3W/5W, AC-DC converter

FEATURES

- Universal Input : 85 - 264VAC/100 - 370VDC
- Operating temperature range: -40℃ to +70℃
- High isolation voltage up to 4K VAC
- 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
- Meets IEC62368, UL62368, EN62368 standards (Pending)

LDE03/05-20Bxx Series---- a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high reliability, safer isolation.
Note: Please refer to Design Reference when module being used in a bad EMC environment.

Selection Guide

Certification	Model	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency (230VAC/%, Typ.)	Max. Capacitive Load (uF)
UL/CE/CB (Pending)	LDE03-20B03	2.3W	3.3V/700mA	66	6000
	LDE03-20B05	3W	5V/600mA	74	6000
	LDE03-20B09		9V/330mA	75	1500
	LDE03-20B12		12V/250mA	77	1500
	LDE03-20B15		15V/200mA	77	1000
	LDE03-20B24		24V/125mA	78	330
	LDE05-20B03	3.3W	3.3V/1000mA	68	5000
	LDE05-20B05	5W	5V/1000mA	75	5000
	LDE05-20B09		9V/560mA	77	1200
	LDE05-20B12		12V/420mA	79	1200
	LDE05-20B15		15V/330mA	79	1000
	LDE05-20B24		24V/210mA	81	330

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		85	--	264	VAC
	DC input		100	--	370	VDC
Input frequency			47	--	63	Hz
Input current	LDE03	115VAC	--	--	80	mA
		230VAC	--	--	45	
	LDE05	115VAC	--	--	130	
		230VAC	--	--	70	
Inrush current	115VAC		--	10	--	A
	230VAC		--	20	--	
Leakage current			0.1mA RMS typ. 230VAC/50Hz			
Recommended External Input Fuse			1A/250V, slow fusing, necessary			
Hot Plug			Unavailable			

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-peak value)		--	50	100	mV
Temperature Drift Coefficient			--	±0.02	--	%/°C
Short Circuit Protection			Continuous, self-recovery			
Over-current Protection	LDE03		⩾150% Io self-recovery			
	LDE05		⩾120% Io self-recovery			
Over-voltage Protection	3.3/5VDC output		⩽7.5VDC			
	9VDC output		⩽15VDC			
Over-voltage Protection	12/15VDC output		⩽20VDC			
	24VDC output		⩽30VDC			
Min. Load			0	--	--	%
Power-off Holding Time	LDE03	115VAC input	--	10	--	ms
		230VAC input	--	60	--	
	LDE05	115VAC input	--	5	--	
		230VAC input	--	50	--	

Note: *Parallel line test method is adopted to test the ripple and noise, 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		4000	--	--	VAC
Operating Temperature				-40	--	+70	°C
Storage Temperature				-40	--	+105	
Storage Humidity				--	--	95	%RH
Welding Temperature		Wave-soldering		260 ± 5℃; time: 5 - 10s			
		Manual-welding		360 ± 10℃; time: 3 - 5s			
Switching Frequency				--	100	--	kHz
Power Derating		LDE03	-40℃ to -25℃	1.0	--	--	%/°C
			+55℃ to +70℃	1.0	--	--	
		LDE05	-40℃ to 0℃	1.13	--	--	
			+55℃ to +70℃	3.0	--	--	
		LDE05	85 - 100VAC	1.0	--	--	%/VAC
Safety Standard				IEC62368,EN62368,UL62368			
Safety Certification				IEC62368,EN62368,UL62368 (Pending)			
Safety Class				CLASS Ⅱ			
MTBF				MIL-HDBK-217F@25°C > 300,000 h			

