AC/DC 350W Enclosed Switching Power Supply

LM350-22BxxR2(-C, -Q, -CQ, -QQ, -CQQ) Series

MORNSUN®

Report EN62368-1 EN60335-1 EN61558-1 | CB IEC62368-1 | UK CA BS EN62368-1 | CQC GB4943.1 | RoHS

FEATURES

- Universal 176 - 264VAC or 240 - 370VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +85℃
- Low standby power consumption: <0.75W@230VAC
- Output short circuit, over-current, over-voltage protection, over-temperature protection
- Operating altitude up to 5000m
- OVC Ⅲ (designed to meet EN62477)
- 3 years warranty
- Safety according to UL62368, EN62477

LM350-22BxxR2 series is the ultra-small Mornsun second-generation new industrial standard enclosed power supply, which has innovated the industrial power supply standard from the aspect of dimension, performance, technology and structure. It features general 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. These converters offer excellent EMC performance and meet IEC/EN61000-4, CISPR32/EN55032, IEC/UL/EN/BS EN62368, EN60335, EN62477, GB4943 standards and they are widely used in areas of industrial, LED, street light control, electricity, security, telecommunications, smart home, etc.

Selection Guide

Certification	Part No.*	Output Power (W)*	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF)Max.
EN/CQC/ IEC/BIS	LM350-22B12R2	348.0	12.0V/29.0A	11.4 -13.8	85.5	4000
	LM350-22B15R2	349.5	15.0V/23.3A	14.25 -17.25	86.0	3300
	LM350-22B24R2	350.4	24.0V/14.6A	22.8 - 27.6	88.0	1500
	LM350-22B36R2	349.2	36.0V/9.7A	32.4 - 39.6	88.5	1500
	LM350-22B48R2	350.4	48.0V/7.3A	43.2 - 52.8	89.0	470
EN/CQC/IEC	LM350-22B54R2	351.0	54.0V/6.5A	51.3 - 56.7	88.5	330

Note:
1.*Use suffix "C" for terminal with protective cover, suffix "Q" for bottom conformal coating and "QQ" for both sides conformal coating;
2.*Under any 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.
3. 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	AC input	176	--	264	VAC
	DC input	240	--	370	DAC
Input Frequency	AC input	47	--	63	Hz
Input Current	230VAC	--	3.4	4.0	A
Inrush Current	230VAC	--	80	--	
Start-up Delay Time	230VAC	--	1000	3000	ms
Hot Plug		Unavailable			

Output Specifications*

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range	12V	--	1.5	--	%
		15V/24V/36V/48V/54V	--	1.0	--	
Line Regulation	Rated load		--	0.5	--	
Load Regulation	0% - 100% load	12V/15V	--	1.0	--	
		24V/36V/48V/54V	--	0.5	--	
Minimum Load			0	--	--	
Stand-by Power Consumption	25℃, 230VAC		--	--	0.75	W

Ripple & Noise*	20MHz bandwidth (peak-peak value)	12V/15V	--	180	--	mV
		24V/36V/48V	--	240	--	
		54V	--	300	--	
Temperature Coefficient	230VAC, 0 - 50℃		--	--	0.03	%/℃
Output Rise Time	230VAC, rated load		--	50	--	ms
Hold-up Time	230VAC, rated load		--	16	--	
Short Circuit Protection	Recover time <5s after the short circuit disappear		Hiccup, continuous, self-recover			
Over-current Protection			130% - 220% Io, self-recover			
Over-voltage Protection	12V		≤16.2V	Hiccup, self-recover		
	15V		≤21.0V			
	24V		≤33.6V	Hiccup, self-recover or output voltage clamp		
	36V		≤46.8V			
	48V		≤63.0V			
	54V		≤70.0V			
Over-temperature Protection			Hiccup, self-recover			

