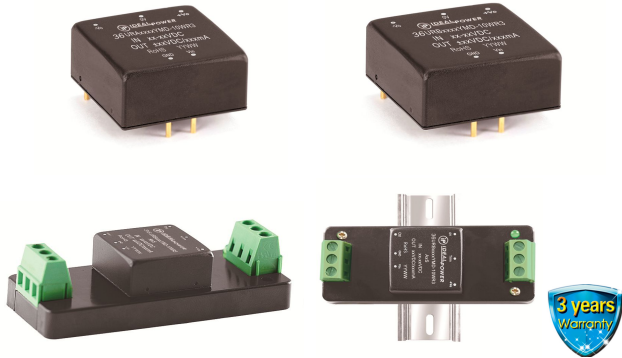


# DC/DC Converter

36URA\_YMD-10WR3&36URB\_YMD-10WR3 Series

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



**UL CE CB CE Patent Protection RoHS**

## FEATURES

- Wide range of input voltage (4:1)
- Efficiency up to 88%
- No-load power consumption as low as 0.12W
- Isolation voltage :1.5K VDC
- Input under-voltage protection, output over-voltage protection, short circuit protection, output over-current protection
- Operating temperature range: -40°C to +85°C
- Meet CISPR22/EN55022 CLASS A
- A2S (chassis mounting) and A4S (TS35 DIN-Rail mounting) products featuring anti-reverse connection for input
- Meet UL60950 , EN60950 and IEC60950
- International standard pin-out

36URA\_YMD-10WR3 & 36URB\_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°C~+85°C, 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		Efficiency③ (%,Min./Typ.) @ Full Load	Max. Capacitive Load④(μF)
		Nominal (Range)	Max. ②	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
UL/CE/CB	36URA2405YMD-10WR3	24 (9-36)	40	±5	±1000/0	81/83	1000
	36URA2409YMD-10WR3			±9	±555/0	84/86	680
	36URA2412YMD-10WR3			±12	±416/0	85/87	470
	36URA2415YMD-10WR3			±15	±333/0	85/87	330
	36URA2424YMD-10WR3			±24	±208/0	85/87	100
	36URB2403YMD-10WR3			3.3	2400/0	77/79	2200
	36URB2405YMD-10WR3			5	2000/0	81/83	2200
	36URB2409YMD-10WR3			9	1111/0	84/86	680
	36URB2412YMD-10WR3			12	833/0	85/87	470
	36URB2415YMD-10WR3			15	667/0	85/87	330
	36URB2424YMD-10WR3	24	416/0	86/88	100		
	36URA4805YMD-10WR3	48 (18-75)	80	±5	±1000/0	81/83	1000
	36URA4812YMD-10WR3			±12	±416/0	85/87	470
	36URA4815YMD-10WR3			±15	±333/0	85/87	330
	36URA4824YMD-10WR3			±24	±208/0	85/87	100
	36URB4803YMD-10WR3			3.3	2400/0	77/79	2200
	36URB4805YMD-10WR3			5	2000/0	81/83	2200
	36URB4812YMD-10WR3			12	833/0	85/87	470
	36URB4815YMD-10WR3			15	667/0	85/87	330
	36URB4824YMD-10WR3			24	416/0	86/88	100

- Notes:
- ①Part No. with suffix of "A2S" means chassis mounting and suffix of "A4S" means DIN-Rail mounting (e.g. 36URB2405YMD-10WR3A2S means chassis mounting; 36URB2405YMD-10WR3A4S means DIN-Rail mounting);
  - ②Absolute maximum rating without damage on the converter, but it isn't recommended;
  - ③Efficiency 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.

### Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC input	--	502/5	514/12	mA
	48VDC input	--	251/4	257/8	
Reflected Ripple Current	24VDC input	--	40	--	mA
	48VDC input	--	30	--	
Input impulse Voltage (1sec. max.)	24VDC input	-0.7	--	50	VDC
	48VDC input	-0.7	--	100	
Starting Voltage	24VDC input	--	--	9	VDC
	48VDC input	--	--	18	
Input under-voltage Protection	24VDC input	5.5	6.5	--	VDC
	48VDC input <sup>①</sup>	14	15.5	--	
Starting Time	Nominal input& 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 Accuracy <sup>①</sup>	0%-100% load	--	±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	Positive output	--	±0.2		±0.5
		Negative output	--	±0.5		±1
Load Regulation <sup>②</sup>	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	--	300	500	µs	
Transient Response Deviation		--	±3	±5	%	
Temperature Drift Coefficient	Full load	--	--	±0.03	%/°C	
Ripple & Noise <sup>③</sup>	20MHz bandwidth, 5%-100% load	--	40	80	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: 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	°C
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	°C

Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
Switching Frequency	PWM mode	--	350	--	KHz
MTBF	MIL-HDBK-217F@25°C	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.

