

### FEATURES

- Universal 176 - 285VAC or 240 - 400VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +85℃
- High efficiency, low ripple & noise
- AC OK, DC OK function
- High I/O isolation test voltage up to 3000VAC
- Output short circuit/over-current/over-voltage protection, over-temperature protection, input over-voltage/under-voltage protection
- Operating altitude up to 3000m
- Safety according to EN62368, GB4943
- 3 years warranty



RoHS



LM550-12Dxx Series is one of Mornsun's enclosed AC-DC switching power supply. It features universal AC input and at the same time accepts DC input voltage, cost-effective, low no load power consumption, high efficiency, high reliability and double or reinforced insulation. The converter offer excellent EMC performance and meet IEC/EN61000-4, CISPR32/EN55032, EN62368, GB4943 standards and they are widely used in areas of industrial, communication etc.

### Selection Guide

| Part No.*        | Cooling Method        | Output Power (W) | Nominal Output Voltage and Current |         | Efficiency at 230VAC (%) Typ. | Max. Capacitive Load (uF) |      |
|------------------|-----------------------|------------------|------------------------------------|---------|-------------------------------|---------------------------|------|
|                  |                       |                  | Vo1/Io1                            | Vo2/Io2 |                               | Vo1                       | Vo2  |
| LM550-12D2812-40 | Add surface heat sink | 552              | 28V/18A                            | 12V/4A  | 94                            | 2200                      | 3500 |
| LM550-12D3012-40 |                       | 552              | 30V/16.8A                          | 12V/4A  | 94                            | 2000                      | 3500 |
| LM550-12D4812-40 |                       | 552              | 48V/10.5A                          | 12V/4A  | 94                            | 1100                      | 3500 |
| LM550-12D2809-50 |                       | 549              | 28V/18A                            | 9V/5A   | 94                            | 2200                      | 3500 |
| LM550-12D4809-50 |                       | 549              | 48V/10.5A                          | 9V/5A   | 94                            | 1100                      | 3500 |

Note: \*The product picture is for reference only. For details, please refer to the actual product.

### Input Specifications

| Item                           | Operating Conditions                                                                             |            | Min.        | Typ. | Max. | Unit |
|--------------------------------|--------------------------------------------------------------------------------------------------|------------|-------------|------|------|------|
| Input Voltage Range            | Rated input (Certified voltage)                                                                  |            | 200         | --   | 240  | VAC  |
|                                | AC input                                                                                         |            | 176         | --   | 285  |      |
|                                | DC input                                                                                         |            | 240         | --   | 400  | VDC  |
| Input Voltage Frequency        | Rated input (Certified voltage)                                                                  |            | 50          | --   | 60   | Hz   |
|                                | AC input                                                                                         |            | 47          | --   | 63   |      |
| Input Current                  | Rated input (Certified voltage)                                                                  |            | --          | --   | 7.5  | A    |
|                                | 230VAC                                                                                           |            | --          | --   | 7    |      |
| Inrush Current                 | 230VAC                                                                                           | Cold start | --          | 30   | 35   |      |
| Start-up Delay Time            | 230VAC, rated load                                                                               |            | --          | --   | 1.5  | s    |
| Input Fuse                     | Built-in fuse                                                                                    |            | --          | 12.5 | --   | A    |
| Input Under-voltage Protection | Under-voltage protection start (Input voltage drops from high to low), each output with 50% Io   |            | 145         | --   | 165  | VAC  |
|                                | Under-voltage protection release (Input voltage rises from low to high), each output with 50% Io |            | 160         | --   | 175  |      |
| Input Over-voltage Protection  | Under-voltage protection start (Input voltage rises from low to high), each output with 50% Io   |            | 286         | --   | 305  |      |
|                                | Under-voltage protection release (Input voltage drops from high to low), each output with 50% Io |            | 265         | --   | 285  |      |
| Hot Plug                       |                                                                                                  |            | Unavailable |      |      |      |

