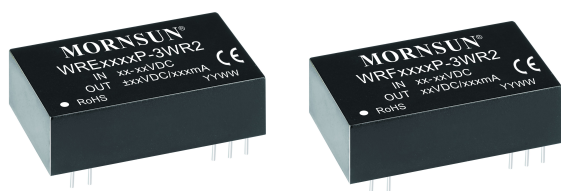


3W,wide input isolated & regulated single/dual output DC-DC converter



Patent Protection

FEATURES

- Wide input voltage range (2:1)
- High efficiency up to 86%
- Isolation voltage 3KVDC
- Output short circuit protection(automatic recovery)
- Operating temperature range:-40° C ~ +85° C
- EN60950 approval

The WRE_P-3WR2 & WRF_P-3WR2 series are isolated 3W DC-DC products with 2:1 input voltage and conventional voltage output. The product has a relatively compact DIP package, and features high efficiency, operating temperature of -40°C~+85°C, remote control, and continuous short-circuit protection. The smaller size and fine cost design make the converter an ideal solution in communication, instruments, and industrial electronics applications.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Efficiency (% Min./Typ.) @ Full Load	Max. Capacitive Load ^② (μF)
		Nominal (Range)	Max. ^①	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
CE	WRE0505P-3WR2	5 (4.5-9)	11	±5	±300/±15	74/76	2200
	WRE0512P-3WR2			±12	±125/±6	76/78	1800
	WRE0515P-3WR2			±15	±100/±5	76/78	1000
	WRF0505P-3WR2			5	600/30	72/74	4700
	WRF0512P-3WR2			12	250/12	75/77	2700
	WRF0515P-3WR2			15	200/10	75/77	2200
	WRE1205P-3WR2	12 (9-18)	20	±5	±300/±15	79/81	2200
	WRE1209P-3WR2			±9	±166/±8	82/84	2000
	WRE1212P-3WR2			±12	±125/±6	82/84	1800
	WRE1215P-3WR2			±15	±100/±5	83/85	1000
	WRF1203P-3WR2			3.3	909/46	72/74	4700
	WRF1205P-3WR2			5	600/30	79/81	4700
	WRF1212P-3WR2	12	250/12	81/83	2700		
	WRF1215P-3WR2	15	200/10	80/82	2200		
	WRF1224P-3WR2	24	125/6	81/83	1800		
	WRE2405P-3WR2	24 (18-36)	40	±5	±300/±15	80/82	2200
	WRE2412P-3WR2			±12	±125/±6	82/84	1800
	WRE2415P-3WR2			±15	±100/±5	82/84	1000
	WRF2403P-3WR2			3.3	909/46	76/78	4700
	WRF2405P-3WR2			5	600/30	79/81	4700
	WRF2412P-3WR2			12	250/12	84/86	2700
	WRF2415P-3WR2	15	200/10	84/86	2200		
	WRF2424P-3WR2	24	125/6	83/85	1800		
	WRE4803P-3WR2	48 (36-75)	80	±3.3	±454/±23	74/76	4700
WRE4805P-3WR2	±5			±300/±15	80/82	2200	
WRE4812P-3WR2	±12			±125/±6	82/84	1800	
WRE4815P-3WR2	48 (36-75)	80	±15	±100/±5	83/85	1000	
WRF4803P-3WR2			3.3	909/46	74/76	4700	
WRF4805P-3WR2			5	600/30	80/82	4700	
WRF4812P-3WR2			12	250/12	84/86	2700	
WRF4815P-3WR2	15	200/10	84/86	2200			

Note:

①. Exceeding the maximum input voltage may cause permanent damage;

