

1W, Single-wire converter



RoHS

FEATURES

- Ultra-wide input voltage range: 8(15)- 380VDC
- Operating ambient temperature range: -25°C to +85°C
- Ultra-low static current, low ripple & noise
- Compact size
- Output short circuit, over-current protection
- EN62368 safety approval

LSF01-K5BxxSS series is regulated single-wire converters with an ultra-low DC input of 8(15)-380VDC. The products feature high reliability. It can be widely used in areas of single-wire smart home with extremely demanding on power consumption requirements, non-isolated power supply products, and replace low-efficiency resistance-capacitance step-down power supply circuits (such as white goods, smart meters, automation instrument power), and standby power for appliances with low power consumption requirements (such as ultra-low power standby power for green and energy-saving appliances), etc. The converters provide stable operating voltage for the load. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Certification	Model	Output Power*	Nominal Output Voltage and Current**		Efficiency (%) Typ.	
			Vo/lo	Vo1/lo1		
CE	LSF01-K5B05SS	0.625W	5.5V/114mA	5V/125mA	54(Vin=15VDC, lo1=40mA)	46 (Vin=340VDC, lo1=125mA)
	LSF01-K5B12SS	1W	12.5V/83mA	5V/200mA	70 (Vin=20VDC, lo1=100mA)	55 (Vin=340VDC, lo1=200mA)

Note: * Two-stage in series, total output power at 0.625/ 1W;

** Vo is the output voltage of converter. Vo1 is the output voltage of the second stage regulator circuit. See figure1/ figure2 for details;

Caution: this series is non-isolated power supply and there is no insulation protection at the input and output, please beware of electric shock!

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	LSF01-K5B05SS		8	--	380	VDC
	LSF01-K5B12SS		15	--	380	
Input Current	8VDC	LSF01-K5B05SS	--	--	0.2	A
	15VDC	LSF01-K5B12SS	--	--	0.2	
	340VDC		--	--	0.02	
External Input Fuse			1A/250V, slow-blow, required			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Vo	LSF01-K5B05SS	4.9	--	6.5	V
	Vo	LSF01-K5B12SS	11.5	--	13.5	
	Vo1		--	±2	--	%
Linear Regulation	Vin=50V-340VDC	Vo1	--	±1	--	
Load Regulation	Vin=310VDC	Vo1	--	±2	--	
Output Ripple & Noise*	Vo1, 20MHz bandwidth (peak-to-peak value)	LSF01-K5B05SS	--	30	--	mV
		LSF01-K5B12SS	--	50	--	
Stand-by Power Consumption	260VDC		--	5.2	--	mW
Temperature Coefficient			--	±0.02	--	%/°C
Short Circuit Protection	Vo1		Continuous, self-recovery			
Over-current Protection	Vo1		≥105%lo1 self-recovery			
Minimum Load			0	--	--	%

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

** Please avoid short to ground during using, otherwise the module may be permanently damaged.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Operating Temperature		-25	--	+85	°C	
Storage Temperature		-40	--	+85		
Soldering Temperature	Wave-soldering	260±5°C; time: 5-10s				
	Manual-welding	360±10°C; time: 3-5s				
Power Derating	-25°C to -10°C	LSF01-K5B05SS	3.33	--	--	% / °C
	+70°C to +85°C (120VDC-380VDC)		3.33	--	--	
	-25°C to -10°C (120VDC-380VDC)	LSF01-K5B12SS	1.00	--	--	
	+70°C to +85°C		3.33	--	--	
	30VDC-80VDC		1.36	--	--	% / VDC
	10VDC-30VDC	LSF01-K5B05SS	0.00	--	--	
	8VDC-10VDC		25.00	--	--	
	15VDC-30VDC	LSF01-K5B12SS	4.00	--	--	
Safety Standard		EN62368				
Safety Certification		EN62368				
MTBF		MIL-HDBK-217F@25°C > 300,000 h				

