

**DESCRIPTION**

AD-AxxxxS-1WR3 (Dual) & AD-BxxxxLS-1WR3 (Single) series are specially designed for applications where an(two) isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits. Where the voltage of the input power supply is fixed (voltage variation  $\leq \pm 10\%$ )

**FEATURES**

- High efficiency up to 90%
- I/O Isolation test voltage 1500VDC
- $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  Working Temperature Range
- No-load power consumption bottom 0.25W
- MTBF  $\geq 3500\text{KHrs}$
- Output short-circuit, over-current protection
- Industry standard pin-out

**ORDERING INFORMATION**

| Part Number     | Input Voltage (VDC) | Output        |                         | Full Load Efficiency(%)<br>Min/Typ | Capacitive Load (uF)<br>Max. |
|-----------------|---------------------|---------------|-------------------------|------------------------------------|------------------------------|
|                 | Nominal (Range)     | Voltage (VDC) | Current (mA)<br>Max/Min |                                    |                              |
| AD-A0303S-1WR3  | 3.3<br>(2.97~3.63)  | $\pm 3.3$     | $\pm 152/\pm 15$        | 76/80                              | 1200                         |
| AD-A0305S-1WR3  |                     | $\pm 5$       | $\pm 100/\pm 10$        | 86/88                              | 1200                         |
| AD-A0309S-1WR3  |                     | $\pm 9$       | $\pm 56/\pm 6$          | 87/89                              | 560                          |
| AD-A0312S-1WR3  |                     | $\pm 12$      | $\pm 42/\pm 5$          | 87/89                              | 330                          |
| AD-A0315S-1WR3  |                     | $\pm 15$      | $\pm 34/\pm 4$          | 87/89                              | 330                          |
| AD-A0324S-1WR3  |                     | $\pm 24$      | $\pm 21/\pm 3$          | 87/89                              | 100                          |
| AD-B0303LS-1WR3 |                     | 3.3           | 303/30                  | 76/80                              | 2400                         |
| AD-B0305LS-1WR3 |                     | 5             | 200/20                  | 80/84                              | 2400                         |
| AD-B0312LS-1WR3 |                     | 12            | 84/9                    | 84/86                              | 560                          |
| AD-A0503S-1WR3  | 5<br>(4.5~5.5)      | $\pm 3.3$     | $\pm 152/\pm 15$        | 76/80                              | 1200                         |
| AD-A0505S-1WR3  |                     | $\pm 5$       | $\pm 100/\pm 10$        | 86/88                              | 1200                         |
| AD-A0509S-1WR3  |                     | $\pm 9$       | $\pm 56/\pm 6$          | 87/89                              | 560                          |
| AD-A0512S-1WR3  |                     | $\pm 12$      | $\pm 42/\pm 5$          | 87/89                              | 330                          |
| AD-A0515S-1WR3  |                     | $\pm 15$      | $\pm 34/\pm 4$          | 87/89                              | 330                          |
| AD-A0524S-1WR3  |                     | $\pm 24$      | $\pm 21/\pm 3$          | 87/89                              | 100                          |
| AD-B0503LS-1WR3 |                     | 3.3           | 303/30                  | 76/80                              | 2400                         |
| AD-B0505LS-1WR3 |                     | 5             | 200/20                  | 86/88                              | 2400                         |
| AD-B0509LS-1WR3 |                     | 9             | 111/12                  | 87/89                              | 1000                         |
| AD-B0512LS-1WR3 |                     | 12            | 84/9                    | 87/89                              | 560                          |
| AD-B0515LS-1WR3 |                     | 15            | 67/7                    | 87/89                              | 560                          |
| AD-B0524LS-1WR3 |                     | 24            | 42/4                    | 87/89                              | 220                          |



