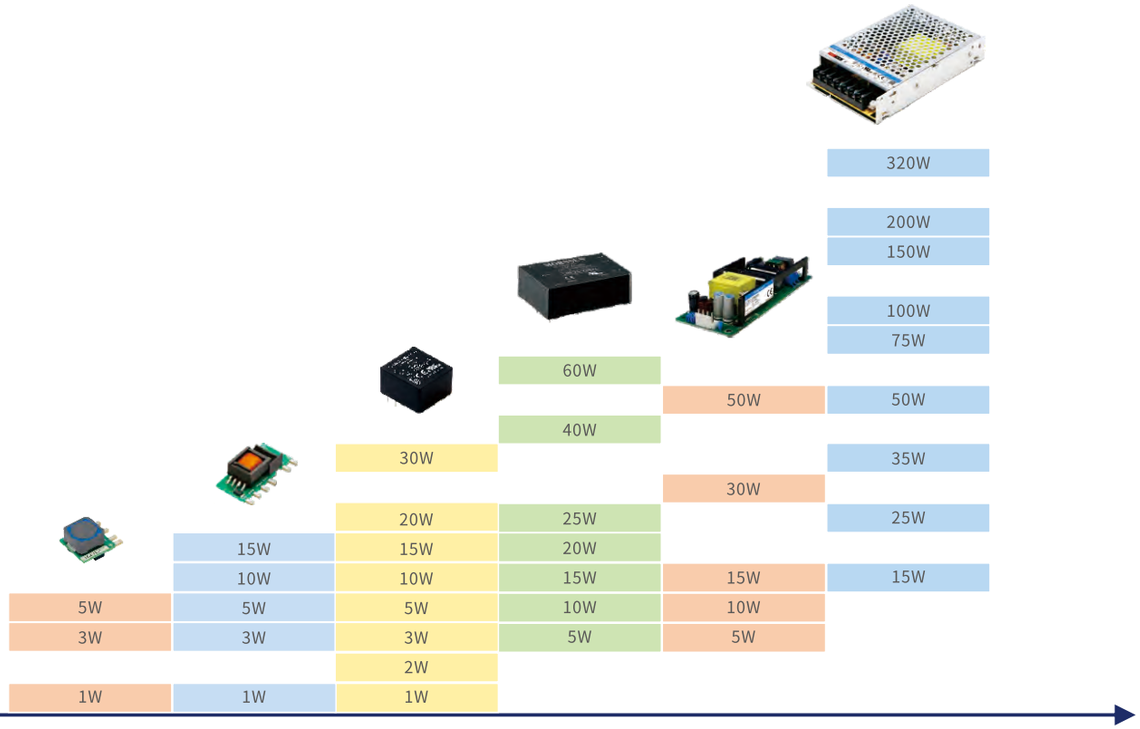
## 305RAC AC/DC Power supply Section Guide




305 RAC AC/DC Converter

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MORNSUN®

# 305RAC

# AC/DC Selection Guide

Reliable Performance

Fast Delivery

Controllable Cost

# MORNSUN®

## one-stop solutions of power supplies

CONTENT







MORNSUN provides one-stop solutions of power supplies, which has endeavored to offer 5000+ high-quality products including AC/DC converter, DC/DC converter, enclosed switching power supply, self-designed IC and transformer for different demands and numerous industries, such as industrial automation, charging station, photovoltaic, telecommunications, medical, smart home, automotive industry, and more. Guided by the service principle of “trustworthy” and distribution network more than 40+ countries, MORNSUN offers the best product, fast and local service and efficient pre-sale and after-sales for client.

