DC/DC Converter

URA_YMD-6WR2 & URB_YMD-6WR2 Series

MORNSUN®

6W, Ultra wide input voltage, isolated & regulated output DC/DC converter

Patent Protection RoHS

FEATURES

- Wide range of input voltage (4:1)
- Efficiency up to 88%
- Isolation voltage: 1.5K VDC
- Output over-voltage protection, short-circuit protection
- Operating temperature range: -40℃ to +85℃
- Low ripple & noise
- Meet CISPR22/EN55022 CLASS A
- Reverse voltage protection available with A2S(Chassis mounting) or A4S(DIN-rail mounting)
- Meet EN60950
- International standard pin-out

URA_YMD-6WR2 & URB_YMD-6WR2 series are isolated 6W DC-DC products with 4:1 input voltage. They feature efficiency up to 88%, 1500VDC isolation, operating temperature of -40℃~+85℃, output over-voltage protection, short-circuit protection and EMI meets CISPR22/EN55022 CLASS A, which make them widely applied in battery power supplies, industrial control, electricity, instruments, 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.)		
--	URA2405YMD-6WR2	24 (9-36)	40	±5	±600/±30	81/83	470
	URA2412YMD-6WR2			±12	±250/±12	85/87	100
	URA2415YMD-6WR2			±15	±200/±10	86/88	100
CE	URB2403YMD-6WR2			3.3	1500/75	77/79	1800
	URB2405YMD-6WR2			5	1200/60	81/83	1000
	URB2409YMD-6WR2			9	667/33	83/85	470
	URB2412YMD-6WR2			12	500/25	85/87	100
	URB2415YMD-6WR2			15	400/20	86/88	100
	URB2424YMD-6WR2			24	250/12	86/88	47
--	URA4805YMD-6WR2	48 (18-75)	80	±5	±600/±30	81/83	470
	URA4812YMD-6WR2			±12	±250/±12	85/87	100
	URA4815YMD-6WR2			±15	±200/±10	86/88	100
CE	URB4803YMD-6WR2			3.3	1500/75	77/79	1800
	URB4805YMD-6WR2			5	1200/60	81/83	1000
	URB4812YMD-6WR2			12	500/25	85/87	100
	URB4815YMD-6WR2			15	400/20	86/88	100
	URB4824YMD-6WR2			24	250/12	86/88	47

Notes:
①Part No. with suffix of "A2S" means chassis mounting and suffix of "A4S" means DIN-Rail mounting (e.g. URB2405YMD-6WR2A2S means chassis mounting without Ctrl pin; URB2405YMD-6WR2A4S means DIN-Rail mounting with Ctrl pin);
②Exceeding the maximum input voltage may cause permanent damage;
③The efficiency of products with chassis mounting or DIN-Rail mounting is 2% lower than the DIP package ones due to the reverse voltage protection;
④For the dual output modules, the capacitive loads of positive and negative outputs are the same.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC input	--	301/7	309/13	mA
	48VDC input	--	151/3	154/7	
Reflected Ripple Current		--	20	--	

Input impulse Voltage (1sec. max.)	24VDC input	-0.7	--	50	VDC
	48VDC input	-0.7	--	100	
Starting Voltage	24VDC input	--	--	9	
	48VDC input	--	--	18	
Input Filter		Pi filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Main load		--	±1	±2	%
	Side load		--	±1	±2	
Balance of Output Voltage	Dual output, balanced load		--	±0.5	±1.5	
Line Regulation	Full load, the input voltage is from low to high	Main side	--	±0.2	±0.5	
		Secondary side	--	--	±1	
Load Regulation	5%-100% load		--	±0.5	±1	
Cross Regulation	Dual output, primary output with 50% loading, secondary output with 10%-100% loading		--	--	±5	
Transient Recovery Time	25% load step change		--	300	500	μs
Transient Response Deviation			--	±3	±5	%
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Ripple & Noise*	20MHz bandwidth		--	50	75	mV p-p
Over-voltage Protection	Input voltage range		110	120	140	%Vo
Short circuit Protection			Continuous			

