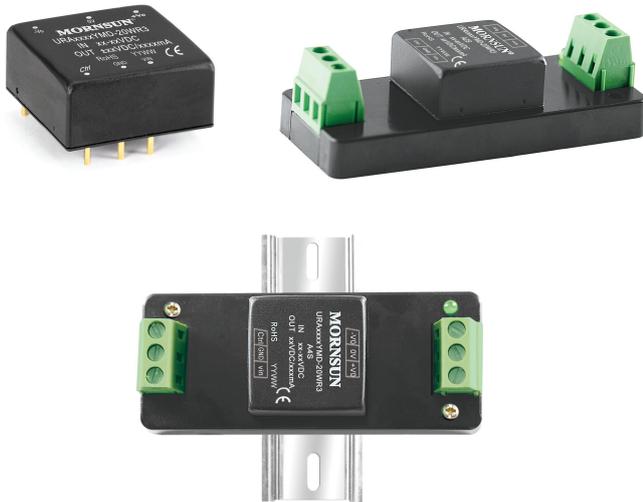


20W isolated DC-DC converter in DIP package  
Ultra-wide input and regulated dual output



## FEATURES

- Ultra-wide 4:1 input voltage range
- High efficiency up to 90%
- No-load power consumption as low as 0.24W
- 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 to +105°C
- Input reverse polarity protection available with Chassis (A2S) or 35mm DIN-Rail mounting (A4S) version
- Industry standard pin-out
- EN62368 approved



URA\_YMD-20WR3 series of isolated 20W DC-DC converter products have an ultra-wide 4:1 input voltage and feature efficiencies of up to 90%, input to output isolation is tested with 1500VDC and the converters safely operate in an ambient temperature of -40°C to +105°C, input under-voltage protection, output over-voltage, over-current, short-circuit protection, optional packages are offered for chassis or DIN-rail mounting (A2S, A4S), adding additional input reverse polarity protection and they are widely used in applications such as 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.		
CE	URA2405YMD-20WR3	24 (9-36)	40	±5	±2000	85/87	2000
	URA2412YMD-20WR3			±12	±833	88/90	800
	URA2415YMD-20WR3			±15	±667	88/90	600
	URA2424YMD-20WR3			±24	±417	87/89	300
	URA4805YMD-20WR3	48 (18-75)	80	±5	±2000	84/86	2000
	URA4812YMD-20WR3			±12	±833	88/90	800
	URA4815YMD-20WR3			±15	±667	88/90	600
	URA4824YMD-20WR3			±24	±417	88/90	300

Notes:

- ① Use "A2S" suffix for chassis mounting and "A4S" suffix for DIN-Rail mounting;
- ② Minimum input voltage and start-up voltage are increased by 1VDC for all models with A2S (wiring) and A4S (rail) suffixes because of the input reverse polarity function;
- 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 positive and negative output is identical.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC nominal input series, nominal input voltage	--	958/10	--/20	mA
	48VDC nominal input series, nominal input voltage	--	969/5	--/11	
Reflected Ripple Current		--	30	--	
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	VDC
	48VDC nominal input series	--	--	18	
Under-voltage Protection	24VDC nominal input series	5.5	6.5	--	
	48VDC nominal input series	12	15.5	--	
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 (3.5-12VDC)			
	Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off	--	2	7	mA

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

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy <sup>①</sup>	5%-100% load	--	±1	±3	%	
Linear Regulation	Input voltage variation from low to high at full load	Vo1	±0.2	±0.5		
		Vo2	±0.4	±1		
Load Regulation <sup>②</sup>	5%-100% load	--	±0.5	±1		
Cross Regulation	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	All products	--	±3	±8	%
		Others	--	±3	±5	
Temperature Coefficient	Full load	--	--	±0.03	%/°C	
Ripple & Noise <sup>③</sup>	20MHz bandwidth, 5%-100% load	--	100	200	mV p-p	
Over-voltage Protection	Input voltage range	110	--	160	%Vo	
Over-current Protection		110	150	200	%Io	
Short-circuit Protection		Continuous, self-recovery				

Note: ① Output voltage accuracy for 0%-5% load is ±4% 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 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
	Input/output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.	1000	--	--	
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	2000	--	pF
Operating Temperature	See Fig. 1	-40	--	+105	°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, 0.75mm, 5G, 90Min. along X, Y and Z			
Switching Frequency*	PWM mode	--	270	--	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	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 chassis mounting/A4S DIN-rail mounting	15.0g/35.0g/58.0g (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 ±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

