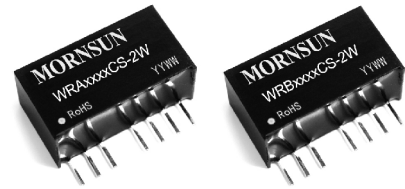


WRA_CS-2W & WRB_CS-2W Series 2W, WIDE INPUT, ISOLATED & REGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER



Patent Protection RoHS

FEATURES

Miniature SIP Package
Wide (2:1) Input Range
Regulated Outputs
I/O Isolation 1500VDC
Short Circuit Protection(automatic recovery)
External On/Off control
Internal SMD construction
Operating Temperature: -40°C to +85°C
RoHS Compliance

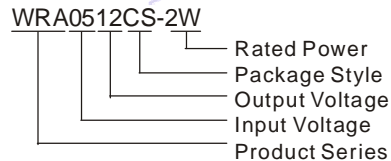
APPLICATIONS

The WRA_CS-2W & WRB_CS-2W 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 ranges $\leq 2:1$);
- 2) Where isolation is necessary between input and output(isolation voltage ≤ 1500 VDC);
- 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) | | No Load (mA)(Typ) | Voltage (VDC) | Current (mA) | | | | | |
| | Nominal(Range) | Max* | | | Max | Min | | | | |
| WRA0505CS-2W | 5 (4.5-9.0) | 11 | 40 | ±5 | ±200 | ±20 | 67 | | | |
| WRA0509CS-2W | | | | ±9 | ±111 | ±11 | 71 | | | |
| WRA0512CS-2W | | | | ±12 | ±83 | ±8 | 72 | | | |
| WRA0515CS-2W | | | | ±15 | ±67 | ±7 | 73 | | | |
| WRA0524CS-2W | | | | ±24 | ±42 | ±4 | 72 | | | |
| WRB0503CS-1W6 | | | | 12 (9.0-18) | 22 | 20 | 3.3 | 500 | 50 | 64 |
| WRB0505CS-2W | | | | | | | 5 | 400 | 40 | 67 |
| WRB0509CS-2W | | | | | | | 9 | 222 | 22 | 72 |
| WRB0512CS-2W | | | | | | | 12 | 167 | 16 | 73 |
| WRB0515CS-2W | | | | | | | 15 | 133 | 13 | 72 |
| WRB0524CS-2W | | | | | | | 24 | 80 | 8 | 71 |
| WRA1205CS-2W | | | | | | | 24 (18-36) | 40 | 10 | ±5 |
| WRA1209CS-2W | ±9 | ±111 | ±11 | | | | | | | 74 |
| WRA1212CS-2W | ±12 | ±83 | ±8 | | | | | | | 78 |
| WRA1215CS-2W | ±15 | ±67 | ±7 | | | | | | | 77 |
| WRB1203CS-1W6 | 3.3 | 500 | 50 | | | | | | | 68 |
| WRB1205CS-2W | 5 | 400 | 40 | | | | | | | 75 |
| WRB1209CS-2W | 9 | 222 | 22 | 77 | | | | | | |
| WRB1212CS-2W | 12 | 167 | 16 | 79 | | | | | | |
| WRB1215CS-2W | 15 | 133 | 13 | 80 | | | | | | |
| WRB1224CS-2W | 24 | 80 | 8 | 78 | | | | | | |
| WRA2405CS-2W | 48 (36-72) | 80 | 5 | ±5 | ±200 | ±20 | | | | 76 |
| WRA2409CS-2W | | | | ±9 | ±111 | ±11 | | | | 78 |
| WRA2412CS-2W | | | | ±12 | ±83 | ±8 | 79 | | | |
| WRA2415CS-2W | | | | ±15 | ±67 | ±7 | 78 | | | |
| WRB2403CS-1W6 | | | | 3.3 | 500 | 50 | 67 | | | |
| WRB2405CS-2W | | | | 5 | 400 | 40 | 77 | | | |
| WRB2409CS-2W | | | | 9 | 222 | 22 | 79 | | | |
| WRB2412CS-2W | | | | 12 | 167 | 16 | 80 | | | |
| WRB2415CS-2W | | | | 15 | 133 | 13 | 80 | | | |
| WRB2424CS-2W | | | | 24 | 80 | 8 | 80 | | | |
| WRA4805CS-2W | | | | 48 (36-72) | 80 | 5 | ±5 | ±200 | ±20 | 75 |
| WRA4809CS-2W | | | | | | | ±9 | ±111 | ±11 | 78 |
| WRA4812CS-2W | ±12 | ±83 | ±8 | | | | 79 | | | |
| WRA4815CS-2W | ±15 | ±67 | ±7 | | | | 79 | | | |
| WRB4803CS-1W6 | 3.3 | 500 | 50 | | | | 71 | | | |
| WRB4805CS-2W | 5 | 400 | 40 | | | | 75 | | | |
| WRB4809CS-2W | 9 | 222 | 22 | | | | 76 | | | |
| WRB4812CS-2W | 12 | 167 | 16 | | | | 78 | | | |
| WRB4815CS-2W | 15 | 133 | 13 | | | | 78 | | | |
| WRB4824CS-2W | 24 | 80 | 8 | | | | 80 | | | |

Note:

