

3W AC to DC Converter PCB Mount

multicomp PRO

3W, AC-DC converter

**RoHS
Compliant**

Features

- Ultra-wide 85 - 305V AC and 100 - 430VDC input voltage range
- 1" x 1" compact size
- Operating ambient temperature range: -40°C to +85°C
- Up to 81.5% efficiency
- No-load power consumption 0.1W
- 5000m altitude application
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32 / EN55032 CLASS B, EN55014



Description

MP-LD03-23BxxR2 series AC-DC converters is one of compact size power converter. It features ultra-wide AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability, reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets IEC/EN/UL62368/EN60335/EN61558 standards. The converters are widely used in industrial, power, home appliances, instrumentation, communication and civil applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide				
Part Number	Output Power	Nominal Output Voltage and Current	Efficiency at 230VAC (%) Typ.	Capacitive Load (µF) Max.
MP-LD03-23B03R2	3W	3.3V/900mA	72	4000
MP-LD03-23B05R2		5V/600mA	76	3000
MP-LD03-23B09R2		9V/333mA	78	1200
MP-LD03-23B12R2		12V/250mA		
MP-LD03-23B24R2		24V/125mA	79	220

Input Specifications					
Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	-	305	V AC
	DC input	100		430	V DC
Input Frequency		47		63	Hz
Input Current	115V AC	-		0.08	A
	230V AC			0.06	
Inrush Current	115V AC		15	-	
	230V AC		25	-	
Leakage Current	277V AC/50Hz	0.25mA RMS Max.			
Recommended External Input Fuse		1A, slow-blow, required (The actual use needs to be selected according to the application environment)			
Hot Plug		Unavailable			

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Output Specifications						
Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	3.3V output	--	±3	-	%	
	others	--	±2	-		
Linear Regulation	Full load	--	±0.5	-		
Load Regulation	0%-100% load	--	±1	-		
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	50	100	mV	
Stand-by Power Consumption	230V AC	--	0.10	-	W	
Temperature Coefficient		--	±0.02	-	%/ ^o C	
Short-circuit Protection		Hiccup, continuous, self-recovery				
Over-current Protection		≥200%Io, self-recovery				
Over-voltage Protection	3.3/5V DC output	≤7.5V DC				
	9V DC output	≤15V DC				
	12V DC output	≤16V DC				
	24V DC output	≤30V DC				
Minimum Load		0	-	-	%	
Hold-up Time	115V AC input	-	5	-	ms	
	230V AC input	-	50	-		

Notes: *The "Tip and barrel method" is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Isolation Input-Output	Electric Strength Test for 1min, leakage current <5mA	4000	-	-	V AC	
Operating Temperature		-40	-	+85	^o C	
Storage Temperature			-	+105		
Storage Humidity		-	-	+95	%RH	
Soldering Temperature	Wave-soldering	260 ± 5 ^o C; time: 5 - 10s				
	Manual-welding	360 ± 10 ^o C; time: 3 - 5s				
Switching Frequency		-	65	-	kHz	
Power Derating	+70 ^o C to +85 ^o C	3.3V	2.33	-	-	%/ ^o C
		Others	1.33	-	-	
	85V AC - 100V AC	1.33	-	-	%/VAC	
Altitude		-	-	5000	m	
Safety Standard		IEC/UL62368-1, EN61558-1, EN60335-1 Safety Approval & EN62368-1 (Report)				
Safety Class		CLASS II				
MTBF		MIL-HDBK-217F@25 ^o C > 2799,000 h				
Designed Life	230V AC	Ta:25 ^o C 100% load	>150 × 10 ³ h			
		Ta: 55 ^o C 100% load	>27 × 10 ³ h			

