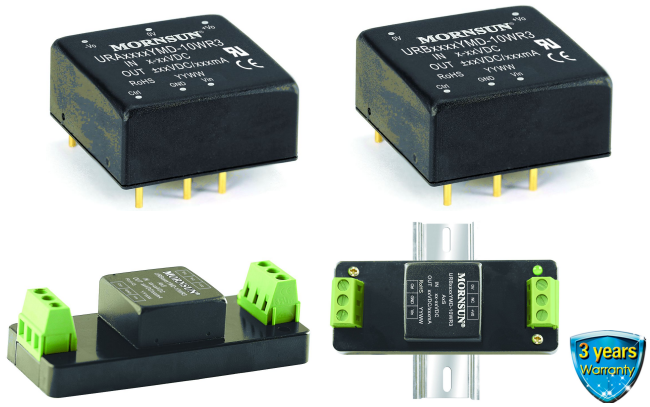
10W, Ultra wide input isolated & regulated dual/single output ,DIP packaging, DC-DC converter



Patent Protection RoHS

FEATURES

- Ultra wide input voltage range (4:1)
- High efficiency up to 88%
- No-load power consumption as low as 0.12W
- Isolation voltage :1.5K VDC
- 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
- A2S (wring mounting) and A4S (TS35 rail mounting) products featuring anti-reverse connection for input
- IEC60950, UL60950, EN60950 approval
- International standard pin-out

URA_YMD-10WR3 & URB_YMD-10WR3 series are isolated 10W DC-DC products with 4:1 input voltage. They feature efficiency up to 88%, 1500VDC isolation, operating temperature of -40℃ to +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 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 ④ (% ,Min./Typ.) @ Full Load	Max. Capacitive Load ⑤ (μF)
		Nominal ② (Range)	Max. ③	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
UL/CE/CB	*URA2405YMD-10WR3	24 (9-36)	40	±5	±1000/0	81/83	1000
	URA2409YMD-10WR3			±9	±555/0	84/86	680
	*URA2412YMD-10WR3			±12	±416/0	85/87	470
	URA2415YMD-10WR3			±15	±333/0	85/87	330
	*URA2424YMD-10WR3			±24	±208/0	85/87	100
	URB2403YMD-10WR3			3.3	2400/0	77/79	2200
	URB2405YMD-10WR3			5	2000/0	81/83	2200
	URB2409YMD-10WR3			9	1111/0	84/86	680
	URB2412YMD-10WR3			12	833/0	85/87	470
	URB2415YMD-10WR3			15	667/0	85/87	330
	URB2424YMD-10WR3			24	416/0	86/88	100
	*URA4805YMD-10WR3	48 (18-75)	80	±5	±1000/0	81/83	1000
	*URA4812YMD-10WR3			±12	±416/0	85/87	470
	*URA4815YMD-10WR3			±15	±333/0	85/87	330
	*URA4824YMD-10WR3			±24	±208/0	85/87	100
	*URB4803YMD-10WR3			3.3	2400/0	77/79	2200
	*URB4805YMD-10WR3			5	2000/0	81/83	2200
	*URB4812YMD-10WR3			12	833/0	85/87	470
	*URB4815YMD-10WR3			15	667/0	85/87	330
	*URB4824YMD-10WR3			24	416/0	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 The minimum input voltage and starting voltage of A2S (wiring) and A4S (rail) Model are 1VDC higher than those of DIP package due to input reverse polarity protection function;

③ Absolute maximum rating without damage on the converter, but it isn't recommended;

④ 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.

⑤ The capacitive loads of positive and negative outputs are identical;

⑥ With "*" products need to add capacitance at the input end, conduction to meet the CISPR22/EN55022 CLASS A.

