

FEATURES

- ◆ RoHS compliant
- ◆ Efficiency up to 86%
- ◆ SIP Package
- ◆ Wide temperature performance at full 1 Watt load, -40°C to 85°C
- ◆ UL 94V-0 package material
- ◆ No heatsink required
- ◆ Low ripple and good EMC Features
- ◆ Industry standard pinout
- ◆ Power sharing on output
- ◆ I/O Isolation 1500VDC
- ◆ Short Circuit Protection (automatic recovery)
- ◆ Internal SMD construction
- ◆ External On/Off control
- ◆ 2:1 wide input voltage range

MODEL SELECTION

WRA^①05^②05^③Y^④S^⑤-1W^⑥

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

DESCRIPTION

The WRA_YS-1W & WRB_YS-1W series are specially designed for applications where a group of polar 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.



SELECTION GUIDE

| order code | Input | | | Output | | | Efficiency (% Typ) |
|--------------|--------------|-----------|------|-------------|-----|---------------|--------------------|
| | Voltage(VDC) | | | Current(MA) | | Voltage (VDC) | |
| | Nominal | Range | Max* | Max | Min | | |
| WRA0505YS-1W | 5 | 4.5-9.0 | 11 | ±100 | ±10 | ±5 | 72 |
| WRA0512YS-1W | 5 | 4.5-9.0 | 11 | ±42 | ±4 | ±12 | 76 |
| WRA0515YS-1W | 5 | 4.5-9.0 | 11 | ±33 | ±3 | ±15 | 75 |
| WRB0505YS-1W | 5 | 4.5-9.0 | 11 | 200 | 20 | 5 | 72 |
| WRB0509YS-1W | 5 | 4.5-9.0 | 11 | 111 | 11 | 9 | 74 |
| WRB0512YS-1W | 5 | 4.5-9.0 | 11 | 83 | 8 | 12 | 76 |
| WRB0515YS-1W | 5 | 4.5-9.0 | 11 | 67 | 7 | 15 | 75 |
| WRA1205YS-1W | 12 | 9.0-18.0 | 22 | ±100 | ±10 | ±5 | 76 |
| WRA1212YS-1W | 12 | 9.0-18.0 | 22 | ±42 | ±4 | ±12 | 80 |
| WRA1215YS-1W | 12 | 9.0-18.0 | 22 | ±33 | ±3 | ±15 | 80 |
| WRB1205YS-1W | 12 | 9.0-18.0 | 22 | 200 | 20 | 5 | 76 |
| WRB1209YS-1W | 12 | 9.0-18.0 | 22 | 111 | 11 | 9 | 78 |
| WRB1212YS-1W | 12 | 9.0-18.0 | 22 | 83 | 8 | 12 | 80 |
| WRB1215YS-1W | 12 | 9.0-18.0 | 22 | 67 | 7 | 15 | 80 |
| WRA2405YS-1W | 24 | 18.0-36.0 | 40 | ±100 | ±10 | ±5 | 78 |
| WRA2412YS-1W | 24 | 18.0-36.0 | 40 | ±42 | ±4 | ±12 | 81 |
| WRA2415YS-1W | 24 | 18.0-36.0 | 40 | ±33 | ±3 | ±15 | 81 |
| WRB2405YS-1W | 24 | 18.0-36.0 | 40 | 200 | 20 | 5 | 76 |
| WRB2409YS-1W | 24 | 18.0-36.0 | 40 | 111 | 11 | 9 | 78 |
| WRB2412YS-1W | 24 | 18.0-36.0 | 40 | 83 | 8 | 12 | 81 |
| WRB2415YS-1W | 24 | 18.0-36.0 | 40 | 67 | 7 | 15 | 81 |
| WRB2424YS-1W | 24 | 18.0-36.0 | 40 | 42 | 2 | 24 | 78 |
| WRA4805YS-1W | 48 | 36.0-72.0 | 80 | ±100 | ±10 | ±5 | 76 |
| WRA4812YS-1W | 48 | 36.0-72.0 | 80 | ±42 | ±4 | ±12 | 80 |
| WRA4815YS-1W | 48 | 36.0-72.0 | 80 | ±33 | ±3 | ±15 | 80 |
| WRB4805YS-1W | 48 | 36.0-72.0 | 80 | 200 | 20 | 5 | 76 |
| WRB4809YS-1W | 48 | 36.0-72.0 | 80 | 111 | 11 | 9 | 78 |
| WRB4812YS-1W | 48 | 36.0-72.0 | 80 | 83 | 8 | 12 | 80 |
| WRB4815YS-1W | 48 | 36.0-72.0 | 80 | 67 | 7 | 15 | 80 |

