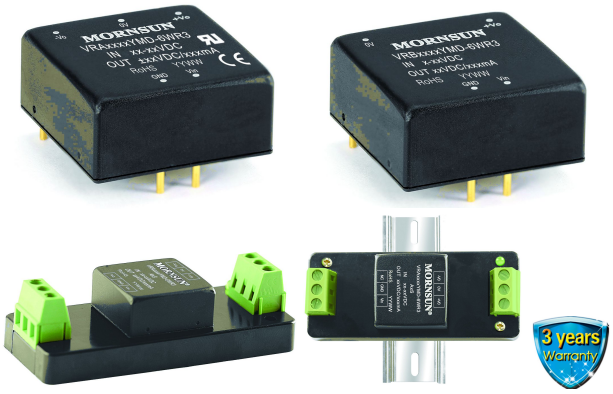
DC/DC Power Supply Module

VRA_YMD-6WR3 & VRB_YMD-6WR3 Series

MORNSUN®

6W,wide input, isolated & regulated dual/single output, YMD package, DC-DC converter



cULus CE CB Patent Protection RoHS

FEATURES

- Wide input voltage range (2:1)
- High efficiency up to 87%
- No-load power consumption as low as 0.12W
- Isolation voltage :1500VDC
- Input under-voltage protection, output short circuit, over-current, over–voltage protection
- Operating temperature range: -40℃ to +85℃
- Meet CISPR22/EN55022 CLASS A, without external components
- Reverse voltage protection available with A2S(Chassis mounting) or A4S(35mm DIN-Rail mounting)
- International standard pin-out
- UL60950,EN60950,IEC60950 approval

VRA_YMD-6WR3 & VRB_YMD-6WR3 series are isolated 6W DC-DC products with 2:1 input voltage. The feature efficiency up to 87%, 1500VDC isolation, operating temperature of -40℃~+85℃, input under-voltage protection, output over-voltage, over-current, short circuit protection and EMI meets CISPR22/EN55022 CLASS A, which make them widely applied in medical care, industrial control, electric power, instruments and communication fields. And extension package A2S and A4S also enable them with reverse voltage protection.

Selection Guide

Certification	Part No. ①	Input Voltage (VDC)		Output		Efficiency ③(%,Min./Typ.) @ Full Load	Max. Capacitive Load④(μF)
		Nominal (Range)	Max. ②	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
UL/CE/CB	VRA1205YMD-6WR3	12 (9-18)	20	±5	±600/0	79/81	470
	VRA1212YMD-6WR3			±12	±250/0	83/85	100
--	VRB1205YMD-6WR3			5	1200/0	79/81	1000
	VRB1212YMD-6WR3			12	500/0	83/85	470
UL/CE/CB	VRA2405YMD-6WR3	24 (18-36)	40	±5	±600/0	81/83	470
	VRA2412YMD-6WR3			±12	±250/0	85/87	100
	VRA2415YMD-6WR3			±15	±200/0	85/87	100
--	VRB2403YMD-6WR3			3.3	1500/0	75/77	1800
	VRB2405YMD-6WR3			5	1200/0	80/82	1000
	VRB2412YMD-6WR3			12	500/0	83/85	470
	VRB2415YMD-6WR3			15	400/0	84/86	220
	VRB2424YMD-6WR3			24	250/0	83/85	100

Notes:

① Part No. with suffix of "A2S" means chassis mounting and suffix of "A4S" means DIN-Rail mounting (e.g. VRB2405YMD-6WR3A2S means chassis mounting; VRB2405YMD-6WR3A4S means DIN-Rail mounting);

② Absolute maximum rating without damage on the converter, but it isn't recommended;

③ Efficiency is measured In nominal input voltage and rated output load;A2S (wiring) and A4S (rail) Model due to input reverse polarity protection, minimum efficiency greater than Min.-2 is qualified.

