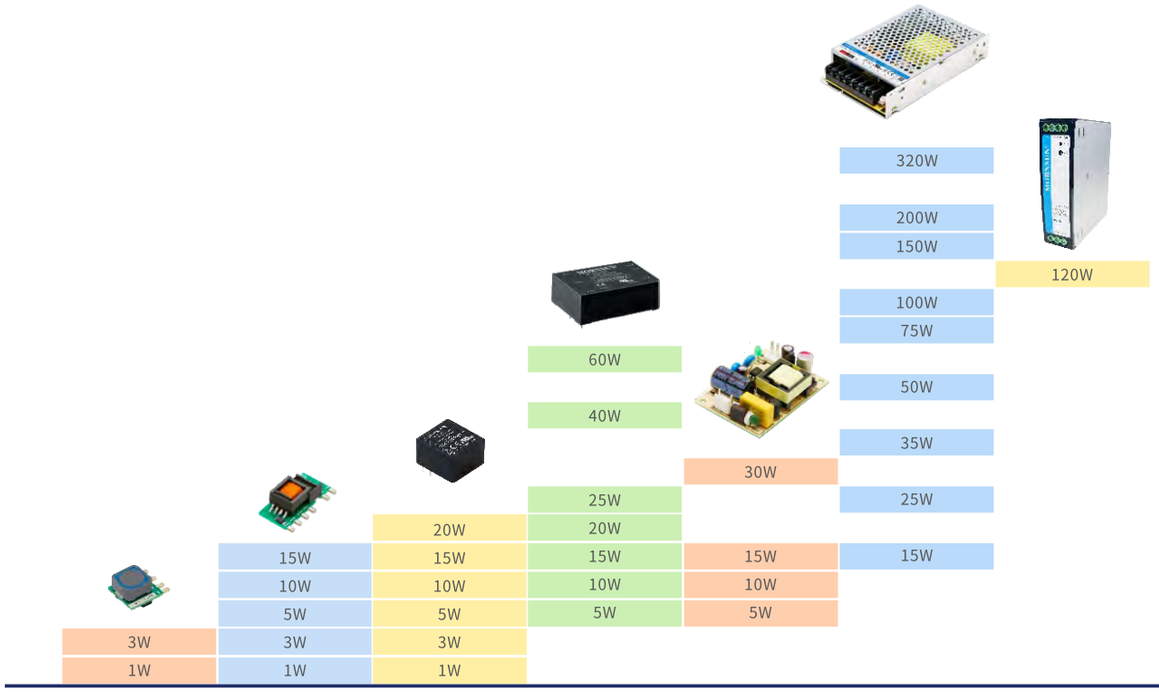
305RAC AC/DC Selection Guide



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MORNSUN®

305 RAC
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.

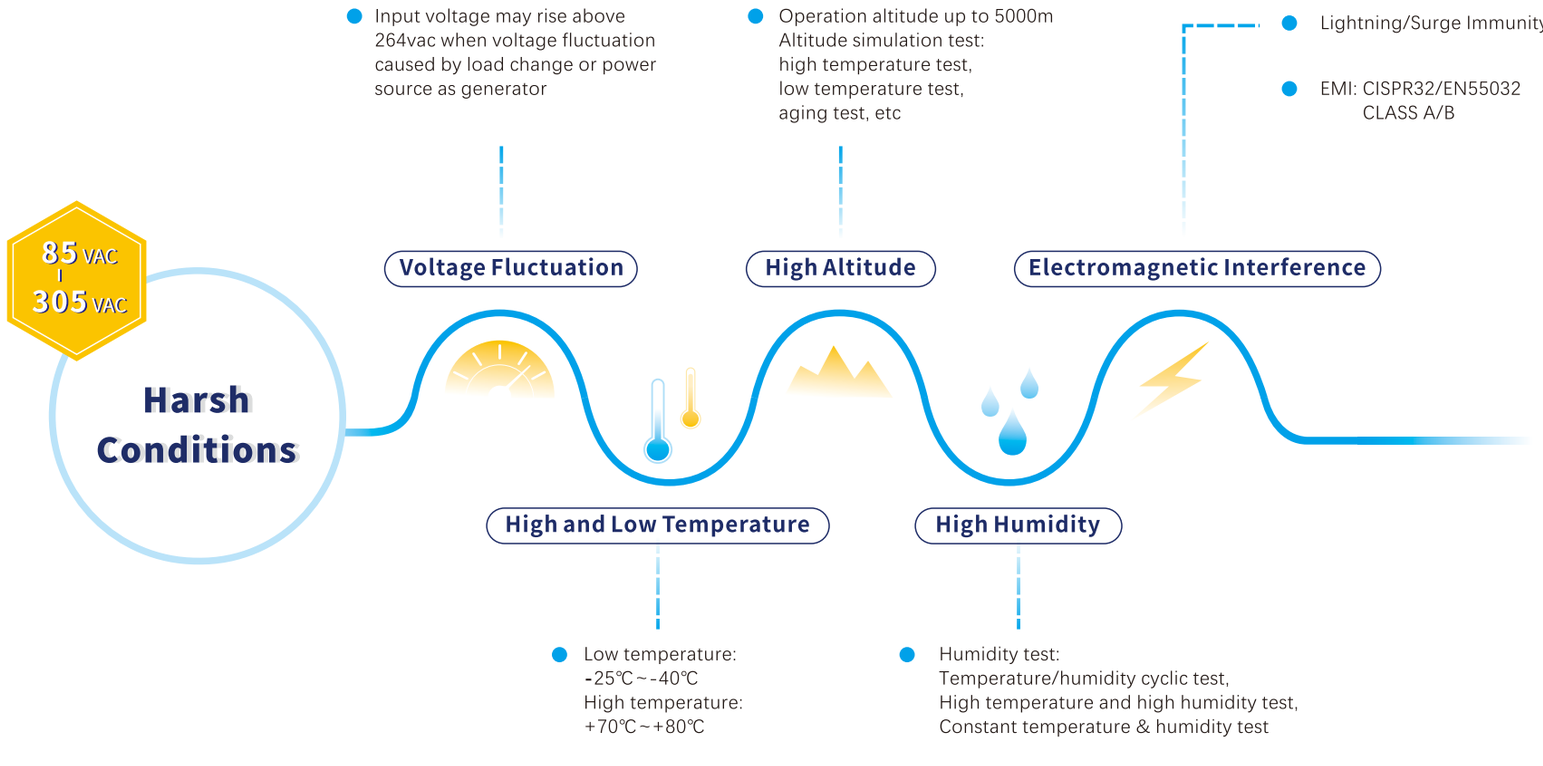
Headquarter in Guangzhou

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

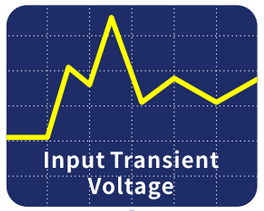
85-305VAC input voltage

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:

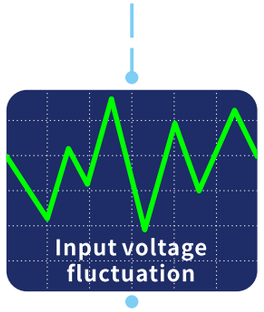
1, It works normally under the high input transient voltage (there are lightning and surge in harsh environment).
2. It solves the power failure caused by voltage fluctuation in grid power distribution or generator.
3. Its ultra wide input voltage of 85-305VAC covers the standard voltage of 110/220/277VAC.



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

Common issue:

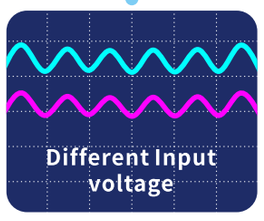
- There are lightning and surge in harsh environment, the input transient voltage is over 264VAC, the normal products with 85-264VAC input may be damaged.



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.

