30W, specific power supply for power grid

CE 3 years Warranty RoHS

FEATURES

- Specific power supply designing for smart grid
- Ultra-wide 85 - 305VAC and 88- 430VDC input voltage range
- Ultra-wide operating ambient temperature range: -40℃ to +85℃
- High reliability, low output ripple & noise
- EMI performance meets CISPR32/EN55032 CLASS B
- Immunity meets electricity standard Level 4
- Meets impulse voltage requirements of 1.2/50us 5KV
- Designed to meet UL/EN/IEC62368 standards
- EN62368 safety approval

LO30-23BxxE series is a special power supply design for the smart grid industry that meets the power industry standards. It features AC input and at the same time accepts DC input voltage, with ultra-wide input voltage range, wide operating temperature range, high EMS level, high reliability, and high isolation. EMC and safety specifications meet IEC/EN61000-4, CISPR32/EN55032, UL/EN/IEC62368 standards. It is suitable for smart grid occasions with poor power quality and high reliability requirements, such as smart power transmission and substations. It also can be used in microcomputer protection equipment, bus voltage protection equipment or equipment with high reliability requirements that require 110VDC input voltage.

Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current	Output Voltage Adjustable Range(V)	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
CE	LO30-23B03E	19.8W	3.3V/6000mA	2.97-3.63	77	30000
	LO30-23B05E	30W	5V/6000mA	4.5-5.5	82	30000
	LO30-23B12E		12V/2500mA	10.8-13.2	86	15000
	LO30-23B15E		15V/2000mA	13.5-16.5	87	12000
	LO30-23B24E	31.2W	24V/1300mA	21.6-26.4	88	2000

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	305	VAC
	DC input	88	--	430	VDC
Input Frequency		47	--	440	Hz
Input Current	115VAC	--	--	750	mA
	230VAC	--	--	450	
Inrush Current	115VAC	--	15	--	A
	230VAC	--	30	--	
Leakage Current	277VAC	0.3mA RMS max.			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	0% - 100% load	3.3V, 5V output	--	±2	--	%
		Other output	--	±1	--	
Line Regulation	Rated load	3.3V, 5V output	--	±0.8	--	
		Other output	--	±0.4	--	
Load Regulation	0% - 100% load		--	±1	--	
Ripple & Noise*	100MHz bandwidth (peak-to-peak value)		--	50	120	mV
Stand-by Power Consumption			--	--	0.5	W
Temperature Coefficient			--	±0.02	--	%/°C
Short Circuit Protection			Hiccup, continuous, self-recovery			

Over-current Protection		≥120%Io, self-recovery			
Over-voltage Protection	3.3VDC output	≤5.25V (Output voltage clamp or hiccup)			
	5VDC output	≤7V (Output voltage clamp or hiccup)			
	12VDC output	≤16V (Output voltage clamp or hiccup)			
	15VDC output	≤20.3V (Output voltage clamp or hiccup)			
	24VDC output	≤32.4V (Output voltage clamp or hiccup)			
Minimum Load		0	--	--	%
Start-up Delay Time		--	500	1000	ms
Hold-up Time	115VAC input, Io=100%	--	40	--	ms
	230VAC input, Io=100%	--	160	--	

Note: *The "Tip and barrel method" is used for ripple and noise test, with a 0.1uf ceramic capacitor & 100uf parallel capacitor, please refer to AC-DC Converter Application Notes for specific information.

General Specifications

Item			Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output		Electric Strength Test for 1min., leakage current <10mA	4000	--	--	VAC
	Input-PE		Electric Strength Test for 1min., leakage current <5mA	2000	--	--	VAC
	Output-PE		Electric Strength Test for 1min., leakage current <20mA	500	--	--	VAC
Insulation Resistance	Input-output		500VDC	≥100x10⁶			Ω
	Input-PE						
	Output-PE						
Impulse withstand voltage	Input-output		5KV, 1.2/50 us Impulse voltage				
	Input-PE						
Operating Temperature				-40	--	+85	℃
Storage Temperature				-40	--	+85	
Storage Humidity				--	--	90	%RH
Altitude				--	--	5000	m
Switching Frequency				--	65	--	kHz
Power Derating			-40℃ to -25℃	2	--	--	%/℃
	5 years design life	Natural air cooling	+50℃ to +70℃	2.5	--	--	
			+70℃ to +85℃	2.66	--	--	
		Forced cooling wind speed≥ 0.7m/s	+65℃ to +70℃	8	--	--	
			+70℃ to +85℃	2	--	--	
	3 years design life	Natural air cooling	+55℃ to +70℃	2	--	--	
			+70℃ to +85℃	2.66	--	--	
		Forced cooling wind speed≥ 0.7m/s	+65℃ to +70℃	2	--	--	
			+70℃ to +85℃	3.33	--	--	
			85VAC - 100VAC	1.33	--	--	%/VAC
			277VAC - 305VAC	0.72	--	--	
			2000m-5000m	5	--	--	%/Km
Safety Certification				UL62368/EN62368/IEC62368			
Safety Certification				EN62368			
Safety Class				CLASS I			
MTBF				MIL-HDBK-217F@25℃ >300,000 h			

