

DC/DC Converter

URA_YMD-6WR3 & URB_YMD-6WR3 Series

MORNSUN®

6W isolated DC-DC converter in YMD package
Ultra-wide input voltage and regulated dual/single output



FEATURES

- Ultra wide 4:1 input voltage range
- High efficiency up to 88%
- No-load power consumption as low as 0.12W
- I/O test isolation voltage: 1.5k VDC
- Input under-voltage protection, output short circuit, over-current, over-voltage protection
- Operating ambient temperature range: -40°C ~ +85°C
- Meet CISPR32/EN55032 CLASS A, without extra components
- Input reverse polarity protection available with chassis(A2S) or Din-Rail mounting (A4S) version
- IEC60950, UL60950, EN60950 approved
- Industry standard pin-out

UL US CE CB Patent Protection RoHS

URA_YMD-6WR3 & URB_YMD-6WR3 series of isolated 6W DC-DC converter with 4:1 input voltage with efficiencies of up to 88%, 1500VDC input to output isolation and the converter safely operate ambient temperature of -40°C to +85°C, input under-voltage protection, output over-voltage, over-current, short circuit protection. They meet CLASS A of CISPR32/EN55032 EMI standards without external components, optional packages are offered for chassis or DIN-rail mounting (A2S, A4S), adding additional input reverse polarity protection, which make them widely applied in medical care, industrial control, electric power, instruments and communication fields.

Selection Guide

Certification	Part No. ①	Input Voltage (VDC)		Output		Full Load Efficiency ④ (%) Min./Typ.	Max. Capacitive Load ⑤ (μF)
		Nominal ② (Range)	Max. ③	Voltage (VDC)	Current (mA) Max./Min.		
UL/CE/CB	URA2405YMD-6WR3	24 (9-36)	40	±5	±600/0	81/83	470
	URA2412YMD-6WR3			±12	±250/0	85/87	100
	URA2415YMD-6WR3			±15	±200/0	85/87	100
	URA2424YMD-6WR3			±24	±125/0	85/87	100
	URB2403YMD-6WR3			3.3	1500/0	77/79	1800
	URB2405YMD-6WR3			5	1200/0	81/83	1000
	URB2409YMD-6WR3			9	667/0	83/85	680
	URB2412YMD-6WR3			12	500/0	85/87	470
	URB2415YMD-6WR3			15	400/0	85/87	220
	URB2424YMD-6WR3			24	250/0	86/88	100
	URA4805YMD-6WR3	48 (18-75)	80	±5	±600/0	81/83	470
	URA4812YMD-6WR3			±12	±250/0	85/87	100
	URA4815YMD-6WR3			±15	±200/0	86/88	100
	URB4803YMD-6WR3			3.3	1500/0	77/79	1800
	URB4805YMD-6WR3			5	1200/0	81/83	1000
	URB4812YMD-6WR3			12	500/0	85/87	470
	URB4815YMD-6WR3			15	400/0	86/88	220
	URB4824YMD-6WR3			24	250/0	86/88	100

Notes:

- ① Use "A2S" suffix for chassis mounting and "A4S" suffix for Din-Rail mounting;
- ② The A2S and A4S Model's start-up and minimum input voltages are increased by 1VDC due to the input reverse polarity protection circuit;
- ③ Exceeding the maximum input voltage may cause permanent damage;
- ④ Efficiency is measured at nominal input voltage and rated output load; efficiencies for A2S and A4S Model's is decreased by 2% due to the input reverse polarity protection circuit;
- ⑤ The specified maximum capacitive load value for Vo1 and Vo2 output is identical.

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Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Input Current (full load / no-load)	24VDC nominal input series, nominal input voltage	3.3V output	--	261/5	268/12	mA
		Others	--	292/5	309/12	
	48VDC nominal input series, nominal input voltage	3.3V output	--	130/4	134/8	
		Others	--	146/4	155/8	
Reflected Ripple Current	Nominal input voltage	--	20	--		
Surge Voltage (1sec. max.)	24VDC nominal input series	-0.7	--	50	VDC	
	48VDC nominal input series	-0.7	--	100		
Start-up Voltage	24VDC nominal input series	--	--	9		
	48VDC nominal input series	--	--	18		
Input Under-voltage Protection	24VDC nominal input series	5.5	6.5	--		
	48VDC nominal input series	12	15.5	--		
Input Filter		PI filter				
Hot Plug		Unavailable				

