

10W, Ultra wide input isolated & regulated dual/single Output,DC-DC converter



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



FEATURES

- Ultra wide input voltage range (4:1)
- High efficiency up to 87%
- No-load power consumption as low as 0.12W
- Isolation voltage : 3K VDC
- Input under-voltage protection, output short circuit, over-current, over-voltage, over-temperature protection
- Operating temperature range: -40°C to +85°C
- Meet CISPR22/EN55022 CLASS A, without external components
- Reverse voltage protection available with A2S(Chassis mounting) or A4S(35mm DIN-Rail mounting)
- IEC60950, UL60950, EN60950 approval
- International standard pin-out

URE_LP-10WR3 & URF_LP-10WR3 series are isolated 10W DC-DC products with 4:1 input voltage. They feature efficiency up to 87%, 3000VDC isolation, operating temperature of -40°C to +85°C. Input under-voltage protection, output short circuit protection, over-voltage protection, over-current 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		Efficiency ^④ (%,Min./Typ.) @ Full Load	Max. Capacitive Load(μF) ^⑤
		Nominal ^② (Range)	Max. ^③	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
UL/CE/CB	URE2405LP-10WR3	24 (9-36)	40	±5	±1000/0	80/82	1000
	URE2412LP-10WR3			±12	±416/0	84/86	330
	URE2415LP-10WR3			±15	±333/0	85/87	220
	URF2403LP-10WR3			3.3	2400/0	77/79	5400
	URF2405LP-10WR3			5	2000/0	80/82	5400
	URF2409LP-10WR3			9	1111/0	83/85	680
	URF2412LP-10WR3			12	833/0	84/86	470
	URF2415LP-10WR3			15	667/0	85/87	330
	URF2424LP-10WR3			24	416/0	85/87	100
	URE4805LP-10WR3	48 (18-75)	80	±5	±1000/0	80/82	1000
	URE4812LP-10WR3			±12	±416/0	84/86	330
	URE4815LP-10WR3			±15	±333/0	85/87	220
	URF4803LP-10WR3			3.3	2400/0	77/79	5400
	URF4805LP-10WR3			5	2000/0	80/82	5400
	URF4812LP-10WR3			12	833/0	84/86	470
	URF4815LP-10WR3			15	667/0	85/87	330
	URF4824LP-10WR3			24	416/0	85/87	100

Notes:
 ① Part No. with suffix of "A2S" means chassis mounting and suffix of "A4S" means DIN-Rail mounting (e.g. URF2405LP-10WR3A2S means chassis mounting; URF2405LP-10WR3A4S means DIN-Rail mounting);
 ② A2S (wiring) and A4S (rail) Model due to input reverse polarity protection function, input voltage range the minimum value and starting voltage is higher than 1VDC DIP package;
 ③ Absolute maximum rating without damage on the converter, but it isn't recommended;
 ④ Efficiency 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;
 ⑤ 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 nominal input series, nominal input voltage	3.3V output	--	417/5	429/12	mA
		Others	--	493/5	521/12	
	48VDC nominal input series, nominal input voltage	3.3V output	--	208/5	215/12	
		Others	--	246/5	261/12	
Reflected Ripple Current	24VDC nominal input series, nominal input voltage	--	40	--		
	48VDC nominal input series, nominal input voltage	--	30	--		
Surge Voltage (1sec. max.)	24VDC nominal input series	-0.7	--	50		
	48VDC nominal input series	-0.7	--	100		
Starting Voltage	24VDC nominal input series	--	--	9	VDC	
	48VDC nominal input series	--	--	18		
Input under-voltage protection	24VDC nominal input series	5.5	6.5	--		
	48VDC nominal input series	12	15.5	--		
Starting Time	Nominal input voltage & 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	--	5	8	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 ^①	0% -100% load	--	±1	±3	%	
Line Regulation	Full load, the input voltage is from low voltage to high voltage	Positive output	--	±0.2		±0.5
		Negative	--	±0.5		±1.0
Load Regulation ^②	5% -100% load	Positive output	--	±0.5		±1
		Negative	--	±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, nominal input voltage	--	300	500	μs	
Transient Response Deviation		--	±3	±5	%	
Temperature Coefficient	Full load	--	--	±0.03	%/°C	
Ripple & Noise ^③	20MHz bandwidth, 5% -100% load	--	60	120	mV p-p	
Over-voltage Protection	Input voltage range	110	130	160	%Vo	
Over-current Protection		110	140	190	%Io	
Short circuit Protection		Continuous				

Note: ① At 0% - 5% load, the Max. output voltage accuracy of ±5VDC output converter is ±5%;

② When testing from 0% -100% load working conditions, load regulation index of ±5%;

③ 0% - 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	3000	--	--	VDC
Insulation Resistance	Input-output, insulation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	500	--	pF
Operating Temperature	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	°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 using the technique of reducing frequency. The switching frequency is test at full load; when the load is below 50%, the switching frequency decreases with decreasing load.

