2018/08/18 (A/1)

AD60-23Sxx Series

AC-DC Converter | 60W | Compact size | DIP | 4200VAC | 85～305VAC

Features

- Package Type: DIP
- Universal Input: 85～305VAC / 100～430VDC
- Operating temperature range: -40℃ ～ +85℃
- Isolation voltage: 4200VAC
- High efficiency：up to 91% (Typ.)
- Overvoltage category III (OVC III)
- Output short circuit,over-current,over-voltage protection
- EMI Class B and Surge ±2KV without additional components
- Designed to meet IEC/EN/UL62368,EN60335,EN61558

Product description

Industrial Automate Power Network Telecom Medical

AD60-23Sxx series is a 60W miniature AC DC module-type power suppy provided by BETTPOWER. This series features the universal input voltage range of 85-305Vac, low power consumption, high efficiency, high reliability, and reinforced isolation. The entire series is compliance with BS EN/EN55032 Class B without the need of any addtional components. The EMC and safety specification design complies with IEC/EN61000-4, CISPR32/EN55032, IEC/EN/UL62368, EN60335, EN61558. These power supply modules are widely used in industries, power generation, household appliances, instrumentation, communication, and civil applications.

Selection Guide

Certification	Part No.	Input Voltage (VAC)	Out Power (W)	Out Voltage (VDC)	Out Current Max.(mA)	Full Load Efficiency %(230VAC,Typ.)	Capacitive Load Max.(μF)
EN/UL pending	AD60-23S05	85～305	50	5	10	89	20000
	AD30-23S12	85～305	60	12	5	91	5000
	AD30-23S15	85～305	60	15	4	90	3000
	AD30-23S24	85～305	60	24	2.5	90	1800
	AD30-23S48	85～305	60	48	1.25	91	470

Note：

1. All the above data were tested within the parameter range of typical application circuits；
2. The product images are for reference only. Please refer to the actual product for details.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	305	VAC
	DC input	100	--	430	VDC
Input Current	115VAC	--	--	1.8	A
	230VAC	--	--	1.0	A
Inrush Current	115VAC	--	30	--	A
	230VAC	--	60	--	A
Input Frequency		47	--	63	Hz
Recommended External Input Fuse		3.15A/300V, slow-blow, required			
Leakage Current	277VAC/50Hz	0.25mA RMS MAX.			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±2	--	%
Line Regulation	Full load	--	±1	--	%
Load Regulation	0 ～ 100% load	--	± 1.5	--	%
Ripple & Noise*	20MHz bandwidth (peak-to-peak value),10% ～ 100% load	--	80	150	mV
Temperature Coefficient		--	±0.02	--	%/℃
Stand-by Power Consumption	230VAC	--	0.3	0.45	W
Min. Load		0	--	--	%
Over-current Protection		140	--	--	%Io
Short Circuit Protection		Continuous, Self-Recovery			
Hold-up Time	230VAC	--	65	--	ms

Note: Ripple & noise are measured at 20MHz of bandwidth with a 10uF electrolytic capacitor and a 1uF ceramic capacitor connected inparallel at the output.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 5mA	4200	--	--	VAC
Insulation Resistance	Input-output, insulated voltage 500VDC	100	--	--	MΩ
Power Derating	-40℃ ～ -25℃(85～200VAC Input)	3.33	--	--	%/℃
	-40℃ - -25℃(200-305VAC Input)	1.33			%/℃
	+40℃ - +70℃(5VDC Outnput)	1.5			%/℃
	+45℃ - +70℃(85-165VAC Input,12/15/24/48VDC Output)	1.8			%/℃

	+50℃ - +70℃ (≥165VAC Input,12/15/24/48VDC Output)	2.25	--	--	%/℃
	+70℃ - +85℃	2	--	--	%/℃
	85VAC ～ 100VAC	1.33	--	--	%/VAC
	277VAC ～ 305VAC	0.72	--	--	%/VAC
Operating Temperature		-40	--	85	℃
Storage Temperature		-40	--	85	℃
Storage Humidity	Non-condensing	--	--	95	%RH
Soldering Profile	Wave-soldering	260 ± 5℃; time: 5 - 10s			
	Manual soldering	360 ± 10℃; time: 3 - 5s			
Safety Standard	Product design conforms to IEC/EN/BS EN62368-1,EN61558-1,EN60335-1;UL62368-1				
Safety Class		CLASS Ⅱ			
MTBF	MIL-HDBK-217F@25℃	≥300,000h			

Mechanical Specifications

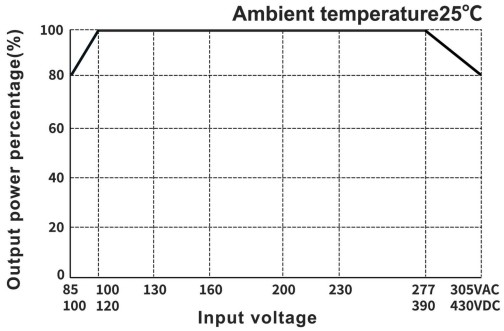
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Package Dimensions	70.00 * 48.00 * 27.00mm
Weight	132g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

