

# 40W AC to DC Converter PCB Mount

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**RoHS  
Compliant**



## Features

- Universal 85V AC to 305V AC or 100V DC to 430V DC input voltage
- Operating ambient temperature range: -40°C to +85°C
- High I/O isolation test voltage up to 4200V AC
- Up to 90% efficiency
- Compact size, high power density
- Output short circuit, over-current, over-voltage protection
- OVC III ( meet EN62477, 5000m altitude)
- 5000m altitude application
- Meets Emissions CLASS B and surge  $\pm 2$ KV without additional circuits

These series AC-DC converters is one of new generation compact size power converters. 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/UL/EN62368, IEC/EN60335/62477, 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					
Certification	Part Number	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 230V AC (%) Typ.	Capacitive Load ( $\mu$ F) Max.
IEC/UL/EN	MP-LD40-23B05R2	35	5V/7000mA	86	6600
	MP-LD40-23B12R2	40	12V/3330mA	89	4400
	MP-LD40-23B15R2		15V/2666mA	90	3000
	MP-LD40-23B24R2		24V/1670mA	89	1500
	MP-LD40-23B48R2		48V/833mA	90	470

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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	--	--	1	A
	230V AC	--	--	0.6	
Inrush Current	115V AC	--	30	--	
	230V AC	--	60	--	
Leakage Current	277V AC/50Hz	0.1mA RMS Max.			
Recommended External input Fuse		3.15A/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	5V	±2	--	
		12V/15V/24V/48V	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	100	150	mV
Temperature Coefficient		--	±0.02	--	%/°C
Stand-by Power Consumption		--	0.3	0.55	W
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-current Protection		≥130% I <sub>o</sub> , self-recovery			
Over-voltage Protection	5V DC output	≤6.3V DC (Hiccup or clamp)			
	12V DC output	≤16V DC (Hiccup or clamp)			
	15V DC output	≤25V DC (Hiccup or clamp)			
	24V DC output	≤35V DC (Hiccup or clamp)			
	48V DC output	≤60V DC (Hiccup or clamp)			
Minimum Load		0	--	--	%
Hold-up Time	115V AC input	--	8	--	ms
	230V AC input	--	50		

Note: \*The "parallel cable" 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;

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General Specifications						
Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input - output	Electric strength test for 1min., Leakage current<5mA	4200	--	--	V AC
Insulation Resistance	Input - output	At 500V DC	100		--	MΩ
Operating Temperature			-40		+85	°C
Storage Temperature			-40		+85	
Storage Humidity			--		95	%RH
Soldering Temperature		Wave-soldering	260 ± 5°C; time: 5 - 10s			
		Manual-welding	360 ± 10°C; time: 3 - 5s			
Power Derating		-40°C to -25°C (85-200V AC Input)	4	--	--	% / °C
		+50°C to +70°C	2.5			
		+70°C to +85°C	1.67			
		85V AC - 100V AC	1.33			% / V AC
		277V AC - 305V AC	0.71			
Altitude Derating		2000m - 5000m	6.67			% / Km
Safety Standard		IEC/UL62368-1 safety approved & EN62368-1, BS EN 62368-1(Report); Design refer to IEC/EN60335-1, IEC/EN62477-1, EN61558-1				
Safety Class		CLASS II				
MTBF		MIL-HDBK-217F@25°C ≥500,000 h				

Mechanical Specifications		
Case Material		Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimensions	Horizontal package	69.5mm × 39mm × 24mm
	A2 chassis mounting	96.1mm × 54mm × 31mm
	A4 Din-Rail mounting	96.1mm × 54mm × 35.6mm
Weight	Horizontal package	100g (Typ.)
	A2S chassis mounting	147g (Typ.)
	A4S Din-Rail mounting	190g (Typ.)
Cooling Method*		Free air convection

