

DC/DC Converter

URA_YMD-10WR3 & URB_YMD-10WR3 Series

MORNSUN®

10W, wide input isolated & regulated dual/single output, DIP packaging, DC-DC converter



Patent Protection RoHS

FEATURES

- Wide range of input voltage (4:1)
- Efficiency up to 88%
- No-load power consumption as low as 0.2W
- Isolation voltage : 1.5K VDC
- Operating temperature range: -40°C to +85°C
- Input under-voltage protection, output over-voltage protection, short circuit protection, output over-current protection
- Meet CISPR22/EN55022 CLASS A
- International standard pin-out
- A2S (wiring mounting) and A4S (TS35 rail mounting) products featuring anti-reverse connection for input

URA_YMD-10WR3 & URB_YMD-10WR3 series products are of 10W output power, extremely wide range of voltage input of 9-36VDC, 18-75VDC, isolation voltage of 1500VDC, Input under-voltage protection, output over-voltage protection, output short circuit protection and output over-current protection with the bare component in compliance with CISPR22/EN55022 CLASS A; these products are widely used in fields such as industrial control, electric power, instruments and communication.

Selection Guide

Part No. ^①	Input Voltage (VDC)		Output		Efficiency ^③ (%Min./Typ.) @ Full Load	Max. Capacitive Load ^④ (μF)
	Nominal (Range)	Max. ^②	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
URA2405YMD-10WR3	24 (9-36)	40	±5	±1000/±50	81/83	1000
URA2409YMD-10WR3			±9	±555/±28	84/86	680
URA2412YMD-10WR3			±12	±416/±21	85/87	470
URA2415YMD-10WR3			±15	±333/±16	85/87	330
URA2424YMD-10WR3			±24	±208/±10	85/87	100
URB2403YMD-10WR3			3.3	2400/120	77/79	2200
URB2405YMD-10WR3			5	2000/100	81/83	2200
URB2409YMD-10WR3			9	1111/56	84/86	680
URB2412YMD-10WR3			12	833/42	85/87	470
URB2415YMD-10WR3			15	667/33	85/87	330
URB2424YMD-10WR3			24	416/21	86/88	100
URA4805YMD-10WR3	48 (18-75)	80	±5	±1000/±50	81/83	1000
URA4812YMD-10WR3			±12	±416/±21	85/87	470
URA4815YMD-10WR3			±15	±333/±16	85/87	330
URA4824YMD-10WR3			±24	±208/±10	85/87	100
URB4803YMD-10WR3			3.3	2400/120	77/79	2200
URB4805YMD-10WR3			5	2000/100	81/83	2200
URB4812YMD-10WR3			12	833/42	85/87	470
URB4815YMD-10WR3			15	667/33	85/87	330
URB4824YMD-10WR3			24	416/21	86/88	100

Notes:
① Part No. with suffix of "A2S" means chassis mounting and suffix of "A4S" means DIN-Rail mounting (e.g. URB2405YMD-10WR3A2S means chassis mounting; URB2405YMD-10WR3A4S 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.

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Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC input	--	502/5	--	mA
	48VDC input	--	251/4	--	
Reflected Ripple Current	24VDC input	--	40	--	
	48VDC input	--	30	--	
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 under-voltage Protection	24VDC input	5.5	6.5	--	VDC
	48VDC input ^①	14	15.5	--	
Starting Time	Nominal input& constant resistance load	--	10	--	ms
Input Filter		Pi filter			
Ctrl ^②	Module switch on	Ctrl suspended or connected to TTL high level (3.5-12VDC)			
	Module switch off	Ctrl pin connected to GND or low level (0-1.2VDC)			
	Input current when switched off	--	6	10	mA

