3W, Ultra wide input isolated & regulated single output DC/DC converter





cULus CB CE Patent Protection RoHS

FEATURES

- Wide range of input voltage (4:1)
- Efficiency up to 84%
- No-load power consumption as low as 0.12W
- Isolation voltage:1.5K VDC
- Input under-voltage protection, output over-
- current protection, short-circuit protection
- Operating temperature range: -40℃ to +85℃
- Low ripple & noise
- International standard pin-out
- Meet IEC60950, UL60950,EN60950 standards

URB_MT-3WR3 series products are of 3W output power, extremely wide range of voltage input of 9-36VDC, 18-75VDC, isolation voltage of 1500VDC, output short circuit protection, 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		Efficiency② (%,Typ.) @ Full Load	Max. Capacitive Load(μF)
		Nominal (Range)	Max.①	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
CE/UL/CB	URB2405MT-3WR3	24 (9-36)	40	5	600/0	78/80	2200
	URB2412MT-3WR3			12	250/0	80/82	680
	URB2415MT-3WR3			15	200/0	81/83	470
	URB2424MT-3WR3			24	125/0	80/82	100
--	URB4815MT-3WR3	48 (18-75)	80	15	200/0	82/84	470

Notes:
①Exceeding the maximum input voltage may cause permanent damage;
②The efficiency value is measured in the input nominal voltage and output rated load.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC input	--	158/4	173/6	mA
	48VDC input	--	79/3	81/5	
Reflected Ripple Current	24VDC input	--	120	--	
	48VDC input	--	60	--	
Input impulse Voltage (1sec. max.)	24VDC input	-0.7	--	50	VDC
	48VDC input	-0.7	--	100	
Starting Voltage	24VDC input	--	--	9	
	48VDC input	--	--	18	
Input under-voltage protection	24VDC input	5.5	6.5	--	
	48VDC input	13	15.5	--	
Starting Time	Nominal input& constant resistance load	--	10	--	ms
Input Filter		C filter			
Ctrl*	Module turn-on	Ctrl pin floating or connected to TTL high level(3.5-12VDC)			
	Module turn-off	Ctrl pin connected to GND or low level(0-1.2VDC)			
	Input current when switched off	--	6	10	mA
Hot Plug		Unavailable			

Note: *The voltage of Ctrl pin is relative to input pin GND.

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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	0%-100% load	--	±0.5	±1	
Transient Recovery Time	25% load step change	--	300	500	μs
Transient Response Deviation		--	±3	±5	%
Temperature Coefficient	Full load	--	--	±0.03	%/℃
Ripple & Noise*	20MHz bandwidth,5%-100% load	--	30	120	mV p-p
Over-current Protection	Input voltage range	--	150	250	%Io
Short circuit Protection		Hiccup protection			

Note: *Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.
0%-5% load ripple&Noise is no more than 5%Vo.

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	1500	--	--	VDC
Insulation 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℃ (see Fig. 1)	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Casing Temperature Rise	Ta=25℃, nominal input, full load output	--	+65	--	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	+300	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature		Peak temp.≤245℃, maximum duration time≤60s at 217℃. For actual application, please refer to IPC/JEDEC J-STD-020D.1.			
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
Switching Frequency*	PWM Mode	--	350	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours

Note:*This series of products using lower frequency technology, the switching frequency value is the test value in full load, when the load is reduced to 50% or less the switching frequency decreases with decreasing load.

Physical Specifications

Casing Material	Black flame-retardant heat-proof plastic
Dimensions	19.20*18.10*10.16 mm
Weight	3.50g(Typ.)
Cooling Method	Free convection

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS B (see Fig.3-② for recommended circuit)	
	RE	CISPR22/EN55022	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

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Product Characteristic Curve

