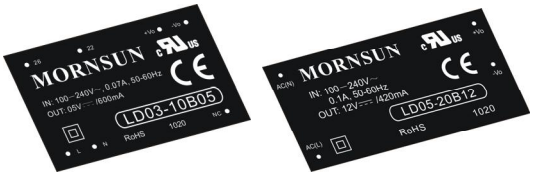
MORNSUN®

# LD03-05 SERIES

## 3-5W, AC-DC CONVERTER

LDseries ----is a compact size power converter offered by Mornsun for PCB mount installation applications. 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, UL60950and IEC60950 standards, and is UL & CE certified, and widely used in industrial,medical,electricity, instruments, telecommunication and civil applications.




RoHS

### PRODUCT FEATURES

1. Universal Input: 85 ~ 264VAC, 50/60Hz
2. AC and DC all in one (input from the same terminal)
3. Low Ripple and Noise
4. Over output voltage protection, short circuit protection and Over temperature
5. High efficiency, High power density
6. Low loss, green power
7. Multiple models available
8. industrial, medical level specifications
9. 3 years warranty

### MODEL SELECTION

LD05-20B24

- Output Voltage
- Output Style
- Input Voltage
- Isolation Voltage
- Rated Power
- Package Style
- Product Series

### PRODUCT PROGRAM

| Approval | Model | Package | Power | Output (Vo1/Io1) | Output (Iomax/T) | Ripple and Noise (Typ) | Efficiency (%,Typ) | Standby Power |
|---|---|---|---|---|---|---|---|---|
| UL/CE60950 | LD03-10B03 | 37.0X23.0X15.0mm | 2.3W | 3.3V/700mA | 900mA/60s | 30mV | 63 | 0.25W |
| | LD03-10B05 | | 3W | 5V/600mA | 750mA/60s | | 72 | 0.3W |
| | LD03-10B09 | | | 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/CE60601 | LD05-20B03 | 50.8X25.4X15.16mm | 4.2W | 3.3V/1250mA | 1400mA/60s | 30m | 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 | | 5.5W | 24V/230mA | 300mA/60s | | 78 | 0.4W |

Note:
1. Ripple and Noise were measured by the method of anear measure (The details see the anear measure);
2. Unless otherwise specified, all specifications above are measured at rated input voltage and rated output load, TA=25°C, humidity < 75%;
3. All specifications stated in this datasheet are subject to the above listed models only. For specifications of non-standard models, please contact our technical support team.
4. Product can not be operated continuously over current, or it will cause permanent damage to the device.

### INTPUT SPECIFICATIONS

| | | | |
|---|---|---|---|
| Input Voltage Range | | 85~264VAC, 110~370VDC | |
| Input Frequency | | 47~440Hz | |
| Input Current | LD03 models<br>LD05 models | 110VAC<br>65mA, typ<br>110mA,typ | 230VAC<br>30mA, typ<br>70mA, typ |
| Inrush Current | LD03 models<br>LD05 models | 110VAC<br>10A, typ<br>10A, typ | 230VAC<br>20A, typ<br>20A, typ |
| External input fuse (Recommended) | LD03 models<br>LD05 models | 0.5A/250V<br>1A/250V | Slow blow<br>Slow blow |

## OUTPUT SPECIFICATIONS

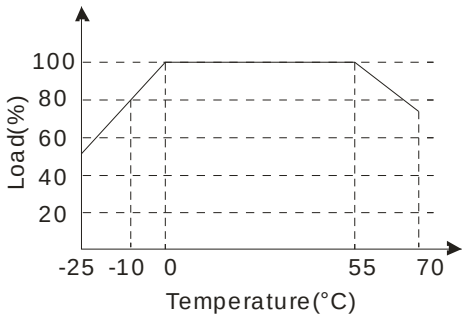
| | | | |
|---|---|---|---|
| Voltage set accuracy | | ±2% (typ) (±3%@3.3V output ) | |
| Input variation | | ±0.5% (typ) | |
| Load variation (10% to 100%) | | ±1% (typ) | |
| Ripple& noise(p-p) | 20MHz Bandwidth | 30mV(typ) | 60mV(max) |
| Short circuit protection | | Continuous, and auto resume | |
| Over temperature protection | | 150°C (max) | |
| Over output voltage protection | LD03 models<br>LD05 models | chip lock up<br>diode clamp and chip lock up | |