Note:
 ① When the input voltage from 18V down to 0V, the under-voltage protection to work; When the input voltage rises from 0V to 7-8V range, the output voltage decreases with increasing load, but does not affect customers
 ② the voltage of Ctrl pin is relative to input pin GND.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±3	%
Balance of Output Voltage	Dual output, balanced load	--	±0.5	±1.5	
Line Regulation	Full load, the input voltage is from low voltage to high voltage	--	±0.2	±0.5	
Load Regulation	5%-100% load	--	±0.5	±1	
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	±5	%
Temperature Drift Coefficient	Full load	--	--	±0.03	%/°C
Ripple & Noise*	20MHz bandwidth	--	40	80	mV p-p
Output Over-voltage Protection	Input voltage range	110	--	160	%Vo
Output Over-current Protection		110	140	190	%Io
Output Short circuit Protection		Continuous, self-recovery			

Note: * Ripple and noise tested with "parallel cable" method, please see *DC-DC Converter Application Notes* for specific operation methods.

General Specifications

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	see Fig. 1	-40	—	85	℃
Storage Temperature		-55	—	125	
Storage Humidity	Non-condensing	5	—	95	%RH
Max. Operating Temperature for casing	Within the operating temperature curve	—	—	105	℃
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	—	350	—	KHz
MTBF	MIL-HDBK-217F@25℃	1000	—	—	K hours

Note: *This series of products with reduced frequency technology. The switching frequency of the full test, when the load is light, the switching frequency decline.

Physical Specifications

Casing Material	Aluminum alloy	
Package Dimensions	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	15.00g/35.00g/55.00g (Typ.)
Cooling method	Free air convection	

EMC Specifications

EMI	Conducted disturbance	CISPR22/EN55022 CLASS A (Bare component)/ CLASS B (see Fig.3-② for recommended circuit)	
	Radiated emission	CISPR22/EN55022 CLASS A (Bare component)/ CLASS B (see Fig.3-② for recommended circuit)	
EMS	Electrostatic discharge	IEC/EN61000-4-2	Contact $\pm 4\text{KV}$ perf. Criteria B
	Radiation immunity	IEC/EN61000-4-3	10V/m perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2\text{KV}$ (see Fig.3-① for recommended circuit) perf. Criteria B
	Surge immunity	IEC/EN61000-4-5	$\pm 2\text{KV}$ (see Fig.3-① for recommended circuit) perf. Criteria B
	Conducted disturbance immunity	IEC/EN61000-4-6	3 Vr.m.s perf. Criteria A
	Immunities of voltage dip, drop and short interruption	IEC/EN61000-4-29	0-70% perf. Criteria B

Product Characteristic Curve

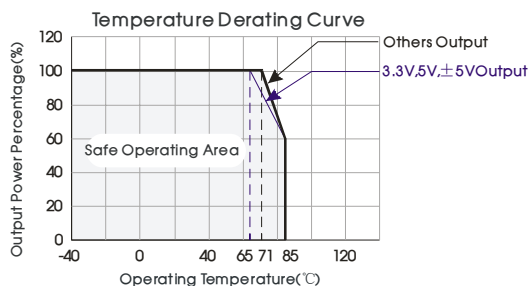
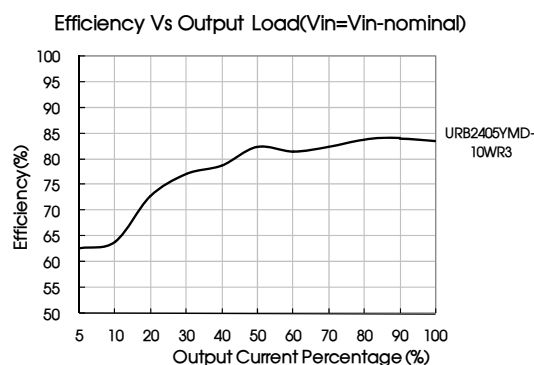
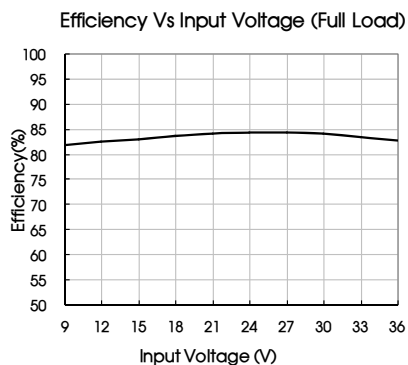
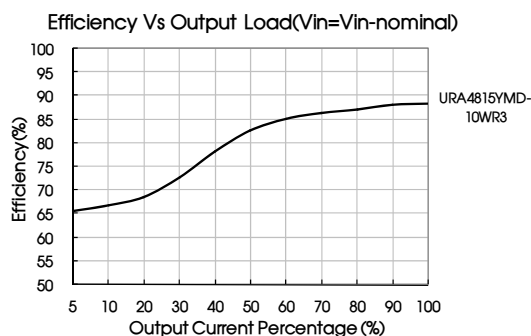
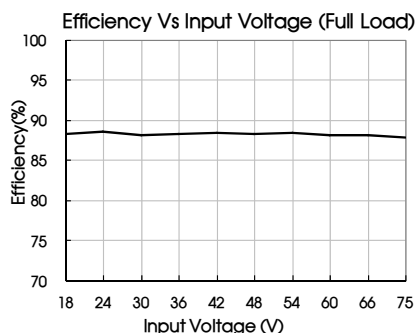


