# AC/DC 350W Enclosed Switching Power Supply

LM350-12Bxx, LM350-12Bxx-C, LM350-12Bxx-Q Series

MORNSUN®

## FEATURES

- Input voltage Range: 176 - 264VAC or 240 - 373VDC
- Accepts AC or DC input (dual-use of same terminal)
- Ultra low standby power consumption <0.75W @230VAC
- Operating ambient temperature range: -30℃ to +70℃
- Compact size with a low 1U profile
- LED indicator for power on
- Operating up to 5000m altitude
- Output short circuit, over-current, over-voltage, Over-temperature protection
- Safety according to IEC/EN/UL62368, GB4943
- Withstand 300VAC surge input for 5s
- Built-in DC fan

*LM350-12Bxx series is one of Mornsun's enclosed AC-DC switching power supply. It features AC input and at the same time accepts DC input voltage, cost-effective, low no load power consumption, high efficiency and high reliability. These converters offer excellent EMC performance and meet IEC/EN61000-4, CISPR32/EN55032, EC/UL/EN62368, GB4943 standards and they are widely used in areas of industrial, LED, street light control, electricity, security, telecommunications, smart home etc.*

## Selection Guide

| Certification | Part No.* | Output Power(W) | Nominal Output Voltage and Current (Vo/Io) | Output Voltage Adjustable Range(V) | Efficiency at 230VAC (%) Typ. | Max. Capacitive Load (μF) |
|---|---|---|---|---|---|---|
| UL/CE/CQC (Pending of UL) | LM350-12B05 | 300 | 5V/60A | 4.5 - 5.5 | 84 | 10000 |
| | LM350-12B12 | 348 | 12V/29A | 10.2 -13.8 | 85.5 | 4000 |
| | LM350-12B15 | 348 | 15V/23.2A | 13.5 -18 | 87.5 | 3300 |
| | LM350-12B24 | 350.4 | 24V/14.6A | 21.6 - 28.8 | 87 | 1500 |
| | LM350-12B36 | 349.2 | 36V/9.7A | 32.4 - 39.6 | 88 | 1500 |
| | LM350-12B48 | 350.4 | 48V/7.3A | 43.2 - 52.8 | 89 | 470 |

Note: *Use suffix "C" for terminal with protective cover and suffix "Q" for conformal coating.

## Input Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Input Voltage Range | AC input | | 176 | -- | 264 | VAC |
| | DC input | | 240 | -- | 373 | VDC |
| Input Voltage Frequency | | | 47 | -- | 53 | Hz |
| Input Current | 230VAC | | -- | 3.4 | 4 | A |
| Inrush Current | 230VAC | Cold start | -- | 60 | -- | |
| Leakage Current | 240VAC | | -- | -- | 0.75 | mA |
| Hot Plug | | | Unavailable | | | |

## Output Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Output Voltage Accuracy | Full load range | 5V | -- | ±3 | -- | % |
| | | 12V | -- | ±1.5 | -- | |
| | | 15V/24V/36V/48V | -- | ±1 | -- | |
| Line Regulation | Rated load | | -- | ±0.5 | -- | |
| Load Regulation | 0% - 100% load | 5V | -- | ±2 | -- | |
| | | 12V | -- | ±1 | -- | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 15V/24V/36V/48V | -- | ±0.5 | -- | |
| Output Ripple & Noise* | 20MHz bandwidth | 5V/12V/15V/24V | -- | 150 | -- | mV |
| | (peak-to-peak value) | 36V/48V | -- | 200 | -- | |
| Temperature Coefficient | | | -- | ±0.03 | -- | %/℃ |
| Minimum Load | | | 0 | -- | -- | % |
| Stand-by Power Consumption | 230VAC, 25℃ | | -- | -- | 0.75 | W |
| Hold-up Time | 230VAC | | -- | 16 | -- | ms |
| Short Circuit Protection | Recovery time <8s after the short circuit disappear. | | Hiccup, continuous, self-recovery | | | |
| Over-current Protection | | | 110%-180% Io, self-recovery | | | |
| Over-voltage Protection | 5V | | 5.75V-6.75V（Hiccup, self-recovery） | | | |
| | 12V | | 13.8V-16.2V（Hiccup, self-recovery） | | | |
| | 15V | | 18V-21V（Hiccup, self-recovery） | | | |
| | 24V | | 28.8V-33.6V（Hiccup self-recovery） | | | |
| | 36V | | 41.4V-46.8V（Hiccup, self-recovery） | | | |
| | 48V | | 55.2V-59.5V（Hiccup, self-recovery） | | | |
| Over Temperature Protection | | | Hiccup, self-recovery | | | |