Physical Specifications

Casing Material	Plastic (UL94 V-0)	
Package Dimensions	Horizontal package	51.50*26.50*12.00 mm
	A2S wiring package	76.00*31.50*21.20 mm
	A4S rail package	76.00*31.50*25.80 mm
Weight	Horizontal package/A2S wiring package/A4S rail package	24g/46g/66g (Typ.)
Cooling method	Free air convection	

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS A (without external components)/ CLASS B (see Fig. 3-② for recommended circuit)	
	RE	CISPR22/EN55022	CLASS A (without external components)/ 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	line to line ±2KV (see Fig. 3-① for 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

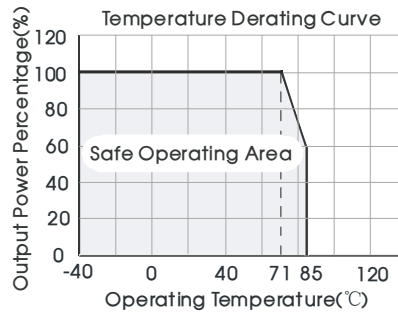
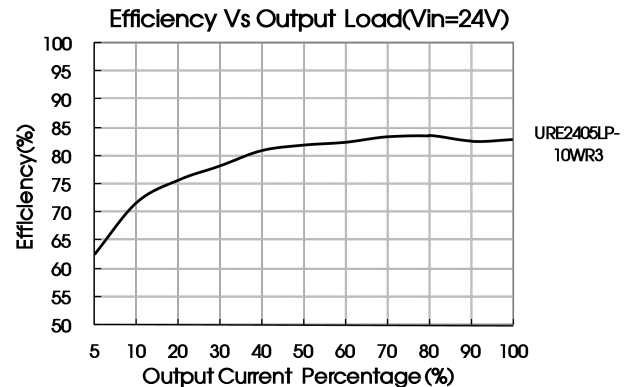
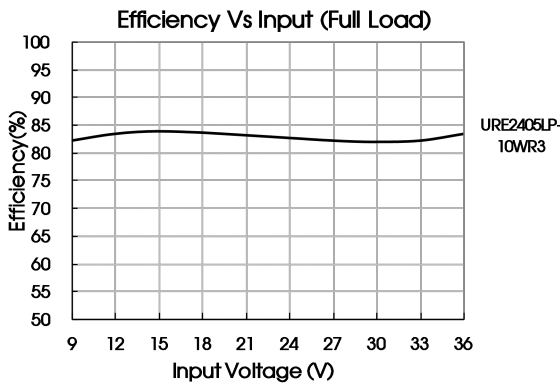
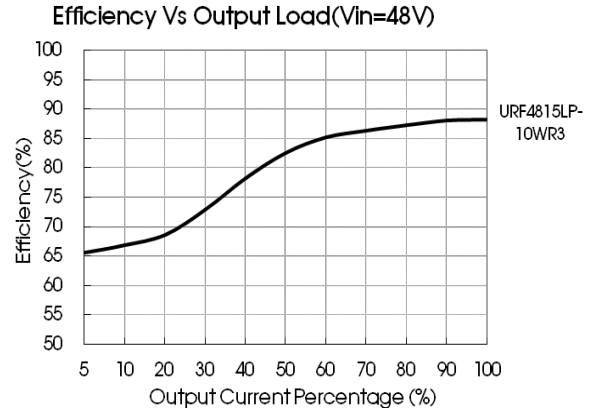
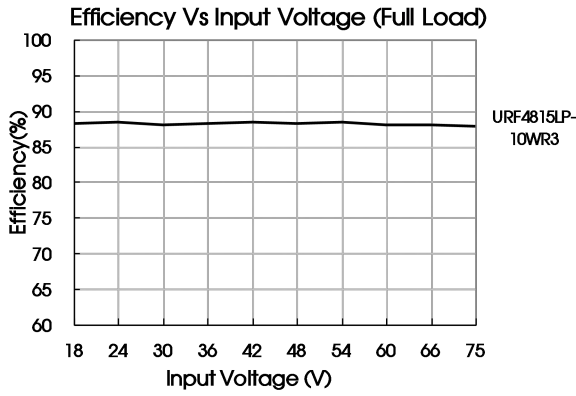