②. For dual output converter, the given value is the same for each output.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	5VDC input	--	752/40	834/45	mA
	12VDC input	--	314/30	348/35	
	24VDC input	--	152/15	165/20	
	48VDC input	--	77/5	85/10	
Reflected Ripple Current	5VDC input	--	20	--	mA
	12VDC input	--	30	--	
	24VDC input	--	30	--	
	48VDC input	--	30	--	
Input impulse Voltage (1sec. max.)	5VDC input	-0.7	--	12	VDC
	12VDC input	-0.7	--	25	
	24VDC input	-0.7	--	50	
	48VDC input	-0.7	--	100	
Starting Voltage	5VDC input	--	--	4.5	VDC
	12VDC input	--	--	9	
	24VDC input	--	--	18	
	48VDC input	--	--	36	
Input Filter		PI filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	5%-100% load	--	±1	±3	%	
No load output Voltage Accuracy	Input voltage range	--	±1.5	±5		
Balance of Output Voltage	Dual output, balanced load	--	±0.5	±1		
Linear Regulation	Full load, the input voltage is from low voltage to high voltage	--	±0.2	±0.5		
Load Regulation	5%-100% load	--	±0.2	±0.5		
Transient Recovery Time	25% load step change	--	0.5	2	ms	
Transient Response Deviation		--	±2	±5	%	
Temperature Coefficient	Full load	--	±0.02	±0.03	%/°C	
Ripple&Noise*	20MHz bandwidth, nominal input voltage	24VDC output	--	100	150	mV p-p
		Others	--	50	80	
Short circuit Protection	Input voltage range	Continuous, self-recovery				

Note: *Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Insulation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	3000	--	--	VDC
Insulation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	30	50	pF
Operating Temperature	Derating if the temperature is ≥85°C (see Fig. 1)	-40	--	85	°C
Storage Temperature		-55	--	125	
Casing Temperature Rise	Ta=25°C	--	25	--	
Hand Soldering	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency(PFM mode)	100% load, nominal input voltage	--	200	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

Physical Specifications

Casing Material	Plastic(UL94-V0)
Dimensions	31.60*20.30*10.20 mm
Weight	14g(Typ.)
Cooling	Free convection

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS B (see Fig.3-② for recommended circuit)	
	RE	CISPR22/EN55022	CLASS B (see Fig.3-② for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2	Contact ±4KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV (see Fig.3-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	±2KV (see Fig.3-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29	0-70%	perf. Criteria B

Product Characteristic Curve

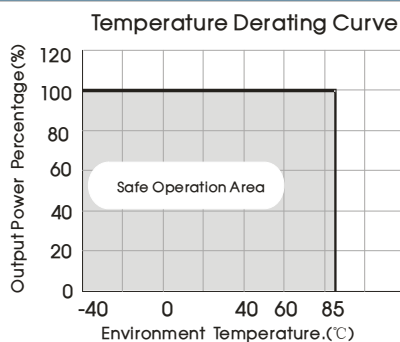
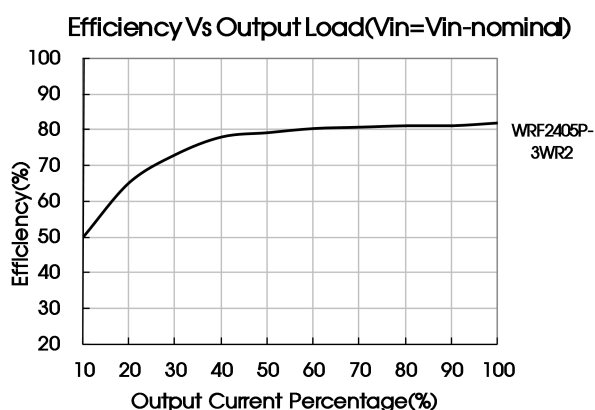
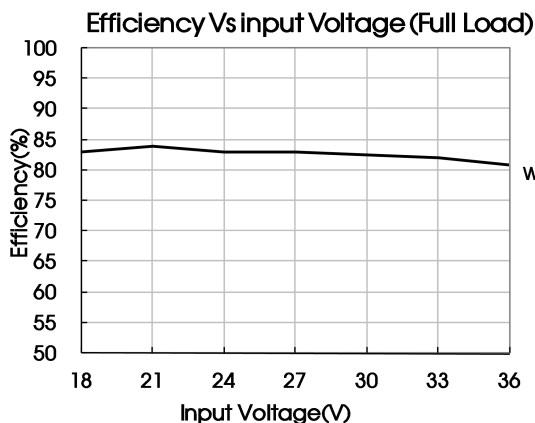
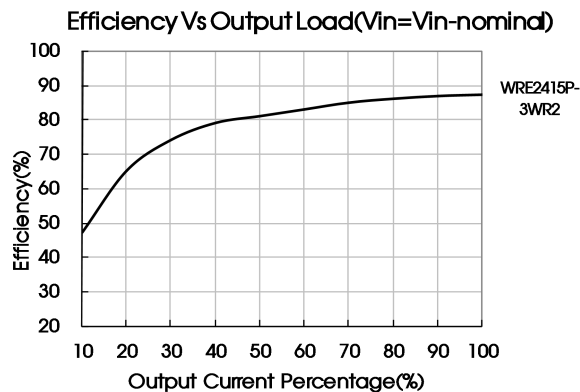
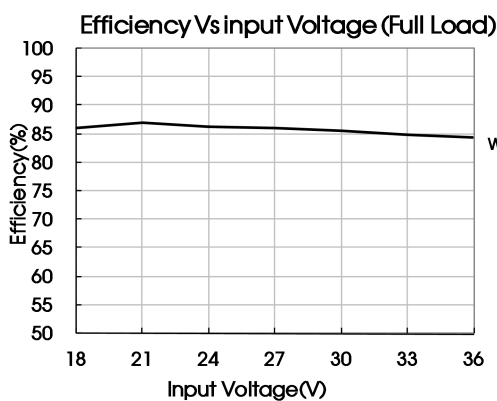


