

10W, Ultra wide input, isolated & regulated single output, SIP package, DC-DC converter



Patent Protection RoHS

FEATURES

- Ultra wide input voltage range (4:1)
- High efficiency up to 88%
- Isolation voltage :1.5K VDC
- High power density
- Input under-voltage protection, output short circuit, over-current protection
- Operating temperature range: -40°C to +85°C
- International standard pin-out
- Meets EN62368 standards (Pending)

URB_S-10WR3 series are isolated 10W DC-DC products with 4:1 input voltage. They feature efficiency up to 88%, 1500VDC isolation, operating temperature of -40°C to +85°C, input under-voltage protection, over-current, short circuit protection, which make them widely applied in medical care, industrial control, electric power, instruments and communication fields.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Efficiency ^② (%Min./Typ.) @ Full Load	Max. Capacitive Load (μF)
		Nominal (Range)	Max. ^①	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
CE (Pending)	URB2403S-10WR3	24 (9-36)	40	3.3	2400/0	83/85	2200
	URB2405S-10WR3			5	2000/0	86/88	2200
	URB2409S-10WR3			9	1111/0	86/88	680
	URB2412S-10WR3			12	833/0	86/88	470
	URB2415S-10WR3			15	667/0	86/88	330
	URB2424S-10WR3			24	417/0	86/88	220

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.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3V output	--	389/25	398/45	mA
	5V output	--	474/25	485/45	
	Others	--	474/9	485/18	
Reflected Ripple Current		--	50	--	
Surge Voltage (1sec. max.)		-0.7	--	50	VDC
Starting Voltage		--	--	9	
Input Under-voltage Protection		5.5	6.5	--	
Input Filter		Capacitance Filter			
Hot Plug		Unavailable			
Ctrl*	Module switch on	Ctrl open circuit 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	--	6	10	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	5% -100% load	--	±1.5	±2	%
Line Regulation	Full load, the input voltage is from low voltage to high voltage	--	±0.25	±0.5	
Load Regulation ^②	5% -100% load	--	±0.5	±1	

Transient Recovery Time			--	300	500	μs
Transient Response Deviation	25% load step change, nominal input voltage	3.3V, 5V,output	--	±5	±8	%
		Others	--	±3	±5	
Temperature Coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise [®]	20MHz bandwidth, 5% -100% load	3.3V, 5V,output	--	60	120	mV p-p
		Others	--	75	150	
Over-current Protection	Input voltage range		110	160	230	%Io
Short circuit Protection	Input voltage range	Continuous, self-recovery				

Note: ① At 0%-5% load, the Max. output voltage accuracy is ±3%;
 ② When testing from 0% -100%load working conditions, load regulation index of ±3%;
 ③ 0% - 5% load ripple&Noise is no more than 300mV. Ripple and noise are measured by Fig.2

General Specification

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	see Fig. 1	-40	--	+85	°C
Storage Humidity	Without condensation	5	--	95	%RH
Storage Temperature		-55	--	+125	°C
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	+300	
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency *	PWM mode	--	500	--	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	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Dimension	22.00*9.50*12.00 mm
Weight	5.5g (Typ.)
Cooling method	Free air convection(20LFM)

EMC Specifications

EMI	CE	CISPR32/EN55032	CLASS B (see Fig.4-② for recommended circuit)		
	RE	CISPR32/EN55032	CLASS B (see Fig.4-② for recommended circuit)		
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV		perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m		perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV (see Fig.4-① for recommended circuit)		perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (see Fig.4-① for recommended circuit)		perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s		perf. Criteria A

