

# Datasheet

## RS Pro LDE03/05-20Bxx AC/DC Converter

3W/5W, AC-DC converter



### Features

- Universal 85 - 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 4000VAC
- 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

UL US CE CB RoHS

LDE03/05-20Bxx series features a universal AC input and DC input voltage, low power consumption, high efficiency, high reliability and double or reinforced insulation. The converters meet CISPR32/EN55032, UL62368, EN62368, IEC62368 standards and are widely used in industrial, medical, instrumentation, telecommunications applications.

### Selection Guide

Certification	RS Stock no. (Standard Pack)	RS Stock no. (Tube Pack 13pcs)	Part No	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (µF)Max.
UL/CE/CB	1812186	1812132	LDE03-20B03	2.3W	3.3V/700mA	66	6000
	1812188	1812133	LDE03-20B05	3W	5V/600mA	74	6000
	1812190	1812134	LDE03-20B09		9V/330mA	75	1500
	1812194	1812136	LDE03-20B12		12V/250mA	77	1500
	1812196	1812137	LDE03-20B15		15V/200mA	77	1000
	1812198	1812138	LDE03-20B24		24V/125mA	78	330
	1812199	1812139	LDE05-20B03		3.3W	3.3V/1000mA	68
	1812200	1812140	LDE05-20B05	5W	5V/1000mA	75	5000
	1812201	1812142	LDE05-20B09		9V/560mA	77	1200
	1812202	1812143	LDE05-20B12		12V/420mA	79	1200
	1812187	1812144	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	230VAC/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	100	mV
Temperature Drift Coefficient			--	±0.02	--	%/°C
Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection	LDE03		≥ 150% I <sub>o</sub> , self-recovery			
	LDE05		≥ 120% I <sub>o</sub> , self-recovery			
Over-voltage Protection	3.3/5VDC output		≤ 7.5VDC			
	9VDC output		≤ 15VDC			
	12/15VDC output		≤ 20VDC			
	24VDC output		≤ 30VDC			
Minimum Load			0	--	--	%
Hold-up Time	LDE03	115VAC input	--	10	--	ms
		230VAC input	--	60	--	
	LDE05	115VAC input	--	5	--	
		230VAC 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	--	--	VAC
Operating Temperature			-40	--	+70	°C
Storage Temperature			-40	--	+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	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			

# AC/DC Converter

## LDE03/05-20Bxx Series

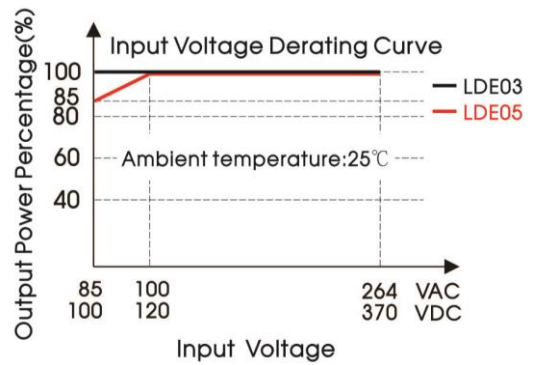
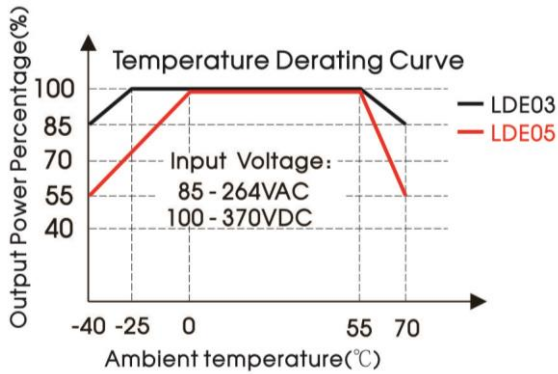
### Mechanical Specifications

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

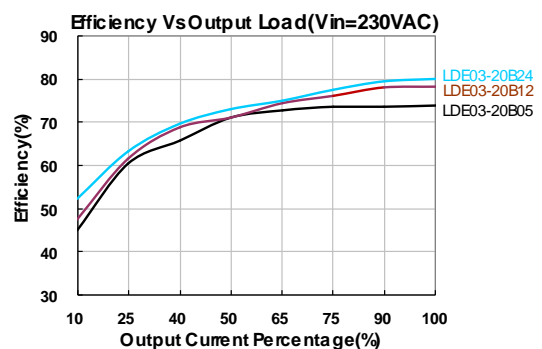
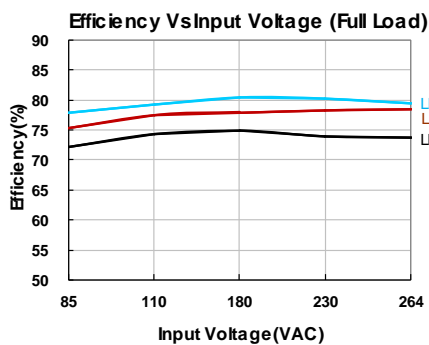
### Electromagnetic Compatibility (EMC)

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 $\pm 6$ KV/Air $\pm 8$ KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2$ KV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN61000-4-4	$\pm 4$ KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line $\pm 1$ KV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN61000-4-5	line to line $\pm 2$ KV/line to ground $\pm 4$ 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