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 - output	Electric strength test for 1min., leakage current <5mA		4000	--	--	VAC
	Input - ⏚	Electric strength test for 1min., leakage current <3mA		2000	--	--	
	Output - ⏚			500	--	--	
Insulation Resistance	Input - output	Environment temperature: 25±5℃ Relative humidity: <95%RH, non-condensing Testing voltage: 500VDC		100	--	--	MΩ
	Input - ⏚			100	--	--	
	Output - ⏚			100	--	--	
Operating Temperature				-40	--	+85	℃
Storage Temperature				-40	--	+85	
Storage Humidity		Non-condensing		10	--	95	%RH
Operating Humidity				20	--	90	
Switching Frequency				--	65	--	KHz
Power Derating		Operating temperature derating	-40℃ to -30℃	2.0	--	--	%/℃
			+50℃ to +85℃	2.0	--	--	
Leakage Current		264VAC	Touch leakage current	<0.5mA			
			Earth leakage current	<2.0mA			
Safety Standards		12V/15V/24V/36V/48V		GB4943.1, IS13252 (Part1) safety approved & IEC/BS EN/EN62368-1, EN60335-1, EN61558-1; Design refer to UL62368-1, EN62477-1			
		54V		GB4943.1 safety approved & IEC/BS EN/EN62368-1, EN60335-1, EN61558-1; Design refer to UL62368-1, EN62477-1			
Safety Class				CLASS I			
MTBF		MIL-HDBK-217F@25℃		> 300,000 h			
Warranty				3 years			

General Specifications

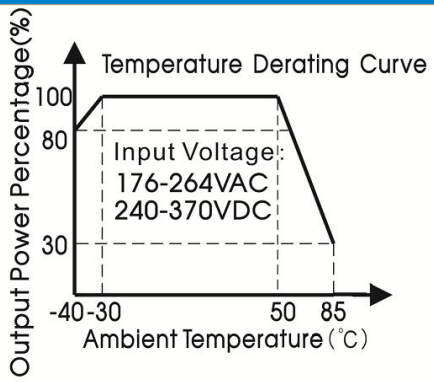
Case Material	Metal (AL5052, SGCC)
Dimensions	179.00mm x 106.00mm x 30.00mm
Weight	540g (Typ.)
Cooling Method	Forced air cooling

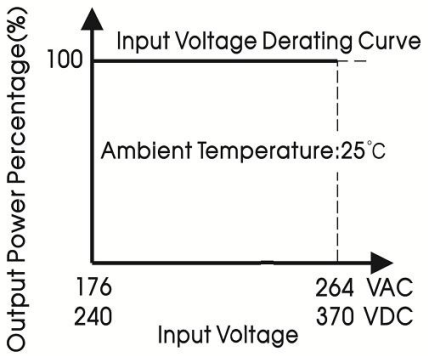
Electromagnetic Compatibility (EMC)*

Emissions	CE	CISPR32 EN55032	150kHz—30MHz, CLASS A	
		CISPR32 EN55032	150kHz—30MHz, CLASS B (See Fig. 1 for Wiring Diagram)	
	RE	CISPR32 EN55032	30MHz—1GHz, CLASS A	
		CISPR32 EN55032	30MHz—1GHz, CLASS B (See Remark 1*)	
Immunity*	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria A
	RS	IEC/EN61000-4-3	80MHz – 1GHz 10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV, (5 or 100)kHz	Perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±2KV/line to PE ±4KV	Perf. Criteria A
		IEC/EN61000-4-5	line to line ±4KV/line to PE ±6KV (See Fig. 1 for Wiring Diagram)	Perf. Criteria A
	PFMF	IEC/EN61000-4-8	30A/m	Perf. Criteria A
	CS	IEC/EN61000-4-6	0.15MHz-80MHz 10Vr.m.s	Perf. Criteria A
	Voltage dips	IEC/EN61000-4-11	0%, 70%	Perf. Criteria A
	Voltage interruption	IEC/EN61000-4-11	0% of 230Vac, 0Vac, 5000ms	Perf. Criteria B

Remark:
1.*The power supply should be regarded as a part of the system, and the radiation emissions can be achieved by adding a filter FC-L06Wx and adding a magnetic ring at the output or shielding measures.
2.*The power supply does not meet the requirements of harmonic current stipulated in EN61000-3-2; This power supply is not suitable for the following situations.
1) The terminal equipment is used in the European Union.
2) The terminal equipment is connected to public mains supply with 220VAC or greater rated nominal voltage that mandatory to meet 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.
In addition, the power supply can be used in the following terminals which do not need to meet EN61000-3-2;
(1) Professional equipment with total fixed input power greater than 1000W;
(2) symmetrical controlled heating element with 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.*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.

