

10W isolated DC-DC converter in DIP package,
Ultra-wide input and regulated single output



Patent Protection RoHS



FEATURES

- Wide 2:1 input voltage range
- High efficiency up to 85%
- No load power consumption as low as 0.12W
- 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 ~ +85°C
- Industry standard pin-out

VRB0505YMD-10WHR3 is isolated 10W DC-DC converter products with a 2:1 input voltage range. They feature efficiency of up to 85%, 1500VDC input to output isolation, operating temperature of -40°C ~ +85°C, input under-voltage protection, output over-voltage, over-current and short circuit protection. They are widely used in applications such as industrial controls, electric power, instrumentation and communications. Adding additional input reverse polarity protection.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency ² (%) Min./Typ.	Max. Capacitive Load(μF)
		Nominal (Range)	Max. ^①	Voltage (VDC)	Current(mA) Max./Min.		
--	VRB0505YMD-10WHR3	5 (4.5-9)	12	5	2000/0	83/85	470

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)	5VDC nominal input series	--	2500/60	2564/100	mA
Reflected Ripple Current	5VDC nominal input series	--	50	--	
Surge Voltage (1sec. max.)	5VDC nominal input series	-0.7	--	16	VDC
Start-up Voltage	5VDC nominal input series	--	--	4.5	
Under-voltage Protection	5VDC nominal input series	3	3.5	--	
Start-up Time	Nominal input voltage & constant resistance load	--	10	--	ms
Input Filter		Pi filter			
Hot Plug		Unavailable			
Ctrl*	Module on	Ctrl pin open or pulled high (TTL 3.5-12VDC)			
	Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off	--	6	10	mA

Note: *The Ctrl pin voltage is referenced to input GND.

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		--	±5	±8	%
Temperature Coefficient	Full load	--	--	±0.03	%/°C
Ripple & Noise ^①	20MHz bandwidth, 5%-100% load	--	40	100	mV p-p
Over-voltage Protection	Input voltage range	110	--	160	%Vo

Over-current Protection	Input voltage range	110	140	190	%Io
Short-circuit Protection		Continuous, self-recovery			
Note: ① Ripple & Noise at < 5% load is 5%Vo max. 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.

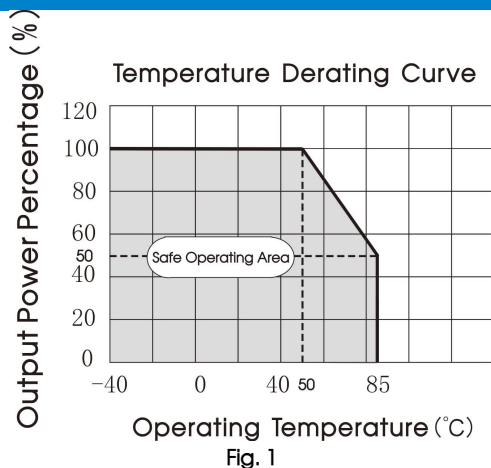
Mechanical Specifications

Case Material	Aluminum alloy
Dimensions	25.40 x 25.40 x 16.20 mm
Weight	17.0g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig.5-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig.5-② 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.5-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (see Fig.5-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

Typical Characteristic Curves



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	5V
Cin	100 μ F
Cout	10 μ F

2. EMC compliance circuit

5VDC nominal input series

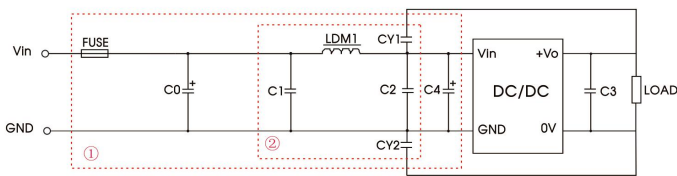


Fig. 5

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

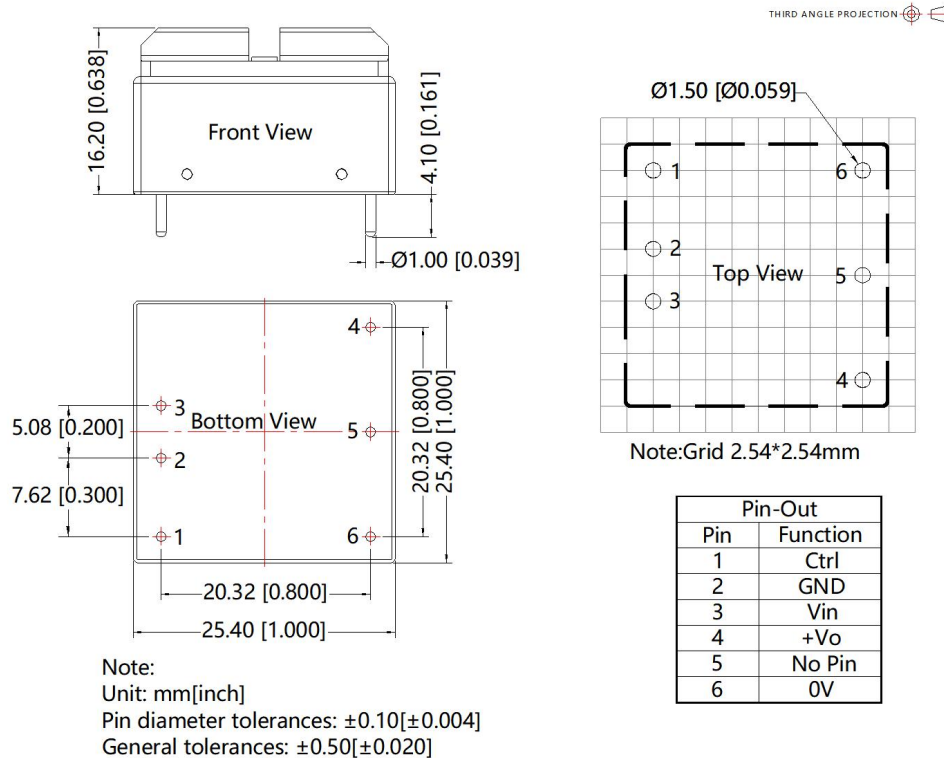
Parameter description:

Model	Vin: 5V
FUSE	Select fuse value according to actual input current
C0	2200 μ F/35V
C1/C2	4.7 μ F/50V
C3	Refer to the Cout in Fig.2
C4	1000 μ F/35V
LDM1	4.7 μ 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

Dimensions and Recommended Layout



- Note:
- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200048;
 - 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 www.mornsun-power.com