④ The capacitive loads of positive and negative outputs are identical.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	12VDC input		--	603/10	633/22	mA
	24VDC input	3.3V output	--	268/5	275/15	
		Others	--	296/5	313/15	
Reflected Ripple Current			--	20	--	
Input impulse Voltage (1sec. max.)	12VDC input		-0.7	--	25	VDC
	24VDC input		-0.7	--	50	

Starting Voltage	12VDC input	--	--	9	VDC
	24VDC input	--	--	18	
Input Under-voltage protections	12VDC input	5.5	6.5	--	
	24VDC input	14	15.5	--	
Input Filter		Pi filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	5%-100% load		--	±1	±3	%
	0%-5% load	±5V output	--	±2	±5	
		others	--	±1	±3	
Line Voltage Regulation	Full load, the input voltage is from low voltage to high voltage	Positive output	--	±0.2	±0.5	
		Negative output	--	±0.5	±1	
Load Regulation①	5%-100% load	Positive output	--	±0.5	±1	
		Negative output	--	±0.5	±1.5	
Cross Regulation	Dual output, main circuit with 50% load, auxiliary circuit with 10%-100% load		--	--	±5	
Transient Recovery Time	25% load step change		--	300	500	μs
Transient Response Deviation		3.3V, 5V, ±5V output	--	±5	±8	%
		Others	--	±3	±5	
Temperature Drift Coefficient	Full load		--	--	±0.03	%/℃
Ripple & Noise②	20MHz bandwidth, 5%-100% load		--	60	85	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: ①When testing from 0% to100%load working conditions, load regulation index is ±5%;
②0%-5% load ripple&Noise is no more than 5%Vo.Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.

General Specification

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Insulation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	1500	--	--	VDC
Insulation Resistance	Input-output, insulation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	1000	--	pF
Operating Temperature	Derating if the temperature is ⩾71℃ (see Fig. 1)	-40	--	+85	℃
Storage Humidity	Without condensation	5	--	95	%RH
Storage Temperature		-55	--	+125	℃
Lead Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	+300	
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
Switching Frequency *	PWM mode	--	300	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours

Note:* This series of products using reduced frequency technology, the switching frequency is test value of full load,When the load is reduced to below 50%, the switching frequency decreases with decreasing load.

Physical Specifications

Casing Material		Aluminum alloy
Dimension	Horizontal package	25.40*25.40*11.70 mm
	A2S chassis mounting	76.00*31.50*21.20 mm
	A4S DIN-rail mounting	76.00*31.50*25.80 mm
Weight	Horizontal package/A2S wiring package/A4S rail package	14g /36g /56g(Typ.)
Cooling method		Free convection

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS A (Bare component)/ CLASS B (see Fig.3-② for recommended circuit)	
	RE	CISPR22/EN55022	CLASS A (Bare component)/ CLASS B (see Fig.3-② for recommended circuit)	
EMS	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	±2KV (see Fig.3-①for 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