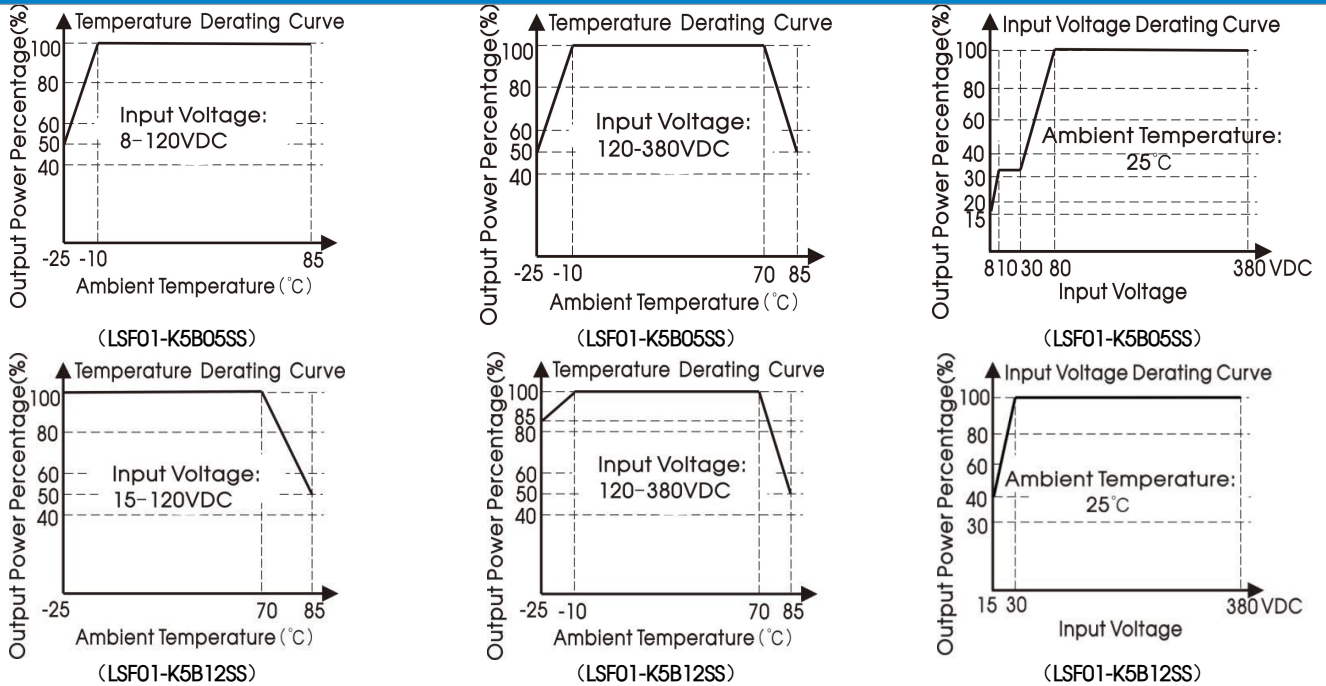
Mechanical Specifications

Package Dimensions	15.70 x 9.00 x 14.50mm
Weight	1.90g (Typ.)
Cooling method	Free air convection

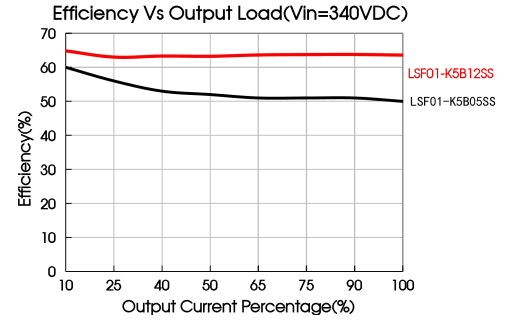
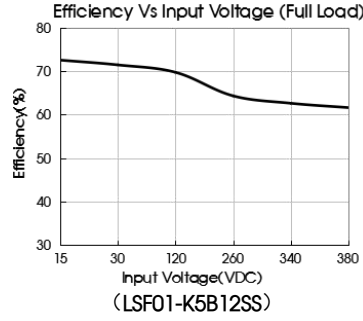
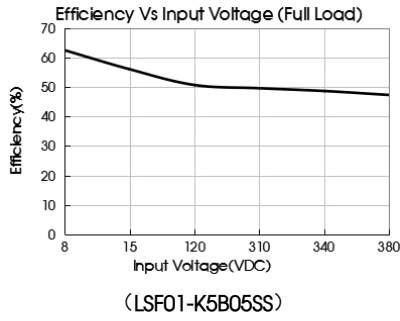
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (See Fig. 1/ Fig. 2 for typical application circuit)
	RE	CISPR32/EN55032 CLASS B (See Fig. 1/ Fig. 2 for typical application circuit)
Immunity	Surge	IEC/EN61000-4-5 line to line ±1KV (See Fig. 1/ Fig. 2 for typical application circuit) perf. Criteria B

