

# 3W AC to DC Converter - PCB Mount

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**RoHS  
Compliant**



## Features

- Universal 85V AC to 264V AC and wide 100 - 370V DC Input
- Operating ambient temperature range -40°C to +70°C
- High I/O isolation test voltage up to 4000V AC
- Regulated output, Low output ripple & noise
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32 / EN55032 CLASS B
- IEC62368, UL62368, EN62368 approval



This is a compact size power converters. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability and double or reinforced insulation. It offers excellent EMC performance and for extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet. The converters meet CISPR32/EN55032, UL62368, EN62368, IEC62368 standards and are widely used in industrial, medical, electricity, instrumentation, telecommunications applications.

Model List				
Model No.	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 230V AC (%) Typ.	Capacitive Load (μF) Max.
Single Output Models				
MP-LDE03-20B03	2.3	3.3V/700mA	66	6000
MP-LDE03-20B05	3W	5V/600mA	74	
MP-LDE03-20B09		9V/330mA	75	
MP-LDE03-20B12		12V/250mA	77	
MP-LDE03-20B24		24V/125mA	78	1500
				330

Input Specifications						
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		85		264	V DC
	DC input		100		370	
Input Frequency	Vi nom, Io = 0		47		30	mA
Input Current	MP-LDE03	115V AC	-	-	80	mA
		230V AC			45	
	MP-LDE05	115V AC			130	
		230V AC			70	
Inrush Current	115V AC		-	10	-	A
	230V AC			20	-	
Leakage Current	230V AC/50Hz		0.1mA RMS Max.			
Recommended External Input Fuse			1A/250V Slow-blow required			
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		
Line Regulation	Full load			±0.5		
Load Regulation	0%-100% load			±1		
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)			50		
Temperature Drift Coefficient				±0.02	-	%/°C
Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection	MP-LDE03		≥150% Io, self-recovery			
	MP-LDE05		≥120% Io, self-recovery			
Over-voltage Protection	3.3/5V DC output		≤7.5V DC			
	9V DC output		≤15V DC			
	12/15V DC output		≤20V DC			
	24V DC output		≤30V DC			
Minimum Load			0	-		%
Hold-up Time	MP-LDE03	115V AC input	-	10	-	ms
		230V AC input		60		
	MP-LDE05	115V AC input		5		
		230V AC input		50		

**Note:** \* The "parallel cable" method is used for Ripple and noise test, 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	-	+70	°C
Storage Temperature					+105	
Storage Humidity			-	-	95	%RH
Soldering Temperature	Wave-soldering		260 ± 5°C; time: 5 - 10s			
	Manual-welding		360 ± 10°C; time: 3 - 5s			
Switching Frequency			-	100	-	kHz
Power Derating	MP-LDE03	-40°C to -25°C	1	-	-	% / °C
		+55°C to +70°C				
	MP-LDE05	-40°C to 0°C				
		+55°C to +70°C				3
MP-LDE05	85V AC to 100V AC	1			% / V AC	
Safety Standard			IEC62368/EN62368/UL62368			
Safety Certification			IEC62368/EN62368/UL62368			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25°C > 300,000 h			

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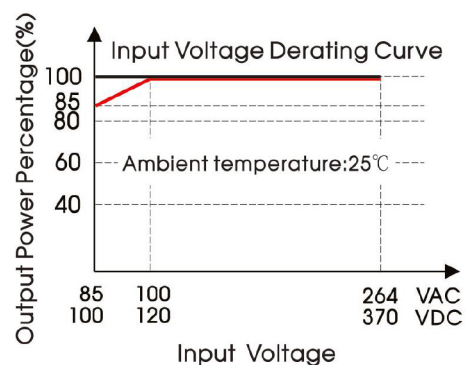
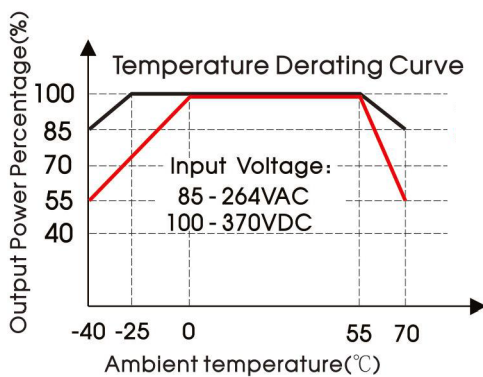
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Mechanical Specifications		
Case Material		Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimensions	DIP	37mm × 24.5mm × 18mm
Weight	DIP	25g(Typ.)
Cooling method		Free air convection

Electromagnetic Compatibility (EMC)			
Emissions	CE	CISPR32/EN55032	CLASS A
		CISPR32/EN55032	CLASS B (See Fig. 2 for recommended circuit)
	RE	CISPR32/EN55032	CLASS A
		CISPR32/EN55032	CLASS B (See Fig. 2 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2	Contact ±6 KV/Air ±8 KV perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m 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
	Surge	IEC/EN61000-4-5	line to line ±1 KV (See Fig. 1 for typical application circuit) perf. Criteria B
		IEC/EN61000-4-5	line to line ±2 KV/line to ground ±4 KV (See Fig. 2 for recommended circuit) perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s perf. Criteria A
Voltage dips, short interruptions and voltage variations		IEC/EN61000-4-11	0%, 70% perf. Criteria B

