

## WRA\_SP-3W & WRB\_SP-3W Series

### 3W, WIDE INPUT, IAOLATED & REGULATED

### DUAL/SINGLE OUTPUT DIP DC-DC CONVERTER



multi-country patent protection **RoHS**

#### FEATURES

- Wide (2:1) input range
- Efficiency up to 82%
- Short circuit protection(automatic recovery)
- Operating temperature: -40°C to +85°C
- Internal SMD construction
- 1.5KVDC Isolation
- Metal shielding package
- No Heat sink required
- No external component required
- Industry standard Pinout
- MTBF>1,000,000 hours
- RoHS Compliance

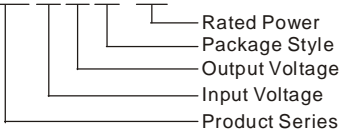
#### APPLICATIONS

The WRB\_SP-3W & WRA\_SP-3W 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: 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.

#### MODEL SELECTION

WRB0512SP-3W



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#### PRODUCT PROGRAM

Part Number	Input			Output			Efficiency (% , Typ)			
	Voltage (VDC)			Voltage (VDC)	Current (mA)					
	Nominal	Range	Max*		Max	Min				
WRA0505SP-3W	5	4.5-9	11	±5	±300	±30	68			
WRA0509SP-3W				±9	±166	±16	70			
WRA0512SP-3W				±12	±125	±12	72			
WRA0515SP-3W				±15	±100	±10	71			
WRB0505SP-3W				5	600	60	68			
WRB0509SP-3W				9	333	33	70			
WRB0512SP-3W				12	250	25	72			
WRB0515SP-3W				15	200	20	71			
WRA1205SP-3W				12	9-18	22	±5	±300	±30	74
WRA1209SP-3W							±9	±166	±16	76
WRA1212SP-3W	±12	±125	±12				78			
WRA1215SP-3W	±15	±100	±10				79			
WRB1205SP-3W	5	600	60				76			
WRB1209SP-3W	9	333	33				78			
WRB1212SP-3W	12	250	25				80			
WRB1215SP-3W	15	200	20				79			
WRB1224SP-3W	24	125	12				81			
WRA2405SP-3W	24	18-36	40				±5	±300	±30	78
WRA2409SP-3W				±9	±166	±16	80			
WRA2412SP-3W				±12	±125	±12	82			
WRA2415SP-3W				±15	±100	±10	81			
WRB2405SP-3W				5	600	60	78			
WRB2409SP-3W				9	333	33	80			
WRB2412SP-3W				12	250	25	82			
WRB2415SP-3W				15	200	20	81			
WRB2424SP-3W				24	125	12	80			
WRA4805SP-3W				48	36-72	80	±5	±300	±30	78
WRA4809SP-3W	±9	±166	±16				79			
WRA4812SP-3W	±12	±125	±12				80			
WRA4815SP-3W	±15	±100	±10				81			
WRB4805SP-3W	5	600	60				78			
WRB4809SP-3W	9	333	33				79			
WRB4812SP-3W	12	250	25				80			
WRB4815SP-3W	15	200	20				81			
WRB4824SP-3W	24	125	12				80			

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

Note: The load shouldn't be less than 10%, otherwise ripple will increase dramatically.

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

#### OUTPUT SPECIFICATIONS

Item	Test conditions	Min	Typ	Max	Units
Output power	Refer to product program	0.3		3	W
Positive voltage accuracy	Refer to recommended circuit		±1	±3	%
Negative voltage accuracy	Refer to recommended circuit		±3	±5	
Load regulation	From 10% to 100% load		±0.5	±1*	
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		75	150	mVp-p
Switching frequency	100% load, nominal input voltage		300		KHz

\*Dual output models unbalanced load: ±5%.

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

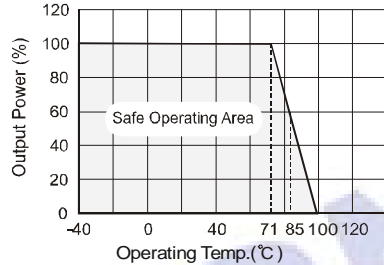
## COMMON SPECIFICATIONS

Item	Test Conditions	Min	Typ	Max	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Temp. rise at full load			15		
Lead temperature	1.5mm from case for 10 seconds			300	
No-load power consumption			0.2		W
Isolation voltage	Tested for 1 minute and 1 mA max	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation Capacitance	Input/Output		100		pF
Cooling	Free air convection				
Short circuit protection	Continuous, automatic recovery				
Case material	Aluminium alloy				
MTBF		1000			K hours
Weight			15		g

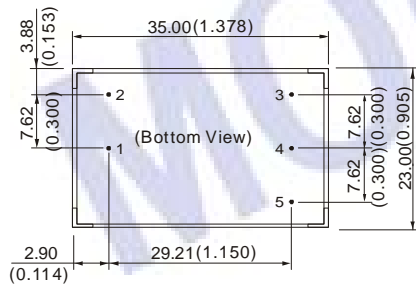
Note:

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

## TYPICAL CHARACTERISTICS



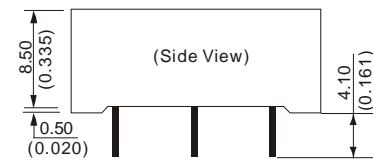
## OUTLINE DIMENSIONS & PIN CONNECTIONS



First Angle Projection

### FOOTPRINT DETAILS

Pin	Single	Dual
1	Vin	Vin
2	GND	GND
3	0V	-Vo
4	No Pin	0V
5	+Vo	+Vo



Note:

Unit:mm(inch)  
 Pin diameter:0.80mm(0.031inch)  
 Pin diameter tolerances:±0.05mm(±0.002inch)  
 General tolerances:±0.25mm(±0.010inch)

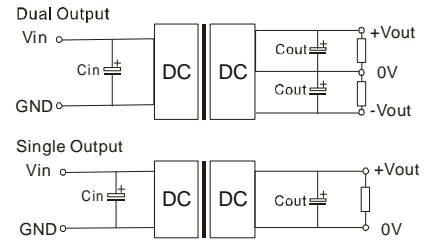
## APPLICATION NOTE

### Requirement on output load

In order to ensure the product operate efficiently and reliably, in addition to a max load (namely full load), a minimum load is specified for this kind of DC/DC converter. Make sure the specified range of input voltage is not exceeded, the minimum output load no less than 10% load. If the actual load is less than the specified minimum load, the output ripple may increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, please add an appropriate resistor as extra loading, or contact our company for other lower output power products.

## Recommended Circuit

All the WRA\_SP-3W & WRB\_SP-3W Series have been tested according to the following recommended testing circuit before leaving factory (Figure 1). This series should be tested under load.



(Figure 1)

If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. 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  
 Cout: 10μF/100mA

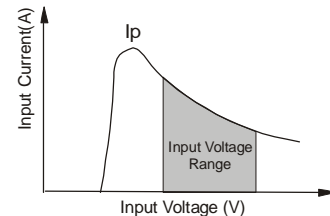
Output External Capacitor Table(Table 1)

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

### Input Current

When it is used in unregulated power supply, be sure that the fluctuating range of the power supply and the rippled voltage do not exceed the module standard. Input current of power supply should afford the startup current of this kind of DC/DC module. (Figure 2)

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



(Figure 2)

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