1W isolated DC-DC converter
Wide input and regulated single output

CE Patent Protection RoHS

FEATURES

- Ultra compact SIP package
- Wide input voltage range(2:1)
- I/O isolation test voltage 1.5K VDC
- Short-circuit protection(self-recovery)
- Operating ambient temperature range: -40℃ to +85℃
- EN62368 approved

WRB1505(X)S-1WR2 is isolated 1W DC-DC products with 2:1 input voltage and conventional voltage output. The product has a relatively compact SIP-8 plastic package, and features high efficiency, operating temperature of -40℃ to +85℃, 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		Full Load Efficiency② (%)Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max.①	Voltage (VDC)	Current(mA) Max./Min.		
CE	WRB1505S-1WR2	15 (12-24)	25	5	200/10	75/77	2200
	WRB1505XS-1WR2						

Notes:
①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency is measured at nominal input voltage and rated output load.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	15VDC input	--	87/--	89/--	mA
Reflected Ripple Current	15VDC input	--	50	--	
Surge Voltage (1sec. max.)	15VDC input	-0.7	--	30	VDC
Start-up Voltage	15VDC input	--	--	12	
Input Filter		Capacitance filter			
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
Voltage Accuracy	5%-100% load	--	±1	±3	%
No-load Output Voltage Accuracy	Input voltage range	--	±1.5	±5	
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	3	ms
Transient Response Deviation	25% load step change	--	±2.5	±5	%
Temperature Coefficient	Full load	--	±0.02	±0.03	%/℃
Ripple & Noise*	20MHz bandwidth	--	100	150	mV p-p
Short-circuit Protection	Input voltage range	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.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 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	--	250	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	22.00 x 9.50 x 12.00 mm
Weight	4.48g(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

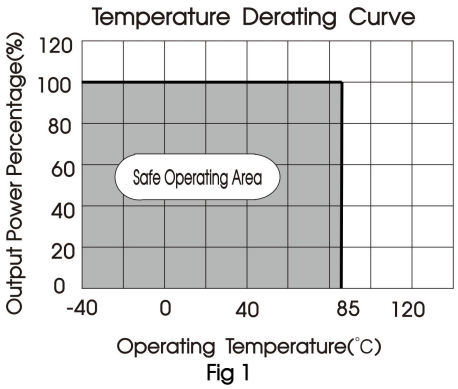


Fig 1

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.

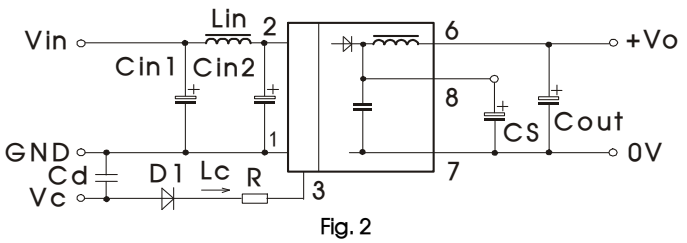


Fig. 2

Vin	15VDC
Cin1	100μF/50V
Cin2	47μF/50V
Lin	4.7μH-12μH
Cs	10μF/50V-22μF/50V
Cout	100μF/50V(Typ.)
Lout	2.2μH-10μH
Cd	47nF/100V

2. EMC compliance circuit

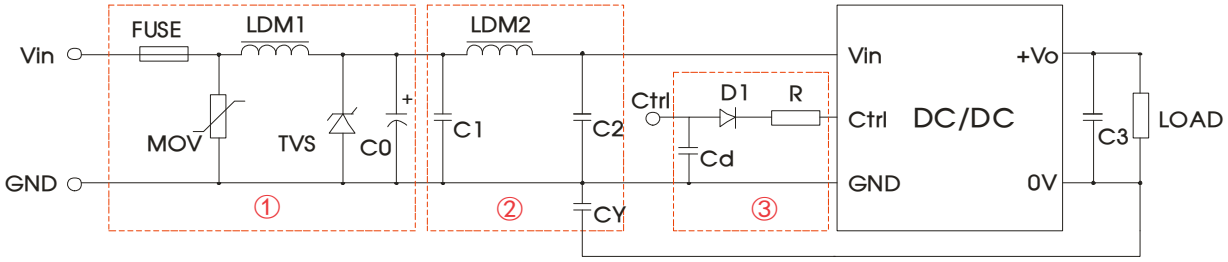


Fig. 3

Parameter description:

Model	Vin:15VDC
FUSE	Slow blown fuses according to the actual input current selections of the clients
MOV	--
LDM1	56μH
TVS	SMCJ48A
C0	330μF/50V
C1	4.7μF/50V
LDM2	12μH
C2	4.7μF/50V
C3	Refer to the Cout in Fig.2
CY	1nF/2KV
D1	RB160M-60V/1A
R	In accordance with the formula: $R = \frac{V_C - V_D - 1.0}{I_C} - 300$
Cd	47nF/100V

Notes:

①For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.
② V_C is the voltage of the Ctrl end relative to the GND of the input grounding; V_D is the positive-going conduction pressure drop of D1; I_C is the current flows into the Ctrl end and its value is generally 5-10mA, see Fig. 3-③ for the peripheral circuit of Ctrl end;
③ If there is no recommended parameters, no external component is required.

