

## LD03-05 SERIES

### 3-5W, AC-DC CONVERTER

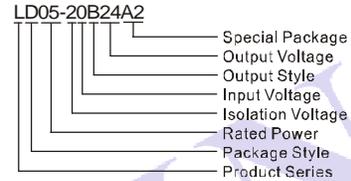
LD series ----is a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, meets IEC61000, UL60950 and IEC60950 standards, and is UL & CE certified, and widely used in industrial, medical, electricity, instruments, telecommunication and civil applications.



#### PRODUCT FEATURES

1. Universal Input: 85 ~ 264VAC, 50/60Hz
2. AC and DC dual-use(input from the same terminal)
3. Low Ripple and Noise
4. Over-voltage, short circuit and Over-temperature protection
5. High efficiency, High power density
6. Low loss, green power
7. Multiple models available
8. industrial, medical level specifications
9. Three years warranty
10. LD05 series mounting: PCB mounting, Chassis mounting with Screw Terminals, DIN-Rail mounting

#### PART NUMBER SYSTEM



#### SELECTION GUIDE

Approval	Model	Package	Power	Output (Vo/Io)	Output (Io[max.]/T)	Ripple and Noise (Typ)	Efficiency (% Typ)	Standby Power(Typ)
UL/CE	LD03-10B03	37.0X23.0X15.0mm	2.3W	3.3V/700mA	900mA/60s	30mV	63	0.25W
	LD03-10B05			5V/600mA	750mA/60s		72	0.3W
	LD03-10B09		3W	9V/330mA	450mA/60s		74	0.35W
	LD03-10B12			12V/250mA	330mA/60s		76	0.35W
	LD03-10B15			15V/200mA	250mA/60s		76	0.35W
	LD03-10B24			24V/125mA	160mA/60s		78	0.35W
UL/CE	LD05-20B03	50.8X25.4X15.16mm	4.2W	3.3V/1250mA	1400mA/60s	30mV	66	0.3W
	LD05-20B05		5W	5V/1000mA	1300mA/60s		72	0.3W
	LD05-20B09			9V/550mA	700mA/60s		74	0.35W
	LD05-20B12			12V/420mA	550mA/60s		76	0.35W
	LD05-20B15			15V/333mA	450mA/60s		76	0.35W
	LD05-20B24			24V/230mA	300mA/60s		78	0.4W
			5.5W					

Note:

1. Ripple and Noise were measured by the method of anear measure (The details see the anear measure);
2. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified;
3. All characteristics are for listed model only, non-standard models may perform differently, please contact our technical person for more detail;
4. Product can not be operated continuously over current, or it will cause permanent damage to the device.

#### INPUT SPECIFICATIONS

Input Voltage Range		85~264VAC, 110~370VDC
Input Frequency		47~440Hz
Input Current	LD03 models LD05 models	110VAC 65mA, typ 110mA,typ 230VAC 30mA, typ 70mA, typ
Inrush Current	LD03 models LD05 models	110VAC 10A, typ 10A, typ 230VAC 20A, typ 20A, typ
Leakage Current		None
Recommended External Input Fuse (LD05 special package series include fuse)	LD03 models LD05 models	0.5A/250V Slow-Blow Type 1A/250V Slow-Blow Type

## OUTPUT SPECIFICATIONS

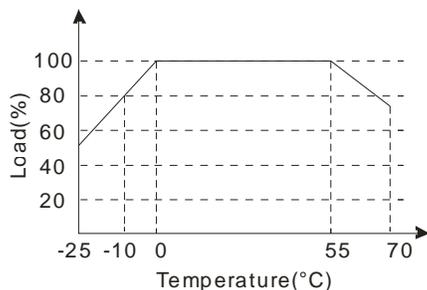
Voltage set accuracy		±2% (typ) (±3% @ 3.3V output )	
Input variation		±0.5% (typ)	
Load variation (10% to 100%)		±1% (typ)	
Ripple & noise (p-p)	20MHz Bandwidth	30mV (typ)	60mV (max)
Short circuit protection		Continuous, and auto resume	
Over temperature protection		150°C (max)	
Over output voltage protection	LD05 models	diode clamp	