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy ^①	0% - 100% load	--	±1	±3	%	
Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.2		±0.5
		Vo2	--	±0.5		±1
Load Regulation ^②	5% -100% load	Vo1	--	±0.5		±1
		Vo2	--	±0.5		±1.5
Cross Regulation	Dual outputs, Vo1 load at 50%, Vo2 load at range of 10% - 100%	--	--	±5		
Transient Recovery Time		--	300	500	μs	
Transient Response Deviation	25% load step change, nominal input voltage	3.3V, 5V, ±5V output	--	±5	±8	%
		Others	--	±3	±5	
Temperature Coefficient	Full load	--	--	±0.03	%/°C	
Ripple & Noise ^③	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: ① Output voltage accuracy of ±5VDC/±9VDC output converter for 0%-5% load is ±5% max;
 ② Load regulation for 0%-100% load is ±5%;
 ③ 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 Specification

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 Humidity	Non-condensing	5	--	95	%RH
Storage Temperature		-55	--	+125	°C
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	
Vibration		10-55Hz, 2G, 30 Min. along X, Y and Z			
Switching Frequency *	PWM mode	--	300	--	KHz

MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours
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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				
Dimension	Horizontal package	25.40 x 25.40 x 11.70 mm			
	A2S chassis mounting	76.00 x 31.50 x 21.20 mm			
	A4S DIN-rail mounting	76.00 x 31.50 x 25.80 mm			
Weight	Horizontal package/A2S wiring package/A4S rail package			12.5g /36g /56g(Typ.)	
Cooling method	Free air convection				

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (see Fig.3-② for recommended circuit)		
	RE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (see Fig.3-② for recommended circuit)		
Immunity	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	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	
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29	0%, 70%	perf. Criteria B	

Product Characteristic Curve

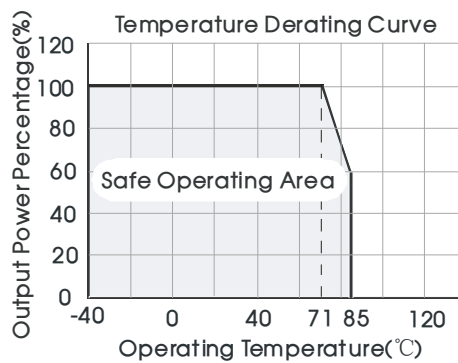
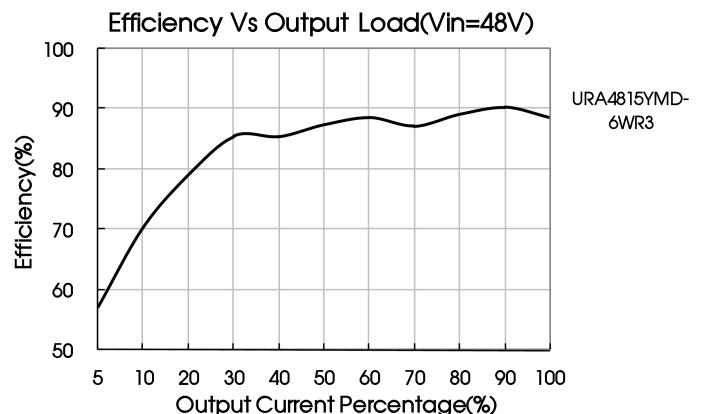
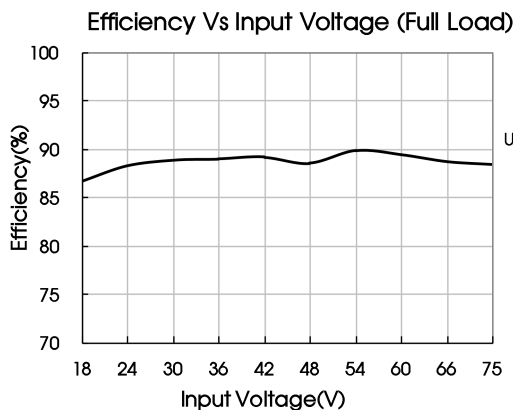
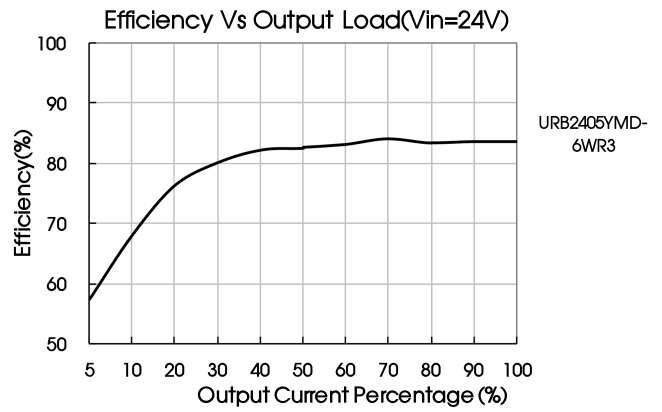
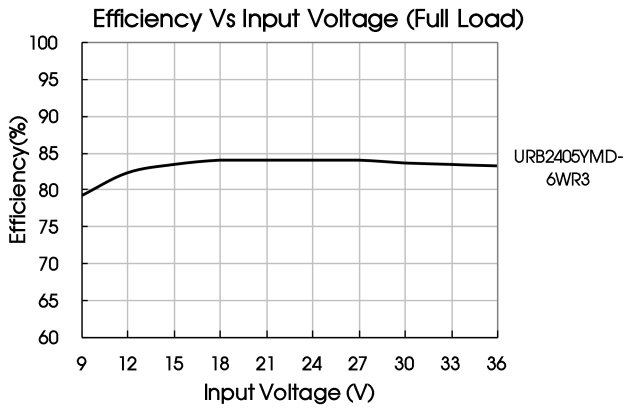