OUTPUT SPECIFICATIONS

| Parameter | Test conditions | Min. | Typ. | Max. | Units |
|-------------------------|-------------------------------------|------|------|------|--------|
| Output power | Refer to product program | 0.1 | | 1 | W |
| Line regulation | Input voltage from low to high | | ±0.2 | ±0.5 | % |
| Load regulation | 10% to 100% full load(WRB_CKS-1W) | | ±0.5 | ±0.7 | % |
| | 10% to 100% full load(WRA_CKS-1W)* | | ±0.5 | ±1.0 | % |
| Output voltage accuracy | Refer to recommended circuit | | ±1 | ±3.0 | % |
| Temperature drift(Vout) | Refer to recommended circuit | | | ±0.0 | %/°C |
| Output Ripple** | 20MHz Bandwidth | | 25 | 75 | MV p-p |
| Output Noise** | 20MHz Bandwidth | | 25 | 75 | MV p-p |
| Switching frequency | 100% Full load, input voltage range | | 300 | | Khz |

* Dual output models unbalanced load (25/100%):±5%Max

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

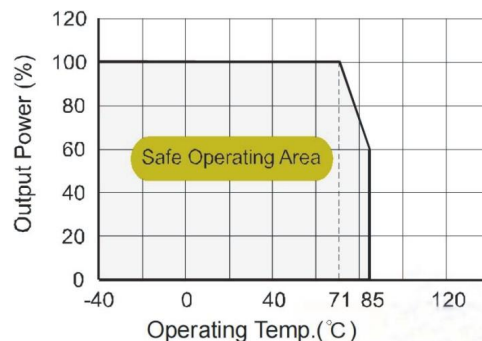
TEMPERATURE CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---------------------------|--------------------------------|-------------------------------|------|------|-------|
| Storage humidity range | | | | 95 | % |
| NO-load power consumption | | | 120 | | °C |
| Operating temperature | | -40 | | 85 | °C |
| Storage temperature | | -55 | | 125 | °C |
| Lead temperature | 1.5mm from case for 10 seconds | | | 300 | °C |
| Temp.rise at full load | | | 15 | 35 | °C |
| Cooling | | Free air convection | | | |
| Case material | | Plastic(UL94-V0) | | | |
| Short circuit protection* | | Continuous,automatic recovery | | | |
| MTBF | | 1000 | | 1 | S |
| Weight | | | 5 | | g |

*Supply voltage must be discontinued at the end of short circuit duration.

TYPICAL CHARACTERISTICS

Temperature Derating Graph



ISOLATION SPECIFICATIONS

| Parameter | Test conditions | Min. | Typ. | Max. | Units |
|------------------------|---------------------------------------|------|------|------|-------|
| Isolation test voltage | Flash tested for 1 minute and 1mA max | 1500 | | | VDC |
| Isolation resistance | Test at Viso=500VDC | 1000 | | | MΩ |
| Isolation capacitance | 100KHz, 1v | | 35 | | pF |

APPLICATION NOTE

SIZE Graph

1) Recommended circuit

If you want to further decrease the input/output ripple, an LC filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1). 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 100PF

24V,48V 10uF

Cout: 47PF(typ.)

Lin: 4.7PH ~120PH

Lout:2.2PH ~10PH

Cs: 10uF ~ 22uF

2) CTRL Terminal

When open or high impedance, the converter work well; When this pin is 'high'; the converter shutdown; It should be note that the input current (Ic) should between 5-10mA, exceeding the maximum 20mA will cause permanence damage to the converter. The value of R Can be derived as follows:

$$R = \frac{V_C - V_D - 1.0}{I_c}$$

3) Input current

While using unstable power source, please ensure the output voltage and ripple voltage do not exceed indexes of the converter. The preceding power source must be able to provide for converter sufficient starting current Ip (Figure 2).