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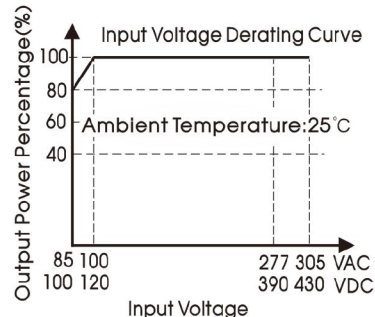
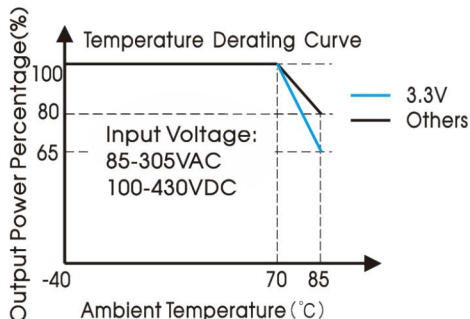
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Mechanical Specifications		
Case Material		Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	Horizontal package	25.4mm × 25.4mm × 17.6mm
Weight	Horizontal package	18g (Typ.)
Cooling Method		Free air convection

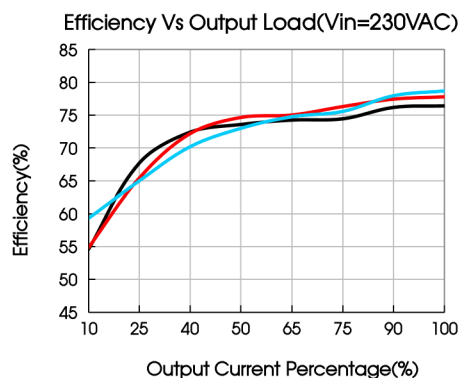
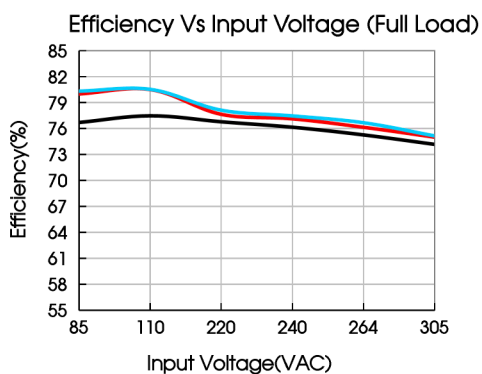
Electromagnetic Compatibility (EMC)				
Emissions	CE	CISPR32/EN55032 CLASS B		
		CISPR32/EN55032 CLASS B (See Fig.3 for recommended circuit)		
		EN55014-1		
	RE	CISPR32/EN55032 CLASS B		
CISPR32/EN55032 CLASS B (see Fig. 5-2 for recommended circuit)				
Immunity	ESD	IEC/EN61000-4-2 Contact ±6KV/Air ±8KV	perf. Criteria B	
		EN55014-2	perf. Criteria B	
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A	
		EN55014-2	perf. Criteria A	
	EFT	IEC/EN61000-4-4 ±2KV (See Fig.1 for typical application circuit)	perf. Criteria B	
		IEC/EN61000-4-4 ±4KV (See Fig.2 for recommended circuit)	perf. Criteria B	
		IEC/EN61000-4-4 ±4KV (See Fig.3 for recommended circuit)	perf. Criteria A	
		EN55014-2	perf. Criteria B	
		Surge	IEC/EN61000-4-5 line to line ±1KV (See Fig.1 for typical application circuit)	perf. Criteria B
			IEC/EN61000-4-5 line to line ±2KV (See Fig.2 for recommended circuit)	perf. Criteria B
	IEC/EN61000-4-5 line to line ±2KV/line to ground ±4KV (See Fig.3 for recommended circuit)		perf. Criteria A	
	EN55014-2		perf. Criteria B	
	CS	IEC/EN61000-4-6 10Vr.m.s	perf. Criteria A	
		EN55014-2	perf. Criteria A	
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70%	perf. Criteria B	
		EN55014-2	perf. Criteria B	
Note: When the output terminal of the product needs to be connected to PE through a Y capacitor, or close to the metal frame, please refer to the Fig.3 for recommended circuit.				

