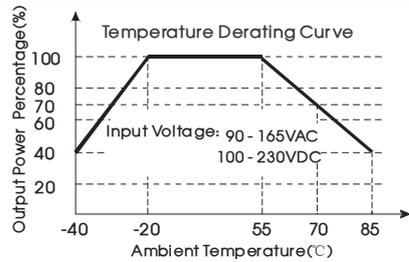
Mechanical Specifications

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

Electromagnetic Compatibility (EMC)

Emissions	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)	
Immunity	ESD	IEC/EN 61000-4-2	Contact ± 4 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	± 2 KV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN 61000-4-4	± 4 KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 61000-4-5	line to line ± 1 KV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN 61000-4-5	line to line ± 2 KV/ line to ground ± 4 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 dip, short interruption and voltage variation	IEC/EN61000-4-11	0%,70% (See Fig. 2 for recommended circuit)	perf. Criteria B	

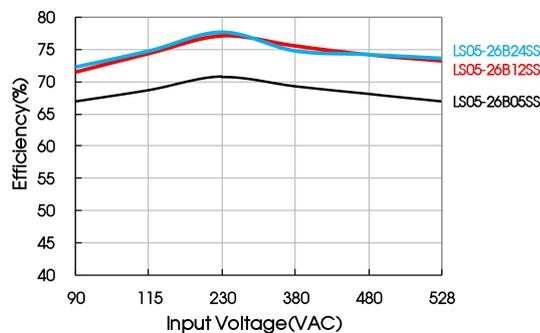
Product Characteristic Curve



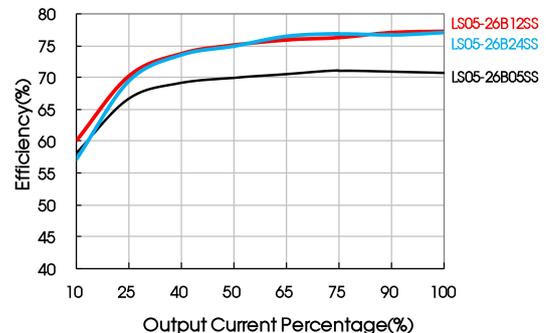
Note: ① With an AC input between 90-110VAC/480-528VAC and a DC input between 100-155VDC/675-745VDC, the output power must be derated as per temperature derating curves; Please refer to typical application circuit;

② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.

Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load (Vin=230VAC)



Design Reference

1. Typical application

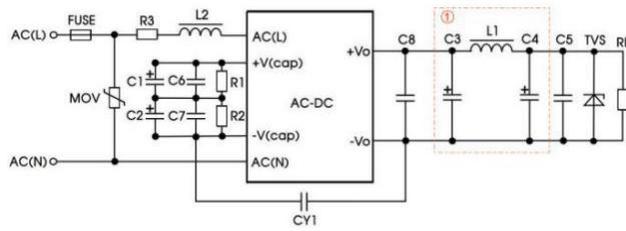


Fig. 1

Note: ① is Pi filter circuit

Part No.	MOV	C6/C7 (required)	C1/C2 (required)	L2	R1/R2 (required)	C8 (required)	C3 (required)	L1 (required)	C4 (required)	C5	CY1 (required)	FUSE (required)	R3 (required)	TVS
LS05-26B03SS(-F)	S14K625	/	33μF/450V	1.2 mH	3MΩ	/	470μF/16V (Solid Capacitor)	4.7μH	470μF/35V	0.1μF/50V	470pF/500VAC	2.0A/500VAC, slow-blow, required	20Ω/2W	SMBJ7.0A
LS05-26B05SS(-F)		/				SMBJ7.0A								
LS05-26B09SS(-F)		/				SMBJ12A								
LS05-26B12SS(-F)		/				SMBJ20A								
LS05-26B15SS(-F)		0.058μF/630V				SMBJ20A								
LS05-26B24SS(-F)		/				SMBJ30A								

