

### FEATURES

- Universal 176 - 305VAC or 240 - 430VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +85℃
- Semi-potted process, fanless design
- High I/O isolation test voltage up to 4000VAC
- High efficiency
- Output short circuit/over-current/over-voltage protection, over-temperature protection
- Operating altitude up to 5000m
- Safety according to UL/EN/UL/BS EN62368, EN60335, EN61558, GB4943
- 3 years warranty



LM350-22BxxUH(-C) series is one of Mornsun's enclosed fanless semi-potted ultra narrow AC-DC switching power supply, it is suitable for industrial and outdoor occasions where the application environment is relatively harsh. It features universal AC input and at the same time accepts DC input voltage, cost-effective, high efficiency, high reliability, operating altitude up to 5000m. These converters offer excellent EMC performance and meet UL/EN/IEC/BS EN62368, EN60335, EN61558, GB4943 standards and they are widely used in areas of industrial, lighting, electricity, security, telecommunications, weave, farm etc.

### Selection Guide

Certification	Part No. <sup>①</sup>	Output Power (W) <sup>②</sup>	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)	Efficiency at 230VAC (%) Typ.	Max. Capacitive Load (uF)
EN/CQC	LM350-22B05UH	300	5V/60A	4.5-5.5	90	12000
	LM350-22B12UH	350.4	12V/29.2A	11.4-12.6	93	10000
	LM350-22B24UH	350.4	24V/14.6A	22.8-25.2	94	8000
	LM350-22B28UH	350	28V/12.5A	26.6-29.4	95	7000
	LM350-22B36UH	351	36V/9.75A	34.2-37.8	93	6000
	LM350-22B48UH	350.4	48V/7.3A	45.6-50.4	94	4000
	LM350-22B54UH	351	54V/6.5A	51.3-56.7	94	2000

Note: ①Use suffix "C" for terminal with protective cover. The product picture is for reference only. For details, please refer to the actual product;  
②Under any steady-state conditions, the total power of the product should not exceed the rated power. When the output voltage is increased, the total output power cannot exceed the rated output power, when the output voltage is decreased, the output current cannot exceed the rated output current.

### Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Rated input (Certified voltage)		200	--	277	VAC
	AC input		176	--	305	
	DC input		240	--	430	VDC
Input Voltage Frequency	Rated input (Certified voltage)		50	--	60	Hz
			47	--	63	
Input Current	Rated input (Certified voltage)		--	--	4	A
	230VAC		--	--	4	
Inrush Current	230VAC	Cold start	--	60	--	
Start-up Delay Time	230VAC, rated load		--	1.5	--	s
Input Fuse	Built-in fuse		8A/300VAC			
Hot Plug			Unavailable			

### Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range	5V	--	±2	--	%
		Other output	--	±1	--	
Line Regulation	Rated load	5V	--	±0.5	--	
		Other output	--	±0.3	--	
Load Regulation	0% - 100% load	5V/12V	--	±1	--	
		Other output	--	±0.5	--	
Minimum Load			0	--	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	5V/12V	--	--	200	mV
		Other output	--	--	240	
Temperature Coefficient			--	±0.03	--	%/°C
Hold-up Time	230VAC, rated load		--	16	--	ms
Short Circuit Protection	After the short circuit disappears, the recovery time is less than 3s		Hiccup or turn-off, continuous, self-recover			
Over-current Protection			≥110% Io, hiccup, self-recover			
Over-temperature Protection			Turn-off, self-recover after over-temperature fault elimination			
Over-voltage Protection	5V		≤6.5V (Output voltage hiccup or turn-off)			
	12V		≤15.6V (Output voltage hiccup or turn-off)			
	24V		≤31.2V (Output voltage hiccup or turn-off)			
	28V		≤36.4V (Output voltage hiccup or turn-off)			
	36V		≤46.8V (Output voltage hiccup or turn-off)			
	48V		≤62.4V (Output voltage hiccup or turn-off)			
	54V		≤63.0V (Output voltage hiccup or turn-off)			

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 Enclosed Switching Power Supply Application Notes for specific information.