Typical Characteristic Curves

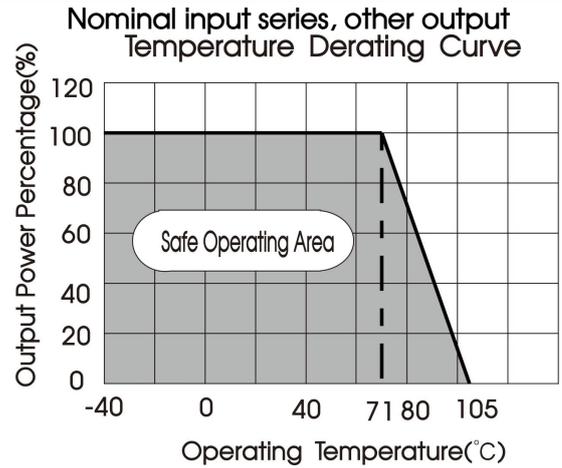
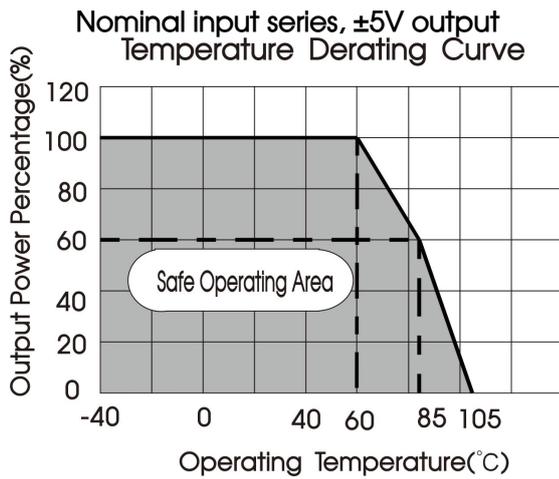
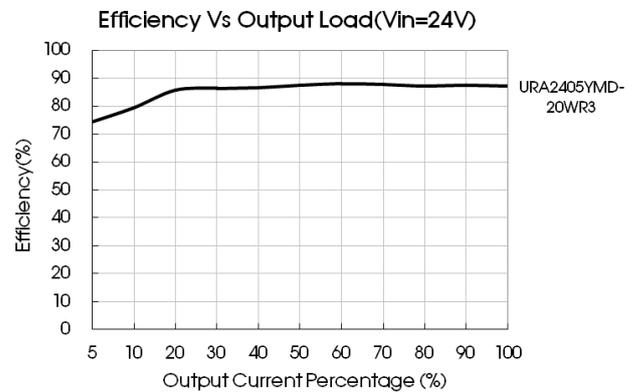
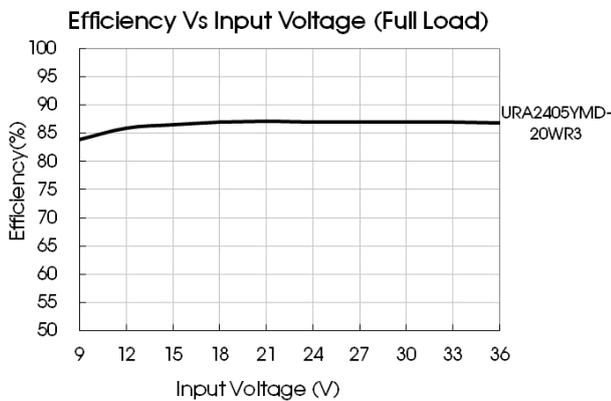
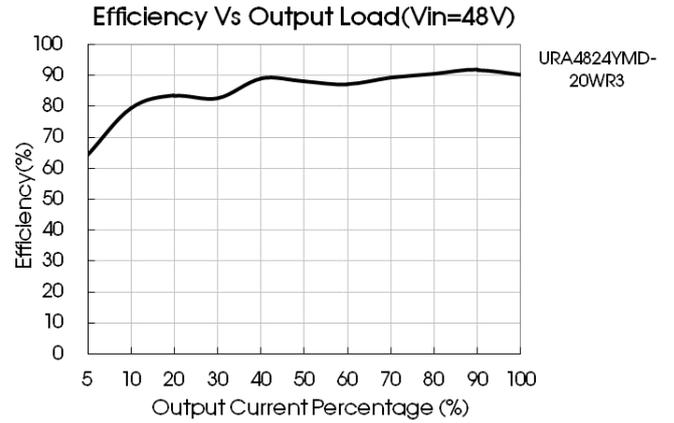
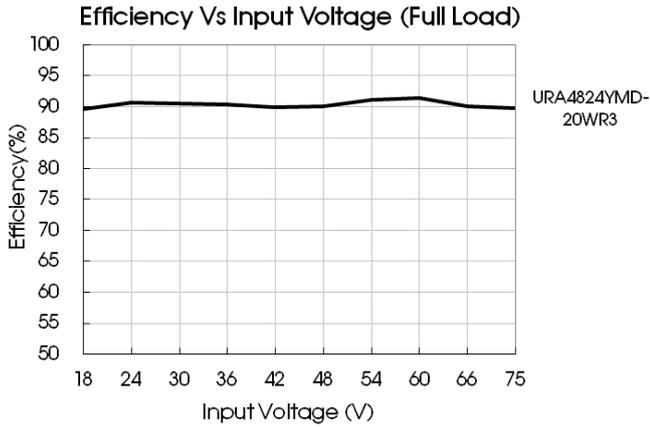