Product Characteristic Curve

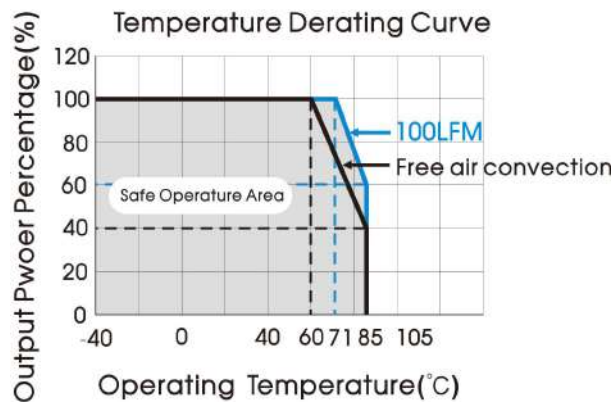
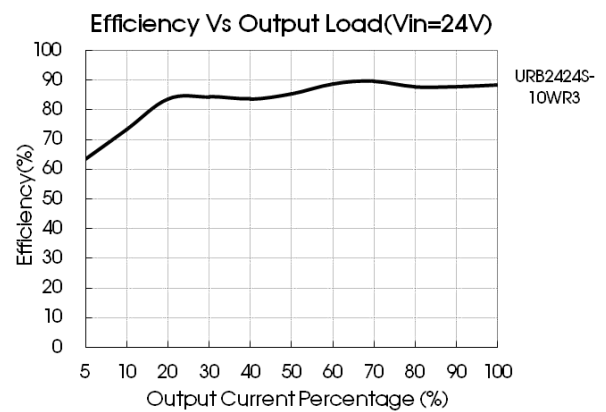
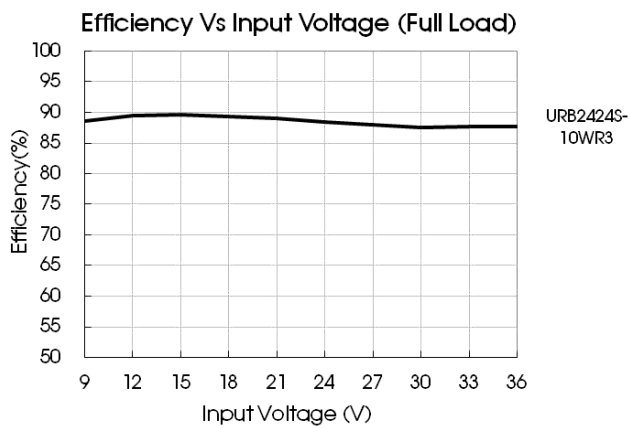
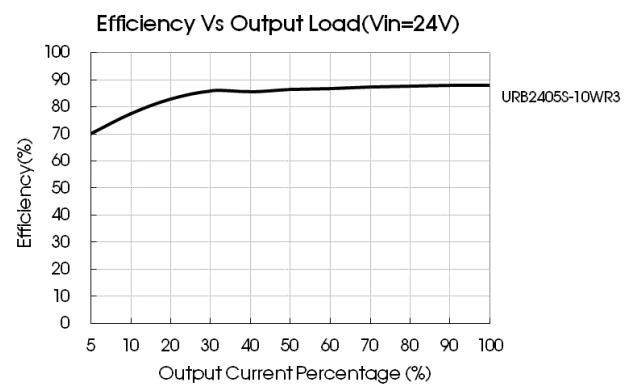
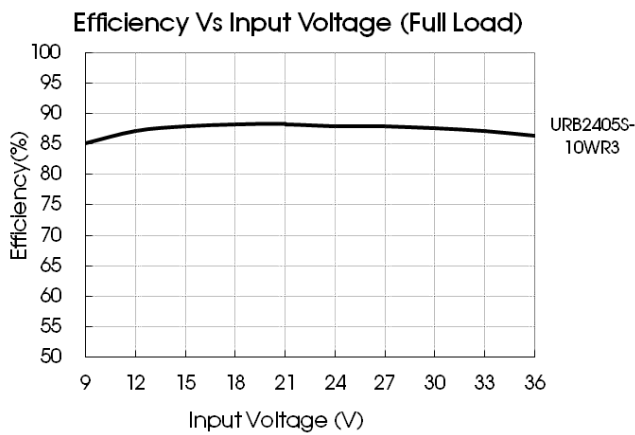


Fig. 1



Design Reference

1. Ripple & Noise

All the URB_S-10WR3 series have been tested according to the following recommended test circuit before delivery (see Fig. 2). The connection of probe to copper foil is shortened as far as possible.