Fig. 1



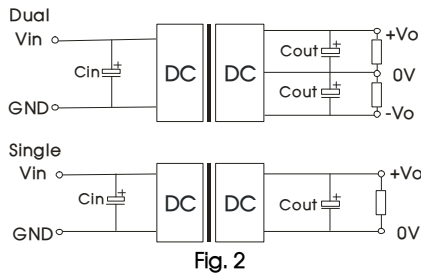


Design Reference

1. Typical application

All the DC/DC converters of this series are tested 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.



Vin(VDC)	Cin(uF)	Cout(uF)
24	100	10
48	10 - 47	10

2. EMC compliance circuit

Parameter description:

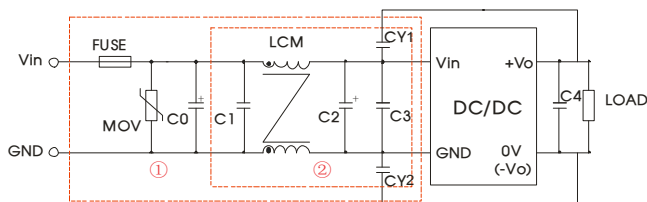


Fig. 3

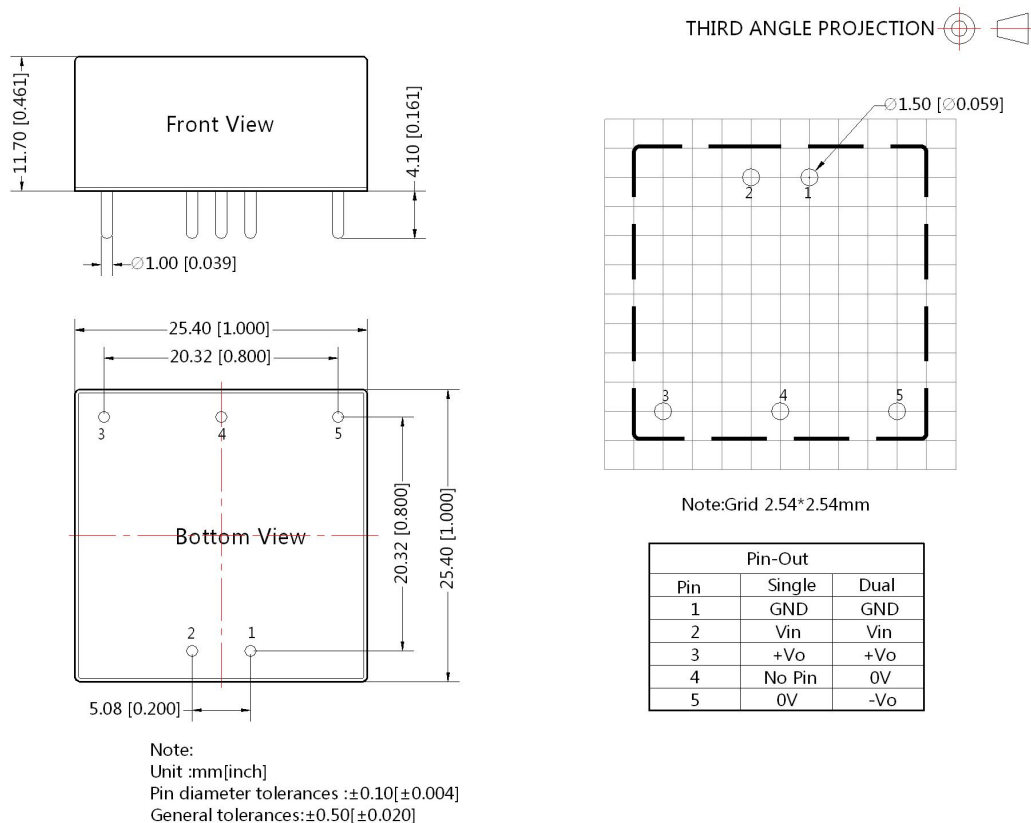
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test.

