

3W/5W, AC-DC converter



UL US CE CB RoHS

FEATURES

- Universal Input : 85 - 264VAC/100 - 370VDC
- Operating temperature range: -40°C to +70°C
- 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
- IEC62368, UL62368, EN62368 approval

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	LDE03-20B03	2.3W	3.3V/700mA	66	6000
	LDE03-20B05		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		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°C; time: 5 - 10s				
	Manual-welding	360 ± 10°C; time: 3 - 5s				
Switching Frequency		--	100	--	kHz	
Power Derating	LDE03	-40°C to -25°C	1.0	--	--	% / °C
		+55°C to +70°C	1.0	--	--	
	LDE05	-40°C to 0°C	1.13	--	--	
		+55°C to +70°C	3.0	--	--	
LDE05	85 - 100VAC	1.0	--	--	%/VAC	
Safety Standard		IEC62368, EN62368, UL62368				
Safety Certification		IEC62368, EN62368, UL62368				
Safety Class		CLASS II				
MTBF		MIL-HDBK-217F@25°C > 300,000 h				

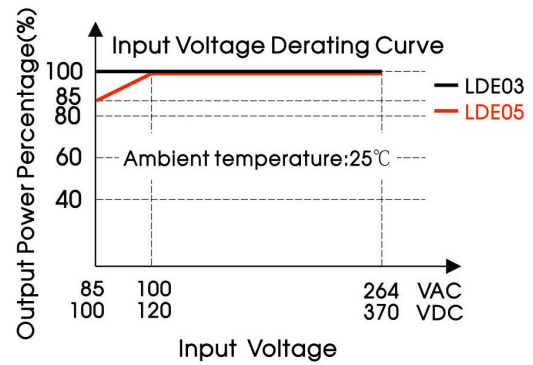
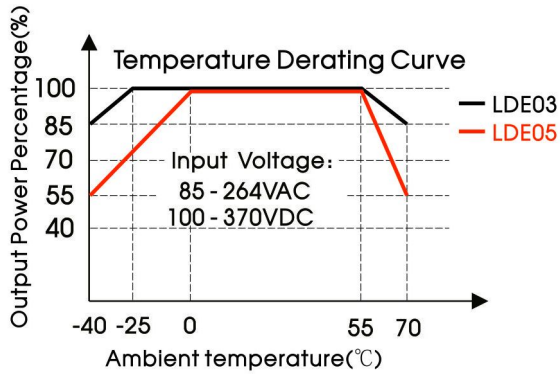
Physical Specifications

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

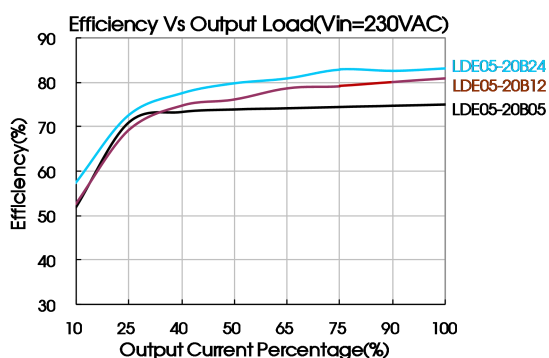
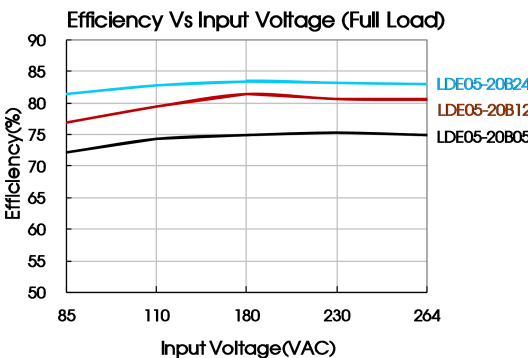
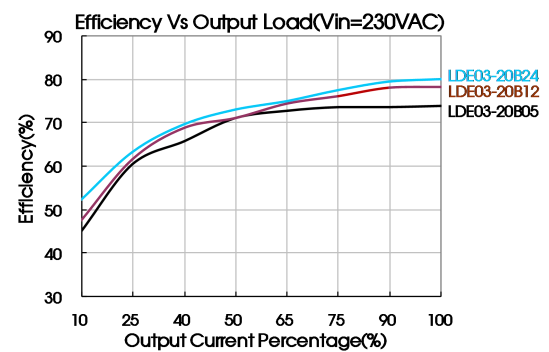
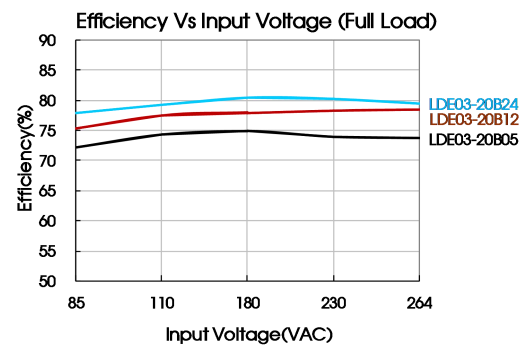
EMC Specifications