Fig. 1



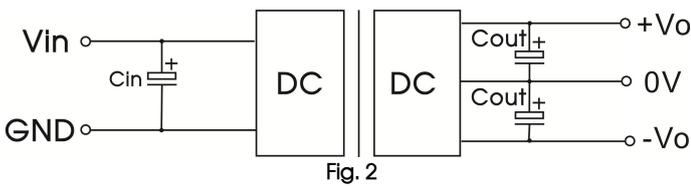


## Design Reference

### 1. Typical application

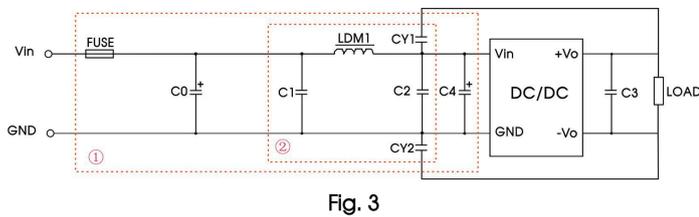
All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

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 max. capacitive load value of the product.



Vin	24V	48V
Cin	100 $\mu$ F	10 $\mu$ F -47 $\mu$ F
Cout	10 $\mu$ F	

### 2. EMC compliance circuit



List of components:

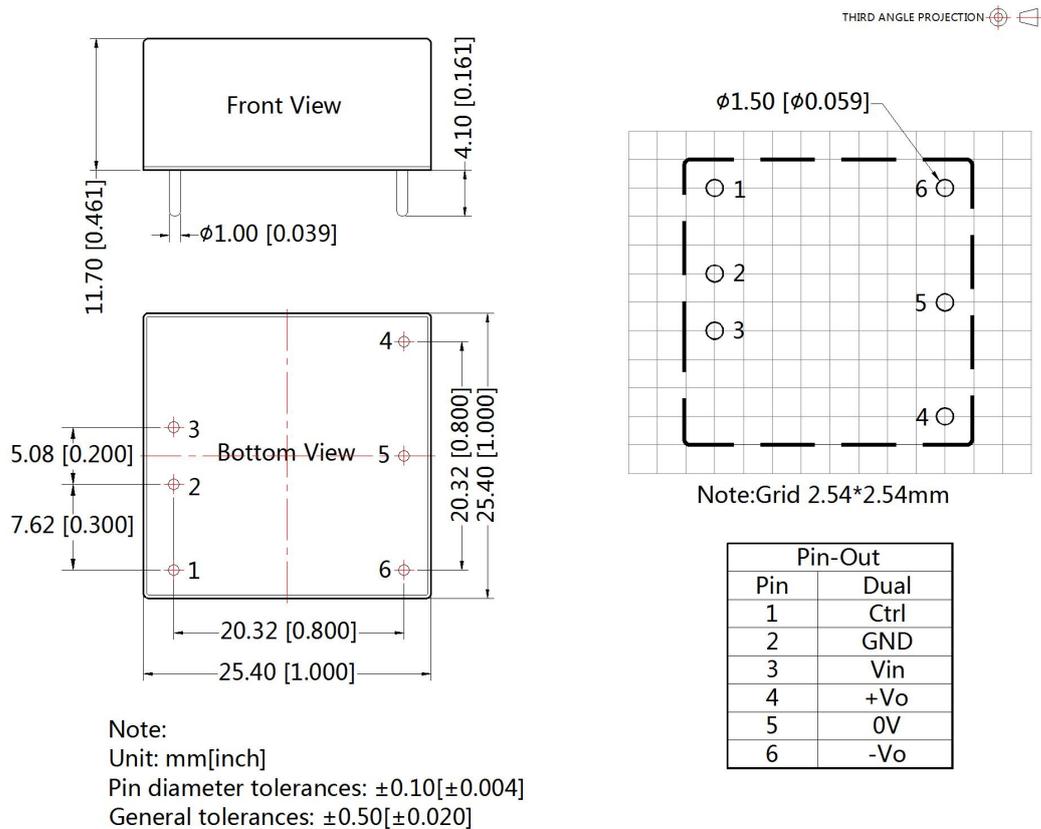
Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
C0, C4	330 $\mu$ F/50V	330 $\mu$ F/100V
C1, C2	4.7 $\mu$ F/50V	4.7 $\mu$ F/100V
C3	Refer to the Cout in Fig.2	
LDM1	4.7 $\mu$ H	
CY1, CY2	1nF/2KV	

