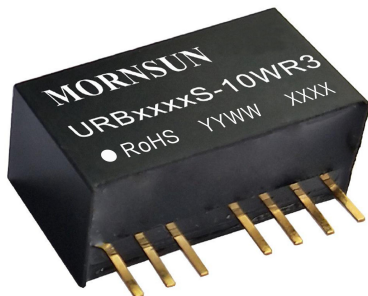


10W isolated DC-DC converter in SIP package
Ultra-wide input and regulated single output



Patent Protection



EN62368-1

RoHS



BS EN62368-1

FEATURES

- Ultra-wide 4:1 input voltage range
- High efficiency up to 88%
- I/O isolation test voltage 1.5k VDC
- High power density
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40°C to +85°C/-40°C to +105°C
- Compact SIP package
- Industry standard pin-out

URB_S-10WR3 series of isolated 10W DC-DC converter products have an ultra-wide 4:1 input voltage and feature efficiencies of up to 88%, input to output isolation is tested with 1500VDC and the converters safely operate in an ambient temperature of -40°C to +85°C/-40°C to +105°C, input under-voltage protection, output short-circuit, over-current protection and they are widely used in applications such as medical care, industrial control, electric power, instruments and communication fields.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency ^② (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max. ^①	Voltage(VDC)	Current (mA) Max./Min.		
EN/BS EN	URB2403S-10WR3	24 (9-36)	40	3.3	2400/0	82/84	2200
	URB2405S-10WR3			5	2000/0	85/87	2200
	URB2409S-10WR3			9	1111/0	85/88	680
	URB2412S-10WR3			12	833/0	86/88	470
	URB2415S-10WR3			15	667/0	86/88	330
	URB2424S-10WR3			24	417/0	85/87	220
—	URB4803S-10WR3	48 (18-75)	80	3.3	2400/0	82/84	2200
	URB4805S-10WR3			5	2000/0	86/88	2200
	URB4812S-10WR3			12	833/0	85/87	470
	URB4824S-10WR3			24	417/0	84/86	220
	URB4828S-10WR3			28	360/0	84/86	200

Notes:

① Exceeding the maximum input voltage may cause permanent damage;

② Efficiency is measured at nominal input voltage and rated output load.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	24VDC nominal input series	3.3VDC Output	—	389/25	398/45	mA
		5VDC Output	—	474/25	485/45	
		Others	—	474/9	485/18	
	48VDC nominal input series	3.3VDC Output	—	777/15	796/25	
		Others	—	969/15	992/25	
Reflected Ripple Current			—	50	—	
Surge Voltage (1sec. max.)	24VDC nominal input series		-0.7	—	50	VDC
	48VDC nominal input series		-0.7	—	100	
Start-up Voltage	24VDC nominal input series		—	—	9	
	48VDC nominal input series		—	—	18	

Input Under-voltage Protection	24VDC nominal input series	5.5	6.5	--	VDC
	48VDC nominal input series	13	16	--	
Input Filter		Capacitance Filter			
Hot Plug		Unavailable			
Ctrl*	Module on	Ctrl pin open or pulled high (3.5-12VDC)			
	Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off	--	6	10	mA
Note: * The Ctrl pin voltage is referenced to input GND.					

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy ^①	5% -100% load	24VDC nominal input series	--	±1.5	±2	%
	0% -100% load	48VDC nominal input series	--	±1.5	±3	
Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
Load Regulation ^②	5% -100% load		--	±0.5	±1.5	
Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
Transient Response Deviation	25% load step change, nominal input voltage	3.3V/5VDC output	--	±5	±8	%
		Others	--	±3	±5	
Temperature Coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise ^③	20MHz bandwidth, 5% -100% load	24VDC nominal input series	--	75	150	mVp-p
		48VDC nominal input series	--	100	250	
Over-current Protection	Input voltage range		110	160	230	%Io
Short-circuit Protection			Continuous, self-recovery			

Note: ① Under 0%-5% load conditions, the 24VDC nominal input series maximum output voltage accuracy is ±3%;
 ② Load regulation for 0%-100% load is ±3%;
 ③ Under 0% -5% load conditions, ripple & noise does not exceed 300mV, please refer to Fig.2 for testing method.

General Specification

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.		1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	M Ω
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	1000	--	pF
Operating Temperature	See Fig. 1	24VDC nominal input series	-40	--	+85	℃
		48VDC nominal input series	-40	--	+105	
Storage Humidity	Non-condensing		5	--	95	%RH
Storage Temperature			-55	--	+125	℃
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	+300	
Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency *	PWM mode		--	400	--	kHz
MTBF	MIL-HDBK-217F@25℃		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 plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions		22.00 x 9.50 x 12.00 mm
Weight	24VDC nominal input series	5.5 g (Typ.)
	48VDC nominal input series	5.8g (Typ.)
Cooling method		Free air convection (20LFM)