- Note:
- For best results we recommended using identical electrolytic filter capacitors for C1 and C2 (brand, model, batch, etc.);
 - R1/R2: The maximum operation voltage of R1 and R2 should be above 450V. We recommend using several chip resistors in series to meet this type of operation voltage;
 - R3 refers to the winding resistance;
 - Output filter: We recommend using an electrolytic capacitor with high frequency, high ripple current and low ESR rating for C3 and C4 (refer to manufacture's datasheet). Combined with L1, they form a pi-type filter circuit. Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. The same type of margins should be chosen for L1 and L2 current ratings. C5, C6, C7, C8 is a ceramic capacitor, used to filtering high frequency noise. A suppressor diode (TVS) is a recommended to protect the application in case of a converter failure.

2. EMC compliance recommended circuit

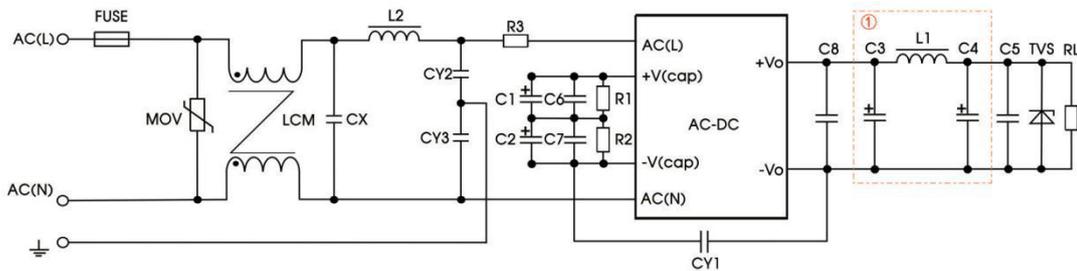


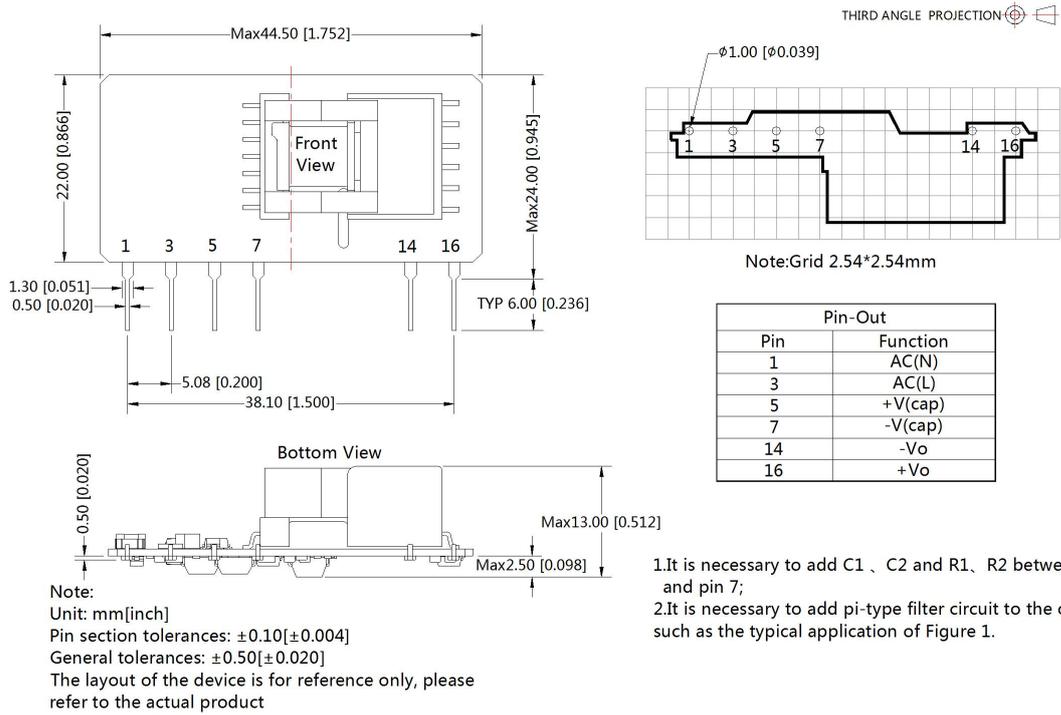
Fig. 2

Component	Recommended value
MOV	S14K625
CY2, CY3	470pF/500VAC
CX	0.1μF/530VAC
LCM	4.5mH
L2	330uH
R3	20Ω/2W
FUSE	2A/500V, slow-blow, required

