# AC/DC 350W Enclosed Switching Power Supply

LMF350-23BxxUH, LMF350-23BxxUH-C, LMF350-23BxxUH-YW Series

UL62368-1 EN62368-1 GB4943.1 BS EN 62368-1

## FEATURES

- Universal 85 - 305VAC or 120 - 430VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Semi-potted process, fanless design
- Operating ambient temperature range: -40℃ to +85℃
- High efficiency, active PFC
- 150% peak load output for 1 second
- High I/O isolation test voltage up to 4000VAC
- Output short circuit, over-current, over-voltage, over-temperature protection
- Operating altitude up to 5000m
- Safety according to EN61558, EN60335
- 3 years warranty

*LMF350-23BxxUH series is one of Mornsun's enclosed fanless semi-potted ultra narrow AC-DC switching power supply, it is suitable for industrial and outdoor occasions where the application environment is relatively harsh. It features 305VAC operating conditions, universal AC input and at the same time accepts DC input voltage, cost-effective, high PF value, high efficiency, high reliability, 150% peak load output and operating altitude up to 5000m. These converters offer excellent EMC performance and meet EN/UL/BS EN62368, EN60335, EN61558, GB4943 standards and they are widely used in areas of industrial, lighting, electricity, security, telecommunications, smart home etc.*

## Selection Guide

| Certification | Part No.* | Rated Output Power (W)* | Nominal Output Voltage and Current (Vo/Io)* | Output Voltage Adjustable Range (V) | Efficiency at 230VAC (%) Typ. | Room Temperature Max. Capacitive Load (uF) | Low Temperature Max. Capacitive Load (uF) |
|---|---|---|---|---|---|---|---|
| UL/EN/CCC/ BIS | LMF350-23B05UH | 300 | 5V/60A | 4.5-5.5 | 90 | 12000 | 6000 |
| | LMF350-23B12UH | 350.4 | 12V/29.2A | 11.4-12.6 | 92 | 10000 | 4000 |
| | LMF350-23B24UH | 350.4 | 24V/14.6A | 22.8-25.2 | 94 | 8000 | 3000 |
| EN (Pending) | LMF350-23B28UH | 350 | 28V/12.5A | 26.6-29.4 | 94 | 7000 | 2500 |
| UL/EN/CCC/ BIS | LMF350-23B36UH | 351 | 36V/9.75A | 34.2-37.8 | 94 | 6000 | 2000 |
| | LMF350-23B48UH | 350.4 | 48V/7.32A | 45.6-50.4 | 94 | 4000 | 1000 |

Note:
1. *Under any conditions, the total power of the product should not exceed the rated output power, and the output current should not exceed the rated output current;
2. *Use suffix "C" for terminal with protective cover and 12V, 24V output product with optional salt-spray proof at terminal: LMF350-23BxxUH-YW.

## Input Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Input Voltage Range | AC input | | 85 | -- | 305 | VAC |
| | DC input | | 120 | -- | 430 | VDC |
| Input Voltage Frequency | | | 47 | -- | 63 | Hz |
| Input Current | 115VAC | | -- | -- | 4 | A |
| | 230VAC | | -- | -- | 2 | |
| Inrush Current | 115VAC | Cold start | -- | 16.7 | -- | |
| | 230VAC | | -- | 42.3 | -- | |
| Power Factor | 115VAC | Full load | 0.98 | -- | -- | -- |
| | 230VAC | | 0.98 | -- | -- | |
| Leakage Current | 240VAC | | <0.5mA | | | |
| Hot Plug | | | Unavailable | | | |

