

AC/DC 50W Enclosed Switching Power Supply

LM50-23BxxR2(-C, -Q, -CQ, -QQ, -CQQ) Series

MORNSUN®



CB IEC62368-1
UKCA EN62368-1
RoHS EN61558-1
EN60335-1
BS EN62368-1
BS EN61558-1
BS EN60335-1



FEATURES

- Universal 80 - 305VAC or 100 - 430VDC Input voltage
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40°C to +85°C
- Low standby power consumption, high efficiency
- High I/O isolation test voltage up to 4000VAC
- Low ripple & noise
- Output short circuit, over-current, over-voltage protection
- OVC III (meet EN62477)
- Operating altitude up to 5000m

LM50-23BxxR2 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 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 IEC/EN61000-4, CISPR32/EN55032, UL/IEC/EN/BS EN62368, EN60335, EN61558, EN62477, GB4943 standards and they are widely used in areas of industrial, street light control, electricity, security, telecommunications, smart home etc. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

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 (uF) Max.
IEC/CCC/EN/BIS	LM50-23B05R2	50	5V/10A	4.75-5.75	86	8500
	LM50-23B12R2	50.4	12V/4.2A	11.4-13.8	88	2000
	LM50-23B15R2	51	15V/3.4A	14.25-17.25	88	1500
	LM50-23B24R2	52.8	24V/2.2A	22.8-27.6	89.5	1000
	LM50-23B36R2	52.2	36V/1.45A	34.2-41.4	90	470
	LM50-23B48R2	52.8	48V/1.1A	43.2-52.8	90.5	220
IEC/CCC/EN	LM50-23B54R2	50	54V/0.925A	48.6-59.4	90.5	100

Note: * ① Use suffix "C" for terminal with protective cover, suffix "Q" for bottom conformal coating and "QQ" for both sides conformal coating;
② 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		80	--	305	VAC
	DC input		100	--	430	VDC
Input Voltage Frequency			47	--	63	Hz
Input Current	115VAC		--	--	1.2	A
	230VAC		--	--	0.8	
Inrush Current	115VAC	Cold start	--	30	--	
	230VAC		--	60	--	
Leakage Current	277VAC		<0.75mA			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range	5V	--	±2	--	%
		12V/15V/24V/36V/48V/54V	--	±1	--	
Line Regulation	Rated load		--	±0.5	--	

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Load Regulation	0% - 100% load	5V	--	±1	--	%
		12V/15V/24V/36V/48V/54V	--	±0.5	--	
Ripple & Noise*	230VAC, Rated load; 20MHz bandwidth (peak-to-peak value)	5V	--	65	150	mV
		12V/15V	--	65	150	
		24V	--	80	150	
		36V/48V/54V	--	120	240	
Temperature Coefficient			--	±0.03	--	%/°C
Minimum Load			0	--	--	%
Stand-by Power Consumption			--	--	0.5	W
Hold-up Time	115VAC		--	6	--	ms
	230VAC		--	30	--	
Short Circuit Protection	Recovery time <3s after the short circuit disappear.		Hiccup, continuous, self-recovery			
Over-current Protection	230VAC, Rated load		120% - 200% Io, hiccup, self-recovery			
Over-voltage Protection	5V		≤7.3VDC		Hiccup or clamp, self-recover	
	12V		≤16.2VDC			
	15V		≤21.75VDC			
	24V		≤33.6VDC			
	36V		≤48.6VDC			
	48V		≤60.0VDC			
	54V		≤70.0VDC			
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 - ⊕			1250	--	--		
Insulation Resistance	Input - ⊕	At 500VDC		100	--	--	MΩ	
	Input - output			100	--	--		
	Output - ⊕			100	--	--		
Operating Temperature				-40	--	+85	℃	
Storage Temperature				-40	--	+85		
Operating Humidity		Non-condensing		20	--	90	%RH	
Storage Humidity				--	--	95		
Switching Frequency				--	90	--	kHz	
Power Derating		5V	-40℃ to -30℃		5	--	--	% /℃
			+40℃ to +70℃	85VAC - 165VAC	1.33	--	--	
			+50℃ to +70℃	165VAC - 305VAC	2	--	--	
			+70℃ to +85℃		2	--	--	
		Others	-40℃ to -30℃		5	--	--	% /℃
			+50℃ to +70℃		2	--	--	
			+70℃ to +85℃		2	--	--	
		85VAC - 100VAC				1.25	--	--
277VAC - 305VAC				0.71	--	--		
Safety Standard		5V/12V/15V/24V/36V/48V		IEC/BS EN/EN62368-1, GB4943.1, IS13252 (Part1) safety approved & BS EN/EN60335-1, BS EN/EN61558-1; Design refer to UL62368-1, EN62477-1				