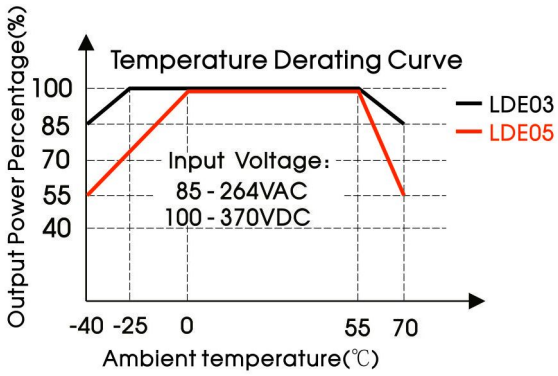
Physical Specifications

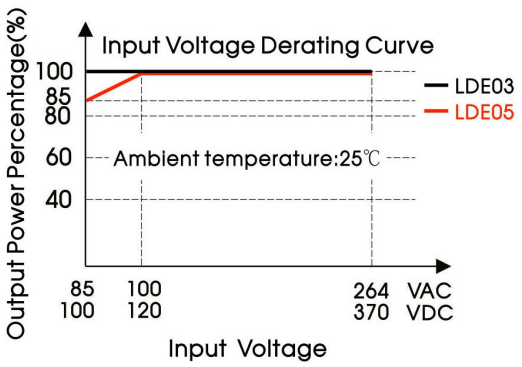
Casing Material	Black flame-retardant and heat-resistant plastic (UL94V-0)
Package Dimensions	37.00*24.50*18.00 mm
Weight	25g(Typ.)
Cooling method	Free air convection

EMC Specifications

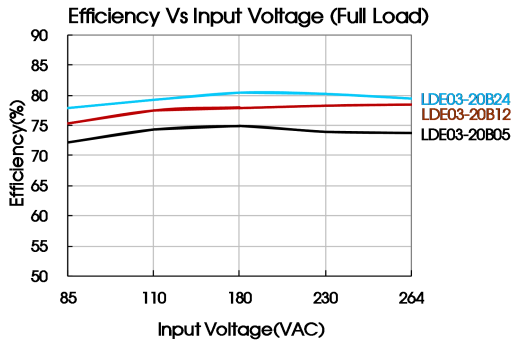
EMI	CE	CISPR32/EN55032	CLASS A	
		CISPR32/EN55032	CLASS B (See Fig. 2 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A	
		CISPR32/EN55032	CLASS B (See Fig. 2 for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2	Contact ±6 KV/Air ±8 KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	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 immunity	IEC/EN61000-4-11	0%,70%	perf. Criteria B

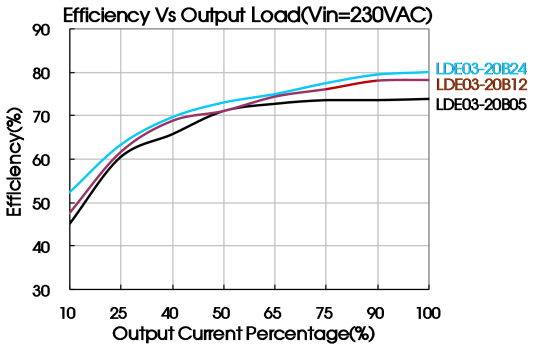
Product Characteristic Curve

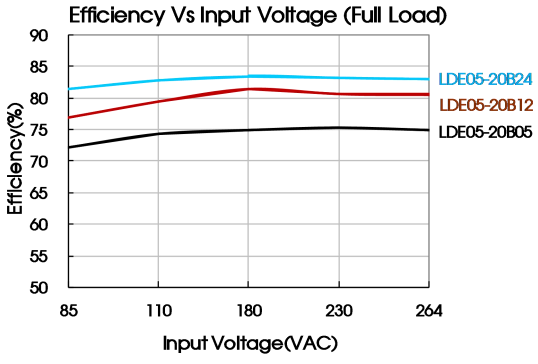


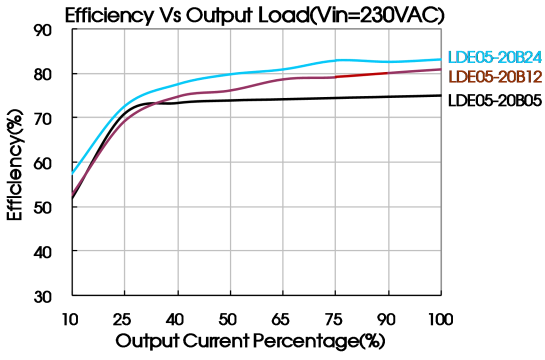


Note: ①When input 85-100VAC/100-120VDC, it need to be voltage derated on basis of temperature derating;
②This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.