Fig. 1

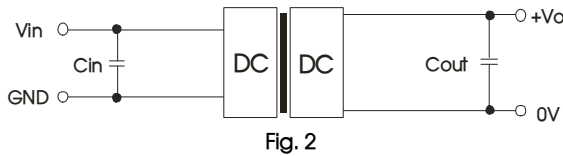




Design Reference

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.



Cin	Cout
10μF - 47μF	10μF

2. EMC solution-recommended circuit

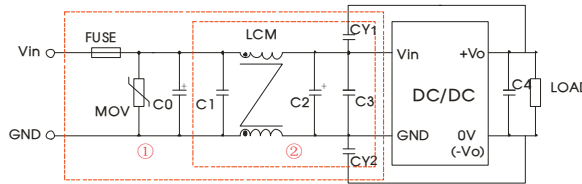


Fig. 3
Notes: Part ① in the Fig. 3 is used for EMS test and part ② for EMI filtering; selected based on needs.

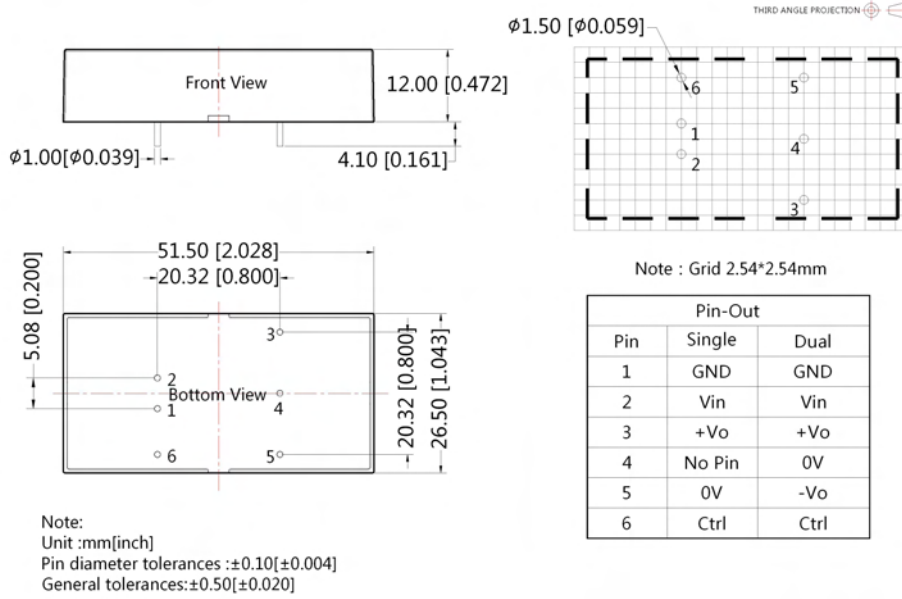
Parameter description:

Model	URE_LP-10WR3		URF_LP-10WR3	
	Vin:24V	Vin:48V	Vin:24V	Vin:48V
FUSE	Choose according to actual input current			
MOV	S20K30	S14K60	S20K30	S14K60
C0	680μF/50V	680μF/100V	680μF/50V	680μF/100V
C1	1μF/50V	1μF/100V	1μF/50V	1μF/100V
C2	330μF/50V	330μF/100V	330μF/50V	330μF/100V
C3	4.7μF/50V	4.7μF/100V	4.7μF/50V	4.7μF/100V
LCM	4.7mH, recommended to use MORNSUN's FL2D-30-472		6.8mH	
C4	Refer to the Cout in Fig.2			
CY1	1nF/3KV			
CY2	1nF/3KV			