## COMMON SPECIFICATIONS

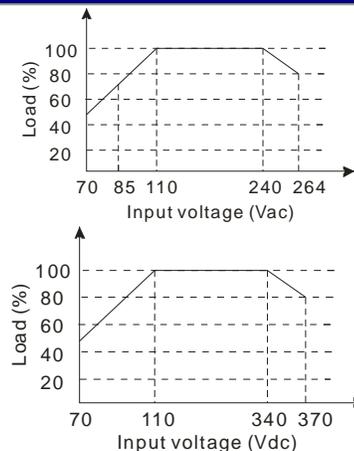
Temperature ranges	Operating		-25°C ~ +70°C		
	Power derating (above 55°C)		2% / °C		
	Storage		-40°C ~ +105°C		
	Case temperature		+95°C max		
Hold-up time	(Vin=230VAC)		50ms(typ)		
Humidity			95%(max)		
Temperature coefficient			0.02%/°C		
Switching frequency			100kHz(typ)		
I/O-isolation voltage	LD03 models LD05 models		3000VAC/1Min 4000VAC/1Min		
EMC	EMI	CE	LD03 models	CISPR22/EN55022, CLASS A	
			LD05 models	CISPR11/EN55011, CLASS A	
		RE	LD03 models	CISPR22/EN55022, CLASS A	
			LD05 models	CISPR11/EN55011, CLASS A	
	EMS	ESD		IEC/EN 61000-4-2 Air ±15KV / Contact ±8KV	perf. Criteria B
		RS		IEC/EN 61000-4-3 10V/m	perf. Criteria A
		EFT	LD03 models	IEC/EN 61000-4-4 ± 2kV	perf. Criteria B
			*LD05 models	IEC/EN 61000-4-4 ± 4kV	perf. Criteria B
		*Surge	LD03 models	IEC/EN 61000-4-5 ±1KV/±2KV	perf. Criteria B
			LD05 models	IEC/EN 61000-4-5 ±2KV/±4KV	perf. Criteria B
Safety standards	LD03 models LD05 models		IEC60950, EN60950, UL60950 IEC60601, EN60601		
Safety approvals	LD03 models LD05 models		EN60950, UL60950 EN60601-1		
Safety Class			CLASS II		
Case material			UL94V-0		
Install	LD03 models LD05 models		PCB mounting PCB mounting, Chassis mounting with Screw Terminals, DIN-Rail mounting		
MTBF			>300,000h @25°C		
Weight	LD03 models		20g		
	LD05 models		35g(PCB mounting) 85g(Chassis mounting with Screw Terminals)		

Note: \*External circuit is required to models at inrush and electrical fast transients experiment, refer to typical application.

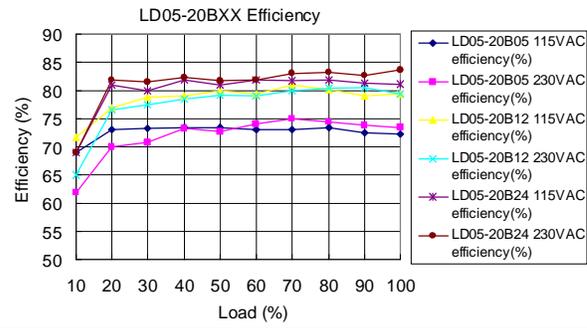
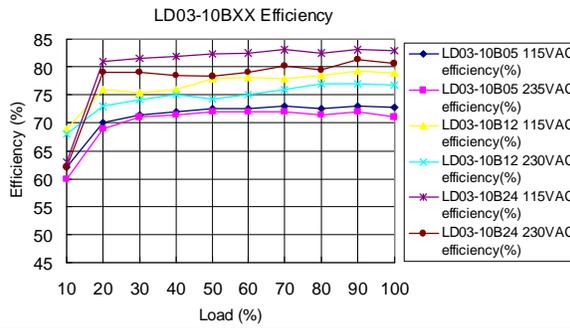
## TEMPERATURE VS LOAD