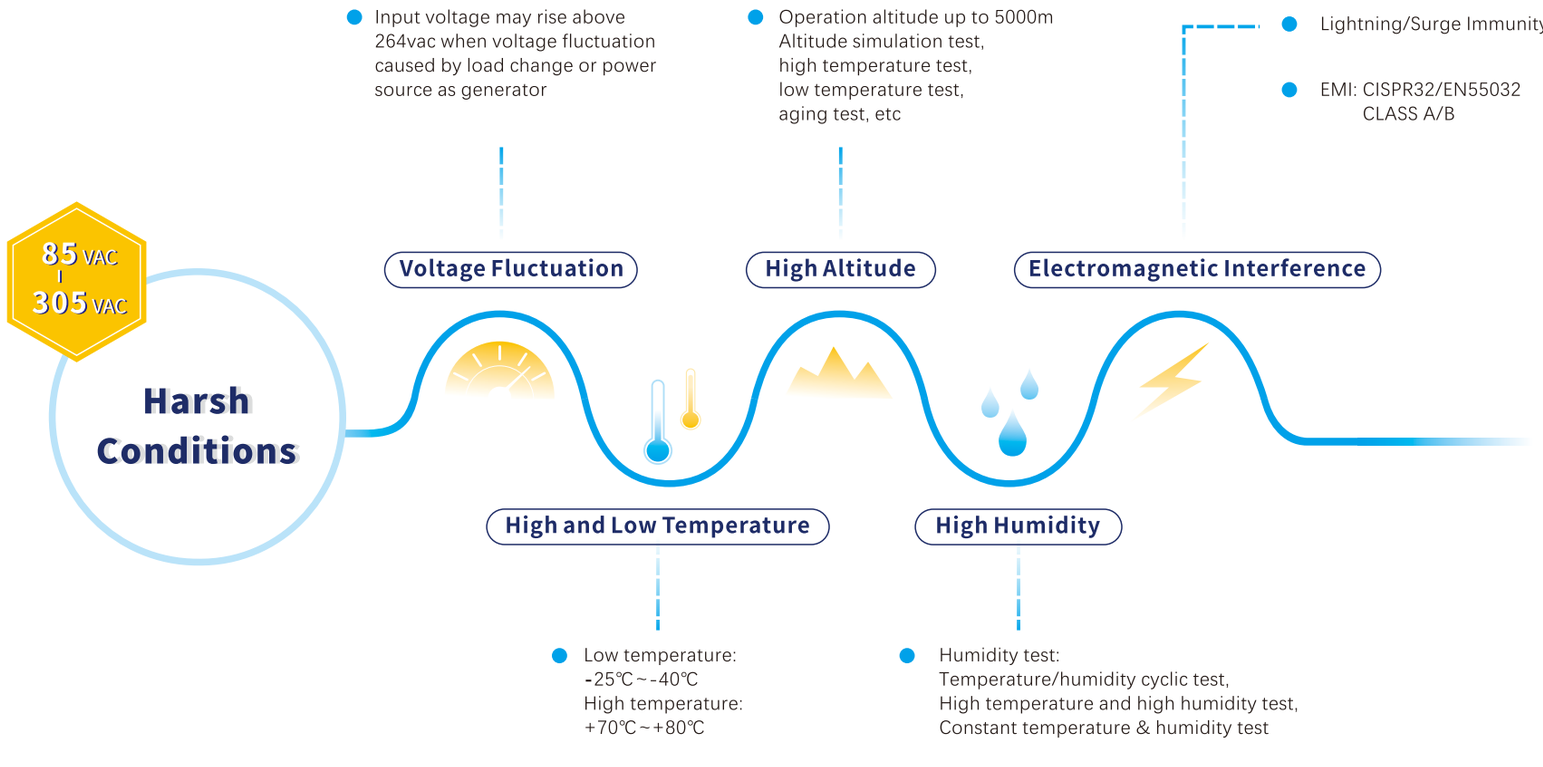
Headquarter in Guangzhou

R&D Center in Guangzhou

Manufacturing Center in Huaihua

## Harsh Conditions in Different Industries

MORNSUN 85-305VAC Input AC/DC converters ensure the stable and reliable performance under almost any harsh conditions.




This brochure is used to introduce our latest products. For more information, please contact our sales team.

# 305RAC -Reliable under All Conditions

## 305

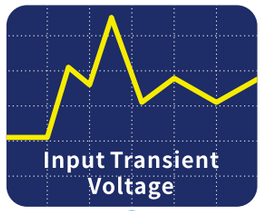
**85-305VAC input voltage**

## RAC (Reliable under All Conditions)

Best-in-class performance. Handle the voltage fluctuation easily. High-input-voltage capability, high-low-temperature reliability, high-humidity reliability, high-altitude reliability and good EMC performance under almost any harsh conditions.

### 305RAC AC/DC converters with 85-305VAC/100-430VDC input, which solves the three major shortcomings of conventional 85-264VAC input products:

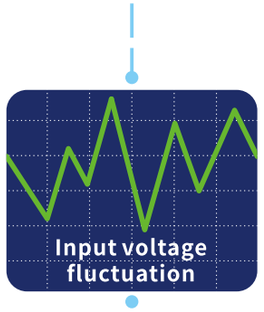
1, It works normally under the high input transient voltage (there are lightning and surge in harsh environment).
2. It solves the power failure caused by voltage fluctuation in grid power distribution or generator.
3. Its ultra wide input voltage of 85-305VAC covers the standard voltage of 110/220/277VAC.




**85-305VAC input voltage ensure the module is running normally when there is an input transient voltage.**

**Common issue:**

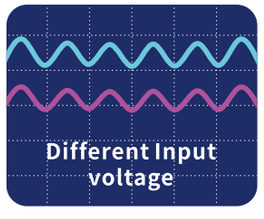
- There are lightning and surge in harsh environment, the input transient voltage is over 264VAC, the normal products with 85-264VAC input may be damaged.




**85-305VAC input voltage ensure the module will not be damaged by voltage fluctuation of power grid.**

**Common issue:**

- Voltage of the power grid is over 264VAC during the off-peak hours, the electrolytic capacitor inside the power supply may be damaged.
- Voltage fluctuation is large when powered by generator, the electrolytic capacitor inside the power supply may be damaged.




