



## WRA\_SP-2W Series

*WIDE INPUT ISOLATED & REGULATED  
2W OUTPUT DUAL OUTPUT  
DIP PACKAGE*

**RoHS**

multi-country patent protection

### FEATURES

- Wide (2:1) Input Range
- Efficiency Up To 82%
- Operating Temperature: -40°C~+85°C
- 1.5KVDC Isolation
- Single Output
- Metal Shielding Package
- No Heat Sink Required
- Industry Standard Pin out
- MTBF>1,000,000 hours
- RoHS Compliance

### APPLICATIONS

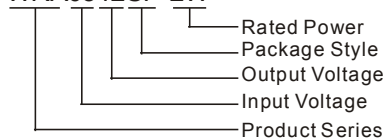
The WRA\_SP-2W Series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is wide range (voltage range: 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

WRA0512SP-2W



### PRODUCT PROGRAM

Part Number	Input			Output			Efficiency (% Typ)	Package Style
	Voltage (VDC)			Voltage (VDC)	Current (mA)			
	Nominal	Range	Max*		Max	Min		
WRA0505SP-2W	5	4.5~9VDC	11	±5	±200	±20	67	DIP
WRA0509SP-2W	5	4.5~9VDC	11	±9	±110	±11	68	DIP
WRA0512SP-2W	5	4.5~9VDC	11	±12	±83	±8	70	DIP
WRA0515SP-2W	5	4.5~9VDC	11	±15	±66	±6	72	DIP
WRA1205SP-2W	12	9~18VDC	22	±5	±200	±20	72	DIP
WRA1209SP-2W	12	9~18VDC	22	±9	±110	±11	73	DIP
WRA1212SP-2W	12	9~18VDC	22	±12	±83	±8	77	DIP
WRA1215SP-2W	12	9~18VDC	22	±15	±66	±6	79	DIP
WRA1505SP-2W	15	12~24VDC	30	±5	±200	±20	75	DIP
WRA1509SP-2W	15	12~24VDC	30	±9	±110	±11	79	DIP
WRA1512SP-2W	15	12~24VDC	30	±12	±83	±8	80	DIP
WRA1515SP-2W	15	12~24VDC	30	±15	±66	±6	81	DIP
WRA2405SP-2W	24	18~36VDC	40	±5	±200	±20	78	DIP
WRA2409SP-2W	24	18~36VDC	40	±9	±110	±11	80	DIP
WRA2412SP-2W	24	18~36VDC	40	±12	±83	±8	81	DIP
WRA2415SP-2W	24	18~36VDC	40	±15	±66	±6	82	DIP
WRA4805SP-2W	48	36~72VDC	80	±5	±200	±20	76	DIP
WRA4809SP-2W	48	36~72VDC	80	±9	±110	±11	81	DIP
WRA4812SP-2W	48	36~72VDC	80	±12	±83	±8	81	DIP
WRA4815SP-2W	48	36~72VDC	80	±15	±66	±6	82	DIP

### ISOLATION SPECIFICATIONS

Item	Test conditions	Min	Typ	Max	Units
Isolation voltage	Flash tested for 60 seconds	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ

### OUTPUT SPECIFICATIONS

Item	Test Conditions	Min	Typ	Max	Units
2W Output Power	See Below Products Program	0.2		2	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	20Hz-300KHz Bandwidth		30	60	mVp-p
Noise	DC-20MHz Bandwidth		80	150	
Switching Frequency	100% Load, Nominal Input Voltage	80		200	KHz
	10% Load, Nominal Input Voltage	250		600	

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 below recommended circuits for more details.