3. Ctrl end

The modules are of normal output when the Ctrl end is suspended or of high resistance; the modules turn off when connecting with high level (relative to the input grounding); notice that the current flows into the pin shall be 5 - 10mA, the modules will be permanently damaged if the current exceeds its max. value (20mA in general). The value of R can be derived as follows:

$$R = \frac{V_C - V_D - 1.0}{I_C} - 300$$

For detailed parameter, please refer to EMC compliance circuit in this manual.

4. 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 start up current of this kind of DC/DC module(see Fig. 4).
Generally: Vin=15V series Iave =200mA

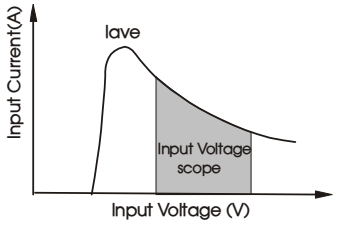
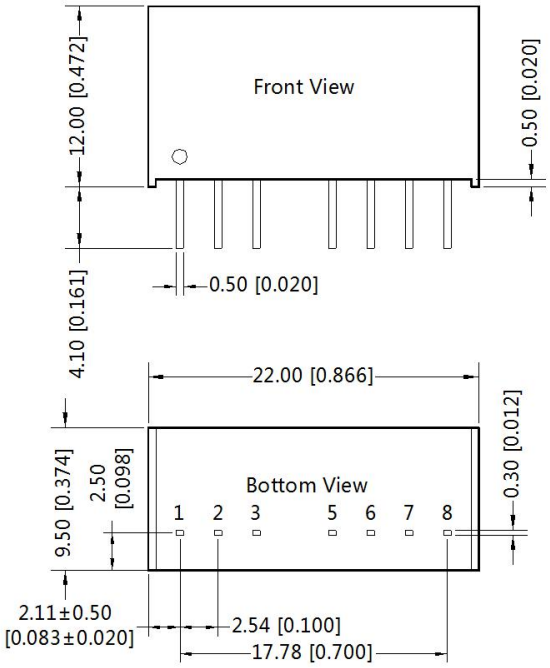


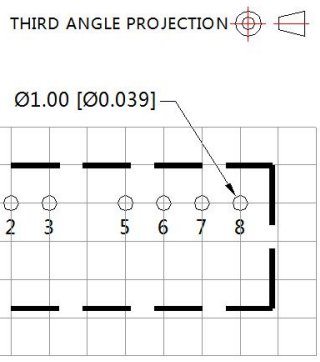
Fig. 4

5. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

WRB1505S-1WR2 Dimensions and Recommended Layout



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



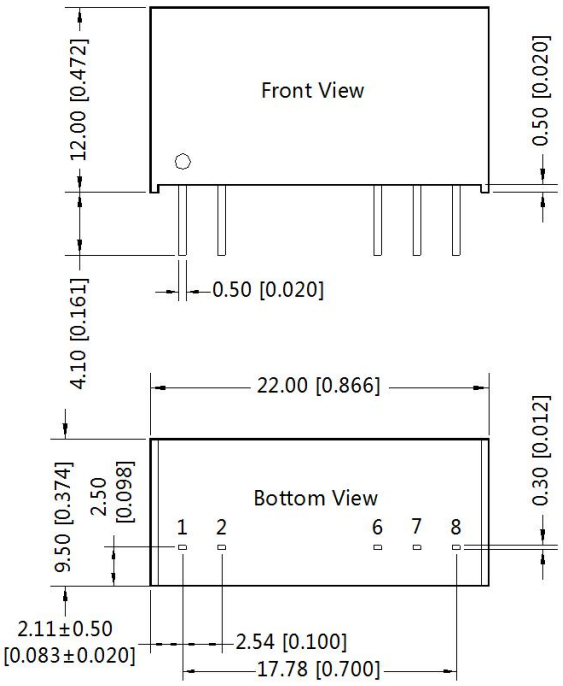
Note : Grid 2.54*2.54mm

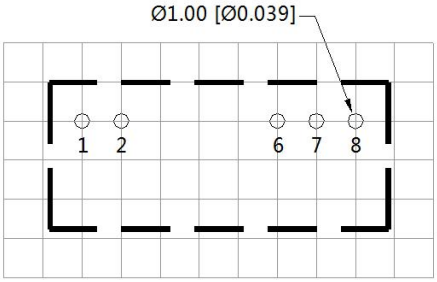
Pin-Out	
Pin	Mark
1	GND
2	Vin
3	Ctrl
5	NC
6	+Vo
7	0V
8	CS

NC: Not available for electrical connection

WRB1505XS-1WR2 Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





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

Note:
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 maximum capacitive load offered were tested at input voltage range and full load;
4. 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;
5. All index testing methods in this datasheet are based on company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information.
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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