

## LDXX SERIES

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

LD--- are high efficiency green power modules with least packaging provided by Mornsun. The features of this series are: wide input voltage, DC and AC all in one, high efficiency, high reliability, low loss, safety isolation etc. They are widely used in industrial, office , civil and medical equipments. EMC and safety standards meet international standards IEC61000 UL60950/UL60601 and IEC60950, and Multi-certificate is in processing.

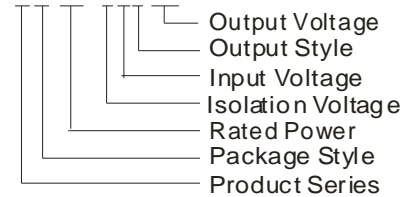


### PRODUCT FEATURES

1. Universal Input :85 to 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



### PRODUCT PROGRAM

| Approval   | Model      | Package           | Power | Output (Vo1/Io1) | Output (Iomax/T) | Ripple and Noise (TYP) | Efficiency (%) (TYP) |
|------------|------------|-------------------|-------|------------------|------------------|------------------------|----------------------|
| UL/CE60950 | LD03-10B03 | 37.0X23.0X15.0mm  | 4W    | 3.3V/700mA       | 900mA/60S        | 30mV                   | 63                   |
|            | LD03-10B05 |                   |       | 5v/600mA         | 750mA/60S        |                        | 72                   |
|            | LD03-10B09 |                   | 3W    | 9V/330mA         | 450mA/60S        |                        | 74                   |
|            | LD03-10B12 |                   |       | 12V/250mA        | 330mA/60S        |                        | 76                   |
|            | LD03-10B15 |                   |       | 15V/200mA        | 250mA/60S        |                        | 76                   |
|            | LD03-10B24 |                   |       | 24V/125mA        | 160mA/60S        |                        | 78                   |
| UL/CE60601 | LD05-20B03 | 50.8X25.4X15.16mm | 4.2W  | 3.3V/1250mA      | 1400mA/60S       | 30mV                   | 66                   |
|            | LD05-20B05 |                   |       | 5v/1000mA        | 1300mA/60S       |                        | 72                   |
|            | LD05-20B09 |                   | 5W    | 9V/550mA         | 700mA/60S        |                        | 74                   |
|            | LD05-20B12 |                   |       | 12V/420mA        | 550mA/60S        |                        | 76                   |
|            | LD05-20B15 |                   |       | 15V/333mA        | 450mA/60S        |                        | 76                   |
|            | LD05-20B24 |                   |       | 24V/230mA        | 300mA/60S        |                        | 78                   |
|            |            |                   |       | 5.5W             |                  |                        |                      |

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 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 65mA, typ<br>230VAC 30mA, typ<br>110mA,typ 70mA, typ |
| Inrush Current                   | LD03 models<br>LD05 models | 110VAC 10A, typ<br>230VAC 20A, typ<br>10A,typ 20A, typ      |
| External input fuse(recommended) | LD03 models<br>LD05 models | 0.5A/250V Slow blow<br>1A/250V Slow blow                    |

## OUTPUT SPECIFICATIONS

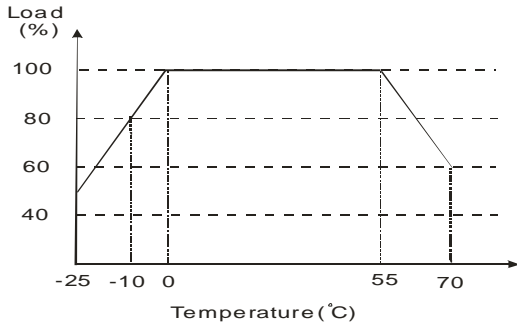
|                                |                            |  |
|--------------------------------|----------------------------|--|
| Voltage set accuracy           |                            | ±2%(±3% when 3.3V output ) (typ)             |
| Input variation                |                            | ±0.5% (typ)                                  |
| Load variation (10% to 100%)   |                            | ±1% (typ)                                    |
| Ripple& noise(p-p)             | 20MHz Bandwidth            | 30mV(typ)                                    |
| 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

