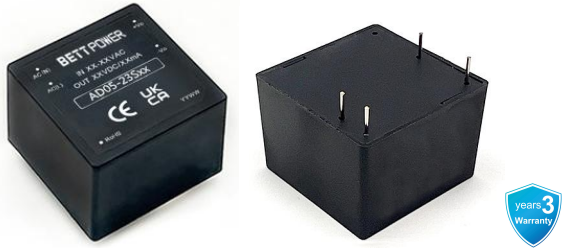


AD05-23Sxx Series

AC-DC Converter | 5W | Compact size | DIP | 4000VAC | 85~305VAC



Features

- Package Type: DIP, 1"x1" compact size
- Universal Input: 85~305VAC / 100~430VDC
- Operating temperature range: -40°C ~ +85°C
- Isolation voltage: 4000VAC
- High efficiency up to: 82%(Typ.)
- Overvoltage category III (OVC III)
- The mechanism has input undervoltage protection
- Output short circuit protection and over current protection
- Designed to meet IEC/EN/UL62368, EN60335, IEC/EN61558

Product description



AD05-23Sxx series is a miniature AC DC module-type power supply provided by BETTPOWER. This series features ultra-wide input voltage range, low power consumption, high efficiency, high reliability, and reinforced isolation. The EMC and safety specifications comply with IEC/EN/UL 62368, EN 60335, and IEC/EN 61558 standards. . This series of products 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	AD05-23S03	85~305	5	3.3	1515	72	4000
	AD05-23S05	85~305	5	5	1000	76	3000
	AD05-23S09	85~305	5	9	555	79	1200
	AD05-23S12	85~305	5	12	416	79	1200
	AD05-23S15	85~305	5	15	333	79	680
	AD05-23S18	85~305	5	18	280	80	220
	AD05-23S24	85~305	5	24	208	82	220

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;
3. Adding "T" to the product model suffix indicates an extension for chassis mount packaging, while adding "Din" to the suffix indicates an extension for Din-rail mount packaging.

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	--	--	0.13	A
	230VAC	--	--	0.07	A
Input Frequency		47	--	63	Hz
Recommended External Input Fuse		1A, slow-blow, required			
Leakage Current	230VAC/50Hz	0.3mA RMS Max.			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	5% ~ 100% load	3.3V output	--	±3	--	%
		others	--	±2	--	%
Line Regulation	Full load	--	±0.5	--	%	
Load Regulation	5% ~ 100% load	--	±1.0	--	%	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value), 10% ~ 100% load	--	60	120	mV	
Temperature Coefficient		--	±0.02	--	%/°C	
Stand-by Power Consumption	230VAC	--	0.10	0.5	W	
Min. Load		0	--	--	%	
Over-current Protection		110	--	--	%Io	
Short Circuit Protection		Continuous, Self-Recovery				
Hold-up Time	230VAC	--	50	--	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	4000	--	--	VAC
Insulation Resistance	Input-output, insulated voltage 500VDC	100	--	--	MΩ

Power Derating	-40°C ~ -25°C		3.0	--	--	%°C
	+50°C ~ +70°C	3.3V/5V	2.25	--	--	%°C
	+55°C ~ +70°C	Other	3.0	--	--	%°C
	+70°C ~ +85°C	3.3V/5V	1.0	--	--	%°C
	+70°C ~ +85°C	Other	0.33	--	--	%°C
	85VAC ~ 100VAC		1.0	--	--	%/VAC
	277VAC ~ 305VAC		0.535	--	--	%/VAC
Operating Temperature			-40	--	85	°C
Storage Temperature			-40	--	105	°C
Storage Humidity	Non-condensing		--	--	95	%RH
Soldering Profile	Wave-soldering		260 ± 5°C; time:5 - 10s			
	Manual soldering		360 ± 10°C; time:3 - 5s			
Safety Standard	Product design conforms to IEC/EN/BS EN62368-1, IEC/EN/BS EN61558-1/-2-16, EN60335-1, UL62368-1					
Safety Class			CLASS II			
MTBF	MIL-HDBK-217F@25°C		>2,600,000h			