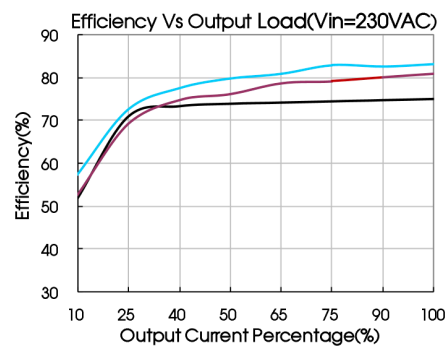
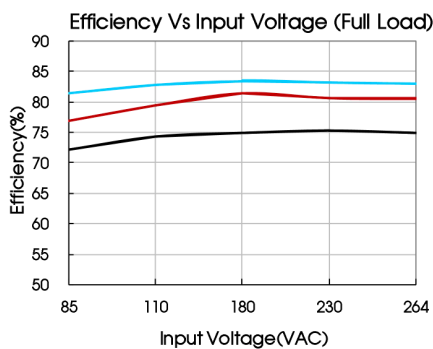
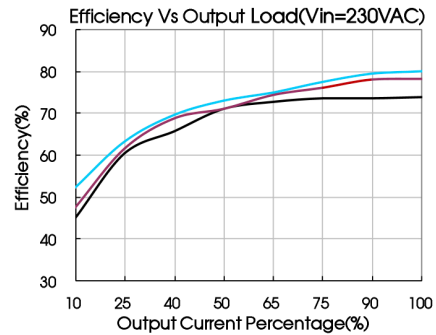
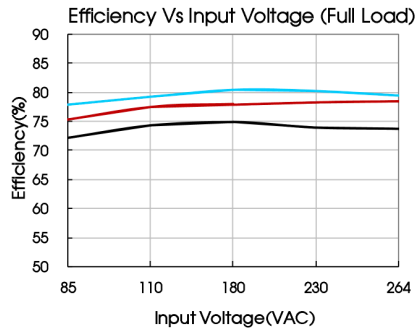
## Product Characteristic Curve



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Note:① With an AC input between 85-100VAC and 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

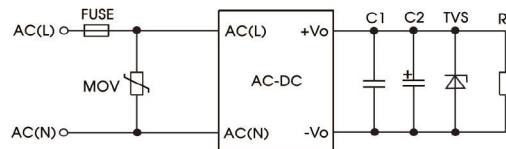


Fig. 1: Typical circuit diagram

Part No.	C1(μF)	C2(μF)	FUSE	MOV	TVS tube
MP-LDE03-20B03	1	150	1A/250V slow-blow required	S14K350	SMBJ7.0A
MP-LDE03-20B05					SMBJ12A
MP-LDE03-20B09		120			SMBJ20A
MP-LDE03-20B12					SMBJ30A
MP-LDE03-20B24					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

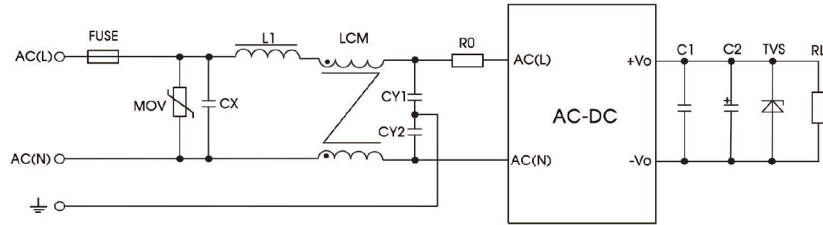
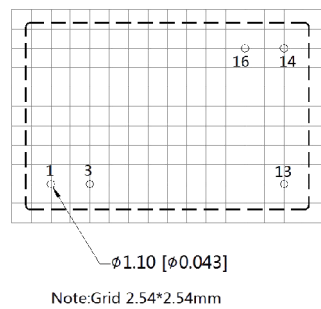
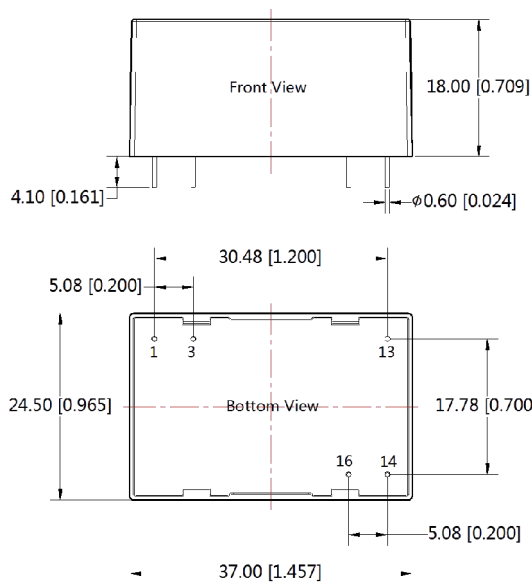


Fig 2: EMC circuit for harsh requirements

Component	Recommended value
MOV	S14K350
CX	0.1µF/275V AC L1
L1	330uH/2.0A
LCM	10mH - 30mH, recommended to use FL2D-Z5-103
CY1	1nF/400V AC CY2
CY2	1nF/400VAC
FUSE	2A/250V slow-blow required
R0	33Ω/3W

## Dimensions and Recommended Layout



Pin-Out	
Pin	Function
1	AC(L)
3	AC(N)
13	NC
14	-Vo
16	+Vo

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

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