

## WRA\_CS-1W & WRB\_CS-1W Series 1W, WIDE INPUT, DUAL & SINGLE OUTPUT DC-DC CONVERTER

multi-country 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

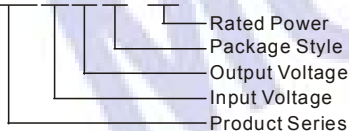
The WRA\_CS-1W & WRB\_CS-1W Series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the input voltage is required to be more than 2:1;
- 2) Where the isolation voltage between input and output is required;
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

### MODEL SELECTION

WRA0512CS-1W



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### PRODUCT PROGRAM

Part Number	Input			Output			Efficiency (%, Typ.)
	Voltage (VDC)		No Load Current (mA)(Typ)	Voltage (VDC)	Current (mA)		
	Range	Max*			Max	Min	
WRA0505CS-1W	5 (4.5-9.0)	11	40	±5	±100	±10	71
WRA0509CS-1W				±9	±55	±5	72
WRA0512CS-1W				±12	±42	±4	73
WRA0515CS-1W				±15	±33	±3	73
WRB0503CS-1W				3.3	303	30	66
WRB0505CS-1W				5	200	20	70
WRB0509CS-1W				9	111	11	72
WRB0512CS-1W				12	83	8	73
WRB0515CS-1W				15	67	7	72
WRB0524CS-1W				24	42	4	70
WRA1205CS-1W	12 (9.0-18)	22	20	±5	±100	±10	75
WRA1209CS-1W				±9	±55	±5	76
WRA1212CS-1W				±12	±42	±4	77
WRA1215CS-1W				±15	±33	±3	76
WRB1203CS-1W				3.3	303	30	68
WRB1205CS-1W				5	200	20	75
WRB1209CS-1W				9	111	11	77
WRB1212CS-1W				12	83	8	78
WRB1215CS-1W				15	67	7	78
WRB1224CS-1W				24	42	4	77
WRA2405CS-1W	24 (18-36)	40	10	±5	±100	±10	76
WRA2409CS-1W				±9	±55	±5	77
WRA2412CS-1W				±12	±42	±4	78
WRA2415CS-1W				±15	±33	±3	78
WRB2403CS-1W				3.3	303	30	70
WRB2405CS-1W				5	200	20	73
WRB2409CS-1W				9	111	11	76
WRB2412CS-1W				12	83	8	78
WRB2415CS-1W				15	67	7	76
WRB2424CS-1W				24	42	4	77
WRA4805CS-1W	48 (36-72)	80	5	±5	±100	±10	75
WRA4809CS-1W				±9	±55	±5	76
WRA4812CS-1W				±12	±42	±4	78
WRA4815CS-1W				±15	±33	±3	78
WRB4803CS-1W				3.3	303	30	71
WRB4805CS-1W				5	200	20	73
WRB4809CS-1W				9	111	11	75
WRB4812CS-1W				12	83	8	78
WRB4815CS-1W				15	67	7	76
WRB4824CS-1W				24	42	4	78

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

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

## COMMON SPECIFICATION

Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-50°C to +125°C
Storage Humidity Range	≤ 95%
Cooling	Free Air Convection
Temperature Rise at Full Load	15°C(Typ.), 35°C(Max)
Lead Temperature (1.5mm from case for 10 seconds)	300°C(Max)
Isolation voltage (60Sec)	1500VDC
Isolation resistance	1000MΩ
Isolation Capacitance (100kHz, 1V)	80pF(Typ.)
No-load Power Consumption	100mW(Typ.)
Output Short Circuit Protection	Continuous, automatic recovery
Case Material	Plastic(UL94-V0)
MTBF	>1,000,000 hours
Weight	5.5g(Typ.)

## OUTPUT SPECIFICATIONS

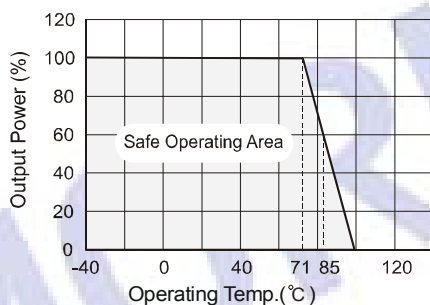
Item	Test Conditions	Typ.	Max	Units
Output Voltage Accuracy	Input Voltage Range Refer To Output Load	±1	±3	
Load Regulation	10% To 100% Load (WRB_CS-1W)	±0.5	±0.75	%
	10% To 100% Load (WRA_CS-1W)	±0.5	±1.0	
Line Regulation	Input Voltage From Low To High	±0.2	±0.5	
Temperature Drift (Vout)	Refer To Recommended Circuit		±0.03	%/°C
Ripple & Noise	20MHz Bandwidth	25	100	mVp-p
Switching Frequency	Input Voltage Range 100% Load	180-550(PFM)		KHz

Note:

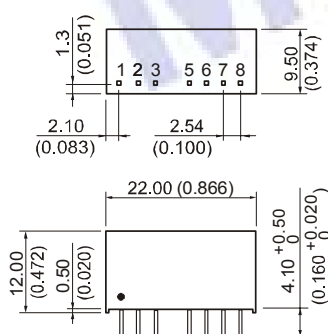
1. All specifications measured at T<sub>A</sub>=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.

2. See the recommended circuits for more details.

## TYPICAL TEMPERATURE CURVE



## OUTLINE DIMENSIONS & FOOTPRINT DETAILS



Note:

Unit:mm(inch)

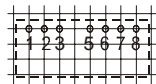
Pin section:0.50\*0.30mm(0.020\*0.012inch)

Pin tolerances:±0.10mm(±0.004inch)

General tolerances:±0.25mm(±0.010inch)

First Angle Projection

RECOMMENDED FOOTPRINT  
Top view, grid: 2.54mm(0.1 inch),  
diameter: 1.00mm  
Dual Output & Single Output



### FOOTPRINT DETAILS

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

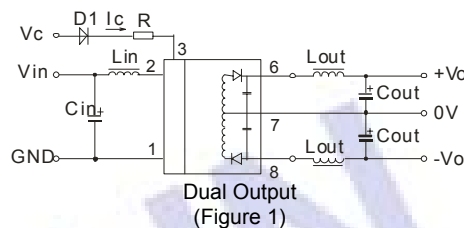
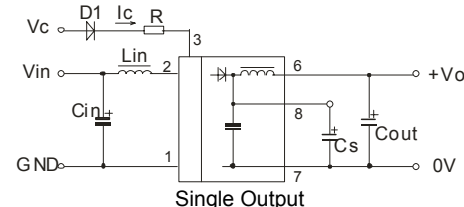
NC: No Connection

maximum 20mA will cause permanence damage to the converter. The value of R Can be derived as

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

### 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 100uF  
24V, 48V 10uF~47uF  
Cout: 100uF(Typ.)  
Lin: 4.7uH~120uH  
Lout: 2.2uH~10uH

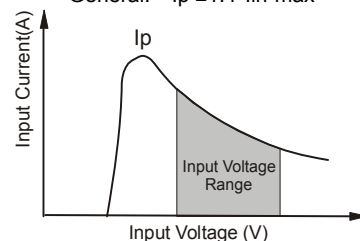
External Capacitor Table (Table 1)

Single Vout(VDC)	Cout (uF)(Max)	Dual Vout(VDC)	Cout (uF)(Max)
3.3	1000	±5	±470
5	800	±9	±330
9	680	±12	±270
12	560	±15	±220
15	470	-	-
24	330	-	-

### 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>



(Figure 2)

## APPLICATION NOTE

### 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

No parallel connection or plug and play.