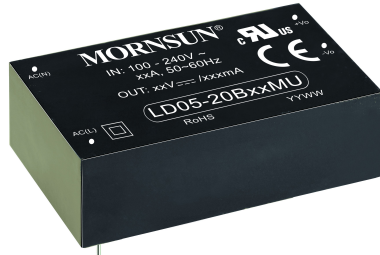


5W, AC/DC converter



UL US CE RoHS

FEATURES

- Universal input: 85~264VAC/100~370VDC
- AC and DC dual-use(input from the same terminal)
- High efficiency, high power density
- Output short circuit, over-current, over-voltage protection
- EN60601-1, ANSI/AAMI ES60601-1 approval (2xMOPP)

LD05-20BxxMU 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, and widely used in medical, industrial, instruments, telecommunication and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

Selection Guide

| Certification | Part No. | Output Power | Nominal Output Voltage and Current (Vo/Io) | Efficiency (230VAC, %/Typ.) | Max. Capacitive Load*(μ F) |
|---------------|--------------|--------------|--|-----------------------------|---------------------------------|
| UL/CE | LD05-20B05MU | 5 W | 5V/1000mA | 76 | 4000 |
| | LD05-20B12MU | | 12V/420mA | 80 | 820 |
| | LD05-20B15MU | | 15V/333mA | 81 | 820 |
| | LD05-20B24MU | 5.5 W | 24V/230mA | 81 | 330 |

Note: *Test without external circuit.

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 | 115VAC | -- | -- | 0.12 | A |
| | 230VAC | -- | -- | 0.07 | |
| Inrush current | 115VAC | -- | 10 | -- | A |
| | 230VAC | -- | 20 | -- | |
| Leakage Current | 264VAC | -- | -- | 80 | μ A |
| Hot Plug | | Unavailable | | | |

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|----------------------------|-----------------------------------|-----------------------------|------------|------|-----------------|
| Output Voltage Accuracy | | -- | ± 2 | -- | % |
| Line Regulation | Full load | -- | ± 0.5 | -- | |
| Load Regulation | 10%-100% load | -- | ± 1 | -- | |
| Ripple & Noise* | 20MHz bandwidth (peak-peak value) | -- | 50 | 100 | mV |
| Temperature Coefficient | | -- | ± 0.02 | -- | %/ $^{\circ}$ C |
| Stand-by Power Consumption | | -- | -- | 0.3 | W |
| Short Circuit Protection | | Continuous, self-recovery | | | |
| Over-current Protection | | 110%Io~280%Io self-recovery | | | |
| Over-voltage Protection | LD05-20B05MU | -- | -- | 7.5 | V |
| | LD05-20B12MU | -- | -- | 16 | |
| | LD05-20B15MU | -- | -- | 20 | |
| | LD05-20B24MU | -- | -- | 30 | |

| | | | | | |
|--------------|--------------|----|----|----|----|
| Min. Load | | 0 | -- | -- | % |
| Hold-up Time | 115VAC input | -- | 10 | -- | ms |
| | 230VAC input | -- | 80 | -- | |

Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.

General Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|-------------------------|---------------------------------|-------------------------------|------|------|------|
| Isolation Voltage | Input-output Test time: 1min | 4000 | -- | -- | VAC |
| Operating Temperature | | -25 | -- | +70 | °C |
| Storage Temperature | | -40 | -- | +85 | |
| Max. Casing Temperature | | -- | -- | +95 | |
| Storage Humidity | | -- | -- | 95 | %RH |
| Welding Temperature | Wave-soldering | 260±5°C; time:5~10s | | | |
| | Manual-welding | 360±10°C; time:3~5s | | | |
| Switching Frequency | | -- | -- | 140 | kHz |
| Power Derating | -25°C~0°C | 1 | -- | -- | %/°C |
| | +55°C~+70°C | 2 | -- | -- | %/°C |
| Safety Standard | | EN60601/UL60601 | | | |
| Safety Certification | | EN60601/UL60601 | | | |
| Safety Class | | CLASS II | | | |
| Insulation Level | First side-Second side | 2xMOPP | | | |
| MTBF | | MIL-HDBK-217F@25°C >300,000 h | | | |