## Output Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Output Voltage Accuracy | Full load range | 5V | -- | ±2 | -- | % |
| | | 12V/24V/28V/36V/48V | -- | ±1 | -- | |
| Line Regulation | Rated load | 5V | -- | ±0.5 | -- | |
| | | 12V/24V/28V/36V/48V | -- | ±0.3 | -- | |
| Load Regulation | 0% - 100% load | 5V | -- | ±1 | -- | |
| | | 12V/24V/28V/36V/48V | -- | ±0.5 | -- | |
| Ripple & Noise* | 20MHz bandwidth (peak-to-peak value), 25℃ | 5V/12V | -- | -- | 200 | mV |
| | | 24V/28V/36V/48V | -- | -- | 240 | |
| Temperature Coefficient | | | -- | ±0.03 | -- | %/℃ |
| Minimum Load | | | 0 | -- | -- | % |
| Hold-up Time | Room temperature, full load, 115VAC/230VAC | | 12 | -- | -- | ms |
| Short Circuit Protection | | | Hiccup, continuous, self-recover | | | |
| Over-current Protection | Room temperature, high temperature | | 110% - 200% Io, the protection lasts for 1s, self-recovery after the abnormality is removed | | | |
| | Low temperature | | >110% Io, the protection lasts for 1s, self-recovery after the abnormality is removed | | | |
| Over-voltage Protection | 5V | | ≤6.5VDC (Output voltage hiccup) | | | |
| | 12V | | ≤15.6VDC (Output voltage hiccup) | | | |
| | 24V | | ≤31.2VDC (Output voltage hiccup) | | | |
| | 28V | | ≤35.0VDC (Output voltage hiccup) | | | |
| | 36V | | ≤46.8VDC (Output voltage hiccup) | | | |
| | 48V | | ≤62.4VDC (Output voltage hiccup) | | | |
| Over-temperature Protection | | | Output voltage turn off, self-recovery after the temperature drops | | | |

Note: *The "Tip and barrel method" is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 0.1uF ceramic capacitor, please refer to Enclosed Switching Power Supply Application Notes for specific information.

## General Specifications

| Item | | Operating Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Isolation | Input - ⏚ | Electric strength test for 1min., leakage current <5mA | 2000 | -- | -- | VAC |
| | Input - output | | 4000 | -- | -- | |
| | Output - ⏚ | | 1500 | -- | -- | |
| Insulation Resistance | Input - ⏚ | Ta= 25 ± 5℃<br>Relative humidity: < 95%RH, no condensation<br>Test voltage: 500VDC | 50 | -- | -- | MΩ |
| | Input - output | | 50 | -- | -- | |
| | Output - ⏚ | | 50 | -- | -- | |
| Operating Temperature | | | -40 | -- | +85 | ℃ |
| Storage Temperature | | | -40 | -- | +85 | |
| Operating Humidity | | Non-condensing | 10 | -- | 95 | %RH |
| Storage Humidity | | Non-condensing | 20 | -- | 90 | |
| Power Derating | | Operating temperature derating: With aluminum plate* | +55℃ to +85℃ | 2.33 | -- | -- | %/℃ |
| | | Operating temperature derating: Without aluminum plate: 230VAC: Others | +55℃ to +70℃ | 3.33 | -- | -- | |
| | | | +70℃ to +85℃ | 1.33 | -- | -- | |
| | | | 5V | +55℃ to +70℃ | 2 | -- | -- |
| | | | | +70℃ to +85℃ | 1.33 | -- | -- |
| | | 110VAC | +55℃ to +85℃ | 1.33 | -- | -- | |
| | Input voltage derating | 85 - 100VAC | | 2 | -- | -- | %/VAC |

| | | |
|---|---|---|
| Safety Standard | | UL62368-1, GB4943.1, IS13252 (Part1) safety approved & EN62368-1, BS EN62368-1 (Report); Design refer to EN61558-1, EN60335-1 |
| Safety Class | | CLASS I |
| MTBF | MIL-HDBK-217F@25℃ | ⩾300,000 h |
| Note: *In order to optimize the heat dissipation performance, when the aluminum plate is used for auxiliary heat dissipation, please note: 1. The size of the aluminum plate is 450mm x 450mm x 3mm; 2. The surface of the aluminum plate mast be coated with thermal grease; 3. The product must be tightly attached to the aluminum plate. | | |

## Mechanical Specifications

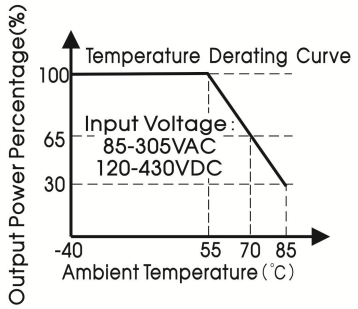
| | |
|---|---|
| Case Material | Metal (AL6063, SGCC) |
| Dimensions | 220.00mm x 62.00mm x 31.00mm |
| Weight | 680g (Typ.) |
| Cooling Method | Free air convection |

