Horizontal Model

Size: 1.87 x 1.06 x 0.93in (47.6 x 26.8 x 23.5mm)

Chassis Mount (“A2” Suffix)

Size: 2.99 x 1.24 x 1.27in (76 x 31.5 x 32.3mm)

DIN Rail (“A4” Suffix)

Size: 2.99 x 1.24 x 1.45in (76 x 31.5 x 36.9mm)

## OPTIONS

- Case Type
  -Horizontal Package
  -Chassis Mount
  -DIN Rail

## FEATURES

- Ultra-Wide Input Voltage Range 85~305VAC (100~430VDC)
- Cooling by Free Air Convection
- High Efficiency
- No Load Power Consumption <0.1W
- RoHS Compliant
- Short Circuit, Over Current, and Over Voltage Protection
- Over Voltage Category OVC III (Meets EN61558)
- EMI Performance Meets CISPR32/EN55032 Class B, EN55014
- IEC/UL62368-1, EN61558-1, EN60335-1 Safety Approvals & EN62368-1 (Report)

## APPLICATIONS

- Industrial
- Medical Treatment
- Home Appliances
- Instrumentation
- Communication
- Civil Applications

## DESCRIPTION

The PSDAL15 series of AC/DC converters offers up to 15 watts of output power in a compact horizontal, chassis mount, or DIN rail package. This series consists of single output models with an ultra-wide 85-305VDC (100~430VDC) input range. Features of this series include short circuit, over current, and over voltage protection and cooling by free air convection. This series is RoHS compliant, has IEC/UL62368-1, EN61558-1, EN60335-1 safety approvals & EN62368-1 (report) and is designed to meet IEC/EN60601-1/ANSI/AAMI ES60601-1.

**MODEL SELECTION TABLE**

| Model Number[1] | Input Voltage Range | Output Voltage | Output Current | Maximum Capacitive Load | Typ. Efficiency | Output Power | Max. Ripple & Noise | Certification |
|---|---|---|---|---|---|---|---|---|
| PSDAL15-03S | 85~305VAC (100~430VDC) | 3.3V | 4000mA | 6600µF | 82% | 13.2W | 120mV | UL/EN/IEC |
| PSDAL15-05S | | 5V | 3000mA | 5000µF | 85% | 15W | | |
| PSDAL15-09S | | 9V | 1670mA | 3000µF | 84% | | | |
| PSDAL15-12S | | 12V | 1250mA | 2000µF | 85% | | | |
| PSDAL15-15S | | 15V | 1000mA | 1500µF | 85% | | | |
| PSDAL15-24S | | 24V | 625mA | 680µF | 86% | | | |

## SPECIFICATIONS

All specifications are based on 25°C, Humidity <75%, Nominal Input Voltage, and Rated Output Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