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

## General Specifications

| Item | | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Isolation Test | Input - ⏚ | Electric strength test for 1min., leakage current <10mA | | 2000 | -- | -- | VAC |
| | Input-output | | | 3000 | -- | -- | |
| | output - ⏚ | | | 500 | -- | -- | |
| Insulation Resistance | Input - ⏚ | At 500VDC | | 100 | -- | -- | MΩ |
| | Input - output | | | 100 | -- | -- | |
| | output - ⏚ | | | 100 | -- | -- | |
| Operating Temperature | | | | -30 | -- | +70 | ℃ |
| Storage Temperature | | | | -40 | -- | +85 | |
| Fan On/Off Control | | Fan On, temperature for Rth3 | | 50 | -- | -- | |
| | | Fan Off, temperature for Rth3 | | -- | -- | 40 | |
| Operating Humidity* | | Non-condensing | | -20 | -- | 90 | %RH |
| Storage Humidity | | Non-condensing | | -- | -- | 95 | |
| Switching Frequency | | | | -- | 65 | -- | kHz |
| Power Derating | | Operating temperature derating | +50℃ to +70℃ | 2 | -- | -- | %/℃ |
| | | | -20℃ to -30℃ | 0.8 | -- | -- | |
| Safety Standard | | | | Meet IEC/EN/UL62368/GB4943 | | | |
| Safety Class | | | | CLASS I | | | |
| MTBF | | MIL-HDBK-217F@25℃ | | >300,000 h | | | |

Note：*Select part number with "Q" for conformal coating requirement.

## Mechanical Specifications

| | |
|---|---|
| Case Material | Metal (AL1100, SGCC) |
| Dimensions | 215.00 x 115.00 x 30.00 mm |
| Weight | 700g (Typ.) |
| Cooling Method | Forced air cooling |
| Notice: there is built-in fan inside product, so it can't be shipped by air. | |

## Electromagnetic Compatibility (EMC)

| | | | |
|---|---|---|---|
| Emissions | CE | CISPR32/EN55032 CLASS A | |
| | RE | CISPR32/EN55032 CLASS A | |
| Immunity | ESD | IEC/EN 61000-4-2 Contact ±6KV /Air ±8KV | Perf. Criteria A |
| | RS | IEC/EN 61000-4-3 10V/m | perf. Criteria A |
| | EFT | IEC/EN 61000-4-4 ±2KV | perf. Criteria A |
| | Surge | IEC/EN 61000-4-5 line to line ±2KV/line to ground ±4KV | perf. Criteria A |
| | CS | IEC/EN61000-4-6 10 Vr.m.s | perf. Criteria A |
| | Voltage dips, short interruptions and voltage variations | IEC/EN61000-4-11 0%, 70% | perf. Criteria B |

Remark A:

1, One magnetic beed should be coupled with the output load line during CE/RE testing;

2, This power supply does not meet the harmonic current requirements specified in EN61000-3-2.

Please do not use this power supply under the following conditions:

1) The terminal equipment is used in the European Union.

2) The terminal equipment is connected to public mains supply with 220VAC or greater rated nominal voltage.

3) The power supply is installed in terminal equipment with average or continuous input power greater than 75W.

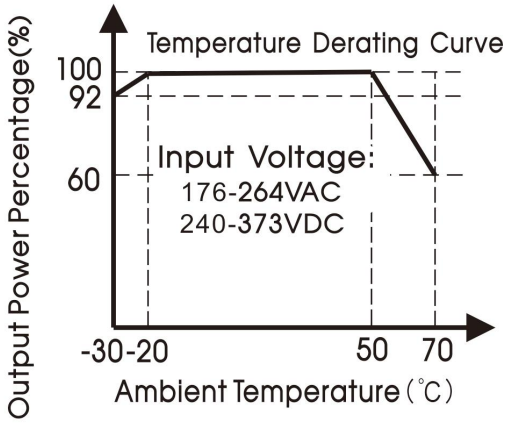
4) The power supply belongs to a part of lighting system.

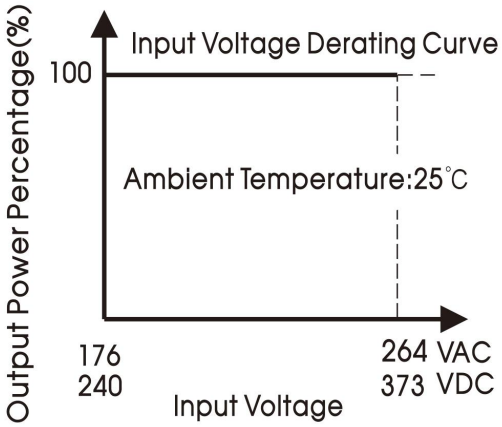
Exception: The power supply used in the following terminal equipment does not need to meet EN61000-3-2.