### General Specifications

Item	Operating Conditions			Min.	Typ.	Max.	Unit
Isolation	Input - ⊕	Electric strength test for 1min., leakage current <5mA		2000	--	--	VAC
	Input - output			4000	--	--	
	Output - ⊕			1500	--	--	
Insulation Resistance	Input - ⊕	Ambient temperature: 25 ± 5°C Relative humidity: < 95%RH, no condensation Test voltage: 500VDC		100	--	--	MΩ
	Input - output			100	--	--	
	Output - ⊕			100	--	--	
Leakage Current	277VAC	Touch current		--	--	0.5	mA
Operating Temperature				-40	--	+85	°C
Storage Temperature				-40	--	+85	
Operating Humidity	Non-condensing			20	--	90	%RH
Storage Humidity	Non-condensing			10	--	95	
Power Derating	Operating temperature derating (With aluminum plate)	5V	+45°C to +70°C	1.6	--	--	% / °C
			+70°C to +85°C	2	--	--	
		Other output	+50°C to +70°C	2	--	--	
			+70°C to +85°C	2	--	--	
	Operating temperature derating (Without aluminum plate)	5V	+15°C to +25°C	3	--	--	
			+25°C to +45°C	0.5	--	--	
			+45°C to +70°C	1.2	--	--	
			+70°C to +85°C	0.67	--	--	

		Other output	+30℃ to +50℃	1.5	--	--	
			+50℃ to +70℃	2	--	--	
			+70℃ to +85℃	0.67	--	--	
	Input voltage derating	176VAC - 200VAC		2.08	--	--	%VAC
		277VAC - 305VAC		0.715	--	--	
Safety Standards				EN/BS EN62368-1, GB4943.1 safety approved Design refer to UL/IEC62368-1, EN60335-1, EN61558-1			
Safety Class				CLASS I			
MTBF	MIL-HDBK-217F@25℃			≥300,000 h			
Warranty	Ambient temperature: ≤70℃			3 years			

## General Specifications

Case Material	Metal (AL5052, SGCC)
Dimensions	220.00mm x 59.70mm x 31.00mm
Weight	530g (Typ.)
Cooling Method*	With aluminum plate heat dissipation

Note: \* 1. Cooling mode and power derating parameter product characteristic curve;

2. In order to optimize the heat dissipation performance, when the aluminum plate is used for auxiliary heat dissipation, please note: (1) The size of the aluminum plate is 450mm x 450mm x 3mm; (2) The surface of the aluminum plate must be coated with thermal grease; (3) The product must be tightly attached to the aluminum plate.

## Electromagnetic Compatibility (EMC)

Emissions	CE (Input port)	CISPR32/EN55032 CLASS A			
	RE	CISPR32/EN55032 CLASS A			
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV		perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m		
	EFT (Input port)	IEC/EN61000-4-4	±4KV		
	Surge (Input port)	IEC/EN61000-4-5	Line to line ±2KV/line to PE ±4KV		
	CS	IEC/EN61000-4-6	10Vr.m.s		
	PFMF	IEC/EN61000-4-8	30A/m		
	Voltage variations *	IEC61000-6-2/IEC61000-4-11		70% Un, 25/30 cycle(50/60Hz) 40% Un, 10/12 cycle(50/60Hz) 0% Un, 1 cycle	perf. Criteria B
	Voltage interruptions *	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.