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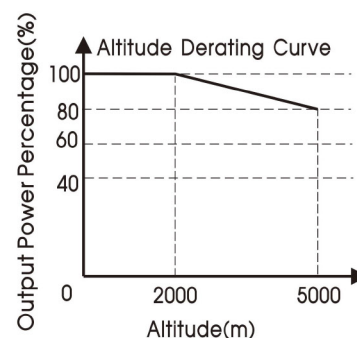
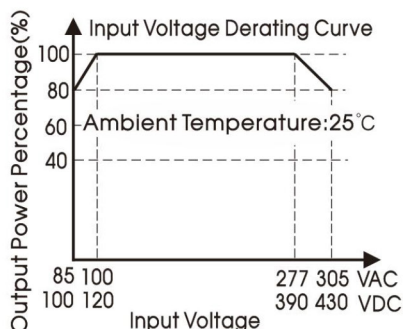
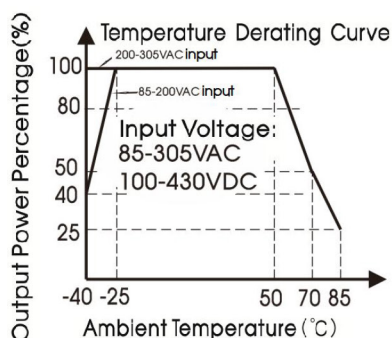
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## Electromagnetic Compatibility (EMC)

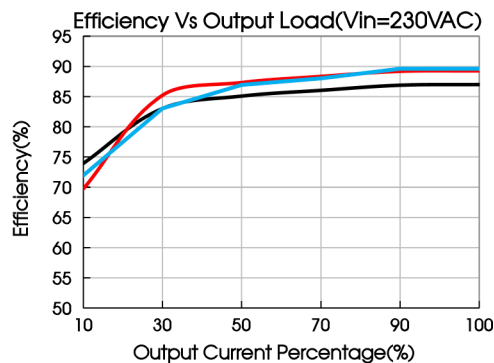
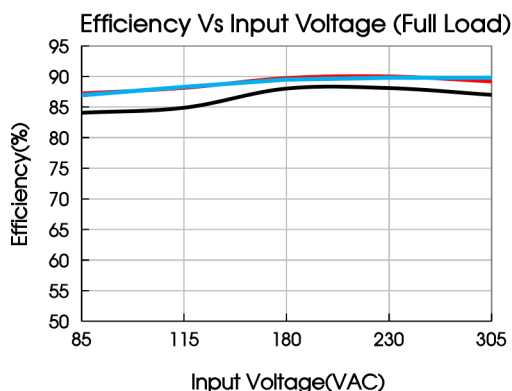
Emissions	CE	CISPR32/EN55032 CLASS B		
	RE	CISPR32/EN55032 CLASS B		
Immunity	ESD	IEC/EN61000-4-2	Contact $\pm 6\text{KV}$ /Air $\pm 8\text{KV}$	Perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN 61000-4-4	$\pm 2\text{KV}$	Perf. Criteria A
		IEC/EN61000-4-4	$\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	Perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line $\pm 2\text{KV}$	Perf. Criteria A
		IEC/EN61000-4-5	line to line $\pm 2\text{KV}$ /line to PE $\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	Perf. Criteria A
	CS	IEC/EN61000-4-6	10 Vr.m.s	Perf. Criteria A
Voltage dips, short interruptions and voltage variation	IEC/EN61000-4-11	0%, 70%	Perf. Criteria B	

Note: 1.\*The power Should be considered as part of the components in the system, All EMC performance are been tested on a metal plate with a thickness of 1mm and a length of 360mm x 360mm. The power supply should be combined with the terminal equipment for electromagnetic compatibility confirmation

## Product Characteristic Curve



- Note: 1 With an AC input between 85-100VAC/277-305VAC and a DC input between 100-120VDC/390-430VDC, 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 FAE.