| SPECIFICATION | TEST CONDITIONS | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **INPUT SPECIFICATIONS** | | | | | | |
| Input Voltage Range | AC Input | | 85 | | 305 | VAC |
| | DC Input | | 100 | | 430 | VDC |
| Input Frequency | | | 47 | | 63 | Hz |
| Input Current | 115VAC | | | | 0.45 | A |
| | 230VAC | | | | 0.30 | |
| Inrush Current | 115VAC | | | 30 | | A |
| | 230VAC | | | 60 | | |
| Leakage Current | 277VAC/50Hz | | | 0.1mA RMS max. | | |
| Built-In Fuse | | | | 2A/300V, slow-blow | | |
| Hot plug | | | | Unavailable | | |
| **OUTPUT SPECIFICATIONS** | | | | | | |
| Output Voltage | | | | See Table | | |
| Voltage Accuracy | | | | ±2 | | % |
| Line Regulation | Full Load | | | ±0.5 | | % |
| Load Regulation | 0%-100% Load | | | ±1.0 | | % |
| Output Power | | | | See Table | | |
| Output Current | | | | See Table | | |
| Minimum Load | | | 0 | | | % |
| Maximum Capacitive Load | | | | See Table | | |
| Ripple & Noise[2] | 20MHz Bandwidth (peak-to-peak value) | | | 70 | 120 | mV |
| Stand-by Power Consumption | 230VAC | 3.3/5/9/12/15V | | | 0.10 | W |
| | | 24V | | | 0.12 | |
| Hold-Up Time | 115VAC Input | | | 10 | | ms |
| | 230VAC Input | | | 55 | | |
| Temperature Coefficient | | | | ±0.02 | | %/ºC |
| **PROTECTION** | | | | | | |
| Short Circuit Protection | | | | Hiccup, Continuous, Self-Recovery | | |
| Over Current Protection | | | | ≥110%Io, self-recovery | | |
| Over Voltage Protection | Output voltage clamp or hiccup | 3.3/5V | | ≤7.5 | | VDC |
| | | 9V | | ≤15 | | |
| | | 12/15V | | ≤20 | | |
| | | 24V | | ≤30 | | |
| **ENVIRONMENTAL SPECIFICATIONS** | | | | | | |
| Operating Temperature | | | -40 | | +85 | ºC |
| Storage Temperature | | | -40 | | +85 | ºC |
| Storage Humidity | | | | | 95 | %RH |
| Soldering Temperature | Wave-Soldering | | | 260±5ºC; time: 5-10s | | |
| | Manual-Welding | | | 360±10ºC; time: 3-5s | | |
| Power Derating | +50ºC to 70ºC | 3.3/5V | 3.00 | | | %/ºC |
| | +55°C to +70°C | 9/12/15/24V | 2.67 | | | |
| | +70°C to +85°C | | 0.66 | | | |
| | 85VAC-100VAC | | 1.33 | | | %/VAC |
| | 277VAC-305VAC | | 0.71 | | | |
| | 2000-5000m | | 6.7 | | | %/Km |
| MTBF | MIL-HDBK-217F@25ºC | | | >3,200,000 | | h |
| Designed Life | 230VAC | Ta: 25°C 100% Load | | >130x10$^3$ | | h |
| | | Ta: 55°C 100% Load | | >27x10$^3$ | | |
| **GENERAL SPECIFICATIONS** | | | | | | |
| Efficiency | 230VAC | | | See Table | | |
| Switching Frequency | | | | 65 | | kHz |
| Isolation | Input-Output, Electric Strength Test for 1min, leakage current <5mA | | 4000 | | | VAC |
| Insulation Resistance | Input-Output, at 500VDC | | 100 | | | MΩ |

## SPECIFICATIONS

All specifications are based on 25°C, Humidity <75%, Nominal Input Voltage, and Rated Output Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