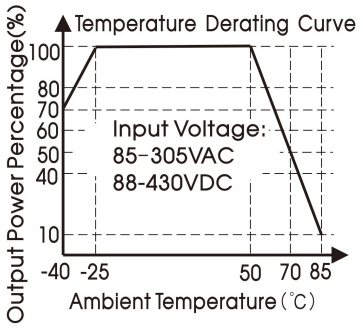
Mechanical Specifications

Dimension	105.00 x 50.00 x 30.00 mm
Weight	110g (Typ.)
Cooling method	Free air convection

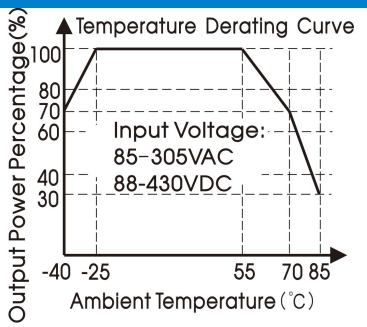
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV/ Air ±15KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	perf. Criteria B
	Surge	IEC/EN61000-4-5	Line to line ±2KV/ line to ground ±4KV	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
	Voltage dips, short interruption and voltage variations	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

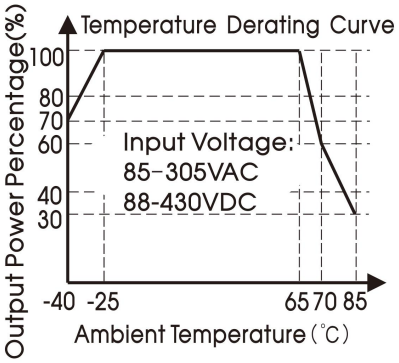
Product Characteristic Curve



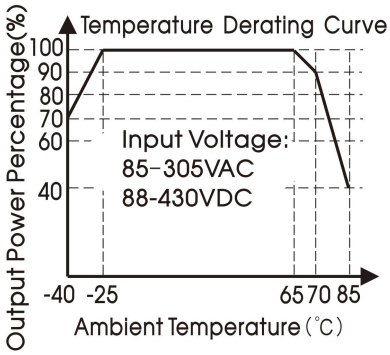
Natural air cooling 5 years design life



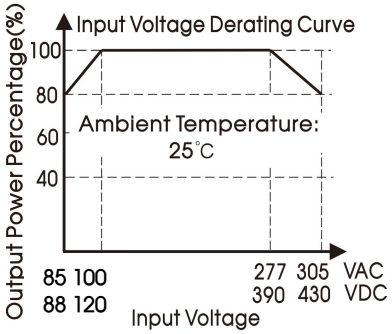
Natural air cooling 3 years design life

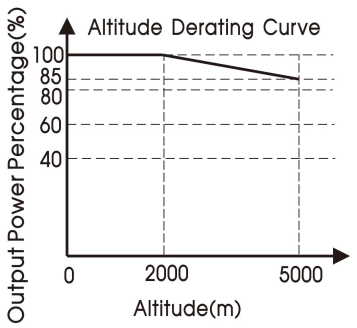


Forced cooling 5 years design life

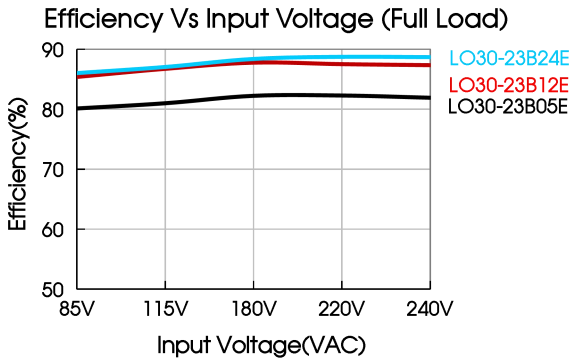


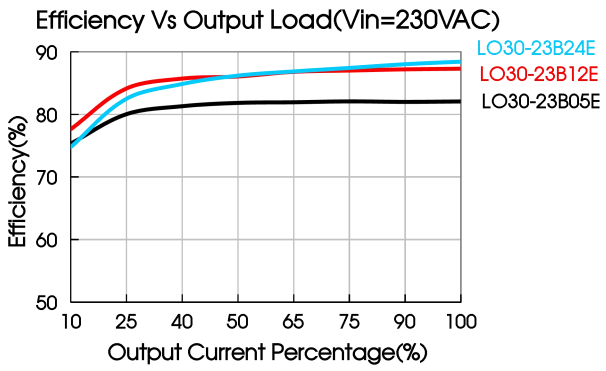
Forced cooling 3 years design life





Note: ① With an AC input between 85-100VAC/277-305VAC and a DC input between 88-120VDC/390-430VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.





Design Reference