Mechanical Specifications

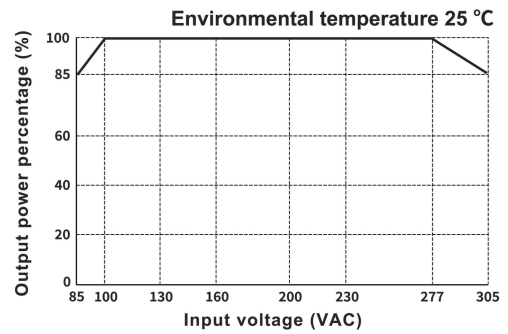
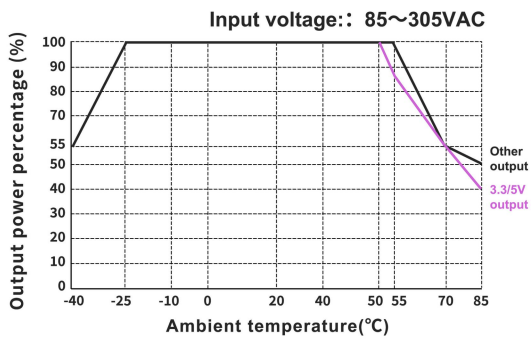
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Package Dimensions	25.40 * 25.40 * 17.60mm
Weight	23g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

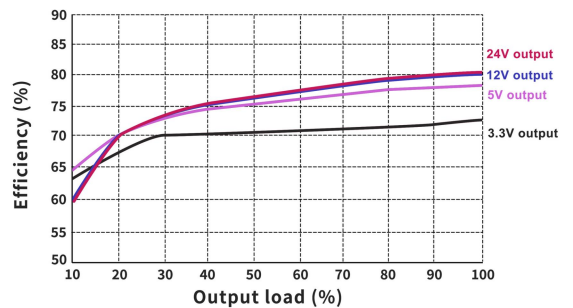
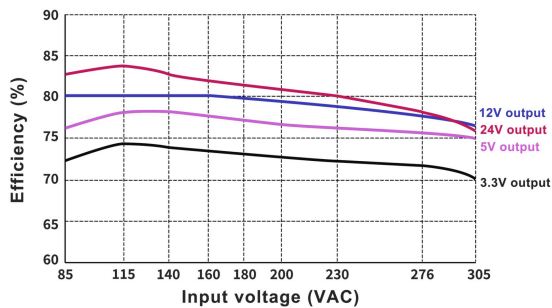
EMI	CE	CISPR32/EN55032 CLASS B		
	RE	CISPR32/EN55032 CLASS B		
EMS	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A	
	EFT	IEC/EN61000-4-4 ±4KV (EMC Solutions - Recommended Circuits Figure 2)	perf. Criteria B	
	Surge	IEC/EN61000-4-5 line to line ±1KV		perf. Criteria B
		IEC/EN61000-4-5 line to line ±2KV (EMC Solutions - Recommended Circuits Figure 2)		perf. Criteria B
	CS	IEC/EN61000-4-6 10Vr.m.s	perf. Criteria A	
	ESD	IEC/EN61000-4-2 Contact ±6KV/Air ±8KV	perf. Criteria B	

Product Characteristic Curve

Temperature Derating Curve	Input voltage Derating Curve
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Efficiency VS Input Voltage (Full load)	Efficiency VS Out Load (Vin=230VAC)
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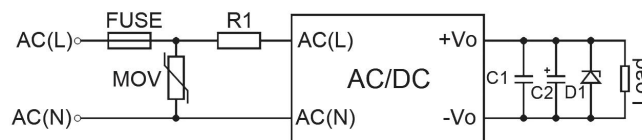


Note:

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)



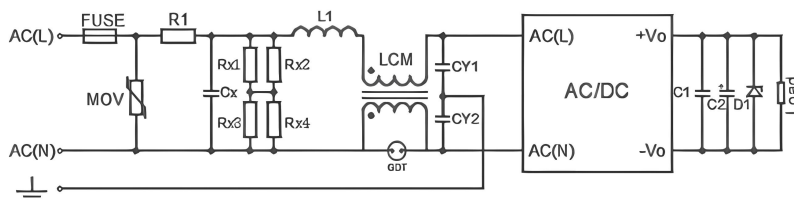
Reference Table for Selection of Peripheral Devices

Part No.	FUSE	MOV	R1	C1	C2	D1
AD05-23S03	1A/300VAC Slow-blow Required	10D561K	12Ω/3W Wire-wound resistor Required	1uF/16V	150uF/16V	See Note
AD05-23S05				1uF/16V	150uF/16V	
AD05-23S09				1uF/25V	120uF/25V	
AD05-23S12				1uF/25V	120uF/25V	
AD05-23S15				1uF/50V	100uF/35V	
AD05-23S24				1uF/50V	100uF/35V	

