

DC/DC Converter

URH_P-6WR3 Series

6W isolated DC-DC converter in DIP package
Ultra wide input and regulated single output



FEATURES

- Ultra wide 4:1 input voltage range
- High efficiency up to 85%
- No-load power consumption as low as 0.12W
- Reinforced isolation, I/O isolation test voltage: 6KVDC and 2MOPP high isolation
- Leakage current < 5 μ A, under 240VAC/60Hz operating conditions
- Transformer creepage distance is 8mm, Transformer clearance is 5mm
- Operating ambient temperature range: -40°C ~ +85°C
- Input under-voltage protection, output short circuit, over-current, over-voltage protection
- EN60601-1(3rd edition medical grade) approved, EN60601-1: 2006+A1: 2013
- Industry standard pin-out

URH_P-6WR3 series of isolated 6W DC-DC converter products with an ultra-wide input voltage range of 9-36VDC, 18-75VDC, input to output isolation is tested with 6000VDC, output over-voltage protection and output short circuit protection, EN60601-1 approval; they are widely used in applications that requiring high isolation, such as medical, electricity, also for energy storage systems that requiring an low no-load power consumption.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency (%) Min./Typ.	Max. Capacitive Load(μ F)
		Nominal (Range)	Max.*	Voltage (VDC)	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
--	URH2418P-6WR3			18	333/0	83/85	1200
CE	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:*Exceeding the maximum input voltage may cause permanent damage.

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	--	
Surge Voltage (1sec. max.)	24VDC input	-0.7	--	50	VDC
	48VDC input	-0.7	--	100	
Start-up 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
Voltage Accuracy		--	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load	--	±0.2	±0.5	
Load Regulation ^①	5%-100% load	--	±0.5	±1	
Transient Recovery Time	25% load step change	--	300	500	μs
Transient Response Deviation		--	±3	±5	%
Temperature Coefficient	Full load	--	--	±0.03	%/°C
Ripple & Noise ^②	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 Load regulation for 0%-100% load is ±5%;

② Ripple & Noise at <5% load is 5%Vo max. The "parallel cable" method is used for Ripple and Noise test, oscilloscope using the 1X probe, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength test for 1 minute with a leakage current of 1mA max.	6000	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	10000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	13	20	pF
Leakage Current	240VAC/60Hz	--	3.6	5	uA
Application Part		CF Type			
Reinforced 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
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	
Vibration		10-55Hz, 2G, 30 Min. along X, Y and Z			
Switching Frequency*	PWM mode(nominal, full load)	--	300	--	KHz
Safety Standard		EN60601-1: 2006+A1: 2013			
Insulation Protection Grade	240VAC/60Hz	2xMOPP			
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

Note:* Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Mechanical Specifications

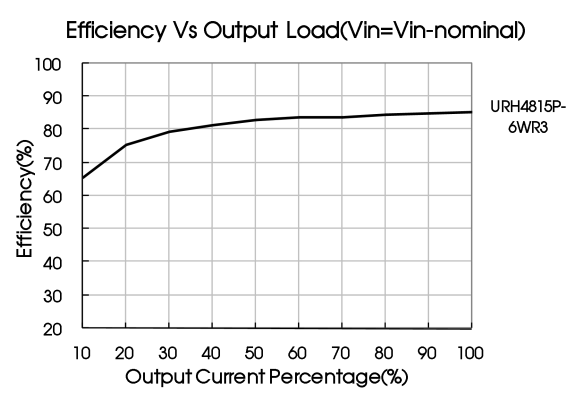
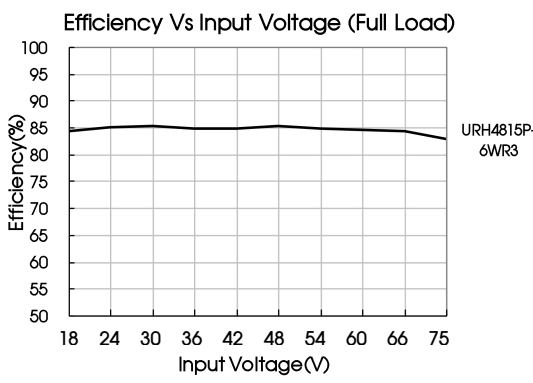
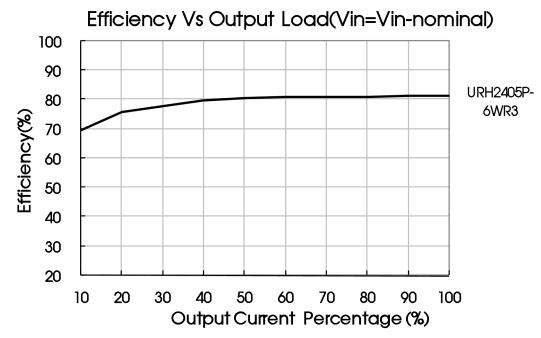
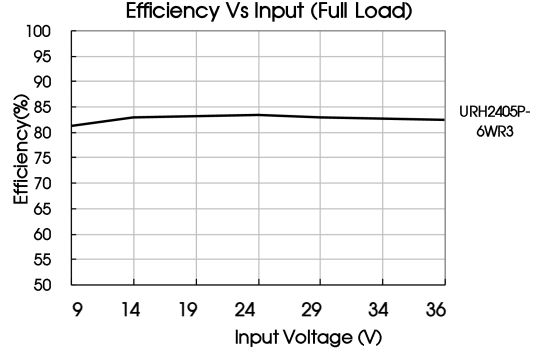
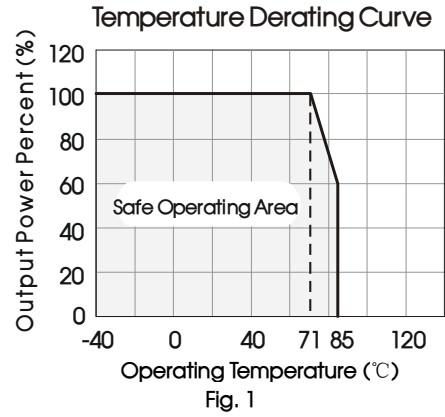
Case Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Dimensions	31.60 x 20.30 x 10.20 mm
Weight	13.0g(Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	Others	CISPR32/EN55032	CLASS A (without extra components)
		URH2418P-6WR3	CISPR32/EN55032	CLASS B (see Fig.3-② for recommended circuit)
Immunity	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