| SPECIFICATION | TEST CONDITIONS | | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **PHYSICAL SPECIFICATIONS** | | | | | | | |
| Weight | Horizontal Package | | | | 1.69oz (48g) | | |
| | Chassis Mounting | | | | 2.4oz (68g) | | |
| | DIN Rail Mounting | | | | 3.10oz (88g) | | |
| Dimensions (L x W x H) | Horizontal Package | | | | 1.87 x 1.06 x 0.93in (47.6 x 26.8 x 23.5mm) | | |
| | Chassis Mounting | | | | 2.99 x 1.24 x 1.27in (76 x 31.5 x 32.3mm) | | |
| | DIN Rail Mounting | | | | 2.99 x 1.24 x 1.45in (76 x 31.5 x 36.9mm) | | |
| Cooling Method | | | | | Free Air Convection | | |
| Case Material | | | | | Black Plastic, Flame-Retardant and Heat-Resistant (UL94V-0) | | |
| **SAFETY CHARACTERISTICS** | | | | | | | |
| Safety Standards[3] | IEC/UL62368-1, EN61558-1, EN60335-1 Safety Approval & EN62368-1 (Report) | | | | | | |
| Safety Class | | | | | | | Class II |
| EMI | CE | CISPR32/EN55032 | | | | | Class B |
| | | CISPR32/EN55032 | | | | | Class B[5] |
| | | CISPR11/EN55011 | | | | | Class B |
| | | EN55014-1 | | | | | |
| | RE | CISPR32/EN55032 | | | | | Class B |
| | | CISPR32/EN55032 | | | | | Class B[5] |
| | | CISPR11/EN55011 | | | | | Class B |
| | | EN55014-1 | | | | | |
| Immunity | ESD | IEC/EN61000-4-2 | Contact ±8kV | | | | Perf. Criteria B |
| | | EN55014-2 | | | | | Perf. Criteria B |
| | RS | IEC/EN61000-4-3 | 10V/m | | | | Perf. Criteria A |
| | | EN55014-2 | | | | | Perf. Criteria A |
| | EFT | IEC/EN61000-4-4 | ±2kV | | | | Perf. Criteria B |
| | | IEC/EN61000-4-4 | ±4kV[4] | | | | Perf. Criteria B |
| | | IEC/EN61000-4-4 | ±4kV[5] | | | | Perf. Criteria A |
| | | IEC/EN55014-2 | | | | | Perf. Criteria B |
| | Surge | IEC/EN61000-4-5 | Line to Line ±1kV | | | | Perf. Criteria B |
| | | IEC/EN61000-4-5 | Line to Line ±2kV[4] | | | | Perf. Criteria B |
| | | IEC/EN61000-4-5 | Line to Line ±2kV/Line to Ground±4kV [5] | | | | Perf. Criteria A |
| | | IEC/EN55014-2 | | | | | Perf. Criteria B |
| | CS | IEC/EN61000-4-6 | 10Vr.m.s | | | | Perf. Criteria A |
| | | IEC/EN55014-2 | | | | | Perf. Criteria A |
| | Voltage dips, short interruptions and voltage variations | IEC/EN61000-4-11 | 0%, 70% | | | | Perf. Criteria B |
| | | IEC/EN55014-2 | | | | | Perf. Criteria B |

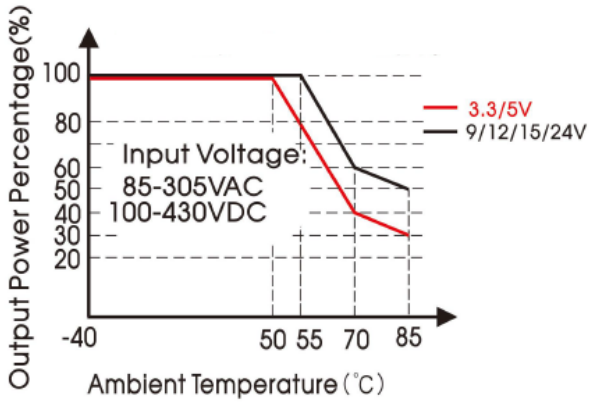
## NOTES

1. Chassis mount and DIN rail models are available for this series. To indicate chassis mount model, add “A2” to product model number. To indicate DIN Rail model, add “A4” to product model number.
2. Tip and barrel method is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor, please contact factory for more information.
3. This product is Listed to applicable standards and requirements by UL.
4. See Fig. 2 for recommended circuit.
5. See Fig. 3 for recommended circuit.
6. When the output terminal of the product needs to be connected to PE through a Y capacitor or close to the metal frame, please refer to Fig. 3 for recommended circuit.
7. If product is not operated within required load range, it is not guaranteed that the product performance will comply with all parameters in the datasheet.
8. Products classified according to ISO14001 and related environmental laws and regulations. It should be handled by qualified units.
9. Customization available.