| Part Number     | Input Voltage (VDC) | Output        |                         | Full Load Efficiency(%)<br>Min/Typ | Capacitive Load (uF)<br>Max. |
|-----------------|---------------------|---------------|-------------------------|------------------------------------|------------------------------|
|                 | Nominal (Range)     | Voltage (VDC) | Current (mA)<br>Max/Min |                                    |                              |
| AD-A1203S-1WR3  | 12<br>(10/8~13.2)   | ±3.3          | ±152/±15                | 76/80                              | 1200                         |
| AD-A1205S-1WR3  |                     | ±5            | ±100/±10                | 86/88                              | 1200                         |
| AD-A1209S-1WR3  |                     | ±9            | ±56/±6                  | 87/89                              | 560                          |
| AD-A1212S-1WR3  |                     | ±12           | ±42/±5                  | 87/89                              | 330                          |
| AD-A1215S-1WR3  |                     | ±15           | ±34/±4                  | 87/89                              | 330                          |
| AD-A1224S-1WR3  |                     | ±24           | ±21/±3                  | 87/89                              | 100                          |
| AD-B1203LS-1WR3 |                     | 3.3           | 303/30                  | 76/80                              | 2400                         |
| AD-B1205LS-1WR3 |                     | 5             | 200/20                  | 87/89                              | 2400                         |
| AD-B1209LS-1WR3 |                     | 9             | 111/12                  | 87/89                              | 1000                         |
| AD-B1212LS-1WR3 |                     | 12            | 84/9                    | 87/89                              | 560                          |
| AD-B1215LS-1WR3 |                     | 15            | 67/7                    | 87/89                              | 560                          |
| AD-B1224LS-1WR3 |                     | 24            | 42/4                    | 87/89                              | 220                          |
| AD-A1503S-1WR3  | 15<br>(13.5~16.5)   | ±3            | ±152/±15                | 76/80                              | 1200                         |
| AD-A1505S-1WR3  |                     | ±5            | ±100/±10                | 86/88                              | 1200                         |
| AD-A1509S-1WR3  |                     | ±9            | ±56/±5                  | 87/89                              | 560                          |
| AD-A1512S-1WR3  |                     | ±12           | ±42/±5                  | 87/89                              | 330                          |
| AD-A1515S-1WR3  |                     | ±15           | ±34/±4                  | 87/89                              | 330                          |
| AD-A1524S-1WR3  |                     | ±24           | ±21/±2                  | 87/89                              | 100                          |
| AD-B1503LS-1WR3 |                     | 3             | 300/30                  | 76/80                              | 2400                         |
| AD-B1505LS-1WR3 |                     | 5             | 200/20                  | 87/89                              | 2400                         |
| AD-B1509LS-1WR3 |                     | 9             | 111/12                  | 87/89                              | 1000                         |
| AD-B1512LS-1WR3 |                     | 12            | 84/9                    | 87/89                              | 560                          |
| AD-B1515LS-1WR3 |                     | 15            | 67/7                    | 87/89                              | 560                          |
| AD-B1524LS-1WR3 |                     | 24            | 42/4                    | 87/89                              | 220                          |
| AD-A2403S-1WR3  | 24<br>(21.6~26.4)   | ±3            | ±152/±15                | 76/80                              | 1200                         |
| AD-A2405S-1WR3  |                     | ±5            | ±100/±10                | 86/88                              | 1200                         |
| AD-A2409S-1WR3  |                     | ±9            | ±56/±5                  | 87/89                              | 560                          |
| AD-A2412S-1WR3  |                     | ±12           | ±42/±5                  | 87/89                              | 330                          |
| AD-A2415S-1WR3  |                     | ±15           | ±34/±4                  | 87/89                              | 330                          |
| AD-A2424S-1WR3  |                     | ±24           | ±21/±3                  | 87/89                              | 100                          |
| AD-B1503LS-1WR3 |                     | 3             | 303/30                  | 76/80                              | 2400                         |
| AD-B1505LS-1WR3 |                     | 5             | 200/20                  | 86/88                              | 2400                         |
| AD-B1509LS-1WR3 |                     | 9             | 111/12                  | 87/89                              | 1000                         |
| AD-B1512LS-1WR3 |                     | 12            | 83/9                    | 87/89                              | 560                          |
| AD-B1515LS-1WR3 |                     | 15            | 67/7                    | 87/90                              | 560                          |
| AD-B1524LS-1WR3 |                     | 24            | 42/4                    | 87/90                              | 220                          |

