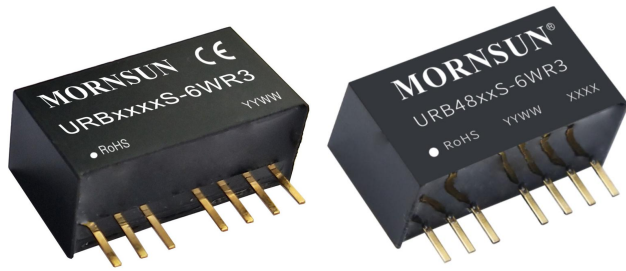


6W isolated DC-DC converter wide input and regulated single output SIP package



Patent Protection RoHS



EN62368-1 BS EN62368-1

FEATURES

- Wide 4:1 input voltage range
- High efficiency up to 87%
- No-load power consumption bottom 0.12W
- I/O isolation test voltage 1.6k VDC
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40°C to +105°C
- Small SIP packaging
- International Standard Pin out

URB_S-6WR3 series are isolated 6W DC-DC converter products with a 4:1 input voltage range. They feature efficiencies of up to 87%, 1600VDC input to output isolation, operating ambient temperature of -40°C to +105°C, input under-voltage protection, output over-current, short-circuit protection, which is widely used in medical, industrial controls, electricity, instrumentation, communications and other 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-6WR3	24 (9-36)	40	3.3	1350/0	76/78	1800
	URB2405S-6WR3			5	1200/0	80/82	1000
	URB2409S-6WR3			9	667/0	82/84	470
	URB2412S-6WR3			12	500/0	84/86	470
	URB2415S-6WR3			15	400/0	85/87	220
	URB2424S-6WR3			24	250/0	83/85	100
/	URB4803S-6WR3	48 (18-75)	80	3.3	1600/0	76/79	1200
	URB4805S-6WR3			5	1200/0	80/83	680
	URB4809S-6WR3			9	667/0	82/84	330
	URB4812S-6WR3			12	500/0	84/86	330
	URB4815S-6WR3			15	400/0	85/87	150
	URB4824S-6WR3			24	250/0	85/87	68

Notes:

① Exceeding the maximum input voltage may cause permanent damage;

② The above efficiency values are measured within 10 seconds of starting the product under the nominal input voltage and output rated load.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Input Current (full load /no load)	24VCD nominal input series nominal input voltage	3.3V Ouput	--	238/5	245/12	mA
		Others	--	305/5	313/12	
	48VCD nominal input series nominal input voltage	3.3V, 5V Ouput	--	158/5	165/12	
		Others	--	143/10	156/16	
Reflected Ripple Current		--	50	--		
Surge Voltage (1sec. max.)	24VCD nominal input series	-0.7	--	50	VDC	
	48VCD nominal input series	-0.7	--	100		

Start-up Voltage	24VCD nominal input series	--	--	9	
	48VCD nominal input series	--	--	18	
Input Under-voltage Protection	24VCD nominal input series	5.5	6.5	--	
	48VCD nominal input series	13	14.5	--	
Input Filter		Capacitive filter			
Hot Plug		Unavailable			
Ctrl *	Module on	Ctrl pin open or pulled high (TTL 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	
Output Voltage Accuracy	24VCD nominal input series	--	±1	±2	%	
	48VCD nominal input series			±3		
Linear Regulation	Input voltage variation from low to high at full load	--	±0.5	±1		
Load Regulation ^①	5%-100% load	--	±0.5	±1.5		
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 ^②	20MHz bandwidth, 5%-100% load.	--	50	100	mV p-p	
Over-current Protection	Input voltage range	110	160	230	%Io	
Short-circuit Protection		Continuous, self-recovery				

Note:
 ① Under 0%-5% load, the maximum output voltage accuracy is ±3%;
 ② Load regulation for 0%-100% load is ±3%;
 ③ Ripple & Noise at < 5% load is 150mV_o max. The "parallel cable" method is used for ripple and noise test, please refer to *DC-DC Converter Application Notes* for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1600	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	1000	--	pF
Operating Temperature	See Fig. 1	-40	--	+105	°C
Storage Humidity	Non-condensing	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		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency *	PWM mode	--	500	--	kHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	k hours

