AC/DC Converter

LNxx-12Bxx Series

MORNSUN®

1-3W, AC/DC converter

RoHS

FEATURES

- Input voltage range:165~264VAC/233~370VDC
- Service life is more than 5 years
- Wide range of Operating temperature range: -40℃~70℃
- EMI Meet CLASS B, Anti surge capacity 4 grade
- Protection of output short circuit, output over -current

LNxx-12Bxx series is a compact size high reliability power converter offered by Mornsun, It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It can work safely and reliability in-40℃~70℃. It widely used in LED, street lamp control, instruments, telecommunication and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

Selection Guide

Part No.	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load*(μF)
LN01-12B05	1W	5V/200mA	68%	3000
LN01-12B12		12V/83mA	69%	1000
LN01-12B24		24V/42mA	69%	220
LN02-12B05	2W	5V/400mA	70%	3000
LN02-12B12		12V/167mA	76%	1000
LN02-12B24		24V/83mA	78%	220
LN03-12B05	3W	5V/600mA	71%	2200
LN03-12B12		12V/250mA	75%	1000
LN03-12B24		24V/125mA	76%	220

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		165	--	264	VAC
	DC input		233	--	370	VDC
Input frequency			47	--	63	Hz
Input current	165VAC	LN01 models	--	--	20	mA
		LN02 models	--	--	30	
		LN03 models	--	--	40	
	230VAC	LN01 models	--	--	18	
		LN02 models	--	--	25	
		LN03 models	--	--	35	
Inrush current	165VAC		--	6	--	A
	230VAC		--	10	--	
Recommended External Input Fuse			2A/250V, slow fusing			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±2	--	%
Line Regulation	Full load	--	±1	--	
Load Regulation	10%-100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	50	150	mV
Temperature Coefficient		--	±0.01	--	%/℃

Stand-by Power Consumption	LN01/ LN02 models		--	--	0.3	W
	LN03 models		--	--	0.4	
Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			≥110%Io self-recovery			
Min. Load			0	--	--	%
Hold-up Time	165VAC input	LN01 models	--	16	--	ms
		LN02 models	--	8	--	
		LN03 models	--	6	--	
	230VAC input	LN01 models	--	30	--	
		LN02 models	--	16	--	
		LN03 models	--	10	--	
Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.						

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	Test time: 1min	3000	--	--	VAC
Operating Temperature			-40	--	+70	℃
Storage Temperature			-40	--	+105	
Storage Humidity			--	--	95	%RH
Welding Temperature		Wave-soldering	260±5℃; time:5~10s			
		Manual-welding	360±10℃; time:3~5s			
Switching Frequency			--	115	--	kHz
Safety Standard		IEC60950/EN60950/UL60950				
Safety Class		CLASS II				
MTBF		MIL-HDBK-217F@25℃ >300,000 h				

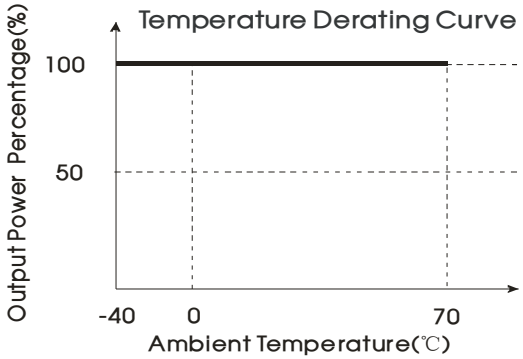
Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94-V0)
Dimensions	37.00*24.50*18.00 mm
Weight	25g(Typ.)
Cooling method	Free convection