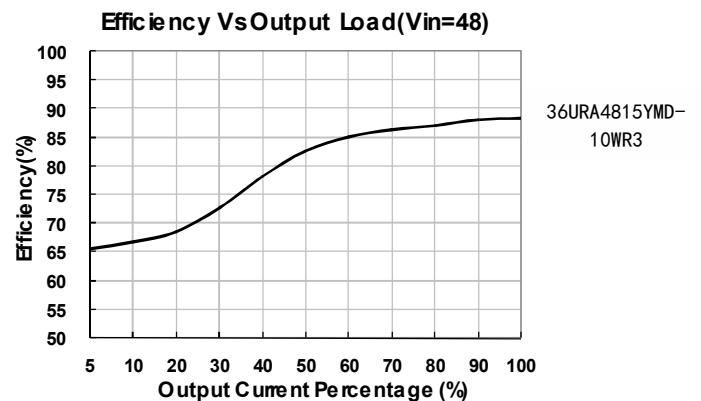
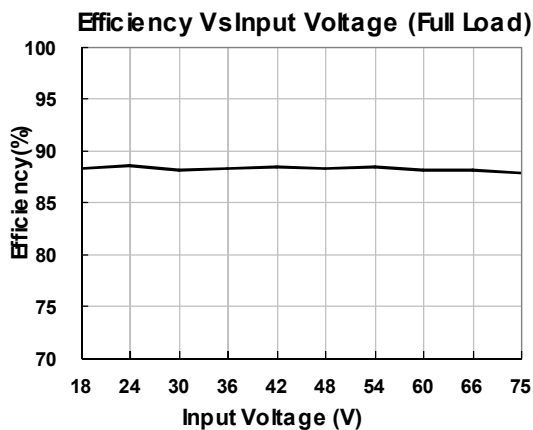
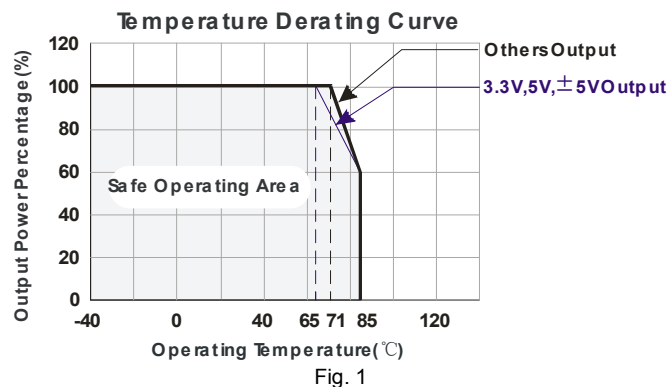
### Physical Specifications

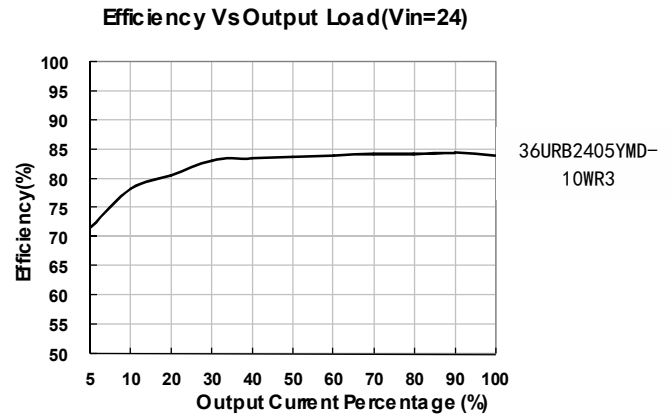
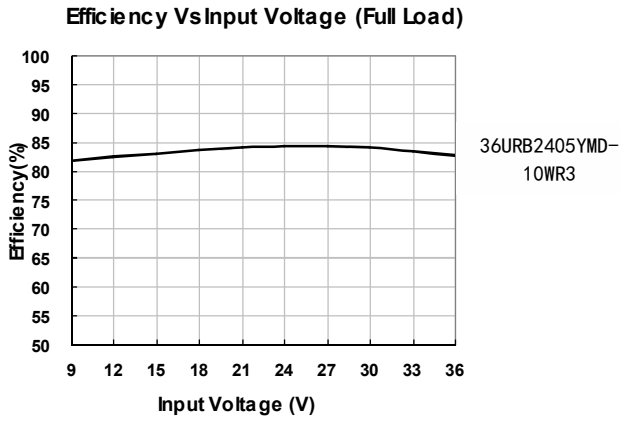
Casing Material	Aluminum alloy				
Dimension	Horizontal package	25.40*25.40*11.70 mm			
	A2S chassis mounting	76.00*31.50*21.20 mm			
	A4S DIN-rail mounting	76.00*31.50*25.80 mm			
Weight	Horizontal package/A2S wiring package/A4S rail package		15.00g/35.00g/55.00g (Typ.)		
Cooling method	Free convection				