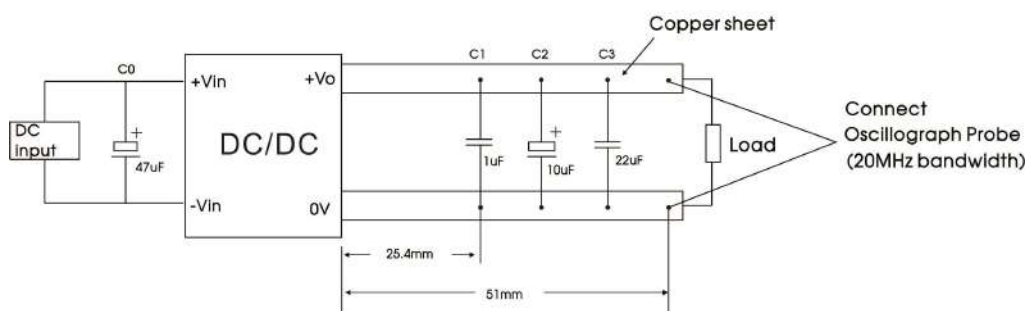
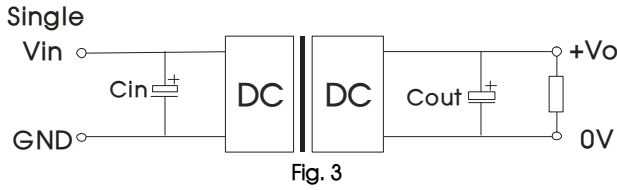


Fig. 2

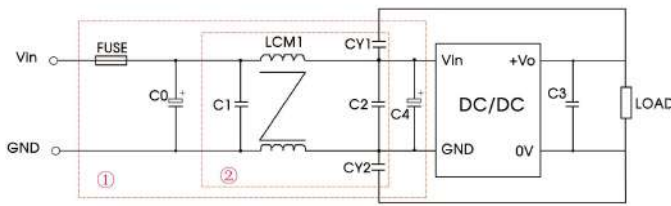
2. Typical application

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.



$C_{in}(\mu F)$	$C_{out}(\mu F)$
47	22

3. EMC solution-recommended circuit



Notes: Part ① in the Fig. 4 is used for EMC test and part ② for EMI filtering; selected based on needs.

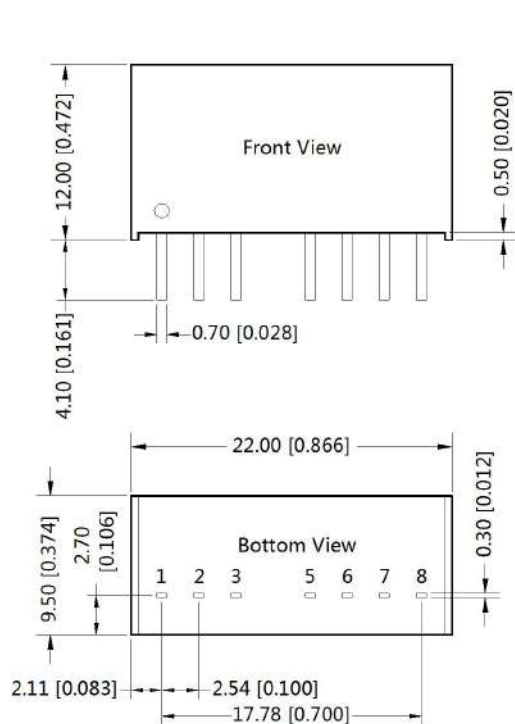
Fig. 4 Parameter description

Model	$V_{in}:24V$
FUSE	Choose according to actual input current
$C0, C4$	330 $\mu F/50V$
$C1, C2$	10 $\mu F/50V$
$C3$	22 $\mu F/50V$
LCM1	1.4-1.7mH (TN150P-RH12.7*12.7*7.9)
$CY1, CY2$	1nF/2000VDC

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

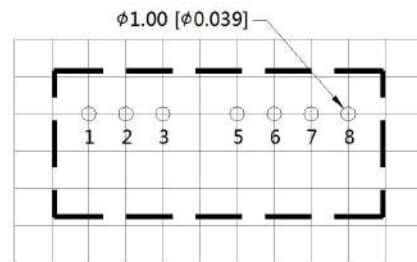
5. For more information please find DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin section tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$

THIRD ANGLE PROJECTION



Pin-Out	
Pin	Function
1	GND
2	V_{in}
3	Ctrl
5	NC
6	$+V_{o}$
7	0V
8	NC

NC: Pin to be isolated from circuitry

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number : 58210004;
2. The maximum capacitive load offered were tested at 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 Company's corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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