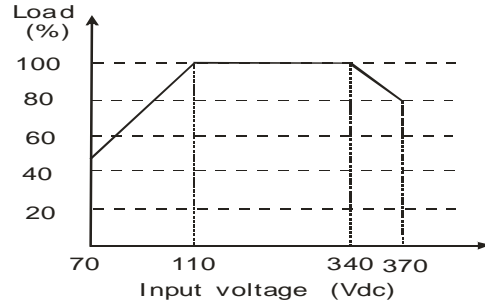
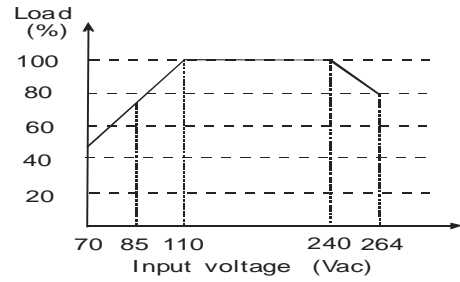
|                         |  |   |
|-------------------------|--|---|
| Temperature ranges      | Operating<br>Power derating (above 55°C):<br>Storage:<br>Case temperature:   | -25°C to +70°C<br>2% / °C<br>-40°C to +105°C<br>+95°C max   |
| Hold-up time            | (Vin=230VAC)   | 50ms(typ)   |
| Humidity                |  | 95%(max)  |
| Temperature coefficient |  | 0.02%/°C  |
| Switching frequency     |  | 100kHz(typ)   |
| Efficiency              |  | 76% 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*<br>LD03 models<br>LD05 models | IEC/EN 61000-4-2 level 4 8kV/15kV<br>IEC/EN 61000-4-2<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                    |  | >200,000h @25°C   |

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

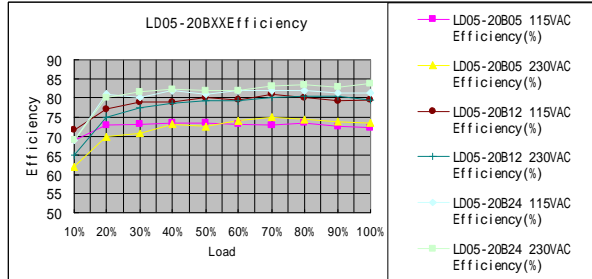
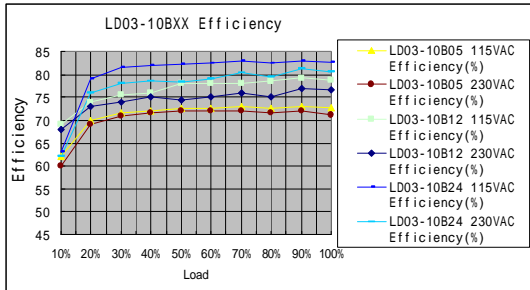
## TEMPERATURE VS LOAD



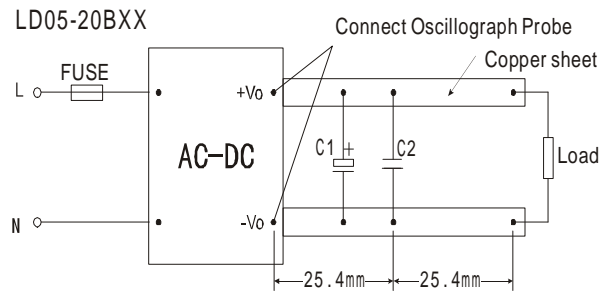
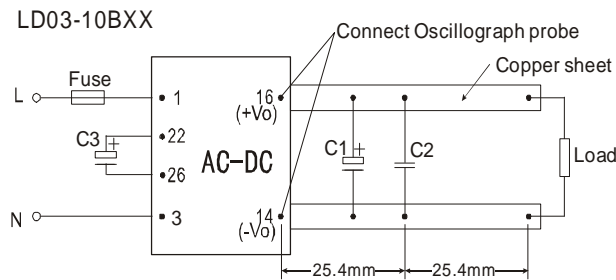
## INPUT VOLTAGE VS LOAD