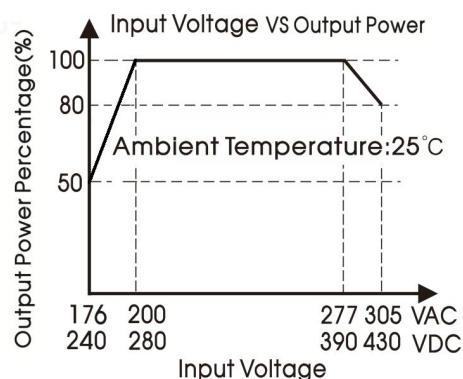
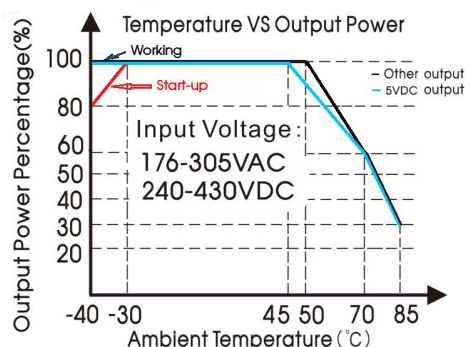
(2) Symmetrically controlled heating element with a rated power less than or equal to 200W.

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

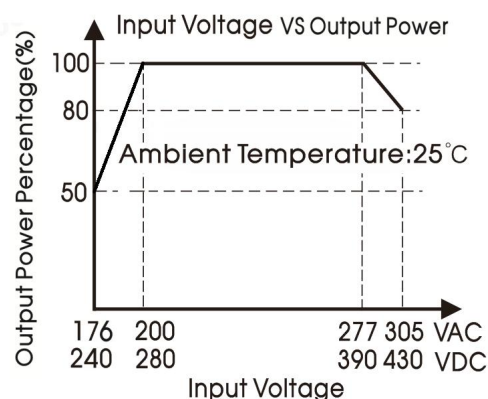
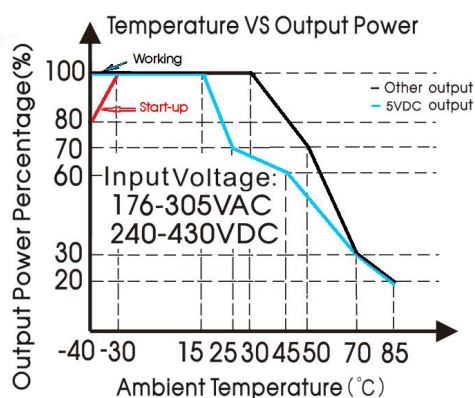
4. \*Un is the maximum input nominal voltage.

### Product Characteristic Curve

#### With aluminum plate

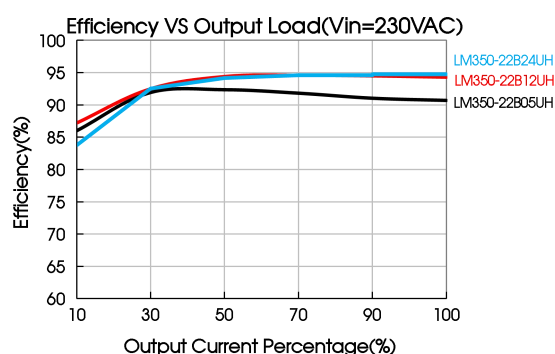
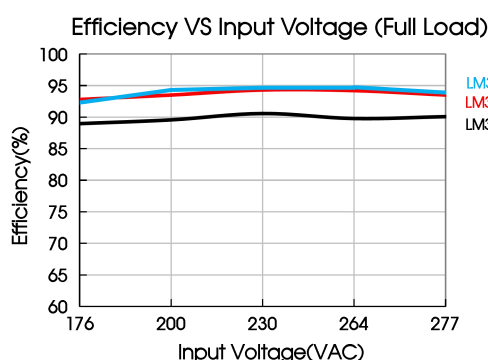