Fig. 1



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 C_{in} and C_{out} or select capacitors of low equivalent impedance provided that the capacitance is no larger than the max. capacitive load of the product.

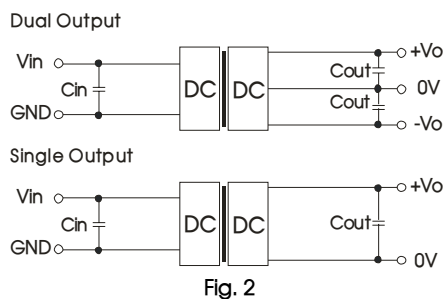


Fig. 2

V_{in}	24V	48V
C_{in1}	100 μ F	10 μ F ~47 μ F
C_{out}	10 μ F	

2. EMC solution-recommended circuit

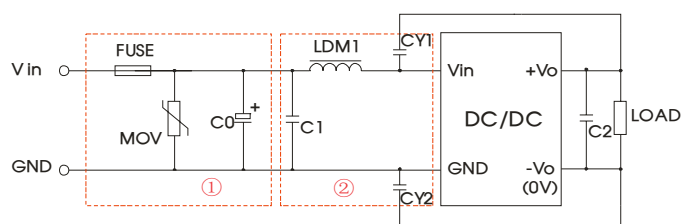


Fig. 3

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	V_{in} :24V	V_{in} :48V
FUSE	Choose according to actual input current	
MOV	S14K35	S14K60
C_0	330 μ F/50V	330 μ F/100V
C_1	1 μ F/50V	1 μ F/100V
C_2	Refer to the C_{out} in Fig.2	
LDM1	4.7 μ H	
$CY1$	1nF/2KV	
$CY2$	1nF/2KV	