**INPUT SPECIFICATIONS**

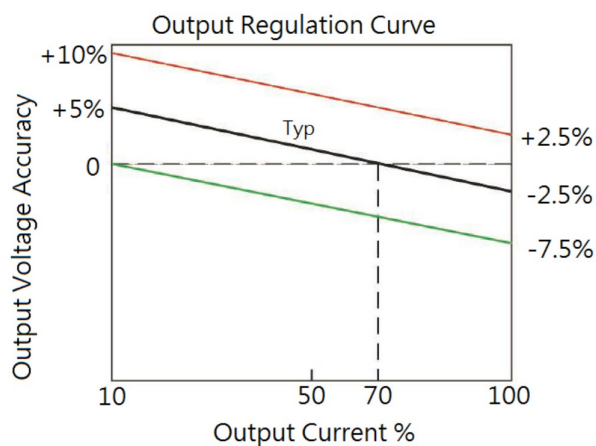
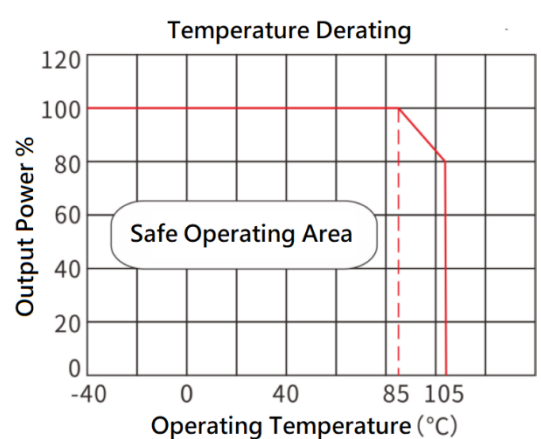
| Item                                 | Operating Conditions | Min                | Typ   | Max   | Unit |
|--------------------------------------|----------------------|--------------------|-------|-------|------|
| Input Current<br>(Full Load/No-Load) | 3.3VDC input         | --                 | 387/6 | --/12 | mA   |
|                                      | 5VDC input           | --                 | 224/5 | --/10 |      |
|                                      | 12VDC input          | --                 | 93/3  | --/5  |      |
|                                      | 15VDC input          | --                 | 74/2  | --/4  |      |
|                                      | 24VDC input          | --                 | 47/1  | --/2  |      |
| Reflect Ripple Current               |                      | --                 | 15    | --    | mA   |
| Surge Voltage (1sec. max)            | 3.3VDC input         | -0.7               | --    | 5     | VDC  |
|                                      | 5VDC input           | -0.7               | --    | 9     |      |
|                                      | 12VDC input          | -0.7               | --    | 18    |      |
|                                      | 15VDC input          | -0.7               | --    | 21    |      |
|                                      | 24VDC input          | -0.7               | --    | 30    |      |
| Input Filter                         |                      | Capacitance Filter |       |       |      |
| Hot Plug                             |                      | Unavailable        |       |       |      |

**OUTPUT SPECIFICATIONS**

| Item                                      | Operating Conditions                                     |               | Min                       | Typ  | Max   | Unit  |
|-------------------------------------------|----------------------------------------------------------|---------------|---------------------------|------|-------|-------|
| Output Load                               | Load Percentage                                          |               | 10                        | --   | 100   | %     |
| Load Regulation                           | 10~100% Load                                             | 3.3VDC output | --                        | 18   | --    | %     |
|                                           |                                                          | 5VDC output   | --                        | 12   | --    |       |
|                                           |                                                          | 9VDC output   | --                        | 8    | --    |       |
|                                           |                                                          | 12VDC output  | --                        | 7    | --    |       |
|                                           |                                                          | 15VDC output  | --                        | 6    | --    |       |
|                                           |                                                          | 24VDC output  | --                        | 5    | --    |       |
| Linear Regulation                         | Input voltage change:<br>±0.1%                           | 3.3VDC output | --                        | --   | ±1.5  | %     |
|                                           |                                                          | Others        |                           | --   | ±1.2  |       |
| Linear Regulation                         | Input voltage variation from low to high at full load    |               | --                        | ±0.5 | ±1    | %     |
| Output Voltage Accuracy                   | See Fig 1. Output Regulation Curve                       |               | --                        | ±0.5 | ±1.5  | %     |
| Ripple & Noise                            | Pure resistance load, 20MHz bandwidth peak-to-peak value |               | --                        | 30   | 80    | mVp-p |
| Temperature Drift Coefficient (Full Load) |                                                          |               | --                        | --   | ±0.03 | %/°C  |
| Output Short Circuit Protection           |                                                          |               | Continuous, self-recovery |      |       |       |