### 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





## 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.

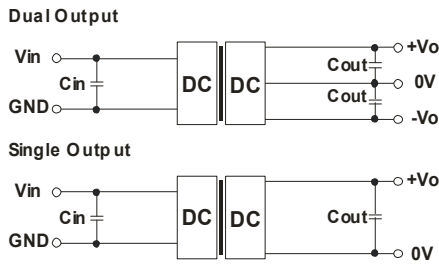


Fig. 2

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

### 2. EMC solution-recommended circuit

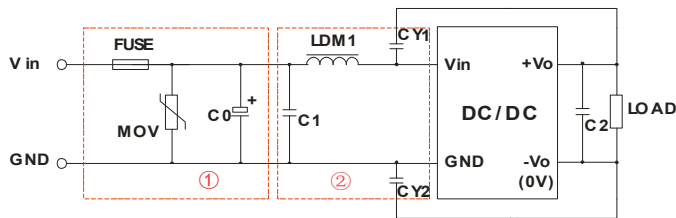


Fig. 3

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

### EMC solution-recommended circuit PCB layout

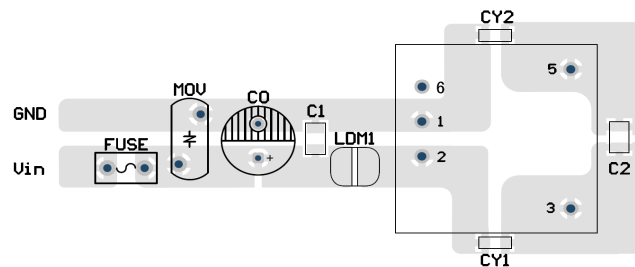


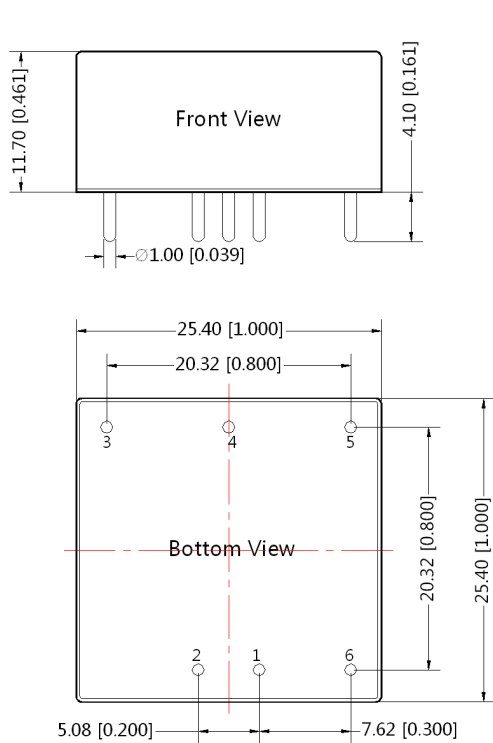
Fig. 4

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

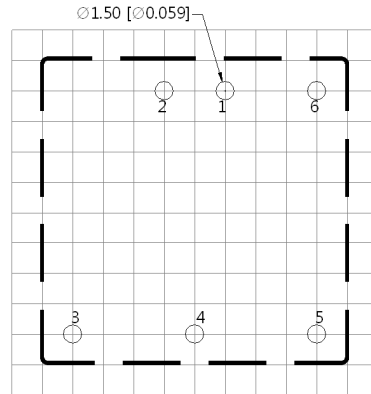
3. It is not allowed to connect modules output in parallel to enlarge the power

