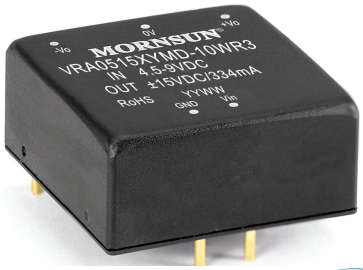
DC/DC Converter
VRA0515XYMD-10WR3

MORNSUN®

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



Patent Protection RoHS

3 years Warranty

FEATURES

- Wide 2:1 input voltage range
- High efficiency up to 84%
- 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℃ to +85℃
- Industry standard pin-out

VRA0515XYMD-10WR3 is isolated 10W DC-DC converter products with a 2:1 input voltage range. They feature efficiencies up to 84%, 1500VDC input to output isolation, operating temperature of -40℃ to +85℃, 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.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency② (%) Min./Typ.	Max. Capacitive Load(μF)
		Nominal (Range)	Max. ①	Voltage (VDC)	Current(mA) Max./Min.		
--	VRA0515XYMD-10WR3	5 (4.5-9)	12	±15	±334/0	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		--	50	--	
Surge Voltage (1sec. max.)		-0.7	--	16	VDC
Start-up Voltage		--	--	4.5	
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	5VDC input	Positive output	--	±1	±2	%
			Negative output	--	±1	±3	
Linear Regulation	Input voltage variation from low to high at full load	5VDC input		--	--	±1	
Load Regulation	0%-100% load	5VDC input		--	--	±1.5	
Cross Regulation	Input voltage range, 25%-100% load			--	--	±5	
Transient Recovery Time	25% load step change, nominal input voltage			--	300	500	μs
Transient Response Deviation				--	±3	±5	%
Temperature Coefficient	Full load			--	--	±0.03	%/℃
Ripple & Noise①	20MHz bandwidth, 5%-100% load			--	40	100	mV p-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 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	℃
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	℃
Vibration		10-150Hz, 5G, 90 Min. along X, Y and Z			
Switching Frequency*	PWM mode	--	350	--	KHz
MTBF	MIL-HDBK-217F@25℃	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	Horizontal package	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.3-①for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

Typical Characteristic Curves

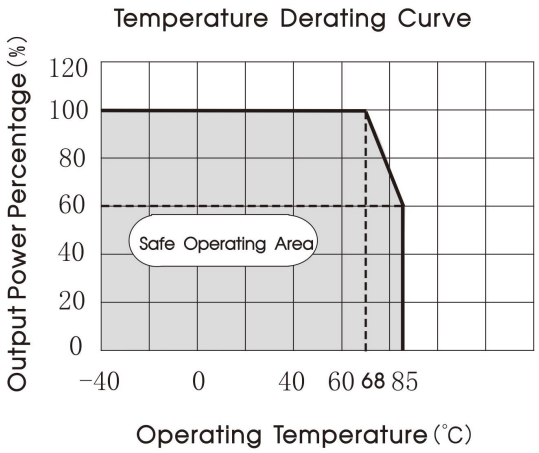


Fig. 1

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 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

Cin	100μF
Cout	10μF

2. EMC compliance circuit

5VDC nominal input series

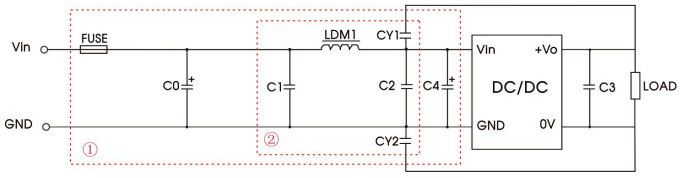


Fig. 3

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

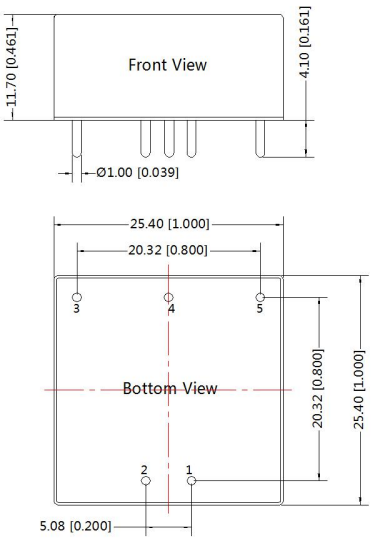
Parameter description:

Model	Vin: 5V
FUSE	T/4A/250VAC
C0	2200μF/35V
C1/C2	4.7μF/50V
C3	Refer to the Cout in Fig.2
C4	1000μF/35V
LDM1	4.7μH
CY1/CY2	1nF/2KV

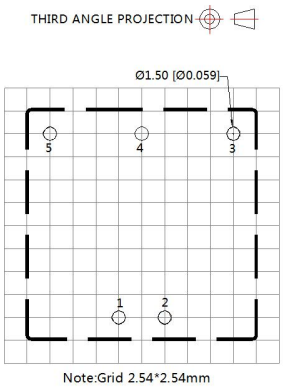
3. The products do not support parallel connection of their output

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

Dimensions and Recommended Layout



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



Note:Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	GND
2	Vin
3	+Vo
4	0V
5	-Vo

Note:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210003 (DIP);
2. 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;
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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