**85-305VAC input voltage ensure the module covers various input requirements.**

- 100/110/130/220/230/240/277VAC

### Reliability and Availability of 305RAC

1.Optimal circuit topologies.
Suitable topology can reduce voltage, current and thermal stress on build-in components.

2. Components quality and reliability.
It is critical to select the correct grade of components for the expected operating conditions.

3. Manufacturing process.
Manufacturing process is critical to improving end-product quality.

4. Verification for expected operating conditions.
To ensure the products can be used in applications with higher requirements for vibration, altitude, temperature, etc, we conduct various types of testing for reliability of our products.

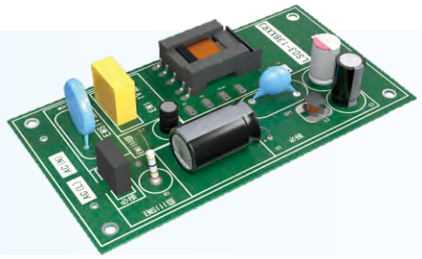
| Types | Test | Test |
|---|---|---|
| **Reliability testing** | Low temperature working | Thermal shock |
| | Low temperature storage | Low temperature altitude |
| | High temperature working | High temperature low pressure |
| | High temperature aging | High temperature altitude |
| | High temperature storage | High temperature high humidity |
| | Constant temperature & humidity | Input ON/OFF |
| | Alternating temperature & humidity | Short-circuit for long time |
| | Drop test | Constant humidity and temperature(500h) |
| | Sine vibration | High-temperature aging(1000h) |
| | Temperature cycling | |
| **Structural testing** | Strength test of the terminal and the mounting device | |

# 305RAC Product Design and Verification

Design optimization allied with qualified components contribute to the reliable performance.

Key points of the qualified components, such as filter, capacitor, MOSFET, diode, etc.

- ☑ High withstand voltage
- ☑ Derating of voltage stress



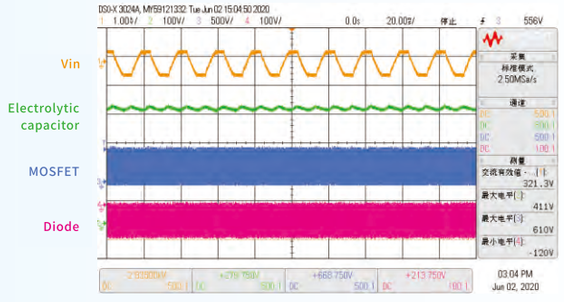
Design optimization and verification for the harsh environment to ensure the module's reliability, and components inside have enough margin of voltage stress.

**Test of LM150-23BXX:**

### Test 1: Vin=321VAC

**MOSFET:** rated=650V,actual stress(Max.)=610V;

**Diode:** rated=150V, actual stress(Max.)=120V;

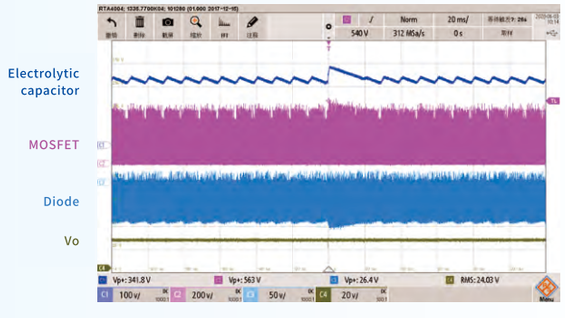



### Test 2: Lightning/Surge Immunity

**Electrolytic capacitor:** actual stress(Max.)=341.8V;

**MOSFET:** actual stress(Max.)=563V;

**Diode:** actual stress(Max.)=124V;

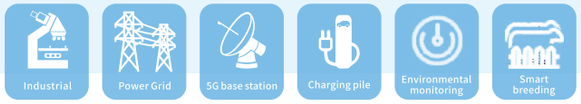







# 305RAC Product Applications

85-305VAC input AC/DC converters can be used in applications of commercial indoor environment, industrial indoor and outdoor environment, special industrial outdoor environment, etc.




## Typical application: DC charging point

**Common issue:**

1.Large voltage fluctuation of power grid in harsh environment,

2.Input voltage may up to 290VAC as voltage unbalance of three-phase ac distribution system, the electrolytic capacitor inside the power supply may be damaged.

**Solution:** LMxx-23Bxx


## Typical application: Street lighting controller

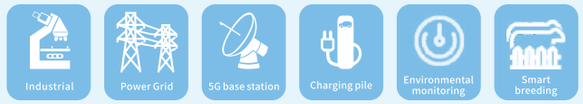
**Common issue:**

There are lightning and surge in harsh environment, the input transient voltage is over 264VAC, the normal products with 85-264VAC input may be damaged.