#### Without aluminum plate



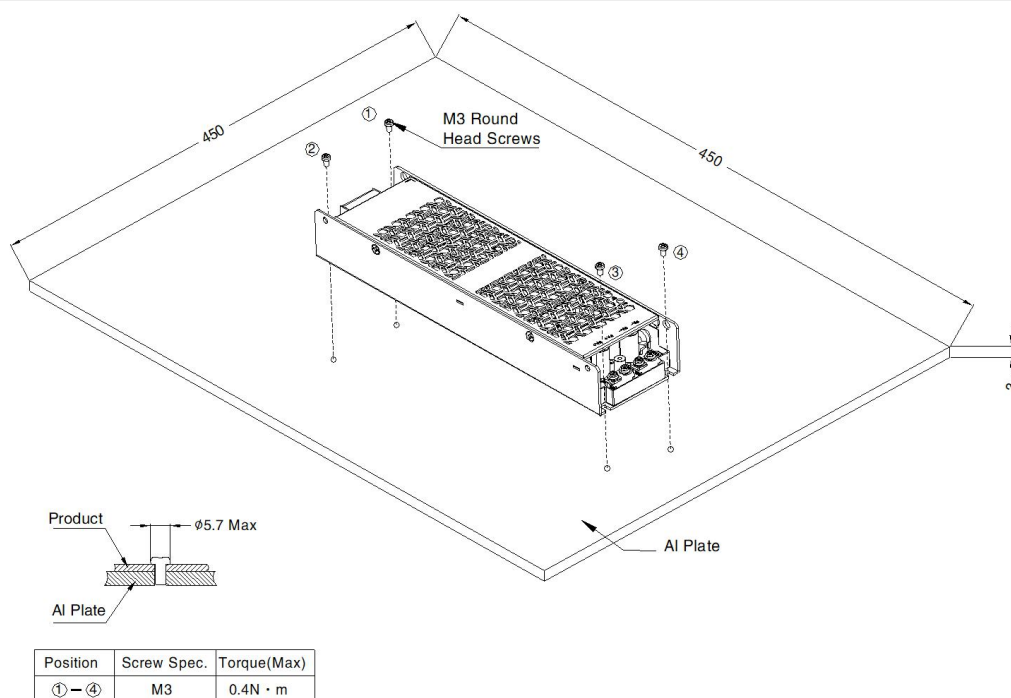
#### Note:

1. With an AC input voltage between 176 -200VAC/240-280VDC and a DC input between 240-280VDC/390-430VDC the output power must be derated as per the temperature derating curves;
2. In order to distinguish the temperature derating corresponding to long-term steady-state operation, it should be noted that: when the product is started at a low temperature of -40°C, the temperature derating should be reduced by 20% for starting test;
3. This product is suitable for applications using nature air cooling; for applications in closed environment please consult Mornsun FAE.





### Installation Diagram



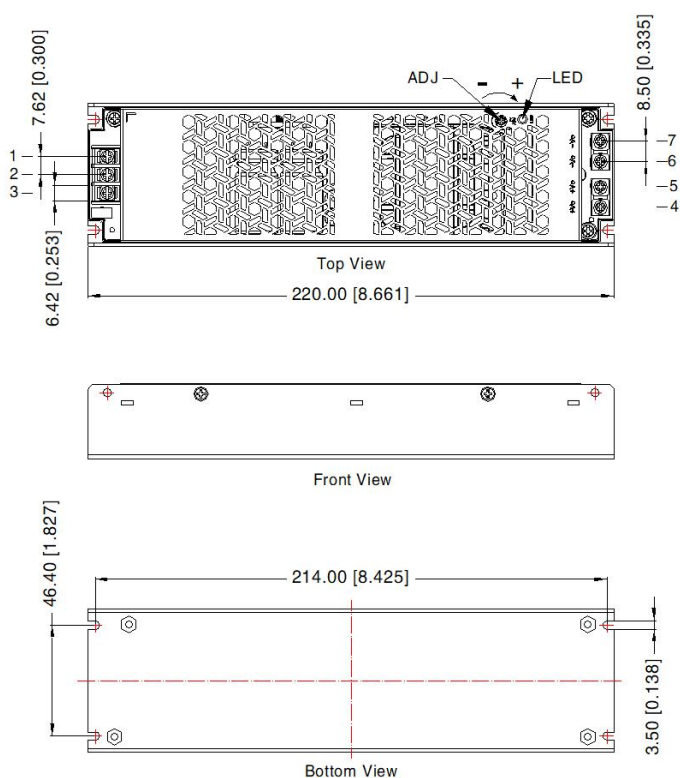
Note:

1. To meet the derating curve, the product must be tested on an aluminum plate. The recommended size of the aluminum plate is shown in the figure. To ensure thermal conductivity, apply thermal grease to the bottom of the product.
2. M3 round head screws are recommended for installation. Ensure that the product is firmly installed in the center of the aluminum plate.

