

# AC/DC 450W Enclosed Switching Power Supply

## LM450-20Bxx (-C, -Q, -CQ, -QQ, -CQQ) Series

# MORNSUN®



### FEATURES

- Universal 90 - 132VAC/180 - 264VAC or 255 - 370VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40°C to +70°C
- Low standby power consumption, high efficiency, low ripple & noise
- High I/O isolation test voltage up to 4000VAC
- Output short circuit, over-current, over-voltage, over-temperature protection
- Operating altitude up to 5000m
- Meets pollution degree 3
- 3 years warranty
- Safety according to IEC62368, EN/IEC60335, EN61558



EN62368-1 GB4943.1 BS EN62368-1 UL62368-1

LM450-20Bxx 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. These converters offer excellent EMC performance and meet UL/EN/BS EN/IEC62368, EN/IEC60335, EN61558, 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.*	Cooling Method	Output Power(W)*	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)	Efficiency at 230VAC (%) Typ.*	Max. Capacitive Load (µF)
BIS/EN/CQC /UL	LM450-20B12	Forced air cooling	450	12V/37.5A	11.4-13.2	90	20000
	LM450-20B15		450	15V/30A	14.25-16.5	90	10000
	LM450-20B24		451.2	24V/18.8A	22.8-26.4	91	8000
	LM450-20B27		450.9	27V/16.7A	25.65-29.7	91	8000
	LM450-20B36		450	36V/12.5A	34.2-39.6	92	6000
EN/CQC/UL	LM450-20B42		449.4	42/10.7A	39.9-46.2	92	5000
BIS/EN/CQC /UL	LM450-20B48		451.2	48V/9.4A	45.6-52.8	92	4000

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	Rated input (Certified voltage)		100	--	120	VAC
			200	--	240	
	AC input	Low voltage (switch in position of 115)	90	--	132	VAC
		High voltage (switch in position of 230)	180	--	264	
	DC input	Switch in position of 230	255	--	370	VDC
Input Voltage Frequency	AC input		47	--	63	Hz
Input Current	115VAC		--	10	--	A
	230VAC		--	6	--	
Inrush Current	115VAC		--	35	--	A
	230VAC		--	60	--	
Start-up Delay Time	115VAC/230VAC, rated load		--	1500	--	ms
Input Fuse	Built-in fuse		--	16	--	A
Hot Plug			Unavailable			

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Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range	12V	--	±1.5	--	%
		15V/24V/27V/36V/42V/48V	--	±1.0	--	
Line Regulation	Rated load		--	±0.5	--	
Load Regulation	0% - 100% load	12V	--	±1.0	--	
		15V/24V/27V/36V/42V/48V	--	±0.5	--	
Minimum Load			--	0	--	
Stand-by Power Consumption	230VAC input at normal temperature		--	5	--	W
Ripple & Noise*	20MHz bandwidth (peak-peak value)	12V/15V	--	--	200	mV
		24V	--	--	240	
		27V	--	--	270	
		36V/42V/48V	--	--	360	
Temperature Coefficient			--	±0.03	--	%/°C
Hold-up Time	115VAC, rated load		--	12	--	ms
	230VAC, rated load		--	16	--	
Short Circuit Protection	Recovery time <10s after the short circuit disappear.		Hiccup or turn off, continuous, self-recover			
Over-current Protection	230VAC		105% - 200%Io, constant current mode, shut down after 1S, self-recover, Io is the load point without derating			
Over-voltage Protection	12V		13.8-18V(Hiccup, self-recover)			
	15V		18-21V(Hiccup, self-recover)			
	24V		27.6-32.4V(Hiccup, self-recover)			
	27V		31-36.5V(Hiccup, self-recover)			
	36V		41.4-48.6V(Hiccup, self-recover)			
	42V		52-60V(Hiccup, self-recover)			
	48V		55.2-64.8V(Hiccup, self-recover)			
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 Test	Input - ⊕	Electric strength test for 1min., leakage current <5mA	2000	--	--	VAC
	Input - output		4000	--	--	
	Output - ⊕		500	--	--	
Insulation Resistance	Input - ⊕	Ambient temperature: 25 ± 5°C Relative humidity: < 95%RH, no condensation Test voltage: 500VDC	50	--	--	MΩ
	Input - output		50	--	--	
	Output - ⊕		50	--	--	
Operating Temperature			-40	--	+70	°C
Storage Temperature			-40	--	+85	
Operating Humidity			10	--	95	%RH
Storage Humidity	Non-condensing		20	--	90	
Power Derating	Operating temperature derating	-40°C to -20°C	3	--	--	% / °C
		+50°C to +70°C	2	--	--	
	Input voltage derating	90VAC-100VAC	2	--	--	% / VAC
		180VAC-200VAC	1	--	--	
Leakage Current	240VAC, 60Hz	Touch current	<0.75mA			
Safety Standards	12V/15V/24V/27V/36V/48V		GB4943.1, UL62368-1, IS13252 (Part1) safety approved & EN62368-1, BS EN62368-1(Report)			