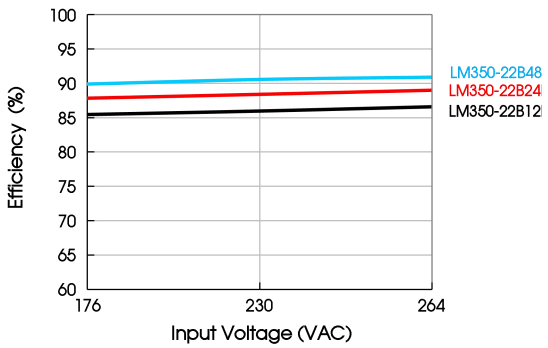
Product Characteristic Curve



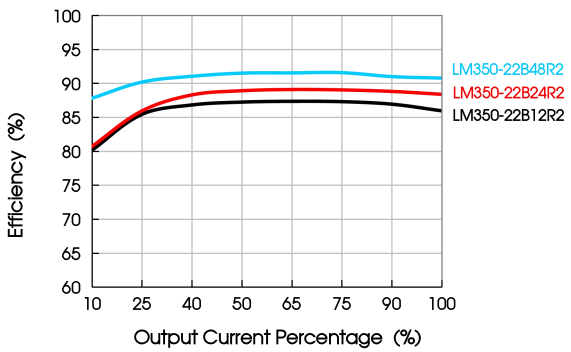


Notes: This product is suitable for applications using forced air cooling; for applications in closed environment please consult Mornsun FAE.

Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load (Vin=230VAC)



Note:
The product is equipped with a built-in cooling fan. Keep the air intake clear of debris. If the environment cannot meet this requirement, a fanless model is recommended.

FC-L06W2 & LM350-22BxxR2 Wiring Diagram

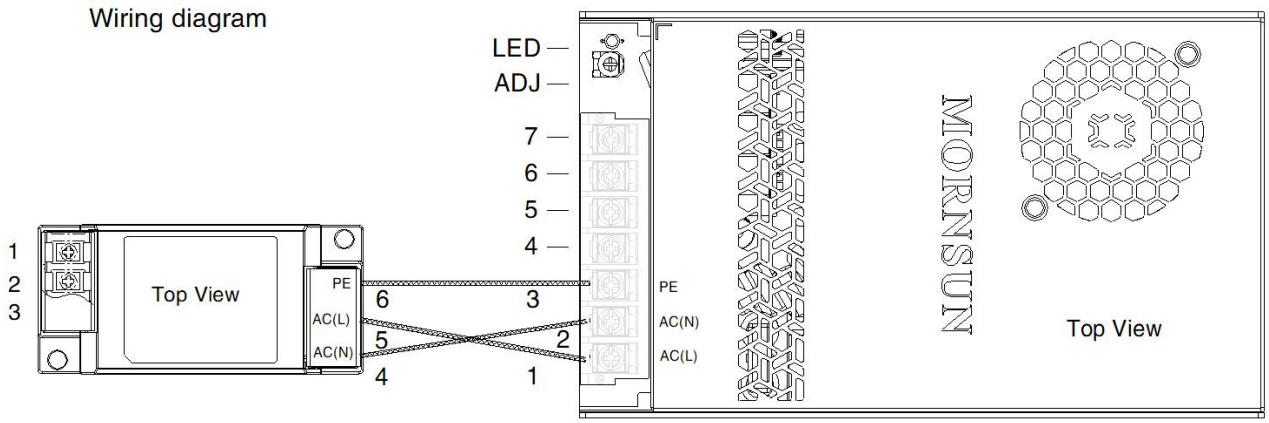
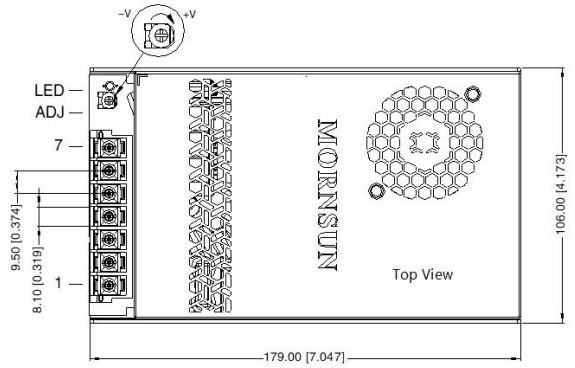
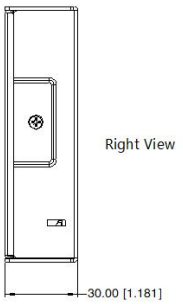