1) Professional equipment with a total rated input power greater than 1000W.

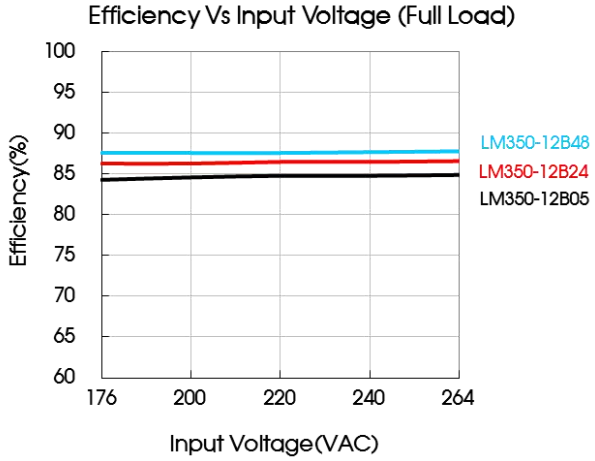
2) Symmetrically controlled heating element with a rated power less than or equal to 200W.

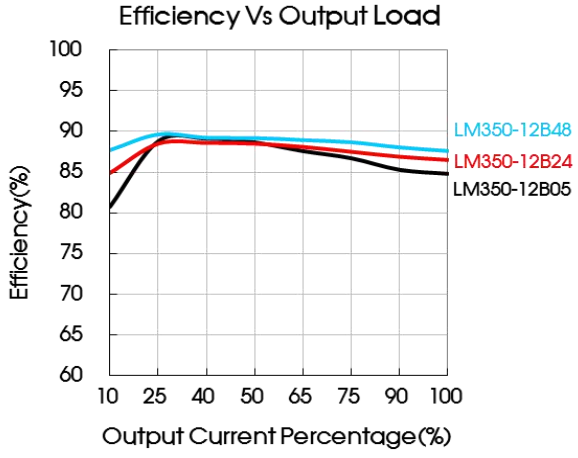
## Product Characteristic Curve



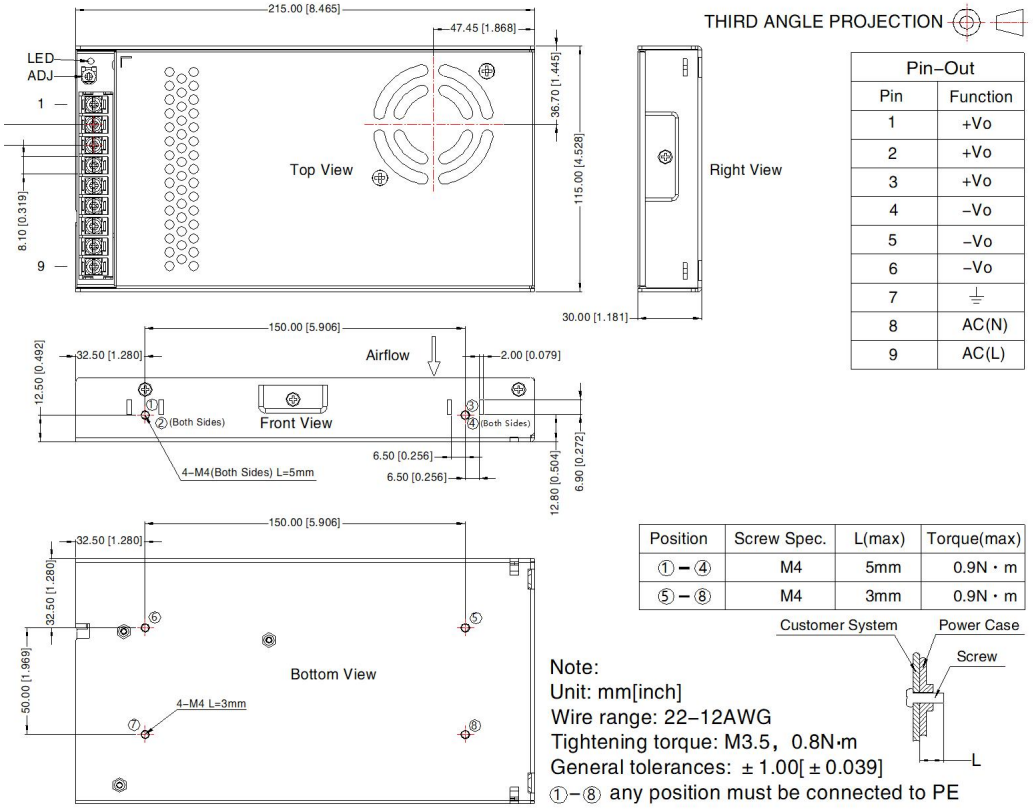

Note: This product is suitable for applications using forced air cooling; for applications in closed environment please consult Mornsun FAE.