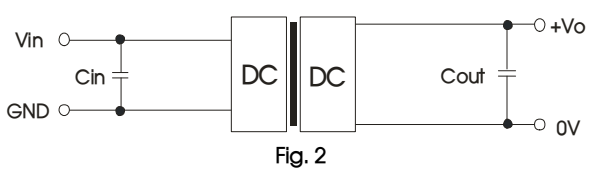
Typical Characteristic Curves



Design Reference

1. Typical application

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.



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

Parameter description:

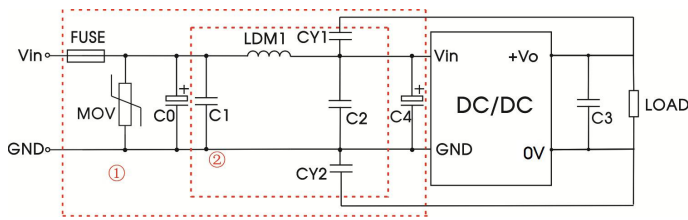


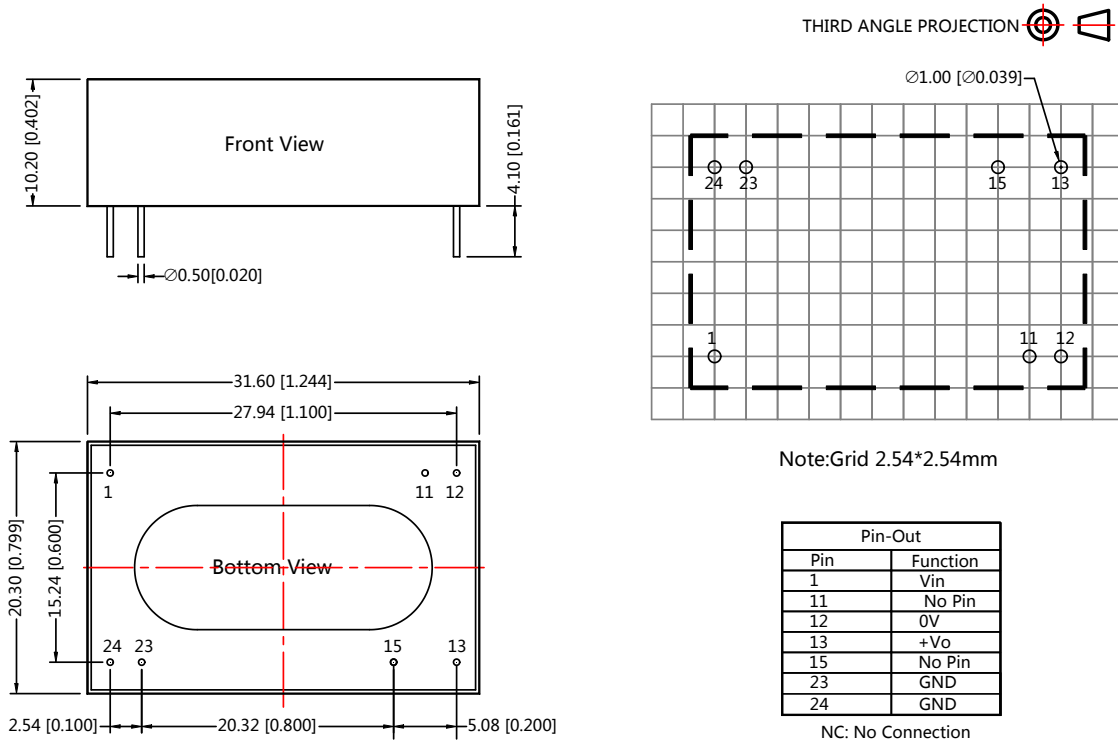
Fig. 3

Notes: For EMC tests we use part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0, C4	330μF/50V	330μF/100V
C1, C2	10μF/50V	--
C3	Refer to the Cout in Fig.2	
LDM1	10μH	--
CY1, CY2	1nF/6KV	--

- The products do not support parallel connection of their output
- For additional information please refer to DC-DC converter 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]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. The Packaging bag number of Horizontal package: 58210008;
2. The maximum capacitive load offered were tested at nominal input voltage range 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%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. 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 contact our technicians directly for specific information;
6. We can provide product customization service;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. 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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