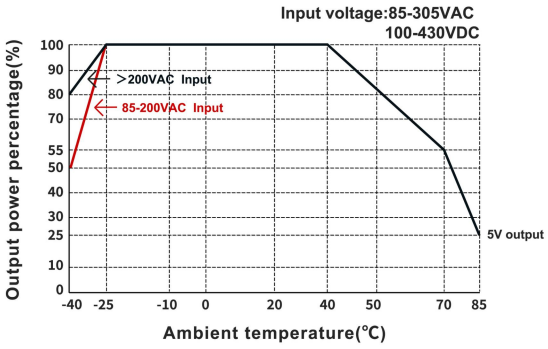
EMI	CE	CISPR32/EN55032 CLASS B	
	RE	CISPR32/EN55032 CLASS B	
EMS	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV	perf. Criteria B
		IEC/EN61000-4-4 ±4KV (EMC Solutions - Recommended Circuit(2))	perf. Criteria A
	Surge	IEC/EN61000-4-5 line to line ±2KV	perf. Criteria B
		IEC/EN61000-4-5 line to line ±2KV/line to PE ±4KV/(EMC Solutions - Recommended Circuit(2))	perf. Criteria A
	CS	IEC/EN61000-4-6 10Vr.m.s	perf. Criteria A
	ESD	IEC/EN61000-4-2 Contact ±6KV / Air ±8KV	perf. Criteria A

Product Characteristic Curve

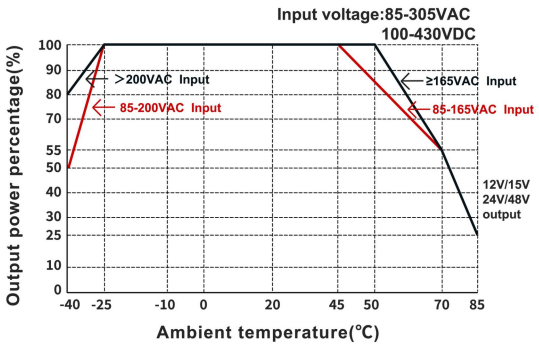
Input voltage Derating Curve



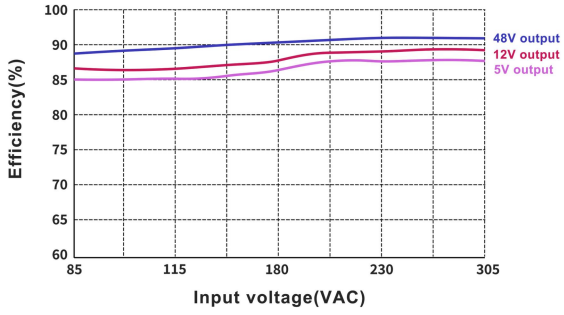
Temperature Derating Curve(5Voutput)



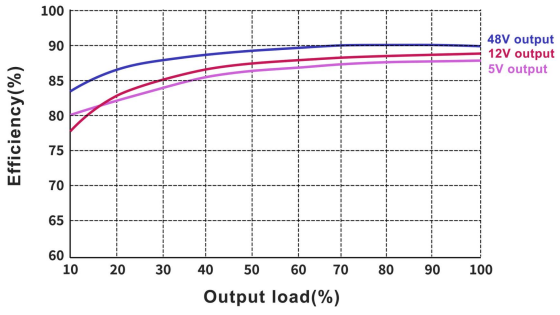
Temperature Derating Curve(Others)



Efficiency VS Input Voltage (Full load)



Efficiency VS Out Load (Vin=230VAC)

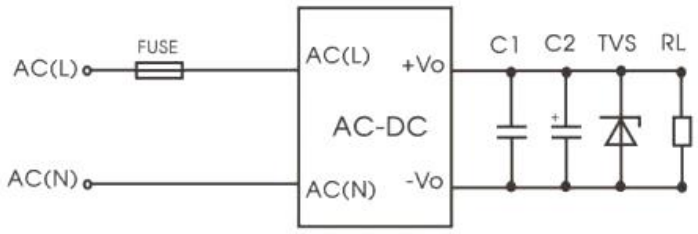


Note:

1. For input voltages of 85-100VAC/277-305VAC, voltage derating should be carried out on the basis of temperature derating.
2. This product is suitable for use in a natural wind-cooled environment.