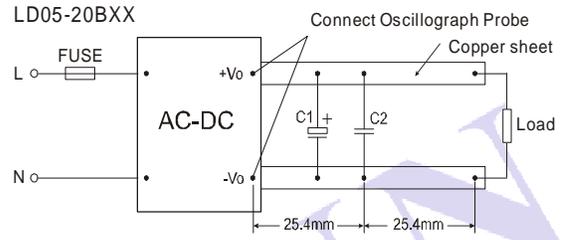
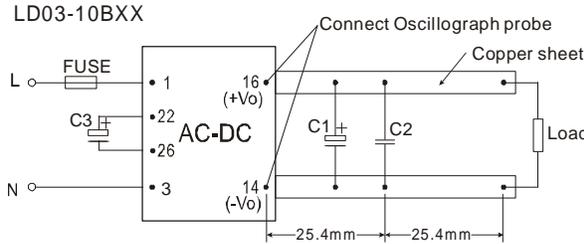
## INPUT VOLTAGE VS LOAD



## TYPICAL EFFICIENCY CURVE



## ANEAR MEASURE



## TYPICAL APPLICATIONS

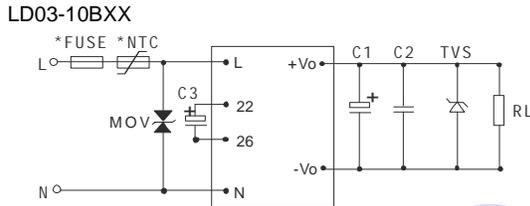


Figure 1

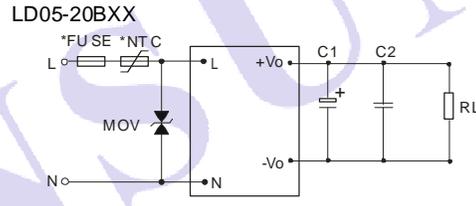


Figure 2

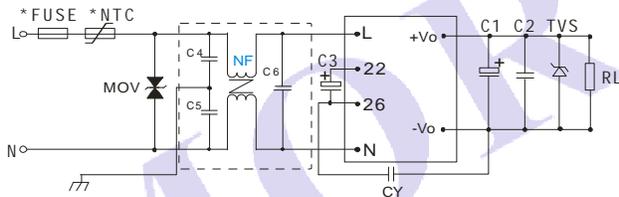


Figure 3 LD03 EMC Application

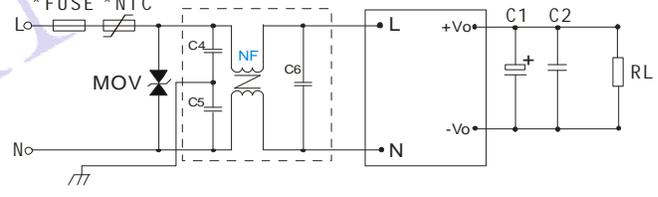


Figure 4 LD05 EMC Application

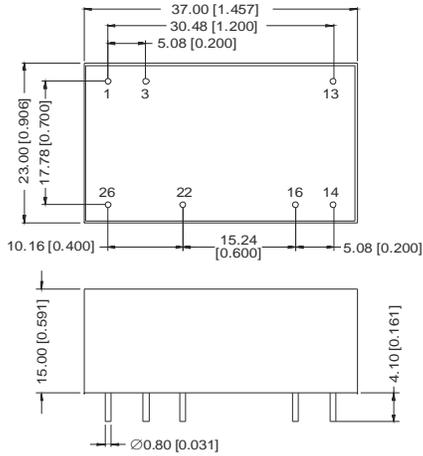
### EXTERNAL CAPACITORS TYPICAL VALUE(Unit: mF)