### Dimensions and Recommended Layout

#### LM350-22BxxUH Series

THIRD ANGLE PROJECTION



Pin-Out	
Pin	Mark
1	
2	AC(N)
3	AC(L)
4	+Vo
5	+Vo
6	-Vo
7	-Vo

Note:

Unit: mm[inch]

General tolerances:  $\pm 1.00[\pm 0.039]$

ADJ: Output adjustable resistor

Connection range: Input: 20-14AWG

Output: 5V, 12AWG

12V, 16-12AWG

24/28V, 18-12AWG


36/48/54V, 20-12AWG

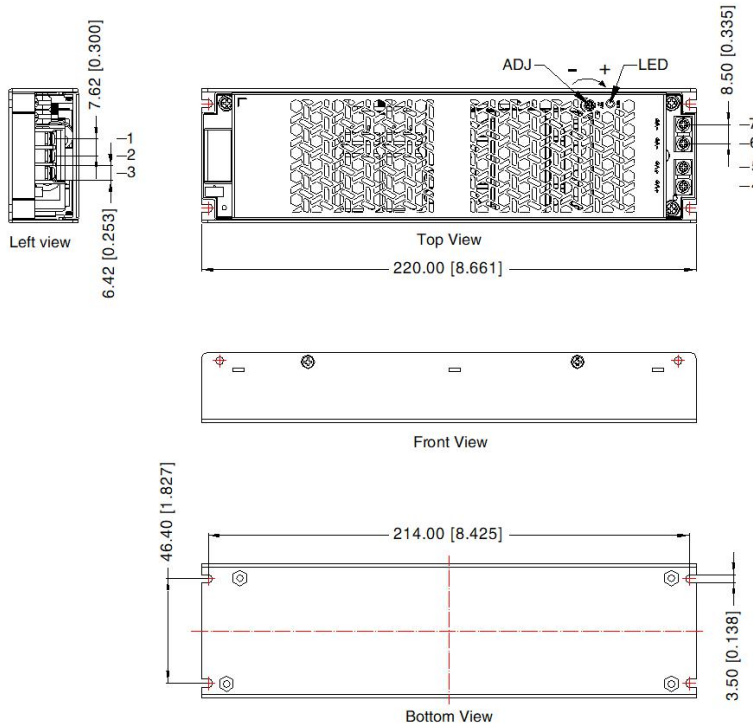
1-3 Input terminal lock torque: M3, 0.4N·m (Max)


4-7 Output terminal locking torque: M3.5, 0.6N·m (Max)

The layout of the device is for reference only, please refer to the actual product

### LM350-22BxxUH-C Series

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Mark
1	
2	AC(N)
3	AC(L)
4	+Vo
5	+Vo
6	-Vo
7	-Vo

**Note:**

Unit: mm[inch]

General tolerances:  $\pm 1.00[\pm 0.039]$

ADJ: Output adjustable resistor

Connection range: Input: 20-14AWG

Output: 5V, 12AWG

12V, 16-12AWG

24/28V, 18-12AWG


36/48/54V, 20-12AWG

1-3 Input terminal lock torque: M3, 0.4N · m ( Max )

4-7 Output terminal locking torque: M3.5, 0.6N · m ( Max )

The layout of the device is for reference only, please refer to the actual product

**Note:**

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220233;
- 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;
- 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;
- The room temperature derating of  $5^\circ\text{C}/1000\text{m}$  is needed for operating altitude greater than 2000m;
- 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 () of system when the terminal equipment in operating;
- The output voltage can be adjusted by the ADJ, clockwise to increase;
- 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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