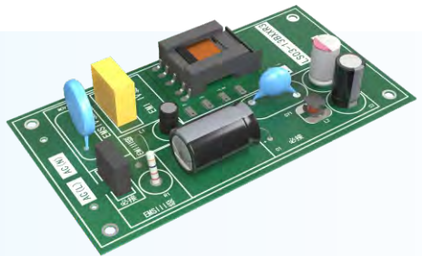
Types	Test	Test
Reliability testing	Low temperature working	Thermal shock
	Low temperature storage	Low temperature altitude
	High temperature working	High temperature low pressure
	High temperature aging	High temperature altitude
	High temperature storage	High temperature high humidity
	Constant temperature & 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 fliter, capactitor, MOSFET, diode, etc.

- ☑ High withstand voltage
- ☑ Derating of voltage stress



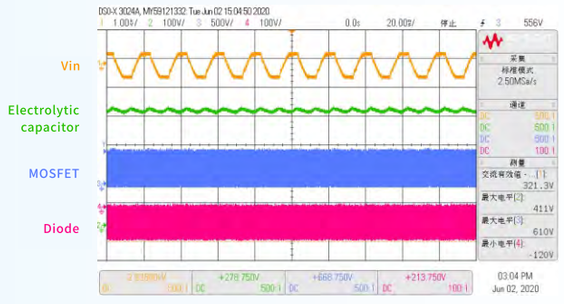
Design optimization and verification for the harsh environment to ensure the module's reliability, and components inside have enough margin of voltage stress.

Test of LM150-23BXX:

Test 1: Vin=321VAC

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

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

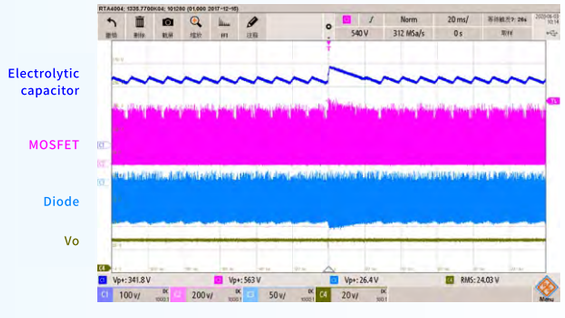


Test 2: Lightning/Surge Immunity

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

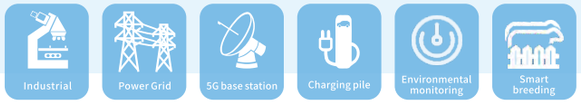
MOSFET: actual stress(Max.)=563V;

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

15-320W Enclosed Power Supplies LM/LMF(PFC) Series

LM/LMF series AC/DC enclosed switching power supplies, featuring wide range of input voltage and operating temperature, excellent EMC performance, high reliability with multiple protections, are ideal solutions for a wide range of applications such as industrial automation, IoT, LED, street light control, electricity, security, telecommunications, smart home, etc.

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
Power (W)	15	25	35	50	75	100
Nominal output voltage and current (Vo/Io)	3.3V/3A 5V/3A 12V/1.3A 15V/1A 24V/0.625A 48V/0.32A	3.3V/6A 5V/5A 12V/2.1A 15V/1.7A 24V/1.1A 48V/0.57A	5V/7A 12V/3A 15V/2.4A 24V/1.5A	5V/10A 12V/4.2A 15V/3.4A 24V/2.2A	5V/14A 12V/6A 15V/5A 24V/3.2A 36V/2.1A 48V/1.6A	5V/18A 12V/8.5A 15V/7A 24V/4.5A 36V/2.8A 48V/2.3A
Output voltage adjustable range (V)	2.85-3.6 4.5-5.5 10.2-13.8 13.5-18 21.6-28.8 42-54	2.85-3.6 4.5-5.5 10.8-13.2 13.5-16.5 22-27.6 42-54	4.5-5.5 10.2-13.8 13.5-18 21.6-28.8	4.5-5.5 10.2-13.8 13.5-18 21.6-28.8	4.5-5.5 10.2-13.8 13.5-18 21.6-28.8 32.4-39.6 43.2-52.8	4.5-5.5 10.2-13.8 13.5-18 21.6-28.8 32.4-39.6 43.2-52.8
Inrush current @ 230VAC	50A	Cold start at normal temperature, 40A	Cold start at normal temperature, 65A	Cold start at normal temperature, 70A		Cold start at normal temperature, 65A
Efficiency (Max.)	83.0%	87.0%	87.0%	87.0%	90.5%	91.0%
Over-current protection (Self-recovery)	⩾110% Io	110%-300% Io	110%-200% Io			
Output short circuit protection	Hiccup, continuous, self-recovery		Hiccup or turning off, continuous, self-recovery	Hiccup, continuous, self-recovery		
Isolation voltage (Electric strength test for 1 min., leakage current <10mA)	Input-Output: 4kVAC, Input-PE: 2kVAC, Output-PE: 1.25kVAC					
Operating temperature	-30℃ to +70℃					
EMC — EMI	CISPR32/EN55032 CLASS B					
EMC — 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
MTBF	MIL-HDBK-217F@25℃ >300,000 h					
Dimension (LxWxH) (mm)	65 x 55 x 25	80 x 55 x 25	99 x 82 x 30		99 x 97 x 30	129 x 97 x 30
Packaging	120pcs/13.3kg	85pcs/11.7kg	52pcs/12.7kg		48pcs/12.8kg	36pcs/13.7kg

