

DC/DC Converter

URF_P-6WR3 Series

MORNSUN®

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

FEATURES

- Wide range of input voltage (4:1)
- Efficiency up to 88%
- No-load power consumption as low as 0.12W
- Isolation voltage :3K VDC
- 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



UL **us** **CB** **CE** Patent Protection **RoHS**

URF_P-6WR3 series products are of 6W output power, extremely wide range of voltage input of 9-36VDC, 18-75VDC, isolation voltage of 3000VDC, 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 (%Min./Typ.) @ Full Load	Max. Capacitive Load(μF)
		Nominal (Range)	Max. *	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
UL/CE/CB	URF2403P-6WR3	24 (9-36)	40	3.3	1500/75	77/79	2200
	URF2405P-6WR3			5	1200/60	81/83	2200
	URF2409P-6WR3			9	667/33	85/87	1000
	URF2412P-6WR3			12	500/25	86/88	680
	URF2415P-6WR3			15	400/20	86/88	470
	URF2424P-6WR3	24	250/13	85/87	330		
	URF4803P-6WR3	48 (18-75)	80	3.3	1500/75	77/79	2200
	URF4805P-6WR3			5	1200/60	81/83	2200
	URF4812P-6WR3			12	500/25	86/88	680
	URF4815P-6WR3			15	400/20	86/88	470
URF4824P-6WR3	24			250/13	85/87	330	

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	3.3V output	--	261/5	268/8	mA
		5V output	--	301/5	309/8	
		Other output	--	284/5	291/8	
	48VDC Input	3.3V output	--	131/4	134/7	
		5V output	--	151/4	154/7	
		Other output	--	142/4	145/7	
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	VDC	
	48VDC Input	--	--	18		
under-voltage turn-off	24VDC Input	5.5	6.5	--		
	48VDC Input	14.0	15.5	--		

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Starting Time	Nominal input& constant resistance load	--	10	--	ms
Input Filter		PI filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±3	%
Line Regulation	Full load, the input voltage is from low voltage to high voltage	--	±0.2	±0.5	
Load Regulation	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*	20MHz bandwidth	--	85	120	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
Isolation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	3000	--	--	VDC
Isolation 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	%
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

Physical Specifications

Casing Material	Plastic (UL94-V0)
Package Dimensions	31.60*20.30*10.20 mm
Weight	13.00g(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