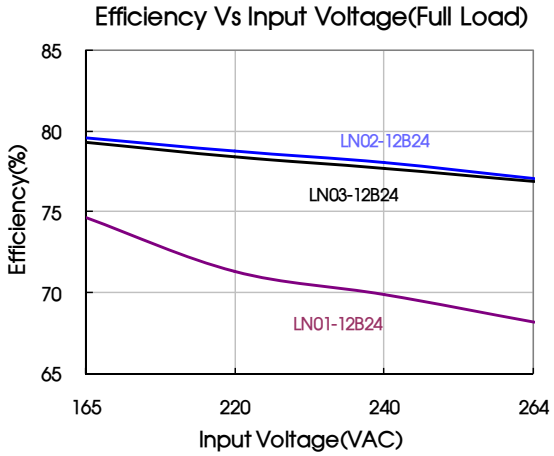
EMC Specifications

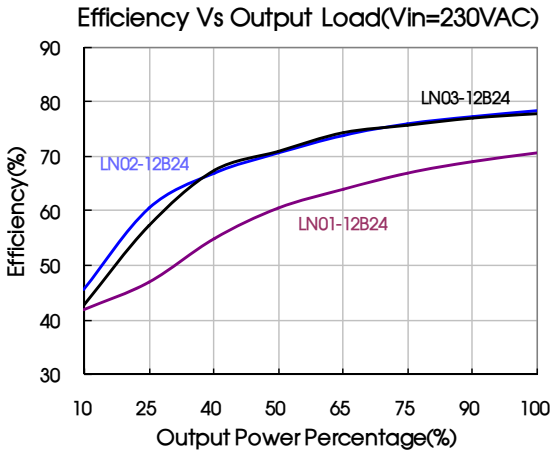
EMI	CE	CISPR22/EN55022, CLASS B	
	RE	CISPR22/EN55022, CLASS B	
EMS	ESD	IEC/EN61000-4-2 Contact±6KV/Air8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV	perf. Criteria B
		IEC/EN61000-4-4 ±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5 ±2KV	perf. Criteria B
		IEC/EN61000-4-5 ±2KV/4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A
	PFM	IEC/EN61000-4-8 10A/m	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11 0%-70%	perf. Criteria B

Product Characteristic Curve



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





Design Reference

1. Typical application circuit

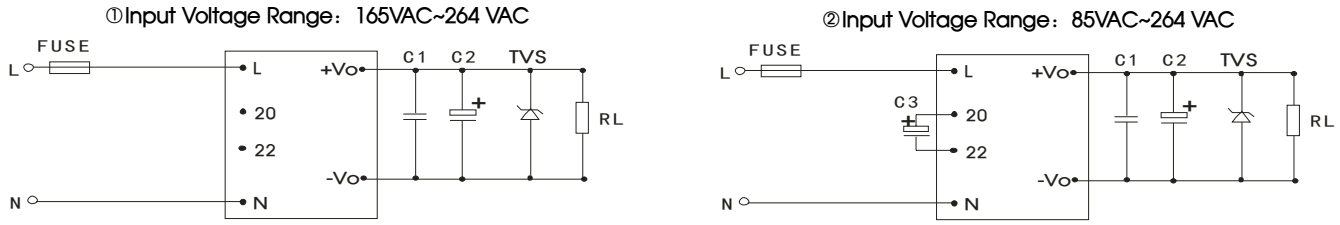


Fig. 1: Typical application circuit

Model	C1(μF)	C2(μF)	C3(μF)	TVS
LN01-12B05	MURATA SMD capacitor 105K 16V 0805 X7R	Rubycon ZLH series 16YXJ100MEFC5X11	RUBYCON LLE series 400LLE4.7MEFC 10X12.5	SMBJ7.0A
LN01-12B12	MURATA SMD capacitor 105K 25V 0805 X7R	RUBYCON ZLH series 25YXJ68MEFC5X11		SMBJ20A
LN01-12B24	MURATA SMD capacitor 105K 50V 0805 X7R	RUBYCON ZLH series 35YXJ47MEFC5X11		SMBJ30A
LN02-12B05	MURATA SMD capacitor 105K 16V 0805 X7R	Rubycon ZLH series 16YXJ100MEFC5X11		SMBJ7.0A
LN02-12B12	MURATA SMD capacitor 105K 25V 0805 X7R	RUBYCON ZLH series 25YXJ68MEFC5X11		SMBJ20A
LN02-12B24	MURATA SMD capacitor 105K 50V 0805 X7R	RUBYCON ZLH series 35YXJ47MEFC5X11		SMBJ30A
LN03-12B05	MURATA SMD capacitor 105K 16V 0805 X7R	Rubycon ZLH series 16YXJ100MEFC5X11	RUBYCON LLE series 400LLE6.8MEFC 10X16	SMBJ7.0A
LN03-12B12	MURATA SMD capacitor 105K 25V 0805 X7R	RUBYCON ZLH series 25YXJ68MEFC5X11		SMBJ20A
LN03-12B24	MURATA SMD capacitor 105K 50V 0805 X7R	RUBYCON ZLH series 35YXJ47MEFC5X11		SMBJ30A

