10W AC to DC Converter PCB Mount

multicomp PRO

10W, AC-DC converter

RoHS Compliant

Features

- Ultra-wide 85 - 305VAC and 100 - 430VDC input voltage range
- Operating ambient temperature range: -40°C to +85°C
- Up to 85% efficiency
- No-load power consumption < 0.1W
- 5000m altitude application
- EMI performance meets CISPR32/EN55032 CLASS B, EN55014
- IEC/EN/UL62368/EN60335/EN61558 safety approval

Description

MP-LD10-23BxxR2 series AC-DC converters is one of new generation compact size power converter. It features ultra-wide AC input and at the same time accepts DC input voltage, low power consumption, low ripple & noise, 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-LD10-23B03R2	8.6W	3.3V/2600mA	74	6600
MP-LD10-23B05R2	10W	5V/2000mA	79	5000
MP-LD10-23B09R2		9V/1100mA	81	3600
MP-LD10-23B12R2		12V/830mA	84	2000
MP-LD10-23B24R2		24V/410mA	85	470

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	-		0.23	A
	230V AC			0.15	
Inrush Current	115V AC		15		
	230V AC		25		
Leakage Current	277V AC/50Hz	0.1mA RMS Max.			
Fuse(A2S/A4S package series include fuse)		2A/300V, slow-blow, required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			--	±2	-	%
Line 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	3.3/5/9/12V	--	0.10	-	W
		24V	--	0.12	--	
Temperature Coefficient			--	±0.02	-	%/°C
Short-circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			≥110%Io, self-recovery			
Over-voltage Protection	3.3/5V		≤7.5VDC (Output voltage clamp or hiccup)			
	9V		≤15VDC (Output voltage clamp or hiccup)			
	12V		≤20VDC (Output voltage clamp or hiccup)			
	24V		≤30VDC (Output voltage clamp or hiccup)			
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

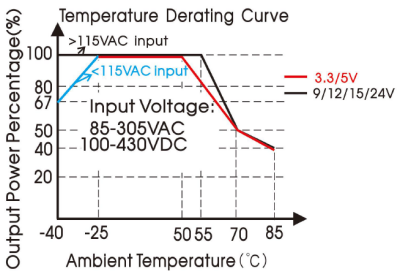
Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-Output	Electric Strength Test for 1min, leakage current <5mA		4000	-	-	V AC
Insulation Resistance	Input-Output	At 500V DC		100	-	-	MΩ
Operating Temperature				-40	-	+85	°C
Storage Temperature					-		
Storage Humidity				-	-	+95	%RH
Soldering Temperature		Wave-soldering		260 ± 5°C; time: 5 - 10s			
		Manual-welding		360 ± 10°C; time: 3 - 5s			
Switching Frequency				-	65	-	kHz
Power Derating		-40°C to -25°C	85V AC to 115V AC	2.2	-	-	%/°C
		+50°C to +70°C	3.3/5V	2.5	-	-	
		+55°C to +70°C	9/12/24V	3.33	-	-	
		+70°C to +85°C		0.66	-	-	
		85V AC - 100V AC		0.83	-	-	%/V AC
		2000m - 5000m		0.67	-	--	%/Km
Safety Standard				IEC/EN/UL62368/EN60335/EN61558			

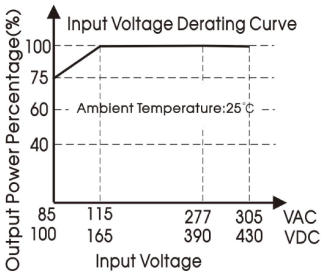
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Safety Certification			IEC/EN/UL62368/EN60335/EN61558			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25°C > 3200,000 h			
Designed Life	230V AC	Ta:25°C 100% load	>130 × 10^3 h			
		Ta: 55°C 100% load	>20 × 10^3 h			
		Ta: 55°C 80% load	>27 × 10^3 h			

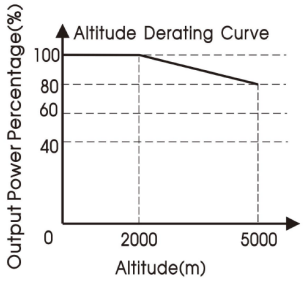
Mechanical Specifications		
Case Material		Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	DIP package	40mm × 25.4mm × 21mm
Weight	DIP mounting	34g (Typ.)
Cooling Method		Free air convection