Note: *Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	1500	--	--	VDC
Isolation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	1000	--	pF
Operating Temperature	Derating when operating temperature up to ⩾71℃ (see Fig. 1)	-40	--	85	℃
Storage Temperature		-55	--	125	
Max. Casing Temperature	Within the operating temperature curve	--	--	105	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency	PWM Mode	--	300	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours

Physical Specifications

Casing Material		Aluminum alloy
Dimension	DIP	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	DIP/A2S chassis mounting/A4S DIN-Rail mounting	13g/35g/55g(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

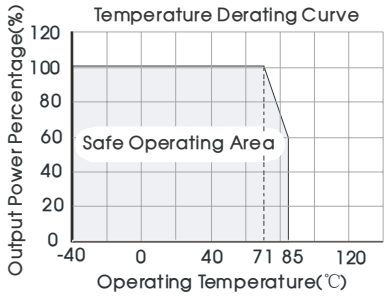
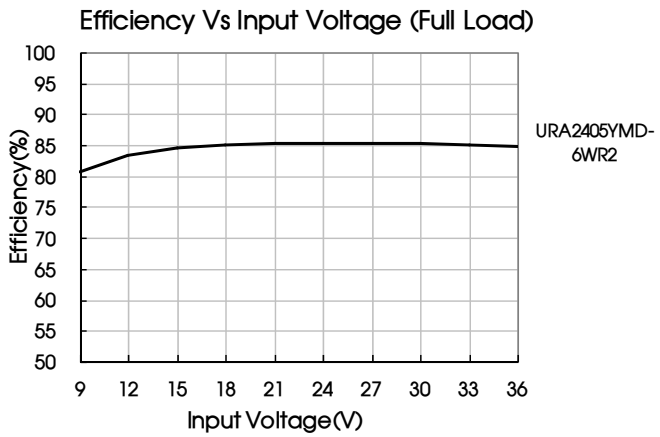
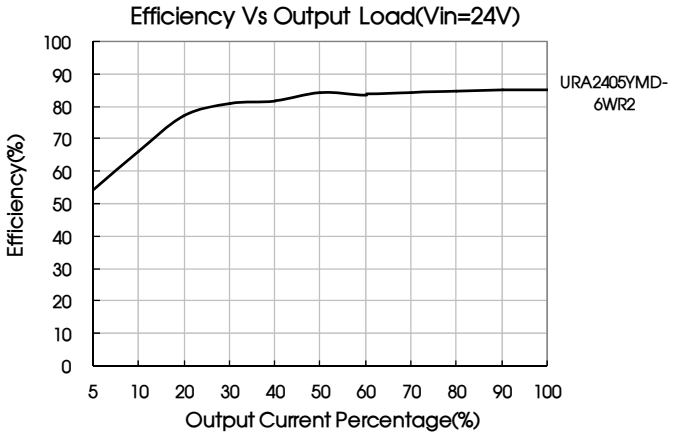
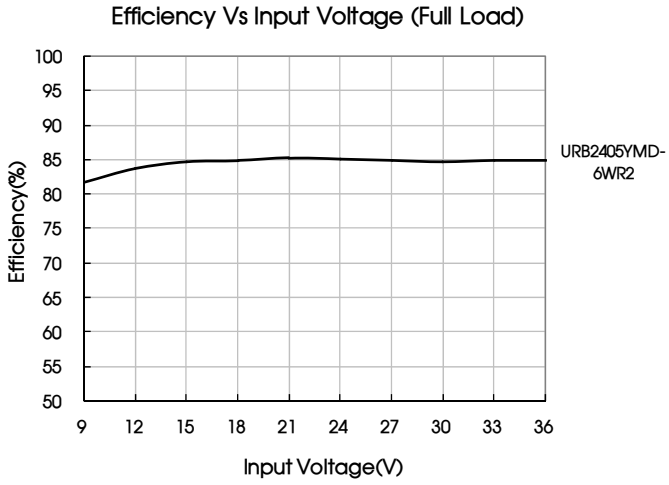
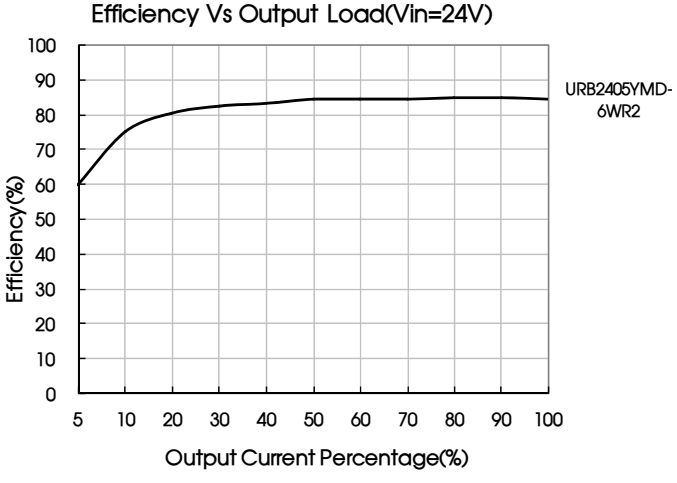