## Dimensions and Recommended Layout

### LM350-12Bxx, LM350-12Bxx-Q Series

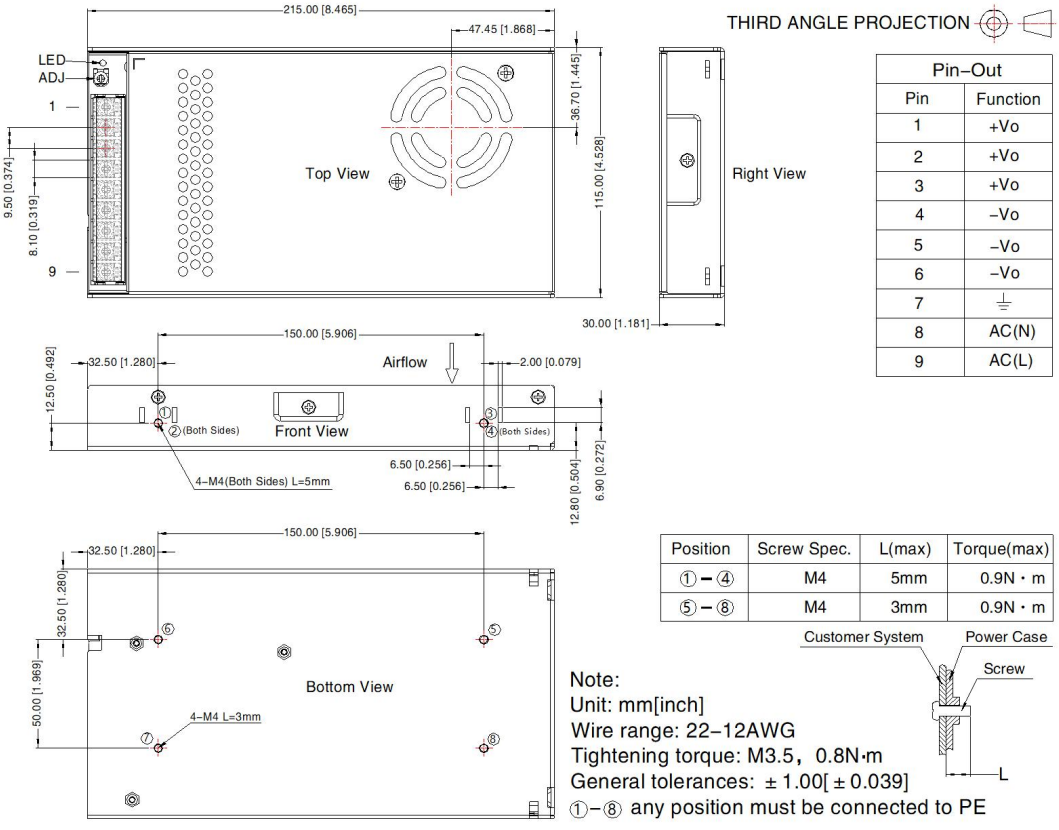



| Pin–Out | |
|---|---|
| Pin | Function |
| 1 | +Vo |
| 2 | +Vo |
| 3 | +Vo |
| 4 | –Vo |
| 5 | –Vo |
| 6 | –Vo |
| 7 | ⏚ |
| 8 | AC(N) |
| 9 | AC(L) |

| Position | Screw Spec. | L(max) | Torque(max) |
|---|---|---|---|
| ①–④ | M4 | 5mm | 0.9N · m |
| ⑤–⑧ | M4 | 3mm | 0.9N · m |

Note:
Unit: mm[inch]
Wire range: 22–12AWG
Tightening torque: M3.5，0.8N·m
General tolerances: ± 1.00[ ± 0.039]
①–⑧ any position must be connected to PE

### LM350-12Bxx-C Series




| Pin–Out | |
|---|---|
| Pin | Function |
| 1 | +Vo |
| 2 | +Vo |
| 3 | +Vo |
| 4 | –Vo |
| 5 | –Vo |
| 6 | –Vo |
| 7 | ⏚ |
| 8 | AC(N) |
| 9 | AC(L) |

| Position | Screw Spec. | L(max) | Torque(max) |
|---|---|---|---|
| ①–④ | M4 | 5mm | 0.9N · m |
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Note:
Unit: mm[inch]
Wire range: 22–12AWG
Tightening torque: M3.5，0.8N·m
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Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220115;
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 ambient 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. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
10. The power supply is considered a component which will be installed into a final equipment. All EMC tests should be confirmed with the final equipment. Please consult our FAE for EMC test operation instructions.

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