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Typical Characteristic Curves



Note: ① With an AC input between 85-100V/ a DC input between 100-120VDC, 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

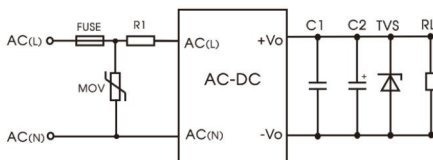


Fig. 1: Typical circuit diagram

Part Number	C1(μF)	C2(μF)	FUSE	R1	TVS	MOV
MP-LD03-23B03R2	1	150	1A/300V, slow-blow, required	12Ω/3W (wire-wound resistor, required)	SMBJ7A	S10K350
MP-LD03-23B05R2					SMBJ12A	
MP-LD03-23B09R2		SMBJ20A				
MP-LD03-23B12R2		SMBJ30A				
MP-LD03-23B24R2		68				

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

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2. EMC compliance recommended circuit

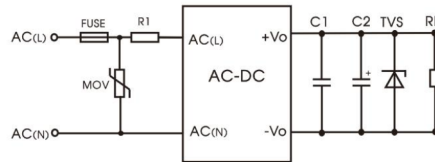


Fig. 2: EMC application circuit with higher requirements

Component	Recommended value
MOV	S14K350
R1	33Ω/3W (wire-wound resistor, required)
FUSE	2A/300V, slow-blow, required

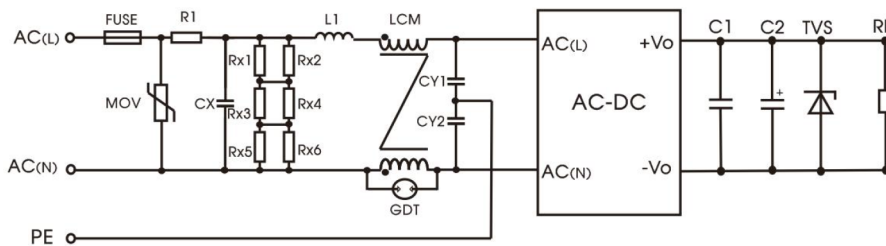


Fig. 3: Recommended circuit for class I equipment

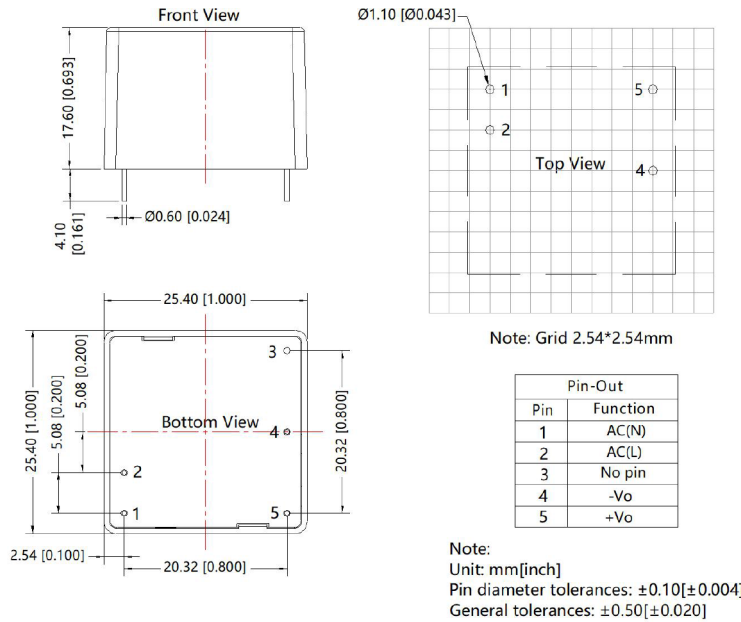
Component	Recommended value
FUSE	2A/300V, slow-blow, required
MOV	S14K350
CX	334K/305VAC
R1	33Ω/3W (wire-wound resistor, required)
L1	1.2mH/0.3A
CY1/CY2	1nF/400VAC
GDT	300V/1KA
LCM	20 mH, P/N: FL2D-10-203 is recommended

Note: Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX, and the recommended resistance value is 1.5MΩ/150V DC.

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Dimensions and Recommended Layout



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