



## WRA\_ZP-6W & WRB\_ZP-6W Series 6W, WIDE INPUT, DUAL & SINGLE OUTPUT, DIP DC-DC CONVERTER

multi-country patent protection **RoHS**

### FEATURES

Efficiency up to 86%  
Wide (2:1) Input Range  
1.5KVDC Input/Output Isolation  
Continuous Short-Circuit Protection  
Operating Temperature: -40°C to +85°C  
Internal SMD construction  
Metal Shielding Package  
No Heat Sink Required  
Industry-Standard Pinout  
MTBF>1,000,000 hours  
RoHS Compliance

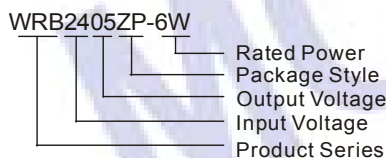
### APPLICATIONS

The WRA\_ZP-6W & WRB\_ZP-6W 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 $\leq$ 2:1);
- 2) Where isolation is necessary between input and output(Isolation Voltage $\leq$ 1500VDC);
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

### MODEL SELECTION



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### PRODUCT PROGRAM

| Part Number   | Input         |       |      | Output        |              |     | Efficiency (% Typ) |      |     |    |
|---------------|---------------|-------|------|---------------|--------------|-----|--------------------|------|-----|----|
|               | Voltage (VDC) |       |      | Voltage (VDC) | Current (mA) |     |                    |      |     |    |
|               | Nominal       | Range | Max* |               | Max          | Min |                    |      |     |    |
| WRA0505ZP-6W* | 5             | 4.5-7 | 9    | ±5            | ±600         | ±60 | 78                 |      |     |    |
| WRA0512ZP-6W* |               |       |      | ±12           | ±250         | ±25 | 80                 |      |     |    |
| WRA0515ZP-6W* |               |       |      | ±15           | ±200         | ±20 | 82                 |      |     |    |
| WRB0505ZP-6W* |               |       |      | 5             | 1200         | 120 | 78                 |      |     |    |
| WRB0512ZP-6W* |               |       |      | 12            | 500          | 50  | 80                 |      |     |    |
| WRB0515ZP-6W* |               |       |      | 15            | 400          | 40  | 82                 |      |     |    |
| WRB0524ZP-6W* |               |       |      | 24            | 250          | 25  | 81                 |      |     |    |
| WRA1205ZP-6W* |               |       |      | 12            | 9-18         | 20  | ±5                 | ±600 | ±60 | 78 |
| WRA1212ZP-6W* |               |       |      |               |              |     | ±12                | ±250 | ±25 | 80 |
| WRA1215ZP-6W* | ±15           | ±200  | ±20  |               |              |     | 82                 |      |     |    |
| WRB1203ZP-6W* | 3.3           | 1500  | 150  |               |              |     | 77                 |      |     |    |
| WRB1205ZP-6W  | 5             | 1200  | 120  |               |              |     | 78                 |      |     |    |
| WRB1212ZP-6W  | 12            | 500   | 50   |               |              |     | 80                 |      |     |    |
| WRB1215ZP-6W  | 15            | 400   | 40   |               |              |     | 82                 |      |     |    |
| WRB1224ZP-6W  | 24            | 250   | 25   |               |              |     | 81                 |      |     |    |
| WRA2405ZP-6W* | 24            | 18-36 | 40   |               |              |     | ±5                 | ±600 | ±60 | 82 |
| WRA2412ZP-6W* |               |       |      | ±12           | ±250         | ±25 | 84                 |      |     |    |
| WRA2415ZP-6W* |               |       |      | ±15           | ±200         | ±20 | 86                 |      |     |    |
| WRB2403ZP-6W  |               |       |      | 3.3           | 1500         | 150 | 79                 |      |     |    |
| WRB2405ZP-6W  |               |       |      | 5             | 1200         | 120 | 82                 |      |     |    |
| WRB2412ZP-6W  |               |       |      | 12            | 500          | 50  | 84                 |      |     |    |
| WRB2415ZP-6W  |               |       |      | 15            | 400          | 40  | 86                 |      |     |    |
| WRB2424ZP-6W* |               |       |      | 24            | 250          | 25  | 85                 |      |     |    |
| WRA4805ZP-6W* |               |       |      | 48            | 36-72        | 80  | ±5                 | ±600 | ±60 | 82 |
| WRA4812ZP-6W* | ±12           | ±250  | ±25  |               |              |     | 84                 |      |     |    |
| WRA4815ZP-6W* | ±15           | ±200  | ±20  |               |              |     | 86                 |      |     |    |
| WRB4805ZP-6W  | 5             | 1200  | 120  |               |              |     | 82                 |      |     |    |
| WRB4812ZP-6W  | 12            | 500   | 50   |               |              |     | 84                 |      |     |    |
| WRB4815ZP-6W  | 15            | 400   | 40   |               |              |     | 86                 |      |     |    |
| WRB4824ZP-6W  | 24            | 250   | 25   |               |              |     | 85                 |      |     |    |