Specification

Series	LM150-23B	LMF100-23B	LMF150-23B	LMF200-23B	LMF320-23B
Power (W)	150	100	150	200	320
Nominal output voltage and current (Vo/Io)	12V/12.5A 15V/10A 24V/6.5A 36V/4.3A 48V/3.3A	12V/8.5A 15V/6.7A 24V/4.2A 48V/2.1A	12V/12.5A 15V/10A 24V/6.3A 48V/3.2A	12V/16.7A 15V/13.4A 24V/8.4A 48V/4.2A	5V/60A 12V/26.7A 15V/21.4A 24V/13.4A 48V/6.7A
Output voltage adjustable range (V)	10.2-13.8 13.5-18 21.6-28.8 32.4-39.6 43.2-52.8	11.4-13.8 14.3-16.5 22.8-27.6 45.6-55.2	10.2-13.8 13.5-18 21.6-28.8 45.6-55.2	11.4 - 12.6 14.25 - 15.75 22.8 - 25.2 45.6 - 50.4	4.5 - 5.5 10 - 13.2 13.5 - 18 20 - 26.4 41 - 56
Inrush current @ 230VAC	Cold start at normal temperature, 65A	Cold start at normal temperature, 45A	Cold start at normal temperature, 45A	Cold start at normal temperature, 65A	Cold start at normal temperature, 65A
Efficiency (Max.)	89.0%	87.0%	88.0%	90.0%	89.0%
Over-current protection (Self-recovery)	110%-150% Io	105%-150% Io	105%-150% Io	105%-200% Io	105%-150% Io
Output short circuit protection	Hiccup, continuous, self-recovery	Constant current, continuous, self-recovery	Constant current, continuous, self-recovery	Hiccup, continuous, self-recovery	Hiccup, continuous, self-recovery
Isolation voltage (Electric strength test for 1 min., leakage current <10mA)	Input-Output: 4kVAC, Input-PE: 2kVAC, Output-PE: 1.25kVAC	Input-Output: 4kVA, Input-PE: 2kVAC, Output-PE: 500VAC			
Operating temperature	-30℃ to +70℃				
EMC — EMI	CISPR32/EN55032 CLASS B				
EMC — 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/ GB4943/EN60335, IEC/EN61558-1, 2-16	IEC/EN/UL62368/EN60335/GB4943			
MTBF	MIL-HDBK-217F @25℃ >300,000 h	MIL-HDBK-217F @25℃ >100,000 h	MIL-HDBK-217F @25℃ >300,000 h	MIL-HDBK-217F @25℃ >250,000 h	MIL-HDBK-217F @25℃ >250,000 h
Dimension (LxWxH) (mm)	159 x97 x 30	179 x 99x 30	179 x 99x 30	179 x 99x 30	215 x 115 x 30
Packaging	28pcs/13.1kg	26pcs/13.71kg	26pcs/14.75kg	26pcs/14.10kg	19pcs/15.94kg