Model	C1	C2	C3	TVS	Model	C1	C2
LD03-10B03	150	0.1	4.7/400V	P4KE6.8A	LD05-20B03	47	0.1
LD03-10B05	150	0.1	4.7/400V	P4KE6.8A	LD05-20B05	47	0.1
LD03-10B09	120	0.1	4.7/400V	P4KE12A	LD05-20B09	33	0.1
LD03-10B12	120	0.1	4.7/400V	P4KE20A	LD05-20B12	33	0.1
LD03-10B15	120	0.1	4.7/400V	P4KE20A	LD05-20B15	33	0.1
LD03-10B24	68	0.1	4.7/400V	P4KE30A	LD05-20B24	10	0.1

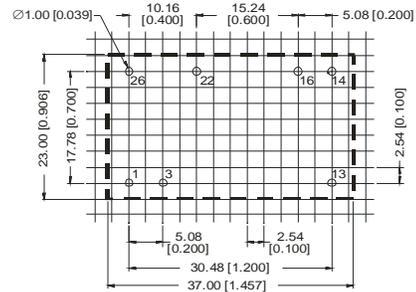
Note:

- Output filtering capacitor C1 and input filtering capacitors C3 are electrolytic capacitors. It is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to manufacture's datasheet. Voltage derating of capacitor should be 80% or above. C2 is ceramic capacitor, it is used to filter high frequency noise. TVS is a recommended component to protect post-circuits (if converter fails).
- To protect the device from damage, external circuit is required to models at inrush and electrical fast transients experiment, MOV is required to LD03 models and LD05 models, model: 471KD14; It is recommended to connect FUSE, the parameter for LD03 models is 0.5A/250V slow blow, for LD05 models is 1A/250V slow blow. External input NTC is recommended to use 5D-14 or 10Ω/2W wire-round resistor. (see figure 1,2)
- If EMC performance is required, recommended to add "EMC filter" at the input end(see figure 3,4)  
 C6: X capacitor, recommended parameter 0.1μF/275V;  
 C7,C8: Y capacitor, recommended parameter 2200pF/400V;  
 CY: Y capacitor, recommended parameter 102K/400V,LD03 models recommended external, to meet EMC higher require.  
 NF: common model choke, recommended inductance is about 10mH-30mH.
- LD03 models: Terminals 22 and 26 are internal rectification and filtering terminals. To protect the models further, it is recommended to connect an electrolytic capacitor C3 (it is recommended to be 4.7μF/400V). If operation voltage of the module is between 160~264VAC, C3 can be removed.

## LD03 PCB mounting with solder pins



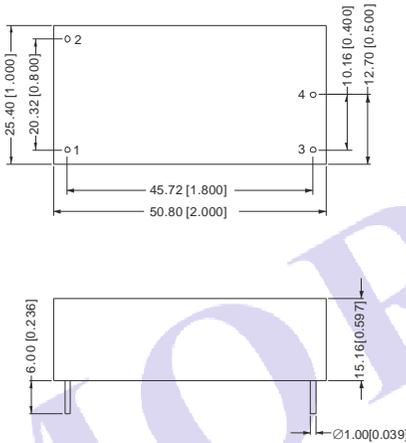
Note:  
First Angle Projection  
Unit: mm[inch]  
Pin section tolerances:  $\pm 0.10\text{mm}[\pm 0.004\text{inch}]$   
General tolerances:  $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$



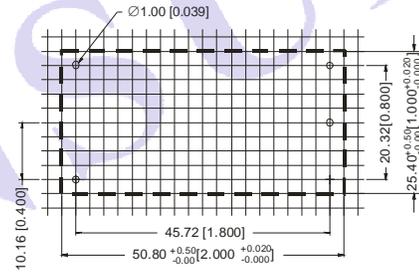
FOOTPRINT DETAILS	
Pin	Function
1	L
3	N
13	NC
14	-Vo
16	+Vo
22	+V(cap)
26	-V(cap)