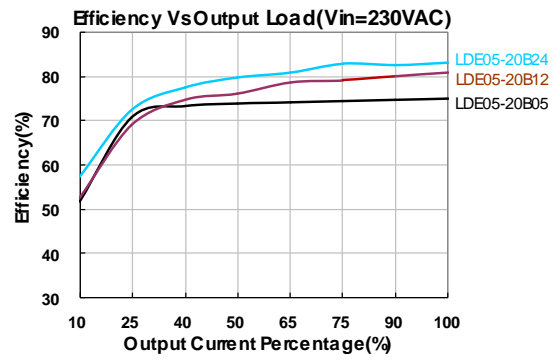
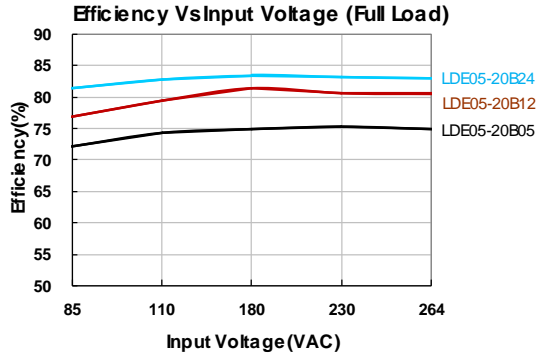


Note: With an AC input between 85-100VAC and a DC input between 100-120VDC, the output power must be derated as per temperature derating curves;



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### Design Reference

#### 1. Typical application

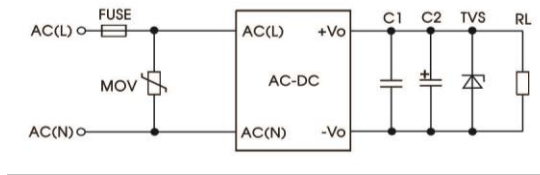


Fig. 1: Typical circuit diagram

Part No.	C1(μF)	C2(μF)	FUSE	MOV	TVS tube
LDE03/05-20B03	1	150	1A/250V slow-blow required	S14K350	SMBJ7.0A
LDE03/05-20B05		150			SMBJ7.0A
LDE03/05-20B09		120			SMBJ12A
LDE03/05-20B12		120			SMBJ20A
LDE03/05-20B24		68			SMBJ30A

#### 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 the TVS provides optional supplementary overvoltage protection.

#### 2. EMC compliance recommended circuit

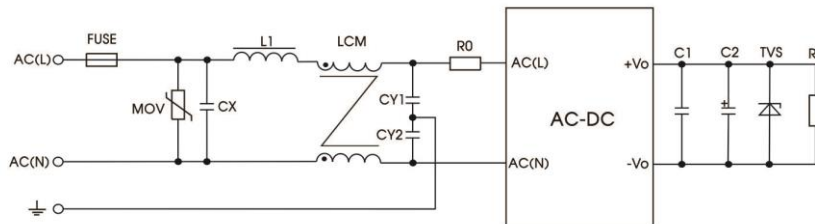


Fig 2: EMC circuit for harsh requirements

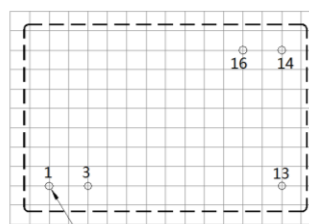
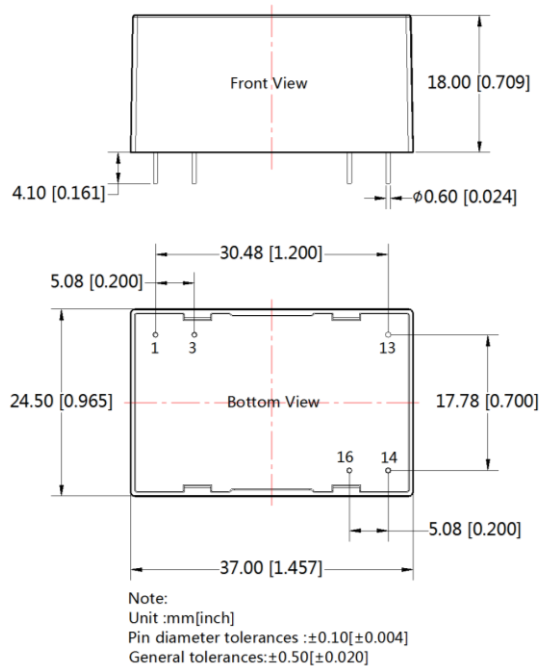
Component	Recommended value
MOV	S14K350
CX	0.1μF/275VAC
L1	330uH/2.0A
LCM	10mH - 30mH, recommended to use MORNSUN's FL2D-Z5-103
CY1	1nF/400VAC
CY2	1nF/400VAC
FUSE	2A/250V slow-blow required
R0	33Ω/3W

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### Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



Note:Grid 2.54\*2.54mm

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

Note:

- 1.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;
- 2.All index testing methods in this datasheet are based on our Company's corporate standards.
- 3.Products are related to laws and regulations: see "Features" and "EMC".
- 4.Products are classified according to ISO14001 and related environmental laws and regulation.