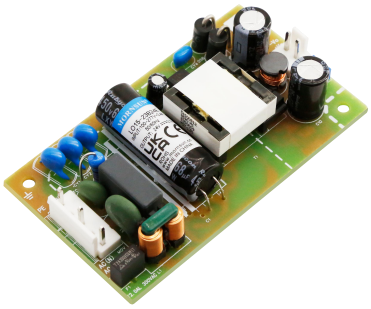
15W, specific power supply for power grid



CE Report EN62368-1 UKCA BS EN62368-1 RoHS

FEATURES

- Specific power supply designing for smart grid
- Ultra-thin, product height less than 22mm
- 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
- 5 years warranty
- Safety according to UL/IEC62368

LO15-23BxxE 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 ADJ (V)	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
EN	LO15-23B05E	15W	5V/3000mA	4.5-5.5	78	12000
	LO15-23B12E	15.6W	12V/1300mA	10.8-13.2	83	5000
	LO15-23B24E	16.8W	24V/700mA	21.6-26.4	85	1000

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	--	--	370	mA
	230VAC	--	--	220	
Inrush Current	115VAC	--	15	--	A
	230VAC	--	30	--	
Leakage Current	277VAC	0.5mA RMS max.			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	0% - 100% load	5V output	--	±2	--	%
		Other output	--	±1	--	
Line Regulation	Rated load	5V output	--	±0.8	--	
		Other output	--	±0.4	--	
Load Regulation	0% - 100% load		--	±1	--	
Ripple & Noise*	100MHz bandwidth (peak-to-peak value)		--	70	120	mV
Stand-by Power Consumption			--	--	0.5	W
Temperature Coefficient			--	±0.02	--	%/°C
Short Circuit Protection			Hiccup, continuous, self-recovery			

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Over-voltage Protection	5VDC output	≤7V	Output voltage clamp or hiccup		
	12VDC output	≤16V			
	24VDC output	≤32.4V			
Over-current Protection		≥120%Io, self-recovery			
Minimum Load		0	--	--	%
Start-up Delay Time		--	500	1000	ms
Hold-up Time	115VAC input, Io=100%	--	20	--	ms
	230VAC input, Io=100%	--	130	--	

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	--	--	
	Output - PE	Electric Strength Test for 1min., leakage current <20mA	500	--	--	
Insulation Resistance	Input - output	500VDC	100	--	--	MΩ
	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
Power Derating		-40℃ to -25℃	2	--	--	%/℃
	Natural air cooling	+50℃ to +70℃	2.5	--	--	
		+70℃ to +85℃	1.2	--	--	
	Forced cooling wind speed≥ 0.7m/s	+60℃ to +70℃	3	--	--	
		+70℃ to +85℃	2	--	--	
		85VAC - 100VAC	1.33	--	--	%/VAC
		277VAC - 305VAC	0.72	--	--	
		2000m-5000m	5	--	--	%/Km
Safety Standard			EN62368-1, BS EN62368-1 (Report); Design refer to UL/IEC62368-1			
Safety Class			CLASS I I			
MTBF		MIL-HDBK-217F@25℃	>300,000 h			

Mechanical Specifications

Dimension	87.50 x 50.00 x 22.00 mm	
Weight	5V/12V	53g (Typ.)
	24V	58g (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

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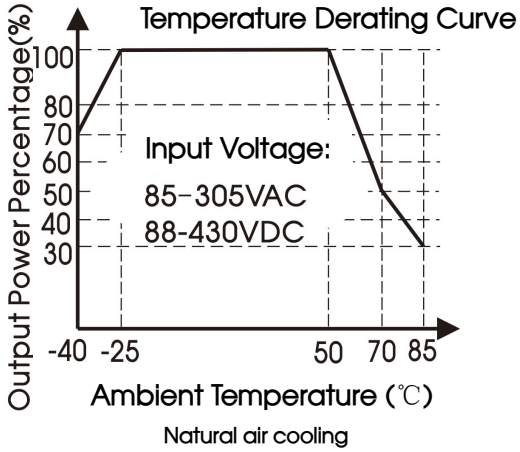
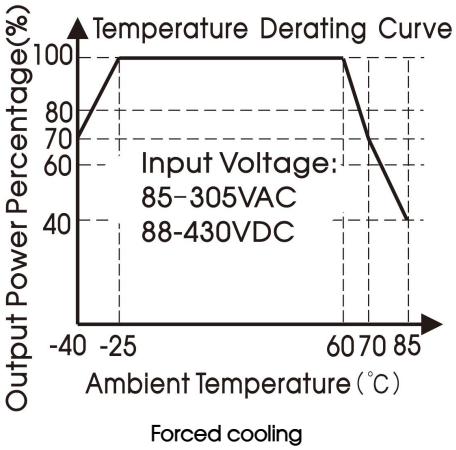
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	Perf. Criteria B
	Surge	IEC/EN61000-4-5	Line to line ±2KV/ line to ground ±4KV	Perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria A
	Voltage dips, short interruption and voltage variations	IEC/EN61000-4-11	100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods	Perf. Criteria B

