

### DCWB\_S-10W Series



CE Report RoHS 

### FEATURES

- Ultra-wide 4:1 input voltage range
- High efficiency up to 88%
- I/O isolation test voltage 1.5k VDC
- High power density
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40°C to +105°C
- Industry standard pin-out
- 3 Years Warranty

### DESCRIPTION

DC-DC Module Power Supply, Wide Voltage Input, Power 10W, Isolated, Regulated, Single Output, SIP Packaging.

### MODEL NUMBERING

## DCWBxxxxS-10W



### SELECTION GUIDE

| Product Model | Input Voltage<br>Standard Value(range) | Output<br>Voltage<br>(Vdc) | Output<br>Current (mA)<br>(Max./Min.) | Efficiency %<br>(Min./Typ.) | Maximum<br>capacitive load<br>(μF) |
|---------------|----------------------------------------|----------------------------|---------------------------------------|-----------------------------|------------------------------------|
| DCWB2403S-10W | 24VDC<br>(9-36)                        | 3.3                        | 2400/0                                | 83/85                       | 2200                               |
| DCWB2405S-10W |                                        | 5                          | 2000/0                                | 86/88                       | 2200                               |
| DCWB2406S-10W |                                        | 6                          | 1667/0                                | 86/88                       | 1500                               |
| DCWB2409S-10W |                                        | 9                          | 1111/0                                | 86/88                       | 680                                |
| DCWB2412S-10W |                                        | 12                         | 833/0                                 | 86/88                       | 470                                |
| DCWB2415S-10W |                                        | 15                         | 667/0                                 | 86/88                       | 330                                |
| DCWB2424S-10W |                                        | 24                         | 417/0                                 | 86/88                       | 220                                |

**DC-DC CONVERTERS**
**10 WATTS**

| Product Model | Input Voltage<br>Standard Value(range) | Output<br>Voltage<br>(Vdc) | Output<br>Current (mA)<br>(Max./Min.) | Efficiency %<br>(Min./Typ.) | Maximum<br>capacitive load<br>( $\mu$ F) |
|---------------|----------------------------------------|----------------------------|---------------------------------------|-----------------------------|------------------------------------------|
| DCWB4803S-10W | 48VDC<br>(18-75)                       | 3.3                        | 2400/0                                | 82/84                       | 2200                                     |
| DCWB4805S-10W |                                        | 5                          | 2000/0                                | 86/88                       | 2200                                     |
| DCWB4812S-10W |                                        | 12                         | 833/0                                 | 85/87                       | 470                                      |
| DCWB4824S-10W |                                        | 24                         | 417/0                                 | 84/86                       | 220                                      |
| DCWB4828S-10W |                                        | 28                         | 360/0                                 | 84/86                       | 200                                      |

**INPUT CHARACTERISTICS**

| Parameter                  | Conditions                  | Min. | Typ. | Max. | Units |
|----------------------------|-----------------------------|------|------|------|-------|
| Input current (Rated Load) | Nominal voltage input 24VDC | --   | 389  | 485  | mA    |
|                            | Nominal voltage input 48VDC | --   | 777  | 992  | mA    |
| Input current (No-load)    | Nominal voltage input 24VDC | --   | 9    | 45   | mA    |
|                            | Nominal voltage input 48VDC | --   | 15   | 25   | mA    |
| Reflected ripple current   |                             | --   | 50   | --   | mA    |
| Input impulse voltage      | Nominal voltage input 24VDC | -0.7 | --   | 50   | VDC   |
|                            | Nominal voltage input 48VDC | -0.7 | --   | 100  | VDC   |
| Starting voltage           | Nominal voltage input 24VDC | --   | --   | 9    | VDC   |
|                            | Nominal voltage input 48VDC | --   | --   | 18   | VDC   |

## DC-DC CONVERTERS

## 10 WATTS

| Parameter                                           | Conditions                    | Min.                     | Typ. | Max. | Units |
|-----------------------------------------------------|-------------------------------|--------------------------|------|------|-------|
| Under voltage protect                               | Nominal voltage input 24VDC   | 5.5                      | 6.5  | --   | VDC   |
|                                                     | Nominal voltage input 48VDC   | 13                       | 16   | --   | VDC   |
| Input filter                                        |                               | Capacitance type         |      |      |       |
| Remote control foot<br>(Some models are applicable) | Module Off                    | 0-1.2V turn off          |      |      |       |
|                                                     | Module On                     | No connect or 3.5-12V on |      |      |       |
|                                                     | Input current during shutdown | --                       | 6    | 10   | mA    |