- Note:
1. FUSE and Mov Can be selected based on actual needs.
 2. 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)

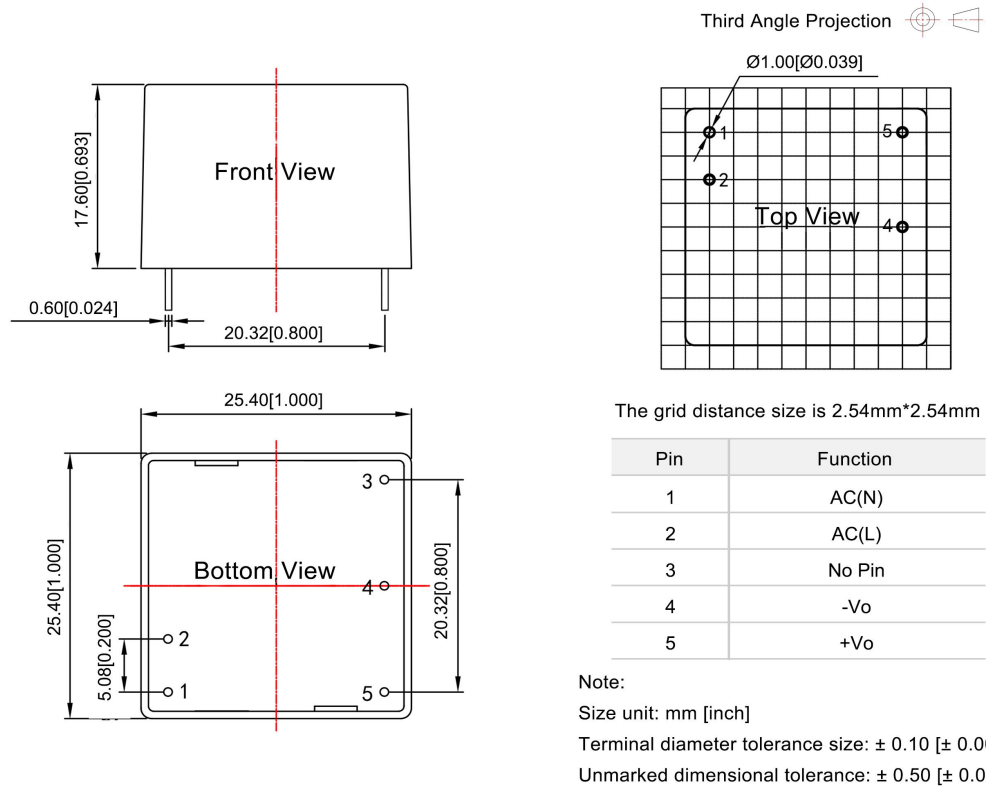


Recommended parameter values for EMC solution circuits	Model	Recommended value
	FUSE	2A/300VAC, Slow-blow, Required
	MOV	14D561K
	R1	33Ω/3W(Wire-wound resistor, Required)
	Cx	0.33uF/305VAC
	L1	1.2mH/0.3A

	CY1,CY2	1nF/400VAC
	GDT	300V/1KA
	LCM	20mH Common mode Choke
	Rx1,Rx2,Rx3,Rx4	2MΩ/1206

Dimensions and Recommended Layout

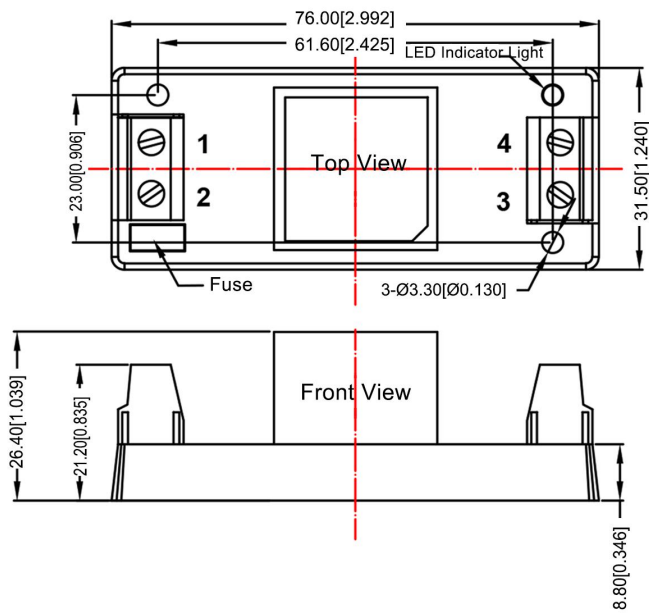
AD05-23Sxx Dimensions and Recommended Layout