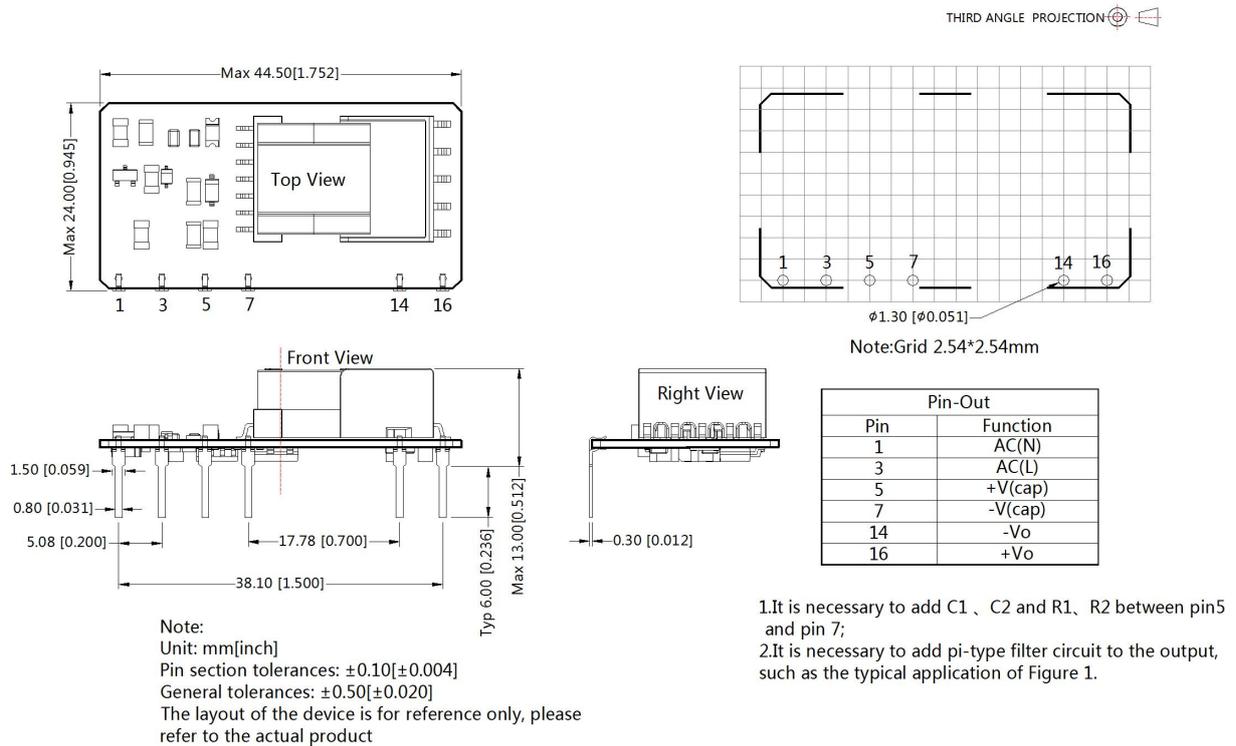
Note: The recommended value of other components refers to typical application circuit.

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

LS05-26BxxSS Dimensions and Recommended Layout



LS05-26BxxSS-F Dimensions and Recommended Layout



Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. LS05-26BxxSS Packaging bag number: 58220032; LS05-26BxxSS-F Packaging 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%, typical application circuit with nominal input voltage and rated output load;
5. In order to improve the efficiency at light load, there will be audible noise generated, but it does not affect product performance and reliability;
6. The module needs to be glued and fixed after assembly;
7. All index testing methods in this datasheet are based on our company 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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