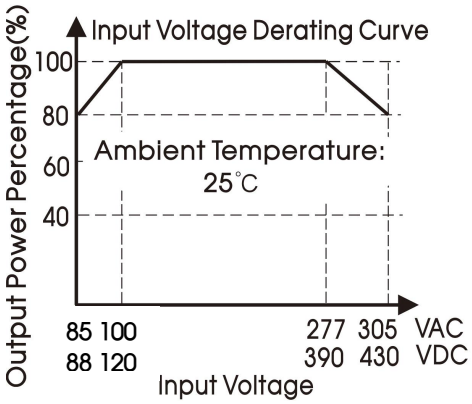
Product Characteristic Curve

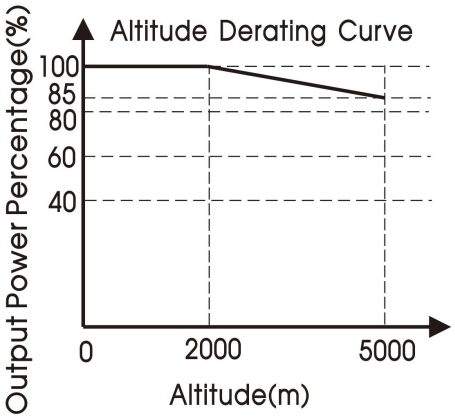


Natural air cooling



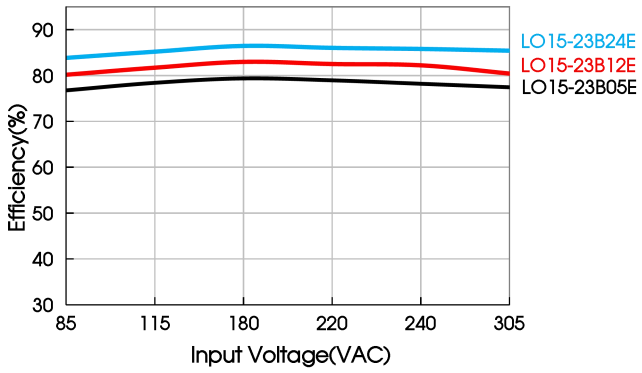
Forced cooling



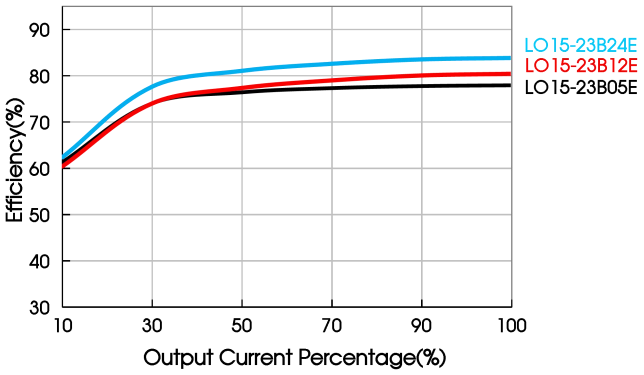


Note: ① With an AC input between 85-100VAC/277-305VAC and a DC input between 88-120VDC/390-430VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory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

Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load (Vin=230VAC)



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Design Reference

1. Typical application

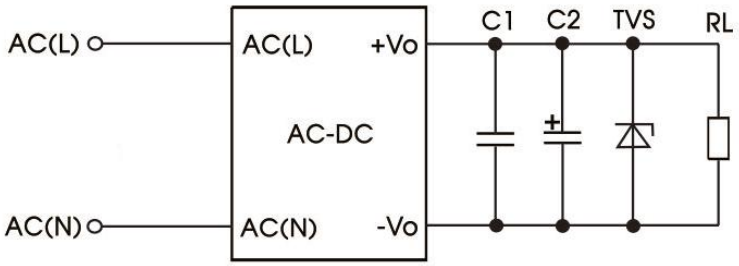


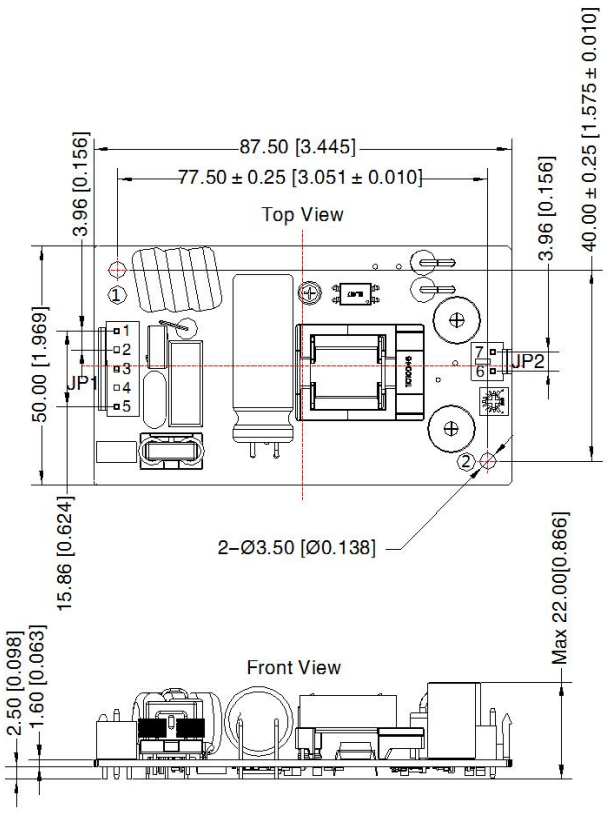
Fig. 1: Typical circuit diagram

Part no.	C1	C2	TVS
LO15-23B05E	0.1μF/50V	100μF/50V	SMBJ7.0A
LO15-23B12E			SMBJ20A
LO15-23B24E			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.

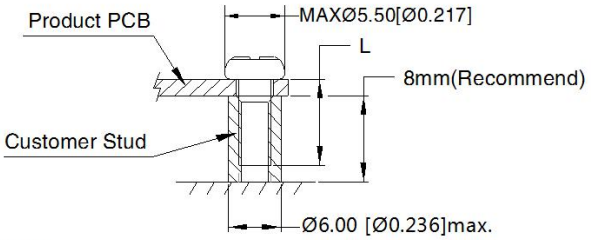
Dimensions and Recommended Layout



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	

Position	Screw Spec.	L(Recommend)	Torque(max)
① – ②	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

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Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220149;
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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