Fig. 1









Design Reference

1. Recommended circuit

All the DC/DC converters of this series are tested according to the recommended circuit (see Fig. 2) before delivery.

If a further decrease of the input and output ripple is required, properly increase the input & output of additional capacitors Cin and Cout or select capacitors of low equivalent impedance， and ensure the capacitance should be lower than the max. capacitive load of the product.

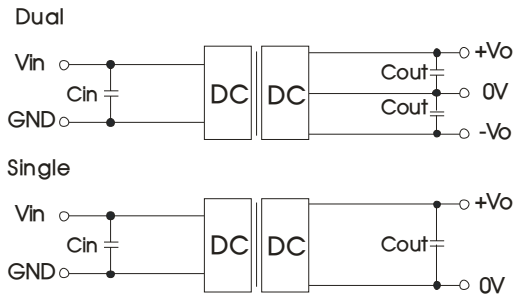


Fig. 2

Vout (VDC)	Cin (μF)	Cout (μF)
24	100	10
48	10~ 47	

2. EMC solution-recommended circuit

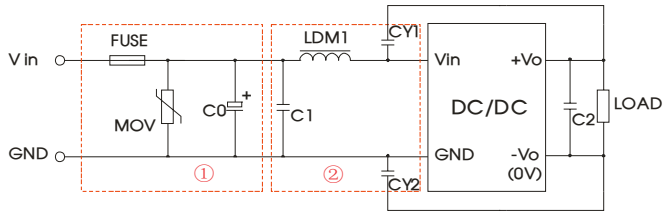


Fig. 3

Note: Part ① in the Fig. 3 is for EMS test, part ② is for EMI filtering; parts ① and ② can be added based on actual requirement.

Parameter description

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S14K35	S14K60
C0	330μF/50V	330μF/100V
C1	1μF/50V	1μF/100V
C2	Refer to the Cout in Fig.2	
LDM1	4.7μH	
CY1	1nF/2KV	
CY2	1nF/2KV	

EMC solution-recommended circuit PCB layout

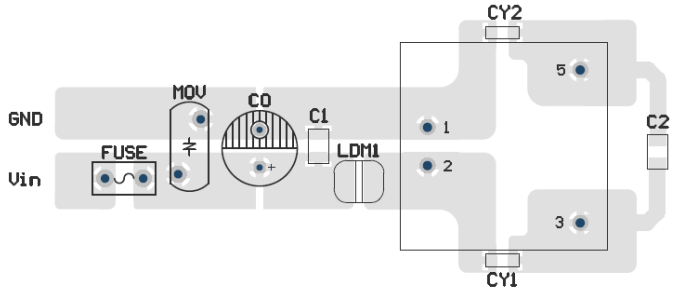


Fig. 4

Note: the min. distance of the bonding pads between input & output isolation capacitors (CY1/CY2) shall be ≥ 2mm.