## Output Specifications

| Item                                                                                                                                                                                                                       | Operating Conditions                 |                           | Min.                                                          | Typ.  | Max. | Unit |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------|---------------------------------------------------------------|-------|------|------|
| Output Voltage Accuracy                                                                                                                                                                                                    | Full load range                      | 28/30/48V                 | --                                                            | ±1    | ±2   | %    |
|                                                                                                                                                                                                                            |                                      | 9V/12V                    | --                                                            | ±2    | ±3   |      |
| Line Regulation                                                                                                                                                                                                            | Rated load                           | 28/30/48V<br>(200-285VAC) | --                                                            | ±1    | --   |      |
|                                                                                                                                                                                                                            |                                      | 9V/12V                    | --                                                            | ±2    | --   |      |
| Load Regulation                                                                                                                                                                                                            | 0% - 100% load                       | 28/30/48V                 | --                                                            | ±1.5  | --   |      |
|                                                                                                                                                                                                                            |                                      | 9V/12V                    | --                                                            | ±2    | --   |      |
| Minimum Load                                                                                                                                                                                                               |                                      |                           | 0                                                             | --    | --   |      |
| Ripple & Noise*                                                                                                                                                                                                            | 20MHz bandwidth<br>(peak-peak value) | 28/30V                    | --                                                            | 100   | 200  | mV   |
|                                                                                                                                                                                                                            |                                      | 48V                       | --                                                            | 100   | 250  |      |
|                                                                                                                                                                                                                            |                                      | 9V/12V                    | --                                                            | 80    | 150  |      |
| Temperature Coefficient                                                                                                                                                                                                    |                                      |                           | --                                                            | ±0.02 | --   | %/℃  |
| Hold-up Time                                                                                                                                                                                                               | 230VAC, rated load                   |                           | --                                                            | 15    | --   | ms   |
| Short Circuit Protection                                                                                                                                                                                                   |                                      |                           | Hiccup mode, continuous, self-recover                         |       |      |      |
| Over-current Protection                                                                                                                                                                                                    | <200VAC                              |                           | ≥ 110% Io, hiccup, self-recover                               |       |      |      |
|                                                                                                                                                                                                                            | ≥200VAC                              |                           | ≥ 130% Io, hiccup, self-recover                               |       |      |      |
| Over-voltage Protection                                                                                                                                                                                                    | 28/30V                               |                           | ≤40VDC (Hiccup, self-recover)                                 |       |      |      |
|                                                                                                                                                                                                                            | 48V                                  |                           | ≤60VDC (Hiccup, self-recover)                                 |       |      |      |
| Over-temperature Protection                                                                                                                                                                                                |                                      |                           | Hiccup, self-recover after over-temperature fault elimination |       |      |      |
| 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 AC-DC Converter Application Notes for specific information. |                                      |                           |                                                               |       |      |      |

## General Specifications

| Item                   |                   | Operating Conditions                                                                                                                            |                  | Min.                                | Typ. | Max. | Unit       |
|------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------|------|------|------------|
| Isolation*             | Input - $\oplus$  | Electric strength test for 1min., leakage current <5mA<br>(Before testing the isolation and insulation resistance, remove the $\phi 4$ screw ①) |                  | 1500                                | --   | --   | VAC        |
|                        | Input - output    |                                                                                                                                                 |                  | 3000                                | --   | --   |            |
|                        | Output - $\oplus$ |                                                                                                                                                 |                  | 500                                 | --   | --   |            |
| Insulation Resistance* | Input - $\oplus$  | Ambient temperature: 25 $\pm$ 5℃<br>Relative humidity: < 95%RH, no condensation<br>Test voltage: 500VDC                                         |                  | 100                                 | --   | --   | M $\Omega$ |
|                        | Input - output    |                                                                                                                                                 |                  | 100                                 | --   | --   |            |
|                        | Output - $\oplus$ |                                                                                                                                                 |                  | 100                                 | --   | --   |            |
| Operating Temperature  |                   |                                                                                                                                                 |                  | -40                                 | --   | +85  | ℃          |
| Storage Temperature    |                   |                                                                                                                                                 |                  | -45                                 | --   | +85  |            |
| Operating Humidity     |                   | Non-condensing                                                                                                                                  |                  | --                                  | --   | 95   | %RH        |
| Storage Humidity       |                   |                                                                                                                                                 |                  | --                                  | --   | 95   |            |
| Power Derating         |                   | Operating temperature derating (With heat sink)                                                                                                 | -40℃ to -25℃     | 2.67                                | --   | --   | % /℃       |
|                        |                   |                                                                                                                                                 | +55℃ to +70℃     | 3.33                                | --   | --   |            |
|                        |                   |                                                                                                                                                 | +70℃ to +85℃     | 1.33                                | --   | --   |            |
|                        |                   | Altitude derating                                                                                                                               |                  | 2000m - 3000m                       | 5    | --   | --         |
| Leakage Current        |                   | 240VAC, 60Hz                                                                                                                                    | Input - $\oplus$ | <3.5mA                              |      |      |            |
|                        |                   |                                                                                                                                                 | Input - output   | <0.25mA                             |      |      |            |
| Safety Standards       |                   |                                                                                                                                                 |                  | Design refer to EN62368-1, GB4943.1 |      |      |            |
| Safety Class           |                   |                                                                                                                                                 |                  | CLASS I                             |      |      |            |
| MTBF                   |                   | MIL-HDBK-217F@25℃                                                                                                                               |                  | $\geq$ 300,000 h                    |      |      |            |
| Warranty               |                   | Ambient temperature: <85℃                                                                                                                       |                  | 3 years                             |      |      |            |