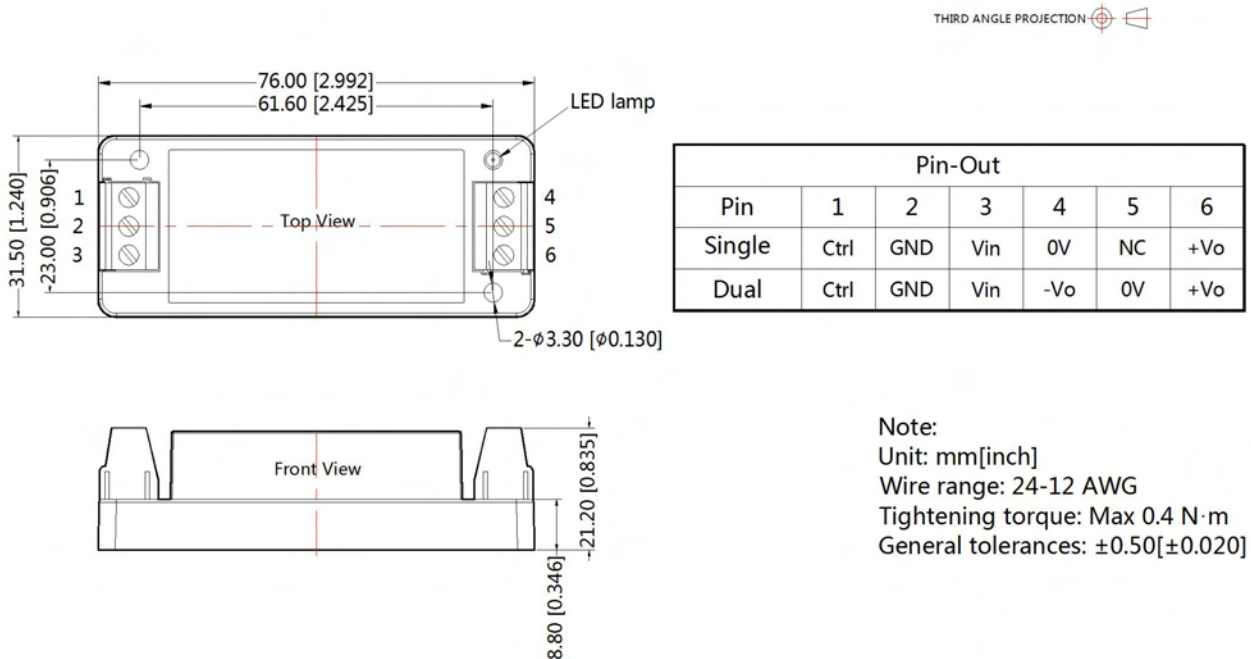
3. It is not allowed to connect modules output in parallel to enlarge the power

4. For more information please find DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

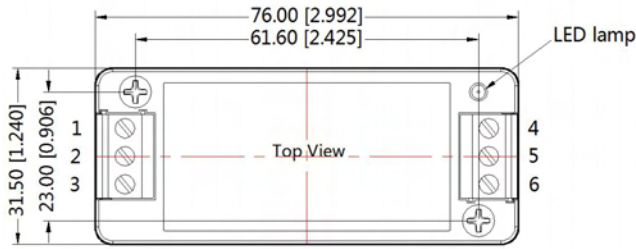


URE_LP-10WR3A2S & URF_LP-10WR3A2S Dimensions

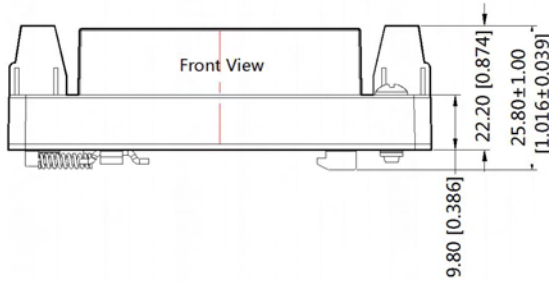


URE_LP-10WR3A2S & URF_LP-10WR3A4S Dimensions

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
 Tightening torque: Max 0.4 N·m
 General tolerances: ±0.50[±0.020]

- Note:
1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number : 58210039(DIP), 58220022(A2S/A4S package);
 2. 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;
 3. The maximum capacitive load offered were tested at input voltage range and full load;
 4. 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;
 5. All index testing methods in this datasheet are based on Company's corporate standards;
 6. We can provide product customization service, please contact our technicians directly for specific information;
 7. Specifications are subject to change without prior notice.

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