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Safety Standard	54V	IEC/BS EN/EN62368-1, GB4943.1 safety approved & BS EN/EN60335-1, BS EN/EN61558-1; Design refer to UL62368-1, EN62477-1
Safety Class		CLASS I
MTBF	MIL-HDBK-217F@25°C	≥300,000 h

Mechanical Specifications

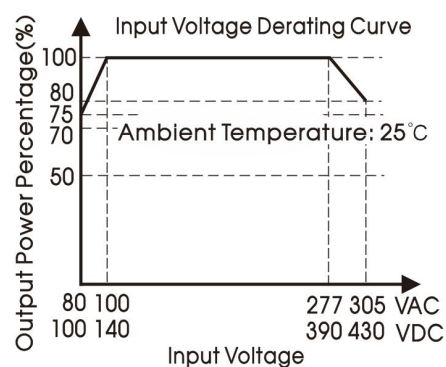
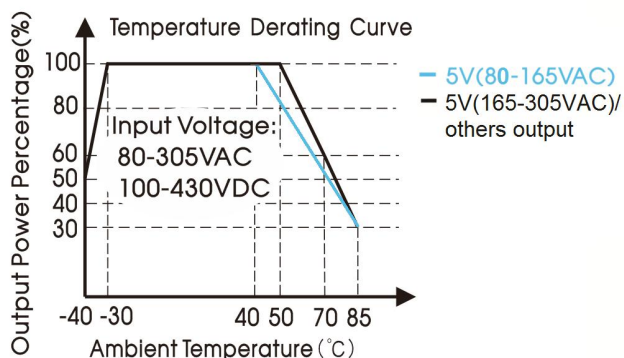
Case Material	Metal (AL5052, SGCC)
Dimensions	99.00 x 65.00 x 30.00 mm
Weight	150g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B		
	RE	CISPR32/EN55032 CLASS B		
Immunity	ESD	IEC/EN 61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria A
	RS	IEC/EN 61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN 61000-4-4	±4KV	perf. Criteria A
	Surge	IEC/EN 61000-4-5	line to line ±2KV/line to PE ±4KV	perf. Criteria A
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

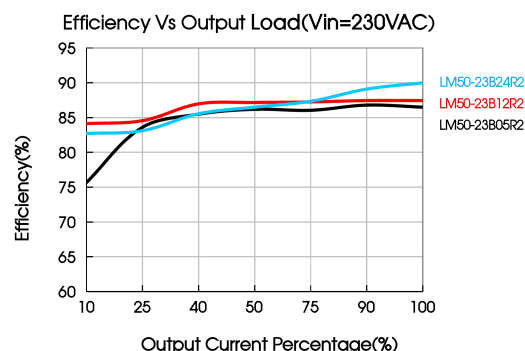
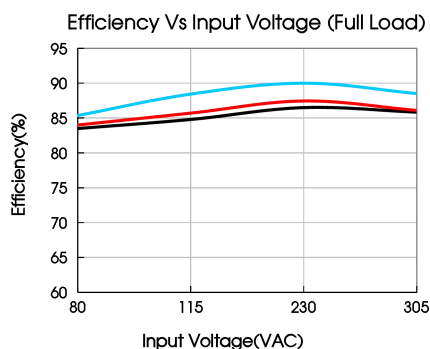
Note: If the EMC performance needed to be improved, please add EMC filter FC-L03Wx series (see wiring diagram 1). Details of specific indicators please refer to filter datasheet.