Note: Output filtering capacitor C2 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitance withstand voltage derating should be 80% or above. C1 is ceramic capacitor, which is used to filter high-frequency noise. If operation voltage of the module is lower than 165VAC, then need external capacitor C3, C3 can use film capacitors or electrolytic capacitor. If C3 use electrolytic capacitors, when the film capacitors is under 120HZ, require the LN03-12Bxx series corresponding ripple current rating must be greater than 80mA, the LN02-12Bxx series must be greater than 40mA, the LN01-12Bxx series must be greater than 30mA, and the capacitors' shelf life should more than 5 years.

2. EMC solution-recommended circuit

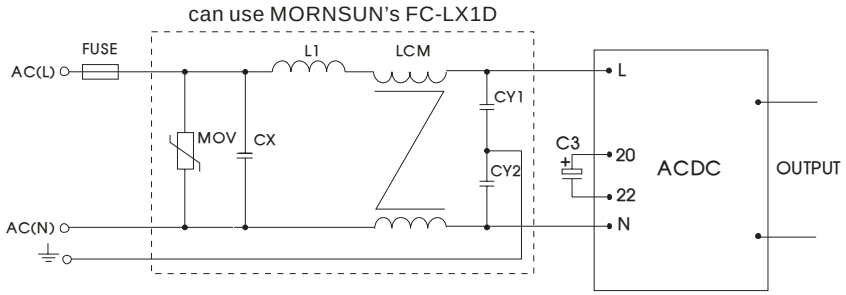


Fig 2: EMC application circuit with higher requirements

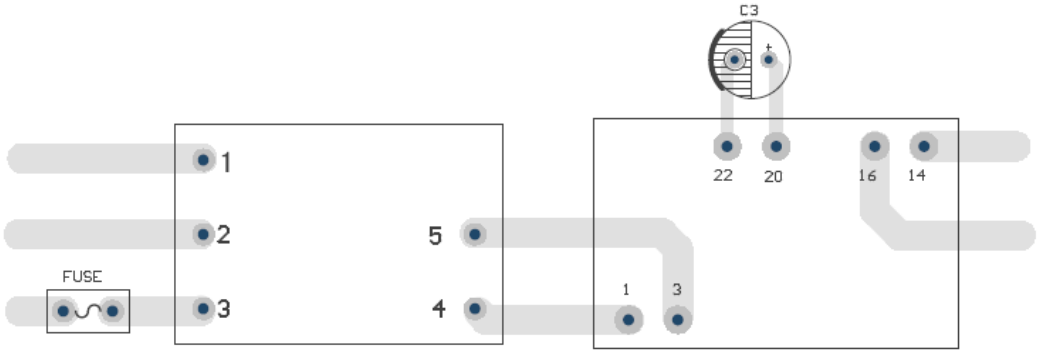


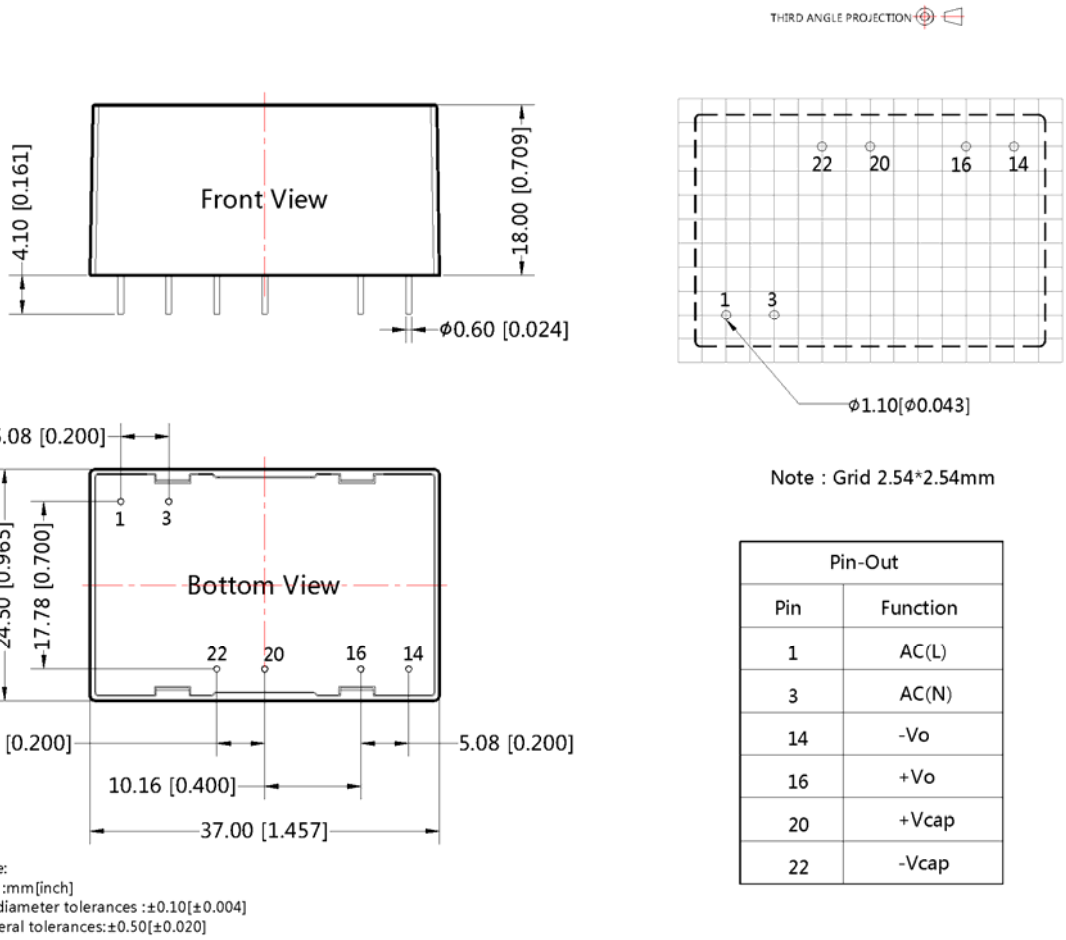
Fig 3: Recommended EMC circuit-PCB layout

Suggestions for safety regulation and wiring width: wire width ≥3mm, distance between wires ≥6mm, and distance between wire and ground ≥6mm

Element model	Recommended value
MOV	S14K350
CX	0.1μF/275VAC
L1	4.7uH/2.0A
LCM	10mH ~30mH,recommended to use MORNSUN's FL2D-Z5-103
CY1、CY2	1nF/400VAC
FUSE	2A/250V, slow fusing, necessary
C3	The capacitor is the input voltage range：85VAC~264 VAC External capacitor, refer to the value in Fig.1
FC-LX1D	2KV/4KV EMC filter

3. For more information about Mornsun EMC Filter products, please visit www.mornsun-power.com to download the Selection Guide of EMC Filter

Dimensions and Recommended Layout



Note : Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	AC(L)
3	AC(N)
14	-Vo
16	+Vo
20	+Vcap
22	-Vcap

Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances:±0.50[±0.020]

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58200055;
2. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
5. We can provide product customization service;
6. Specifications of this product are subject to changes without prior notice.

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