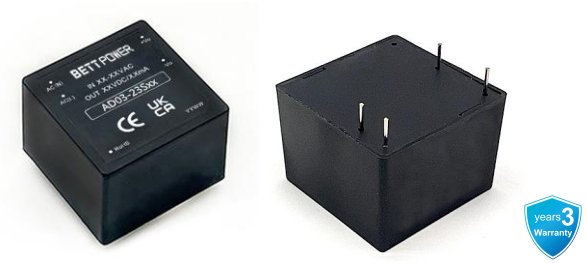
2025/08/18(A/2)

# AD03-23Sxx Series

AC-DC Converter | 3W | Compact size | DIP | 4000VAC | 85～305VAC



## Features

- Package Type: DIP,1"x1" compact size
- Universal Input: 85～305VAC / 100～430VDC
- Operating temperature range: -40℃ ～ +85℃
- Isolation voltage: 4000VAC
- High efficiency up to: 79%(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

Power Industrial Telecom Automotive Network Security Medical Automate

AD03-23Sxx series is a miniature AC DC module-type power suppy 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 | AD03-23S03 | 85～305 | 3 | 3.3 | 900 | 71 | 4000 |
| | AD03-23S05 | 85～305 | 3 | 5 | 600 | 75 | 3000 |
| | AD03-23S09 | 85～305 | 3 | 9 | 333 | 78 | 1000 |
| | AD03-23S12 | 85～305 | 3 | 12 | 250 | 78 | 820 |
| | AD03-23S15 | 85～305 | 3 | 15 | 200 | 79 | 680 |
| | AD03-23S18 | 85～305 | 3 | 18 | 167 | 79 | 220 |
| | AD03-23S24 | 85～305 | 3 | 24 | 125 | 79 | 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 | -- | -- | 0.06 | 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 | -- | %/℃ |
| Stand-by Power Consumption | 230VAC | | -- | 0.1 | 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℃ ～ -25℃ | | 3 | -- | -- | %℃ |
| | +50℃ ～ +70℃ | 3.3V/5V Output | 2.25 | -- | -- | %℃ |
| | +55℃ ～ +70℃ | Other | 3 | -- | -- | %℃ |
| | +70℃ ～ +85℃ | 3.3V/5V Output | 1 | -- | -- | %℃ |
| | +70℃ ～ +85℃ | Other | 0.33 | -- | -- | %℃ |
| | 85VAC ～ 100VAC | | 1 | -- | -- | %/VAC |
| | 277VAC ～ 305VAC | | 0.535 | -- | -- | %/VAC |
| Operating Temperature | | | -40 | -- | 85 | ℃ |
| Storage Temperature | | | -40 | -- | 105 | ℃ |
| 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, IEC/EN/BS EN61558-1/-2-16，EN60335-1, UL62368-1 | | | | | |
| Safety Class | | | CLASS Ⅱ | | | |
| MTBF | MIL-HDBK-217F@25℃ | | >2,600,000h | | | |

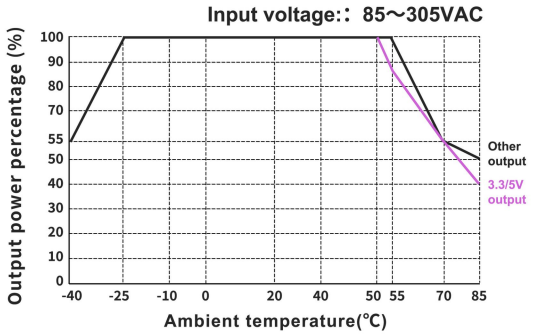
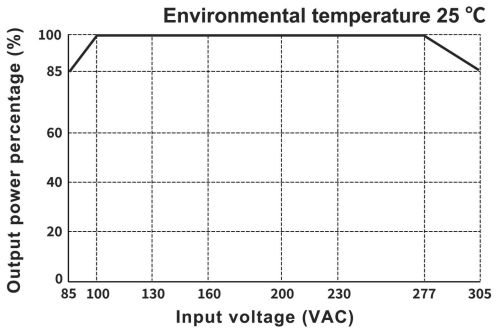
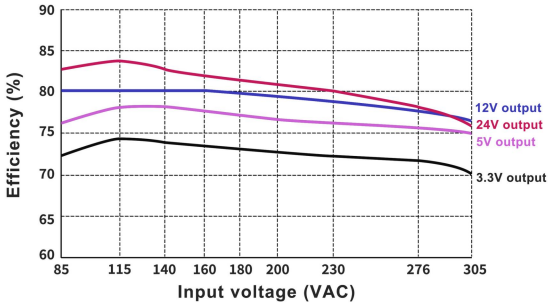
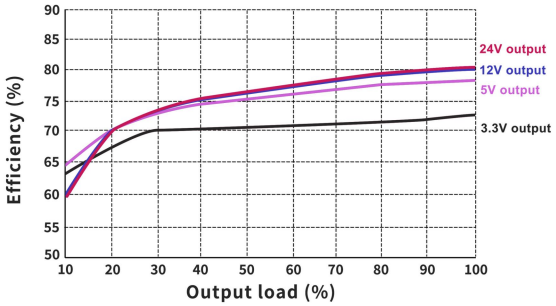
## Mechanical Specifications