Product Characteristic Curve



Note: 1. With an AC input voltage between 80 -100VAC /277-305VAC and a DC input between 100 -140VDC/390-430VDC the output power must be derated as per the temperature derating curves;

2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.



FC-L03Wx & LM50-23BxxR2 Wiring Diagram

Wiring diagram

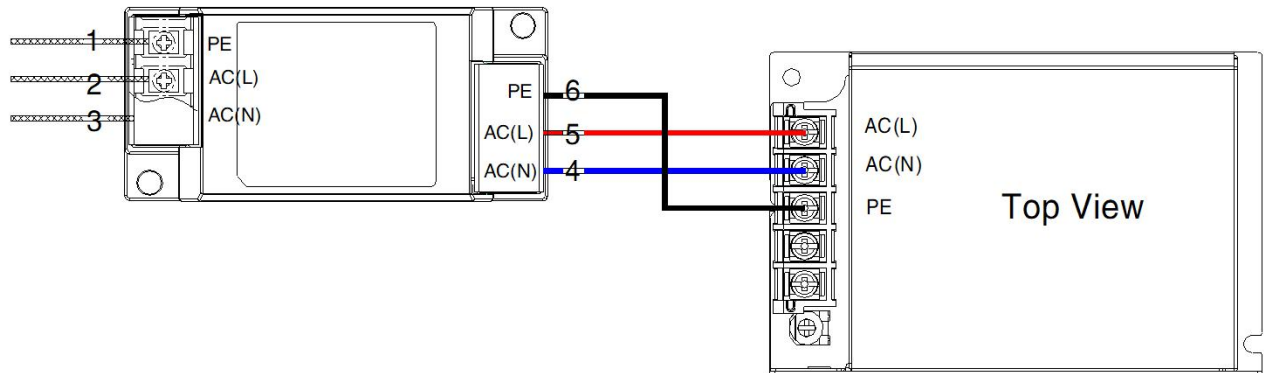
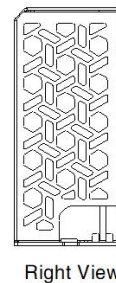
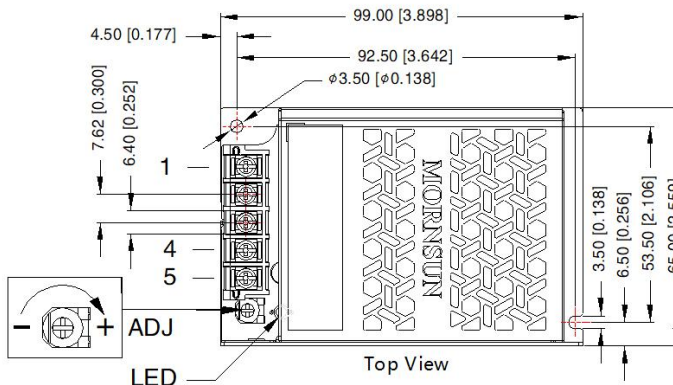


