

## WRB\_S-1W & WRB\_S-2W Series 1W & 2W, WIDE INPUT, ISOLATED & REGULATED SINGLE OUTPUT DC-DC CONVERTER

Patent Protection RoHS

### FEATURES

- Miniature SIP Package
- 2:1 wide input voltage range
- Operating temperature: -40°C to +85°C
- I/O Isolation 1500VDC
- Short circuit protection(automatic recovery)
- Internal SMD construction
- RoHS Compliance

### APPLICATIONS

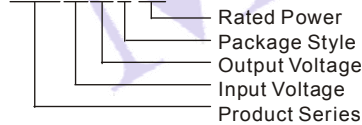
The WRB\_S-1W & WRB\_S-2W series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is wide range (voltage range  $\leq 2:1$ );
- 2) Where isolation is necessary between input and output(isolation voltage  $\leq 1500\text{VDC}$ );
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

### MODEL SELECTION

WRB2412S-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.				
WRB0503S-1W	5(4.5-9.0)	11	40	3.3	303	30	66			
WRB0505S-1W				5	200	20	67			
WRB0509S-1W				9	111	11	71			
WRB0515S-1W				15	67	7	72			
WRB0524S-1W				24	42	4	70			
WRB0503S-1W6				3.3	500	50	64			
WRB0505S-2W				5	400	40	67			
WRB0509S-2W				9	222	22	72			
WRB0512S-2W				12	167	16	73			
WRB0515S-2W				15	133	13	72			
WRB1203S-1W				12 (9.0-18)	22	20	3.3	303	30	68
WRB1205S-1W							5	200	20	71
WRB1209S-1W	9	111	11				74			
WRB1212S-1W	12	83	8				75			
WRB1215S-1W	15	67	7				77			
WRB1224S-1W	24	42	4				72			
WRB1205S-2W	5	400	40				75			
WRB1209S-2W	9	222	22				77			
WRB1212S-2W	12	167	16				79			
WRB1215S-2W	15	133	13				80			
WRB1224S-2W	24	83	8				78			
WRB2403S-1W	24(18-36)	40	10				3.3	303	30	72
WRB2405S-1W				5	200	20	74			
WRB2409S-1W				9	111	11	78			
WRB2412S-1W				12	83	8	78			
WRB2415S-1W				15	67	7	78			
WRB2424S-1W				24	42	4	78			
WRB2403S-1W6				3.3	500	50	67			
WRB2405S-2W				5	400	40	78			
WRB2409S-2W				9	222	22	79			
WRB2412S-2W				12	167	16	80			
WRB2415S-2W				15	133	13	80			
WRB2424S-2W				24	83	8	82			
WRB4803S-1W	48(36-72)	80	5	3.3	303	30	71			
WRB4805S-1W				5	200	20	73			
WRB4812S-1W				12	83	8	78			
WRB4805S-2W				5	400	40	75			
WRB4812S-2W				12	167	16	78			
WRB4815S-2W				15	133	13	78			

Note: 1.Models listed with strike-through text have been officially discontinued.  
2.\*Input voltage can't exceed this value, or will cause the permanent damage.

COMMON SPECIFICATIONS					
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage humidity				95	%
Operating temperature	Power derating (above 71°C)	-40		85	°C
Storage temperature		-55		125	
Temp. rise at full load			15	35	
Lead temperature	1.5mm from case for 10 seconds			300	
Cooling		Free Air Convection			
Short circuit protection		Continuous, automatic recovery			
Case material		Plastic(UL94-V0)			
MTBF	25°C(MIL-HDBK-217F)	1000			k hours
Weight			5.5		g

ISOLATION SPECIFICATIONS					
Item	Test Conditions	Min.	Typ.	Max.	Units
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

OUTPUT SPECIFICATIONS					
Item	Test Conditions	Min.	Typ.	Max.	Units
Output voltage accuracy	Refer to recommended circuit		±1	±3	%
Load regulation	10% to 100% load		±0.5	±0.75	
Line regulation	Input voltage from low to high		±0.2	±0.5	% / °C
Temperature drift (Vout)	Refer to recommended circuit			±0.03	
Ripple & Noise*	20MHz Bandwidth		35	100	mVp-p
Switching frequency	100% load, input voltage range		300		kHz

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

## APPLICATION NOTE

### 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 100μF
- 24V,48V 10μF ~ 47μF
- Lin: 4.7μH ~ 120μH
- Cout: 100μF(typ)
- Lout: 2.2μH ~ 10μH
- Cs: 4.7μF ~ 22μF

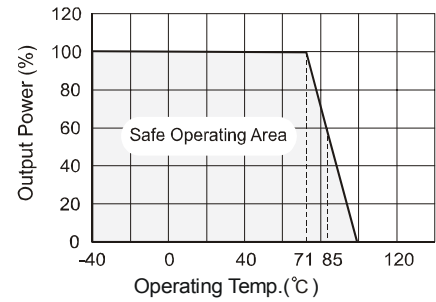
### 2) Input current

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).