**GENERAL SPECIFICATIONS**

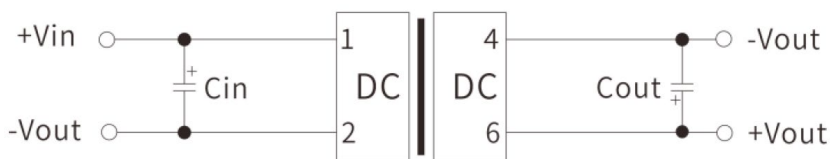
| Item                                   | Test Condition                                                 | Min                                                      | Typ | Max  | Unit |
|----------------------------------------|----------------------------------------------------------------|----------------------------------------------------------|-----|------|------|
| Insolation Voltage                     | Input-output, test time 1minute, leakage current less than 1mA | 1500                                                     | --  | --   | VDC  |
| Insolation Resistance                  | Input-output, insulation voltage 500VDC                        | 1000                                                     | --  | --   | MΩ   |
| Isolation Capacitor                    | Input-output, 100KHz/0.1V                                      | --                                                       | 20  | --   | pF   |
| Operating Temperature                  | Refer to Fig1. Temperature Derating                            | -40                                                      | --  | +85  | °C   |
| Storage Temperature                    |                                                                | -40                                                      | --  | +125 | °C   |
| Case Temperature Rise During Operation |                                                                | --                                                       | 25  | --   | %RH  |
| Storage Humidity                       | No Condensation                                                | 5                                                        | --  | 95   | %RH  |
| Pin Soldering Temperature Resistance   | Solder joint distance from housing 1.5mm, 10s                  | --                                                       | --  | +300 | °C   |
| Switching Frequency                    | Full load, nominal voltage input                               | --                                                       | 100 | --   | KHz  |
| Vibrations                             |                                                                | 10-55Hz, 10G, 30Min along X,Y & Z                        |     |      |      |
| Housing Material                       |                                                                | Black flame retardant & heat resistant plastic (UL94V-0) |     |      |      |
| MTBF                                   | MIL-HDBK-217F@25°C                                             | 3.5X10 <sup>6</sup>                                      |     |      | KHrs |

**TYPICAL CHARACTERISTIC CURVES****Fig 1.****Fig 2.**

**DESIGN REFERENCE****Typical Application**

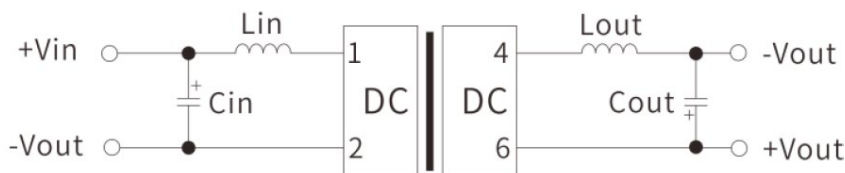
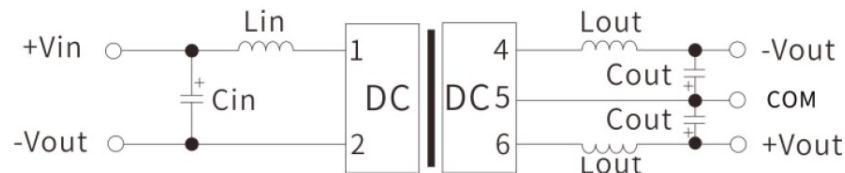
If want to reduce the input and output ripples, can connect a capacitor filter circuit to the input and output.

The application circuit is shown in Fig 3 & 4. However, be careful to select the appropriate filter capacitor. If the capacitance is too large, it might cause startup problems.