**Solution:** LDExx-23Bxx


This brochure is used to introduce our latest products. For more information, please contact our sales team.

# 305RAC Product Applications




## Typical application: Protective relay

**Common issue:** The protective relay is directly applied to the electrical power grid, the working environment it is in is very harsh. Considering reliability, there are high requirements for EMC protection in protective relay.

**Solution:** LO30-23B12E This AC DC power module has an excellent EMS performance of ESD (IEC/EN61000-4-2 Contact ±8KV/ Air ±15KV) and Surge (IEC/EN61000-4-5 Line to line ±2KV/ line to ground ±4KV), and meets high insulation requirements, while solving the problem of large voltage fluctuations in power grid.


## Typical application: Lighting in harsh and hazardous area

**Common issue:** Lighting in harsh and hazardous areas needs to withstand harsh conditions, such as large voltage fluctuation, extreme temperatures, dust, or moisture.

**Solution:** LMF320-23B12 This AC/DC enclosed power module has an ultra-wide input voltage of 85-305VAC with PFC function, while also having conformal coating to improve its reliability.






## 15-150W Enclosed Power Supplies LM Series

Isolation voltage up to 4000VAC

Meets 5000m altitude requirement

CE/CCC/UL Certification

**Specification**

| Series | | LM15-23B | LM25-23B | LM35-23B | LM50-23B | LM75-23B | LM100-23B | LM150-23B |
|---|---|---|---|---|---|---|---|---|
| Power (W) | | 15 | 25 | 35 | 50 | 75 | 100 | 150 |
| Output Voltage (VDC) | | 85 - 305VAC/120 - 430VDC | | | | | | |
| Nominal output voltage and current (Vo/Io) | | 3.3V/3.0A (2.85-3.6)<br>5V/3.0A (4.5-5.5)<br>12V/1.3A (10.2-13.8)<br>15V/1.0A (13.5-18)<br>24V/0.625A (21.6-28.8)<br>48V/0.32A (42-54) | 3.3V/6A (2.85-3.6)<br>5V/5A (4.5-5.5)<br>12V/2.1A (10.8-13.2)<br>15V/1.7A (13.5-16.5)<br>24V/1.1A (22-27.6)<br>48V/0.57A (42-54) | 5V/7A (4.5-5.5)<br>12V/3A (10.2-13.8)<br>15V/2.4A (13.5-18)<br>24V/1.5A (21.6-28.8) | 5V/10A (4.5-5.5)<br>12V/4.2A (10.2-13.8)<br>15V/3.4A (13.5-18)<br>24V/2.2A (21.6-28.8)<br>36V/1.45A (32.4-39.6)<br>48V/1.1A (43.2-52.8) | 5V/14A (4.5-5.5)<br>12V/6A (10.2-13.8)<br>15V/5A (13.5-18)<br>24V/3.2A (21.6-28.8)<br>36V/2.1A (32.4-39.6)<br>48V/1.6A (43.2-52.8) | 5V/18A (4.5-5.5)<br>12V/8.5A (10.2-13.8)<br>15V/7A (13.5-18)<br>24V/4.5A (21.6-28.8)<br>36V/2.8A (32.4-39.6)<br>48V/2.3A (43.2-52.8) | 12V/12.5A (10.2-13.8)<br>15V/10A (13.5-18)<br>24V/6.5A (21.6-28.8)<br>36V/4.3A (32.4-39.6)<br>48V/3.3A (43.2-52.8) |
| Efficiency (Max.) | | 83.0% | 87.0% | 87.0% | 87.0% | 90.5% | 91.0% | 89.0% |
| Over-current protection (Self-recovery) | | ⩾110% Io | 110%-300% Io | 110%-200% Io | | | | 110%-150% Io |
| Output short circuit protection | | Hiccup, continuous, self-recovery | | Hiccup or turning off, continuous, self-recovery | Hiccup, continuous, self-recovery | | | |
| Isolation voltage | | Input-Output: 4kVAC, Input-PE: 2kVAC, Output-PE: 1.25kVAC | | | | | | |
| Operating temperature | | -30°C to +70°C | | | | | | |
| EMC | EMI | CISPR32/EN55032 CLASS B | | | | | | |
| | EMS | IEC/EN 61000-4-2 Contact ±6KV/ Air±8KV, IEC/EN 61000-4-3 10V/m, IEC/EN61000-4-6 10 Vr.m.s, IEC/EN61000-4-4,5,11 | | | | | | |
| Safety standard | | IEC/EN/UL62368/EN60335/GB4943 | | IEC/EN/UL62368/GB4943，IEC/EN61558-1, 2-16 | | | IEC/EN/UL62368/GB4943/EN60335，IEC/EN61558-1, 2-16 | |
| Dimension (LxWxH) (mm) | | 65 x 55 x 25 | 80 x 55 x 25 | 99 x 82 x 30 | 99 x 82 x 30 | 99 x 97 x 30 | 129 x 97 x 30 | 159 x97 x 30 |
| Weight (Typ.) | | 90g | 115g | 170g | 190g | 220g | 305g（325g：5V） | 410g（430g：12V/15V） |