Note:

1. The power derating curve is the test installed with 450mm x 450mm x 3mm aluminum heat sink. The specific derating specifications need to be adjusted based on actual conditions after customer tests.

2.\* The built-in gas discharge tube protects the power supply from asymmetric interference variables (e.g. EN 610v00-4-5). Each power supply sustained voltage test will cause a very high load on the power supply. Therefore, unnecessary load or damage to the power supply caused by high test voltage should be

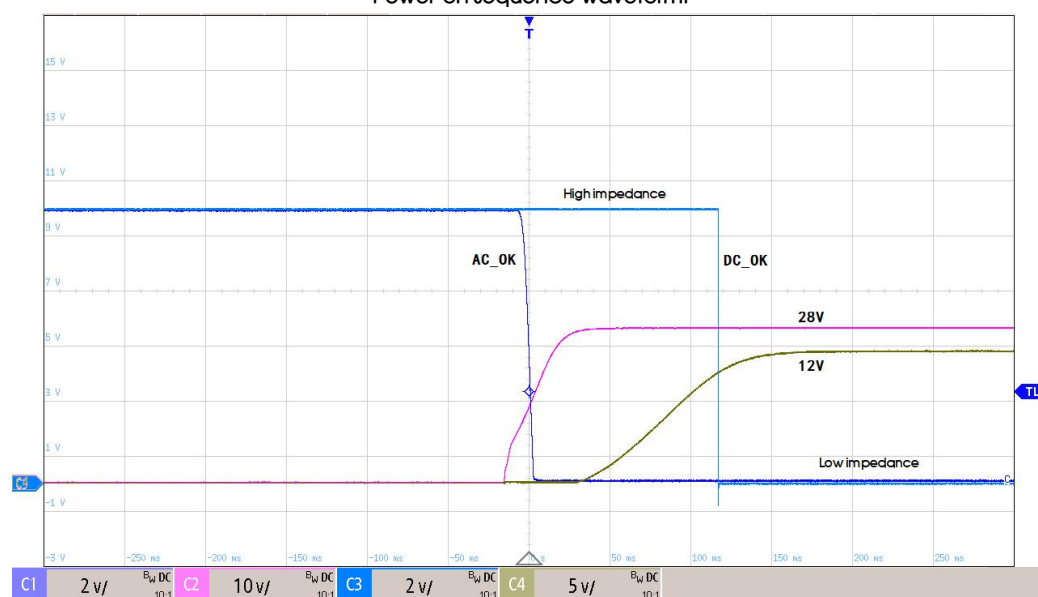
avoided. Disconnect the device's built-in gas discharge tube if necessary to use a higher test voltage. Reconnect the gas discharge tube after successful completion of the test.

### Functional Specifications

| Item         | Operating Conditions                    |                              | Standard       |
|--------------|-----------------------------------------|------------------------------|----------------|
| LED Signal   | Output status indication                | Normal output                | Green on       |
|              |                                         | Abnormal output, protected   | Light off      |
|              |                                         | Power off (AC without Input) |                |
| DC_OK Signal | All input voltage range, all load range | DC normal output             | Low impedance  |
|              |                                         | DC abnormal output           | High impedance |
| AC_OK Signal |                                         | AC normal input              | Low impedance  |
|              |                                         | AC abnormal input            | High impedance |