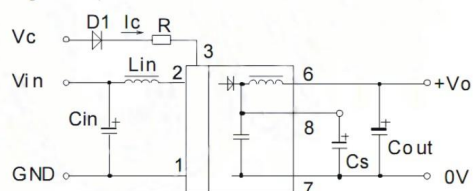
General: $I_p \leq 1.4 \cdot I_{in-max}$

4) No parallel connection or plug and play

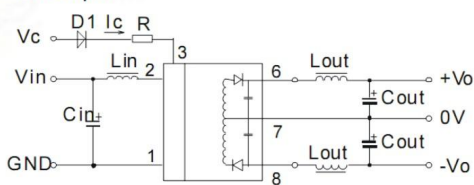
RECOMMENDED CIRCUIT

OUTPUT Graph

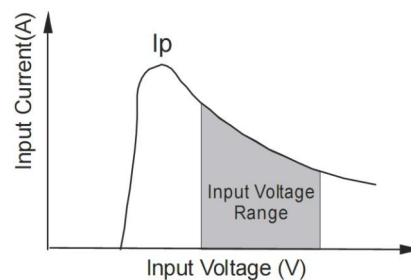
Single Output



Dual Output



(Figure 1)



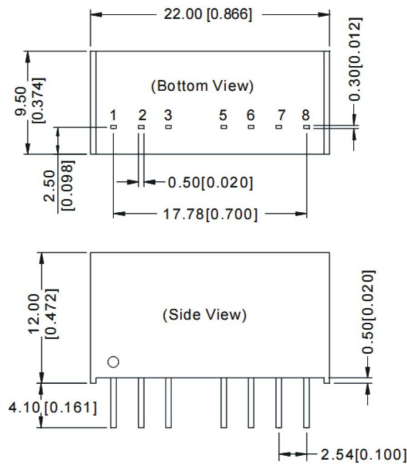
(Figure 2)

EXTERNAL CAPACITOR TABLE (TABLE 1)

| Single Vout (VDC) | Cout (μF) | Dual Vout (VDC) | Cout (μF) |
|-------------------|-----------|-----------------|-----------|
| 5 | 680 | ±5 | 330 |
| 9 | 560 | ±12 | 220 |
| 12 | 470 | ±15 | 150 |
| 15 | 330 | - | - |

OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS



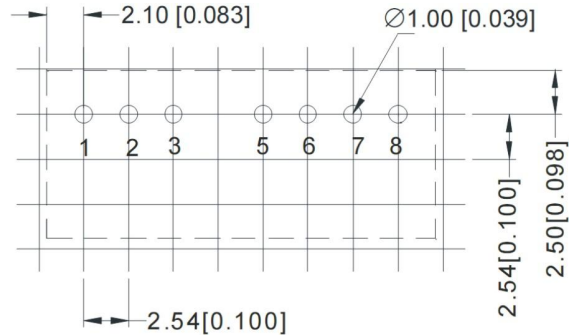
Note:

Unit:mm[inch]

Pin section tolerances:±0.10mm[±0.004inch]

General tolerances:±0.25mm[±0.010inch]

RECOMMENDED FOOTPRINT

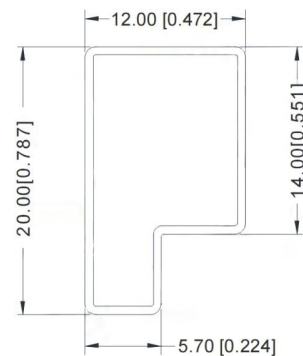


RECOMMENDED FOOTPRINT

Top view,grid:2.54mm(0.1inch)

diameter:1.00mm(0.039inch)

TUBE OUTLINE DIMENSIONS



Note:

Unit :mm[inch]

General tolerances: ±0.50mm[±0.020inch]

L=530mm[20.866inch] Tube Quantity: 22pcs

L=220mm[8.661inch] Tube Quantity: 8pcs

When the environment temperature is higher than 71°C, the product output power should be less then 60% of the rated power.

No parallel connection or plug and play.

Use dual output simultaneously, forbid opening output pin(0V) to use as single output.

FOOTPRINT DETAILS

| Pin | Single | Dual |
|-----|--------|------|
| 1 | GND | GND |
| 2 | Vin | Vin |
| 3 | CTRL | CTRL |
| 5 | NC | NC |
| 6 | +V0 | +V0 |
| 7 | 0V | 0V |
| 8 | CS | -V0 |

NC:No connection

When the environment temperature is higher than 71°C, the product output power should be less then 60% of the rated power.

No parallel connection or plug and play.

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.