

3W, AC/DC converter



FEATURES

- Ultra wide input voltage range: 90 - 528VAC/100 - 745VDC
- AC and DC dual-use (input from the same terminal)
- Operating temperature range: -40°C to +70°C
- Compact size, high power density
- Isolation voltage: 3KVAC
- Used in such as electrical, instrumentation industries
- Output short circuit, over-current protection
- Meets IEC60950, UL60950, EN60950, FCC part 15 standards (Pending)

LD03-16Bxx 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 IEC60950, UL60950, EN60950, FCC part 15 standards. 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 UL / CE certification and EMC less demanding applications.

Note: Please refer to Design Reference when module being used in a bad EMC environment.

Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency (230VAC, %/Typ.)	Max. Capacitive Load (μF)
UL/CE/CB (Pending)	LD03-16B03	1.65W	3.3V/500mA	63	2200
	LD03-16B05	2.5W	5V/500mA	70	1100
	LD03-16B09	3W	9V/333mA	73	680
	LD03-16B12		12V/250mA	76	680
	LD03-16B15		15V/200mA	76	560
	LD03-16B24		24V/125mA	76	470

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	--	--	0.12	A
	230VAC	--	--	0.06	
	480 VAC	--	--	0.04	
Inrush Current	115VAC	--	9	--	
	230VAC	--	15	--	
	480 VAC	--	27	--	
Leakage current		0.25mA RMS typ. 230VAC/50Hz			
Recommended External Input Fuse		2.0A, slow fusing, necessary			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	LD03-16B03	--	±6	--	%	
	Others	--	±5	--		
Line Regulation	Full load	LD03-16B03	--	±2.5		--
		Others	--	±1.5		--
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
	528VAC Input	--	--	0.5	
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		150 - 300%Io self-recovery			
Min. Load		10			%
Hold-up Time	230VAC input	--	40	--	ms

Note: *Parallel line test method is adopted to test the ripple and noise, connect the output capacitor to the external circuit Fig.1, please see AC-DC Converter Application Notes for specific operation methods.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	3000	--	--	VAC
Operating Temperature	Test time: 1min				
Storage Temperature	Work in the power drop curve range	-40	--	+70	°C
Storage Humidity		-40	--	+105	
Welding Temperature	Wave-soldering	--	--	85	%RH
	Manual-welding	260 ± 5°C; time: 5 - 10s			
Power Derating	+55°C to +70°C	360 ± 10°C; time: 3 - 5s			% / °C
	-40°C to -20°C (90-165VAC)	2.0	--	--	
Safety Standard		3.0	--	--	
Safety Certification		IEC60950/EN60950/UL60950			
Safety Class		IEC60950/EN60950/UL60950 (Pending)			
MTBF	MIL-HDBK-217F@25°C	CLASS II			
		≥ 300,000 h			

Physical Specifications

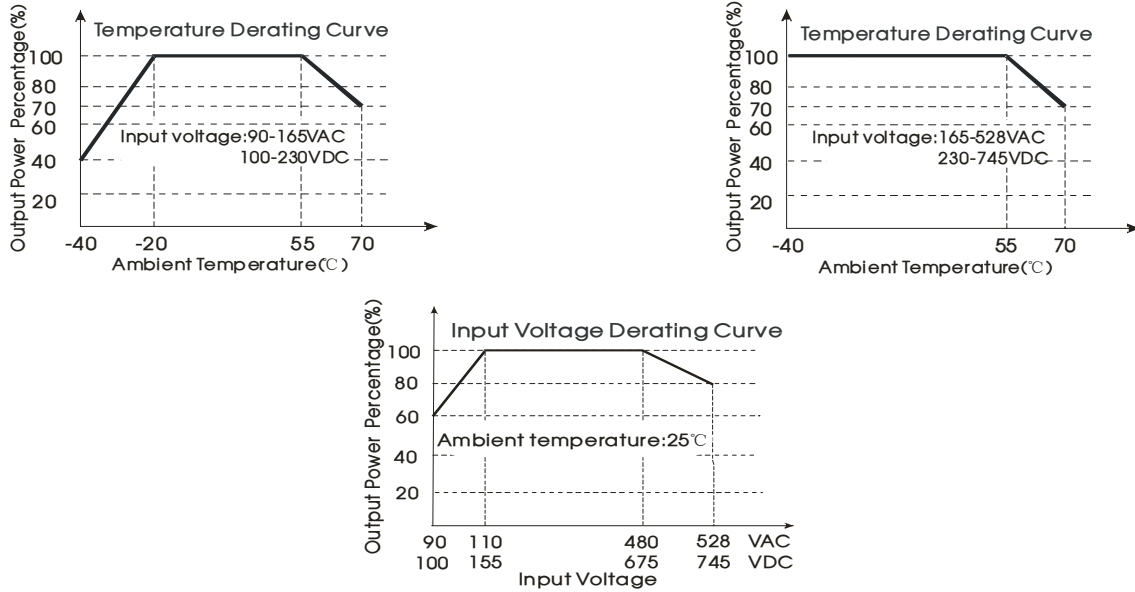
Casing Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Dimension	50.80*25.40*15.16mm
Weight	30g (Typ.)
Cooling Method	Free air convection

EMC Specifications

EMI*	CE	CISPR22/EN55022/FCC part 15	CLASS A
EMI*	RE	CISPR22/EN55022/FCC part 15	CLASS B (See Fig. 2 for recommended circuit)
		CISPR22/EN55022/FCC part 15	CLASS A
EMS	ESD	IEC/EN 61000-4-2	Contact ±6KV/Air ±8KV
		IEC/EN 61000-4-3	10V/m (See Fig. 2 for recommended circuit)
	EFT	IEC/EN 61000-4-4	±2KV
		IEC/EN 61000-4-4	±4KV (See Fig. 2 for recommended circuit)
	Surge	IEC/EN 61000-4-5	line to line ±1KV
		IEC/EN 61000-4-5	line to line ±2KV/ line to ground ±4KV (See Fig. 2 for recommended circuit)
CS	IEC/EN61000-4-6	3Vr.m.s (See Fig. 2 for recommended circuit)	
Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	0%,70% (See Fig. 2 for recommended circuit)	