## Electromagnetic Compatibility (EMC)

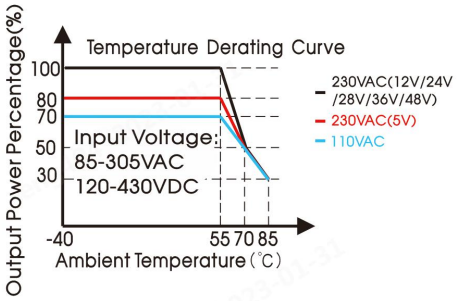
| | | | | |
|---|---|---|---|---|
| Emissions | CE | CISPR32/EN55032 | CLASS B | |
| | RE | CISPR32/EN55032 | CLASS B | |
| | Harmonic current | IEC/EN61000-3-2 | CLASS A | |
| | Voltage flicker | IEC/EN6100-3-3 | | |
| Immunity | ESD | IEC/EN61000-4-2 | Contact ±6KV/Air ±8KV | perf. Criteria A |
| | RS | IEC/EN61000-4-3 | 10V/m | perf. Criteria A |
| | EFT | IEC/EN61000-4-4 | ±2KV | perf. Criteria A |
| | Surge | IEC/EN61000-4-5 | line to line ±2KV/line to PE ± 4KV | perf. Criteria A |
| | CS | IEC/EN61000-4-6 | 10 Vr.m.s | perf. Criteria A |
| | Voltage dip, short interruption and voltage variation | IEC/EN61000-4-11 | 0%, 70% | perf. Criteria B |
| | Intercom interference test | MS-SOP-DQC-007 | | perf. Criteria B |

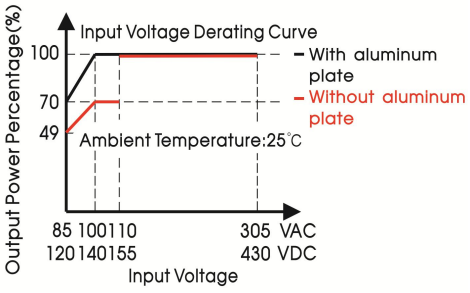
## Product Characteristic Curve

With aluminum plate




Without aluminum plate

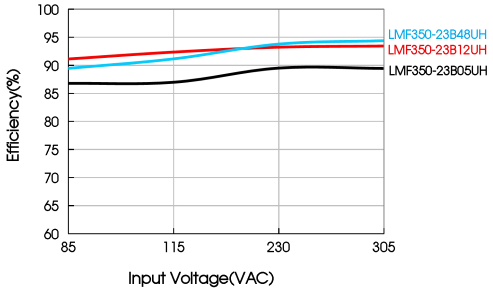


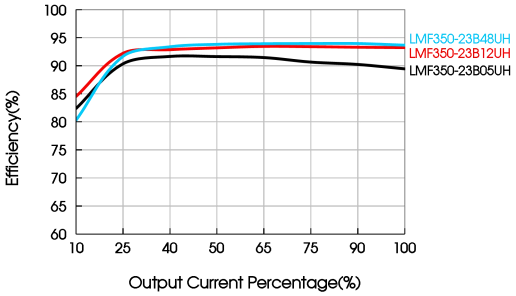

Note: 1. With an AC input voltage between 85-100VAC and a DC input between 120-140VDC the output power must be derated as per the temperature derating curves;

2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.