EMC solution-recommended circuit PCB layout

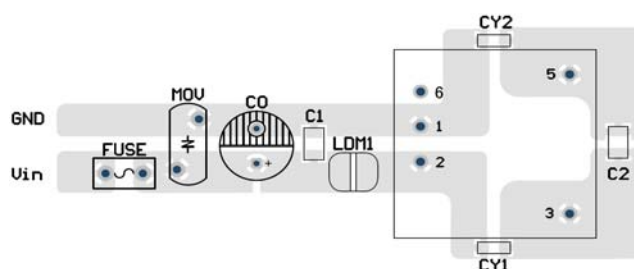


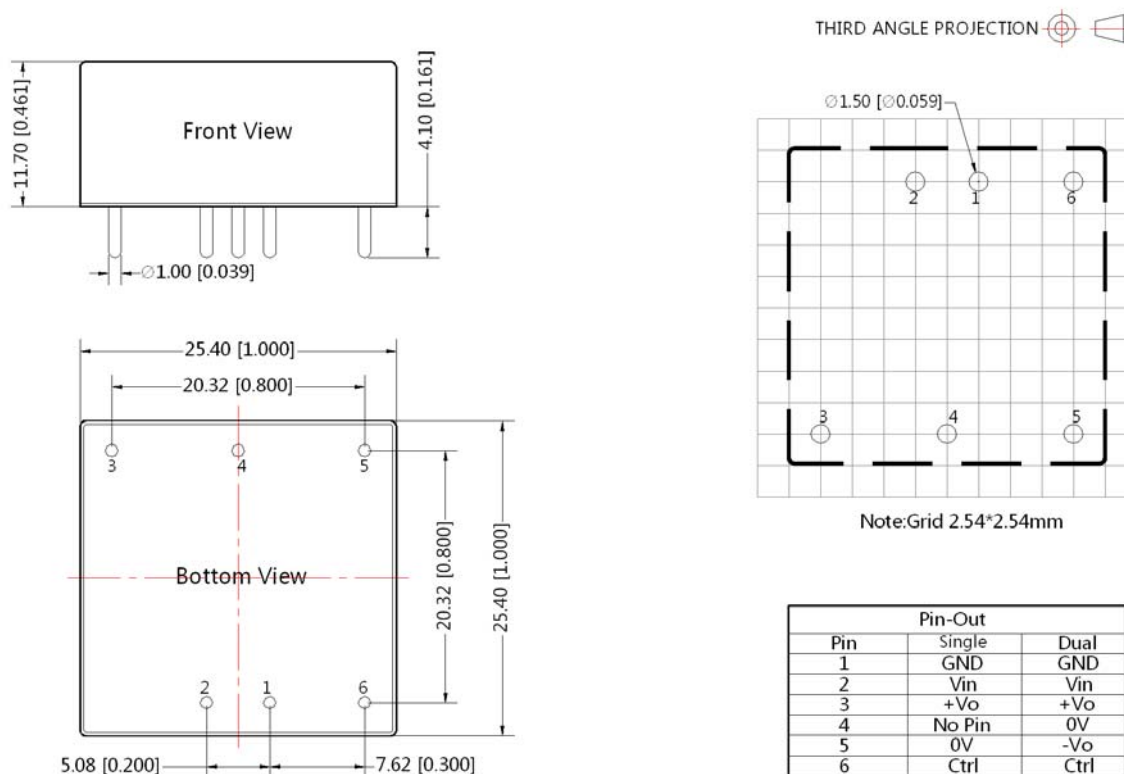
Fig. 4

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

3. The product does not support output in parallel with power per liter or hot-plug use

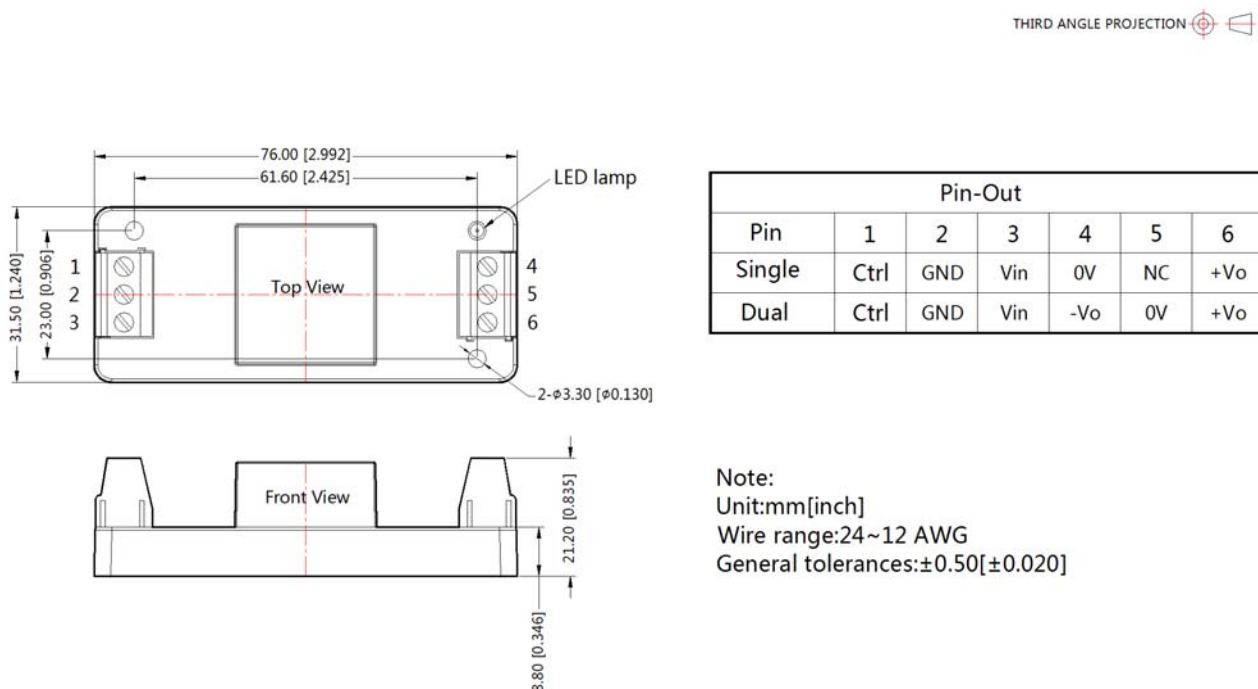
4. For more information please find the application notes on www.mornsun-power.com

