

20W AC to DC Converter - PCB Mount

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**RoHS
Compliant**



Features

- Universal Input : 85 - 264V AC/100 - 370V DC
- Operating temperature range: -40°C to +70°C
- High isolation voltage up to 4K V AC
- Regulated output, Low ripple & noise
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Plastic case, meets UL94V-0
- EMI performance meets CISPR32 / EN55032 CLASS B
- IEC62368, UL62368, EN62368 approval



This is a 20W compact size power converter with ultra-slim volume. It features universal input voltage, taking both DC and AC input voltage, low power consumption, low ripple & noise, high efficiency, high reliability, 4000V AC safer isolation. It offers good EMC performance, meet IEC/EN61000-4, CISPR32/EN55032, UL62368 and EN62368 standards, and widely used in industrial, electricity, instruments, telecommunication and civil 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 at 230V AC (%) Typ.	Max. Capacitive Load (µF)
UL/CE/CB	MP-LDE20-20B03	11.8W	3.3V/3600mA	74	10000
	MP-LDE20-20B05	18W	5V/3600mA	78	6600
	MP-LDE20-20B09	20W	9V/2200mA	79	4400
	MP-LDE20-20B12		12V/1660mA	82	3000
	MP-LDE20-20B24		24V/833mA	83	800

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	-	264	V DC
	DC input	100		370	
Input Frequency		47		63	Hz
Input Current	115V AC	-	0.37	0.44	A
	230V AC		0.24	0.26	
Inrush Current	115V AC	-	12	-	
	230V AC		36	-	
Recommended External Input Fuse		3.15A/250V, slow fusing, necessary			
Hot Plug		Unavailable			

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Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	0%-100%	3.3V output	-	±3	-	%
		Other models		±2		
Line Regulation	Full load			±0.5		
Load Regulation	0%-100% load			±1		
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)			50	120	mV
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 output		≤7.5V			
	9V output		≤15V			
	12/15V output		≤20V			
	24V output		≤30V			
Minimum Load			0	-		%
Hold-up Time	115V AC input		5	10	-	ms
	230V AC input		44	55		

Note: *Ripple and noise tested with "parallel cable" method, Testing at rated load. Please see AC-DC Converter Application Notes for specific operation methods.

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Isolation Voltage	Input-output	Test time: 1min (leakage current <5mA)	4000	-	-	V AC	
Operating Temperature			-40	-	+70	°C	
Storage Temperature					+85		
Storage Humidity			-	-	95	%RH	
Welding Temperature	Wave-Soldering		260 ± 5°C; time: 5 - 10s				
	Manual-Welding		360 ± 10°C; time: 3 - 5s				
Switching Frequency			-	100	-	kHz	
Power Derating	-40°C to 0°C		1.67				
	+40°C to +70°C	3.3/5V	2.66	-	-	%/°C	
		Others	2.33				
	85V AC to 130V AC	5V	-25°C to +70°C				0.66
			-40°C to -25°C				1.33
	85V AC to 100V AC	Others	-25°C to +70°C			2	%/V AC
-40°C to -25°C			4				
240V AC to 264V AC		0.83					
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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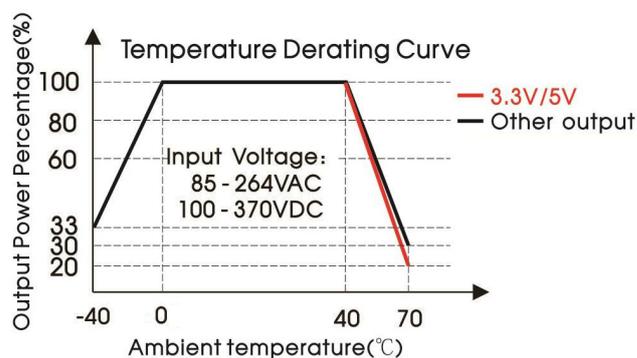
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Physical Specifications		
Casing Material		Black flame-retardant and heat-resistant plastic (UL94 V-0)
Package Dimensions	DIP	53.8mm × 28.8mm × 23.5mm
	A2S chassis mounting	76mm × 31.5mm × 32.3mm
	A4S Din-Rail mounting	76mm × 31.5mm × 36.9mm
Weight	DIP	60g (Typ.)
	A2S chassis mounting	80g (Typ.)
	A4S Din-Rail mounting	100g(Typ.)
Cooling Method		Free air convection

