



## FEATURES

- AC-DC two-way full isolation, two-way energy flow
- Low harmonic, high power factor
- Advanced algorithm control, intellectualized design
- Seamless two-way switching
- Support 8 parallel, power expansion to 18kW
- Reliable island protection
- High efficiency, high-reliability
- Power supply state LED indicator light
- Output short, over-current, over-voltage, over-temperature protection
- Operating altitude up to 2000m
- 3 years warranty
- Safety according to UL/EN/BS EN62368, UL62477

LMB2250-12B15F is a metal shell type bidirectional power supply provided by Mornsun for customers. The power supply can be bidirectional input to achieve AC-DC bidirectional energy conversion, with high cost performance, high power density, high efficiency, high reliability and double or reinforced insulation. These converters offer excellent EMC performance and meet UL/EN/BS EN62368, UL62477 standards and they are widely used in chemical composition, battery detection, aging, charge and discharge, equalization and other related fields.

## Selection Guide

| Certification | Part No.       | Work Orientation | Output Power (W) | Rated Input (Vin/lin) | Rated Output (Vo/lo) | Efficiency (%)Typ. | Air Flow Direction |
|---------------|----------------|------------------|------------------|-----------------------|----------------------|--------------------|--------------------|
| /             | LMB2250-12B15F | AC to DC         | 2250             | 220V/11.5A            | 15V/150A             | 91.5               | Blowing type       |
|               |                | DC to AC         | 1650             | 15V/110A              | 220V/7.5A            | 91                 |                    |

## AC to DC direction

### Input Specifications

| Item                           | Operating Conditions                                                    |            | Min.        | Typ. | Max. | Unit |
|--------------------------------|-------------------------------------------------------------------------|------------|-------------|------|------|------|
| Input Voltage Range            | AC Input                                                                |            | 176         | --   | 264  | VAC  |
| Input Voltage Frequency        | Rated input                                                             |            | 45          | --   | 65   | Hz   |
| Input Current                  | 220VAC                                                                  |            | --          | --   | 15   | A    |
| Inrush Current                 | 220VAC                                                                  | Cold start | --          | 17   | --   |      |
| Power Factor                   | 220VAC, full load                                                       |            | --          | 0.99 | --   | --   |
| Current Harmonic               | 220VAC, full load (power grid THDu ≤2%)                                 |            | --          | 3    | --   | %    |
| Input Fuse                     | Built-in fuse                                                           |            | --          | 20   | --   | A    |
| Input Under-voltage Protection | Under-voltage protection start (Input voltage drops from high to low)   |            | 160         | --   | 170  | VAC  |
|                                | Under-voltage protection release (Input voltage rises from low to high) |            | 168         | --   | 178  |      |
| Input Over-Voltage Protection  | Under-voltage protection start (Input voltage drops from low to high)   |            | 270         | --   | 280  |      |
|                                | Under-voltage protection release (Input voltage rises from high to low) |            | 262         | --   | 272  |      |
| Hot Plug                       |                                                                         |            | Unavailable |      |      |      |

### Output Specifications

| Item                                     | Operating Conditions                 | Min. | Typ. | Max.  | Unit |
|------------------------------------------|--------------------------------------|------|------|-------|------|
| Output Voltage Accuracy                  | Full load range                      | --   | ±1.0 | --    | %    |
| Line Regulation                          | Rated load                           | --   | ±1.0 | --    |      |
| Load Regulation                          | Rated input voltage                  | --   | ±1.0 | --    |      |
| Ripple & Noise* (Power frequency ripple) | 20MHz bandwidth (peak-to-peak value) | --   | --   | 300   | mV   |
| Temperature Coefficient                  |                                      | --   | --   | ±0.03 | %/℃  |

|                                                                                                                                                                                                                                                                          |                                                                                                   |                                                       |                                                                      |    |    |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------|----|----|----|
| Input Current Sharing Accuracy                                                                                                                                                                                                                                           | 50 - 100% load range test, {accuracy = (single supply current - average current)/average current} |                                                       | -5                                                                   | -- | +5 | %  |
| Parallel Operation                                                                                                                                                                                                                                                       | Supports up to 8 parallel power supplies                                                          |                                                       | 8                                                                    |    |    | -- |
| Startup Delay Time                                                                                                                                                                                                                                                       | All input voltage range, all load range                                                           | Normal temperature, high temperature                  | --                                                                   | -- | 5  | S  |
|                                                                                                                                                                                                                                                                          |                                                                                                   | Low temperature                                       | --                                                                   | -- | 8  |    |
| Short Circuit Protection                                                                                                                                                                                                                                                 | The recovery time is less than 8 seconds                                                          |                                                       | Hiccup, self-recover                                                 |    |    |    |
| Over-current Protection                                                                                                                                                                                                                                                  | 220VAC                                                                                            | Normal temperature, high temperature, Low temperature | ≥110% Io, hiccup, self-recover                                       |    |    |    |
| Over-voltage Protection                                                                                                                                                                                                                                                  |                                                                                                   |                                                       | ≤18VDC, output voltage turn off, self-recover after abnormal release |    |    |    |
| Over-temperature Protection                                                                                                                                                                                                                                              | 220AC, 100% load                                                                                  | Over-temperature protection start                     | --                                                                   | 70 | -- | ℃  |
|                                                                                                                                                                                                                                                                          |                                                                                                   | Over-temperature protection release                   | 50                                                                   | -- | -- |    |
| Note: *The “Tip and barrel method” is power frequency ripple, it 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. |                                                                                                   |                                                       |                                                                      |    |    |    |

