

6W, Ultra wide input, isolated & regulated dual/single output, DIP package, DC-DC converter



**UL** **US** **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 : 1500VDC
- Operating temperature range: -40°C to +85°C
- Input under-voltage protection, short circuit , over-voltage & Over-current protection output
- Meet CISPR22/EN55022 CLASS A
- International standard pin-out
- Meet UL60950 , EN60950 and IEC60950

URA\_ZP-6WR & URB\_ZP-6WR3 series products are of 6W output power, extremely wide range of voltage input of 9-36VDC, 18-75VDC, isolation voltage of 1500VDC, output over-voltage protection and output short circuit 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

Certification	Part No.	Input Voltage (VDC)		Output		Efficiency <sup>②</sup> (%Min./Typ.) @ Full Load	Max. Capacitive Load <sup>③</sup> (μF)
		Nominal (Range)	Max. <sup>①</sup>	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
UL/CE/CB	URA2405ZP-6WR3	24 (9-36)	40	±5	±600/±30	81/83	680
	URA2412ZP-6WR3			±12	±250/±12	85/87	330
	URA2415ZP-6WR3			±15	±200/±10	86/88	220
	URA2424ZP-6WR3			±24	±125/±6	85/87	100
	URB2403ZP-6WR3			3.3	1500/75	77/79	1800
	URB2405ZP-6WR3			5	1200/60	81/83	1000
	URB2409ZP-6WR3			9	667/33	82/84	1000
	URB2412ZP-6WR3			12	500/25	85/87	470
	URB2415ZP-6WR3			15	400/20	86/88	220
	URB2424ZP-6WR3			24	250/13	85/87	100
	URA4805ZP-6WR3	48 (18-75)	80	±5	±600/±30	81/83	680
	URA4812ZP-6WR3			±12	±250/±12	85/87	330
	URA4815ZP-6WR3			±15	±200/±10	86/88	220
	URB4803ZP-6WR3			3.3	1500/75	78/80	1800
	URB4805ZP-6WR3			5	1200/60	82/84	1000
	URB4812ZP-6WR3			12	500/25	85/87	470
	URB4815ZP-6WR3			15	400/20	86/88	220
	URB4824ZP-6WR3			24	250/13	85/87	100

- Notes:
- ① Absolute maximum rating without damage on the converter, but it isn't recommended;
  - ② Efficiency is measured in nominal input voltage and rated output load;
  - ③ 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	--	301/5	309/12	mA
	48VDC input	--	148/4	154/8	
Reflected Ripple Current		--	20	--	
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	

under-voltage turn-off	24VDC input	5.5	6.5	--	VDC
	48VDC input	14.0	15.5	--	
Input Filter	Pi filter				
Hot Plug	Unavailable				

### Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	Positive output	--	±1	±3	%	
	Negative output					
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	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	--	--	±0.5		
Transient Recovery Time		--	300	500	μs	
Transient Response Deviation	25% load step change	3.3V, 5V, ±5V output	--	±5	±8	%
		Others	--	±3	±5	
Temperature Drift Coefficient	Full load	--	--	±0.03	%/°C	
Ripple*&Noise*	20MHz bandwidth	--	--	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: \* 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	Derating if the temperature is ≥71°C (see Fig. 1)	-40	--	85	°C
Storage Temperature		-55	--	125	
Storage Humidity	Non-condensing	5	--	95	%RH
Pin Welding Resistance 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	--	300	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

Note: \* This series of products using reduced frequency technology, the switching frequency is test value of full load, When the load is reduced to below 50%, the switching frequency decreases with decreasing load.

### Physical Specifications

Casing Material	Aluminum alloy
Package Dimensions	32.00*20.00*10.80mm
Weight	14g(Typ.)
Cooling Method	Free air 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.3-① for recommended circuit) perf. Criteria B
	CS	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