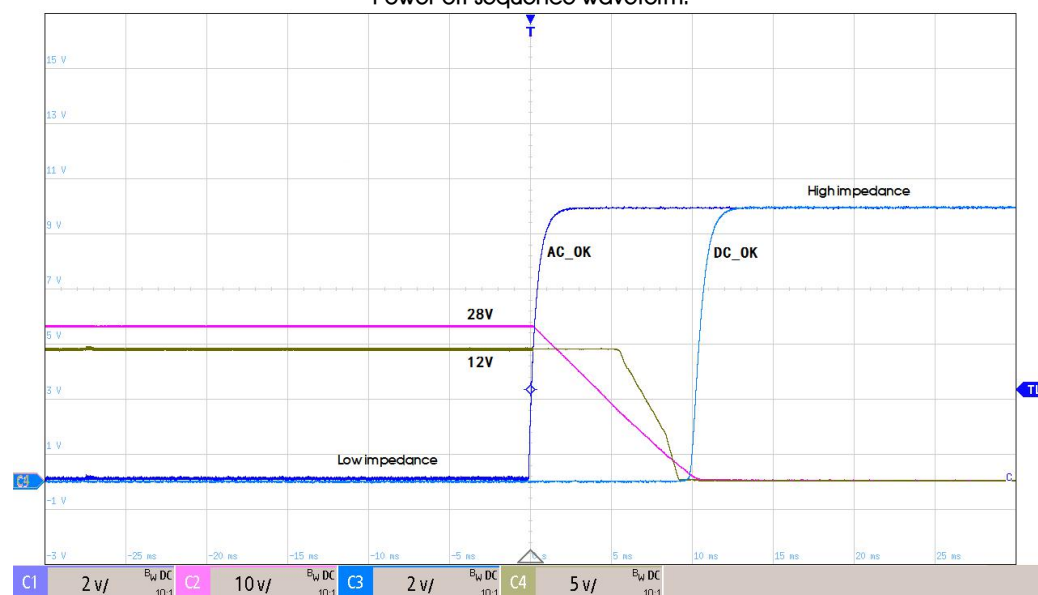
Test conditions:  $T_c=25^{\circ}\text{C}$ ,  $V_{in}=230\text{VAC}$ , rated load, AC\_OK/DC\_OK signal terminal is connected to 10VDC voltage source through 4.3K $\Omega$  resistor, and the test point is AC\_OK/DC\_OK signal terminal.

Power-on sequence waveform:



AC\_OK, DC\_OK Sequence Chart

Power-off sequence waveform:



Note: The AC\_OK, DC\_OK signal end allows the external voltage <40V and the inflow current <10mA.

### Environmental Characteristics

| Item                     | Operating Conditions                             | Standard                                                                                                                                                                                                    |
|--------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sinusoidal Vibration     | 10 - 500Hz, 2g, three directions of X, Y, Z axis | GB2423.10, IEC60068-2-6                                                                                                                                                                                     |
| High Temperature Aging   | +55℃, 12h, full load                             | GB2423.2, IEC60068-2-2                                                                                                                                                                                      |
| Normal Temperature Aging | +25℃, 24h, full load                             | GB2423.1, IEC60068-2-1                                                                                                                                                                                      |
| Temperature Cycle        | -25℃ to +55℃, 12h                                | GB2423.22, IEC60068-2-14                                                                                                                                                                                    |
| Hot And Humid            | +85℃, 85%RH, 12h                                 | GB2423.50, IEC60068-2-67                                                                                                                                                                                    |
| Long-term Short-circuit  | +85℃, 4h                                         | Self-recover after over-temperature fault elimination                                                                                                                                                       |
| Input ON/OFF Test        | +55℃, 4h, 3s ON, 3s OFF                          | Through AC SOURCE programming control, the power supply is not damaged, not locked, after the end of the switch, if the power supply is turned on, the power supply can automatically return to normal work |

### General Specifications

|                |                                                                        |
|----------------|------------------------------------------------------------------------|
| Case Material  | Metal (AL5052, SGCC)                                                   |
| Dimensions     | 240.00mm x 81.00mm x 40.00mm                                           |
| Weight         | 780g (Typ.)                                                            |
| Cooling Method | Windless environment, add surface heat sink (See installation diagram) |