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	680μF/50V	680μF/100V
C1	1μF/50V	1μF/100V
C2	330μF/50V	330μF/100V
C3	4.7μF/50V	4.7μF/100V
C4	Refer to the Cout in Fig.2	
LCM	4.7mH	
CY1, CY2	1nF/2KV	

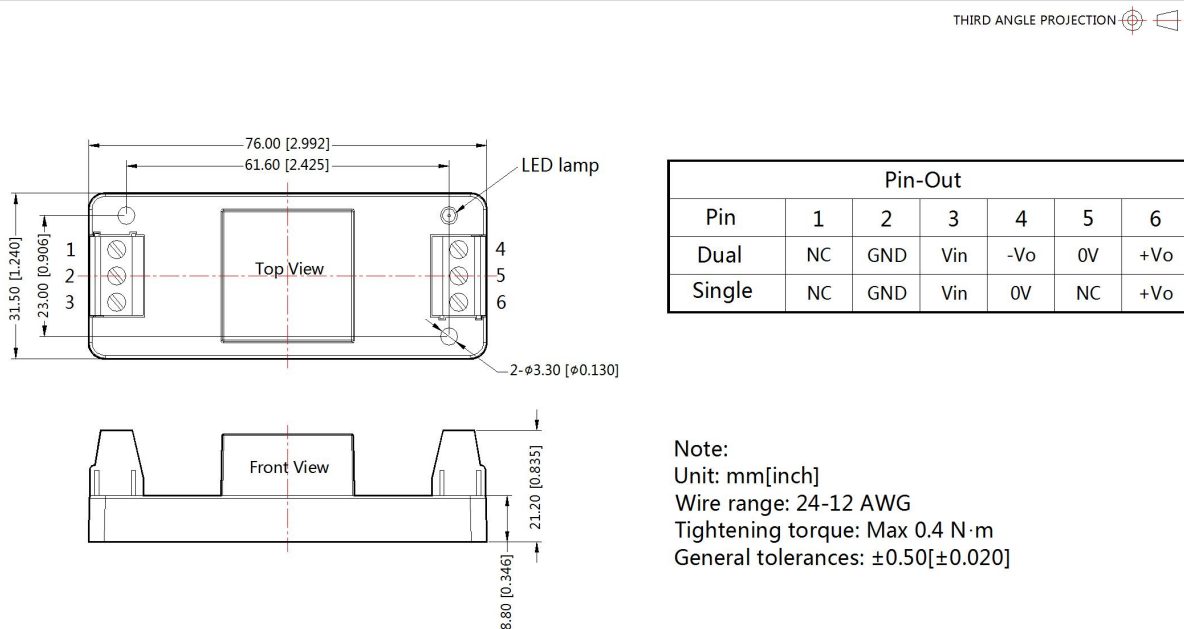
3. The products do not support parallel connection of their output

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


Dimensions and Recommended Layout

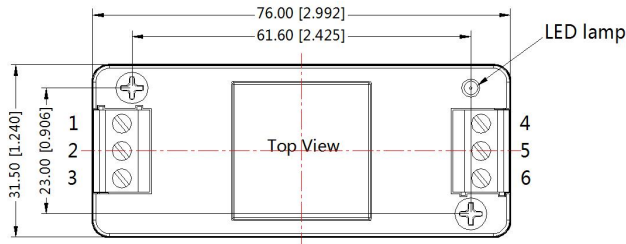


URA_YMD-6WR3A2S & URB_YMD-6WR3A2S Dimensions

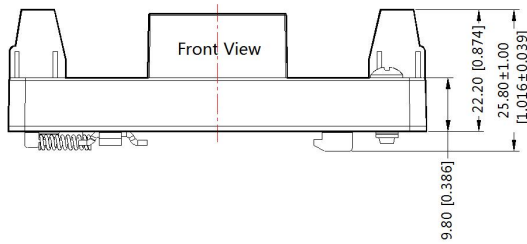


URA_YMD-6WR3A4S & URB_YMD-6WR3A4S Dimensions

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]
 Mounting rail: TS35
 Wire range: 24-12 AWG
 Tightening torque: Max 0.4 N·m
 General tolerances: ±0.50[±0.020]

Note:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210003(DIP), 58220022(A2S/A4S package);
- It is recommended that the load imbalance of the dual output is $\leq \pm 5\%$. If it exceeds $\pm 5\%$, the performance of the product cannot be guaranteed to meet as datasheet marked. For details, please contact our technical staff;
- 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.

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