Dimensions and Recommended Layout



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

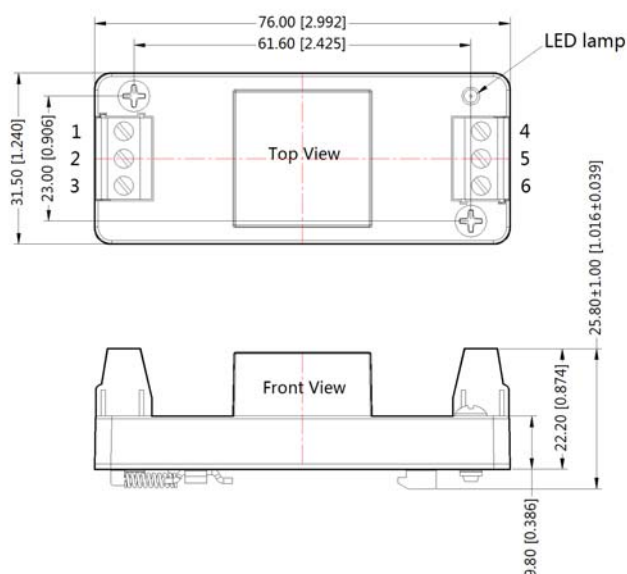
URA_YMD-10WR3A2S & URB_YMD-10WR3A2S Dimensions



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

URA_YMD-10WR3A4S & URB_YMD-10WR3A4S Dimensions

THIRD ANGLE PROJECTION



Pin-Out						
Pin	1	2	3	4	5	6
Single	Ctrl	GND	Vin	0V	NC	+Vo
Dual	Ctrl	GND	Vin	-Vo	0V	+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'. Packing bag number : 58210003(DIP),58220022(A2S/A4S package);
2. The min. load shall be no lower than 5%, or the output ripple may increase rapidly; If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in the Manual, but the reliability of the product will not be influenced;
3. The unbalance degree of the recommended dual output module load: $\leq 5\%$; if the degree exceeds $\pm 5\%$, then the product performances cannot be guaranteed to comply with all the performance indicators in the manual, and please directly contact our technicians for specific information;
4. The max. capacitive load should be tested within the input voltage range and under full load conditions;
5. Unless otherwise specified, data in this datasheet should be tested under the conditions of $T_a=25^\circ\text{C}$, humidity<75% when inputting nominal voltage and outputting rated load;
6. All index testing methods in this datasheet are based on our Company's corporate standards;
7. The performance indexes of the product models listed in this datasheet are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technicians for specific information;
8. We can provide product customization service;
9. Specifications of this product are subject to changes without prior notice.

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