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

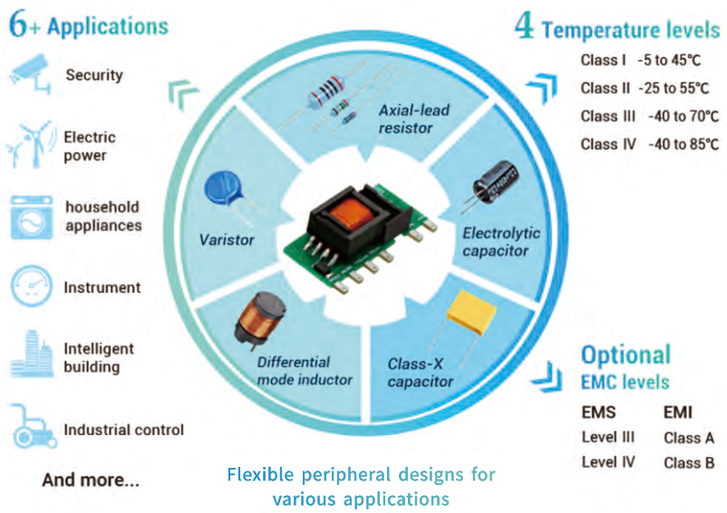
Ease of use

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	—	-40℃ to +85℃	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 UL CB
	LS05-13BxxR3	5					26.40*14.73*11.00	
	LS10-13BxxR3	10					32.00*17.20*15.05	
	LS08-13BxxSS	8					44.50*24.00*15.00	
	LS10-13BxxSS	10					44.50*24.00*15.00	
	LS15-13BxxSS	15					44.50*24.00*15.00	
	LS05-13BxxSR2S	5					35.00*18.00*11.00	
	LS01-15BxxSS(-F)	1	5, 9, 12, 15, 24				35.00*18.00*11.00	

1-20W Compact LD-R2 Series

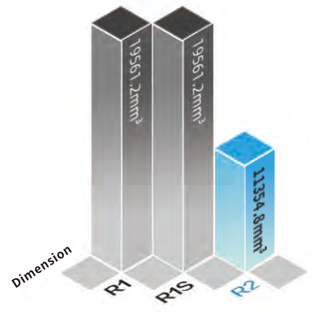
Industrial operating temperature -40℃ to 85℃

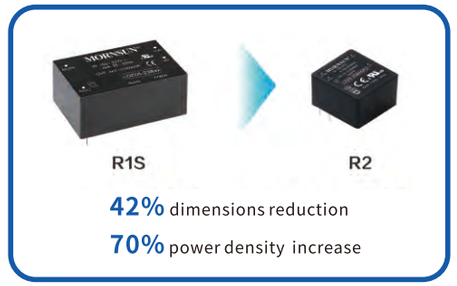
2-Y-capacitors design match for the home appliances

Safety certifications IEC/EN/UL62368, EN60335/61558

LD-R2 series

LDxx-23BxxR2 series includes powers of 3W, 5W, 10W, 15W and 20W. These modules feature an operating temperature range of -40℃ to +85℃, 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.





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℃ to +85℃	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	
LDE-23B	LDE02-23Bxx	2		4000	-40℃ to +70℃		33.70*22.20*18.00	
	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℃ to +70℃		50.80*25.40*15.16	—
	LD02-10Bxx	2		3000			33.70*22.20*18.00	CE,UL
	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

5-30W 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 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 24V/200mA	4000	-40°C to +70°C	61.00*45.00*28.00	2	CE
LO15-23D0524-02E	15	5V/1000mA 24V/200mA	4000	-40°C to +70°C	76.00*45.00*26.00	2	CE
LO15-23BxxE	15	3.3, 5, 12, 15, 24	4000	-40°C to +85°C	87.50*50.00*22.00	1	EFT surge immunity: ±4KV Perf. Criteria B
LO30-23BxxE	30	3.3, 5, 12, 15, 24	4000	-40°C to +85°C	105.00*50.00*30.00	1	EFT surge immunity: ±4KV Perf. Criteria B

5-30W Din-rail LI 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
LI120-13Bxx	120	12V/10A 24V/5A	3000	-25°C to +70°C	35.00*125.00*112.70	1	CISPR32/EN55032 CLASS B