4. For more information please find DC-DC converter application notes on [www.idealpower.co.uk](http://www.idealpower.co.uk)

Dimensions and Recommended Layout



THIRD ANGLE PROJECTION



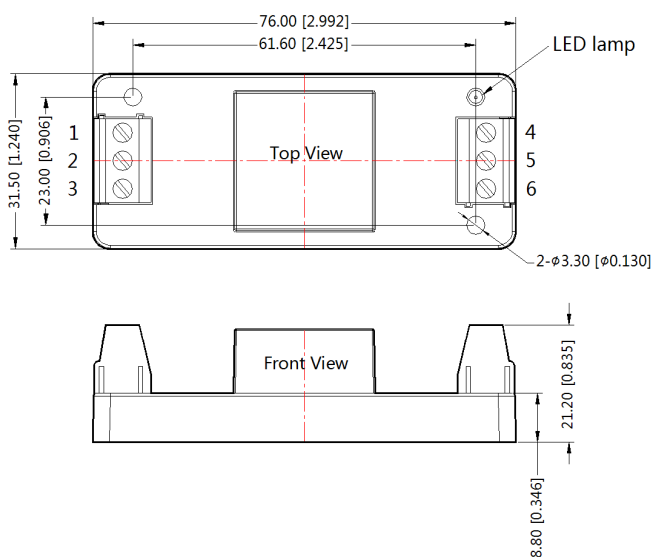
Note: Grid 2.54\*2.54mm

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 : $\pm 0.10$ [ $\pm 0.004$ ]  
General tolerances: $\pm 0.50$ [ $\pm 0.020$ ]

36URA\_YMD-10WR3A2S & 36URB\_YMD-10WR3A2S Dimensions

THIRD ANGLE PROJECTION

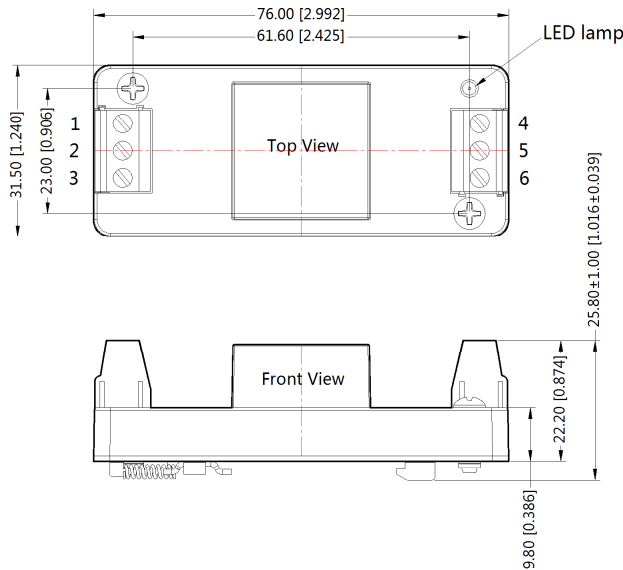


Pin-Out						
Pin	1	2	3	4	5	6
Single	Ctrl	GND	Vin	0V	NC	+Vo
Dual	Ctrl	GND	Vin	-Vo	0V	+Vo

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

36URA\_YMD-10WR3A4S & 36URB\_YMD-10WR3A4S Dimensions

THIRD ANGLE PROJECTION



Pin-Out						
Pin	1	2	3	4	5	6
Single	Ctrl	GND	V <sub>in</sub>	0V	NC	+V <sub>o</sub>
Dual	Ctrl	GND	V <sub>in</sub>	-V <sub>o</sub>	0V	+V <sub>o</sub>

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

- Note:**
1. The recommended unbalance degree of the dual output module load is  $\leq \pm 5\%$ ; if the degree exceeds  $\pm 5\%$ , than the product performance cannot be guaranteed to comply with all parameters in the datasheet. Please contact our technicians directly for specific information;
  2. The maximum capacitive load offered were tested at nominal input voltage and full load;
  3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^\circ\text{C}$ , humidity<75% with nominal input voltage and rated output load;
  4. All index testing methods in this datasheet are based on our Company's corporate standards;
  5. 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;
  6. We can provide product customization service;
  7. Specifications are subject to change without prior notice.