1W isolated DC/DC converter in SIP package
Wide input and regulated dual/single output

3 years Warranty

Patent Protection

CE Report EN62368-1

UKCA Report BS EN62368-1

RoHS

FEATURES

- Ultra compact SIP package
- Wide input voltage range (2:1)
- Operating temperature range: -40℃ to +85℃
- I/O Isolation test voltage: 1.5k VDC
- Low ripple & noise
- Short-circuit protection (self-recovery)
- Remote On/Off

WRA_S-1WR2 & WRB_S-1WR2 series are isolated 1W DC-DC converter productions with a wide 2:1 input voltage range and input isolation is tested with 1500VDC. The product has a relatively compact SIP-8 plastic package, and features high efficiency, operating temperature of -40℃ to +85℃, remote control, and continuous short-circuit protection. The smaller size and cost-effective design make the converter an ideal solution in communication, instruments, and industrial electronics applications.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Ripple & Noise (mVp-p) Typ./Max.	Full Load Efficiency (%)Min./Typ.	Capacitive Load② (μF)Max.
		Nominal (Range)	Max.①	Voltage(VDC)	Current(mA) Max./Min.			
EN	WRA0505S-1WR2	5 (4.5-9)	11	±5	±100/±5	70/100	71/73	1000
	WRA0512S-1WR2			±12	±42/±2		74/76	470
	WRA0515S-1WR2			±15	±33/±2		73/75	330
	WRB0503S-1WR2			3.3	303/15		69/71	1800
	WRB0505S-1WR2			5	200/10		70/72	2200
	WRB0512S-1WR2			12	83/4		74/76	1000
	WRB0515S-1WR2			15	67/3		73/75	680
	WRB0524S-1WR2			24	42/2		71/73	470
	WRA1205S-1WR2	12 (9-18)	20	±5	±100/±5	100/150	75/77	1000
	WRA1212S-1WR2			±12	±42/±2		79/81	470
	WRA1215S-1WR2			±15	±33/±2		76/78	330
	WRB1203S-1WR2			3.3	303/15		73/75	2700
	WRB1205S-1WR2			5	200/10		75/77	2200
	WRB1209S-1WR2			9	111/6		77/79	1800
	WRB1212S-1WR2			12	83/4		76/78	1000
	WRB1215S-1WR2			15	67/3		78/80	680
	WRB1224S-1WR2			24	42/2		74/76	470
	WRA2405S-1WR2	24 (18-36)	40	±5	±100/±5	70/100	77/79	1000
	WRA2409S-1WR2			±9	±56/±3		77/79	680
	WRA2412S-1WR2			±12	±42/±2		76/78	470
	WRA2415S-1WR2			±15	±33/±2		76/78	330
	WRB2403S-1WR2			3.3	303/15		73/75	2700
	WRB2405S-1WR2			5	200/10		75/77	2200
	WRB2412S-1WR2			12	83/4		76/78	1000
	WRB2415S-1WR2			15	67/3		76/78	680
	WRB2424S-1WR2			24	42/2		75/77	470

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EN/BS EN	WRA4805S-1WR2	48 (36-75)	80	±5	±100/±5	100/150	74/76	1000
	WRA4812S-1WR2			±12	±42/±2		76/78	470
	WRA4815S-1WR2			±15	±33/±2		78/80	330
	WRB4803S-1WR2			3.3	303/15		73/75	2700
	WRB4805S-1WR2			5	200/10		74/76	2200
	WRB4812S-1WR2			12	83/4		78/80	1000
	WRB4815S-1WR2			15	67/3		77/79	680

Notes: ①Exceeding the maximum input voltage may cause permanent damage;
②For the dual output modules, the capacitive loads of positive and negative outputs are the same.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	5VDC Input	--	281/40	290/60	mA
	12VDC Input	--	111/15	114/30	
	24VDC Input	--	55/6	57/10	
	48VDC Input	--	27/4	28/6	
Reflected Ripple Current	5VDC Input	--	30	--	
	12VDC Input	--	40	--	
	24VDC Input	--	55	--	
	48VDC Input	--	45	--	
Surge 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	
	12VDC Input	--	--	9	
	24VDC Input	--	--	18	
	48VDC Input	--	--	36	
Input Filter		Filter capacitor			
Hot Plug		Unavailable			
Ctrl*	Module on	Ctrl pin open (high resistance)			
	Module off	Ctrl pin pulled high (current 5-10mA typ. into Ctrl.)			