## 75-320W Enclosed Power Supplies LMF(PFC) Series

Active PFC

CE/CCC/UL Certification

Isolation voltage up to 4000VAC

**Specification**

| Series | | LMF75-23B | LMF100-23B | LMF150-23B | LMF200-23B | | LMF320-23B |
|---|---|---|---|---|---|---|---|
| Power (W) | | 75 | 100 | 150 | 200 | | 320 |
| Output Voltage (VDC) | | 85-305 VAC/88 - 430 VDC | | | | | |
| Nominal output voltage and current (Vo/Io) | | 5V/15A (4.75-5.5)<br>12V/6.3A (11.4-13.2)<br>15V/5A (14.3-16.5)<br>24V/3.2A (22.8-26.4)<br>48V/1.6A (45.6-52.8) | 12V/8.5A (11.4-13.8)<br>15V/6.7A (14.3-16.5)<br>24V/4.2A (22.8-27.6)<br>48V/2.1A (45.6-55.2) | 12V/12.5A (10.2-13.8)<br>15V/10A (13.5-18)<br>24V/6.3A (21.6-28.8)<br>48V/3.2A (45.6-55.2) | 5V/40A (4.5-5.5) | 12V/26.7A (10.2-13.2)<br>15V/21.4A (13.5-18)<br>24V/13.4A (20-26.4)<br>48V/6.7A (41-56) | 5V/60A (4.5-5.5)<br>12V/26.7A (10.2-13.2)<br>15V/21.4A (13.5-18)<br>24V/13.4A (20-26.4)<br>48V/6.7A (41-56) |
| Efficiency (Max.) | | 88.0% | 87.0% | 88.0% | 85.0% | 90.0% | 89.0% |
| Power Factor | | 0.93 | 0.93 | 0.98 | 0.95 | 0.95 | 0.95 |
| Over-current protection (Self-recovery) | | ⩾105% Io | 105%-150% Io | 105%-150% Io | 105%-150% Io | 105%-200% Io | 105%-150% Io |
| Output short circuit protection | | Constant current, continuous, self-recovery | | | Hiccup, continuous, self-recovery | | |
| Isolation voltage | | Input-Output: 4kVAC, Input-PE: 2kVAC, Output-PE: 1.25kVAC | | | | | |
| Operating temperature | | -30°C to +70°C | | | | | |
| EMC | EMI | CISPR32/EN55032 CLASS B<br>CISPR32/EN55032 CLASS B | CISPR32/EN55032 CLASS B,CISPR32/EN55032 CLASS B,IEC/EN61000-3-2 CLASS A | | | | |
| | EMS | IEC/EN 61000-4-2 Contact ±6KV /Air ±8KV;IEC/EN 61000-4-3 10V/m;IEC/EN 61000-4-4 ±2KV;<br>IEC/EN 61000-4-5 ±1KV/±2KV;IEC/EN61000-4-6 10 Vr.m.s | | | | | |
| Safety standard | | IEC/EN/UL62368/EN60335/GB4943,<br>IEC/EN61558 | UL/EN/IEC/62368/EN60335/GB4943 | | | | |
| Dimension (LxWxH) (mm) | | 179x 99 x 30 | | | 215 x 115 x 30 | | |
| Weight (Typ.) | | 460g | | 500g | 750g | 475g | 750g |





## 1-15W Cost-effective DIY LS-R3 Series

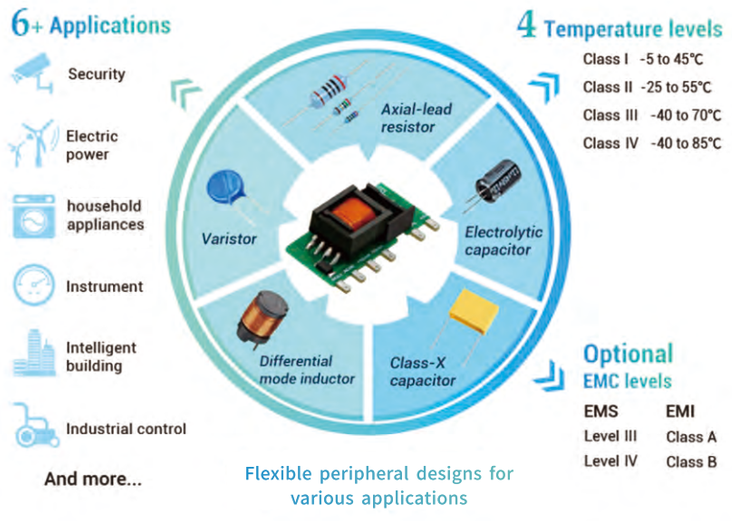
Ease of use

Flexible peripheral

Controllable cost

LS-R3 series

To balance the design cycle, cost, reliability, ease of use, dimensions, performance, and personalization of power supply, LS-R3 series is the first-of-its-kind cost-effective solution. By adopting flexible peripheral circuits, it can be used in a wide range of applications.