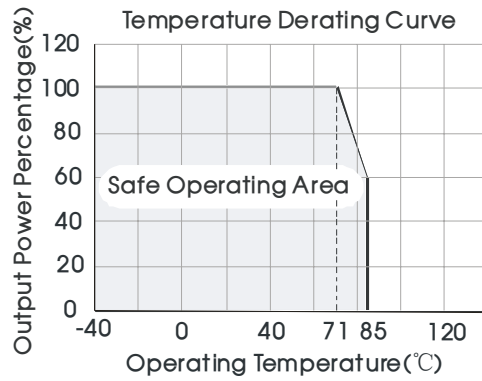
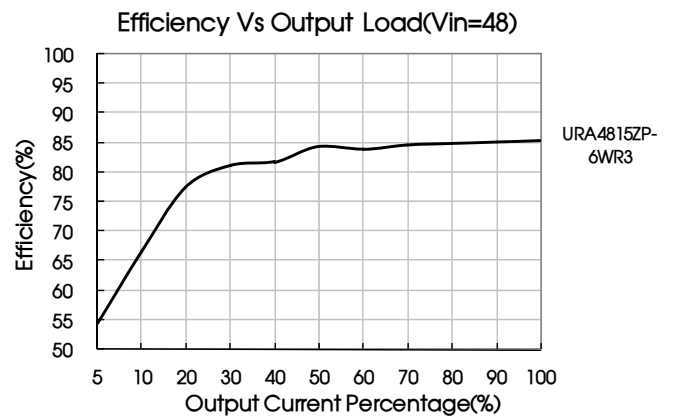
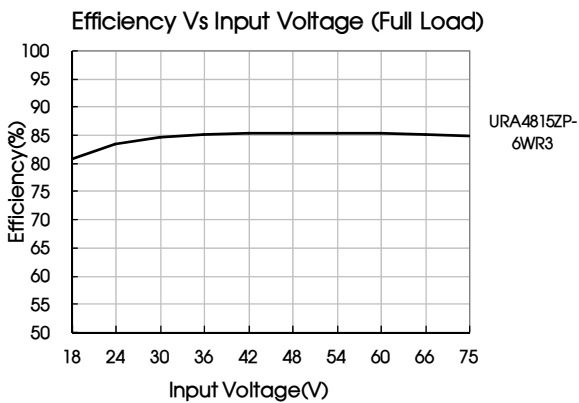
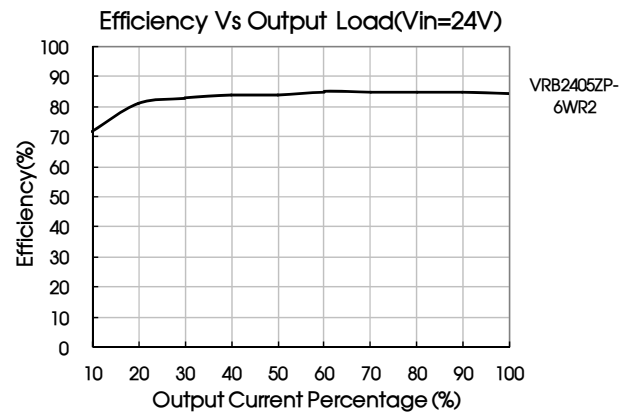
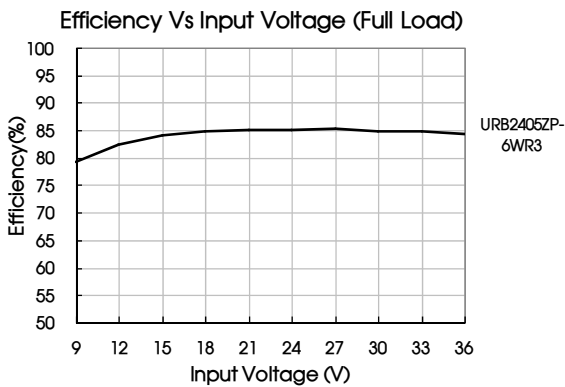


Fig. 1



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.

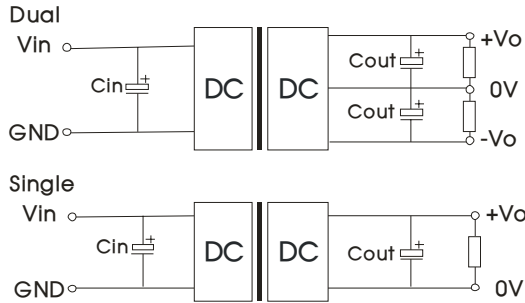


Fig. 2

Vin(VDC)	Cin	Cout
24	100 $\mu$ F	10 $\mu$ F
48	10 $\mu$ F ~47 $\mu$ F	10 $\mu$ F

2. EMC solution-recommended circuit

Parameter description:

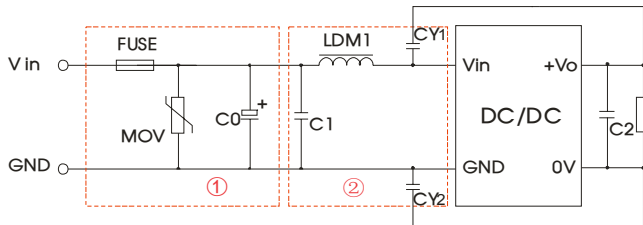


Fig. 3

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

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S14K35	S14K60
C0	330 $\mu$ F/50V	330 $\mu$ F/100V
C1	1 $\mu$ F/50V	1 $\mu$ F/100V
C2	Refer to the Cout in Fig.2	
LDM1	4.7 $\mu$ H	
CY1	1nF/2KV	
CY2	1nF/2KV	

EMC solution-recommended circuit PCB layout

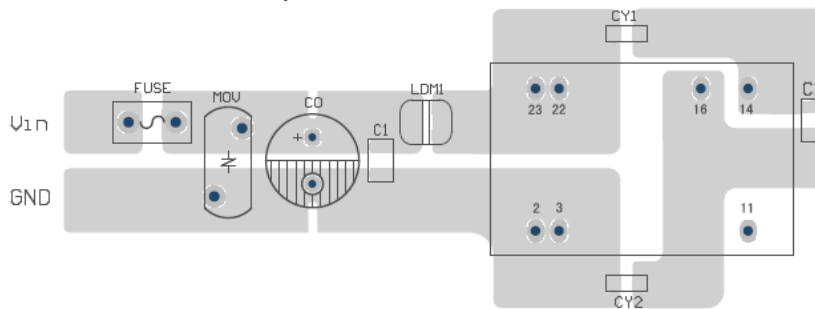


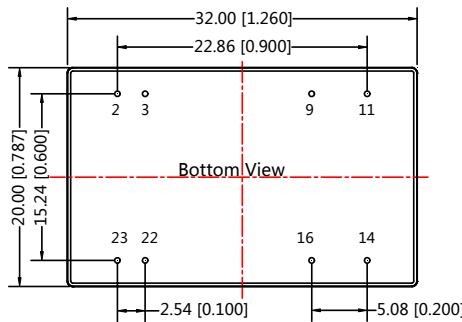
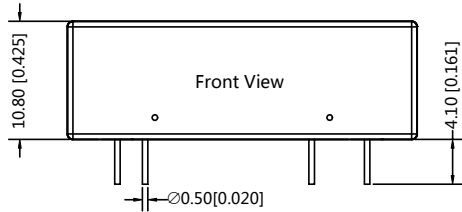
Fig. 4

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

3. The product does not support output in parallel with power per liter

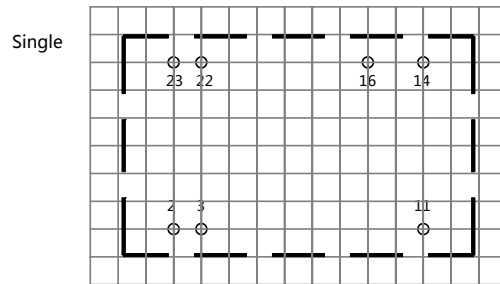
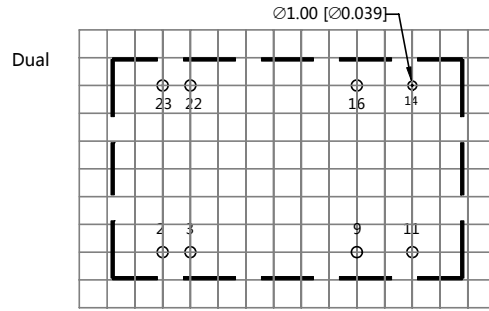
4. For more information please find the application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout



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

THIRD ANGLE PROJECTION



Note:Grid 2.54\*2.54mm

Pin	Single	Dual
2,3	GND	GND
9	No Pin	0V
11	NC	-Vo
14	+Vo	+Vo
16	0V	0V
22,23	Vin	Vin

NC: No Connection

Notes:

1. Packing Information please refer to 'Product Packing Information'. Packing bag number : 58210008;
2. Recommended used in more than 5% load, if the load is lower than 5%, then the ripple index of the product may exceed the specification, but does not affect the reliability of the product;
3. The unbalance degree of the recommended dual output module load: ≤ 5%; if the degree exceeds ±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 Ta=25℃, 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.

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](mailto:info@mornsun.cn)