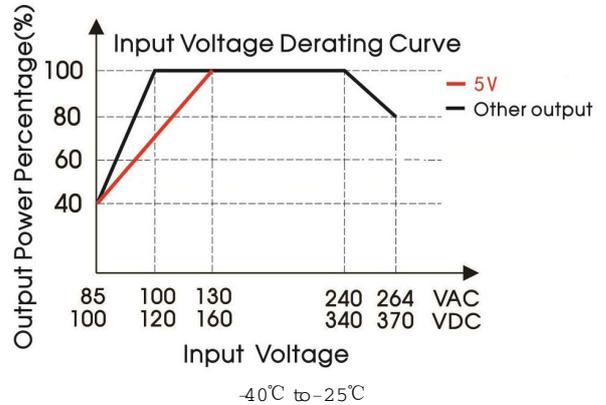
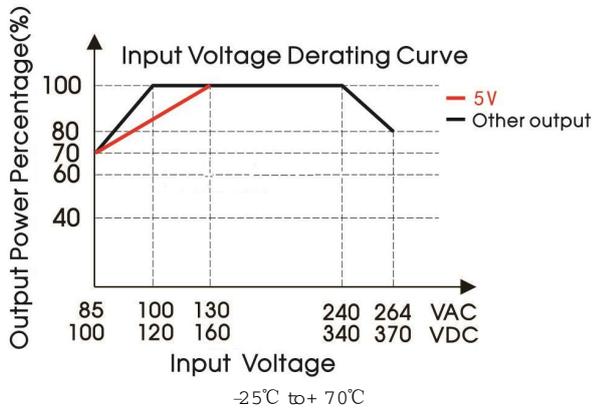
EMC Specifications			
EMI	CE	CISPR32/EN55032	CLASS B
	RE	CISPR32/EN55032	CLASS B
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV/ Air ±8KV perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m perf. Criteria A
	EFT	IEC/EN 61000-4-4	± 4KV perf. Criteria B
	Surge	IEC/EN 61000-4-5	line to line ± 2KV perf. Criteria B
		IEC/EN 61000-4-5	line to line ± 4KV/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



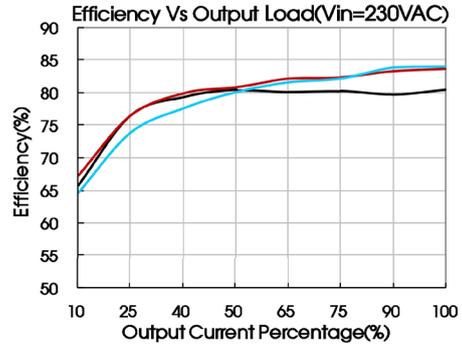
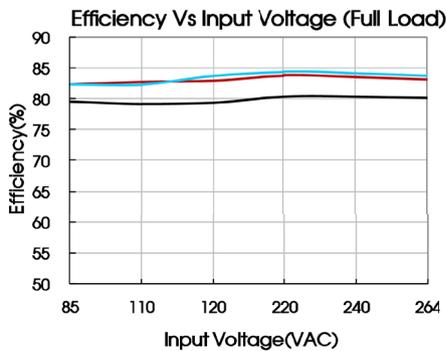
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Note: ① Input voltages should be derated based on temperature derating when it is 85-100VAC/240-264VAC/100-140VDC/340-370VDC (LDE20-20B05 85-130VAC/240-264VAC/100-160VDC/340-370VDC);

② This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's SFAE.



Design Reference

1. Typical Application

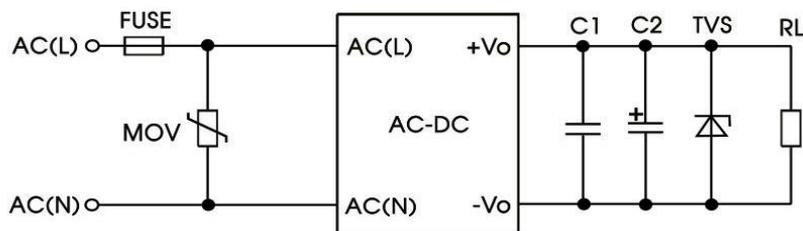


Fig. 1

20W AC to DC Converter - PCB Mount



Part No.	FUSE	MOV	C1	C2	TVS tube
MP-LDE20-20B03	3.15A/250V, slow fusing, necessary	S20K300	1 μ F/50V	220 μ F/16V	SMBJ7A
MP-LDE20-20B05				120 μ F/25V	SMBJ12A
MP-LDE20-20B09					SMBJ20A
MP-LDE20-20B12					SMBJ30A
MP-LDE20-20B24				68 μ F/35V	SMBJ30A