Note:  
1) NC: No connection.  
2) Terminals 1 and 3 are DC&AC input.  
Terminals 22 and 26 are internal  
rectification and filtering terminals

## LD05 PCB mounting with solder pins

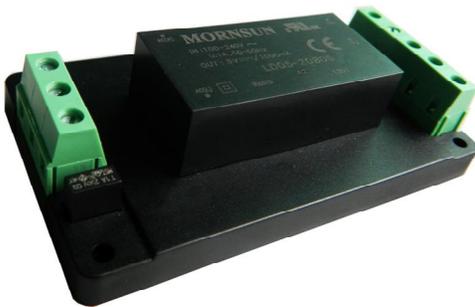


Note:  
First Angle Projection  
Unit: mm[inch]  
Pin section tolerances:  $\pm 0.10\text{mm}[\pm 0.004\text{inch}]$   
General tolerances:  $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$

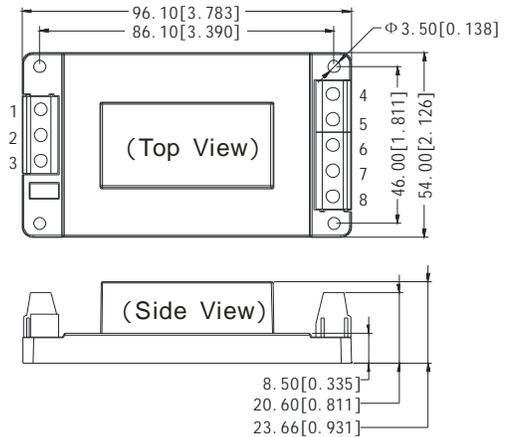


FOOTPRINT DETAILS	
Pin	Function
1	N
2	L
3	+Vo
4	-Vo

## LD05XXA2 Chassis mounting with Screw Terminals



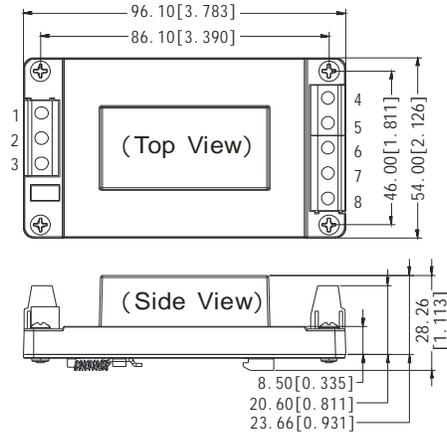
Footprint Details								
Pin	1	2	3	4	5	6	7	8
Function	NC	AC(N)	AC(L)	+Vo	NC	-Vo	NC	NC



Note:  
Unit: mm[inch]