## DC to AC direction

| Input Specifications           |                                                                                                 |           |      |      |      |
|--------------------------------|-------------------------------------------------------------------------------------------------|-----------|------|------|------|
| Item                           | Operating Conditions                                                                            | Min.      | Typ. | Max. | Unit |
| Input Voltage Range            | DC input                                                                                        | 14.8      | 15   | 15.2 | VDC  |
| Input Current                  | 15VDC                                                                                           | --        | --   | 110  | A    |
| Input Current Sharing Accuracy | 50-100% load range test, {accuracy = (single supply current - average current)/average current} | -5        | --   | +5   | %    |
| Input Power                    | 220VAC, full load                                                                               | --        | --   | 1650 | W    |
| Parallel Operation             | Supports up to 8 parallel power supplies                                                        | 8         |      |      | --   |
| Output Specifications          |                                                                                                 |           |      |      |      |
| Item                           | Operating Conditions                                                                            | Min.      | Typ. | Max. | Unit |
| Output Voltage Range           | AC output                                                                                       | 176       | 220  | 264  | VAC  |
| Output Current                 | 220VAC                                                                                          | --        | 7.5  | --   | A    |
| Output Voltage Frequency       |                                                                                                 | 45        | --   | 65   | Hz   |
| Power Factor                   | 220VAC, Full load                                                                               | 0.99      |      |      |      |
| Current Harmonic               | 220VAC, full load (power grid THDu ≤2%)                                                         | --        | 3    | --   | %    |
| Island Protection              | All output voltage range, all load range                                                        | Available |      |      |      |

## General Specifications

| Item                  |                                                                                              | Operating Conditions                                                                                |              | Min. | Typ. | Max. | Unit |
|-----------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------|------|------|------|------|
| Isolation Test        | Input -   | Electric strength test for 1min., leakage current <5mA                                              |              | 2000 | --   | --   | VAC  |
|                       | Input - output                                                                               |                                                                                                     |              | 3000 | --   | --   |      |
|                       | Output -  |                                                                                                     |              | 500  | --   | --   |      |
| Insulation Resistance | Input -   | Ambient temperature: 25 ± 5℃<br>Relative humidity: < 95%RH, no condensation<br>Test voltage: 500VDC |              | 100  | --   | --   | MΩ   |
|                       | Input - output                                                                               |                                                                                                     |              | 100  | --   | --   |      |
|                       | Output -  |                                                                                                     |              | 100  | --   | --   |      |
| Operating Temperature |                                                                                              |                                                                                                     |              | -10  | --   | +60  | ℃    |
| Storage Temperature   |                                                                                              |                                                                                                     |              | -40  | --   | +85  |      |
| Storage Humidity      |                                                                                              | Non-condensing                                                                                      |              | 10   | --   | 95   | %RH  |
| Operating Humidity    |                                                                                              |                                                                                                     |              | 20   | --   | 90   |      |
| Power Derating        |                                                                                              | Operating temperature derating                                                                      | -10℃ to +45℃ | 0    | --   | --   | % /℃ |
|                       |                                                                                              |                                                                                                     | +45℃ to +55℃ | 1    | --   | --   |      |
|                       |                                                                                              |                                                                                                     | +55℃ to +60℃ | 2    | --   | --   |      |

|                              |                              |               |                                             |
|------------------------------|------------------------------|---------------|---------------------------------------------|
| Leakage Current              | 240VAC, 60Hz                 | Touch current | <3.5mA                                      |
| Indicator Status             | AC to DC direction operation |               | Blue                                        |
|                              | DC to AC direction operation |               | Green                                       |
|                              | Fault                        |               | Red                                         |
| Bidirectional Switching Time |                              |               | Seamless switchover                         |
| Communication                |                              |               | CAN                                         |
| Fan Fault Protection         |                              |               | Available                                   |
| Fan Speed                    |                              |               | Intelligent speed regulation                |
| Online Upgrade Function      |                              |               | Available                                   |
| Safety Standards             |                              |               | Design refer to UL/EN/BS EN62368-1, UL62477 |
| Safety Class                 |                              |               | CLASS I                                     |
| MTBF                         | MIL-HDBK-217F@25℃            | ≥300,000 h    |                                             |