Design Reference

1. Typical application circuit

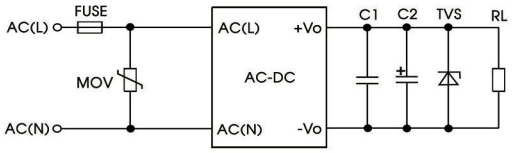


Fig. 1: Typical application circuit

Model	C1(μF)	C2(μF)	FUSE	MOV	TVS tube
LDE03/05-20B03	1	150	1A/250V, slow fusing, necessary	S14K350	SMBJ7.0A
LDE03/05-20B05		150			SMBJ7.0A
LDE03/05-20B09		120			SMBJ12A
LDE03/05-20B12		120			SMBJ20A
LDE03/05-20B15		120			SMBJ20A
LDE03/05-20B24		68			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.

2. EMC solution-recommended circuit

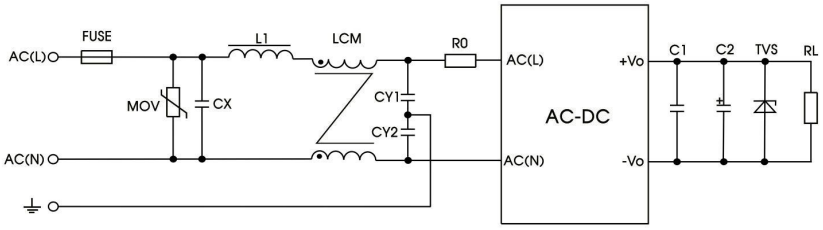


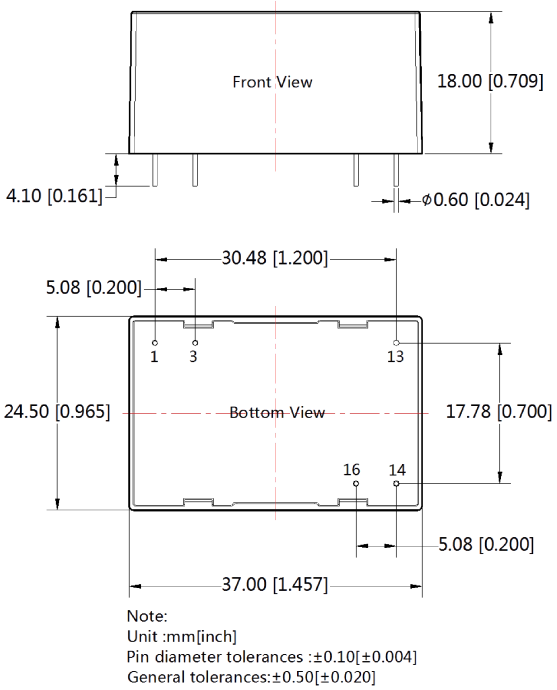
Fig 2: EMC application circuit with higher requirements

Element model	Recommended value
MOV	S14K350
CX	0.1μF/275VAC
L1	330uH/2.0A
LCM	10mH - 30mH,recommended to use MORNSUN's FL2D-Z5-103
CY1	1nF/400VAC
CY2	1nF/400VAC
FUSE	2A/250V, slow fusing, necessary
R0	33Ω/3W

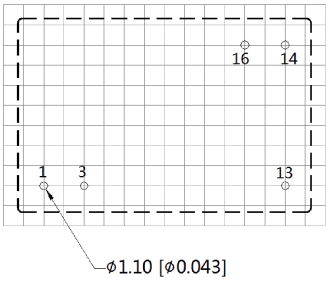
3. For more information please find the application note on www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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



Note:Grid 2.54*2.54mm

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

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58200055;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. 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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