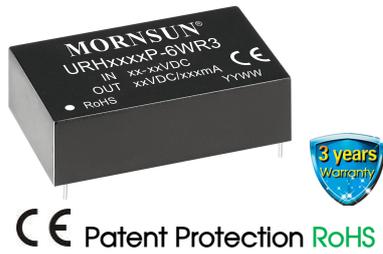


# DC/DC Power Supply Module

## URH\_P-6WR3 Series

# MORNSUN®

6W, Ultra wide input, isolated & regulated single output, DIP packaging, DC-DC converter



## FEATURES

- Ultra wide input voltage rang (4:1)
- High efficiency up to 85%
- No-load power consumption as low as 0.12W
- Enhanced isolation, Input to output 6KVDC, 2MOPP high isolation
- Transformer creepage 8mm, Transformer clearance 5mm
- Operating temperature range: -40°C to +85°C
- Input under-voltage protection, output short circuit, over-current, over-voltage protection
- EN60601-1( 3rd edition medical grade) approval
- International standard pin-out

URH\_P-6WR3 series products are of 6W output power, extremely ultra wide range of voltage input of 9-36VDC, 18-75VDC, isolation voltage of 6000VDC, output over-voltage protection and output short circuit protection, EN60601-1 approval; these products are widely used in medical field and other high isolation situations, power electronics will use this high isolated power supply. Low no-load power consumption widely used in energy storage system.

## Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Efficiency (%Typ.) @ Full Load	Max. Capacitive Load(μF)
		Nominal (Range)	Max.*	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
CE	URH2405P-6WR3	24 (9-36)	40	5	1200/0	79/81	2700
	URH2406P-6WR3			6	1000/0	79/81	2200
	URH2409P-6WR3			9	667/0	81/83	1800
	URH2412P-6WR3			12	500/0	82/84	1000
	URH2415P-6WR3			15	400/0	83/85	680
	URH2424P-6WR3			24	250/0	82/84	470
	URH4805P-6WR3	48 (18-75)	80	5	1200/0	79/81	2700
	URH4809P-6WR3			9	667/0	81/83	1800
	URH4812P-6WR3			12	500/0	82/84	1000
	URH4815P-6WR3			15	400/0	83/85	680
	URH4824P-6WR3			24	250/0	82/84	470

Note:\*Absolute maximum rating without damage on the converter, but it isn't recommended.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC input	--	309/5	317/8	mA
	48VDC input	--	154/4	159/7	
Reflected Ripple Current	24VDC input	--	20	--	
	48VDC input	--	20	--	
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	--	
	48VDC input	12	15.5	--	
Input Filter		Pi filter			
Hot Plug		Unavailable			

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## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±3	%
Line Voltage Regulation	Full load, the input voltage is from low voltage to high voltage	--	±0.2	±0.5	
Load Regulation <sup>①</sup>	5%-100% load	--	±0.5	±1	
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>②</sup>	20MHz bandwidth	--	100	180	mVp-p
Over-current Protection	Input voltage range	110	150	260	%Io
Over-voltage Protection		110	--	160	%Vo
Short circuit Protection		Continuous, self-recovery			

Note:① When testing from 0% to 100% load working conditions, load regulation index of ±5%.

② 0%-5% load ripple & Noise is no more than 5%Vo. Ripple and noise tested with "parallel cable" method, oscilloscope using the 1X probe, 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	6000	--	--	VDC
Insulation Resistance	Input-output, insulation voltage 500VDC	10000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	13	20	pF
Enhanced isolation	Transformer creepage	8.0	--	--	mm
	Transformer clearance	5.0	--	--	
	PCB creepage & clearance	8.0	--	--	
	Optocoupler creepage	8.0	--	--	
Operating Temperature	Derating if the temperature is ≥71°C (see Fig. 1)	-40	--	85	°C
Storage Humidity	Without condensation	5	--	95	%RH
Storage Temperature		-55	--	125	°C
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(nominal, full load)	--	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 for full load, When the load is reduced to below 50%, the switching frequency decreases with decreasing load.

## Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Package Dimensions	31.60*20.30*10.20 mm
Weight	13g(Typ.)
Cooling method	Free air convection

## EMC Specifications

EMI	CE	CISPR32/EN55032 CLASS A (Bare component)			
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV		perf. Criteria B
	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

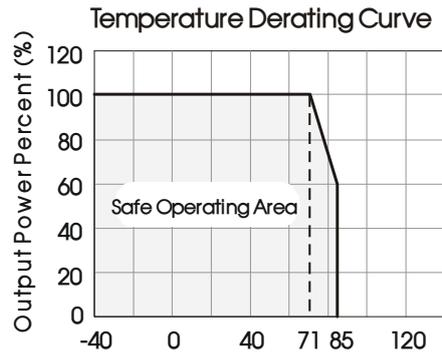
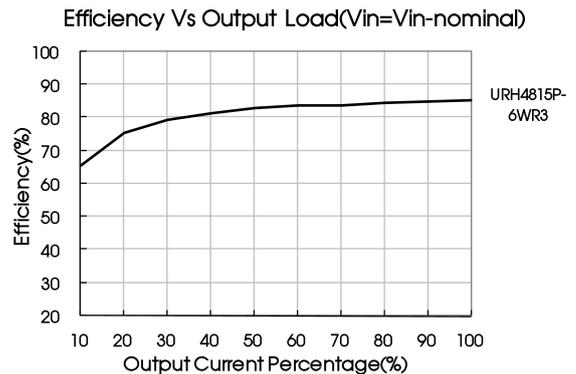
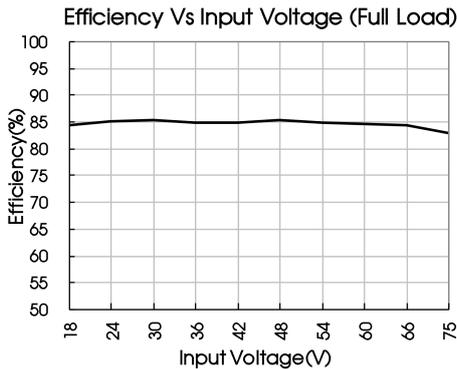
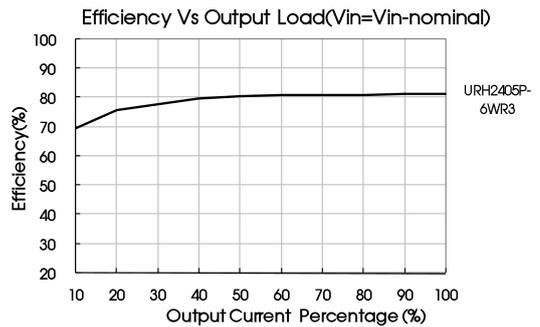
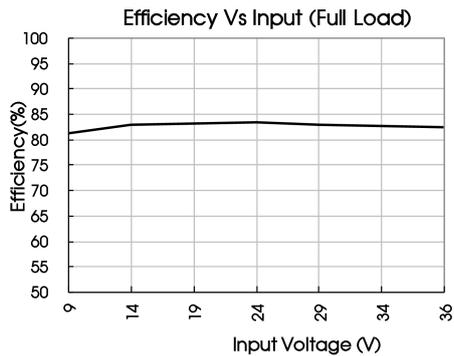


Fig. 1

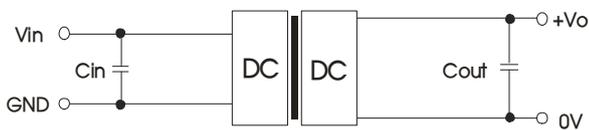


### Design Reference

#### 1. Typical application

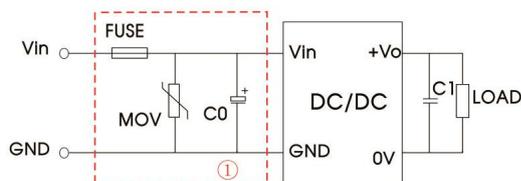
All the DC/DC converters of this series are tested according to the recommended circuit (see Fig. 2) before delivery.