Efficiency Vs Input Voltage (Full Load)

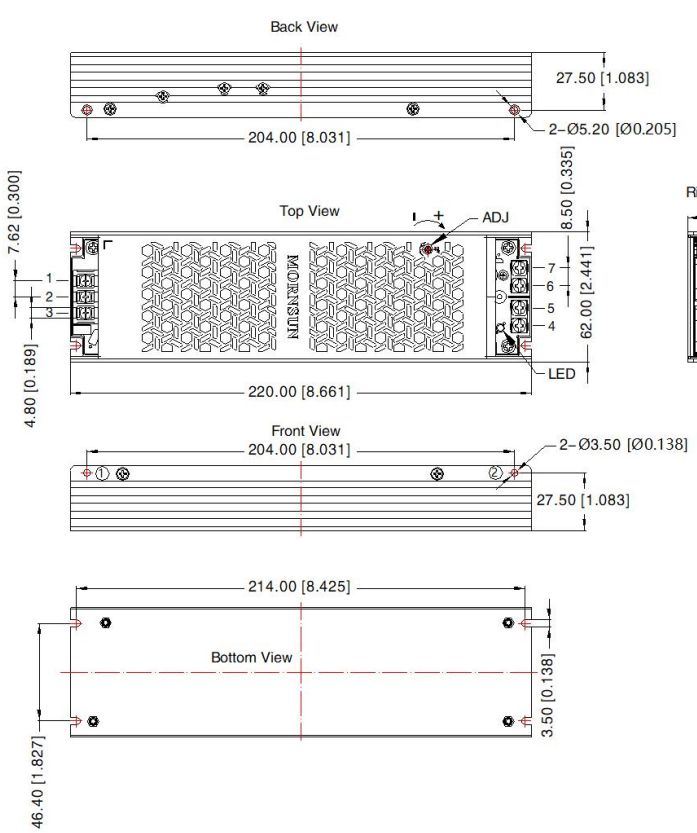



Efficiency Vs Output Load (Vin=230VAC)



## Dimensions and Recommended Layout

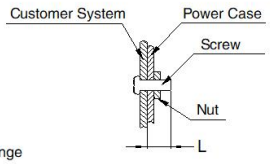
### LMF350-23BxxUH, LMF350-23BxxUH-YW Series




THIRD ANGLE PROJECTION

| Pin-Out | |
|---|---|
| Pin | Mark |
| 1 | ⏚ |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | +Vo |
| 6 | -Vo |
| 7 | -Vo |

| Position | Screw Spec. | L(max) | Torque(max) |
|---|---|---|---|
| ①-② | M3 | 6mm | 0.4N・m |

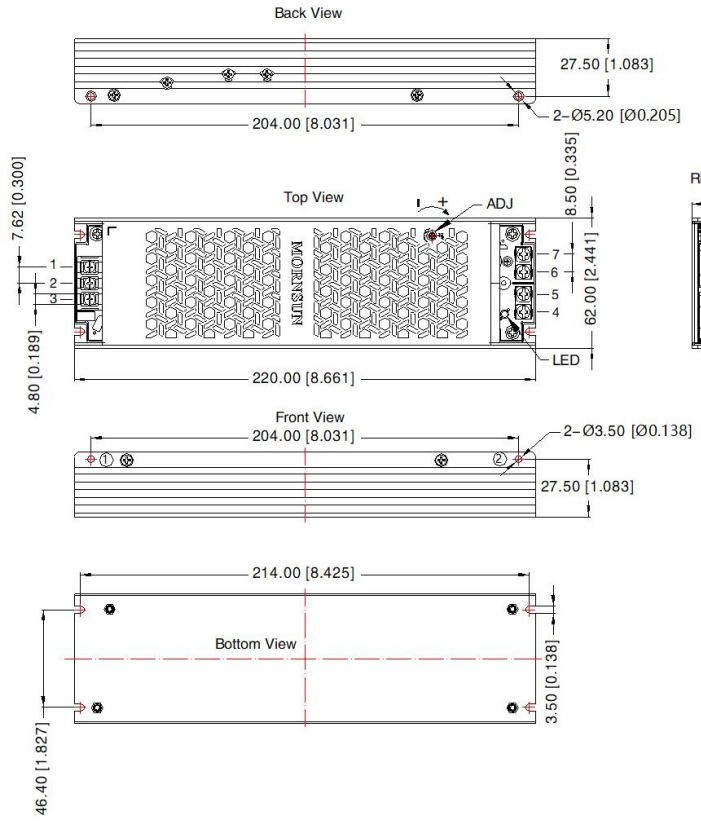



Connector wires range

| Pro. No | Input connector | Output connector (double wires) | Output connector (double wires) Pic. |
|---|---|---|---|
| 5V | 22-14AWG | 14-12AWG | -Vo double wires |
| 12V | | 16-12AWG | |
| 24/36/48V | | 18-12AWG | +Vo double wires |
| Screw/torque | M3.0, Max 0.5N・m | M3.5, Max 0.8N・m | |

Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
General tolerances: ±1.00[±0.039]

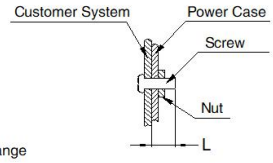
### LMF350-23BxxUH-C Series




THIRD ANGLE PROJECTION

| Pin-Out | |
|---|---|
| Pin | Mark |
| 1 | ⏚ |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | +Vo |
| 6 | -Vo |
| 7 | -Vo |

| Position | Screw Spec. | L(max) | Torque(max) |
|---|---|---|---|
| ①-② | M3 | 6mm | 0.4N・m |

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| 12V | | 16-12AWG | |
| 24/36/48V | | 18-12AWG | +Vo double wires |
| Screw/torque | M3.0, Max 0.5N・m | M3.5, Max 0.8N・m | |

Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
General tolerances: ±1.00[±0.039]

## Installation Diagram

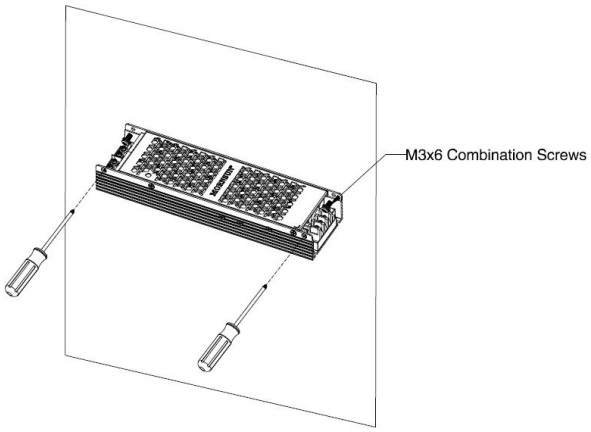


Figure 1

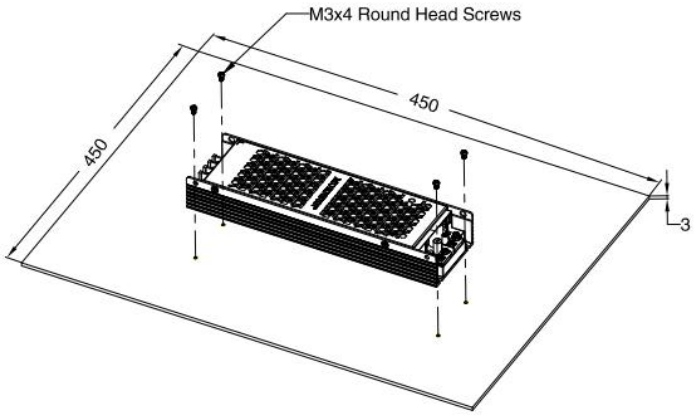


Figure 2

Note: 1. Figure 1 is a schematic diagram of side installation, install with M3 x 6 combination screws, derating refer to without aluminum plate curve;
2. Figure 2 is the schematic diagram of the bottom installation, install with M3 x 4 round head screws, it is necessary to apply thermal grease on the bottom of the product, derating refer to with aluminum plate curve.

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220233;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity <75%RH with nominal input voltage and rated output load;
3. The room temperature derating of 5℃/1000m is needed for operating altitude greater than 2000m;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. In order to improve the efficiency at high input voltage, there will be audible noise generated, but it does not affect product performance and reliability;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating;
9. The output voltage can be adjusted by the ADJ, clockwise to increase;
10. If product involves multi-brand materials and there are differences in color etc, please refer to the standards of each manufacturer;
11. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
12. The power supply is considered a component which will be installed into a terminal equipment. All EMC tests should be confirmed with the final equipment. Please consult our FAE for EMC test operation instructions.

## Mornsun Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China

Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com