Design Reference - Application circuit

Application circuit(Figure 1)



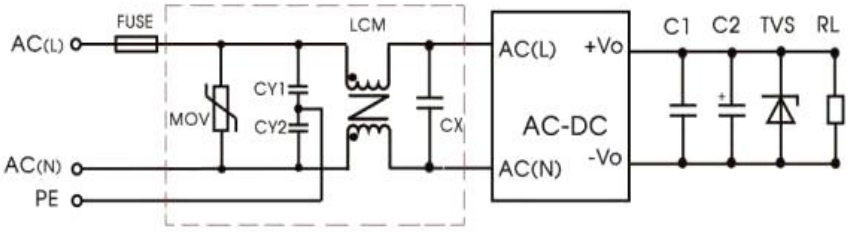
Reference Table for Selection of Peripheral Devices

Part No.	Fuse	C2	C1	TVS
AD60-23S05	3.15A/300VAC, slow-blow, required	1uF/50V	470uF/16V	SMBJ7.0A
AD60-23S12			330uF/16V	SMBJ20A
AD60-23S15			330uF/25V	SMBJ20A
AD60-23S24			220uF/35V	SMBJ30A
AD60-23S48		1uF/100V	100uF/63V	SMBJ64A

Note: D1 is a TVS transistor that can protect the downstream circuit in case of module abnormalities. It is recommended to choose a model that is 1.2 times the output voltage.

Design Reference - EMC Solutions - Recommended Circuits

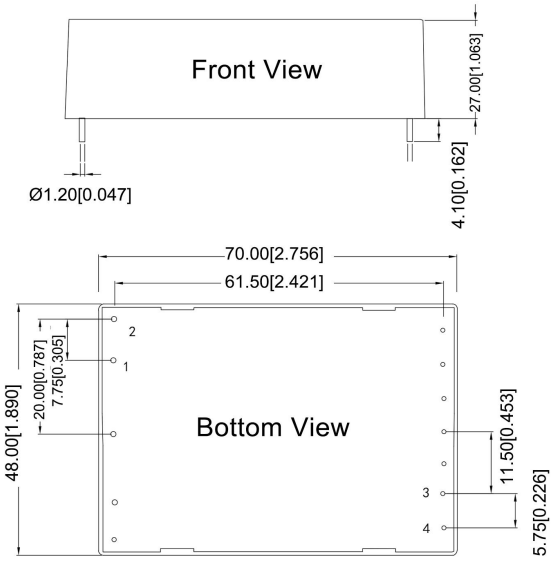
EMC Solutions - Recommended Circuits(Figure 2)

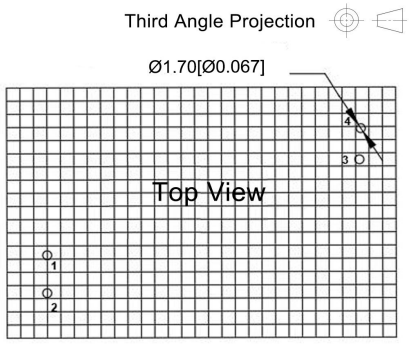


	Model	Recommended value
Recommended parameter values for EMC solution circuits	FUSE	3.15A/300VAC,Slow-blow, Required
	MOV	14D561K
	CY1,CY2	1.0nF/400VAC
	Cx	0.33uF/305VAC
	LCM1	10mH,Common mode inductance

Dimensions and Recommended Layout

AD60-23Sxx Dimensions and Recommended Layout





The grid distance size is 2.54mm*2.54mm

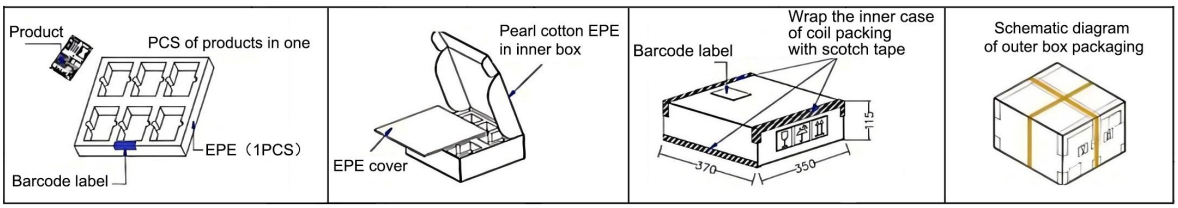
Pin	Function
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

Note:
Size unit: mm [inch]
Terminal diameter tolerance size: ± 0.10 [± 0.004]
Unmarked dimensional tolerance: ± 0.50 [± 0.020]

Packaging Information

Model series	Product quantity(pcs/tray)	Inner carton quantity(pcs/carton)	Outer carton quantity(pcs/carton)
AD60-23Sxx	20	60	120

The schematic diagram of pearl cotton packaging is shown below：



Product precautions

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. The maximum capacitive load is tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, all indicators in this manual are measured at Ta=25 ℃, humidity<75% RH, nominal input voltage, and output rated load;
5. All indicator testing methods in this manual are based on our company's corporate standards;
6. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;

Product specifications are subject to change without prior notice.

Manufacturer contact information

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