| | |
|---|---|
| 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 (EMC Solutions - Recommended Circuits Figure 2) | |
| | RE | CISPR32/EN55032 CLASS B (EMC Solutions - Recommended Circuits Figure 2) | |
| 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 |
|---|---|
|  |  |
| Efficiency VS Input Voltage (Full load) | Efficiency VS Out Load (Vin=230VAC) |
|  |  |

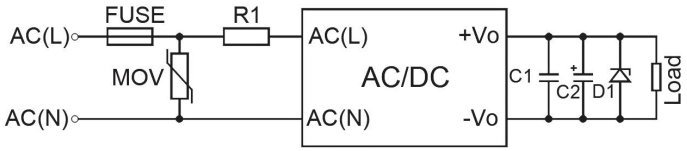


Note:

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

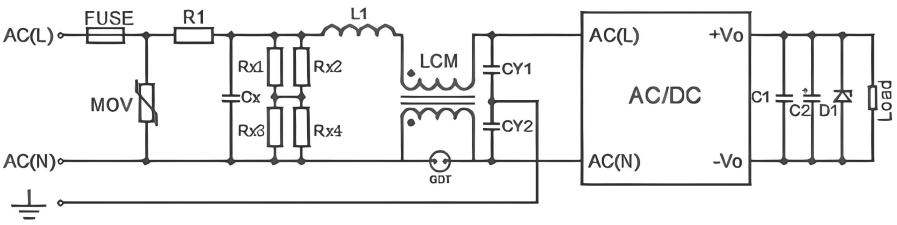
| Part No. | FUSE | MOV | R1 | C1 | C2 | D1 |
|---|---|---|---|---|---|---|
| AD03-23S03 | 1A/300VAC Slow-blow Required | 10D561K | 12Ω/3W Wire-wound resistor Required | 1uF/16V | 150uF/16V | See Note |
| AD03-23S05 | | | | 1uF/16V | 150uF/16V | |
| AD03-23S09 | | | | 1uF/25V | 120uF/25V | |
| AD03-23S12 | | | | 1uF/25V | 120uF/25V | |
| AD03-23S15 | | | | 1uF/50V | 100uF/35V | |
| AD03-23S24 | | | | 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)

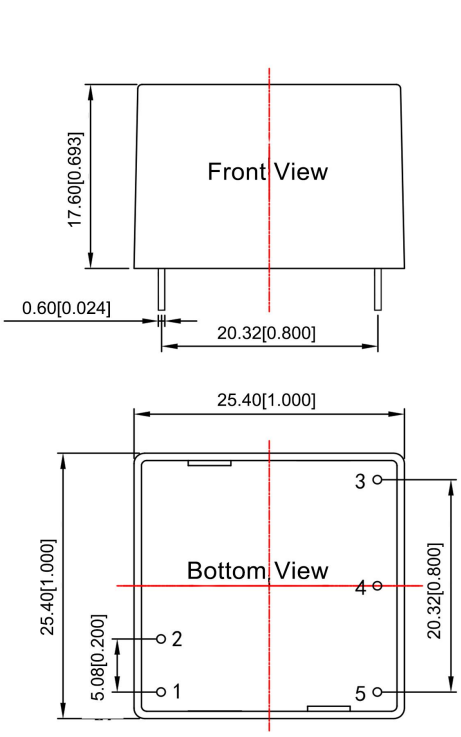


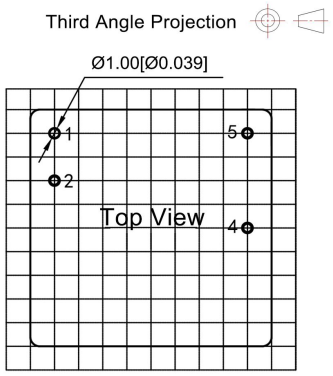

| | Model | Recommended value |
|---|---|---|
| Recommended parameter values for EMC solution circuits | FUSE | 2A/300VAC,Slow-blow, Required |
| | MOV | 14D561K |
| | R1 | 12Ω/3W(Wire-wound resistor, Required) |
| | Cx | 0.33uF/305VAC |
| | L1 | 1.2mH/0.3A |

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

## Dimensions and Recommended Layout

AD03-23Sxx Dimensions and Recommended Layout




The grid distance size is 2.54mm*2.54mm

| Pin | Function |
|---|---|
| 1 | AC(N) |
| 2 | AC(L) |
| 3 | No Pin |
| 4 | -Vo |
| 5 | +Vo |

