MORNSUN[®]

LS05 Series 5W,AC-DC CONVERTER

LS05 Series -----are high efficient green power modules with miniature packaging provided by Mornsun. The series is featured by wide input voltage range, high efficiency, high reliability, low power consumption and safety isolation etc. They are widely used in industrial, official and civil equipments which have no special requirement for EMC performance. For harsh EMC environment, please refer to the EMC recommended circuits.

PRODUCT FEATURES

- 1. Wide input voltage:85 ~ 264VAC(100 ~ 400VDC)
- 2. Over current protection and short-circuit protection
- 3. High efficiency, High security isolation: 3000VAC
- 4. Ultra-Miniature package
- 5. Industrial design
- 6.90 degree curved series, minimizing product height
- 7. Certificate UL60950/EN60950 standards

MORNSUN IN 100-240V-, 50-60Hz OUT xXV===/XXXTA LS05-15BXS C C Toriks YYWY Toriks YYWY



PART NUMBER SYSTEM

LS05-15B05S

Output Voltage Output Style Input Voltage Isolation Voltage Output Power Package Product Series

SELECTION GUIDE

Approval	Model	Power	Output (Vo/Io)	Max. Capacitive Load (µF)	Ripple and Noise (Max.)	Efficiency (%) (230VAC,Typ.)	Standby Power(Max.)
UL	LS05-15B03S(-F)*	3.3W	3.3V/1000mA	2200	150mV	65	
	LS05-15B05S(-F)	5W	5V/1000mA	1500	120mV	70	
	LS05-15B09S(-F)		9V/560mA	680	120mV	72	0.5\//
(beside "-F")	LS05-15B12S(-F)		12V/420mA	470	120mV	74	0.500
	LS05-15B15S(-F)		15V/340mA	330	120mV	75	
	LS05-15B24S(-F)		24V/210mA	100	150mV	75	

Note:* The model of 90 degrees of corner is with F. For example the LS05-15B12S of 90 degrees of corner product is LS05-15B12S-F.

INPUT SPECIFICATIONS

Test Conditions	Min.	Тур.	Max.	Unit	
AC Input	85		264	M	
DC Input	100		400	V	
	47		440	Hz	
115VAC			0.2		
230VAC			0.1	٨	
115VAC		20		A	
230VAC		30			
CY0 is 1nF/400VAC			0.25	mA	
	Test Conditions AC Input DC Input 115VAC 230VAC 115VAC 230VAC 230VAC CY0 is 1nF/400VAC	Test Conditions Min. AC Input 85 DC Input 100 115VAC 230VAC 115VAC 230VAC 230VAC 230VAC 230VAC 230VAC	Test Conditions Min. Typ. AC Input 85 DC Input 100 115VAC 47 230VAC 20 230VAC 230VAC 30 20 230VAC 30	Test Conditions Min. Typ. Max. AC Input 85 264 DC Input 100 400 115VAC 47 440 115VAC 0.2 230VAC 115VAC 0.1 11 115VAC 20 230VAC 30 230VAC 30	

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Тур.	Max.	Unit
	LS05-15B03S(-F)		±2.0 ±3.0		
	LS05-15B05S(-F)				
	LS05-15B09S(-F)				
Output Voltage Accuracy	LS05-15B12S(-F)		±1.0	±2.0	0/
	LS05-15B15S(-F)				70
	LS05-15B24S(-F)				
Line Regulation	full load		±0.1	±0.5	
Load Regulation	10% to 100%		±1.0	±1.5	
Ripple& Noise(p-p) (measuring refer to "RIPPLE AND NOISE MEASURE FIGURE")	20MHz bandwidth		50	150	mV

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Specifications subject to change without notice. LS05(-F) series 2013.08.29-A/1 Page 1 of 5

Min Load		10			%
Hold up Timo	115VAC	20			
	230VAC	80			1115
Short Circuit Protection		Con	tinuous, an	d auto reco	overy
Over Current Protection			≥110%Io, A	uto recover	у
Over Voltage Protection			Zener dic	de clamp	

COMMON SPECIF	ICATIONS					
Item	Test Condition	S	Min.	Тур.	Max.	Unit
Operating Temperature	rature				+85	
Storage Temperature			-40		+105	°C
Surface temperature					+100	
Storage Humidity					85	%RH
Temperature coefficient				±0.02		
Dowor dorating	-25 ℃~ +0 ℃		0.8			%/ °C
Power derating	+55℃~+85℃	2	1.33			1
Isolation Resistance			100			MΩ
Isolation Voltage	input-output	Tested for 1 minute(leakage current setting value:5 mA)	3000			VAC
Switching Frequency			/	100		kHz
Weight				10		g
Wolding Tomporature	Wave-solderin	ıg		260± 5 ℃;	time:5~10s	3
weiding temperature	Manual-weldir	ng		360± 10℃	; time:3~5s	3
Safety approvals			EN60950)/UL60950		
Safety Class			CLASS II			
Safety standards			IEC6095	0/EN60950	/UL60950	
Hot swap			Forbid			
Install			PCB			
Cooling			Free air o	convection		
MTBF			>300,00	0 h @ 25℃		
Noto: 1 External electrolytic	conceitore are rec	uirad ta madulaa, mara dataila rafar ta tuniaal applicationa				

Note: 1. External electrolytic capacitors are required to modules, more details refer to typical applications.

