



## FEATURES

- ◆ Wide (2:1) Input Range
- ◆ Short Circuit Protection(automatic recovery)
- ◆ 1500VDC Isolation
- ◆ Operating Temperature: -40℃~ + 85℃
- ◆ Five sided metal shielding
- ◆ No external component required
- ◆ Internal SMD construction
- ◆ RoHS Compliance
- ◆ MTBF>1000Khours

## MODEL SELECTION

**WRB<sup>①</sup> 24<sup>②</sup> 15<sup>③</sup> Y<sup>④</sup> D<sup>⑤</sup> -3W<sup>⑥</sup>**

- ① Product Series      ② Input Voltage  
 ③ Output Voltage      ④ Wide (2:1) Input Range  
 ⑤ DIP24 Package Style   ⑥ Rated Power

## APPLICATIONS

The WRA\_YD-3W&WRB\_YD-3W Series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board. These products apply to:

- 1) Where the voltage of the input power supply is wide range (Voltage range≤2:1);
- 2) Where isolation is necessary between input and output (Isolation voltage≤1500VDC);
- 3) Where the regulation of the Output voltage and the output ripple noise are demanded.



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## SELECTION GUIDE

| Order code    | Input        |        |      | Output        |             |      | Efficiency (%Typ.) |
|---------------|--------------|--------|------|---------------|-------------|------|--------------------|
|               | Voltage(VDC) |        |      | Voltage (VDC) | Current(mA) |      |                    |
|               | Nominal      | Range  | Max* |               | Max.        | Min. |                    |
| WRA0505YD-3W  | 5            | 4.5-9  | 11   | ±5            | ±300        | ±30  | 76                 |
| WRA0512YD-3W  | 5            | 4.5-9  | 11   | ±12           | ±125        | ±12  | 81                 |
| WRA0515YD-3W  | 5            | 4.5-9  | 11   | ±15           | ±100        | ±10  | 83                 |
| WRB0505YD-3W  | 5            | 4.5-9  | 11   | 5             | 600         | 60   | 76                 |
| WRB0512YD-3W  | 5            | 4.5-9  | 11   | 12            | 250         | 25   | 81                 |
| WRB0515YD-3W  | 5            | 4.5-9  | 11   | 15            | 200         | 20   | 81                 |
| WRA1205YD-3W  | 12           | 9-18   | 22   | ±5            | ±300        | ±30  | 76                 |
| WRA1212YD-3W  | 12           | 9-18   | 22   | ±12           | ±125        | ±12  | 81                 |
| WRA1215YD-3W  | 12           | 9-18   | 22   | ±15           | ±100        | ±10  | 83                 |
| WRB1203YD-3W  | 12           | 9-18   | 22   | 3.3           | 909         | 91   | 74                 |
| WRB1205YD-3W  | 12           | 9-18   | 22   | 5             | 600         | 60   | 76                 |
| WRB1212YD-3W  | 12           | 9-18   | 22   | 12            | 250         | 25   | 81                 |
| WRB1215YD-3W  | 12           | 9-18   | 22   | 15            | 200         | 20   | 81                 |
| WRA2405YD-3W  | 24           | 18-36  | 40   | ±5            | ±300        | ±30  | 76                 |
| WRA2412YD-3W  | 24           | 18-36  | 40   | ±12           | ±125        | ±12  | 81                 |
| WRA2415YD-3W  | 24           | 18-36  | 40   | ±15           | ±100        | ±10  | 83                 |
| WRB2403YD-3W  | 24           | 18-36  | 40   | 3.3           | 909         | 91   | 74                 |
| WRB2405YD-3W  | 24           | 18-36  | 40   | 5             | 600         | 60   | 76                 |
| WRB2412YD-3W  | 24           | 18-36  | 40   | 12            | 250         | 25   | 81                 |
| WRB2415YD-3W  | 24           | 18-36  | 40   | 15            | 200         | 20   | 81                 |
| WRA4805YD-3W  | 48           | 36-72  | 80   | ±5            | ±300        | ±30  | 85                 |
| WRA4812YD-3W  | 48           | 36-72  | 80   | ±12           | ±125        | ±12  | 83                 |
| WRA4815YD-3W  | 48           | 36-72  | 80   | ±15           | ±100        | ±10  | 85                 |
| WRB4803YD-3W  | 48           | 36-72  | 80   | 3.3           | 909         | 91   | 74                 |
| WRB4805YD-3W  | 48           | 36-72  | 80   | 5             | 600         | 60   | 78                 |
| WRB4812YD-3W  | 48           | 36-72  | 80   | 12            | 250         | 25   | 80                 |
| WRB4815YD-3W  | 48           | 36-72  | 80   | 15            | 200         | 20   | 80                 |
| WRB11012YD-3W | 110          | 72-144 | 155  | 12            | 250         | 25   | 80                 |
| WRB11024YD-3W | 110          | 72-144 | 155  | 24            | 125         | 12   | 78                 |

\*Input voltage can't exceed this value, or will cause the permanent damage.

