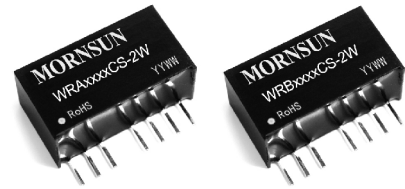


## WRA\_CS-2W & WRB\_CS-2W Series 2W, WIDE INPUT, ISOLATED & REGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER



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

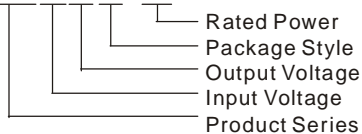
The WRA\_CS-2W & WRB\_CS-2W Series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

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  $\leq 1500$ VDC);
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

### MODEL SELECTION

WRA0512CS-2W



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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	±200	±20	73
WRA1209CS-2W	±9	±111	±11							74			
WRA1212CS-2W	±12	±83	±8							78			
WRA1215CS-2W	±15	±67	±7							77			
WRB1203CS-1W6	48 (36-72)	80	5							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							48 (36-72)	80	5	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				48 (36-72)	80	5				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

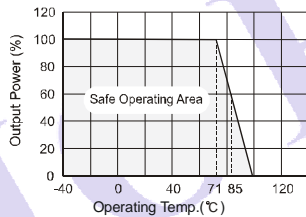
## OUTPUT SPECIFICATIONS

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:
- All specifications measured at T<sub>A</sub>=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
  - See below recommended circuits for more details

## TYPICAL TEMPERATURE CURVE



## OUTLINE DIMENSIONS & FOOTPRINT DETAILS

**MECHANICAL DIMENSIONS**

**FOOTPRINT DETAILS**

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

NC: No connection

Note:  
Unit: mm[inch]  
Pin section tolerances: ± 0.10mm[± 0.004inch]  
General tolerances: ± 0.25mm[± 0.010inch]

**RECOMMENDED FOOTPRINT**

Note: grid 2.54\*2.54mm.

**TUBE OUTLINE DIMENSIONS**

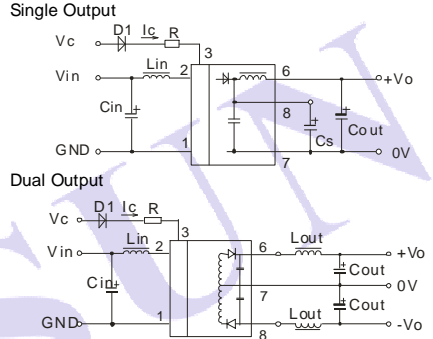
Note:  
Unit: mm[inch]  
General tolerances: ± 0.50mm[± 0.020inch]  
L=530mm[20.866inch] Devices per tube quantity: 22pcs  
L=220mm[8.661inch] Devices per tube quantity: 8pcs  
Short tube inner package dimensions: L\*W\*H= 255\*170\*80mm  
Short tube outer package dimensions:(with six inner package boxes): L\*W\*H= 375\*280\*270mm  
Long tube inner package dimensions: L\*W\*H= 580\*200\*100mm  
Long tube outer package dimensions:(with two inner package boxes): L\*W\*H= 600\*215\*220mm  
Long tube outer package dimensions:(with three inner package boxes): L\*W\*H= 600\*215\*325mm

## 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<sub>c</sub>) should between 5-10mA, exceeding the maximum 20mA will cause permanence damage to the converter. The value of R<sub>C</sub> 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).



(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:

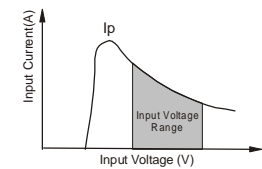
- C<sub>in</sub>: 5V,12V 100μF  
24V,48V 10μF - 22μF
- L<sub>in</sub>: 4.7μH - 120μH
- C<sub>out</sub>: 100μF(typ)
- L<sub>out</sub>: 2.2μH-10μH
- C<sub>s</sub>: 10μF - 22μF

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<sub>p</sub> (Figure 2).

General: I<sub>p</sub> ≤ 1.4\*I<sub>in-max</sub>



④ **No parallel connection or plug and play.**