Note: * For use of Ctrl, please refer to the "design reference" in this manual.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	5%-100% load，Input voltage range	3.3V/5V output	--	±2	±5	%
		others	--	±1	±3	
Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
Load Regulation	5%-100% load		--	±0.4	±0.75	
Transient Recovery Time	25% load step change		--	0.5	2	ms
Transient Response Deviation			--	±2.5	±5	%
Temperature Coefficient	Full load		--	±0.02	±0.03	%/℃
Short Circuit Protection			Continuous, self-recovery			

Note: * The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

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General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output, with the test time of 1 minute and the leak current lower than 1mA	1500	--	--	VDC
Insulation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100kHz/0.1V	--	120	--	pF
Operating Temperature	see Fig. 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency (PFM Mode)	Full load, nominal input voltage	--	200	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

Mechanical Specifications

Case Material	Black flame-retardant and heat-resistant plastic
Dimension	22.00 x 9.50 x 12.00 mm
Weight	4.5g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig. 3-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig. 3-② for recommended circuit)	
Immunity	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	line to line ±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

Typical Characteristic Curves

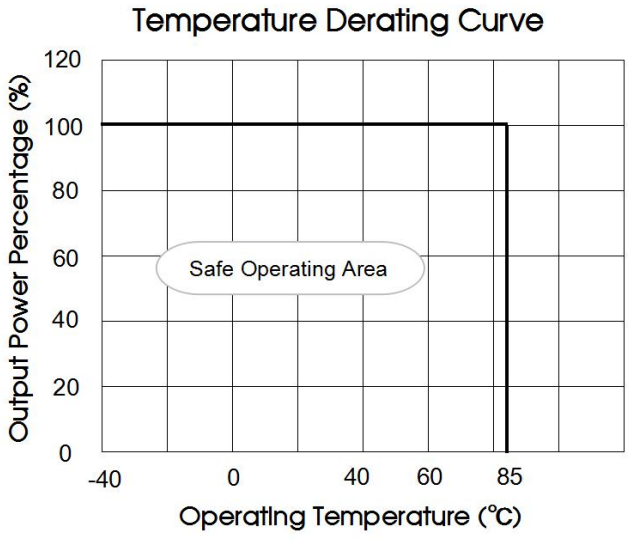

Fig 1

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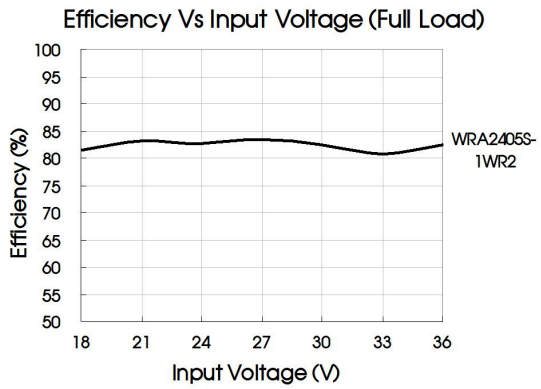
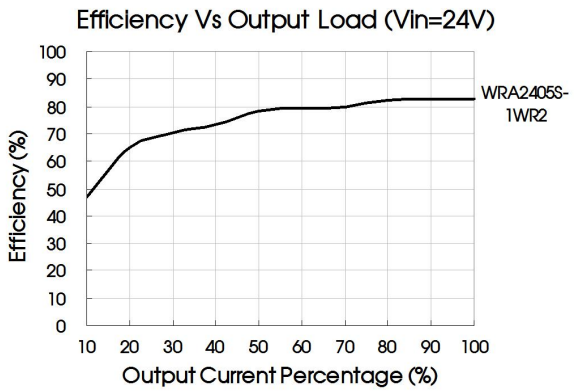
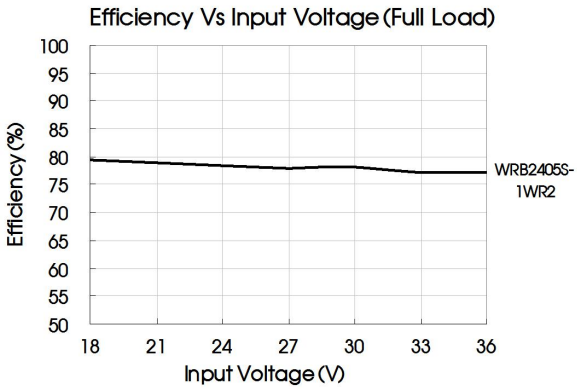
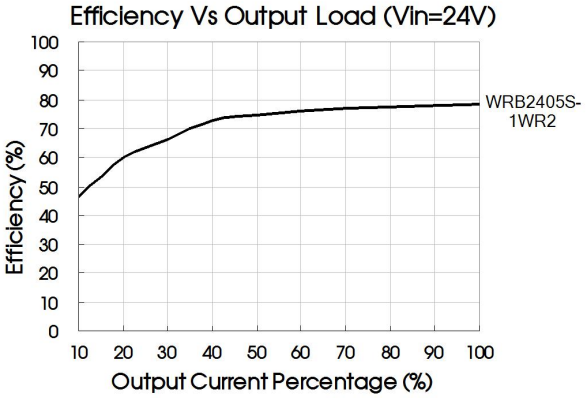