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

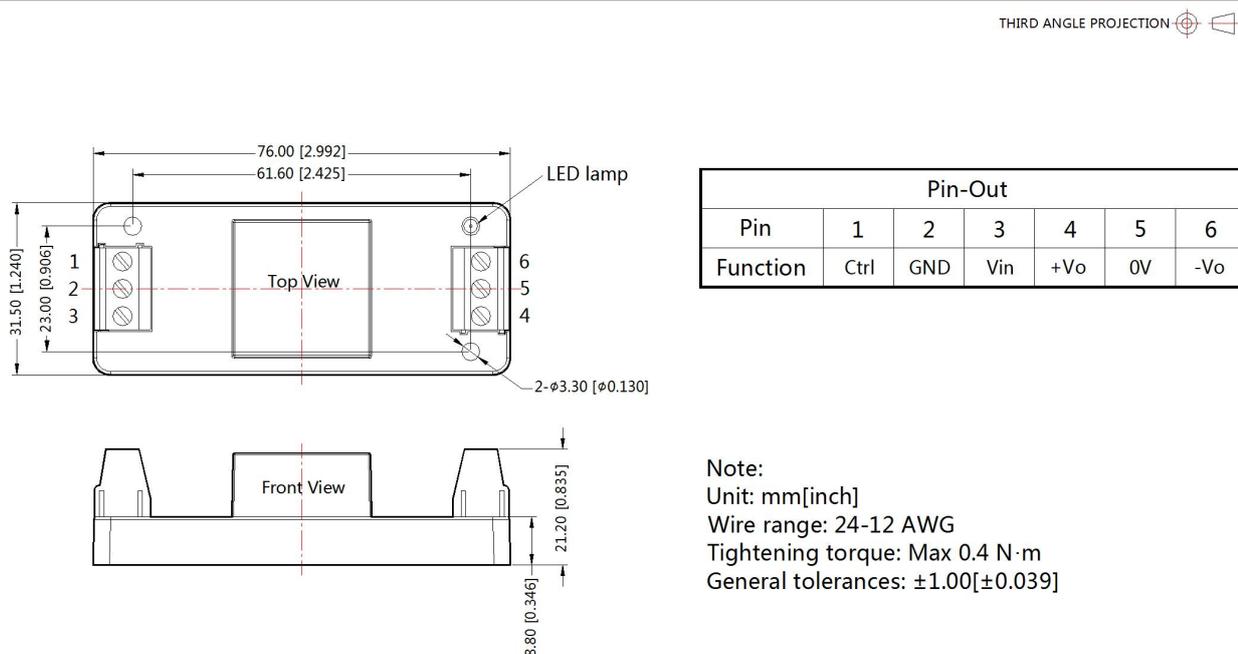
3. The products do not support parallel connection of their output

4. For additional information please refer to DC-DC converter application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout

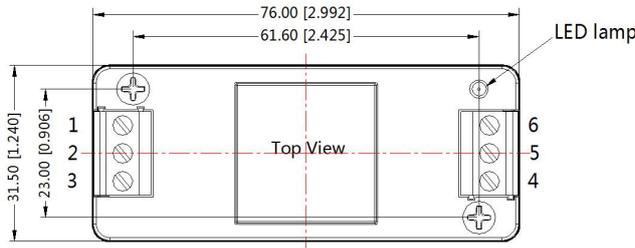


URA\_YMD-20WR3A2S Dimensions

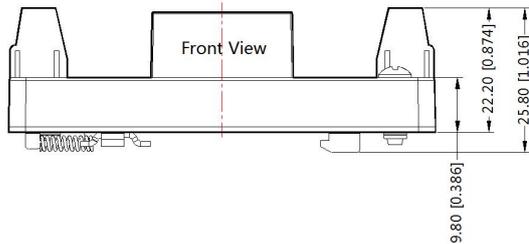


URA\_YMD-20WR3A4S Dimensions

THIRD ANGLE PROJECTION 



Pin-Out						
Pin	1	2	3	4	5	6
Function	Ctrl	GND	Vin	+Vo	0V	-Vo



Note:  
Unit: mm[inch]  
Mounting rail: TS35  
Wire range: 24-12 AWG  
Tightening torque: Max 0.4 N·m  
General tolerances:  $\pm 1.00[\pm 0.039]$

- Note:
- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number : 58210003 (DIP), 58220022(A2S/A4S package);
  - 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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