

## PWE\_D-6W & PWF\_D-6W Series

### 6W, 4:1 WIDE INPUT, ISOLATED & REGULATED SINGLE/DUAL OUTPUT DIP DC/DC CONVERTER

multi-country patent protection **RoHS**

#### FEATURES

- High Efficiency up to 86%
- Operating Temperature: -40°C to +85°C
- 3KVDC Input/Output Isolation
- Short Circuit Protection(Automatic recovery)
- Internal SMD construction
- No Heat Sink Required
- Industry Standard Pinout
- MTBF>1,000,000 hours
- RoHS Compliance

#### APPLICATIONS

The PWE\_D-6W & PWF\_D-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≤ 4:1);
- 2) Where isolation is necessary between input and output (Isolation Voltage≤3000VDC);
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

#### PRODUCT PROGRAM

| Part Number    | Input         |       |       | Output        |              |     | Efficiency (% , Typ) |
|----------------|---------------|-------|-------|---------------|--------------|-----|----------------------|
|                | Voltage (VDC) |       |       | Voltage (VDC) | Current (mA) |     |                      |
|                | Nominal       | Range | Max** |               | Max          | Min |                      |
| PWE2405D-6W *  | 24            | 9-36  | 40    | ±5            | ±600         | ±60 | 80                   |
| PWE 2412D-6W * |               |       |       | ±12           | ±250         | ±25 | 83                   |
| PWE 2415D-6W * |               |       |       | ±15           | ±200         | ±20 | 85                   |
| PWE 2424D-6W * |               |       |       | ±24           | ±125         | ±13 | 86                   |
| PWF2403D-6W *  |               |       |       | 3.3           | 1500         | 150 | 78                   |
| PWF2405D-6W *  |               |       |       | 5             | 1200         | 120 | 80                   |
| PWF2412D-6W    |               |       |       | 12            | 500          | 50  | 83                   |
| PWF2415D-6W *  |               |       |       | 15            | 400          | 40  | 85                   |
| PWF2424D-6W *  |               |       |       | 24            | 250          | 25  | 86                   |
| PWE4805D-6W *  |               |       |       | 48            | 18-72        | 80  | ±5                   |
| PWE4812D-6W *  | ±12           | ±250  | ±25   |               |              |     | 83                   |
| PWE4815D-6W *  | ±15           | ±200  | ±20   |               |              |     | 85                   |
| PWE4824D-6W *  | ±24           | ±125  | ±13   |               |              |     | 86                   |
| PWF4803D-6W *  | 3.3           | 1500  | 150   |               |              |     | 78                   |
| PWF4805D-6W *  | 5             | 1200  | 120   |               |              |     | 80                   |
| PWF4812D-6W *  | 12            | 500   | 50    |               |              |     | 84                   |
| PWF4815D-6W *  | 15            | 400   | 40    |               |              |     | 85                   |
| PWF4824D-6W *  | 24            | 250   | 25    |               |              |     | 86                   |

\* Designing.

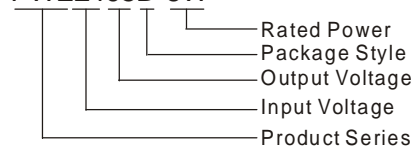
\*\*Input voltage can't exceed this value, or will cause the permanent damage.

Note: The load shouldn't be less than 10%, otherwise ripple will increase dramatically.

Operation under 10% load will not damage the converter; However, they may not meet all specification listed.

#### MODEL SELECTION

PWE2405D-6W



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#### OUTPUT SPECIFICATIONS

| Item                          | Test Conditions                 | Min | Typ  | Max  | Units |
|-------------------------------|---------------------------------|-----|------|------|-------|
| Output Power                  | See below products program      | 0.6 |      | 6    | W     |
| Positive Voltage accuracy     | Refer to recommended circuit    |     | ±1   | ±3   | %     |
| Negative Voltage accuracy     | Refer to recommended circuit    |     | ±3   | ±5   |       |
| Load Regulation               | From 10% to 100% load           |     | ±0.5 | ±2*  |       |
| Line Regulation(at full load) | Input voltage from low to high  |     | ±0.2 | ±0.5 |       |
| Temperature Drift(Vout)       | Refer to recommended circuit    |     | 0.02 |      | %/°C  |
| Ripple**                      | 20MHz bandwidth                 |     | 30   | 50   | mVp-p |
| Noise**                       | 20MHz bandwidth                 |     | 75   | 150  |       |
| Switching Frequency           | 100% load,nominal Input voltage |     | 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.