Product Characteristic Curve

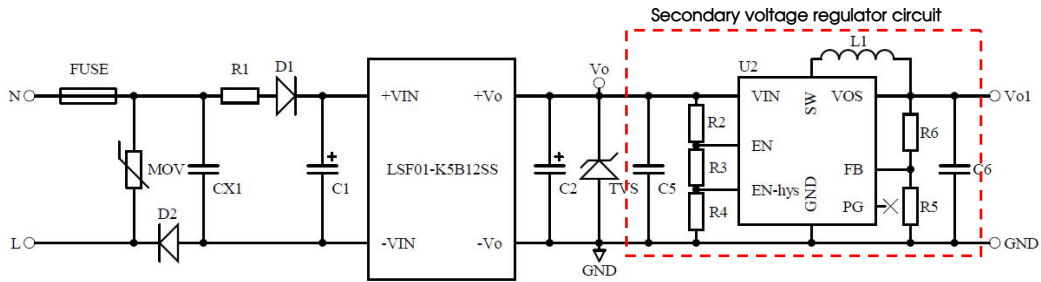
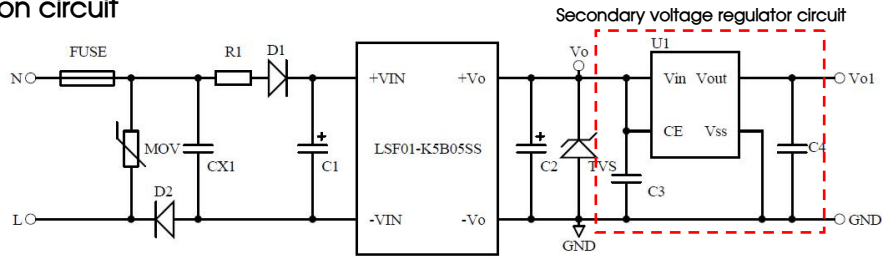


Note:
 ① With a DC input between 8-80VDC (LSF01-K5B05SS)/15 - 30VDC (LSF01-K5B12SS), the output power must be derated as per temperature derating curves;
 ② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.

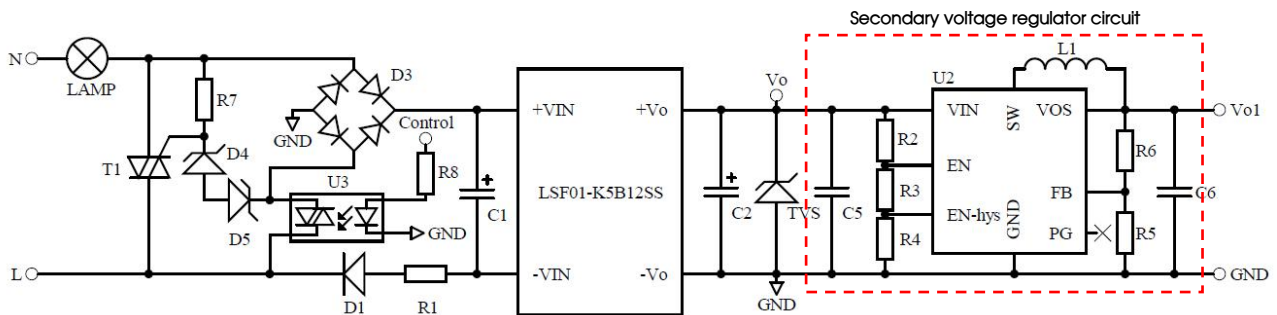
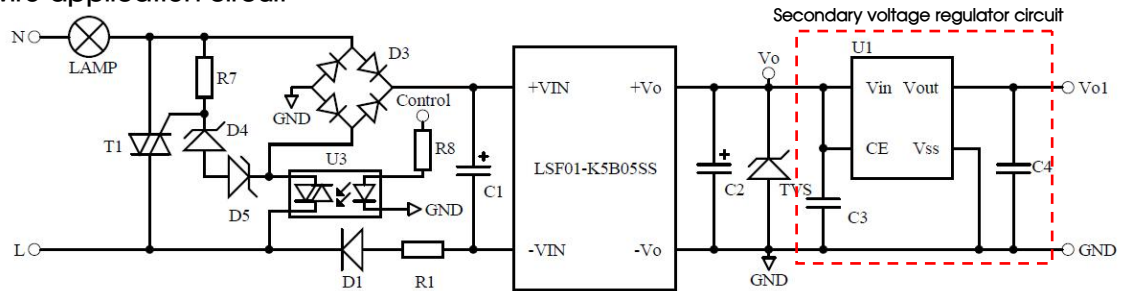