Remarks: This product does not support hot plug

## OUTPUT CHARACTERISTIC

| Parameter                       | Conditions                                            | Min.                      | Typ.  | Max.  | Units |
|---------------------------------|-------------------------------------------------------|---------------------------|-------|-------|-------|
| Output Voltage Accuracy         | 5% -100% Load                                         | --                        | ±1.5  | ±3    | %     |
| Line Regulation Rate            | 100% Load, Input voltage from low limit to high limit | --                        | ±0.25 | ±0.5  | %     |
| Load Regulation Rate            | 5% to 100% load                                       | --                        | ±0.5  | ±1.0  | %     |
| Ripple & Noise                  | 20MHz bandwidth,<br>5% - 100% Load                    | --                        | 75    | 150   | mVp-p |
| Dynamic Response Step Deviation |                                                       | --                        | ±3    | ±8    | %     |
| Dynamic Response Recovery Time  |                                                       | --                        | 300   | 500   | μs    |
| Temperature Drift Coefficient   | 100%load                                              | --                        | --    | ±0.03 | %/°C  |
| Output Overcurrent Protection   | Input voltage range                                   | 110                       | 160   | 230   | %Io   |
| Short Circuit Protection        | Input voltage range                                   | Sustainable, Self-healing |       |       |       |

Note: The testing method for ripple and noise is the parallel line testing method.

## GENERAL CHARACTERISTIC

| Parameter                                | Conditions                                                       | Min.                                   | Typ. | Max. | Units              |
|------------------------------------------|------------------------------------------------------------------|----------------------------------------|------|------|--------------------|
| Isolation voltage                        | Input-output, Test time 1 minute, Leakage current less than 1 mA | 1500                                   | --   | --   | VDC                |
| Insulation resistance                    | Input-output, Insulation voltage 500VDC                          | 1000                                   | --   | --   | MΩ                 |
| Isolation capacitance                    | Input-output, 100KHz/0.1V                                        | --                                     | 1000 | --   | pF                 |
| Working temperature                      | Temperature $\geq 71^{\circ}\text{C}$ for derating (See Fig.1)   | -40                                    | --   | +85  | $^{\circ}\text{C}$ |
| Storage temperature                      |                                                                  | -55                                    | --   | +125 | $^{\circ}\text{C}$ |
| Storage humidity                         | Non condensing                                                   | 5                                      | --   | 95   | %RH                |
| Soldering temperature resistance of pins | Soldering spot is 1.5mm away from case for 10 seconds            | --                                     | --   | 300  | $^{\circ}\text{C}$ |
| Switching frequency                      | Full load, Nominal input voltage                                 | 250                                    | 300  | 400  | kHz                |
| Mean time between failures 【MTBF】        | MIL-HDBK-217F@25 $^{\circ}\text{C}$                              | 1000                                   | --   | --   | kHours             |
| Switching frequency                      |                                                                  | 10-150Hz, 5G, 0.75mm. along X, Y and Z |      |      |                    |

## PHYSICAL CHARACTERISTICS

| Parameter          |       | Contents                                                   |
|--------------------|-------|------------------------------------------------------------|
| Housing material   |       | Black flame retardant and heat-resistant plastic (UL94V-0) |
| Overall dimensions |       | 22.00 × 9.50 × 12.00 mm                                    |
| Weight             | 24VDC | 5.5g(Typ.)                                                 |
|                    | 48VDC | 5.8g(Typ.)                                                 |
| Cooling mode       |       | Natural air cooling                                        |

### EMC CHARACTERISTICS

| Parameter | Category | Content                                                                                                               |
|-----------|----------|-----------------------------------------------------------------------------------------------------------------------|
| EMI       | CE       | CISPR32/EN55032 CLASS B (The recommended circuit is shown in Figure 2-②)                                              |
|           | RE       | CISPR32/EN55032 CLASS B (The recommended circuit is shown in Figure 2-②)                                              |
| EMS       | ESD      | IEC/EN61000-4-2 Contact $\pm 4\text{kV}$ perf. Criteria B                                                             |
|           | RS       | IEC/EN61000-4-3 10V/m perf. Criteria A                                                                                |
|           | EFT      | IEC/EN61000-4-4 IEC/EN61000-4-4 $\pm 2\text{kV}$<br>(The recommended circuit is shown in Figure 2-①) perf. Criteria B |
|           | Surge    | IEC/EN61000-4-5 line to line $\pm 2\text{kV}$<br>(The recommended circuit is shown in Figure 2-①) perf. Criteria B    |
|           | CS       | IEC/EN61000-4-6 3 Vr.m.s perf. Criteria A                                                                             |

### CIRCUIT DESIGN AND APPLICATION

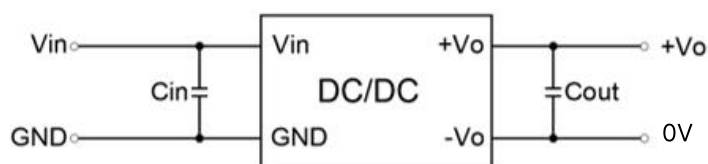


Fig. 1

Table 1: Recommended Capacitive Load Values

| Cin   | Vout       | Cout     |
|-------|------------|----------|
| 24VDC | 3.3/5/9VDC | 22uF/16V |
|       | 12/15VDC   | 22uF/25V |
|       | 24VDC      | 22uF/50V |