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	--	418/5	429/12	mA
		Others	--	487/5	515/12	
	48VDC nominal input series, nominal input voltage	3.3V output	--	190/4	215/8	
		Others	--	244/4	258/8	
Reflected Ripple Current	24VDC nominal input series, nominal input voltage		--	40	--	
	48VDC nominal input series, nominal input voltage		--	30	--	
Surge Voltage (1sec. max.)	24VDC nominal input series		-0.7	--	50	VDC
	48VDC nominal input series		-0.7	--	100	
Starting Voltage	24VDC nominal input series		--	--	9	
	48VDC nominal input series		--	--	18	
Input Under-voltage Protection	24VDC nominal input series		5.5	6.5	--	VDC
	48VDC nominal input series		12	15.5	--	
Starting Time	Nominal input voltage & constant resistance load		--	10	--	ms
Input Filter			Pi filter			
Hot Plug			Unavailable			
Ctrl*	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: *The voltage of Ctrl pin is relative to input pin GND.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy①	0%-100% load		--	±1	±3	%
Line 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 Regulation②	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, nominal input voltage		--	300	500	μs
Transient Response Deviation			--	±3	±5	%
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Ripple & Noise③	20MHz bandwidth, 5%-100% load		--	40	80	mV p-p
Output Over-voltage Protection	Input voltage range		110	--	160	%Vo
Output Over-current Protection			110	140	190	%Io
Short circuit Protection			Continuous, self-recovery			

Note: ①At 0%-5% load, the Max. output voltage accuracy of ±5VDC/±9VDC output converter is ±5%.
②When testing from 0% to100%load working conditions, load regulation index of ±5%;
③0%-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 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

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	
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	15g/35g/55g (Typ.)
Cooling method		Free air convection

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS A (Without external components)/ CLASS B (see Fig.3-② for recommended circuit)	
	RE	CISPR22/EN55022	CLASS A (Without external components)/ 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	line to line ±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

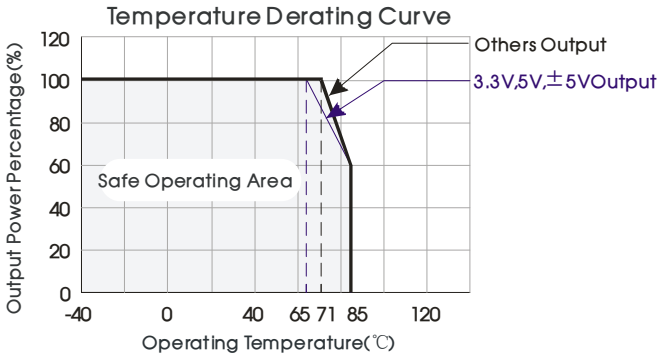
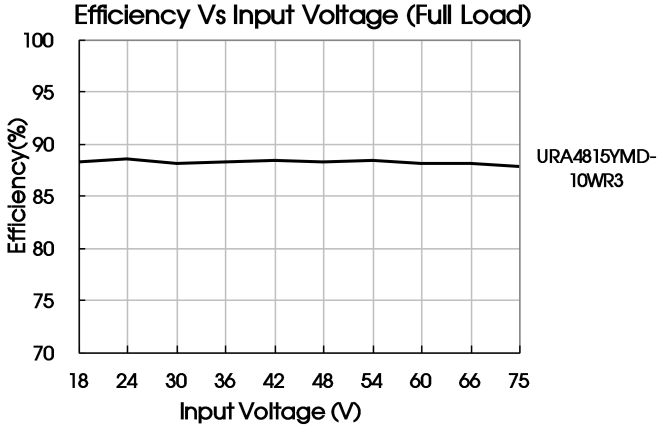
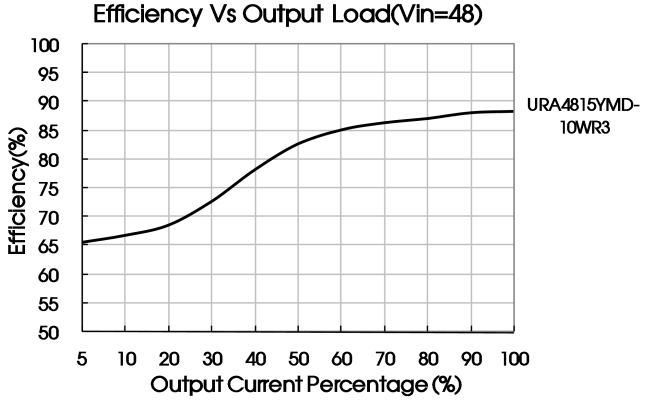
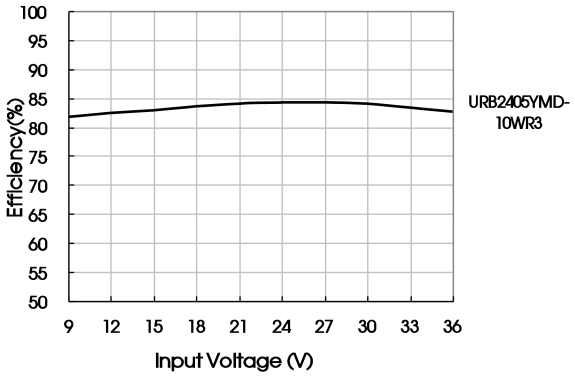