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

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

COMMON SPECIFICATION

| Item | Test Conditions | Min | Typ | Max | Units |
|---------------------------|---------------------------------|---------------------|-----|-----|---------|
| Storage Humidity | | | | 95 | % |
| Operating Temperature | | -40 | | 85 | °C |
| Storage Temperature | | -50 | | 125 | |
| Temp. Rise at Full Load | | | 15 | 35 | |
| Lead Temperature | 1.5mm from case for 10 seconds | | | 300 | |
| Isolation voltage | Tested for 1 minute and 1mA max | 1500 | | | VDC |
| Isolation resistance | Test at 500VDC | 1000 | | | MΩ |
| Isolation Capacitance | Input/Output, 100KHz/1V | | 80 | | PF |
| No-load power consumption | | | 100 | | mW |
| Cooling | | Free Air Convection | | | |
| Short Circuit Protection | | Continuous | | | |
| Case Material | | Plastic(UL94-V0) | | | |
| MTBF | | 1000 | | | K hours |
| Weight | | | 5.5 | | g |

OUTPUT SPECIFICATIONS

| Item | Test Conditions | Min | Typ | Max | Units |
|--------------------------|--|-----|--------------|-------|-------|
| Output Voltage accuracy | Input voltage range refer to output load | | ±1 | ±3 | % |
| Load Regulation | 10% to 100% load(WRB_CS-2W) | | ±0.5 | ±0.75 | |
| | 10% to 100% load(WRA_CS-2W) | | ±0.5 | ±1.0 | |
| Line Regulation | Input voltage from Low To high | | ±0.2 | ±0.5 | |
| Temperature Drift (Vout) | Refer to recommended circuit | | | ±0.03 | %/°C |
| Ripple & Noise * | 20MHz Bandwidth | | 35 | 100 | mVp-p |
| Switching Frequency | Input voltage range 100% load | | 180-500(PFM) | | KHz |

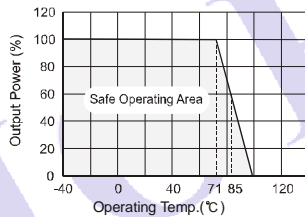
*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

Note:

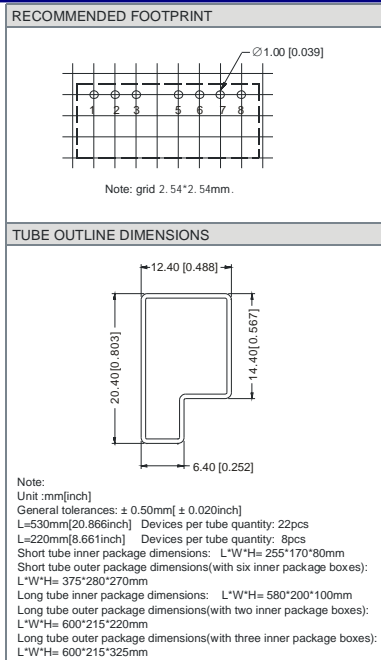
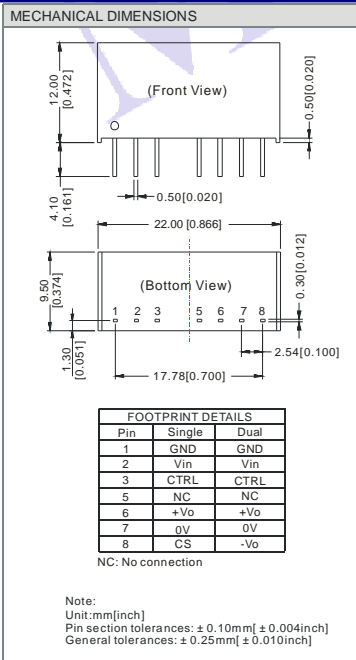
1. All specifications measured at T_A=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.

2. See below recommended circuits for more details

TYPICAL TEMPERATURE CURVE



OUTLINE DIMENSIONS & FOOTPRINT DETAILS



APPLICATION NOTE

① CTRL Terminal

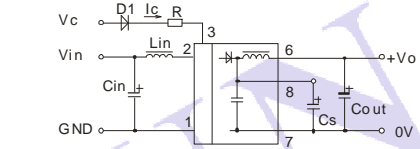
When open or high impedance, the converter work well; When this pin is 'high', the converter shutdown; It should be note that the input current (I_c) should between 5-10mA, exceeding the maximum 20mA will cause permanence damage to the converter. The value of R_C can be derived as follows :

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

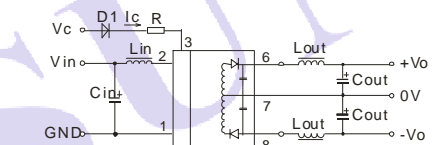
② Recommended circuit

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).

Single Output



Dual Output



(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 100μF
24V,48V 10μF - 22μF
- Lin: 4.7μH - 120μH
- Cout: 100μF(typ)
- Lout: 2.2μH-10μH
- Cs: 10μF - 22μF

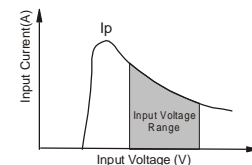
External Capacitor Table(Table 1)

| Single Vout (VDC) | Cout (μF) | Dual Vout (VDC) | Cout (μF) |
|-------------------|-----------|-----------------|-----------|
| 3.3 | 2200 | - | - |
| 5 | 1000 | ±5 | 560 |
| 9 | 820 | ±9 | 470 |
| 12 | 680 | ±12 | 330 |
| 15 | 560 | ±15 | 270 |
| 24 | 470 | ±24 | 100 |

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 I_p (Figure 2).

General: I_p ≤ 1.4*I_{in-max}



④ No parallel connection or plug and play.