Electromagnetic Compatibility (EMC)				
Emissions	CE	CISPR32/EN55032	CLASS B	
		EN55014-1		
	RE	CISPR32/EN55032	CLASS B (see Fig. 5-2 for recommended circuit)	
		EN55014-1		
Immunity	ESD	IEC/EN61000-4-2	Contact ± 8KV/Air ±15KV	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	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig.2 for recommended circuit)	perf. Criteria B
		EN55014-2		perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV	perf. Criteria B
		IEC/EN61000-4-5	line to line ±2KV (See Fig.2 for recommended circuit)	
		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

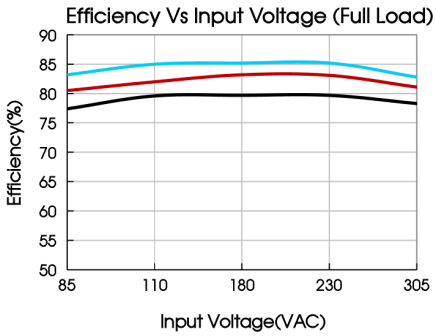
Product Characteristic Curve

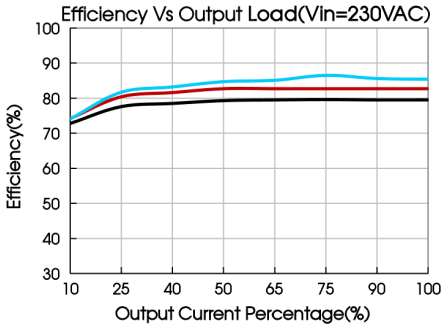






Note: ① With an AC input between 85-115VAC and a DC input between 100-165VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.





Design Reference

1. Typical application

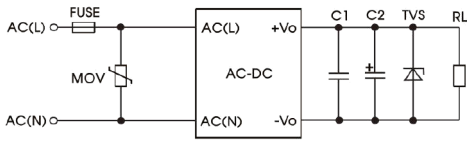


Fig. 1: Typical circuit diagram

Part Number	C1(μF)	C2(μF)	FUSE	TVS	MOV
MP-LD10-23B03R2	1μF/50V	220μF/16V	2A/300V, slow-blow, required	SMBJ7A	S10K350
MP-LD10-23B05R2					
MP-LD10-23B09R2		100μF/25V		SMBJ12A	
MP-LD10-23B12R2				SMBJ20A	
MP-LD10-23B24R2				SMBJ30A	

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.

2. EMC compliance recommended circuit

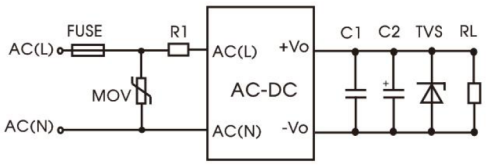
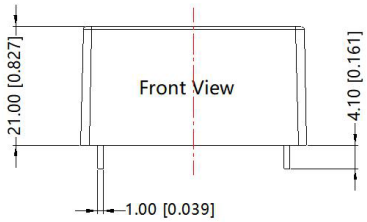


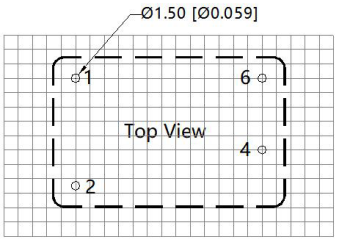
Fig 2: EMC application circuit with higher requirements

Component	Recommended value
MOV	S14K350
R1	6.8Ω/3W
FUSE	2A/300V, slow-blow, required

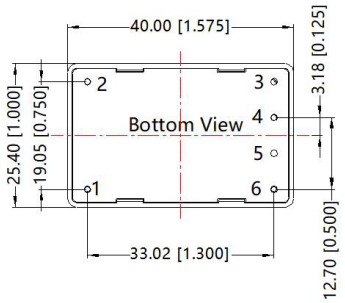
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm



Pin-Out	
Pin	Function
1	AC(L)
2	AC(N)
3	No Pin
4	+Vo
5	No Pin
6	-Vo

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

Dimensions : Millimetres