### Electromagnetic Compatibility (EMC)

|           |                       |                            |                                                                                |                  |
|-----------|-----------------------|----------------------------|--------------------------------------------------------------------------------|------------------|
| Emissions | CE (Input port)       | CISPR32/EN55032            | 150K - 30MHz                                                                   | CLASS A          |
|           | RE                    | CISPR32/EN55032            | 30MHz - 1GHz                                                                   | CLASS A          |
|           | Voltage flicker       | EN61000-3-3                |                                                                                | --               |
| Immunity  | ESD                   | IEC/EN61000-4-2            | Contact ±8KV/Air ±8KV                                                          | perf. Criteria A |
|           | RS                    | IEC/EN61000-4-3            | 3V/m                                                                           | perf. Criteria A |
|           | EFT (Input port)      | IEC/EN61000-4-4            | ±2KV                                                                           | perf. Criteria A |
|           | Surge (Input port)    | IEC/EN61000-4-5            | line to line ±2KV/line to PE ±4KV                                              | perf. Criteria A |
|           |                       | IEC/EN61000-4-5            | line to line/line to PE 5KA (5 times)                                          | perf. Criteria A |
|           | CS                    | IEC/EN61000-4-6            | 0.15 - 80MHz, 3Vr.m.s                                                          | perf. Criteria A |
|           | Voltage variation*    | IEC61000-6-2/IEC61000-4-11 | 70% Un, 25/30 cycle(50/60Hz)<br>40% Un, 10/12 cycle(50/60Hz)<br>0% Un, 1 cycle | perf. Criteria B |
|           | Voltage Interruption* | IEC61000-6-2/IEC61000-4-11 | 0% Un, 250/300 cycle(50/60Hz)                                                  | perf. Criteria C |

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.

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) Supporting terminals are connected to a public power grid with 220VAC or a higher voltage that comply with the requirements of EN61000-3-2.

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

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

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

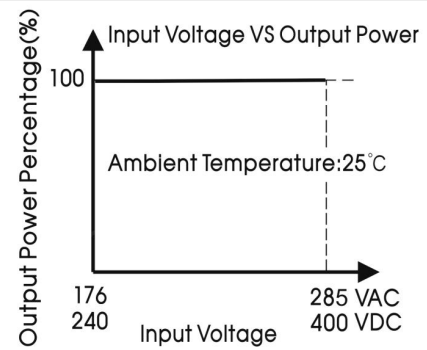
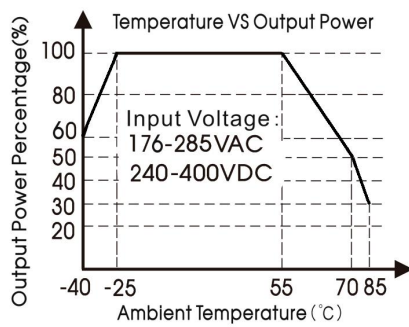
(1) Professional equipment with a total rated input power greater than 1000W.

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

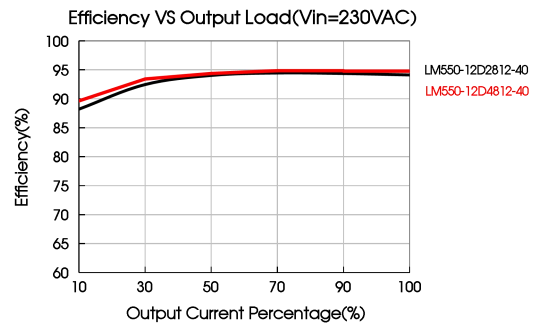
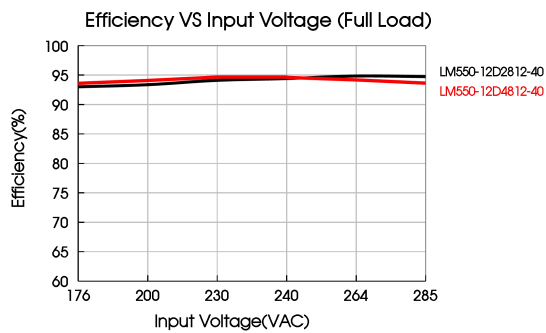
3. If no harmonic current is required or customers can solve harmonic current problems by themselves, this product can be used.

4. \*Un is the maximum input nominal voltage.