	42V	Design refer to IEC62368-1, EN/IEC60335-1, EN61558-1 GB4943.1, UL62368-1 safety approved & EN62368-1, BS EN62368-1(Report) Design refer to IEC62368-1, EN/IEC60335-1, EN61558-1, IS13252 (Part1)
Safety Class		CLASS I
MTBF	MIL-HDBK-217F@25°C	≥300,000 h
Warranty	Ambient temperature: <70°C	3 years

### General Specifications

Case Material	Metal (AL5052, SGCC)
Dimensions	225.00mm x 124.00mm x 35.00mm
Weight	850g (Typ.)
Cooling Method	Forced air cooling

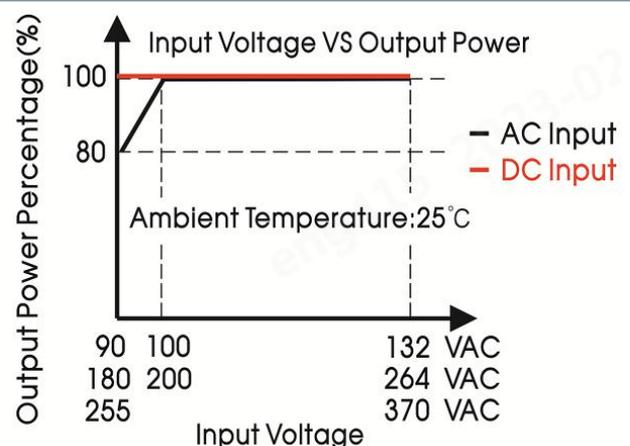
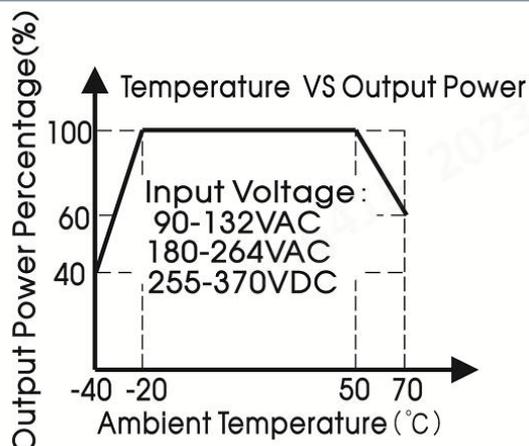
Note: \*Cooling method and power derating refer to typical characteristic curves.

### Electromagnetic Compatibility (EMC)

Emissions	CE (Input port)*	CISPR32 EN55032 150K - 30MHz	CLASS A
	RE	CISPR32 EN55032 30MHz - 1GHz	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	
	EFT (Output port)	IEC/EN61000-4-4 ±2KV	
	Surge (Input port)*	IEC/EN61000-4-5 line to line ±2KV/line to ground ±4KV	
	Surge (Output port)	IEC/EN61000-4-5 line to line ±0.5KV/line to ground ±1KV	
	MS	IEC/EN61000-4-8 30A/m	
	CS	IEC/EN61000-4-6 0.15 - 80MHz 10Vr.m.s	
	Voltage dips	IEC/EN61000-4-11 0%, 70%	perf. Criteria B

Note: 1. \*With Mornsun filters FC-L10/16Wx, the conducted emissions meet EN55032, CLASS B;  
 2. \*With Mornsun filters FC-L10W2, the Surge (Input port) meet line to line ±4KV/line to ground ±6KV;  
 3. \*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.  
 4. \*If no harmonic current is required or customers can solve harmonic current problems by themselves, this product can be used.