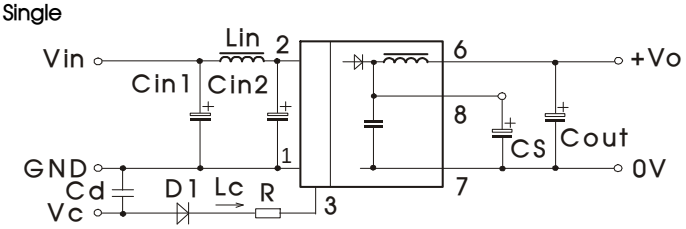


Design Reference

1. Typical application

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.
Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

Single



Dual

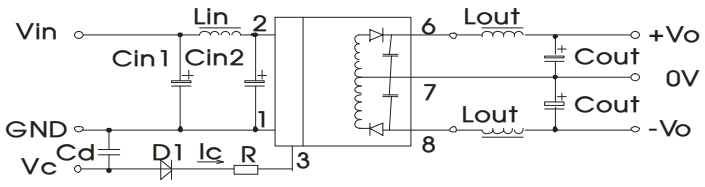


Fig. 2

Vin	5VDC&12VDC	24VDC&48VDC
Cin1	100μF/25V	10μF/100V
Cin2	47μF/25V	1μF/100V
Lin	4.7μH-12μH	
Cs	10μF-22μF/50V	
Cout	Vo(3/ ± 3/5/ ± 5/9/ ± 9V):100μF/16V	
	Vo(12/ ± 12/15/ ± 15V):100μF/25V	
	Vo(24/ ± 24V):100μF/50V	
Lout	2.2 H-10 H	
Cd	47nF/100V	

2. EMC compliance circuit

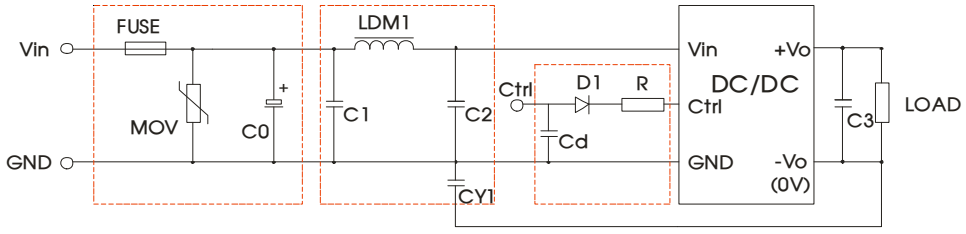


Fig. 3

Parameter description:

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Dimensions and Recommended Layout

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging number: 58210004;
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 ≤±5%; if the degree exceeds ±5%, then 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 input voltage range and full load;
5. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
6. All index testing methods in this datasheet are based on company corporate standards;
7. We can provide product customization service, please contact our technicians directly for specific information;
8. Specifications are subject to change without prior notice.

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