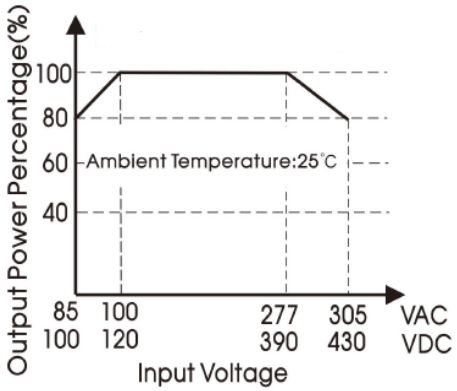
**Due to advances in technology, specifications subject to change without notice.*

## DERATING CURVES

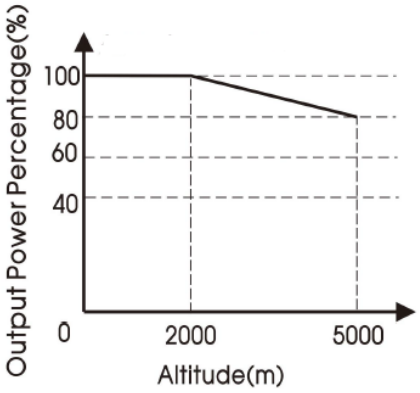
### Temperature Derating Curve




### Input Voltage Derating Curve



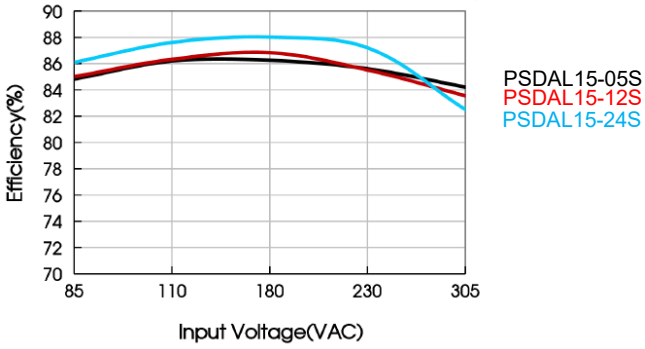

### Altitude Derating Curve



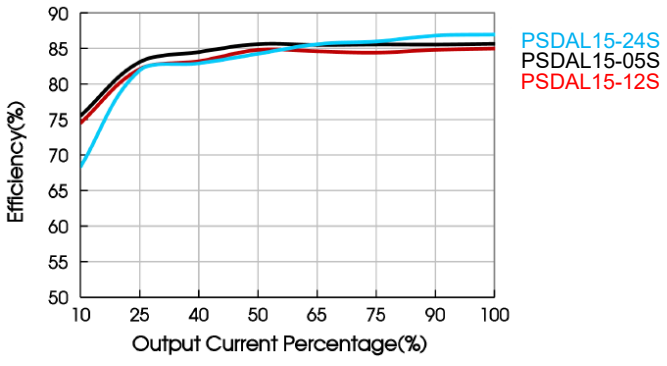

Note:
1. With an AC input between 85-100V/277-305VAC and a DC input between 100-120V/390-430VDC, the output power must be derated as per temperature derating curves.
2. This product is suitable for applications using natural air cooling, if in closed environment, please contact factory.