## COMMON SPECIFICATIONS

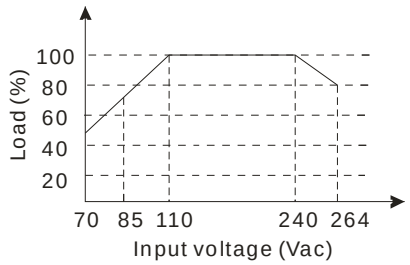
| | | |
|---|---|---|
| Temperature ranges | Operating<br>Power derating (above 55°C):<br>Storage:<br>Case temperature: | -25°C ~ +70°C<br>2% / °C<br>-40°C ~ +105°C<br>+95°C max |
| Hold-up time | (Vin=230VAC) | 50ms(typ) |
| Humidity | | 95%(max) |
| Temperature coefficient | | 0.02%/°C |
| Switching frequency | | 100kHz(typ) |
| I/O-isolation voltage | LD03 models<br>LD05 models | 3000VAC/1Min<br>4000VAC/1Min |
| Leakage current | | None |
| EMI/RFI conducted | LD03 models<br>LD05 models | EN55022, level A<br>EN55011, level A |
| EMC compliance | Electrostatic discharge ESD<br>RF field susceptibility<br>Electrical fast transients/bursts on mainsline<br>LD03 models<br>LD05 models<br>Surge* LD03 models<br>LD05 models | IEC/EN 61000-4-2 level 4 8kV/15kV<br>IEC/EN 61000-4-3<br><br>IEC/EN 61000-4-4 level 3 2kV<br>IEC/EN 61000-4-4 level 4 4kV<br>IEC/EN 61000-4-5 level 3 1kV/2kV<br>IEC/EN 61000-4-5 level 4 2kV/4kV |
| Safety standards | LD03 models<br>LD05 models | IEC60950,EN60950,UL60950<br>IEC60601,EN60601 |
| Safety approvals | LD03 models<br>LD05 models | EN60950,UL60950<br>EN60601-1 |
| Safety Class | | CLASS II |
| Case material | | UL94V-0 |
| Install | | PCB |
| MTBF | | >300,000h @25°C |
| Package | LD03 models<br>LD05 models | 37X23X15mm<br>50.8X25.4X15.2mm |

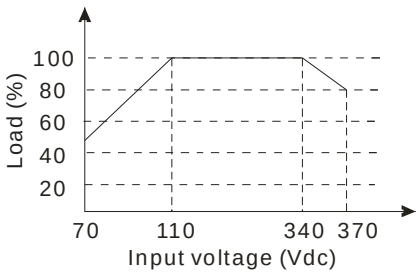
Note: External input pressure sensitive resistor is required to LD03 models at inrush experiment, refer to typical application figure.