### Product Characteristic Curve

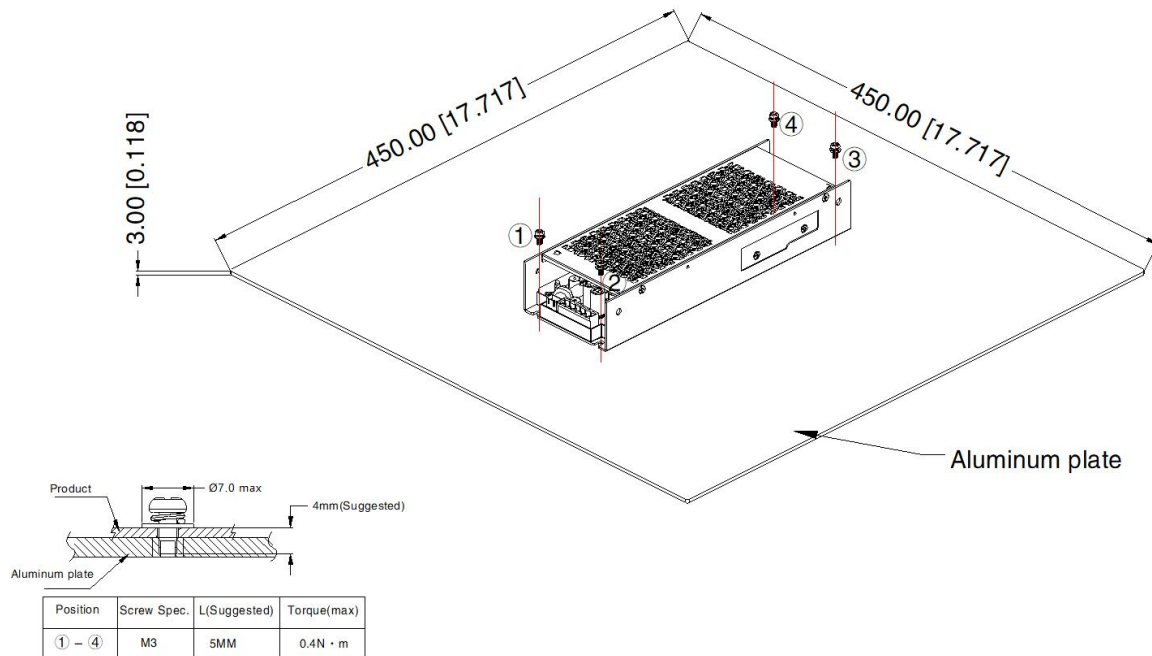


Note: This product is suitable for applications using windless environment and add surface heat sink; for applications in closed environment please consult Mornsun FAE.