\* Designing.

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

### OUTPUT SPECIFICATIONS

| Item                          | Test Conditions                  | Min | Typ    | Max  | Units |
|-------------------------------|----------------------------------|-----|--------|------|-------|
| Output Power                  | See below products program       |     |        | 6    | W     |
| Line Regulation(at full load) | Input voltage from low to high   |     | ±0.2   | ±0.5 | %     |
| Load Regulation               | From 10% To 100% load            |     | ±0.5   | ±1*  |       |
| Positive Voltage Accuracy     | Refer to recommended circuit     |     | ±1     | ±3   |       |
| Negative Voltage Accuracy     | Refer to recommended circuit     |     | ±3     | ±5   |       |
| Temperature Drift(Vout)       | Refer to recommended circuit     |     | 0.02   |      | %/°C  |
| Ripple                        | 20MHz bandwidth                  |     | 10     | 30   | mVp-p |
| Noise                         | 20MHz bandwidth                  |     | 50     | 150  |       |
| Switching Frequency           | 100% load, nominal Input voltage |     | 80-550 |      | KHz   |

\* Dual output models unbalanced load: ±3%

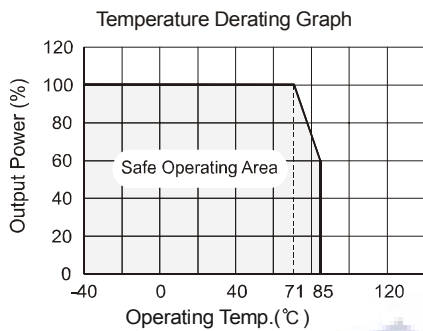
## COMMON SPECIFICATION

| Item                     | Test Conditions                | Min                            | Typ | Max | Units   |
|--------------------------|--------------------------------|--------------------------------|-----|-----|---------|
| Storage humidity         |                                |                                |     | 95  | %       |
| Operating temperature    |                                | -40                            |     | 85  | °C      |
| Storage temperature      |                                | -55                            |     | 125 |         |
| Lead temperature         | 1.5mm from case for 10 seconds |                                |     | 300 |         |
| Temp. rise at full load  |                                |                                | 40  |     |         |
| Cooling                  |                                | Free air convection            |     |     |         |
| Isolation voltage        | Flash tested for 60 seconds    | 1500                           |     |     | VDC     |
| Isolation resistance     | Test at 500VDC                 | 1000                           |     |     | MΩ      |
| Short circuit protection |                                | Continuous, automatic recovery |     |     |         |
| Case material            |                                | Copper, Nickel Plated          |     |     |         |
| MTBF                     |                                | 1000                           |     |     | K Hours |
| Weigh                    |                                |                                | 17  |     | g       |

Note:

- All specifications measured at  $T_A=25^{\circ}\text{C}$ , humidity<75%, nominal input voltage and rated output load unless otherwise specified.
- See below recommended circuits for more details.