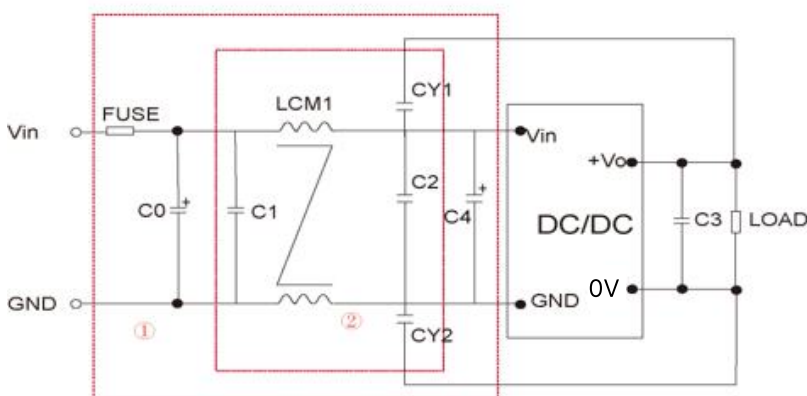


Fig. 2

Table 2: Recommended Circuit Parameter Values

| Model    | Vin:24V                                                      |
|----------|--------------------------------------------------------------|
| Fuse     | Select according to the actual input current of the customer |
| C0, C4   | 330uF/50V                                                    |
| C1, C2   | 10uF/50V                                                     |
| LCM1     | 470uH                                                        |
| C3       | Refer to the Cout parameter in Fig 1                         |
| CY1, CY2 | 1nF/2000VDC                                                  |

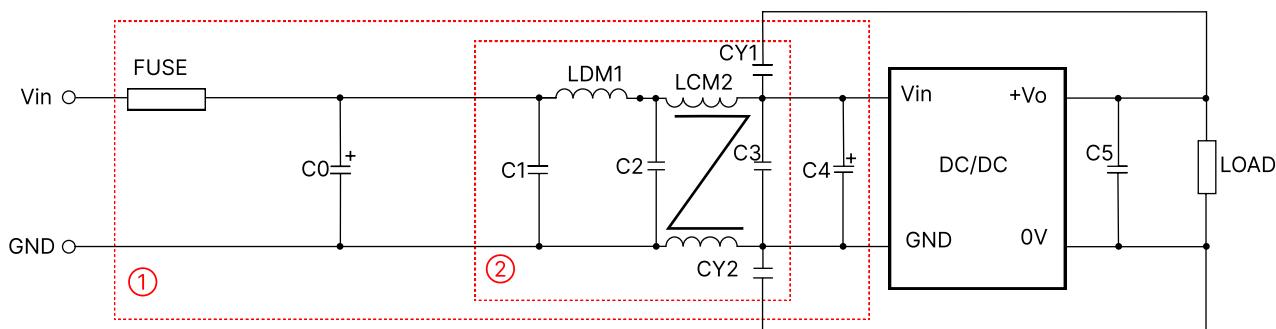


Fig.3

Table 3: Recommended Circuit Parameter Values

| Model  | Vin:48V                                                      | Model    | Vin:48V                       |
|--------|--------------------------------------------------------------|----------|-------------------------------|
| Fuse   | Select according to the actual input current of the customer | C5       | 4.7uH Refer to Cout in Fig. 1 |
| C0, C4 | 560uF/100V                                                   | LDM1     | 4.7uH                         |
| C1     | 10μF/100V                                                    | LCM2     | 1mH                           |
| C2     | 10μF/100V                                                    | CY1, CY2 | 1nF/400VAC                    |
| C3     | 27uF/100V                                                    |          |                               |