Fig. 1: EMC application circuit with higher requirements

Dimensions and Recommended Layout

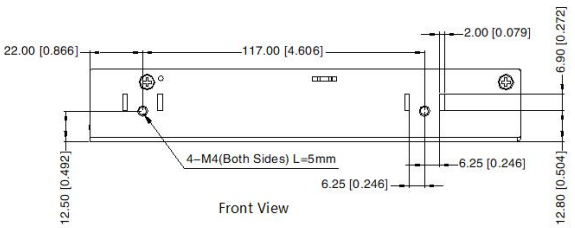
LM350-22BxxR2、LM350-22BxxR2-Q Series

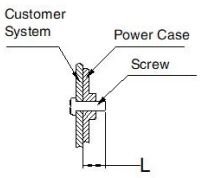




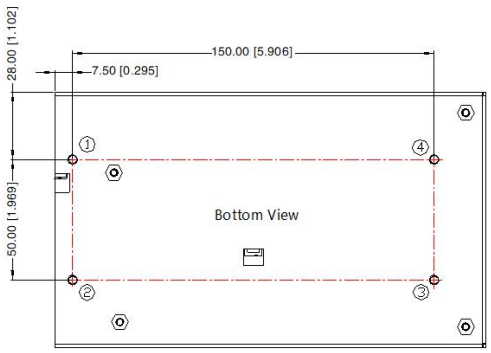
THIRD ANGLE PROJECTION

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



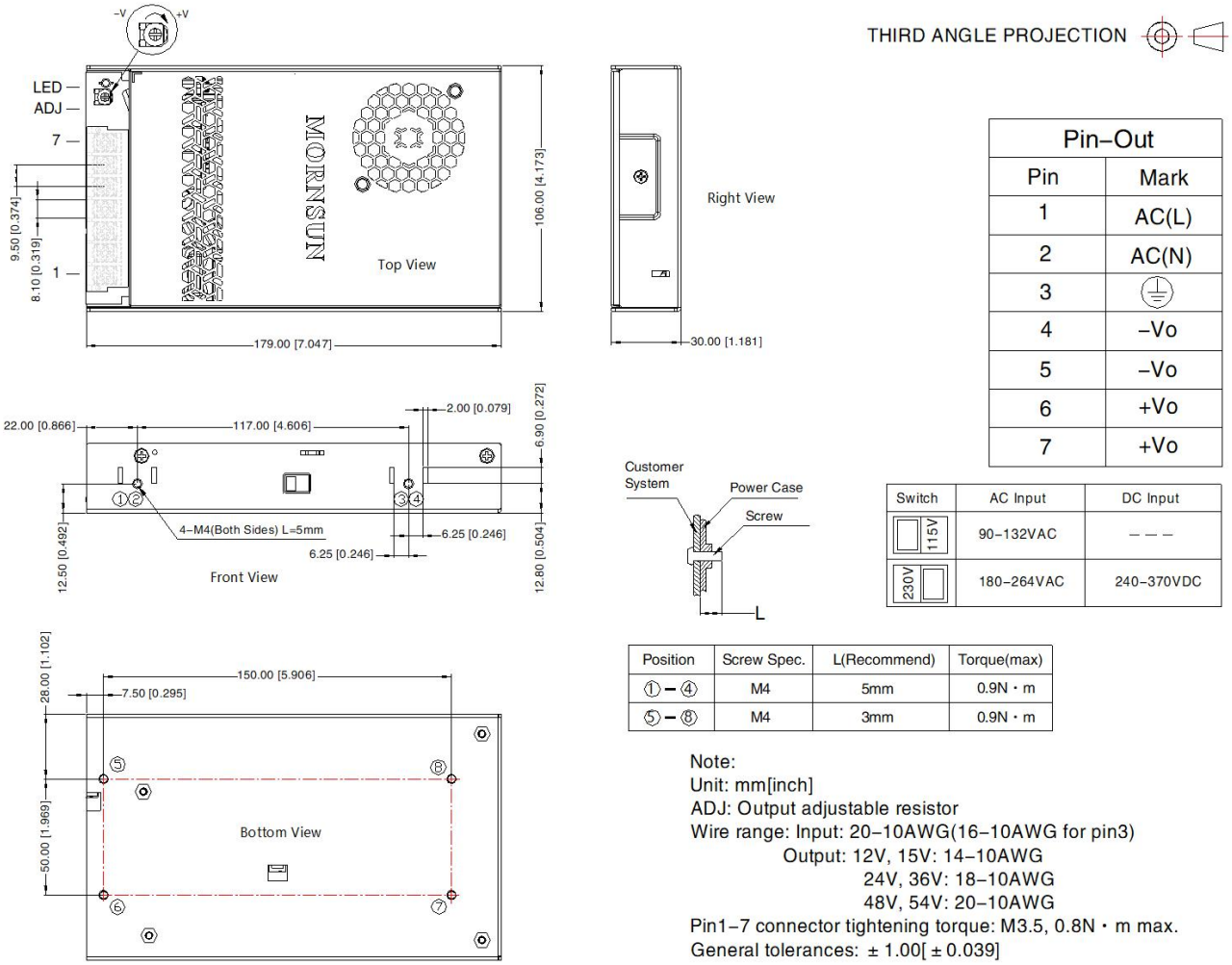


Position	Screw Spec.	L(Recommend)	Torque(max)
①–④	M4	3mm	0.9N · m



Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
Wire range: Input: 20–10AWG(16–10AWG for pin3)
Output: 12V, 15V: 14–10AWG
24V, 36V: 18–10AWG
48V, 54V: 20–10AWG
Pin1–7 connector tightening torque: M3.5, 0.8N · m max.
General tolerances: ± 1.00[± 0.039]

LM350-22BxxR2-C Series



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

Switch	AC Input	DC Input
115V	90-132VAC	— — —
230V	180-264VAC	240-370VDC

Position	Screw Spec.	L(Recommend)	Torque(max)
①-④	M4	5mm	0.9N・m
⑤-⑧	M4	3mm	0.9N・m

Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
Wire range: Input: 20-10AWG(16-10AWG for pin3)
Output: 12V, 15V: 14-10AWG
24V, 36V: 18-10AWG
48V, 54V: 20-10AWG
Pin1-7 connector tightening torque: M3.5, 0.8N・m max.
General tolerances: ± 1.00[± 0.039]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220303;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity <75%RH with nominal input voltage and rated output load;
3. The room temperature derating of 5℃/1000m is needed for operating altitude greater than 2000m;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. 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;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating;
9. The output voltage can be adjusted by the ADJ, clockwise to increase;
10. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
11. 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.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No. 8 Nanyun 4th Road, Huangpu District, Guangzhou, China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com