General tolerances:  $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$

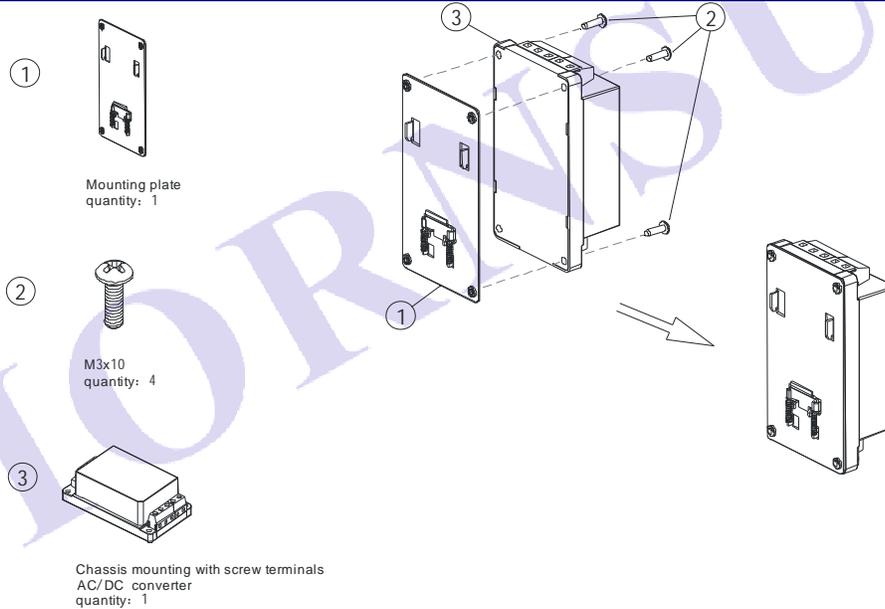
## LD05XXA4 DIN-Rail mounting



Note:  
Unit: mm[inch]  
General tolerances:  $\pm 0.50\text{mm}$  [ $\pm 0.020\text{inch}$ ]

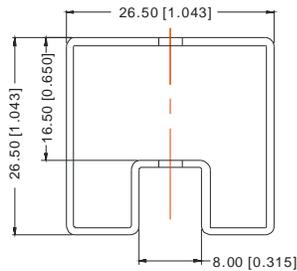
Footprint Details								
Pin	1	2	3	4	5	6	7	8
Function	NC	AC(N)	AC(L)	+Vo	NC	-Vo	NC	NC

## LD05XXA4 DIN-Rail Mount



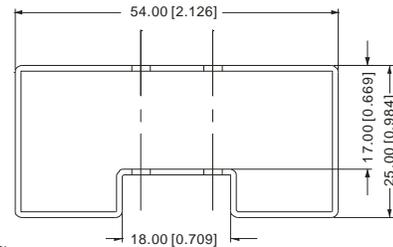
## PACKAGE DIAGRAM

### LD03 PCB mounting Series



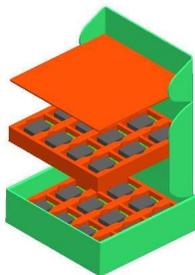
Note:  
Unit :mm[inch]  
General tolerances:  $\pm 0.50\text{mm}$  [ $\pm 0.020\text{inch}$ ]  
L=530mm[20.866inch] Devices per tube quantity: 13pcs  
L=220mm[8.661inch] Devices per tube quantity: 5pcs  
Short tube inner packaging box dimensions: 255\*170\*80mm  
Short tube outer packaging carton dimensions: 375\*280\*270mm  
Long tube inner packaging box dimensions: 580\*200\*100mm  
Long tube outer packaging carton dimensions(with two inner packa-  
600\*215\*220mm  
Long tube outer packaging carton dimensions(with three inner pack  
600\*215\*325mm

### LD05 PCB mounting Series



Note:  
Unit :mm[inch]  
General tolerances:  $\pm 0.50\text{mm}$  [ $\pm 0.020\text{inch}$ ]  
L=530mm[20.866inch] Devices per tube quantity: 19pcs  
L=220mm[8.661inch] Devices per tube quantity: 7pcs  
Short tube inner packaging box dimensions: 255\*170\*80mm  
Short tube outer packaging carton dimensions: 375\*280\*270mm  
Long tube inner packaging box dimensions: 580\*200\*100mm  
Long tube outer packaging carton dimensions(with two inner packaging boxes):  
600\*215\*220mm  
Long tube outer packaging carton dimensions(with three inner packaging boxes):  
600\*215\*325mm

Special Package Series



Inner packaging box dimensions: L\*W\*H=365\*350\*105mm  
Packaging quantity: 24pcs  
Outer packaging box dimensions: L\*W\*H=390\*360\*245mm  
Packaging quantity: 48pcs

**MORNSUN Science & Technology Co.,Ltd.**

Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Luogang district, Guangzhou, P.R.China.

Tel: 86-20-28203030

Fax: 86-20-28203068

[Http://www.mornsun-power.com](http://www.mornsun-power.com)

MORNSUN