### Product Characteristic Curve



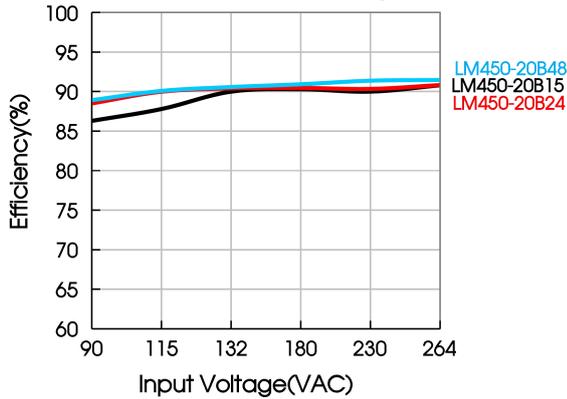
# AC/DC 450W Enclosed Switching Power Supply

## LM450-20Bxx (-C, -Q, -CQ, -QQ, -CQQ) Series

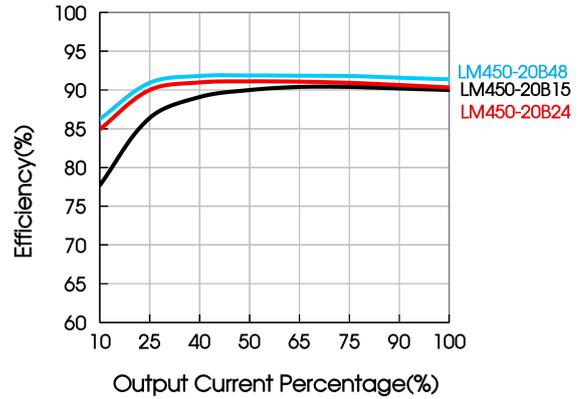


Note: 1. With an AC input voltage between 90 - 100VAC/180 - 200VAC and a DC input 255 - 370VDC must be derated as per the temperature derating curves;  
 2. This product is suitable for applications using forced air cooling; for applications in closed environment please consult Mornsun FAE.

Efficiency Vs Input Voltage (Full Load)

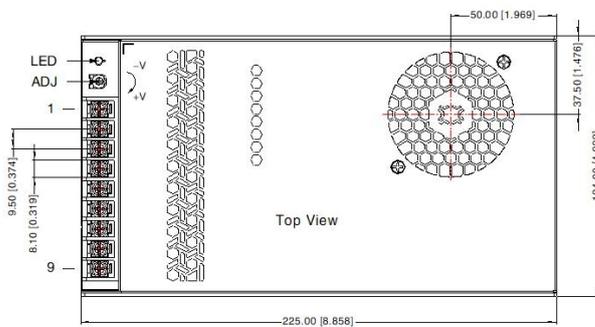


Efficiency Vs Output Load (Vin=230VAC)

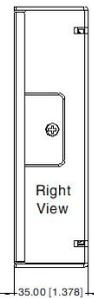


### Dimensions and Recommended Layout

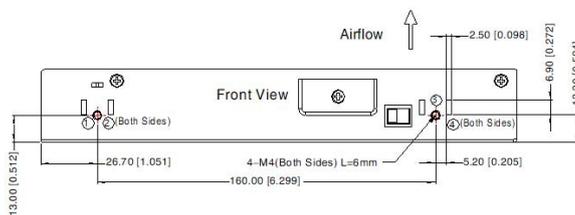
#### LM450-20Bxx, LM450-20Bxx-Q, LM450-20Bxx-QQ Series



THIRD ANGLE PROJECTION



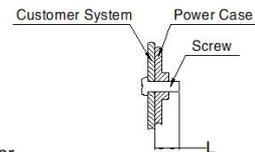
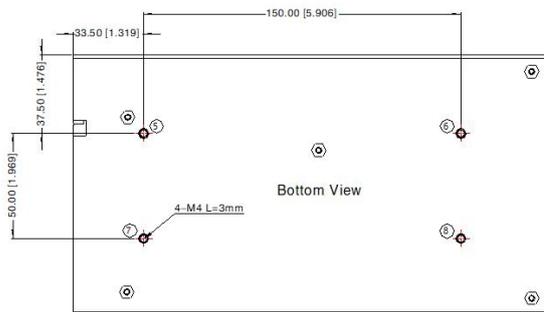
Pin-Out	
Pin	Mark
1	+Vo
2	+Vo
3	+Vo
4	-Vo
5	-Vo
6	-Vo
7	⊕
8	AC(N)
9	AC(L)



①-⑧ any position must be connected to the earth (⊕)

Switch	AC Input	DC Input
115V	90-132VAC	---
230V	180-264VAC	255-370VDC

Position	Screw Spec.	L(max)	Torque(max)
①-④	M4	6mm	0.9N · m
⑤-⑧	M4	3mm	0.9N · m



Note:

Unit: mm[inch]

ADJ: Output adjustable resistor

Wire range: Input: 16-10AWG

Output: 12V, 15V: 14-10AWG(3PCS)

24V, 27, 36V, 42V: 16-10AWG(≥2PCS)

48V: 14-10AWG

Connector tightening torque: M3.5, 0.8N · m Max.