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	± 2 KV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN61000-4-4	± 4 KV (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: ① When input 85-100VAC/100-120VDC, it need to be voltage derated on basis of temperature derating;
② This 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

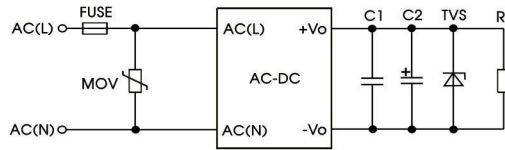


Fig. 1: Typical application circuit

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

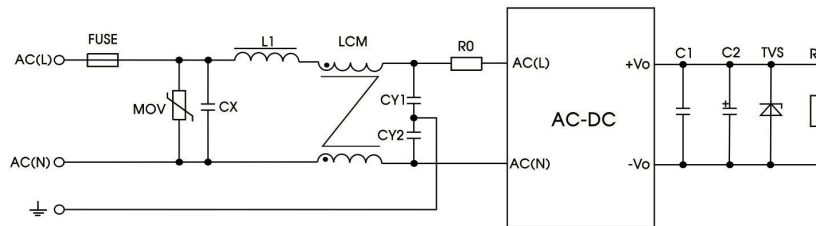


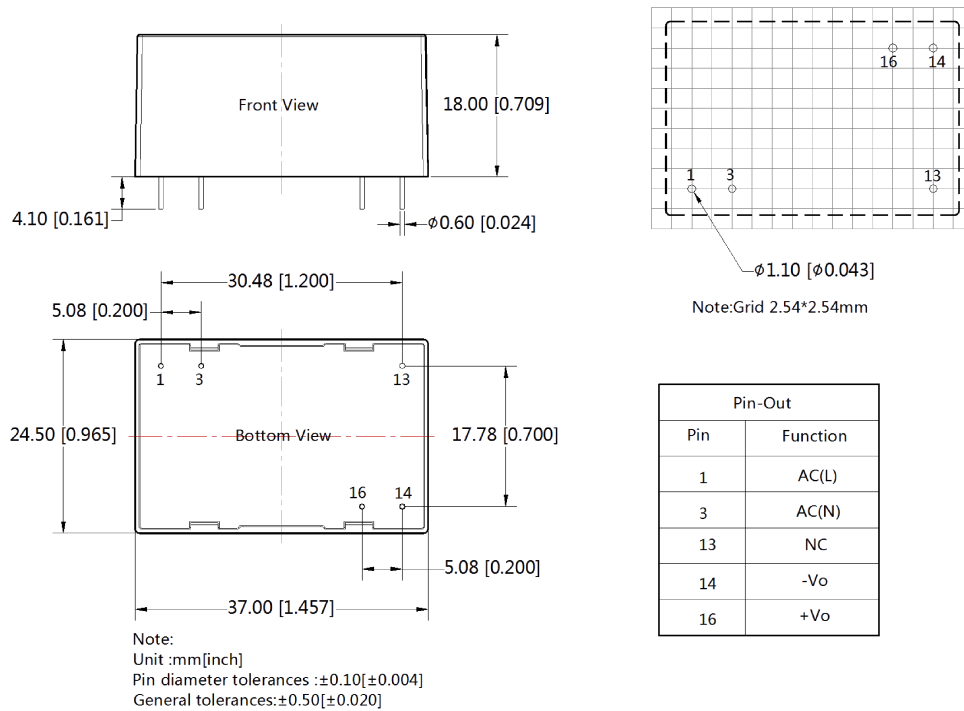
Fig 2: EMC application circuit with higher requirements

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	33 Ω /3W

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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 $T_a=25^\circ\text{C}$, 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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