Electromagnetic compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig.4/5-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig.4/5-② for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact $\pm 6\text{kV}$	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2\text{kV}$ (see Fig.4/5-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line $\pm 2\text{kV}$ (see Fig.4/5-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 V _{r.m.s}	perf. Criteria A

Typical Characteristic Curves

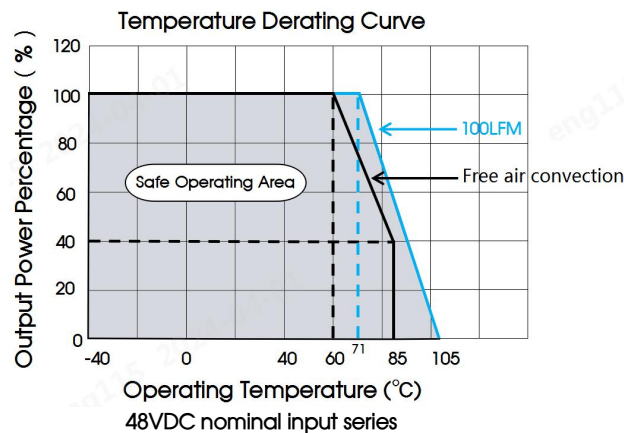
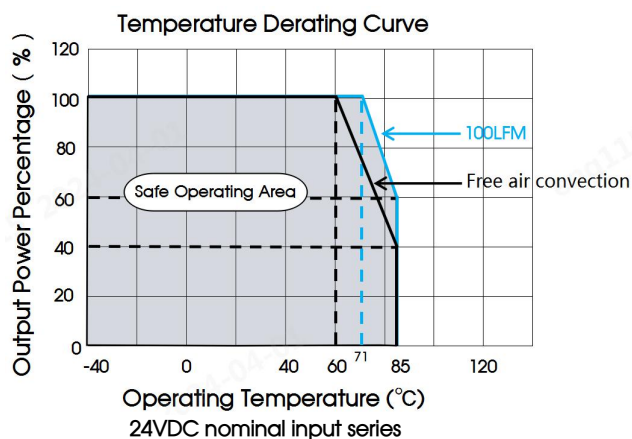
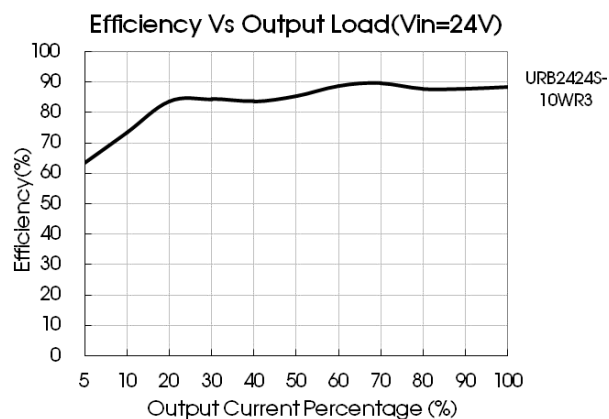
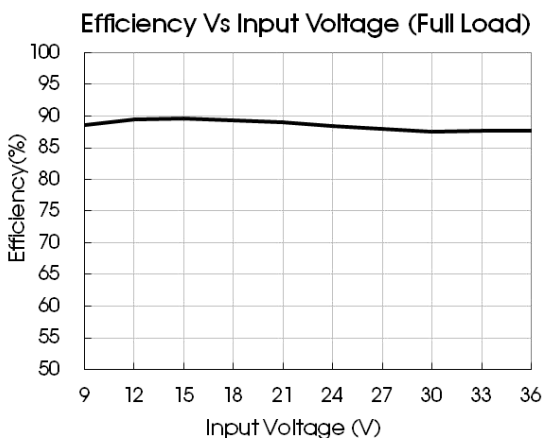
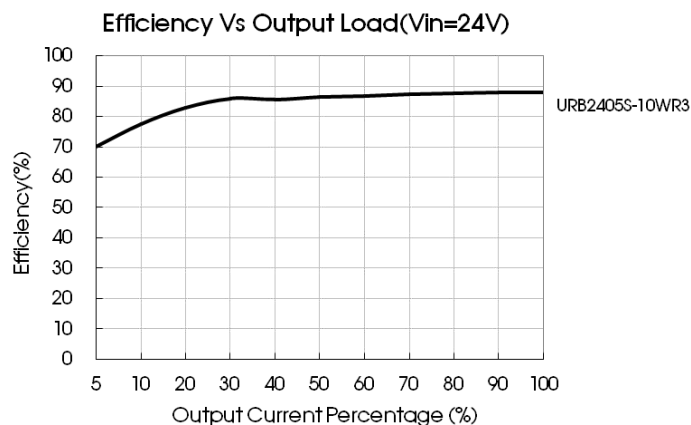
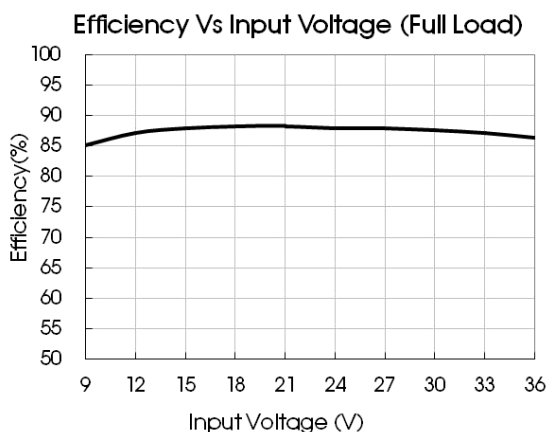


Fig. 1



Design Reference

1. Ripple & Noise

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Please keep the wire of probe to copper as short as possible.