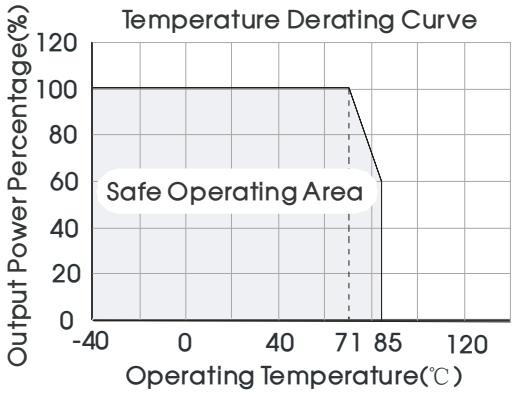
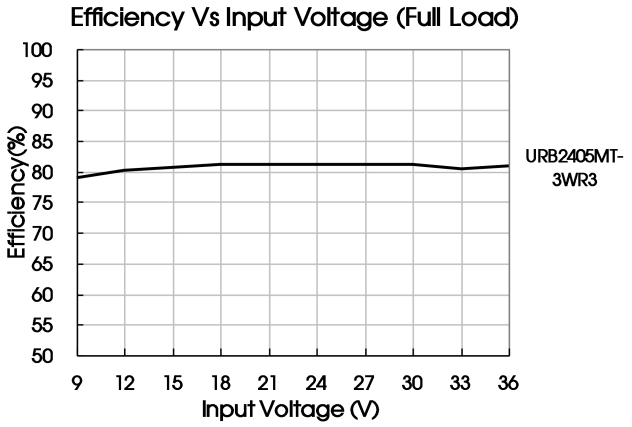
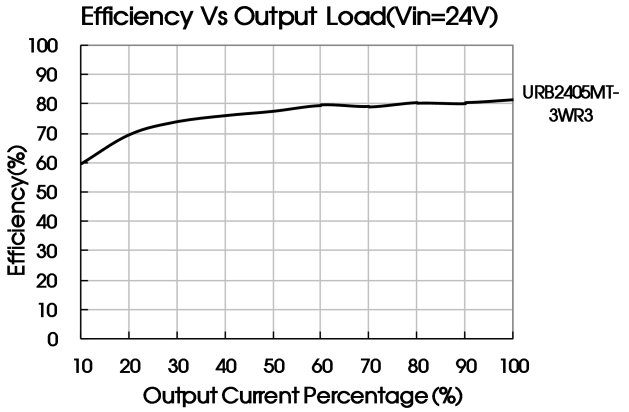
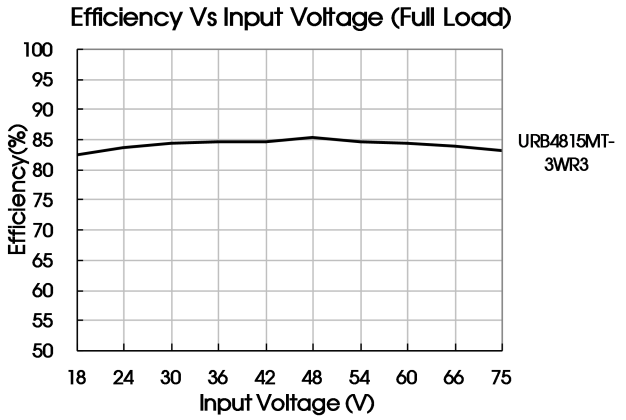
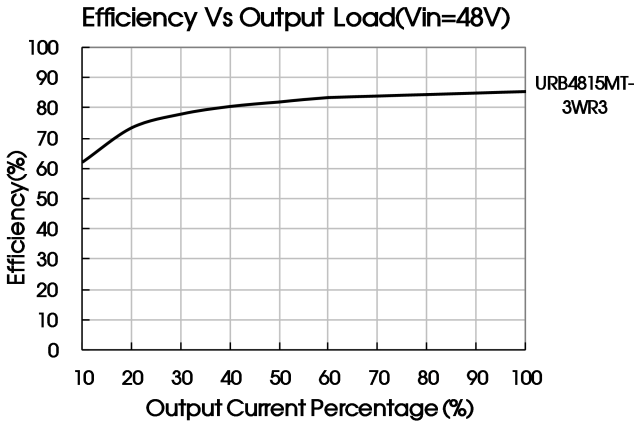


Fig. 1









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.