Note: *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 branch (UL94 V-0)
Dimensions	22 x 9.50 x 12.00mm
Weight	4.7g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (24VDC nominal input series: See Figure 4-② for the recommended circuit; 48VDC nominal input series: See Figure 5-① for the recommended circuit;)
	RE	CISPR32/EN55032 CLASS B (24VDC nominal input series: See Figure 4-② for the recommended circuit; 48VDC nominal input series: See Figure 5-① for the recommended circuit;)
Immunity	ESD	IEC/EN61000-4-2 Contact $\pm 4\text{kV}$ perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m perf. Criteria A
	EFT	IEC/EN61000-4-4 $\pm 2\text{kV}$ (24VDC nominal input series: See Figure 4-① for the recommended circuit; 48VDC nominal input series: See Figure 5-① for the recommended circuit;) perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line $\pm 2\text{kV}$ (24VDC nominal input series: See Figure 4-① for the recommended circuit; 48VDC nominal input series: See Figure 5-① for the recommended circuit;) perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s perf. Criteria A

Typical Characteristic Curves

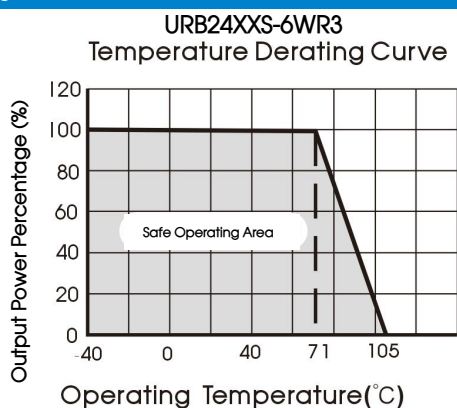


Fig. 1

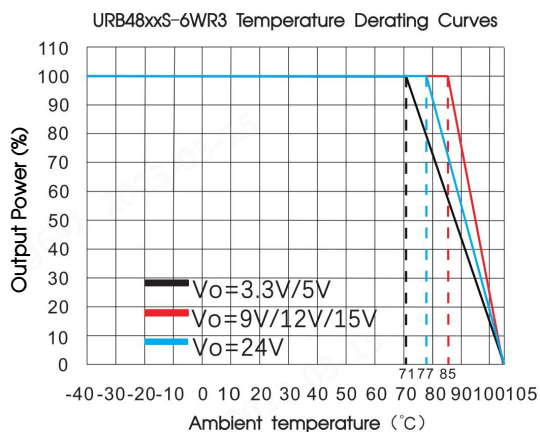


Fig. 1-①

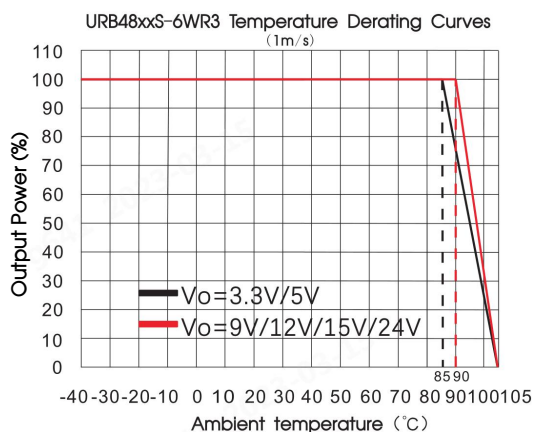


Fig. 1-②

Design Reference

1. Ripple & noise

The general performance of all DC/DC converters of this series is tested in accordance with the test circuit recommended in Figure 2 before leaving the factory. Figure 3 is used for ripple noise test.



Fig. 2

	Cin	Vo(VDC)	Cout	Cout0	Cout1
Vin:24VDC	100μF/100V	3.3/5/9	22μF/16V	1μF/50V	10μF/50V Tantalum Capacitors
		12/15	22μF/25V	1μF/50V	10μF/50V Tantalum Capacitors
		24	22μF/50V	1μF/50V	10μF/50V Tantalum Capacitors
Vin:48VDC	100μF/100V	3.3/5	22μF/16V	1μF/50V	10μF/50V Tantalum Capacitors
		9/12/15/24	10μF/50V	1μF/50V	10μF/50V Tantalum Capacitors

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 specified max. capacitive load value of the product.