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## Design Reference

### Typical application

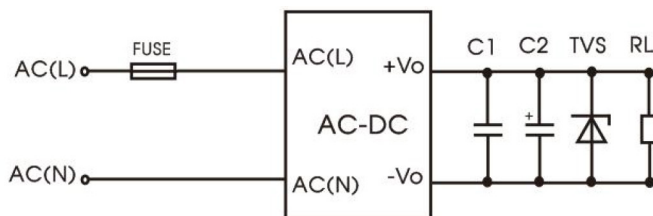


Fig. 1: Typical circuit diagram

Part Number.	Fuse	C1	C2	TVS
MP-LD40-23B05R2	3.15A/300V, slow-blow, required	1uF/50V	330uF/16V	SMBJ7.0A
MP-LD40-23B12R2			330uF/16V	SMBJ20A
MP-LD40-23B15R2			220uF/25V	SMBJ20A
MP-LD40-23B24R2			100uF/35V	SMBJ30A
MP-LD40-23B48R2			47uF/63V	SMBJ64A

### Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2. 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.

### EMC compliance recommended circuit

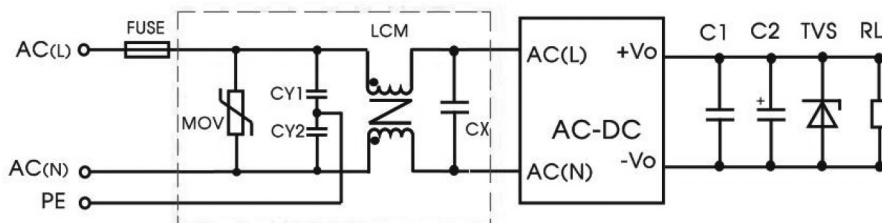


Fig. 2: EMC application circuit with higher requirements

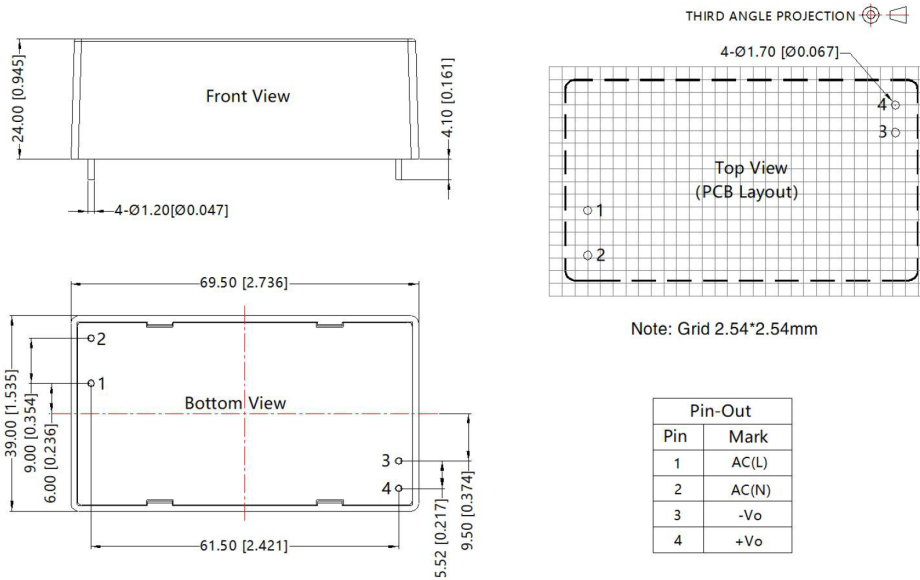
Component	Recommended value
FUSE	3.15A/300V, slow-blow, required
MOV	S14K350
CY1/CY2	1nF/400V AC
CX	684K/310V
LCM	10mH, P/N: FL2D-30-103 is recommended