Flexible peripheral designs for various applications

**Specification**

| Product Category | Series | Power (W) | Output Voltage (VDC) | Isolation Voltage (VAC) | Operating Temperature | Package | Dimension (mm) | Certification |
|---|---|---|---|---|---|---|---|---|
| Non-isolated LS-K | LSxx-K3BxxSS | 1, 3, 5 | 5, 12, 18 | — | -40°C to +85°C | SIP | 16.13*15.10*9.50 | CE |
| Cost-effective LS-R3 | LS03-13BxxR3 | 3 | 3.3, 5 , 9, 12, 15, 24 | 3000 | | | 26.40*12.58*12.00 | CE<br>UL<br>CB |
| | LS05-13BxxR3 | 5 | | | | | 26.40*14.73*11.00 | |
| | LS10-13BxxR3 | 10 | 3.3, 5 , 9, 12, 15, 24 | | | | 32.00*17.20*15.05 | |
| | LS10-13BxxR3P | 10 | | | | | | |
| | LS08-13BxxSS | 8 | | | | | 44.50*24.00*15.00 | |
| | LS10-13BxxSS | 10 | | | | | | |
| | LS15-13BxxSS(-F) | 15 | | | | | | |
| | LS03-15BxxSR2S(-F) | 1 | | | | | 35.00*18.00*11.00 | |
| | LS05-15BxxSR2S | 5 | | | | | | |
| | LS05-15BxxSR2S(-F) | 3 | | | | | | |
| | LS01-15BxxSS(-F) | 1 | 5, 9, 12, 15, 24 | | | | | |

## 1-30W Compact LD Series

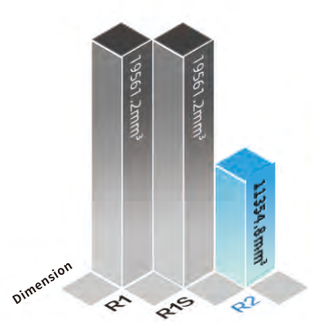
Industrial operating temperature -40°C to 85°C

2-Y-capacitors design match for the home appliances

Safety certifications IEC/EN/UL62368, EN60335/61558

LD-R2 series

LDxx-23BxxR2 series includes powers of 3W, 5W, 10W, 15W, 20W and 30W. These modules feature an operating temperature range of -40°C to +85°C, no-load power consumption as low as 0.1W, EMI class B without external components requirement. With the safety certifications of EN60335/61558, UL/EN/ICE62368, they are suitable for a wide range of commercial and industrial applications.





**42%** dimensions reduction

**70%** power density increase

### Specification

| Product Category | Series | Power (W) | Output Voltage (VDC) | Isolation Voltage (VAC) | Operating Temperature | Package | Dimension (mm) | Certification |
|---|---|---|---|---|---|---|---|---|
| LD-R2 | LD03-23BxxR2 | 3 | 3.3, 5,9, 12,15,24 | 4000 | -40°C to +85°C | DIP | 25.40*25.40*17.60 | CE,UL,CB *LD15/20-R2 design Meets IEC/EN60601-1/ ANSI/AAMI ES60601-1 Certification standards (2xMOPP) |
| | LD05-23BxxR2 | 5 | | 4000 | | | 25.40*25.40*17.60 | |
| | LD10-23BxxR2 | 10 | | 4000 | | | 40.00*25.40*21.00 | |
| | LD15-23BxxR2 | 15 | | 4000 | | | 47.60*26.80*23.50 | |
| | LD20-23BxxR2 | 20 | | 4000 | | | 52.40*27.20*24.00 | |
| | LD30-23BxxR2 | 30 | | 4000 | | | 69.50*39.00*24.00 | |
| | LD05-23BxxR2-M | 5 | | 4000 | | | 45.70*25.40*21.50 | |
| | LD10-23BxxR2-M | 10 | | 4000 | | | 52.40*27.20*24.00 | |
| | LD15-23BxxR2-M | 15 | | 4000 | | | 52.40*27.20*24.00 | |
| LDE-23B | LDE02-23Bxx | 2 | | 4000 | -40°C to +70°C | | 33.70*22.20*18.00 | CE,UL,CB |
| | LDE05-23Bxx | 5 | | 4000 | | | 50.80*25.40*15.36 | |
| | LDE10-23Bxx | 10 | | 4000 | | | 53.80*28.80*19.00 | |
| LD | LD10-13Bxx | 10 | | 3000 | | | 53.80*28.80*19.00 | – |
| | LD05-23Bxx | 5 | | 3000 | -25°C to +70°C | | 50.80*25.40*15.16 | CE,UL,CB |
| | LD02-10Bxx | 2 | | 3000 | | | 33.70*22.20*18.00 | |
| | LD01-10Bxx | 1 | | 3000 | | | 33.70*22.20*18.00 | |