Fig. 1



Design Reference

1. Typical application

All the DC/DC converters of this series are tested according to the recommended circuit (see Fig. 2) before delivery.

If it is required to further reduce input and output ripple, properly increase the input & output of additional capacitors C_{in} and C_{out} or select capacitors of low equivalent impedance provided that the capacitance is no larger than the max. capacitive load of the product.

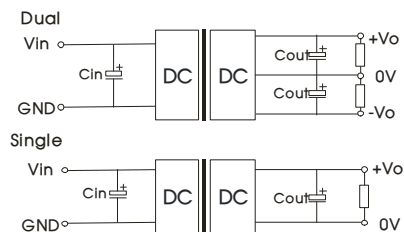


Fig. 2

V_{in}	5V&12V	24V&48V
C_{in}	100 μ F	10 μ F~47 μ F
C_{out}	10 μ F	

2. EMC solution-recommended circuit

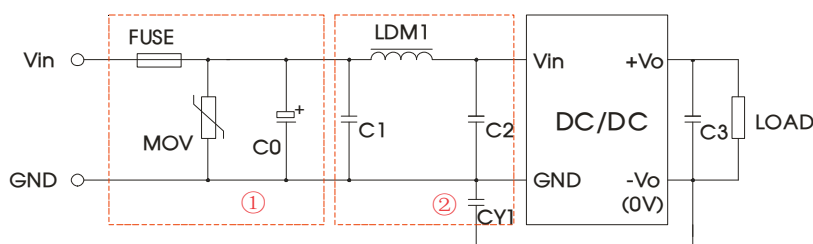


Fig. 3

Parameter description:

Model	V_{in} :5V	V_{in} :12V	V_{in} :24V	V_{in} :48V
FUSE	Slow blown fuses according to the actual input current selections of the clients			
MOV	--	S14K20	S20K30	S14K60
C0	1000 μ F/16V	1000 μ F/25V	330 μ F/50V	330 μ F/100V
C1	4.7 μ F/50V			4.7 μ F/100V
LDM1	12 μ H			
C2	4.7 μ F/50V			4.7 μ F /100V
C3	10 μ F			
CY1	1nF/3KV			

Note: ①,Part ① in the Fig. 3 is used for EMS test and part ② for EMI filtering; selected based on needs.

②.If there is no recommended parameters, the model no require the external component.

3. Input current

When the electricity is provided by the unstable power supply, please make sure that the range of the output voltage fluctuation and the ripple voltage of the power supply do not exceed the indicators of the modules. Input current of power supply should afford the flash startup current of this kind of DC/DC module(see Fig. 5).