AD05-23Sxx-T wired packaging Dimensions

AD05-23Sxx Series

AC-DC Converter | 5W | Compact size | DIP | 4000VAC | 85~305VAC

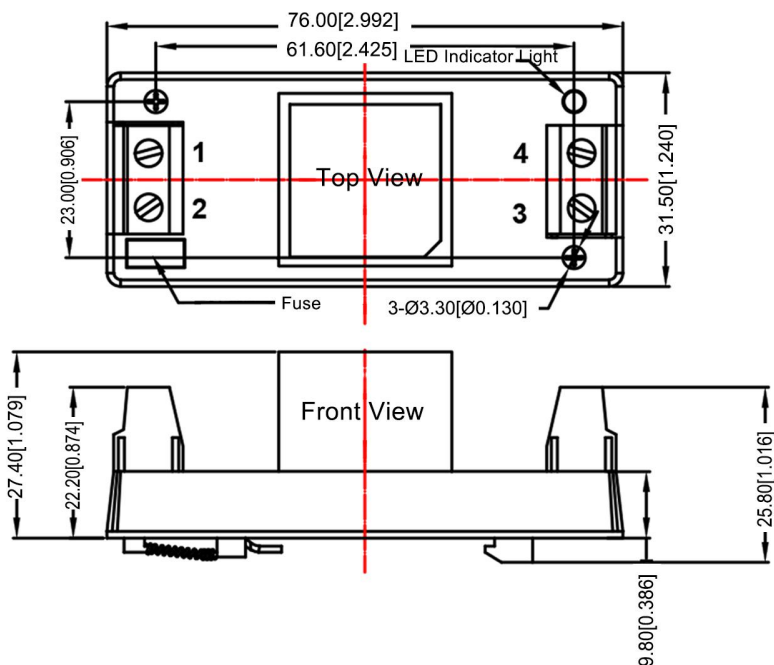


Third Angle Projection

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

Note:
 Size unit: mm [inch]
 Wire diameter: 24-12AWG
 Tightening force distance: Max0.4N · m
 Unmarked tolerance: ± 1.00 [± 0.039]

AD05-23Sxx-DIN rail-mounted packaging Dimensions



Third Angle Projection

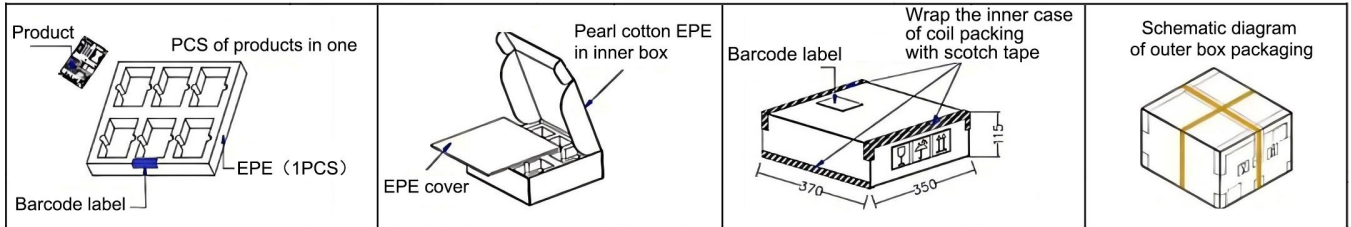
Pin	Function
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

Note:
 Size unit: mm [inch]
 Wire diameter: 24-12AWG
 Tightening force distance: Max0.4N · m
 Rail type: TS35, rail needs to be grounded
 Unmarked tolerance: ± 1.00 [± 0.039]

Packaging Information

Model series	Product quantity(pcs/tray)	Inner carton quantity(pcs/carton)	Outer carton quantity(pcs/carton)
AD05-23SXX	64	192	384
AD05-23SXX-T	28	56	112
AD05-23SXX-DIN	28	56	112

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 $T_a=25\text{ }^\circ\text{C}$, 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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