## 5-60W High-reliable LH Series

### Specification

| Series | Power (W) | Output Voltage (VDC) | Isolation Voltage (VAC) | Operating Temperature | Package | Dimension (mm) | NO. of Outputs | Certification |
|---|---|---|---|---|---|---|---|---|
| LHE10-23Bxx | 10 | 3.3,5,9,12,15,24 | 4000 | -40°C to +85°C | DIP | 55.00*45.00*21.00 | 1 | CE |
| LHE15-23Bxx | 15 | 3.3,5,9,12,15,24,48 | | | | 62.00*45.00*22.50 | 1 | CE,UL,CB |
| LHE25-23Bxx | 25 | 3.3,5,9,12,15,24,48 | | | | 70.00*48.00*23.50 | 1 | CE,UL,CB |
| LHE40-23Bxx | 40 | 3.3,5,9,12,15,24,48 | | | | 89.00*63.50*25.00 | 1 | CE |
| LHE60-23Bxx | 60 | 5,9,12,15,24,48 | | | | 109.00*58.50*30.00 | 1 | CE |
| LH05-13Bxx | 5 | 5,9,12,15,24 | 3000 | -40°C to +70°C | | 55.00*45.00*21.00 | 1 | CE,UL,CB |
| LH10-13Bxx | 10 | 5,9,12,15,24 | | | | 55.00*45.00*21.00 | 1 | CE,UL,CB |
| LH15-13Bxx | 15 | 3.3,5,9,12,15,24,48 | | | | 62.00*45.00*22.50 | 1 | CE,UL,CB |
| LH20-13Bxx | 20 | 3.3,5,9,12,15,24 | | | | 70.00*48.00*23.50 | 1 | CE,UL,CB |
| LH25-13Bxx | 25 | 3.3,5,9,12,15,24,48 | | | | 70.00*48.00*23.50 | 1 | CE,UL,CB |

## 5-15W Open frame LO Series

### Specification

| Series | Power (W) | Nominal Output Voltage and Current (Vo/Io) | Isolation Voltage (VAC) | Operating Temperature | Dimension (mm) | NO. of Outputs | EMC Characteristics/ Certification |
|---|---|---|---|---|---|---|---|
| LO05-13D0505-01E | 5 | 5.0V/900mA<br>5.0V/100mA | 3000 | -40°C to +70°C | 56.20*32.10*26.00 | 2 | EFT surge immunity: ±4KV Perf. Criteria B |
| LO10-13Bxx | 10 | 3.3, 5, 9, 12, 15, 24 | 3000 | -25°C to +70°C | 60.00*42.00*16.30 | 1 | Meets UL/EN/IEC62368, EN/UL60335 standards |
| LO10-23D0524-02E | 10 | 5V/1000mA<br>24V/200mA | 4000 | -40°C to +70°C | 61.00*45.00*28.00 | 2 | CE |
| LO15-23D0524-02E | 15 | 5V/1000mA<br>24V/200mA | 4000 | -40°C to +70°C | 76.00*45.00*26.00 | 2 | CE |

## 15-50W open-frame LO-E series for electric power

- Wide input voltage range: 85-305VAC/88-430VDC
- Shutdown duration >100ms
- Floating voltage <3VAC, ensuring back-end signal acquisition precision
- Operating temperature range: -40°C to +85°C
- EMI performance meets CISPR32/EN55032 CLASS B
- EMS performance meets IEC/EN61000-4-2/3/4/5/6/11
- Meets impulse voltage requirements of 1.2/50us 5KV
- Operating up to 5000m altitude