1. Typical application

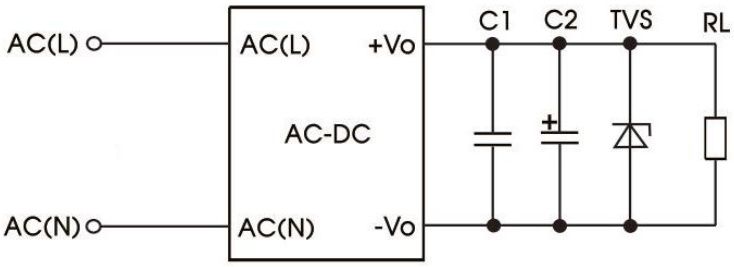


Fig. 1: Typical circuit diagram

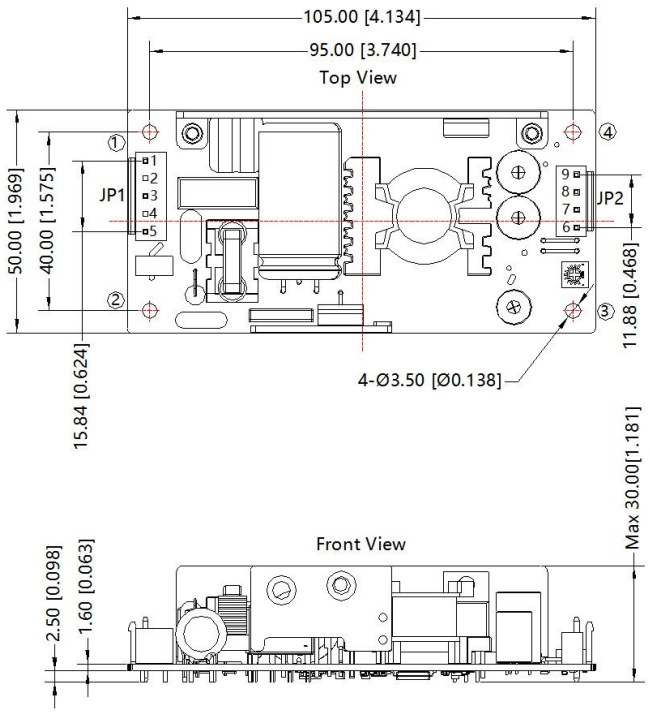
Part no.	C1	C2	TVS
LO30-23B03E	0.1μF/50V	100μF/50V	SMBJ7.0A
LO30-23B05E			SMBJ7.0A
LO30-23B12E			SMBJ20A
LO30-23B15E			SMBJ20A
LO30-23B24E			SMBJ30A

Output Filter Components:
We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. For additional information please refer to application notes on www.mornsun-power.com.

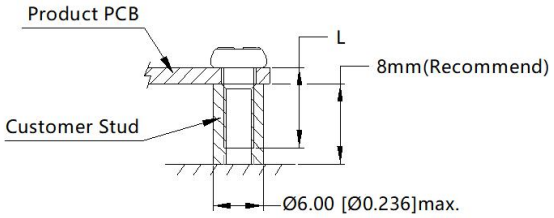
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Pin-Out			
Connectors	Pin	Mark	Client Connectors
JP1	1	PE	Housing: JST VHR Contact:JSTSVH-21T-P1.1 or equivalent
	2	No Pin	
	3	AC(N)	
	4	No Pin	
	5	AC(L)	
JP2	6	+Vo	Housing: JST VHR Contact: JSTSVH-21T-P1.1 or equivalent
	7	+Vo	
	8	-Vo	
	9	-Vo	

Position	Screw Spec.	L(Recommend)	Torque(max)
① - ④	M3	6mm	0.4N·m



Note:
Unit: mm[inch]
General tolerances: ±0.50[±0.020]
The layout of the device is for reference only, please refer to the actual product

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220151;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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