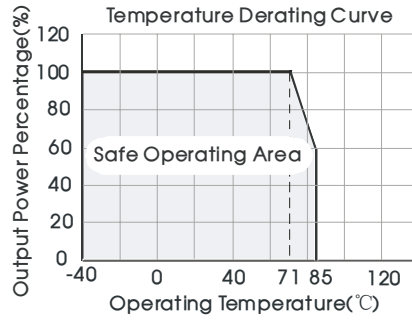
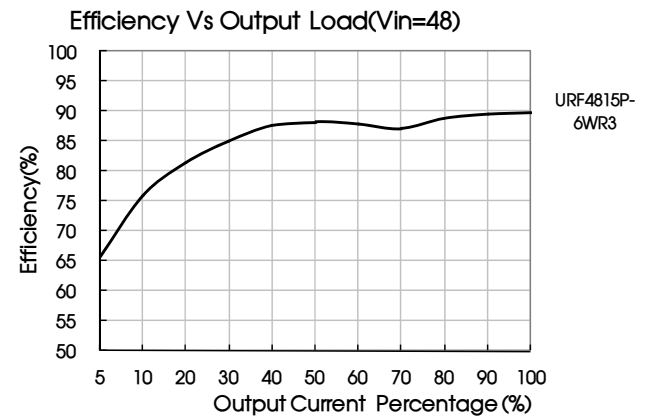
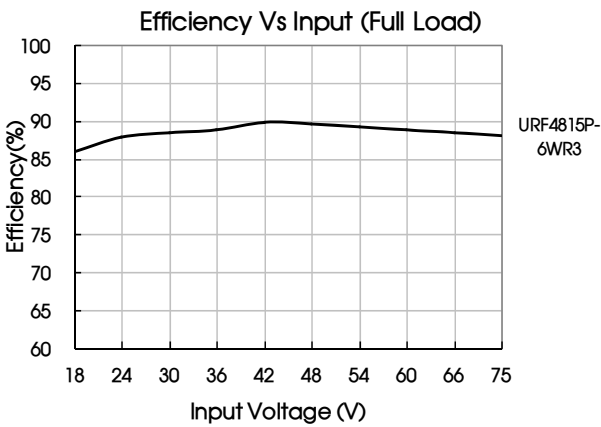
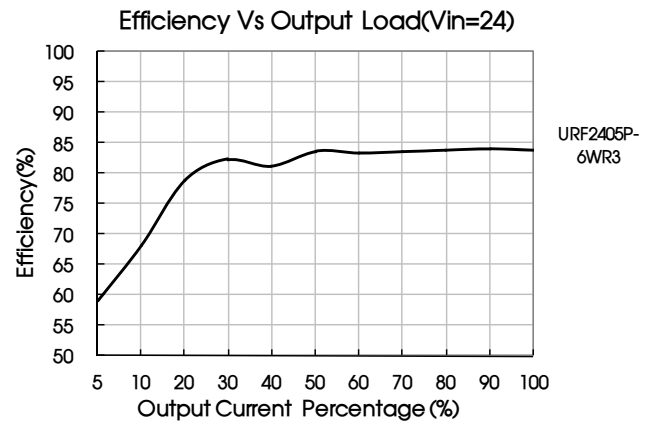
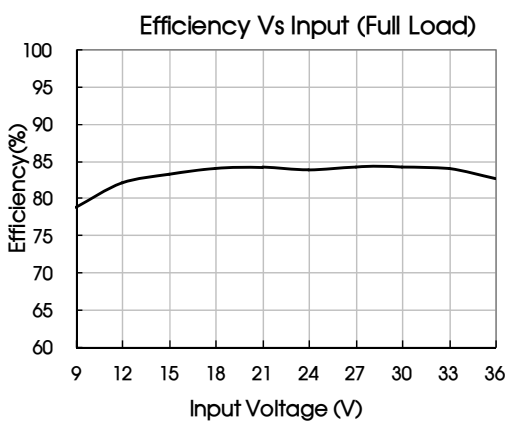


Fig. 1

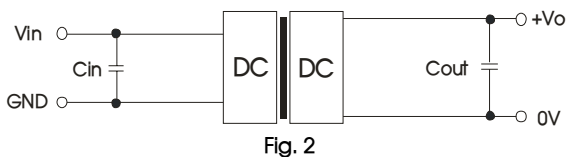


Design Reference

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 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.



Vin(VDC)	Cin(μF)	Cout(μF)
24	100	10
48	10~47	10

2. EMC solution-recommended circuit

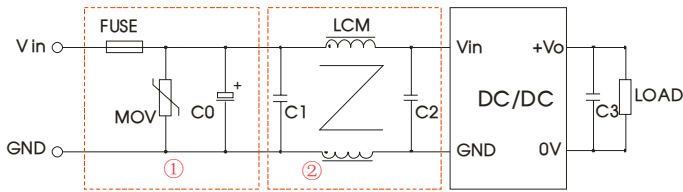


Fig. 3

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	S14K35	S14K60
C0	330μF/50V	330μF/100V
C1,C2	2.2μF/50V	2.2μF/100V
LCM	2.2 mH, recommended to use MORNSUN's FL2D-30-222	
C3	Refer to the Cout in Fig.2	

