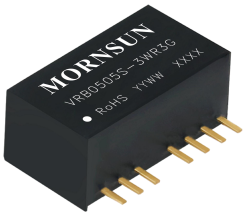
DC/DC Converter

VRB0505S-3WR3G

MORNSUN®

3W isolated DC-DC converter in SIP package
Wide input and regulated single output



Patent Protection RoHS

FEATURES

- Wide 2:1 input voltage range
- I/O isolation test voltage 1500VDC
- Operating ambient temperature range: -40℃ to +85℃
- No-load power consumption as low as 0.05W
- Output short-circuit protection

VRB0505S-3WR3G of isolated 3W DC-DC converter products with a wide 2:1 input voltage range, low no-load power consumption. 1500VDC input to output isolation, operating ambient temperature range of -40℃ to +85℃, output short-circuit protection and they are widely used in applications such as electric power,and instruments fields.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency ② (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max. ①	Voltage(VDC)	Current (mA) Max./Min.		
--	VRB0505S-3WR3G	5 (4.5-9)	11	5	500/0	71/73	2200

Notes:
① Exceeding the maximum input voltage may cause permanent damage;
② Efficiency 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)	nominal input voltage	--	761/10	782/16	mA
Reflected Ripple Current	nominal input voltage	--	20	--	
Surge Voltage (1sec. max.)		-0.7	--	12	VDC
Start-up Voltage		--	--	4.5	
Input Filter		Capacitance Filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	5% -100% load	--	±1	±3	%
	0% -5% load	--	--	±5	
Linear Regulation	Input voltage variation from low to high at full load	--	±0.2	±0.5	
Load Regulation ①	5% -100% load	--	±0.6	±1	
Transient Recovery Time	25% load step change, nominal input voltag	--	0.5	3	ms
Transient Response Deviation	25% load step change, input voltage range	--	--	±5	%
Temperature Coefficient	Full load	--	--	±0.03	%/℃
Ripple & Noise ②	20MHz bandwidth, 5% -100% load	--	40	75	mVp-p
Short-circuit Protection	Input voltage range	Continuous, self-recovery			

Note:
①Load regulation for 0% -100% load increases to ±5%;
②The "parallel cable" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specification

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 insulation at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	1000	--	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	Without condensation	5	--	95	%RH
Switching Frequency ①	PWM mode	--	300	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

Note: ①Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	22.00 x 9.50 x 12.00 mm
Weight	4.5g (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 B
	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 B

Typical Characteristic Curves

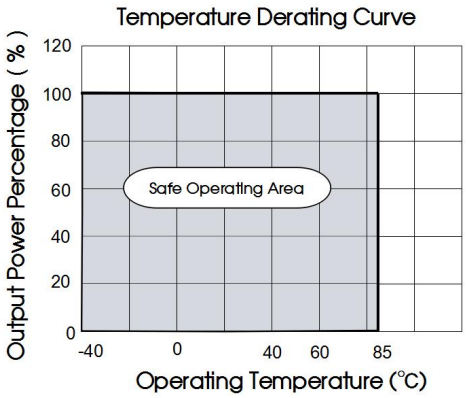


Fig. 1

Design Reference

1. Typical application

All the 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

Vout (VDC)	Cin	Cout
5	100μF/50V	100μF/25V

2. EMC compliance circuit

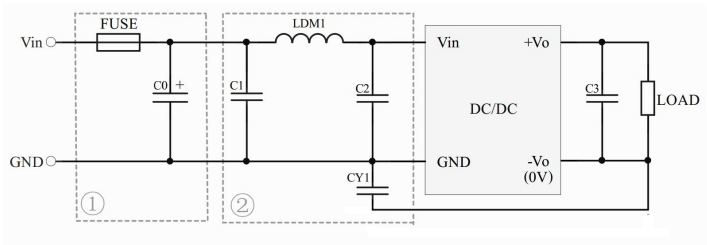


Fig. 3

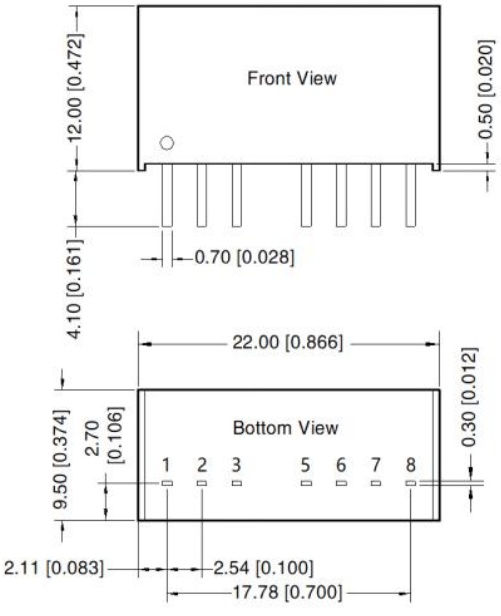
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test.
Selecting based on needs

Components	Vin: 5VDC
FUSE	Slow-blow, selecting based on needs
C0	680μF/25V
C1	4.7μF/50V
LDM1	12μH
C2	4.7μF/50V
C3	100μF/50V
CY1	1nF/2kV

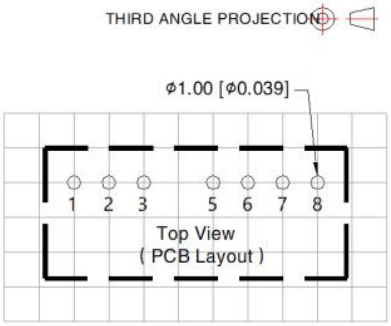
3. The products do not support parallel connection of their output

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

Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]



Note: Grid 2.54*2.54mm

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

NC: Not available for electrical connection

Note:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. packaging number: 58210004;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. 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;
4. All index testing methods in this datasheet are based on company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. 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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