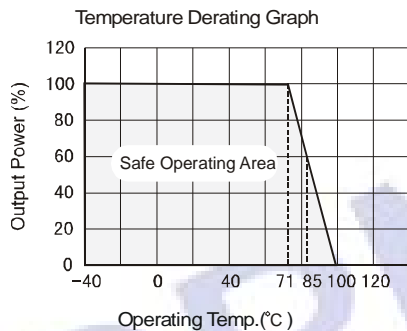
## COMMON SPECIFICATION

| Item                      | Test Conditions                 | Min                            | Typ | Max | Units   |
|---------------------------|---------------------------------|--------------------------------|-----|-----|---------|
| Storage Humidity          |                                 |                                |     | 95  | %       |
| Storage Temperature       |                                 | -40                            |     | 85  | °C      |
| Operating Temp.           |                                 | -55                            |     | 125 |         |
| Temp. rise at full load   |                                 |                                | 40  |     |         |
| Lead Temperature          | 1.5mm from case for 10 seconds  |                                |     | 300 |         |
| Isolation voltage         | Tested for 1 minute and 1mA max | 3000                           |     |     | VDC     |
| Isolation resistance      | Test at 500VDC                  | 1000                           |     |     | MΩ      |
| No-load power consumption |                                 |                                | 500 |     | mW      |
| Cooling                   |                                 | Free air convection            |     |     |         |
| Case Material             |                                 | Plastic(UL94-V0)               |     |     |         |
| Short Circuit Protection  |                                 | Continuous, automatic recovery |     |     |         |
| MTBF                      |                                 | 1000                           |     |     | K hours |
| Weight                    |                                 |                                | 17  |     | g       |

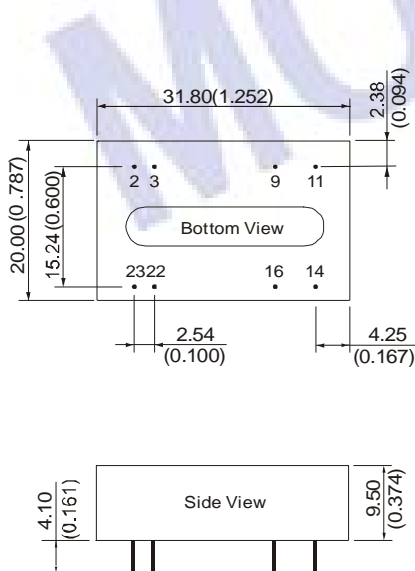
Note:

- 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



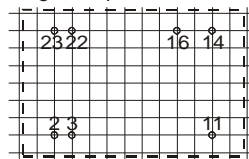
## OUTLINE DIMENSIONS & FOOTPRINT DETAILS



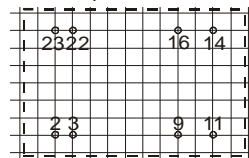
First Angle Projection

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

Single Output



Dual Output



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 diameter: 0.50mm (0.020inch)
- Pin diameter tolerances:  $\pm 0.10\text{mm}$  ( $\pm 0.004\text{inch}$ )
- General tolerances:  $\pm 0.25\text{mm}$  ( $\pm 0.010\text{inch}$ )

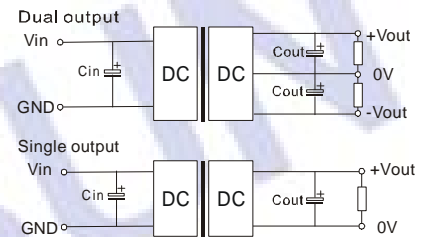
## APPLICATION NOTE

### Requirement 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 PWE\_D-6W & PWF\_D-6W Series have been tested according to the following recommended testing circuit before leaving factory. (See Figure 1).



(Figure 1)

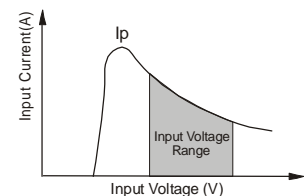
If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance should not be too high (See table 1).

EXTERNAL CAPACITOR TABLE (Table 1)

| Vin (VDC) | Cin (uF) | Single Vout (VDC) | Cout (uF) | Dual Vout (VDC) | Cout (uF) |
|-----------|----------|-------------------|-----------|-----------------|-----------|
| 24        | 10-47    | 3.3               | 2200      | $\pm 5$         | 680       |
| 48        | 10-47    | 5                 | 1000      | $\pm 12$        | 470       |
| -         | -        | 12                | 470       | $\pm 15$        | 330       |
| -         | -        | 15                | 330       | $\pm 24$        | 220       |
| -         | -        | 24                | 220       | -               | -         |

### 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. (See figure 2)



(Figure 2)

**No parallel connection or plug and play.**