*This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Product Characteristic Curve



Note:

- ① When input 90 - 110VAC/480 - 528VAC/100 - 155VDC/675 - 745VDC, it need to be voltage derated on basis of temperature derating;
- ② 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

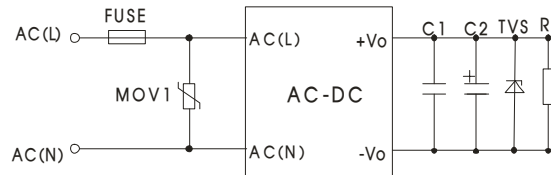


Fig. 1

Element model	MOV1	C1	C2 (necessary)	FUSE (necessary)	TVS
LD03-16B03	S14K550	0.1μF/50V	100μF/16V	2.0A	SMBJ7.0A
LD03-16B05			47μF/16V		SMBJ12A
LD03-16B09			47μF/35V		SMBJ20A
LD03-16B12					SMBJ20A
LD03-16B15					SMBJ20A
LD03-16B24					SMBJ30A

- Note:
- Output filtering capacitor C2 is electrolytic capacitor, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor voltage reduced to at least 80%. C1 is ceramic capacitor, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

2. EMC solution-recommended circuit

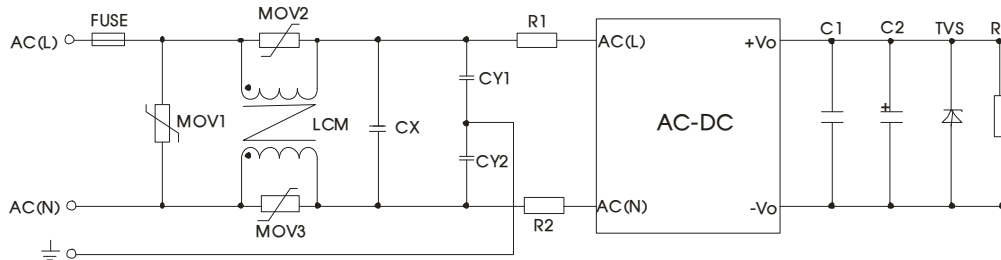
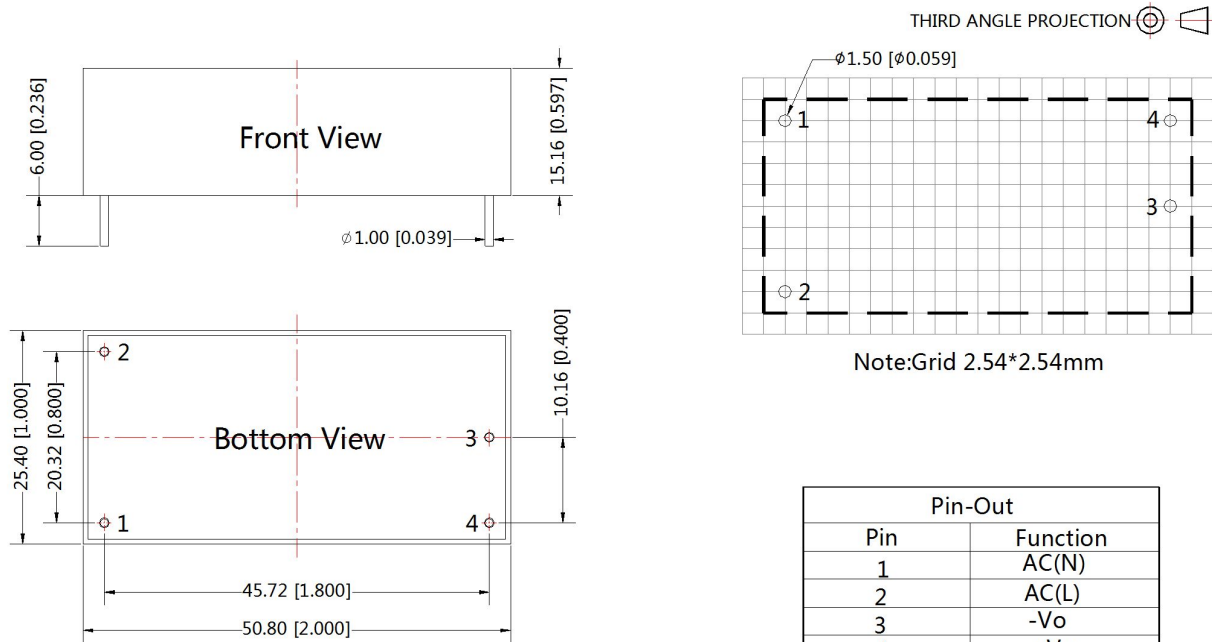


Fig. 2

Element model	Recommended value
MOV1	S14K550
MOV2, MOV3	S07K300
LCM	10mH
CX	0.22 μ F/530VAC
CY1, CY2	470pF/500VAC
R1, R2	12 Ω /2W
FUSE	2.0A, slow fusing, necessary

3. For more information Please find the application note on www.mornsun-power.com

Dimensions and Recommended Layout



Note:
Unit :mm[inch]
Pin diameter tolerances : $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com . Packing bag number: 58220003;
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. 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;
4. 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;
5. All index testing methods in this datasheet are based on our Company's corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Specifications are subject to change without prior notice.

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