**Specification**

| Series | | LO15-23xxE | LO30-23xxE | LO50-23xxE |
|---|---|---|---|---|
| Power (W) | | 15 | 30 | 50 |
| Output Voltage (VDC) | | 85-305 VAC/88 - 430 VDC | | |
| Nominal output voltage and current (Vo/Io) | | 3.3V/3A(2.97-3.63)<br>5V/3A(4.5-5.5)<br>12V/1.3A(10.8-13.2)<br>15V/1A(13.5-16.5)<br>24V/0.7A(21.6-26.4) | 3.3V/6A(2.97-3.63)<br>5V/6A(4.5-5.5)<br>12V/2.5A(10.8-13.2)<br>15V/2A(13.5-16.5)<br>24V/1.3A(21.6-26.4) | 3.3V/10A(2.97-3.63)<br>5V/10A(4.5-5.5)<br>9V/5.6A(8.1-9.9)<br>12V/4.2A(10.8-13.2)<br>15V/3.4A(13.5-16.5)<br>24V/2.1A(21.6-26.4)<br>27V/1.9A(24.3-29.7)<br>48V/1.1A(43.2-52.8) |
| Efficiency (Max.) | | 85.0% | 88.0% | 89.0% |
| Over-current protection (Self-recovery) | | ⩾120% Io | | ⩾110% Io |
| Output short circuit protection | | Hiccup, continuous, self-recovery | | |
| Isolation voltage | | Input-Output: 4kVA, Input-PE: 2kVAC, Output-PE: 0.5kVAC | | |
| Operating temperature | | -40℃ to +85℃ | | |
| EMC | EMI | CISPR32/EN55032 CLASS B,CISPR32/EN55032 CLASS B | | CISPR32/EN55032 CLASS B,<br>CISPR32/EN55032 CLASS A |
| | EMS | IEC/EN61000-4-2 Contact ±8KV/ Air ±15KV;IEC/EN61000-4-3 10V/m;IEC/EN61000-4-4 ±4KV;<br>IEC/EN61000-4-5 Line to line±2KV/line to ground±4KV;IEC/EN61000-4-6 10 Vr.m.s | | |
| Safety standard | | IEC/EN/UL62368/EN60335/GB4943 | | |
| Dimension (LxWxH) (mm) | | 87.5×50×22 | 105×50×30 | 132×50×27.1 |
| Weight (Typ.) | | 53g (58g：15V/24V) | 110g | 145g |



This brochure is used to introduce our latest products. For more information, please contact our sales team.

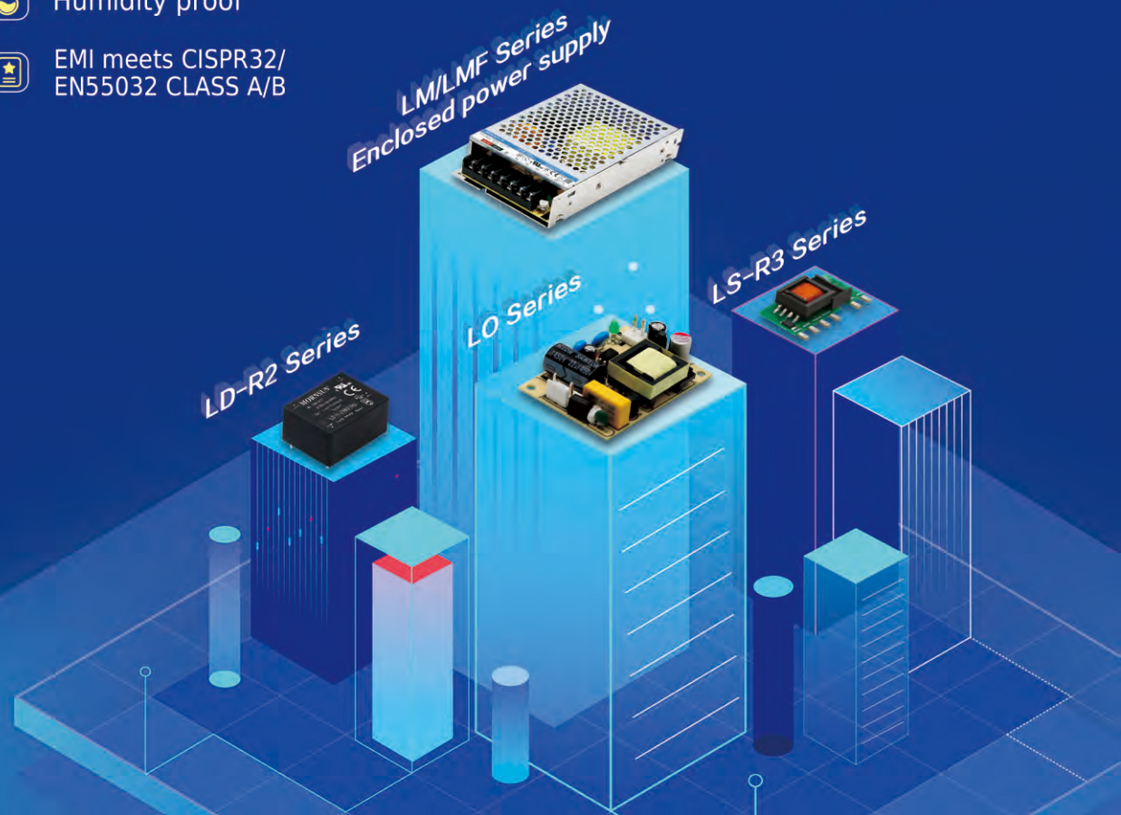
MORNSUN®

# 305RAC

Reliable under All Conditions

- 85-305VAC Input
- 5,000m ASL
- -40℃ to +80℃
- Humidity proof
- EMI meets CISPR32/ EN55032 CLASS A/B

Website



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