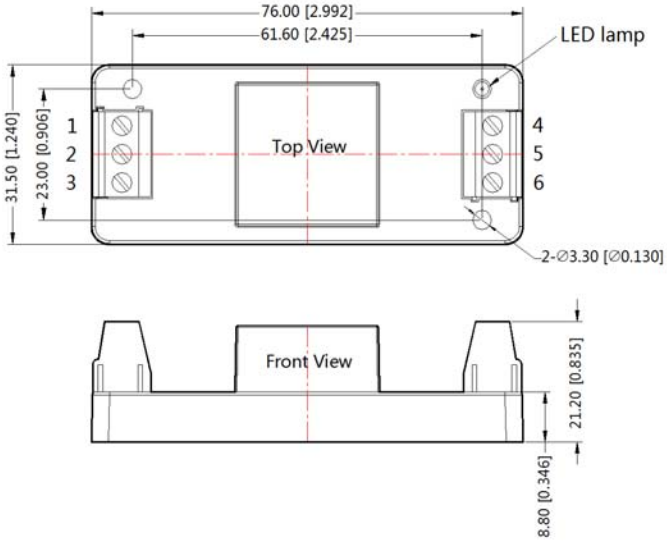
3. It is not allowed to connect modules output in parallel to enlarge the power

4. For more information about Mornsun EMC Filter products, please visit www.mornsun-power.com to download the Selection Guide of EMC Filter

Dimensions and Recommended Layout

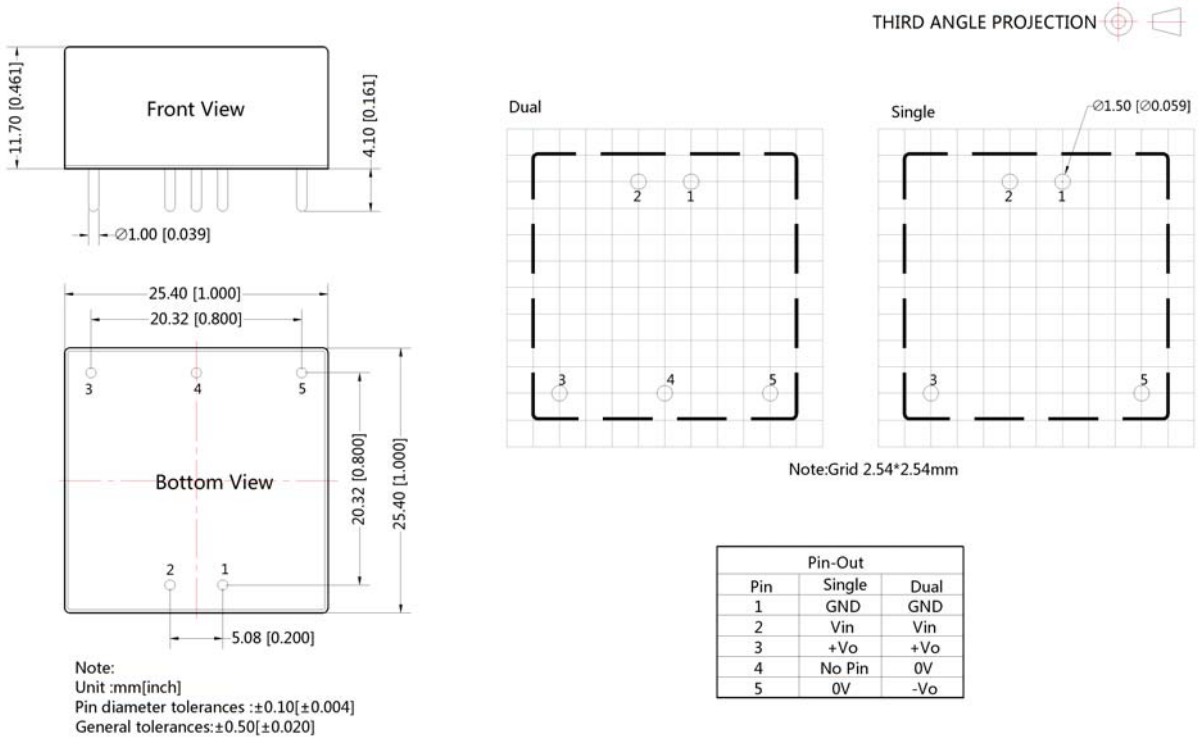
VRA_YMD-6WR2A2S& VRB_YMD-6WR2A2S Chassis Mounting