**Fig 3. Single Output****Fig 4. Dual Output**

| Vin (VDC) | Cin (uF) | Vo (VDC) | Cout (uF) |
|-----------|----------|----------|-----------|
| 3.3/5     | 4.7      | 3.3/5    | 20        |
| 12        | 2.2      | 9        | 4.7       |
| 15        | 2.2      | 12       | 2.2       |
| 24        | 1        | 15       | 1         |
| --        | --       | 24       | 0.47      |

Table1. Recommend Input and output Capacitor Values

**EMC Compliance Circuit****Fig 5. Single Output****Fig 5. Single Output**

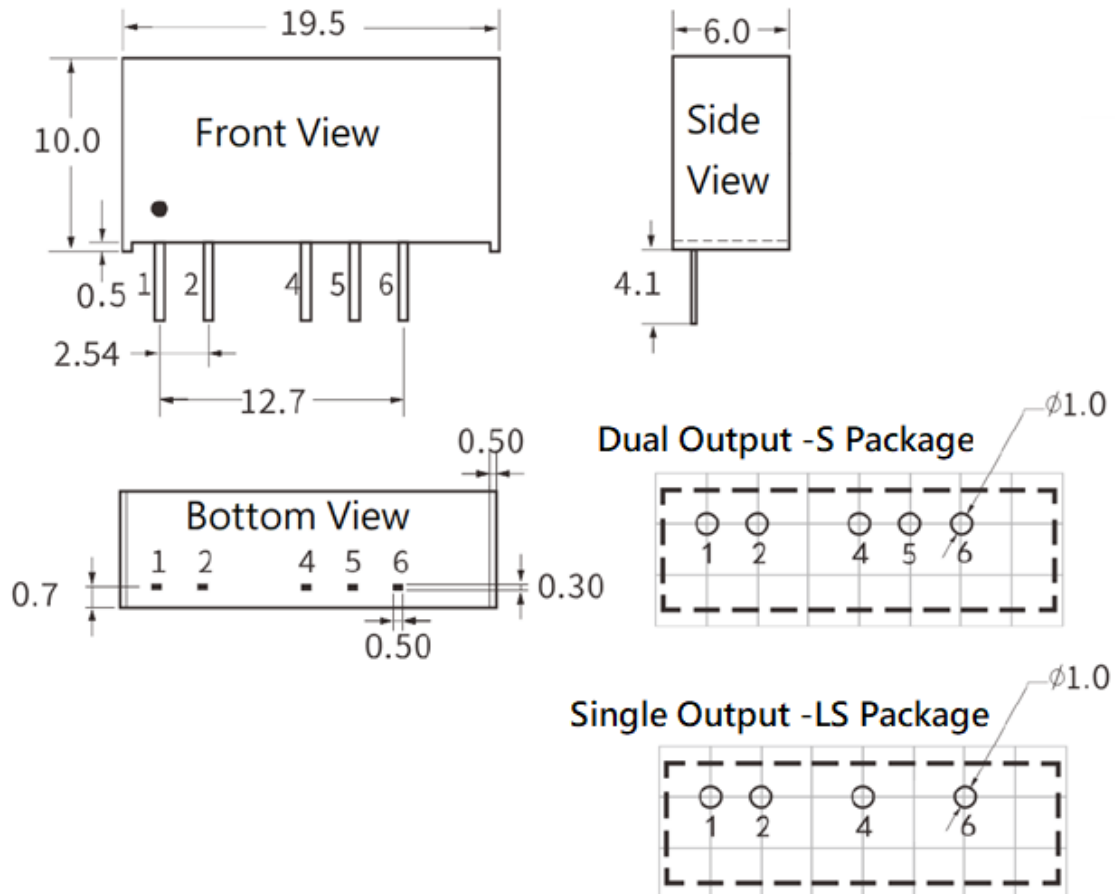
| Vin (VDC) | 3.3/5/12/15/24 |
|-----------|----------------|
| Cin       | 4.7uF/50V      |
| Cout      | See Table 1    |
| Lin       | 4.7uH          |
| Lout      | 4.7uH          |

Table 2. Recommend EMC Reference Value

**PACKAGE INFORMATION**

Package Code: S      Dimension: 19.5x6.0x10.0 mm (0.768x0.236x0.394 inch)

Package Code: LS      Dimension: 19.5x6.0x10.0 mm (0.768x0.236x0.394 inch)



| Pin-Out |           |            |
|---------|-----------|------------|
| Pin #   | AD-AxxxxS | AD-BxxxxLS |
|         | Dual      | Single     |
| 1       | Vin       | Vin        |
| 2       | GND       | GND        |
| 4       | -Vo       | 0V         |
| 5       | 0V        | -          |
| 6       | +Vo       | +Vo        |

Note: Grid 2.54 \* 2.54mm

Unit: mm

General tolerances:  $\pm 0.25$