## Environmental Characteristics

| Item                             | Operating Conditions                             | Standard                 |
|----------------------------------|--------------------------------------------------|--------------------------|
| High and Low Temperature Working | +60℃, -10℃                                       | GB2423.1, IEC60068-2-1   |
| Sinusoidal Vibration             | 10 - 500Hz, 2g, three directions of X, Y, Z axis | GB2423.10, IEC60068-2-6  |
| Low Temperature Storage          | -10℃                                             | GB2423.1, IEC60068-2-1   |
| High Temperature Storage         | +85℃                                             | GB2423.2, IEC60068-2-2   |
| High Temperature Aging           | +60℃                                             | GB2423.2, IEC60068-2-2   |
| Normal Temperature Aging         | +25℃                                             | GB2423.1, IEC60068-2-1   |
| Temperature Cycle                | -25℃ to +60℃                                     | GB2423.22, IEC60068-2-14 |
| Packaging Drop                   | 1m, one corner, three edges and six sides        | GB2423.8, IEC68-2-32     |

## Mechanical Specifications

|                |                               |
|----------------|-------------------------------|
| Case Material  | Metal (SGCC)                  |
| Dimensions     | 285.00mm x 141.00mm x 44.00mm |
| Weight         | 2350g (Typ.)                  |
| Cooling Method | Forced cooling                |

## Electromagnetic Compatibility (EMC)

|           |                                                                   |                                                       |                  |
|-----------|-------------------------------------------------------------------|-------------------------------------------------------|------------------|
| Emissions | CE                                                                | CISPR32 EN55032 150K - 30MHz                          | CLASS A          |
|           | RE                                                                | CISPR32 EN55032 30MHz - 2GHz                          | CLASS A          |
|           | Harmonic current                                                  | IEC/EN61000-3-2                                       | CLASS A          |
|           | THD                                                               |                                                       | 5%               |
| Immunity  | 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 ±4KV                                  | perf. Criteria A |
|           | Surge                                                             | IEC/EN61000-4-5 line to line ±2KV/line to ground ±4KV | perf. Criteria B |
|           | MS                                                                | IEC/EN61000-4-8 30A/m                                 | perf. Criteria A |
|           | Voltage dips, short interruptions and voltage variations immunity | IEC/EN61000-4-11 0%,70%                               | perf. Criteria B |
|           | CS                                                                | IEC/EN61000-4-6 0.15 - 80MHz 10Vr.m.s                 | perf. Criteria A |

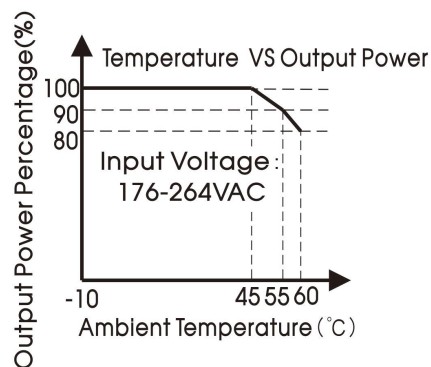
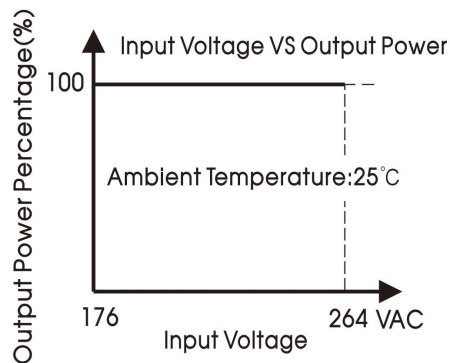
Note: 1. \*perf. Criteria:

A: The equipment shall continue to operate as intended without operator intervention;