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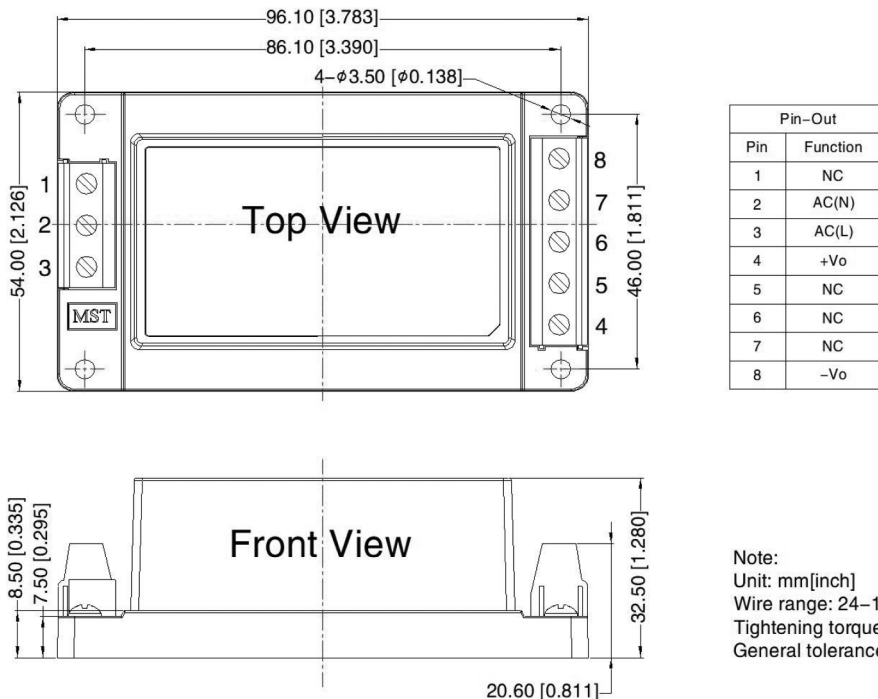
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## Dimensions and Recommended Layout



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

## A2S Dimensions



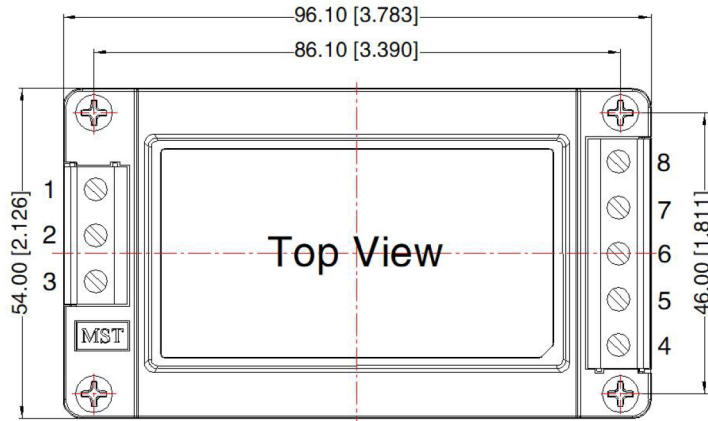
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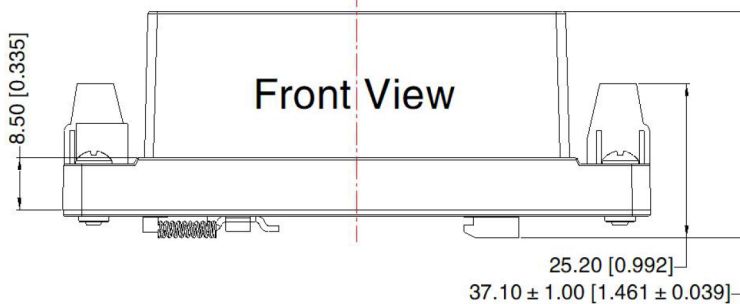
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## A4S Dimensions



Pin-Out	
Pin	Function
1	NC
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	NC
7	NC
8	-Vo



Note:  
Unit: mm[inch]  
Mounting rail: TS35,rail needs to connect safety ground  
Wire range: 24-12AWG  
Tightening torque: Max 0.4N · M  
General tolerances:  $\pm 1.00[\pm 0.039]$

### Notes:

1. 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;
2. 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;
3. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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