Fig. 1: EMC application circuit with higher requirement

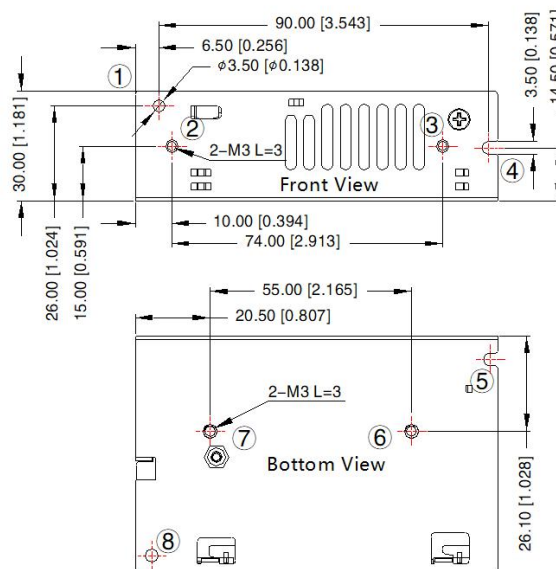
Dimensions and Recommended Layout

LM50-23BxxR2 (-Q, -QQ) Series

THIRD ANGLE PROJECTION

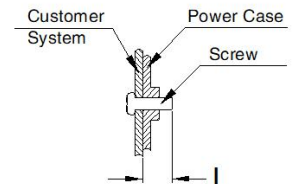


Pin-Out	
Pin	Function
1	AC(L)
2	AC(N)
3	\perp
4	-Vo
5	+Vo



Position	Screw Spec.	L(max)	Torque(max)
② - ③	M3	3mm	0.4N · m
⑥ - ⑦			

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



Note:

Unit: mm[inch]

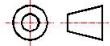
ADJ: Output adjustable resistor

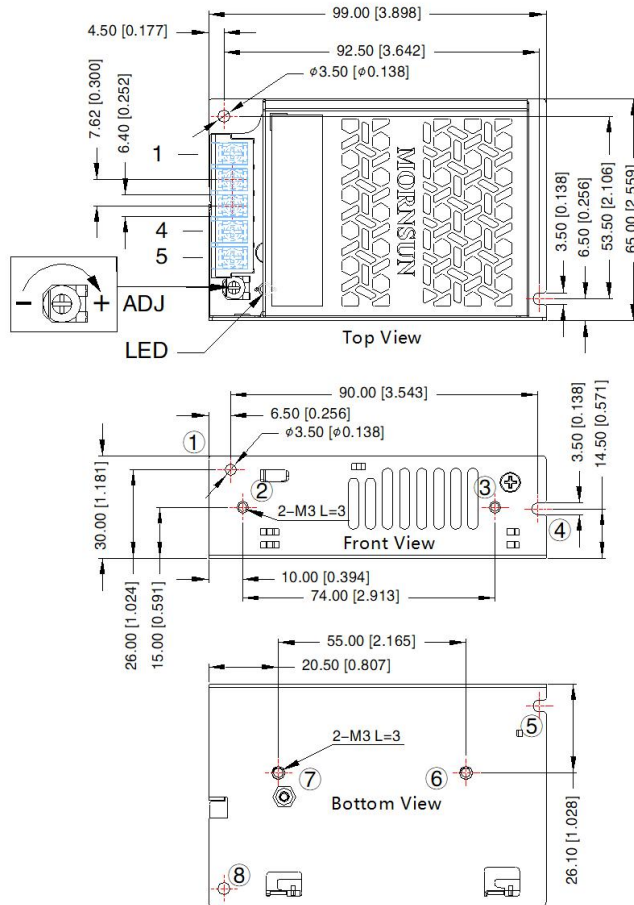
Wire range: 22-14AWG

Tightening torque: M3, 0.5N.m Max

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

LM50-23BxxR2-C (-CQ, -CQQ) Series

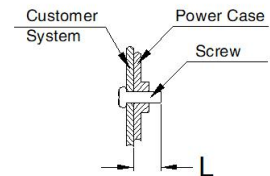
THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Function
1	AC(L)
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3	\oplus
4	-Vo
5	+Vo

Position	Screw Spec.	L(max)	Torque(max)
② - ③	M3	3mm	0.4N · m
⑥ - ⑦			

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



Note:
Unit: mm[inch]
ADJ: Output adjustable resistor
Wire range: 22-14AWG
Tightening torque: M3, 0.5N.m Max
General tolerances: $\pm 1.00[\pm 0.039]$

Note:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220267;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^\circ\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
- The room temperature derating of $5^\circ\text{C}/1000\text{m}$ 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 the earth(\oplus) 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 final equipment. All EMC tests should be confirmed with the final equipment. Please consult our FAE for EMC test operation instructions.

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