## EFFICIENCY GRAPHS

### Efficiency vs. Input Voltage (Full Load)

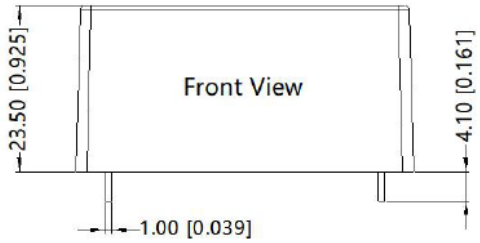


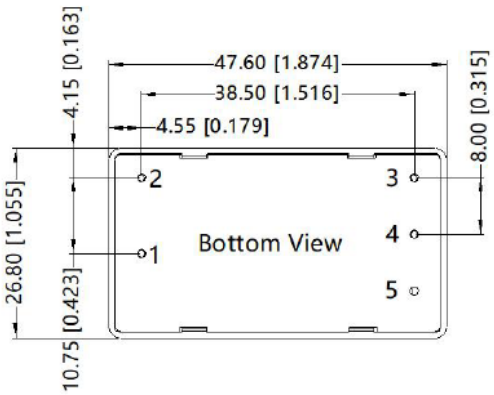

### Efficiency vs. Output Load (Vin=230VAC)



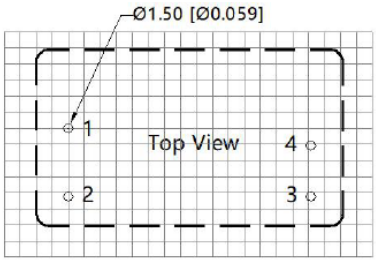

## MECHANICAL DRAWINGS

## Horizontal Model




THIRD ANGLE PROJECTION



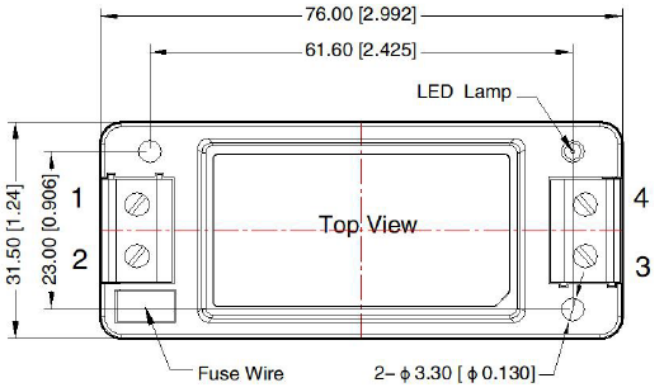

Note: Grid 2.54*2.54mm

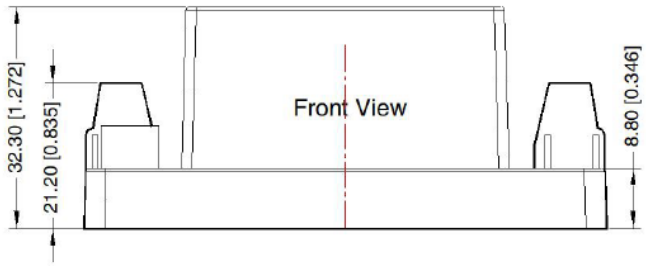
Pin-Out

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

Note:
Unit: mm [inch]
Pin diameter tolerances: ±0.10 [±0.004]
General tolerances: ±0.50 [±0.020]

## Chassis Mount (“A2” Suffix)



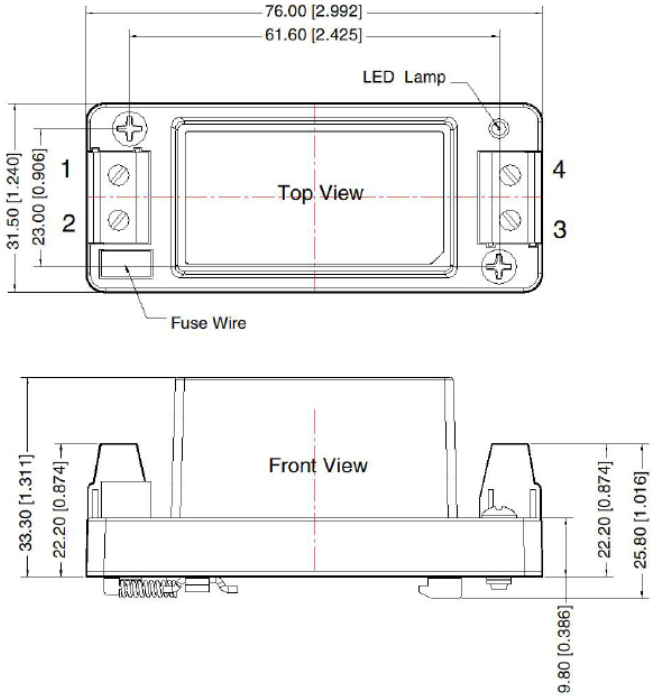

THIRD ANGLE PROJECTION

Pin-Out

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

Note:
Unit: mm [inch]
Wire range: 24-12AWG
Tightening Torque: Max 0.4 N·m
General Tolerances: ±1.00 [±0.039]