2. Ripple and Noise measuring refer to "RIPPLE AND NOISE MEASURE FIGURE".

3. All specifications were measured at Ta=25°C, humidity<75%, nominal input voltage(115VAC or 230VAC) and rated output load unless otherwise specified.

4. In this datasheet, all the test methods of indications are based on corporate standards.

5. When working under high vibration, the product need to be glued for fixing.

EMC SPECIFICATIONS

	CE	CISPR22/EN55022, CLASS A (with typical applications Figure 1)	
EMI		CISPR22/EN55022, CLASS B (with typical applications Figure 3)	
	RE	CISPR22/EN55022, CLASS B (with typical applications Figure 1 or	r Figure 3)
	ESD	IEC/EN61000-4-2 Contact ±4KV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV (with typical applications Figure 1)	perf. Criteria B
		IEC/EN61000-4-4 ±4KV (with typical applications Figure 3)	perf. Criteria B
EMS	Surge	IEC/EN61000-4-5 ±1KV/±2KV (with typical applications Figure 3)	perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s (with typical applications Figure 3)	perf. Criteria A
	PFM	IEC/EN61000-4-8 10A/m	perf. Criteria A
	Voltage dips, short and interruptions immunity	IEC/EN61000-4-11 0%-70%	perf. Criteria B

RIPPLE AND NOISE MEASURE FIGURE



Note: CY0 is 1nF/400VAC Y1 capacitor, C1,C2,L1,C3,C4 refer to" EXTERNAL CIRCUIT PARAMETERS"

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PRODUCT TYPICAL CURVE





LS05-15B12S(-F) AC input efficiency cure







STRUCTURE FIGURE



TYPICAL APPLICATIONS





(Figure 2): Because of the surge protection, this application is not available for this series. Note: If you have such application, please consult to our FAE department.

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Input Voltage Derating Graph Input Voltage Derating Graph Input Voltage Derating Graph Input Voltage Derating Graph Ambient temperature 25°C Ambient temperature 25°C Input Voltage (VAC)

Note: When input DC, VDC=1.414*VAC-20.

LS05-15B12S(-F) DCinput efficiency cure



Efficiency VS Input Voltage curve (Full Load)



EMC RECOMMENDED CIRCUIT



(Figure 3):Recommended circuit for applications which require higher EMC standard

EMC RECOMMENDED CIRCUIT PCB LAYOUT



Figure 4: EMC application circuit PCB layout Safety and recommend wiring: linewidth ≥3mm, line-line distance≥6mm, line-ground distance≥6mm,A≥6.4mm

EXTERNAL CIRCUIT PARAMETERS										
Model	C1 (Required)	C2 (Required) -	L1 (Required)	C3 (Required)	CX1	C4	CY0	FUSE (Required)	TVS	
LS05-15B03S(-F)		470µF/10V	0.47.14	150µF/35		100pE/50V	1nF/400	14/2501/	SMBJ7.0A	
LS05-15B05S(-F)		470µF/16V	0.47 011	V						
LS05-15B09S(-F)	22uF/400V				0.1µF/275V				SMBJ12A	
LS05-15B12S(-F)	330µF/25V	330µF/25V	5V 1uH	1uH 150μF/35 V	150µF/35 V	AC		VAC	1712001	SMD 1204
LS05-15B15S(-F)									SIVIDJZUA	
LS05-15B24S(-F)		100µF/35V	4.7uH	47µF/35V					SMBJ30A	

Note:

1. C1, C2 and C3 are electrolytic capacitors. They are required both AC input and DC input.

When AC input, C1 is used as filter capacitor, the value of C1 is recommended to be 22µF /400V.When DC input, C1 is used as EMC filter capacitor, the value of C1 is recommended to be 10µF/400V(when the input voltage is above 370VDC, the recommended value of C1 is 10µF/450V).C2 and C3 are output filer capacitors, 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. Voltage derating of capacitors should be 80% or above. C4 is a ceramic capacitor, which is used to filter high frequency noise. C2,C3 and L1 form a pi filter circuit. Current of L1 refer to the datasheets provided by the manufactures, source fails), TVS is recommended. And the external NTC thermistor is recommended to be 5D-9. External input MOV is recommended to use S14K350.

2. For standard EMC requirement, please refer to figure 1.If higher EMC requirement ,please refer to figure 3, recommended parameters are shown in the table below.

Recommend Parameter For Higher EMC Standard Circuit					
Components Recommend Parameter					
MOV2	S10K300				
CY1, CY2	1nF/400VAC				
CX	0.1µF/275VAC				
LCM	3.5mH				
LDM	5mH				
FC-L01DV1	MORNSUN's 1KV/2KV Surge protector				
FUSE 1A/250V, slow blow, it must be connected to FUSE					

LS05-15BXXS DIMENSIONS, RECOMMENDED FOOTPRINT



LS05-15BXXS-F DIMENSIONS, RECOMMENDED FOOTPRINT



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