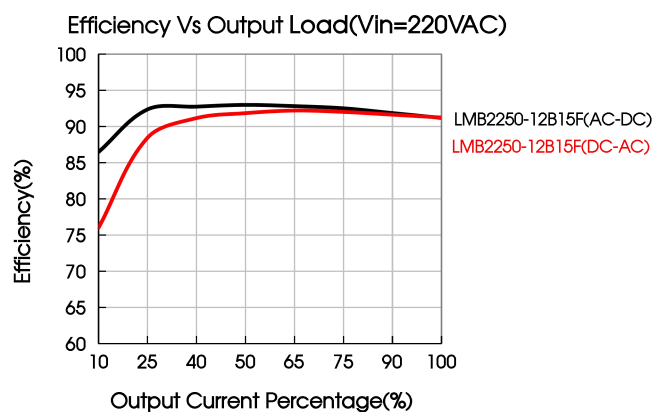
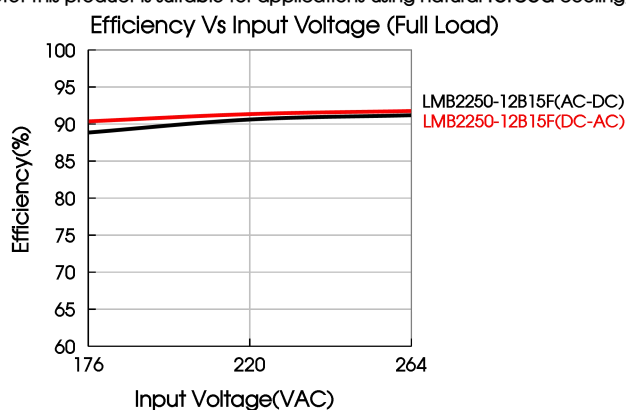
B: After the test, the equipment shall continue to operate as intended without operator intervention;

C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.

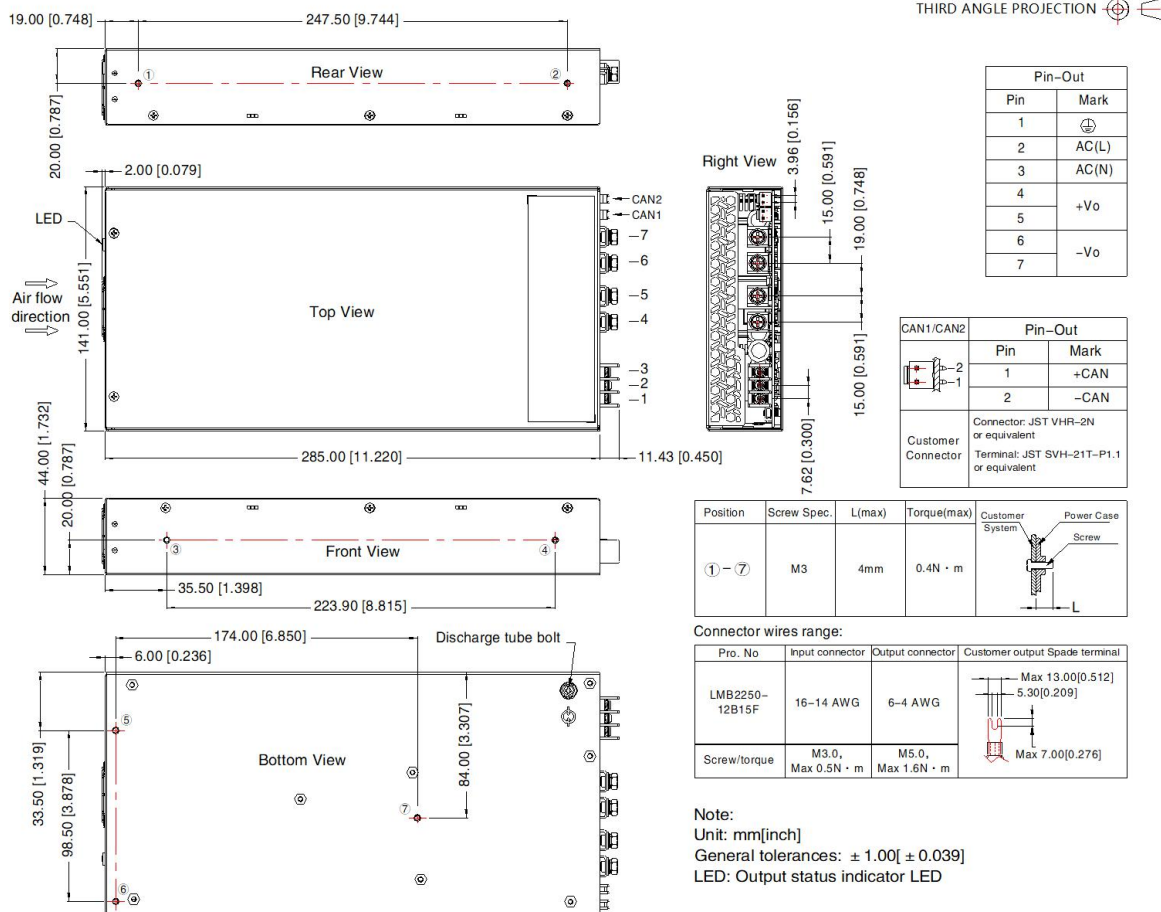
### Product Characteristic Curve



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



### Dimensions and Recommended Layout



Note:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220658;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity  $<75\%\text{RH}$  with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. 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;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. The out case needs to be connected to PE ( $\oplus$ ) of system when the terminal equipment in operating;
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
9. 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.

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