## TYPICAL CHARACTERISTICS

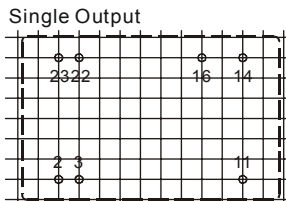
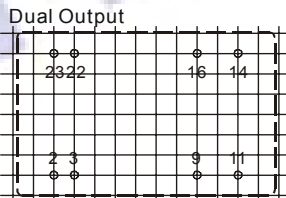
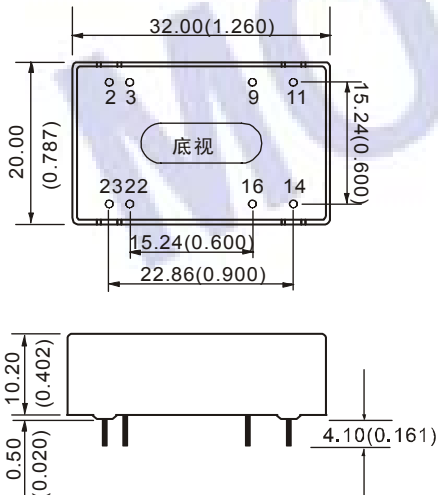


## OUTLINE DIMENSIONS & PIN CONNECTIONS

First Angle Projection

### RECOMMENDED FOOTPRINT

Top view, grid: 2.54mm (0.1inch), diameter: 1.00mm



### FOOTPRINT DETAILS

| Pin    | Single | Dual |
|--------|--------|------|
| 2, 3   | GND    | GND  |
| 9      | NO Pin | 0V   |
| 11     | NC     | -Vo  |
| 14     | +Vo    | +Vo  |
| 16     | 0V     | 0V   |
| 22, 23 | Vin    | Vin  |

NC: No Connection

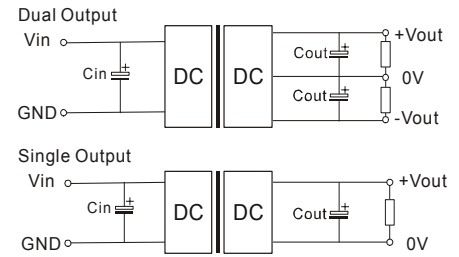
Note:

- Unit: mm (inch)
- Pin section: 0.50mm (0.020inch)
- Pin tolerances:  $\pm 0.05\text{mm}$  ( $\pm 0.002\text{inch}$ )
- General tolerances:  $\pm 0.25\text{mm}$  ( $\pm 0.010\text{inch}$ )

## APPLICATION NOTE

### Recommended Circuit

All the WRA\_ZP-6W&WRB\_ZP-6W Series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load. Never be tested under no load (see Figure 1).



(Figure 1)

If you want to further decrease the output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance should not be too high. (Table 1).

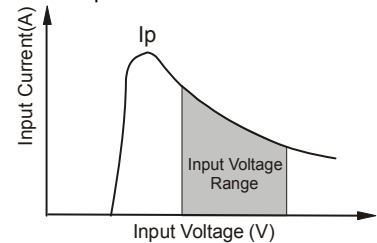
External Capacitor Table (Table 1)

| Vin (VDC) | Cin (uF) | Single Vout (VDC) | Cout (uF) | Dual Vout (VDC) | Cout (uF) |
|-----------|----------|-------------------|-----------|-----------------|-----------|
| 5         | 100      | 3.3               | 3300      | $\pm 5$         | 1000      |
| 12        | 100      | 5                 | 2700      | $\pm 9$         | 680       |
| 24        | 10-47    | 9                 | 2200      | $\pm 12$        | 470       |
| 48        | 10-47    | 12                | 1000      | $\pm 15$        | 330       |
| -         | -        | 15                | 680       | -               | -         |
| -         | -        | 24                | 470       | -               | -         |

### Input Current

When it is used in unregulated power supply, be sure that the fluctuating range of the power supply and the rippled voltage do not exceed the module standard. Input current of power supply should afford the startup current of this kind of DC/DC module. (Figure 2)

General:  $I_p \leq 1.6 \cdot I_{in-max}$



(Figure 2)

The products cannot be used in parallel and in hot plug.