Product Characteristic Curve

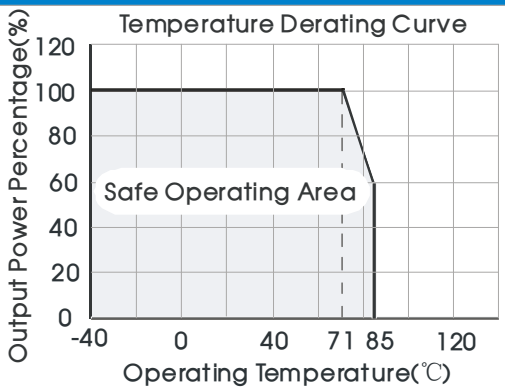
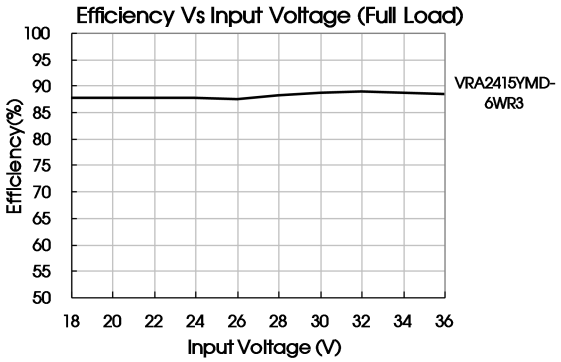
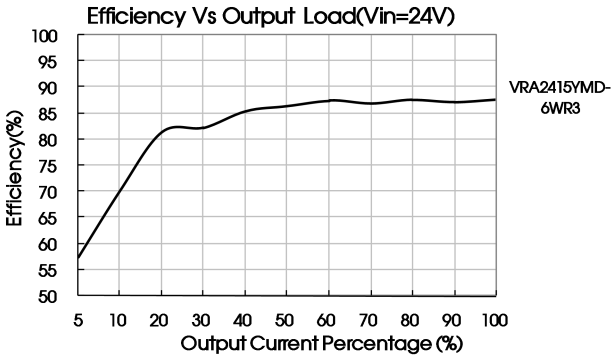
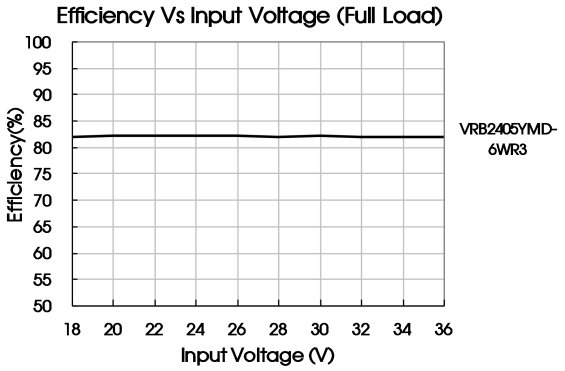
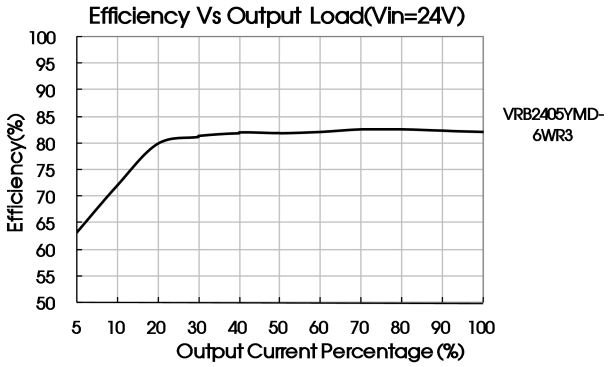


Fig. 1









Design Reference

1. Typical application

All the DC/DC converters of this series are tested according to the recommended circuit (see Fig. 2) before delivery.
If it is required to further reduce input and output ripple, properly increase the input & output of additional capacitors Cin and Cout or select capacitors of low equivalent impedance provided that the capacitance is no larger than the max. capacitive load of the product.

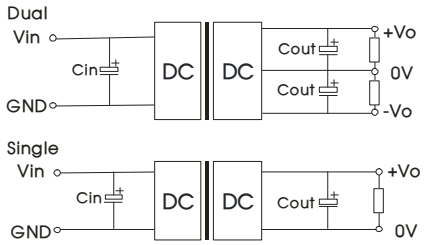


Fig. 2

Vin(VDC)	Cin(uF)	Cout(uF)
12	100	10
24	10~47	

2. EMC solution-recommended circuit

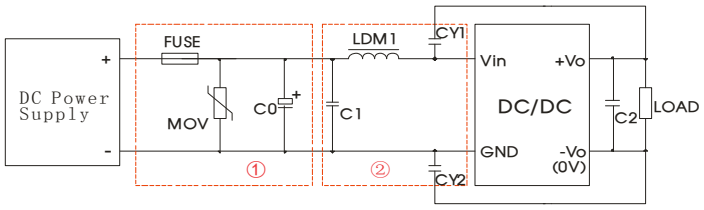


Fig. 3

Notes: Part ① in the Fig. 3 is used for EMS test and part ② for EMI filtering; selected based on needs.

Parameter description

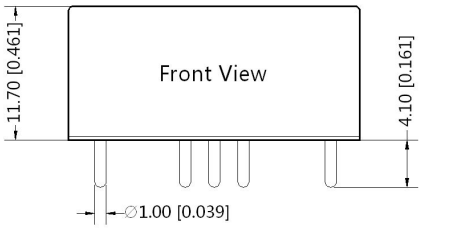
Model	Vin:12V	Vin:24V
FUSE	Choose according to actual input current	
MOV	S14K20	S20K30
C0	1000μF/35V	1000μF/50V
C1	1μF/50V	
C2	Refer to the Cout in Fig.2	
LDM1	4.7μH	
CY1/CY2	1nF/2KV	