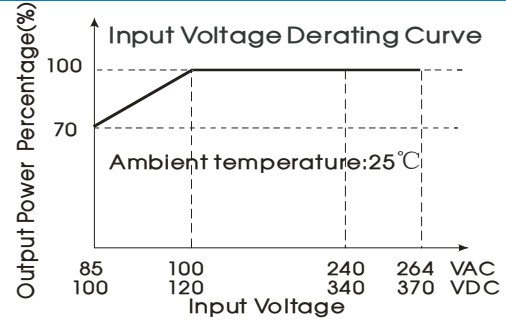
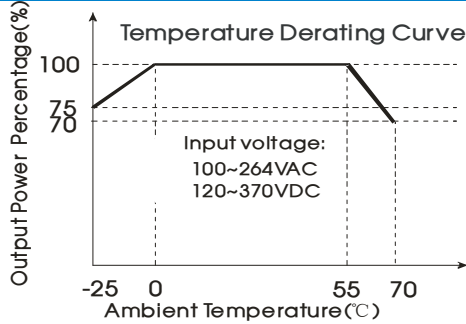
Physical Specifications

| | |
|--------------------|--|
| Casing Material | Black flame-retardant and heat-resistant plastic (UL94-V0) |
| Package Dimensions | 53.80*28.80*19.00 mm |
| Weight | 43.0 g(Typ.) |
| Cooling method | Free air convection |

EMC Specifications

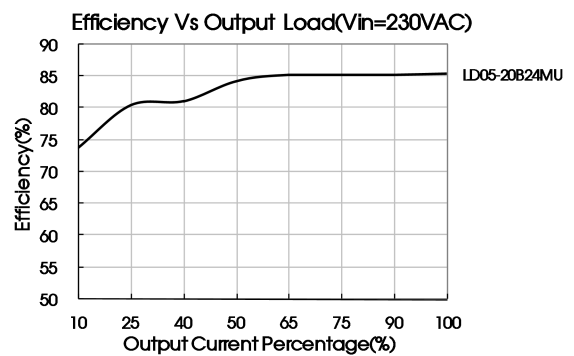
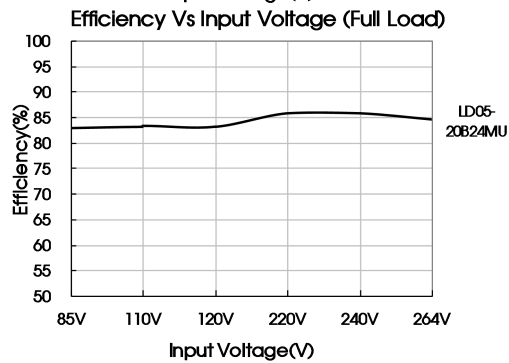
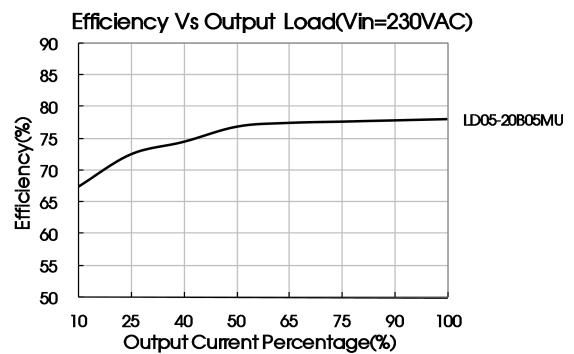
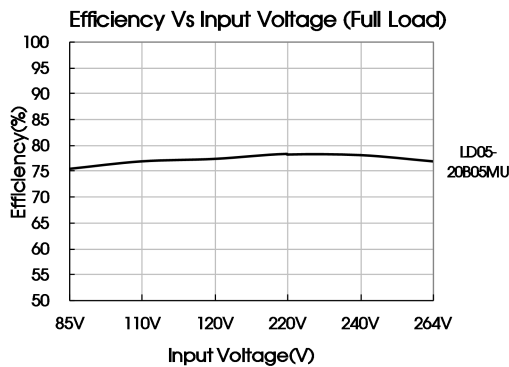
| EMI | | | | |
|-----|---|------------------|--|------------------|
| EMI | CE | CISPR11/EN55011 | CLASS B | |
| | RE | CISPR11/EN55011 | CLASS B | |
| EMS | ESD | IEC/EN61000-4-2 | Contact±6KV/Air±8KV Perf. Criteria B | |
| | RS | IEC/EN61000-4-3 | 10V/m perf. Criteria A | |
| | EFT | IEC/EN61000-4-4 | ±2KV | perf. Criteria B |
| | | IEC/EN61000-4-4 | ±4KV (See Fig. 2 for recommended circuit) | perf. Criteria B |
| | Surge | IEC/EN61000-4-5 | ±1KV | perf. Criteria B |
| | | IEC/EN61000-4-5 | ±2KV/±4KV (See Fig. 2 for recommended circuit) | perf. Criteria B |
| | CS | IEC/EN61000-4-6 | 10 Vr.m.s | perf. Criteria A |
| | PFM | IEC/EN61000-4-8 | 10A/m | perf. Criteria A |
| | Voltage dips, short interruptions and voltage variations immunity | IEC/EN61000-4-11 | 0%-70% perf. Criteria B | |

Product Characteristic Curve



Note: ①Input voltage should be derated based on temperature derating when it is 85~100VAC/100~120VDC;