## COMMON SPECIFICATIONS

| Parameter                | Conditions                     | Min. | Typ. | Max. | Units   |
|--------------------------|--------------------------------|------|------|------|---------|
| Storage humidity         |                                |      |      | 95   | %       |
| Operating temperature    |                                | -40  |      | 85   | ℃       |
| Storage temperature      |                                | -55  |      | 125  | ℃       |
| Temp. rise at full load  |                                |      | 15   |      | ℃       |
| Lead temperature         | 1.5mm from case for 10 seconds |      |      | 300  | ℃       |
| No-load power            |                                |      | 0.2  |      | W       |
| Cooling                  | Free Air Convection            |      |      |      |         |
| Short circuit protection | Continuous, automatic recovery |      |      |      |         |
| Case material            | Steel, nickel coated, copper   |      |      |      |         |
| Isolation voltage        | Tested for 1 minute and 1mA    | 1500 |      |      | VDC     |
| Isolation resistance     | Test at 500VDC                 | 1000 |      |      | MΩ      |
| Isolation Capacitance    | Input/Output                   |      | 85   |      | pF      |
| MTBF                     |                                | 1000 |      |      | K hours |
| Weight                   |                                |      | 15   |      | g       |

### TEMPERATURE CHARACTERISTICS

| Parameter                 | Conditions                     | Min. | Typ. | Max.  | Units |
|---------------------------|--------------------------------|------|------|-------|-------|
| Output power              | See below products program     | 0.3  |      | 3     | W     |
| Positive voltage accuracy | Refer to recommended circuit   |      | ±1   | ±3    | %     |
| Negative voltage accuracy | Refer to recommended circuit   |      | ±3   | ±5    | %     |
| Load regulation           | 10% to 100% load WRB-YD-3W     |      | ±0.5 | ±1    | %     |
| Load regulation           | 10% to 100% load WRA-YD-3W*    |      | ±0.5 | ±0.5  | %     |
| Temperature drift (Vout)  | Refer to recommended circuit   |      |      | ±0.03 | %/°C  |
| Line regulation           | Input voltage from low to high |      | ±0.2 | ±0.5  | %     |
| Ripple & Noise**          | 20MHz Bandwidth                |      | 50   | 100   | mVp-p |
| Switching frequency       | 100% load, input voltage range |      | 300  |       | KHz   |

\* Dual output models unbalanced load: ±5%.

\*\* Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

### APPLICATION NOTE

#### Requirement on output load

In order to ensure the product operate efficiently and reliably, in addition to a max load (namely full load), a minimum load is specified for this kind of DC/DC converter. Make sure the specified range of input voltage is not exceeded, the minimum output load no less than 10% load. If the actual load is less than the specified minimum load, the output ripple may increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, please add an appropriate resistor as extra loading, or contact our company for other lower output power products.

#### Recommended Circuit

All the WRA\_YD-3W & WRB\_YD-3W Series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load (See figure 1).

If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees (Table 1).

General: Cin: 5V & 12V 100µF  
24V & 48V 100µF-47µF  
Cout: 10µF/100mA

#### Input current

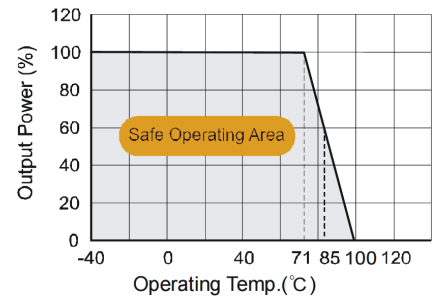
While using unstable power source, please ensure the output voltage and ripple voltage do not exceed indexes of the converter. Input current of power supply should afford the startup current of this kind of DC/DC module (See figure 2).

General:  $I_p \leq 1.4 \cdot I_{in-max}$

#### No parallel connection or plug and play

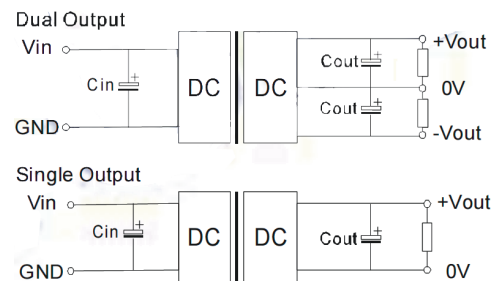
### TYPICAL CHARACTERISTICS

#### Temperature Derating Graph

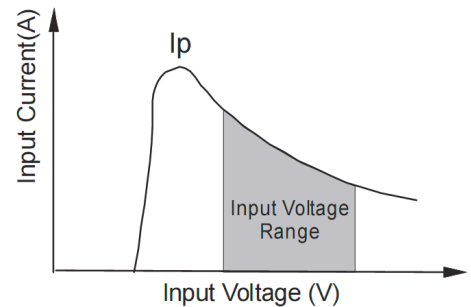


### RECOMMENDED CIRCUIT

#### Output Graph



(Figure 1)