Fig. 1

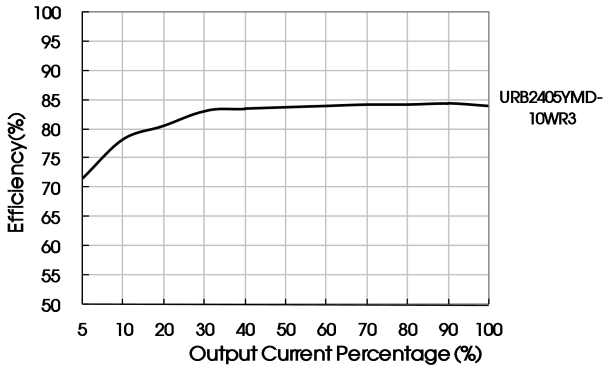




Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load(Vin=24)



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.

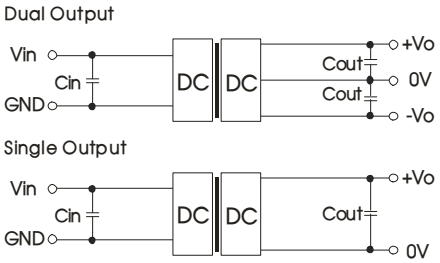


Fig. 2

Vin	24V	48V
Cin1	100μF	10μF -47μF
Cout	10μF	

2. EMC solution-recommended circuit

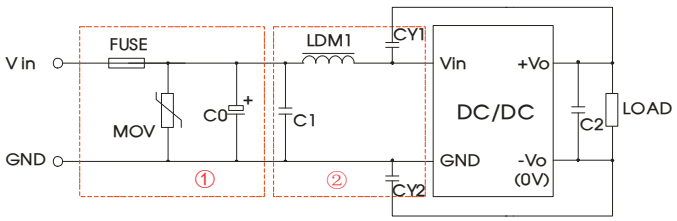


Fig. 3

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

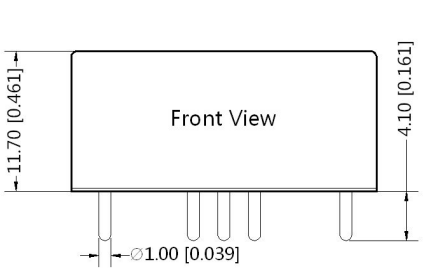
Parameter description:

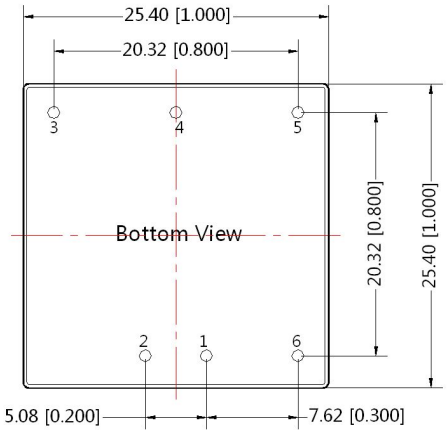
Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	330μF/50V	330μF/100V
C1	1μF/50V	1μF/100V
C2	Refer to the Cout in Fig.2	
LDM1	4.7μH	
CY1/CY2	1nF/2KV	

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

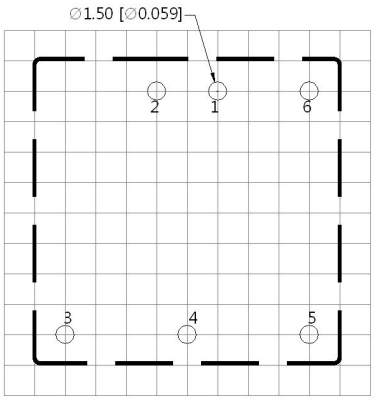
4. For more information please find DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout





THIRD ANGLE PROJECTION



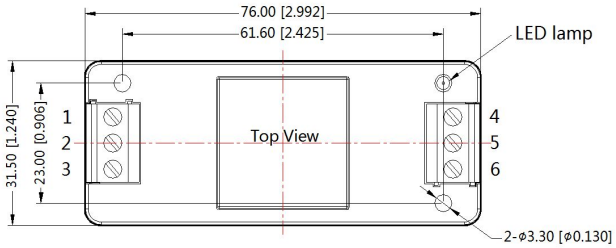
Note:Grid 2.54*2.54mm

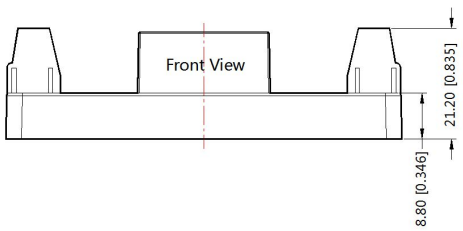
Pin-Out		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	0V
5	0V	-Vo
6	Ctrl	Ctrl

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

URA_YMD-10WR3A2S & URB_YMD-10WR3A2S Dimensions

THIRD ANGLE PROJECTION



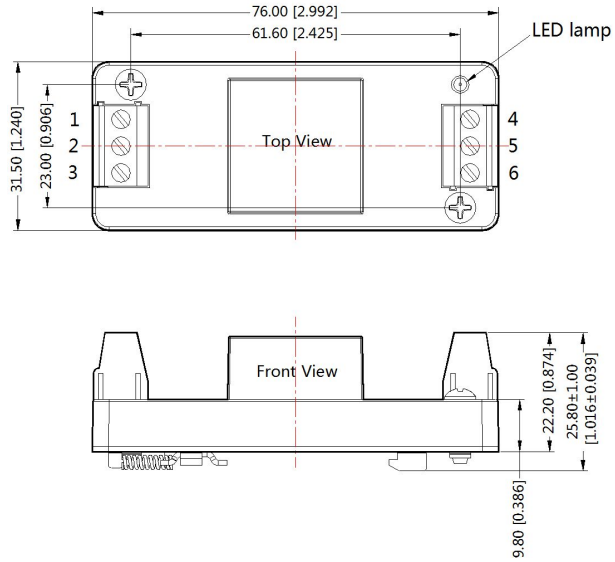


Pin-Out						
Pin	1	2	3	4	5	6
Dual	Ctrl	GND	Vin	-Vo	0V	+Vo
Single	Ctrl	GND	Vin	0V	NC	+Vo

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
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]
Mounting rail: TS35
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
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 Company's corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Specifications are subject to change without prior notice.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Luogang District, Guangzhou, P. R. China
Tel: 86-20-38601850-8801 Fax: 86-20-38601272 E-mail: info@mornsun.cn