②This 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

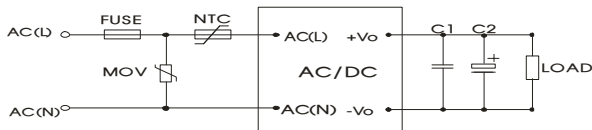


Fig. 1: Typical application circuit

| Model | C1(μF) | C2(μF) |
|--------------|--------|--------|
| LD05-20B05MU | 1 | 220 |
| LD05-20B12MU | | 100 |
| LD05-20B15MU | | 100 |
| LD05-20B24MU | | 47 |

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. Capacitance withstand voltage derating should be 80% or above. C1 is ceramic capacitor, which is used to filter high-frequency noise. External input NTC is recommended to use 5D-9. External input MOV is recommended to use S14K300. External input FUSE is recommended to use 2A/250V,slow fusing.

2. EMC solution-recommended circuit

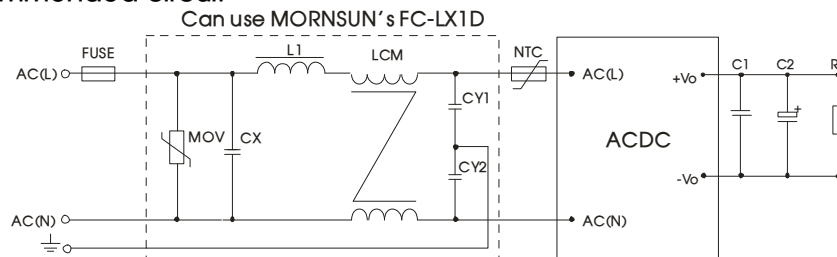
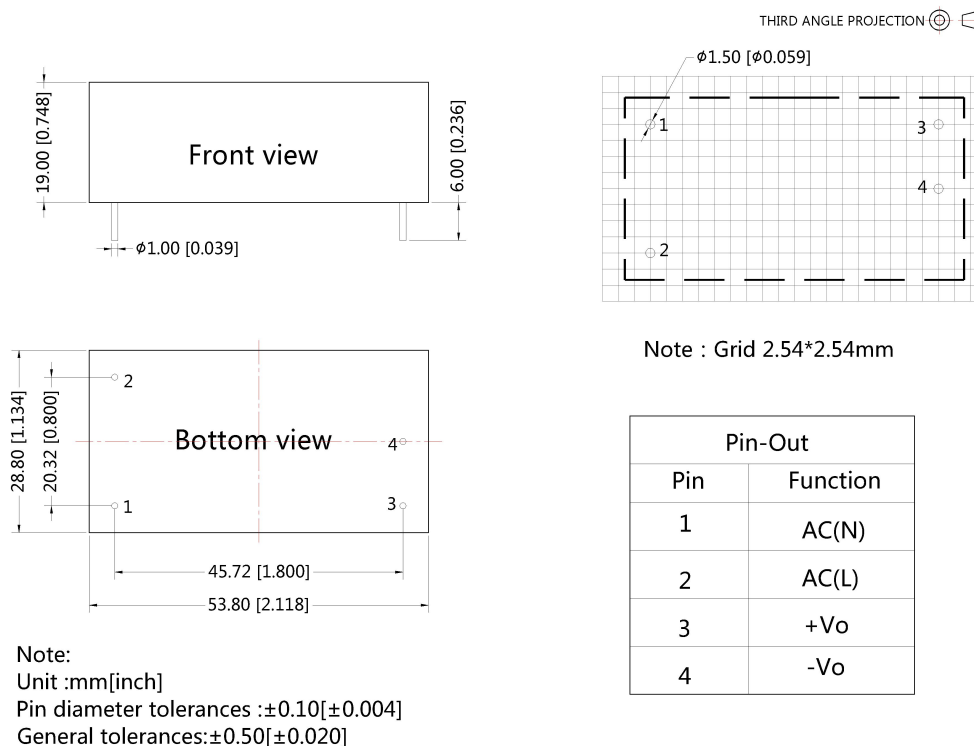


Fig 2: EMC Recommended circuit with high requirements

| Element model | Recommended value |
|---------------|---|
| MOV | S14K300 |
| CX | 0.1μF/275VAC |
| L1 | 4.7uH/2.0A |
| CY1 | 1nF/400VAC |
| CY2 | 1nF /400VAC |
| NTC | 5D-9 |
| LCM | 2.2mH, recommended to use MORNSUN's FL2D-10-222 |
| FUSE | 2A/250V, slow fusing, necessary |
| FC-LX1D | EMC Filter |

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

Dimensions and Recommended Layout



Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58220005;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25 °C, humidity<75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
6. We can provide product customization service;
7. Specifications are subject to change without prior notice.

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