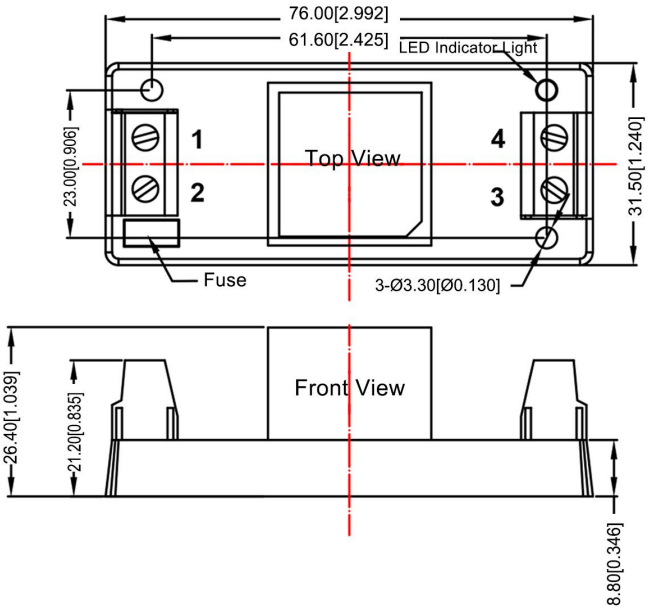
Note:

Size unit: mm [inch]

Terminal diameter tolerance size: ± 0.10 [± 0.004]

Unmarked dimensional tolerance: ± 0.50 [± 0.020]

AD03-23Sxx-T wired packaging Dimensions

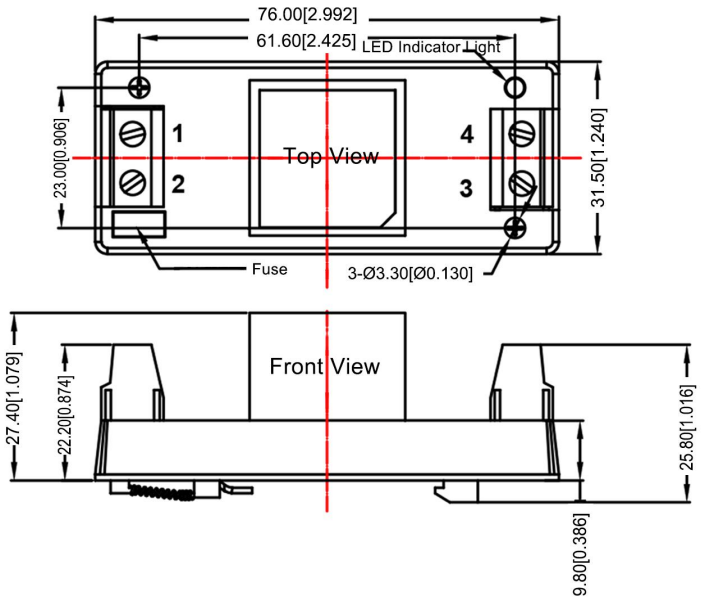



Third Angle Projection

| 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
Unmarked tolerance: ± 1.00 [± 0.039]

AD03-23Sxx-DIN rail-mounted packaging Dimensions




Third Angle Projection

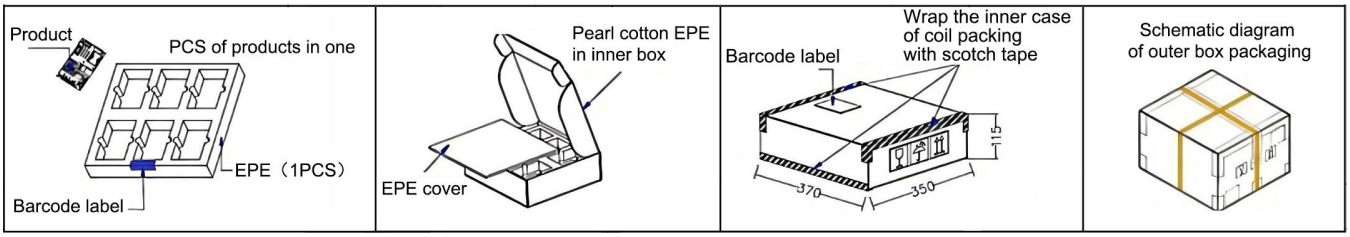
| Pin | Function |
|---|---|
| 1 | AC(N) |
| 2 | AC(L) |
| 3 | -Vo |
| 4 | +Vo |

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) |
|---|---|---|---|
| AD03-23Sxx | 64 | 192 | 384 |
| AD03-23Sxx-T | 28 | 56 | 112 |
| AD03-23Sxx-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 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;
7. Product specifications are subject to change without prior notice.

## Manufacturer contact information

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