**MORNSUN Science & Technology Ltd.**

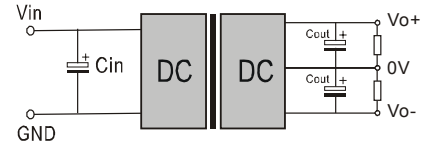
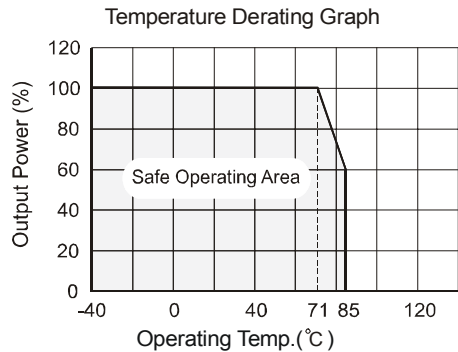
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## COMMON SPECIFICATION

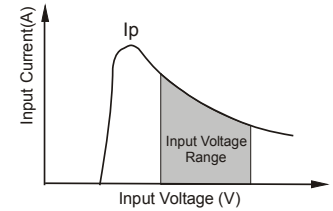
Output Short Circuit Protection	Continuous
Temperature Rise at Full Load	30°C (TYP)
Cooling	Free Air Convection
No-load Power Consumption	100mW (typical)
Operating Temperature Range	-40°C~+85°C
Storage Temperature Range	-55°C ~+125°C
Lead Temperature***	300°C (1.5mm from case for 10 seconds)
Storage Humidity Range	≤ 95%
Case Material	Metal
MTBF	>1,000,000 hours

\*\*\*Lead Temperature 1.5mm from case for 10 seconds.

## TYPICAL CHARECTERISTICS



(Figure)



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. (See figure 2)

### External Capacitor

Although this series of DC/DC converter can work without external capacitor, in order to keep an optimum performance, however, it needs external capacitor. (See Table 1)

### Requirement on Output Load

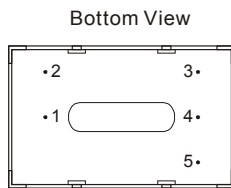
To ensure this module operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum out put load is not less than **10%** Of the full load, and that this product **should never be operated under no load!!!** If the actual load is less below the specified minimum load, the output ripple of this type of DC/DC converter will increase drastically and at the same time efficiency & reliability of the circuit will decrease deeply .If the actual output power from the load in your circuit is very small, please connect a resistor with proper resistance at the output end to in parallel to increase the load, or use our company's other products with a lower rated output power.

**The products cannot be used in parallel and in plug and play.**

### External Capacitor Table(See Table 1)

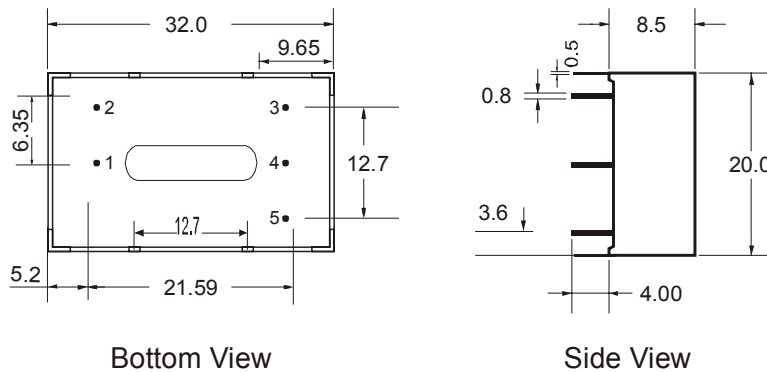
Vin	Cin	Cout (0+70°C)	Cout (-40+85°C)
5V & 12V	100uF	100uF (electrolytic capacitor)	47uF (tantalum capacitor)
24V & 48V	10uF		

## FOOTPRINT DETAILS



Pin	Function
1	Vin
2	GND
3	-Vo
4	0V
5	+Vo

## OUTLINE DIMENSIONS & RECOMMENDED FOOTPRINT



Note: All Pins on a 2.54mm pitch; All Pin diameters are 0.50 mm(Tolerance:±0.15);

## APPLICATION NOTE

### Recommended Circuit

All the WRA\_SP-2W Series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load. Never be tested under no load (See Figure 1 & 2). If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance should not be too high.(See table 1).If you want to use the products in high EMI, please choose our metal packaged products.

### Input Current

When it is used in unregulated power supply, be sure that the fluctuating range of the power



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