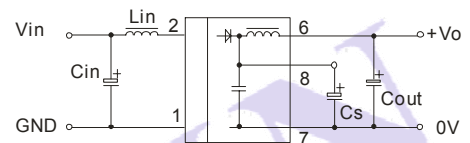
General:  $I_p \leq 1.4 \cdot I_{in-max}$

### 3) No parallel connection or plug and play

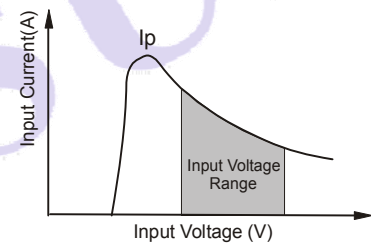
## TYPICAL TEMPERATURE CURVE



## RECOMMENDED CIRCUIT



(Figure 1)

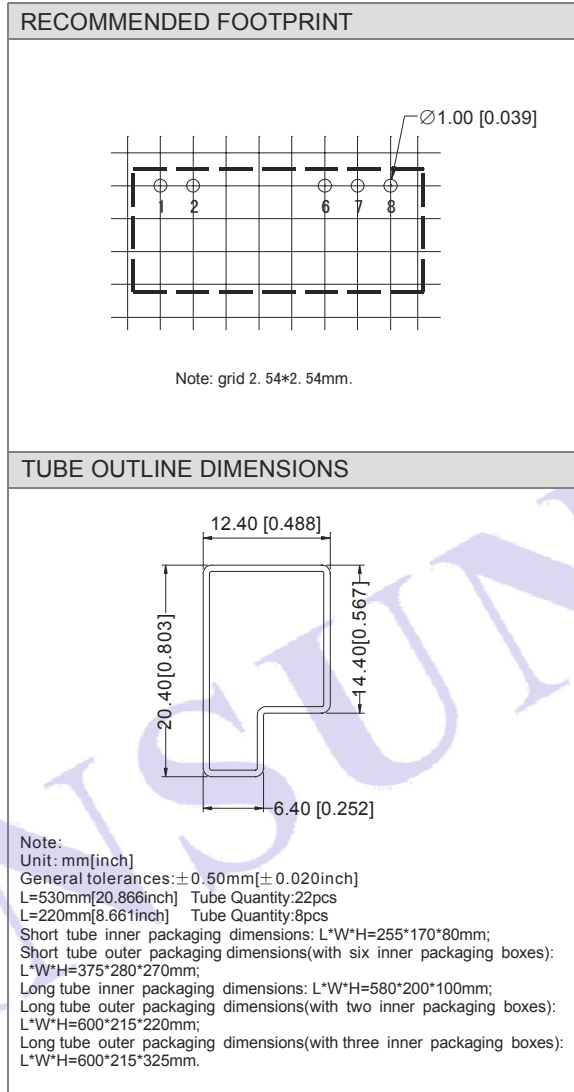
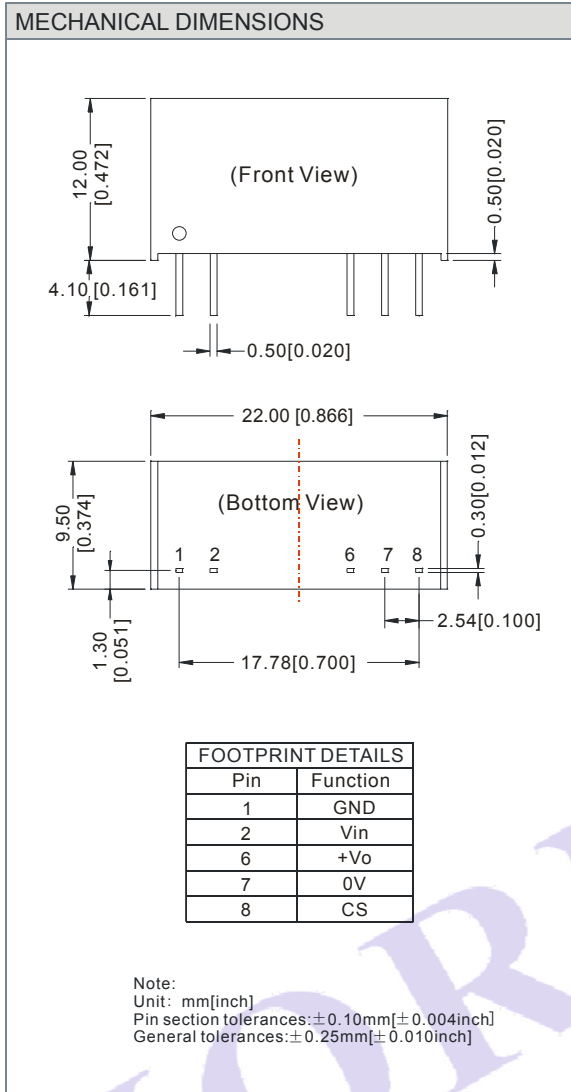


(Figure 2)

External Capacitor Table (Table 1)

Vout (VDC)	2W:Cout (μF)	1W:Cout (μF)
3.3	2200	1000
5	1000	560
9	820	470
12	680	330
15	560	270
24	470	220

## OUTLINE DIMENSIONS & FOOTPRINT DETAILS



**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.