MORNSUN®

WRA_(M)P-3W & WRB_(M)P-3W Series

3W, 2:1 WIDE INPUT, ISOLATED & REGULATED DUAL/SINGLE OUTPUT DIP DC-DC CONVERTER

Patent Protection RoHS

FEATURES

- 2:1 wide input voltage range
- DIP package
- Efficiency up to 81%
- 1500VDC isolation
- Short circuit protection (automatic recovery)
- Operating temperature: -40°C to +85°C
- Internal SMD construction
- No heat sink required
- MTBF>1,000,000 hours
- RoHS Compliance

APPLICATIONS

The WRA_(M)P-3W & WRB_(M)P-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 ≤1500VDC);
3) Where the regulation of the output voltage and the output ripple noise are demanded.

MODEL SELECTION

WRA2412MP-3W

- Rated Power
- Package Style
- Output Voltage
- Input Voltage
- Product Series

PRODUCT PROGRAM

Part Number	Input			Output			Efficiency (%, Typ.)
	Voltage (VDC)			Voltage (VDC)	Current (mA)		
	Nominal	Range	Max*		Max.	Min.	
WRA0505(M)P-3W	5	4.5-9	11	±5	±300	±30	68
WRA0509(M)P-3W				±9	±167	±16	70
WRA0512(M)P-3W				±12	±125	±12	72
WRA0515(M)P-3W				±15	±100	±10	73
WRB0505(M)P-3W				5	600	60	68
WRB0509(M)P-3W				9	333	33	70
WRB0512(M)P-3W				12	250	25	72
WRB0515(M)P-3W				15	200	20	73
★WRB0524(M)P-3W				24	125	12	74
WRA1205(M)P-3W	12	9-18	22	±5	±300	±30	74
WRA1209(M)P-3W				±9	±167	±16	76
WRA1212(M)P-3W				±12	±125	±12	78
WRA1215(M)P-3W				±15	±100	±10	79
WRB1205(M)P-3W				5	600	60	74
WRB1209(M)P-3W				9	333	33	76
WRB1212(M)P-3W				12	250	25	78
WRB1215(M)P-3W				15	200	20	77
WRB1224(M)P-3W				24	125	12	80
WRA2405(M)P-3W	24	18-36	40	±5	±300	±30	77
WRA2409(M)P-3W				±9	±167	±16	78
WRA2412(M)P-3W				±12	±125	±12	79
WRA2415(M)P-3W				±15	±100	±10	80
WRB2403(M)P-3W				3.3	909	90	74
WRB2405(M)P-3W				5	600	60	77
WRB2409(M)P-3W				9	333	33	78
WRB2412(M)P-3W				12	250	25	79
WRB2415(M)P-3W				15	200	20	80
WRB2424(M)P-3W				24	125	12	81
WRA4805(M)P-3W	48	36-72	80	±5	±300	±30	77
WRA4809(M)P-3W				±9	±167	±16	78
WRA4812(M)P-3W				±12	±125	±12	79
WRA4815(M)P-3W				±15	±100	±10	80
WRA4824(M)P-3W				±24	±62	±6	81
WRB4803(M)P-3W				3.3	909	90	74
WRB4805(M)P-3W				5	600	60	77
WRB4809(M)P-3W				9	333	33	78
WRB4812(M)P-3W				12	250	25	79
WRB4815(M)P-3W				15	200	20	80
★WRB4824(M)P-3W				24	125	12	81

* Input voltage can't exceed this value, or will cause the permanent damage. ★Still not design.
Note: Metal package style's series is WRA_MP-3W & WRB_MP-3W.

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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		85		pF

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Storage humidity				95	%
Operating temperature		-40		85	℃
Storage temperature		-55		125	
Temp. rise at full load			15		
Lead temperature	1.5mm from case for 10 seconds			300	
No-load power			0.2		W
Cooling	Free Air Convection				
Short Circuit Protection	Continuous, Automatic Recovery				
Case Material	P: Plastic (UL94-V0) MP: Stainless steel				
MTBF		1000			K hours
Weight			14		g

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Output power		0.3		3	W
Positive voltage accuracy	Refer To Recommended Circuit		±1	±3	%
Negative voltage accuracy	Refer To Recommended Circuit		±3	±5	
Load regulation	10% to 100% load WRB_(M)P-3W		±0.5	±0.75	
	10% to 100% load WRA_(M)P-3W*		±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
Noise & Ripple**	20MHz Bandwidth		50	100	mVp-p
Switching Frequency	100% load, input voltage range		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.

APPLICATION NOTE

1) 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.

2) Recommended circuit

All the WRA_(M)P-3W & WRB_(M)P-3W 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).