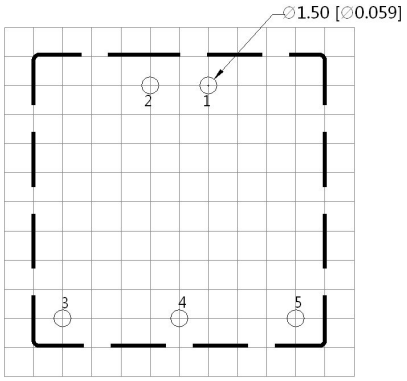
3. It is not allowed to connect modules output in parallel to enlarge the power

4. For more information please find DC-DC converter application notes on www.mornsun-power.com

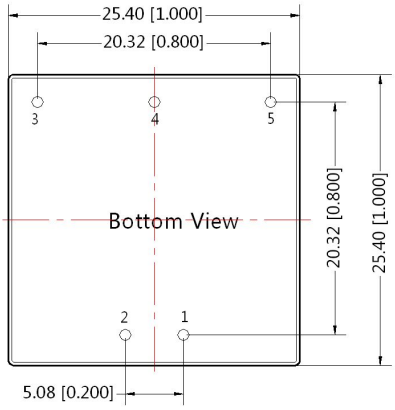
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note:Grid 2.54*2.54mm

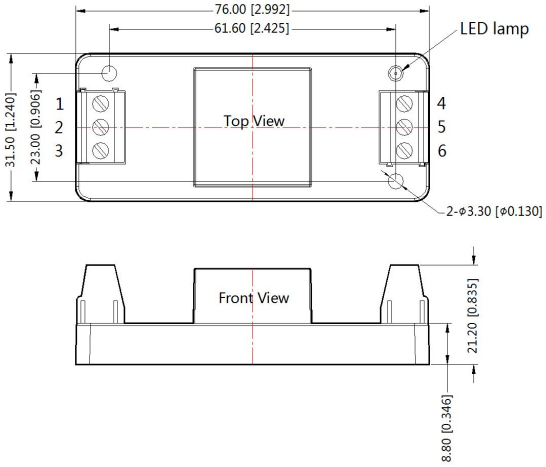


Pin-Out		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	0V
5	0V	-Vo

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

VRA_YMD-6WR3A2S & VRB_YMD-6WR3A2S Dimensions

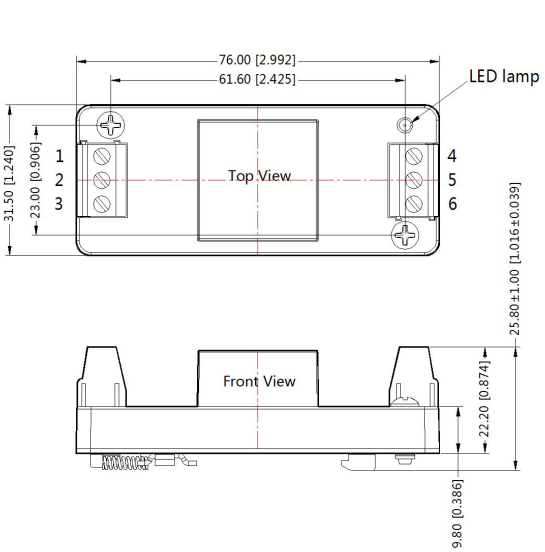
THIRD ANGLE PROJECTION



Pin-Out						
Pin	1	2	3	4	5	6
Dual	NC	GND	Vin	-Vo	0V	+Vo
Single	NC	GND	Vin	0V	NC	+Vo

Note:
Unit:mm[inch]
Wire range:24~12 AWG
General tolerances:±0.50[±0.020]

VRA_YMD-6WR3A4S & VRB_YMD-6WR3A4S Dimensions



Pin-Out						
Pin	1	2	3	4	5	6
Dual	NC	GND	Vin	-Vo	0V	+Vo
Single	NC	GND	Vin	0V	NC	+Vo

Note:
Unit:mm[inch]
Wire range:24~12 AWG
General tolerances:±0.50[±0.020]

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com.Packing bag number : 58210003(DIP),58220022(A2S/A4S package);
2. The recommended unbalance degree of the dual output module load is ⩽±5%; if the degree exceeds ±5%, than the product performance cannot be guaranteed to comply with all parameters in the datasheet. Please contact our technicians directly for specific information;
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 our Company's corporate standards;
6. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
7. We can provide product customization service;
8. Specifications are subject to change without prior notice.

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