Fig. 3

	Cin	Vo(VDC)	Cout
Vin:24VDC	100μF/100V	3.3/5/9	22μF/16V
		12/15	22μF/25V
		24	22μF/50V
Vin:48VDC	100μF/100V	3.3/5	22μF/16V
		9/12/15/24	10μF/50V

3. EMC compliance circuit

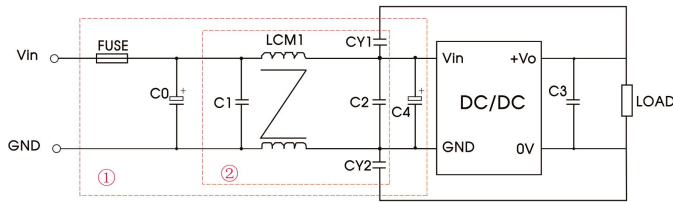


Fig. 4

Notes: We use Part ① in Fig. 4 for Immunity test and part ② for Emissions test. Selecting based on needs.

Parameter description:

Model	Vin: 24VDC
FUSE	Choose according to actual input current
C0/C4	330 μ F/50V
C1/C2	10 μ F/50V
C3	22 μ F/50V
LCM1	470 μ H, recommended to use MORNSUN's FL2D-13-471R3
CY1/CY2	1nF/400VAC

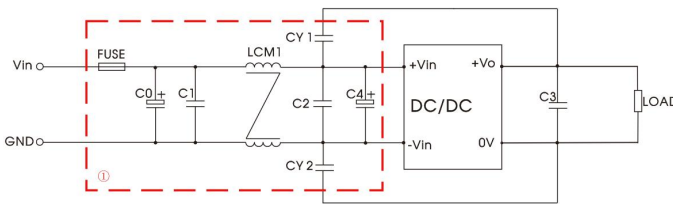



Fig. 5

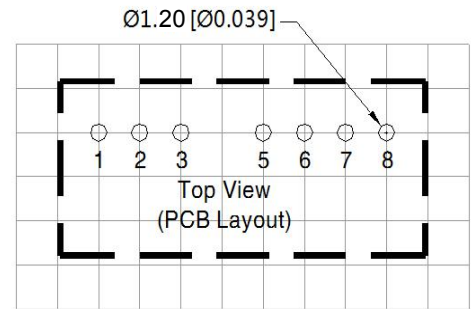
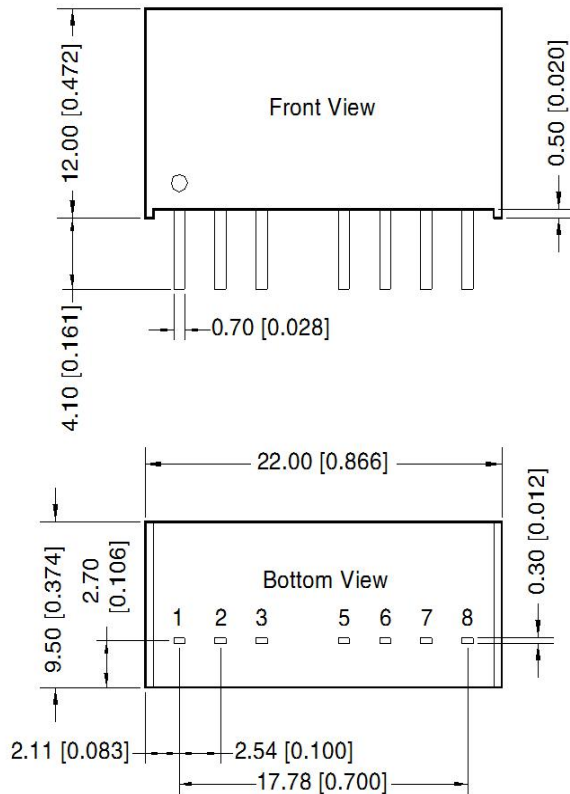
Notes: For EMC and EMI tests we use Part ① in Fig. 5

Parameter description:

Model	Vin: 48VDC
FUSE	Choose according to actual input current
C0	200 μ F/100V
C1/C2	10 μ F/100V
C3	22 μ F/100V
LCM1	470 μ H, recommended to use MORNSUN's FL2D-13-471R3
C4	330 μ F/100V
CY1/CY2	1nF/400VAC

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



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]

Note:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210004;
- The maximum capacitive load offered were tested at input voltage range and full load;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75%RH with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- The products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified companies.

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