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

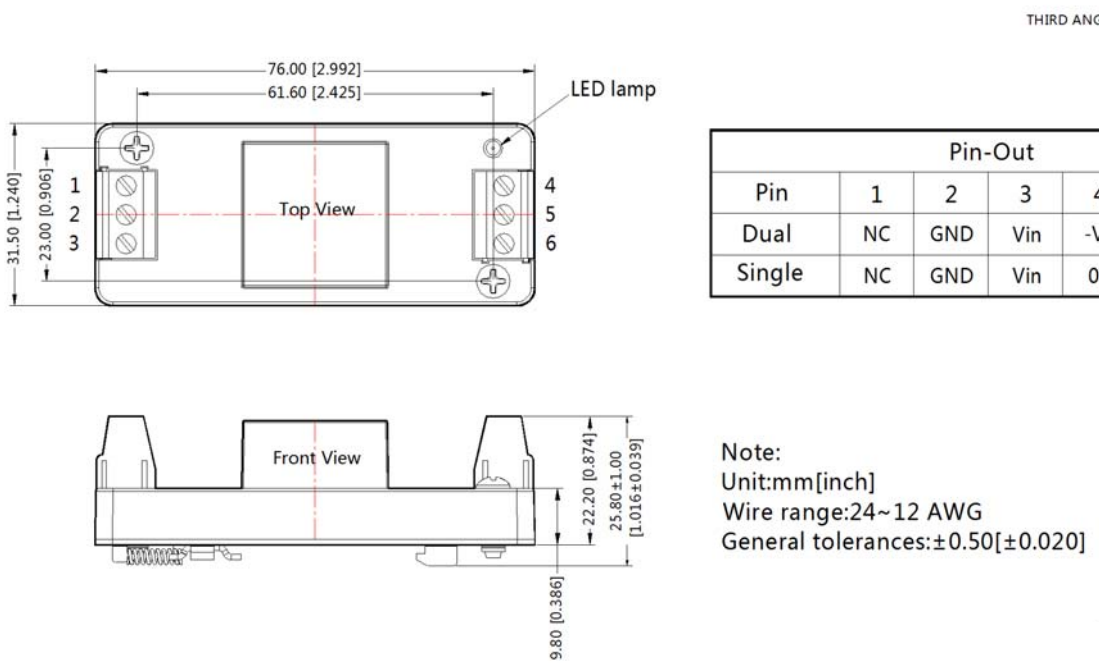
Note:
Unit:mm[inch]
Wire range:24~12 AWG
General tolerances:±0.50[±0.020]



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

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

VRA_YMD-6WR2A4S& VRB_YMD-6WR2A4S Din-Rail Mounting



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]

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Horizontal Packing bag number: 58210003, 2S/A4S Packing Bag Number: 58220022;
2. Recommend to use module with more than 5% load, if not, the ripple of the product may exceeds the specification, but does not affect the reliability of the product;
3. 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;
4. The maximum capacitive load offered were tested at nominal input voltage and full load;
5. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
6. All index testing methods in this datasheet are based on our Company's corporate standards;
7. 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;
8. We can provide product customization service;
9. Specifications are subject to change without prior notice.

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