## TEMPERATURE VS LOAD

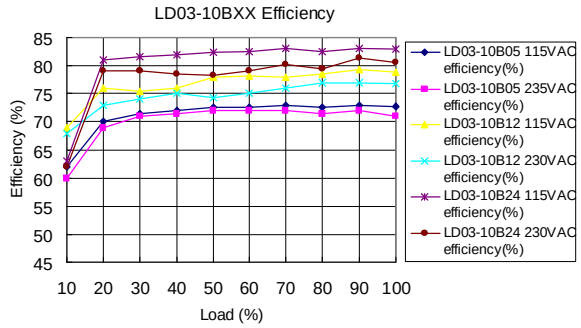


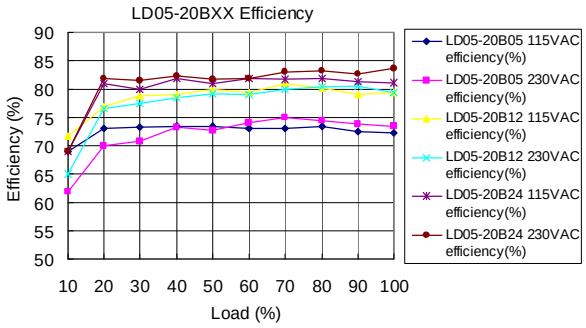

## INPUT VOLTAGE VS LOAD



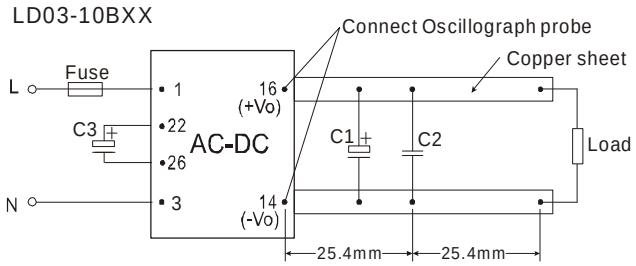



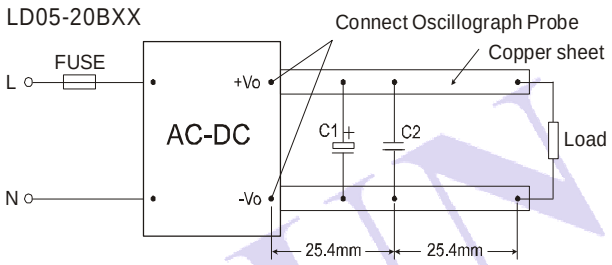
## TYPICAL EFFICIENCY CURVE




## ANEAR MEASURE




## TYPICAL APPLICATIONS

LD03-10B**

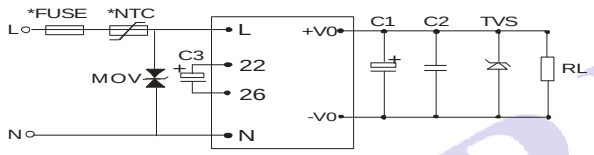



Figure1

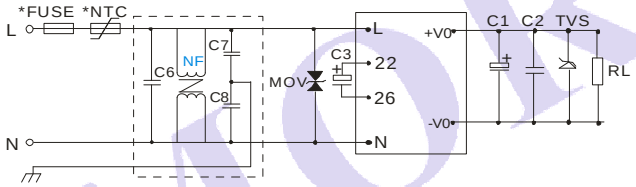



Figure3 LD03 EMC Application Figure

LD05-20B**

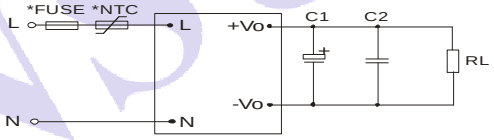



Figure 2

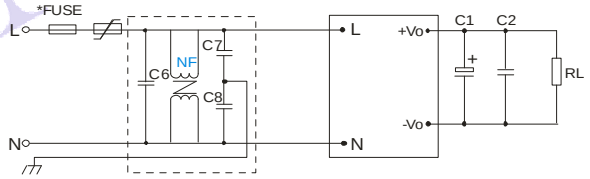



Figure4 LD05 EMC Application Figure

| EXTERNAL CAPACITORS TYPICAL VALUE(Unit: ㎌) | | | | | | | |
|---|---|---|---|---|---|---|---|
| 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 |

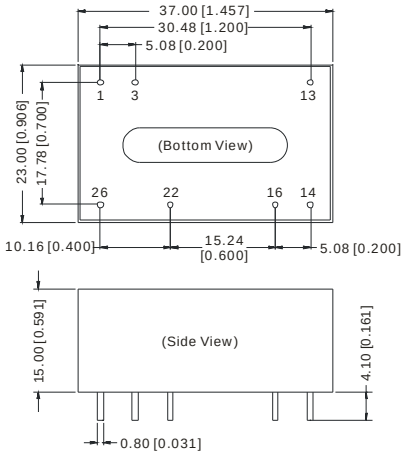
Note:

1. Output filtering capacitors C1, C3 is 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).
2. MOV is required to LD03 models，model: 471KD05, it is used to protect the device under surge.
3. It is recommended to connect FUSE, the parameter for LD03 models is 0.5A/250V slow blow, for LD05 models is1A/250V slow blow. External input NTC is recommended to use 5D-14 or 10Ω/2W wire-round resistor.
4. 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;
   NF: common model choke, recommended inductance is about 10mH-30mH.
5. 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.