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, or may cause start-up problem. If you want to use the products in high EMI, please choose our metal packaged products (WRA_MP-3W/WRB_MP-3W). For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees (Table 1). General:

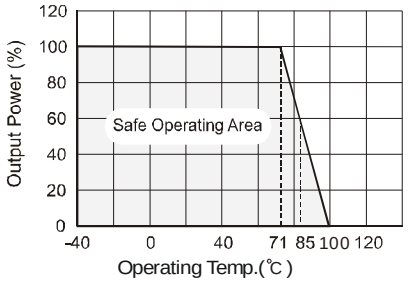
Cin: 5V&12V 100μF
24V&48V 10μF~47μF
Cout: 10μF/100mA

3) Input current

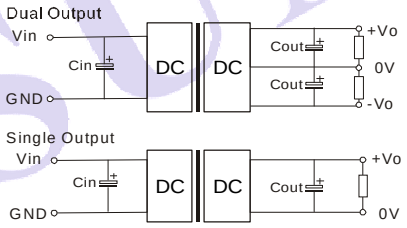
While using unstable power source, please ensure the output voltage and ripple voltage do not excced indexes of the converter. The preceding power source must be able to provide for converter sufficient starting current Ip (Figure 2).
General: Ip ≤1.4*Iin-max

4) No parallel connection or plug and play

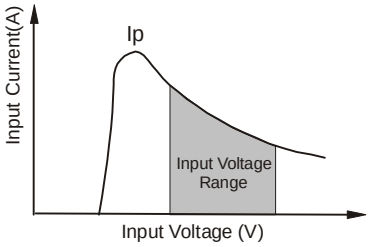
TYPICAL TEMPERATURE CURVE



RECOMMENDED CIRCUIT



(Figure 1)



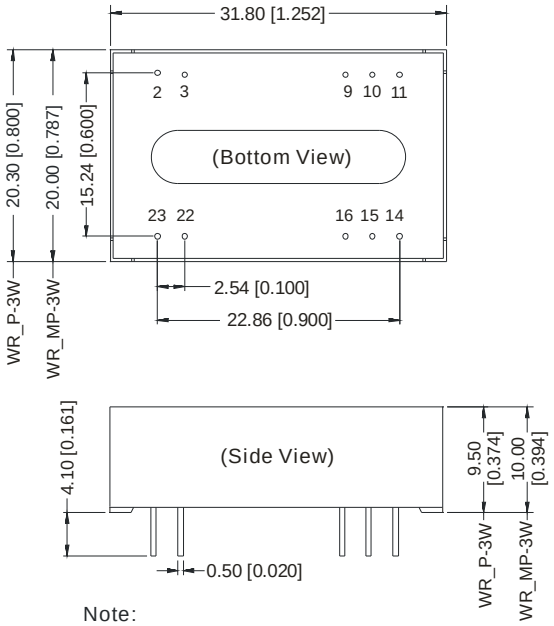
(Figure 2)

External Capacitor Table (Table 1)

Single Vout (VDC)	Cout (uF)	Dual Vout (VDC)	Cout (uF)
3.3	2200	±5	680
5	1000	±9	470
9	680	±12	330
12	470	±15	220
15	330	±24	100
24	220	-	-

OUTLINE DIMENSIONS & PIN CONNECTIONS

MECHANICAL DIMENSIONS

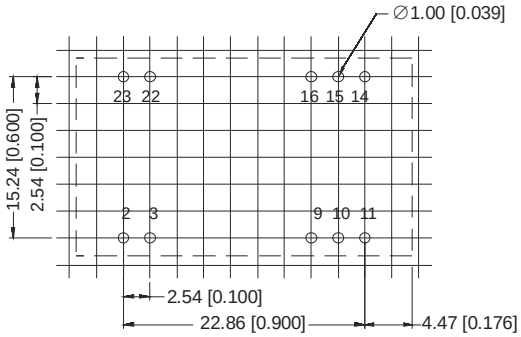


Note:
Unit:mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

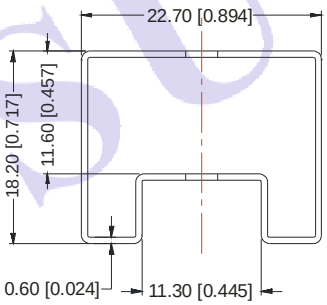
FOOTPRINT DETAILS		
Pin	Single	Dual
2,3	GND	GND
9	NC	0V
10,15	NC	NC
11	NC	-Vo
14	+Vo	+Vo
16	0V	0V
22,23	Vin	Vin

NC: No connection

RECOMMENDED FOOTPRINT(TOP VIEW)



TUBE OUTLINE DIMENSIONS



Note:
Unit :mm[inch]
General tolerances: ±0.50mm[±0.020inch]
L=530mm[20.866inch] Tube Quantity: 15pcs
L=220mm[8.661inch] Tube Quantity: 6pcs

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.