Generally: $V_{in}=5V$ $I_{ave}=1297mA$
 $V_{in}=12V$ $I_{ave}=649mA$
 $V_{in}=24V$ $I_{ave}=307mA$
 $V_{in}=48V$ $I_{ave}=158mA$

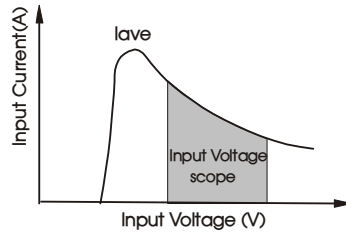


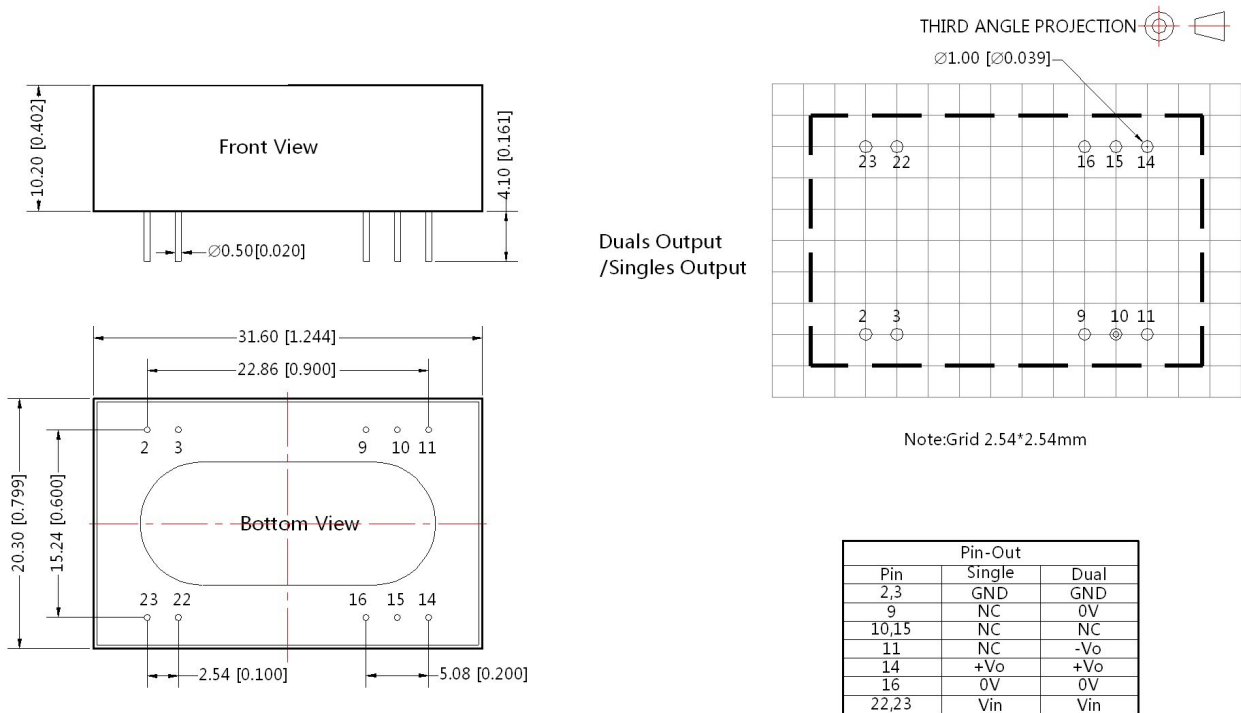
Fig. 5

4. Output load requirements

To ensure that the module can work efficiently and reliably, its output min. load shall be no lower than 5% of the rated load when using, or the output ripple may increase rapidly. Ensure that the product working load must be higher than 5% of the rated load.

5. For more information please find DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Note:
 Unit :mm[inch]
 Pin diameter tolerances : $\pm 0.10[\pm 0.004]$
 General tolerances: $\pm 0.50[\pm 0.020]$

Pin-Out		
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

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58210008;
2. Recommend to use module with more than 5% load, if not, the ripple of the product may exceeds the specification, but does not affect the reliability of the product;
3. The recommended unbalance degree of the dual output module load is $\leq \pm 5\%$; if the degree exceeds $\pm 5\%$, than the product performance cannot be guaranteed to comply with all parameters in the datasheet. Please contact our technicians directly for specific information;
4. The maximum capacitive load offered were tested at nominal input voltage and full load;
5. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^\circ\text{C}$, humidity $<75\%$ RH with nominal input voltage and rated output load;
6. All index testing methods in this datasheet are based on Company's corporate standards;
7. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
8. We can provide product customization service;
9. Specifications are subject to change without prior notice.

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