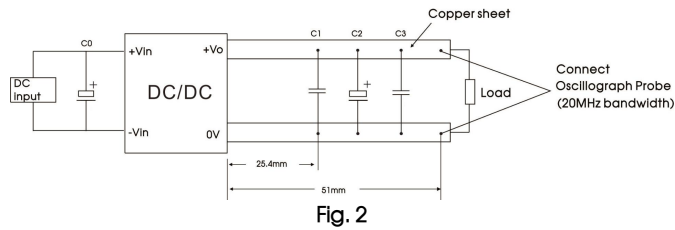


Fig. 2

Vin	C0	Vout	C1	C2	C3
24VDC	47μF /100V	3.3/5/9VDC	1μF/16V	10μF/16V	22μF/16V
		12/15VDC	1μF/25V	10μF/25V	22μF/25V
		24VDC	1μF/50V	10μF/50V	22μF/50V
48VDC	100μF /100V	3.3/5VDC	1μF/16V	10μF/16V	22μF/16V
		12VDC	1μF/25V	10μF/25V	22μF/25V
		24/28VDC	1μF/50V	10μF/50V	22μF/50V

2. Typical application

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the max. capacitive load value of the product.



Fig. 3

Vin	Cin	Vout	Cout
24VDC	47μF/100V	3.3/5/9VDC	22μF/16V
		12/15VDC	22μF/25V
		24VDC	22μF/50V
48VDC	100μF/100V	3.3/5VDC	22μF/16V
		12VDC	22μF/25V
		24/28VDC	22μF/50V

3. EMC compliance circuit

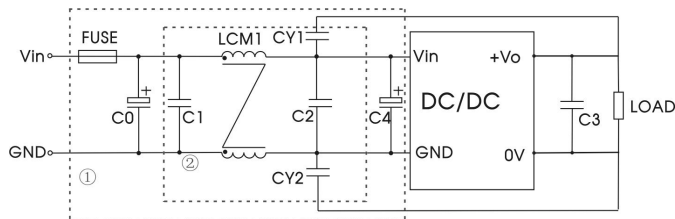


Fig. 4

Notes: For EMC tests we use Part ① in Fig. 4 for immunity and part ② for emissions test. Selecting based on needs.

Parameter description:

Model	Vin: 24VDC
FUSE	Choose according to actual input current
C0/C4	330μF/50V
C1/C2	10μF/50V
C3	Refer to the Cout in Fig.2
LCM1	470μH, recommended to use MORNSUN's FL2D-13-471R3
CY1/CY2	1nF/2000VDC

Parameter description:

Model	Vin: 48VDC
FUSE	Choose according to actual input current
C0、C4	560μF/100V
C1	10μF/100V
C2	10μF/100V
C3	27μF/100V
C5	Refer to the Cout in Fig.2
LDM1	4.7μH
LCM2	1mH, recommended to use MORNSUN's FL2D-10-102B
CY1、CY2	1nF/400VAC

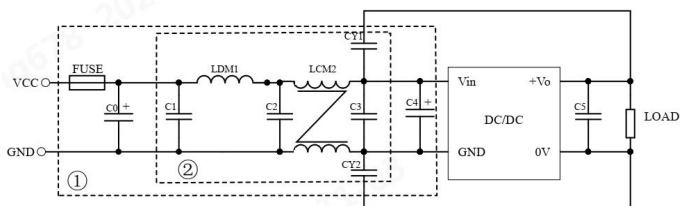


Fig. 5

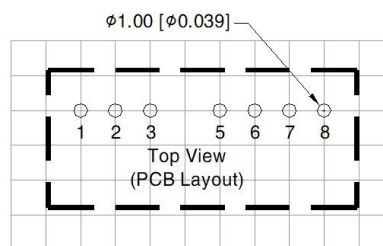
Notes: For EMC tests we use Part ① in Fig. 5 for immunity and part ② for emissions test. Selecting based on needs.

4. The products do not support parallel connection of their output

5. For additional information please refer to DC-DC converter application notes on

www.mornsun-power.com

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	GND
2	Vin
3	Ctrl
5	NC
6	+Vo
7	0V
8	NC

NC: Pin to be isolated from circuitry

Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.50 [± 0.020]

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging 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 Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on company 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.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com