## PRODUCT CHARACTERISTIC CURVE

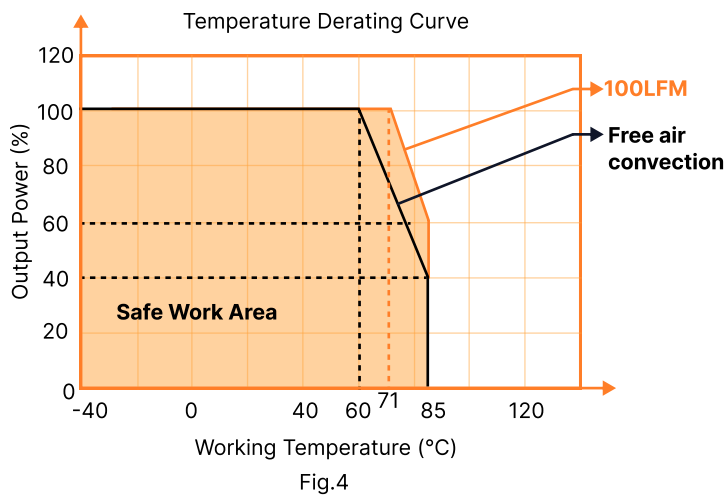
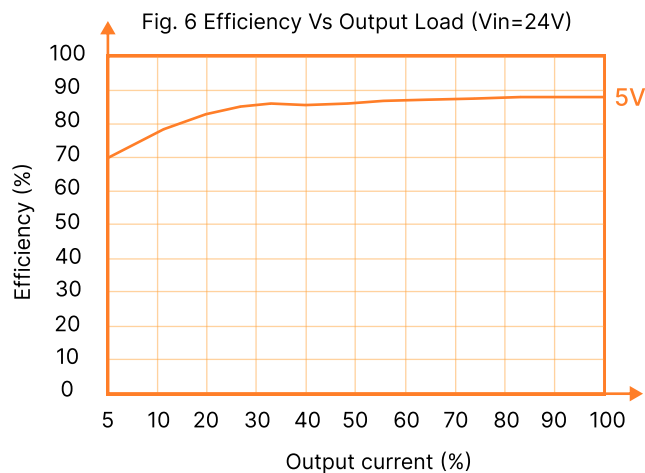
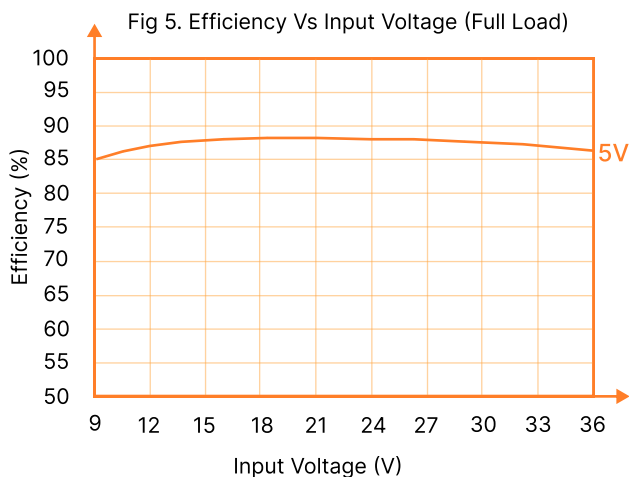
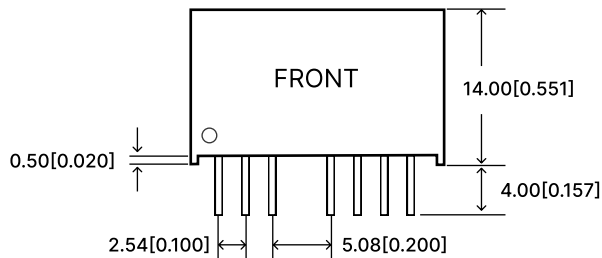


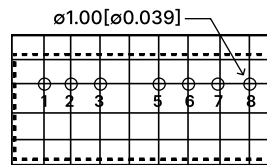
Fig.4



## OVERALL DIMENSIONS AND PIN FUNCTIONS



THIRD ANGLE PROJECTION



Note: The grid distance is 2.54mm \* 2.54mm

Note:  
Dimensions in mm  
Terminal diameter tolerance:  $\pm 0.10 [\pm 0.004]$   
Undeclared tolerance:  $\pm 0.50 [\pm 0.020]$

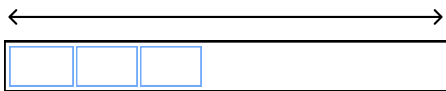
Table 4: Pin Function Table

| Pin | Function |
|-----|----------|
| 1   | GND      |
| 2   | Vin      |
| 3   | Ctrl     |
| 5   | NC       |
| 6   | +Vo      |
| 7   | 0V       |
| 8   | NC       |

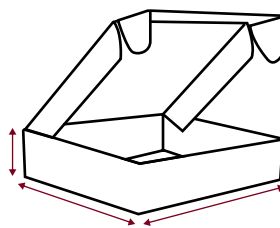
\*NC cannot be connected to any external circuits

Fig. 7

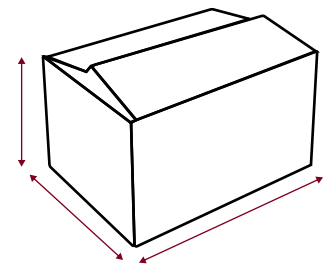
## PACKAGING METHOD



16 Pieces/Tube



432 Pieces/Inner box



2160 Pieces/Outer box

## NOTES & INSTRUCTIONS

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on company corporate standards;
4. The copyright and the final interpretation right of the product belong to RHENXV.