## TYPICAL EFFICIENCY CURVE



## ANEAR MEASURE



## TYPICAL APPLICATIONS

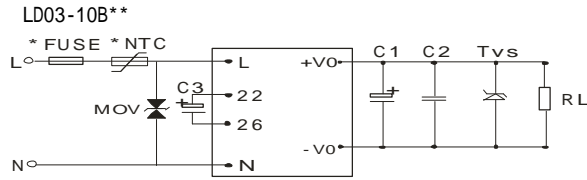


Figure1

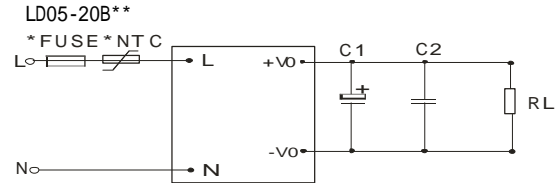


Figure 2

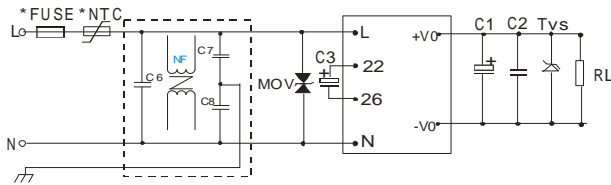


Figure3 LD03 EMC Application Figure

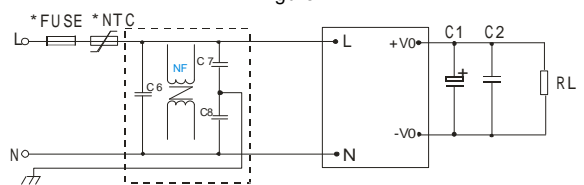


Figure4 LD05 EMC Application Figure

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

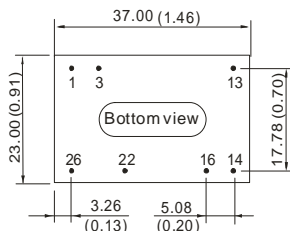
| model      | C1  | C2  | C3       | TVS      | model      | C1 | C2  |
|------------|-----|-----|----------|----------|------------|----|-----|
| LD03-10B03 | 150 | 0.1 | 4.7/400V | P4KE6.8A | LD05-20B03 | 47 | 0.1 |
| LD03-10B05 | 150 | 0.1 | 4.7/400V | P4KE6.8A | LD05-20B05 | 47 | 0.1 |
| LD03-10B09 | 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 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 (when converter fails).
- MOV is required to LD03 models, model: 471KD05, it is used to protect the device under surge.
- 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.
- If EMC performance is required, recommended to add "EMC filter" at the input end(see figure 3,4)  
 C6:X capacitor, recommended parameter 0.1uF/275V;  
 C7,C8:Y capacitor, recommended parameter 220pF/2000V;  
 NF: common model choke, recommended inductance is about 10mH-30mH.
- LD03 modes: 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 4.7uF/400V). If operation voltage of the module is between 160~264VAC, C3 can be removed.

## OUTLINE DIMENSIONS & PIN CONNECTIONS

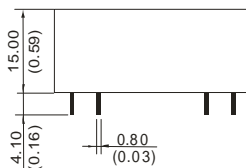
### LD03 - 10BXX



#### FOOTPRINT DETAILS

| PIN | FUNCTION |
|-----|----------|
| 1   | L        |
| 3   | N        |
| 13  | NC       |
| 14  | -Vo      |
| 16  | +Vo      |
| 22  | +Vin(DC) |
| 26  | -Vin(DC) |

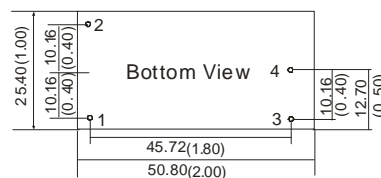
NC:No connection



#### Note::

Unit:mm (inch)  
 Pin diameter:0.80±0.05mm  
 Pin tolerances: ±0.25mm  
 General tolerances: ±0.50mm  
 Weight: 25g

### LD05 - 20BXX



#### FOOTPRINT DETAILS

| PIN | Function |
|-----|----------|
| 1   | N        |
| 2   | L        |
| 3   | +Vo      |
| 4   | -Vo      |



#### Note:

Unit:mm  
 Pin diameter:1.00±0.10mm  
 General tolerances:±0.50mm  
 Weight: 35g