

10W isolated DC-DC converter in DIP package  
Wide input and regulated single output



Patent Protection RoHS

## FEATURES

- Wide 2:1 input voltage range
- High efficiency up to 84%
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Operating ambient temperature range: -40°C to +85°C
- Industry standard pin-out

VRB0515XYMD-10WR3 is isolated 10W DC-DC converter products with a 2:1 input voltage range. They feature efficiency up to 84%, 1500VDC input to output isolation, operating temperature of -40 °C to +85 °C, input under-voltage protection, output short-circuit, over-current and over-voltage protection. They are widely applied in applications such as industrial controls, electric power, instrumentation and communications.

## Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency <sup>2</sup> (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max. <sup>①</sup>	Voltage (VDC)	Current(mA) Max./Min.		
—	VRB0515XYMD-10WR3	5 (4.5~9)	12	15	667/0	82/84	330

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	—	2500/10	2564/30	mA
Reflected Ripple Current	Nominal input voltage	—	50	—	
Surge Voltage (1sec. max.)		-0.7	—	16	VDC
Start-up Voltage		—	—	4.5	
Input Under-voltage Protection		3	3.5	—	
Start-up Time	Nominal input voltage & constant resistance load	—	10	—	ms
Input Filter		Pi filter			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	0%-100% load	—	±1	±2	%
Linear Regulation	Input voltage variation from low to high at full load	—	—	±0.5	
Load Regulation	0%-100% load	—	—	±1	
Transient Recovery Time	25% load step change, nominal input voltage	—	300	500	μs
Transient Response Deviation		—	±3	±5	%
Temperature Coefficient	Full load	—	—	±0.03	%/°C
Ripple & Noise <sup>①</sup>	20MHz bandwidth, 5%-100% load	—	40	100	mVp-p
Over-voltage Protection	Input voltage range	110	—	160	%Vo
Over-current Protection		110	140	190	%Io
Short-circuit Protection		Continuous, self-recovery			

Note: ① Under 0% -5% load conditions, ripple & noise does not exceed 5%Vo. 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	--	1000	--	pF
Operating Temperature	See Fig. 1	-40	--	+85	°C
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	°C
Vibration		10-150Hz, 5G, 90 Min. along X, Y and Z			
Switching Frequency *	PWM mode	--	350	--	kHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	k hours

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

Mechanical Specifications

Case Material	Aluminum alloy
Dimensions	25.40 x 25.40 x 11.70 mm
Weight	12.5g (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 ±6kV	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

Typical Characteristic Curves

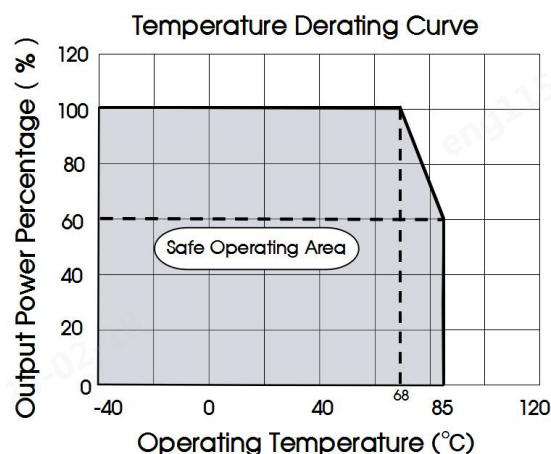


Fig.1

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  $C_{in}$  and  $C_{out}$  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(VDC)	Cin	Cout
5	100 $\mu$ F/16V	10 $\mu$ F/25V

2. EMC compliance circuit

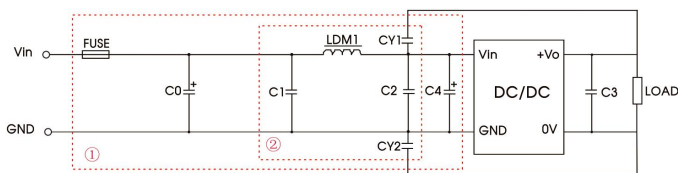


Fig. 3

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

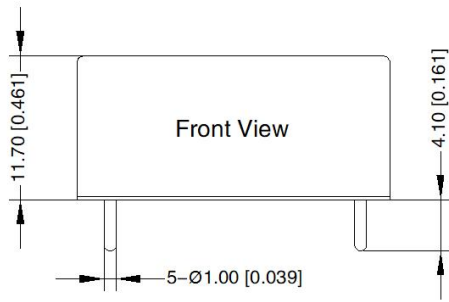
Parameter description:

Model	Vin: 5VDC
FUSE	Select fuse value according to actual input current
C0	2200 $\mu$ F/35V
C1, C2	4.7 $\mu$ F/50V
C3	Refer to the Cout in Fig.2
C4	1000 $\mu$ F/35V
LDM1	4.7 $\mu$ H
CY1, CY2	1nF/2kV

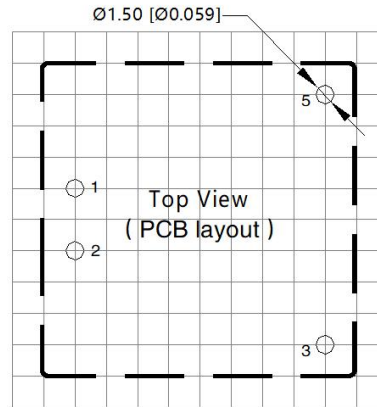
3. The products do not support parallel connection of their output

4. For additional information please refer to DC-DC converter application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

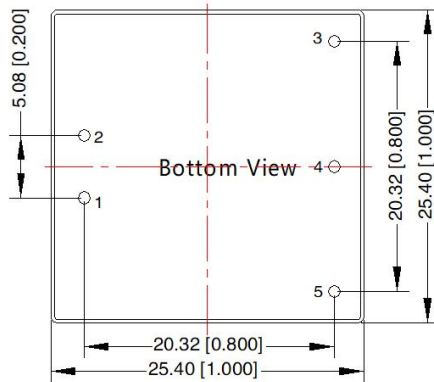
Dimensions and Recommended Layout



THIRD ANGLE PROJECTION



Note: Grid 2.54\*2.54mm



Note:  
Unit: mm[inch]  
Pin diameter tolerances:  $\pm 0.10[\pm 0.004]$   
PIN1/2/3/4/5:  $\phi 1.0\text{mm}$   
General tolerances:  $\pm 0.50[\pm 0.020]$

Pin-Out	
Pin	Mark
1	GND
2	Vin
3	+Vo
4	No Pin
5	0V

Note:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58210003;
- If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
- The maximum capacitive load offered were tested at input voltage range and full load;
- 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;
- All index testing methods in this datasheet are based on company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

Mornsun Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China  
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: [info@mornsun.cn](mailto:info@mornsun.cn) [www.mornsun-power.com](http://www.mornsun-power.com)