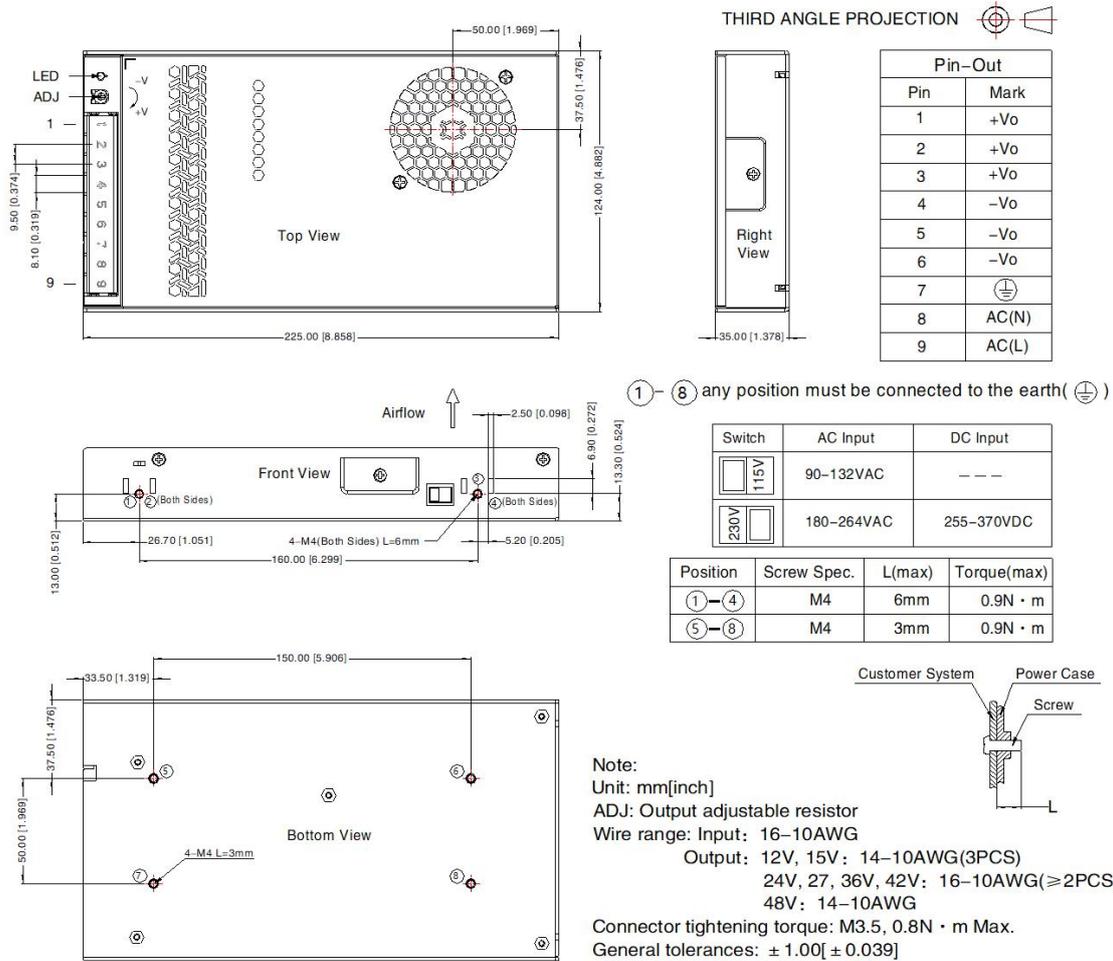
General tolerances: ± 1.00[ ± 0.039]

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### LM450-20Bxx-C, LM450-20Bxx-CQ, LM450-20Bxx-CQQ Series



**Note:**

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220571;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity <75%RH with nominal input voltage and rated output load;
- The room temperature derating of 5°C/1000m 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 (⊕) 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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