## DIN Rail ("A4" Suffix)




THIRD ANGLE PROJECTION

Pin-Out

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

Note:
Unit: mm [inch]
Wire Range: 24-12AWG
Tightening torque: Max 0.4 N·m
Mounting rail: TS35, rail needs to connect safety ground
General tolerances: ±1.00 [±0.039]

## DESIGN REFERENCE

### 1. Typical Application

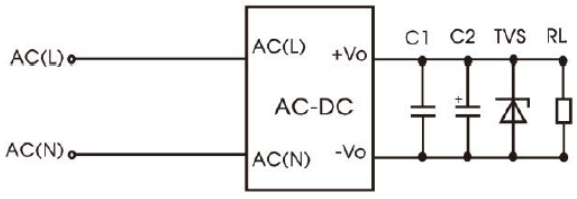



Fig. 1 Typical Circuit Diagram

| Element Model | C1(μF) | C2(μF) | TVS |
|---|---|---|---|
| PSDAL15-03S | 1μF/50V | 220μF/16V | SMBJ7.0A |
| PSDAL15-05S | | 220μF/16V | SMBJ7.0A |
| PSDAL15-09S | | 100μF/25V | SMBJ12A |
| PSDAL15-12S | | 100μF/25V | SMBJ20A |
| PSDAL15-15S | | 100μF/25V | SMBJ20A |
| PSDAL15-24S | | 100μF/35V | SMBJ30A |

Output Filter Components:
We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to data sheet). Choose a capacitor voltage rating with at least 20% margin (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. EMC Compliant Recommended Circuit

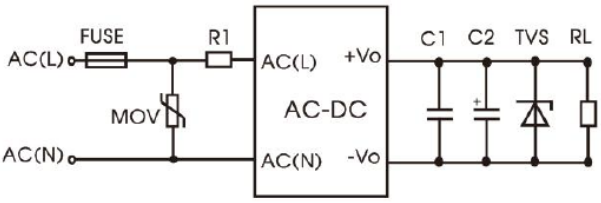



Fig. 2 EMC Application Circuit with Higher Requirements

| Component | Recommended Value |
|---|---|
| FUSE | 3.15A/300V, slow-blow, required |
| MOV | S14K350 |
| R1 (wire-wound resistor, required) | 6.8Ω/3W |

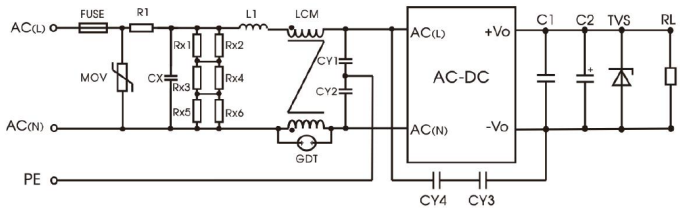



Fig. 3 Recommended circuit for class I equipment

| Component | Recommended Value |
|---|---|
| FUSE | 3.15A/300V, slow-blow, required |
| MOV | S14K350 |
| CX | 334K/305VAC |
| R1 | 12Ω/5W (wire-wound resistor) |
| L1 | 1.2mH/0.5A |
| CY1/CY2 | 2.2nF/400VAC |
| CY3/CY4 | 1nF/400VAC |
| GDT | 300V/1KA |
| LCM | 20mH, contact factory for recommendation |

Note: Rx1/Rx2/Rx3/Rx4/Rx5/Rx6 is the bleeder resistance of CX and the recommended resistance value is 1.5MΩ/150VDC

## COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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