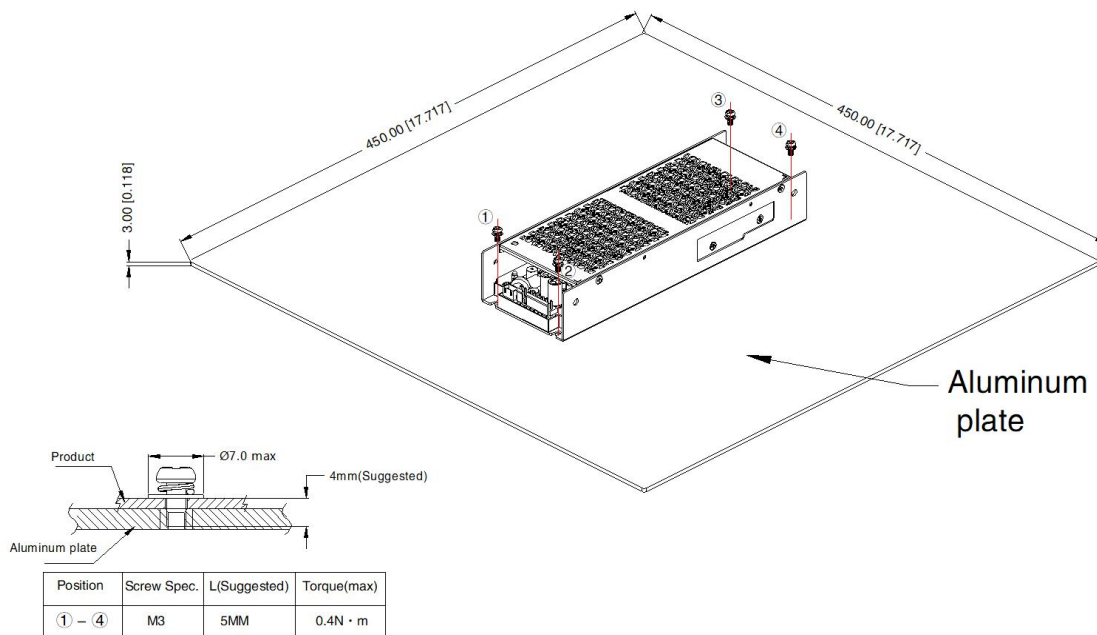
### Installation Diagram

#### LM550-12Dxx-40 Series



**Note:** 1. In order to meet the "Derating Curve", the product testing must be installed onto an aluminum plate. The size of the suggested aluminum plate is shown as above. And for optimizing thermal performance, it is necessary to apply thermal grease on the bottom of the product.  
2. It is suggested to install the product with M3 x 5 combination screws, and the product must be firmly installed at the center of the aluminum plate.