Note:

- Output filtering capacitor C2 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. 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.
- The product in the application must connect external electrolytic capacitors C2, to achieve lower ripple noise and better dynamic load performance.
- When the product’s output terminal is connected to high frequency switch type load, electrolytic capacitor C2’s selection is as following:

Model	C2
MP-LDE20-20B03	470 μ F/16V (Solid capacitor)
MP-LDE20-20B05	
MP-LDE20-20B09	
MP-LDE20-20B12	390 μ F/25V
MP-LDE20-20B24	220 μ F/35V

2. EMC Solution-Recommended Circuit

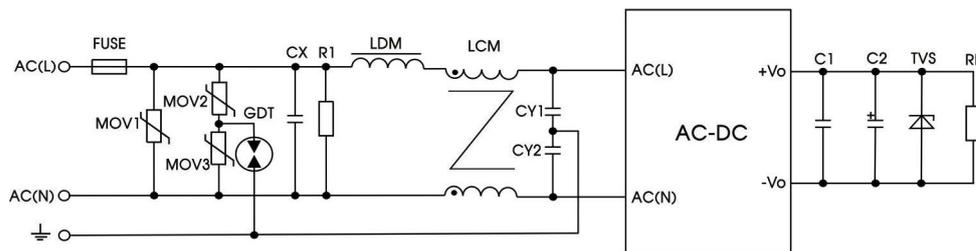


Fig2

Note: Output external circuit refer to the typical application circuit.

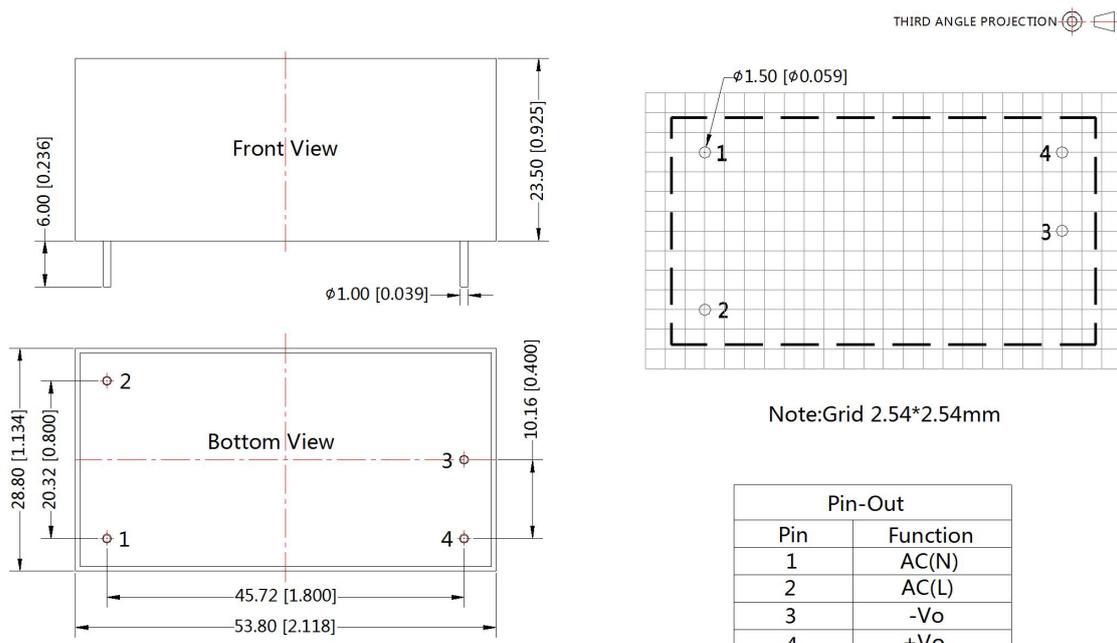


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Element Model	Recommended value
MOV1	S20K300
MOV2	S10K300
MOV3	S10K300
CX	0.22 μ F/275V AC
CY1, CY2	1nF/400V AC
R1	1M Ω /2W
LDM	4.7 μ H
LCM	2mH
GDT	EM3600XS
FUSE	6.3A/250V, slow fusing, necessary

Dimensions and Recommended Layout



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

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