Design Reference

1. Typical application circuit



2. Single wire application circuit



Components	Recommend
FUSE	1A/250VAC, slow-bolw, required
MOV	S14K300
CX1	474K/275VAC
R1	8-120VDC: 24 Ω (LSF01-K5B05SS) 15-120VDC:12 Ω (LSF01-K5B12SS) 120-380VDC: 240 Ω
R2	680K Ω /0603
R3	82K Ω /0603
R4	330K Ω /0603
R5	210K Ω /0603
R6	1.1M Ω /0603
R7	1K Ω /1206
R8	500 Ω /1206
D1, D2	1A/1000V
D4, D5	6.2V/350mW (LSF01-K5B05SS)
	12V/500mW (LSF01-K5B12SS)
D3	1A/1000V
C1	400V/4.7uF
C2	25V/220uF
C3	16V/1uF
C4	16V/2.2uF
C5, C6	25V/10uF
TVS	SMBJ7.0A, required (LSF01-K5B05SS)
	SMBJ15A, required (LSF01-K5B12SS)
U2	TPS62125
L1	10uH
U1	XC6505x501
U3	MOC3063
T1	BT134

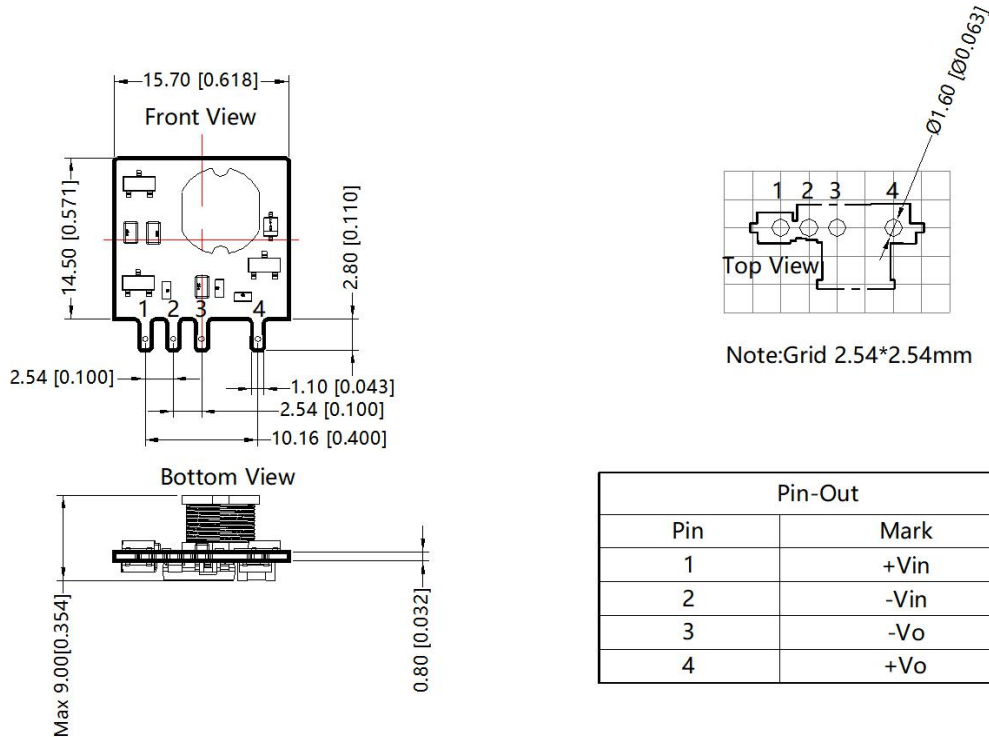
Output Filter Components:

1. CX1 is not necessary if no requirement for emissions, and MOV is not necessary if no requirement for immunity;
2. T1: bidirectional thyristor, please select the type according to the power of the lamp load(LAMP) (T1: The rated voltage is higher than the working voltage, and it is derated to 90% at least; the rated current is higher than the working current of the lamp load, and the T1 temperature meets the working requirements);
3. R1: current-limiting resistor (required), rated power $\geq 3W$, which depends on the input voltage range;
4. Vo: 5.5V (LSF01-K5B05SS) or 12.5V (LSF01-K5B12SS), Vo1: 5V ;
5. The above is only part of the program. For more application information and materials, please contact our technical staff for obtaining.

3. For more information Please find the application notes on www.mornsun-power.com, or contact our technicians to obtain.

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Mark
1	+Vin
2	-Vin
3	-Vo
4	+Vo

Note:
Unit: mm[inch]
Pin section tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$
The layout of the device is for reference only, please refer to the actual product

- Note:
- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220098;
 - 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; (See Fig. 1/ Fig. 2 for typical application circuit)
 - All index testing methods in this data sheet are based on our company corporate standards;
 - The above are the performance indicators of the product models listed in this datasheet. Some indicators of non-standard models will exceed the above requirements. For details, please contact our technical staff.
 - We can provide product customization service;
 - Specifications of this product are subject to changes without prior notice;
 - Products are related to laws and regulations: see "Features" and "EMC";
 - 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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