## OUTLINE DIMENSIONS & PIN CONNECTIONS

# LD03-10BXX

### MECHANICAL DIMENSIONS

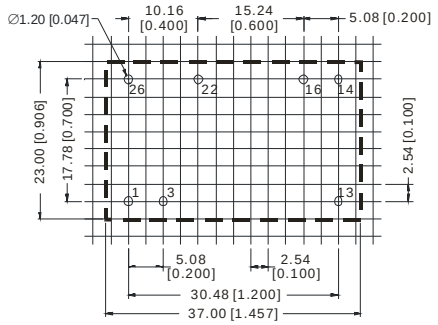



| FOOTPRINT DETAILS | |
|---|---|
| Pin | Function |
| 1 | L |
| 3 | N |
| 13 | NC |
| 14 | -Vo |
| 16 | +Vo |
| 22 | +Vin(DC) |
| 26 | -Vin(DC) |

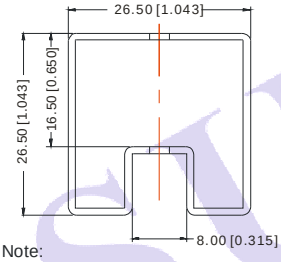
NC: No connection

Note:
Unit:mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

### RECOMMENDED FOOTPRINT(TOP VIEW)




### TUBE OUTLINE DIMENSIONS

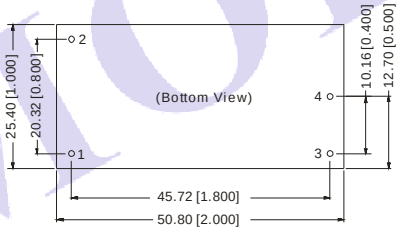


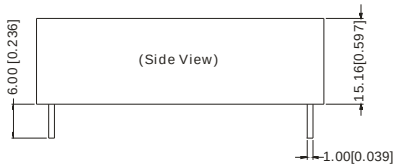

Note:
Unit :mm[inch]
General tolerances: ±0.50mm[±0.020inch]

L=530mm[20.866inch] pcs/tube: 13
L=220mm[8.661inch] pcs/tube: 5

# LD05-20BXX

### MECHANICAL DIMENSIONS

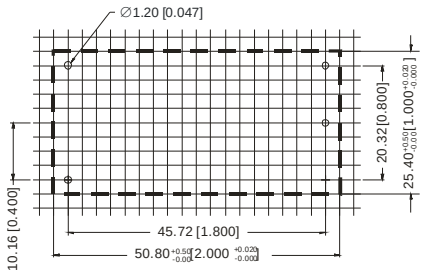


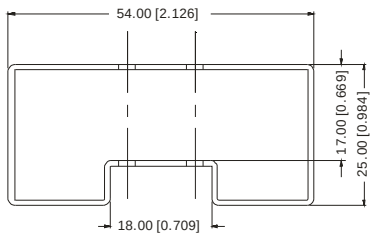

| FOOTPRINT DETAILS | |
|---|---|
| Pin | Function |
| 1 | N |
| 2 | L |
| 3 | +Vo |
| 4 | -Vo |

Note:
Unit:mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

### RECOMMENDED FOOTPRINT(TOP VIEW)




### TUBE OUTLINE DIMENSIONS




Note:
Unit :mm[inch]
General tolerances: ±0.50mm[±0.020inch]

L=530mm[20.866inch] pcs/tube: 19
L=220mm[8.661inch] pcs/tube: 7