EMC solution-recommended circuit PCB layout

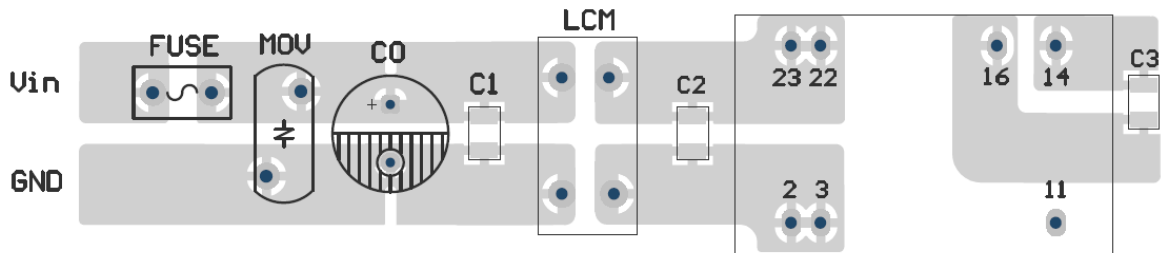
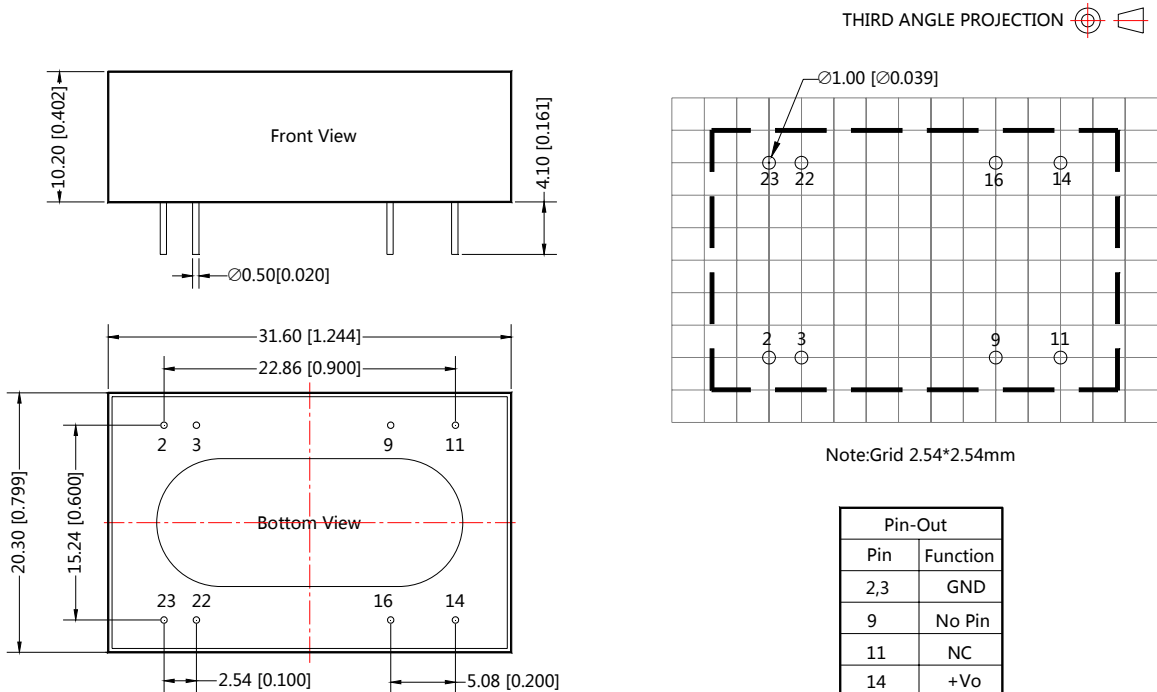


Fig. 4

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

4. For more information please find 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]

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

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com.The Packing bag number of Horizontal package: 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 min. load shall be no lower than 5%, or the output ripple may increase rapidly; If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in the Manual, but the reliability of the product will not be influenced;
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 $T_a=25^{\circ}\text{C}$, 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.

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