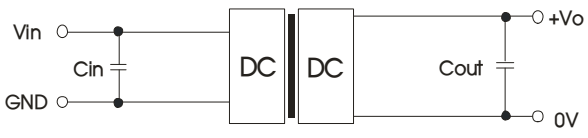


Fig. 2

Vn	Cin	Cout
24VDC	100μF	10μF
48VDC	10μF ~47μF	10μF

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2. EMC solution-recommended circuit

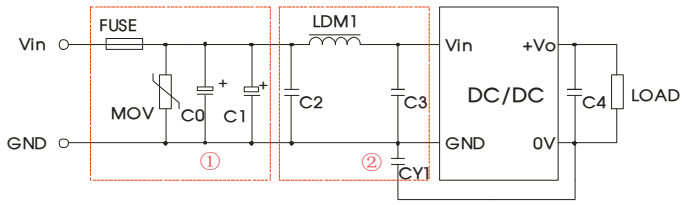


Fig. 3

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,C1	330μF/50V	330μF/100V
C2,C3	4.7μF/50V	4.7μF/100V
C4	Refer to the Cout in Fig.2	
LDM1	12μH	
CY1	1nF/2KV	

EMC solution-recommended circuit PCB layout

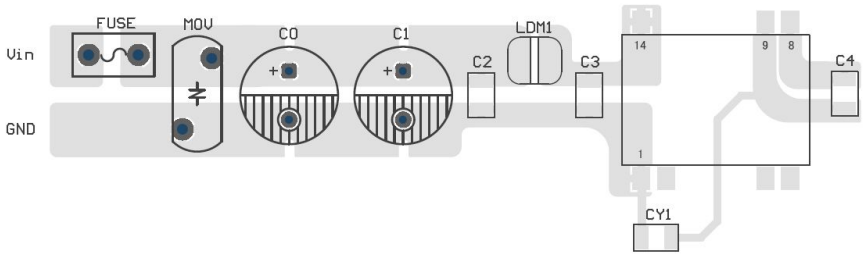


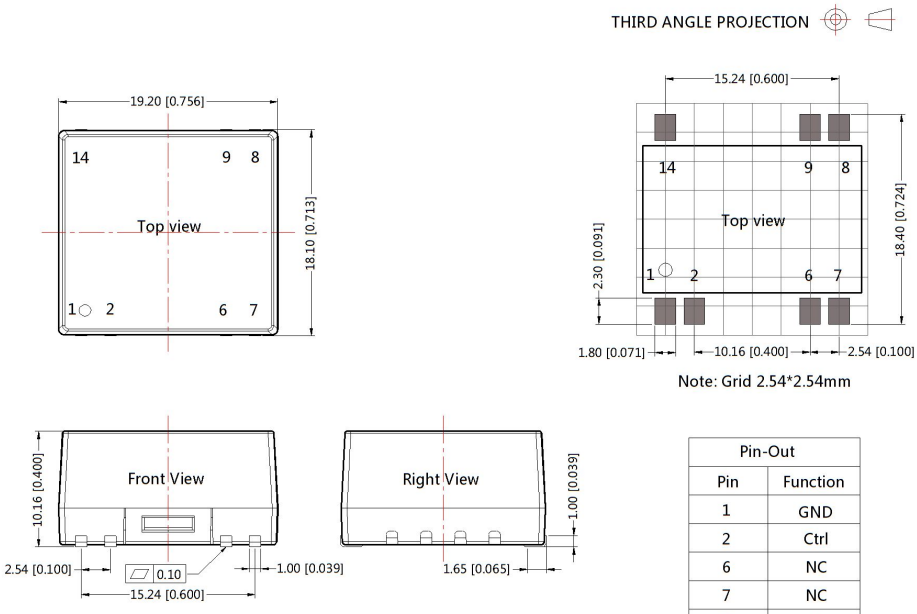
Fig. 4

Note: the min. distance of the bonding pads between input & output isolation capacitors (CY1) shall be ⩾ 2mm.

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

4. For more information about Mornsun EMC Filter products, please visit www.mornsun-power.com to download the Selection Guide of EMC Filter

Dimensions and Recommended Layout



Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	GND
2	Ctrl
6	NC
7	NC
8	+Vo
9	0V
14	Vin

NC: No Connection

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

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Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Tube Packing Bag Number : 58010114, Reel Packing Bag Number : 58010115 ;
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 max. capacitive load should be tested within the input voltage range and under full load conditions;
4. If the product needs to be cleaned after welding, please wait to completely dried before electrical use it;
5. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25℃, 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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