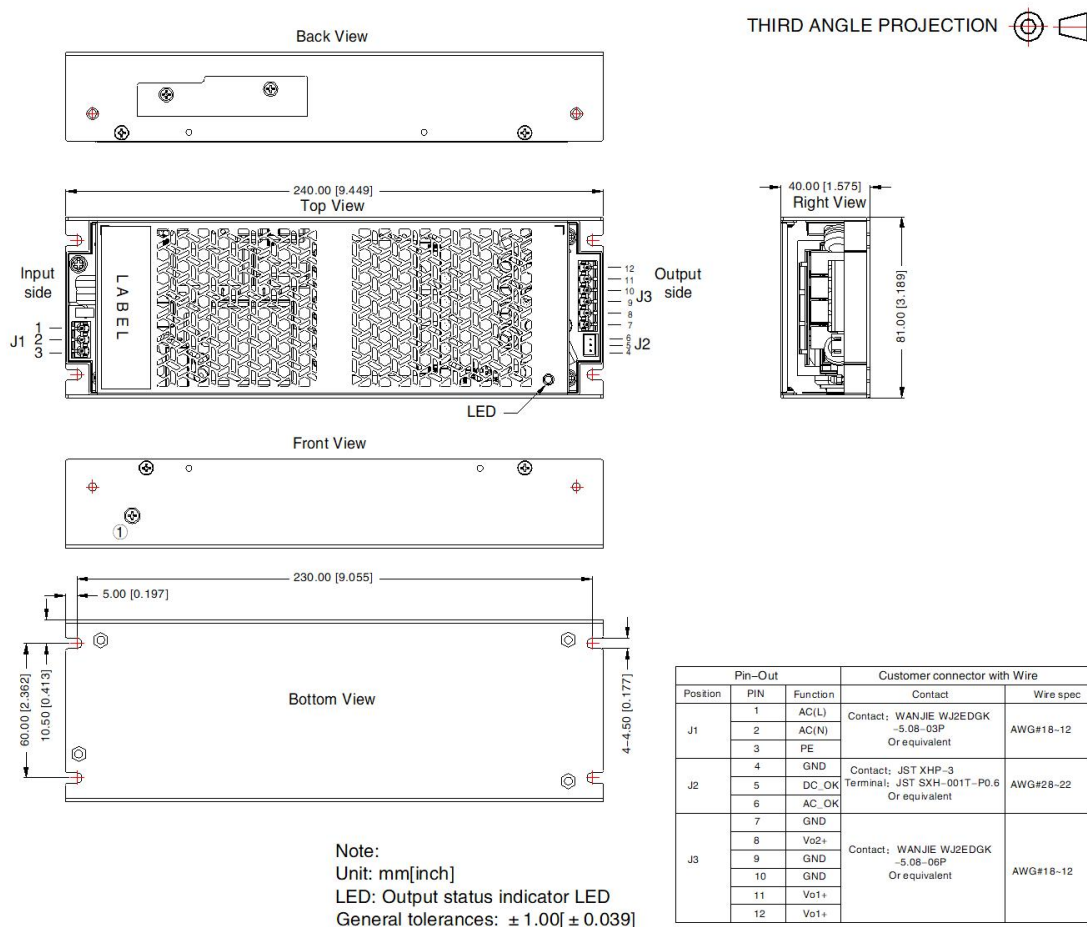
### LM550-12Dxx-50 Series



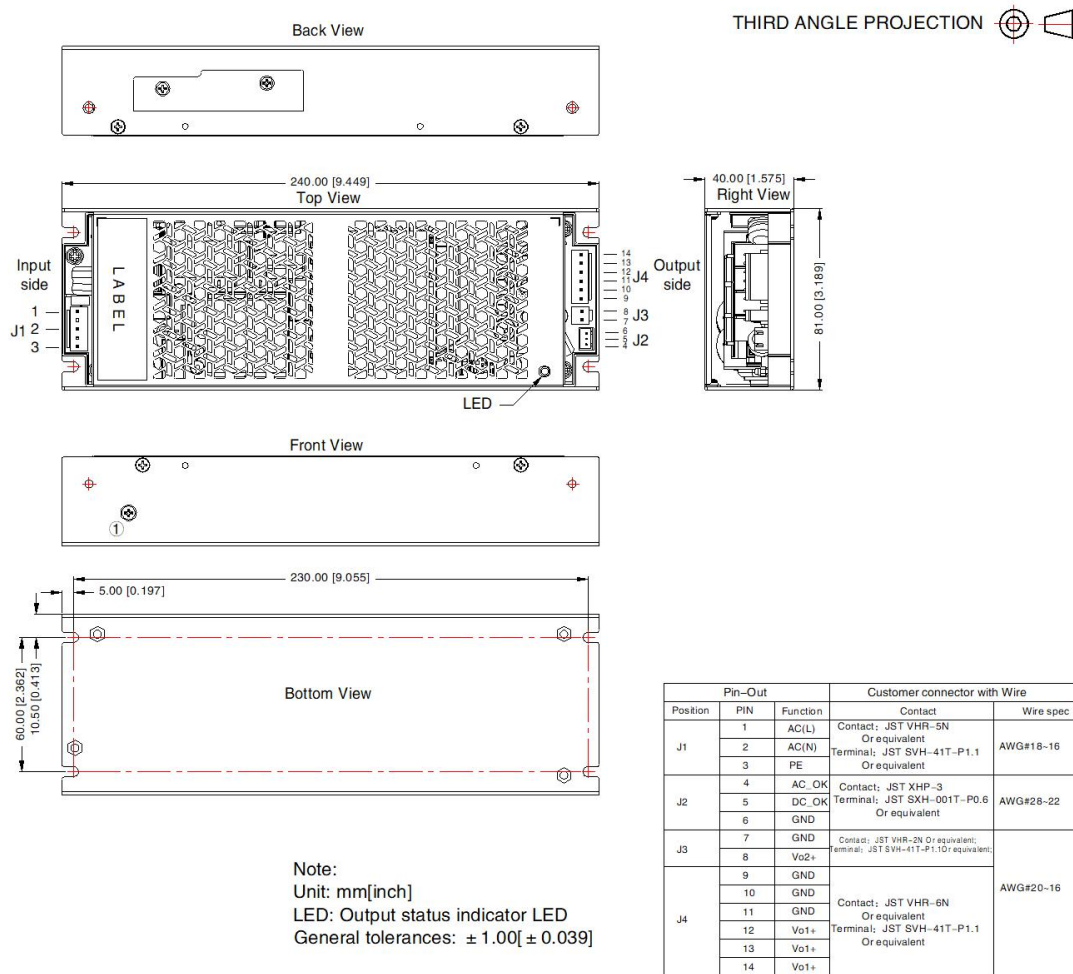
**Note:** 1. In order to meet the "Derating Curve", the product testing must be installed onto an aluminum plate. The size of the suggested aluminum plate is shown as above. And for optimizing thermal performance, it is necessary to apply thermal grease on the bottom of the product.  
2. It is suggested to install the product with M3 x 5 combination screws, and the product must be firmly installed at the center of the aluminum plate.

## Dimensions and Recommended Layout

### LM550-12Dxx-40 Series



### LM550-12Dxx-50 Series



#### Note:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220660;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^\circ\text{C}$ , humidity <75%RH with nominal input voltage and rated output load;
- The room temperature derating of  $5^\circ\text{C}/1000\text{m}$  is needed for operating altitude greater than 2000m;
- All index testing methods in this datasheet are based on our company corporate standards;
- 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;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- The out case needs to be connected to PE ( $\oplus$ ) of system when the terminal equipment in operating;
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
- 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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