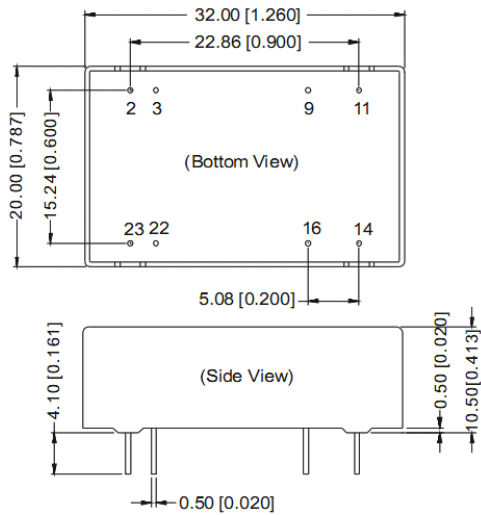
(Figure 2)

#### Output External Capacitor Table (Table 1)

| Single Vout (VDC) | Cout (µF) | Dual Vout (VDC) | Cout (µF) |
|-------------------|-----------|-----------------|-----------|
| 3.3               | 2200      | ±5              | 680       |
| 5                 | 1000      | ±9              | 470       |
| 12                | 470       | ±12             | 330       |
| 15                | 330       | ±15             | 220       |

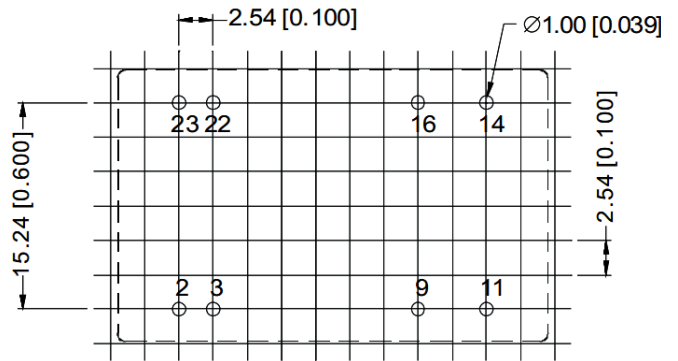
### OUTLINE DIMENSIONS & FOOTPRINT DETAILS

#### MECHANICAL DIMENSIONS



Note:  
 Unit:mm[inch]  
 Pin section tolerances:±0.10mm[±0.004inch]  
 General tolerances:±0.25mm[±0.010inch]

#### RECOMMENDED FOOTPRINT



RECOMMENDED FOOTPRINT  
 Top view grid:2.54mm(0.1inch)  
 diameter:1.00mm(0.039inch)

#### FOOTPRINT DETAILS

| Pin    | Single | Dual |
|--------|--------|------|
| 2, 3   | GND    | GND  |
| 9      | NC     | 0V   |
| 11     | NC     | -Vo  |
| 14     | +Vo    | +Vo  |
| 16     | 0V     | 0V   |
| 22, 23 | Vin    | Vin  |

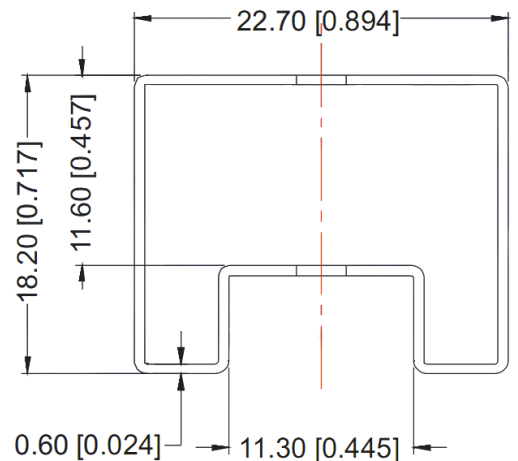
NC:No connection

**When the environment temperature is higher than 71°C, the product output power should be less than 60% of the rated power.**  
**No parallel connection or plug and play.**  
**Use dual output simultaneously,forbid pening output pin (0V) to use as single output.**

Note:

1. The load shouldn't be less than 10%, otherwise ripple will increase dramatically.
2. Operation under 10% load will not damage the converter; However, they may not meet all specification listed.
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on corporate standards.
5. Only typical models listed, other models may be different, please contact our technical person for more details.

#### TUBE OUTLINE DIMENSIONS



Note:  
 Unit :mm[inch]  
 General tolerances:±0.50mm[±0.020inch]  
 L=530mm[20.866inch] Tube Quantity: 15pcs  
 L=220mm[8.661inch] Tube Quantity: 6pcs