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.



Vin	Cin	Cout
24VDC	100μF	10μF
48VDC	10μF -47μF	10μF

#### 2. EMC solution-recommended circuit



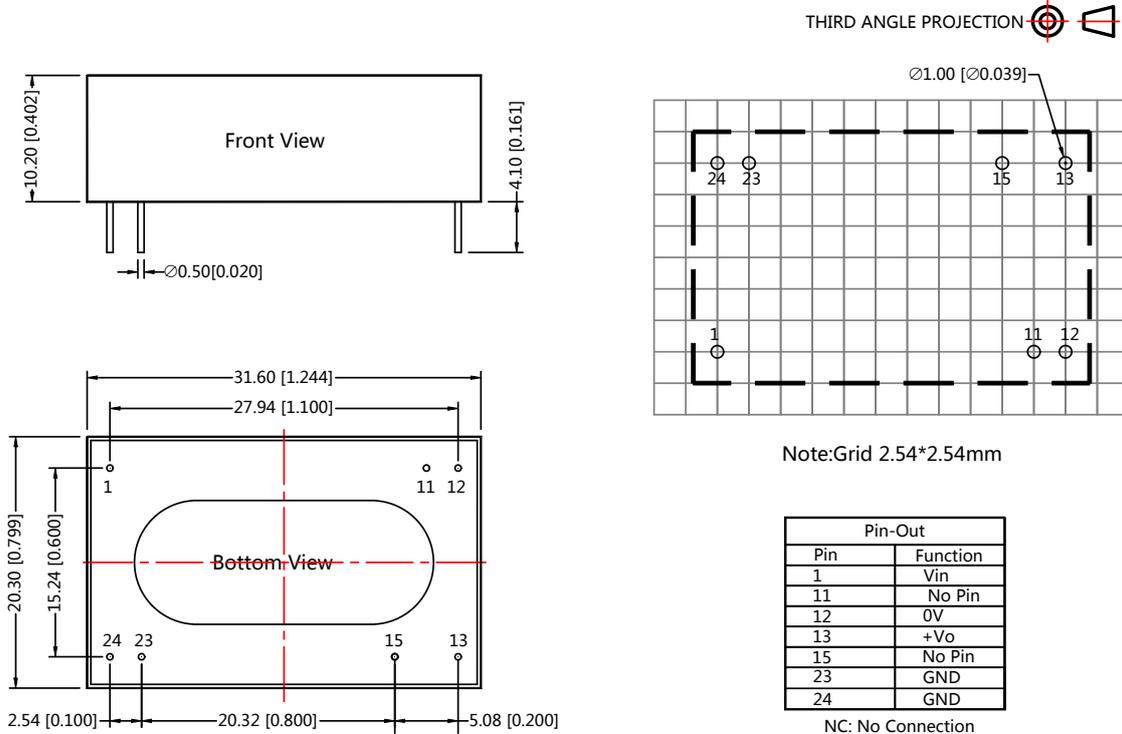
Notes: Part ① in the Fig. 3 is used for EMS test.

Parameter description

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	330μF/50V	330μF/100V
C1	Refer to the Cout in Fig.2	

- The product does not support output in parallel with power per liter
- For more information please find the application note 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]

- Note:
- Packing information please refer to Product Packing Information which can be downloaded from [www.mornsun-power.com](http://www.mornsun-power.com). The Packing bag number of Horizontal package: 58210008;
  - The max. capacitive load should be tested within the input voltage range and under full load conditions;
  - Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25°C, humidity<75%RH, when inputting nominal voltage and outputting rated load;
  - All index testing methods in this datasheet are based on our Company's corporate standards;
  - 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;
  - We can provide product customization service;
  - 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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