

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



UL[®] CE Patent Protection RoHS

FEATURES

- Ultra wide input voltage range (4:1)
- High efficiency up to 84%
- No-load power consumption as low as 0.10W
- Isolation voltage: 1.5K VDC
- Input under-voltage protection, output short-circuit protection, over-current protection
- Operating temperature range: -40°C to +85°C
- International standard pin-out
- UL60950, EN60950 approved

URB_MT-3WR3 series products are of 3W output power, ultra wide range of voltage input of 9-36VDC, 18-75VDC, isolation voltage of 1500VDC, input under-voltage protection, output short circuit protection, over-current 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		Efficiency ² (%, Min./Typ.) @ Full Load	Max. Capacitive Load(μF)
		Nominal (Range)	Max. ^①	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
--	URB2403MT-3WR3	24 (9-36)	40	3.3	728/0	73/75	2200
UL /CE	URB2405MT-3WR3			5	600/0	78/80	2200
--	URB2409MT-3WR3			9	333/0	78/80	1000
UL/ CE	URB2412MT-3WR3			12	250/0	80/82	680
	URB2415MT-3WR3			15	200/0	81/83	470
	URB2424MT-3WR3			24	125/0	80/82	100
CE	URB4803MT-3WR3	48 (18-75)	80	3.3	728/0	73/75	2200
	URB4805MT-3WR3			5	600/0	77/79	2200
	URB4812MT-3WR3			12	250/0	80/82	680
	URB4815MT-3WR3			15	200/0	82/84	470
	URB4824MT-3WR3			24	125/0	80/82	100

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)	3.3V Output	--	134/4	138/7	mA
	24V Output	--	152/4	156/12	
	Others	--	154/4	161/7	
	48VDC Input series nominal input voltage	3.3V Output	67/4	69/7	
	Others	--	77/4	82/7	
Reflected Ripple Current	Nominal 24VDC input series	--	120	--	VDC
	Nominal 48VDC input series	--	60	--	
Surge Voltage (1sec. max.)	Nominal 24VDC input series	-0.7	--	50	
	Nominal 48VDC input series	-0.7	--	100	
Starting Voltage	Nominal 24VDC input series	--	--	9	
	Nominal 48VDC input series	--	--	18	
Input Under-voltage Protection	Nominal 24VDC input series	5.5	6.5	--	
	Nominal 48VDC input series	13	15.5	--	
Starting Time	Nominal input voltage & 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.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±3	%
Line Regulation	Full load, the input voltage is from low to high	--	±0.2	±0.5	
Load Regulation	0%-100% load	--	±0.5	±1	
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*	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
Isolation	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 Temperature		-55	--	+125	
Case Temperature Rise	Ta=25°C, nominal input voltage, full load output	--	+40	--	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the case, 10 seconds	--	--	+300	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature		Peak temp. ≤245°C, maximum duration time ≤60s at 217°C. 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°C	1000	--	--	K hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1			

Note: *Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Physical Specifications

Case Material	Black flame-retardant heat-proof plastic
Dimensions	19.20 × 18.10 × 10.16 mm
Weight	3.5g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig.3-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig.3-② for 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	$\pm 2\text{KV}$ (see Fig.3-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line $\pm 2\text{KV}$ (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

Typical Characteristic Curves

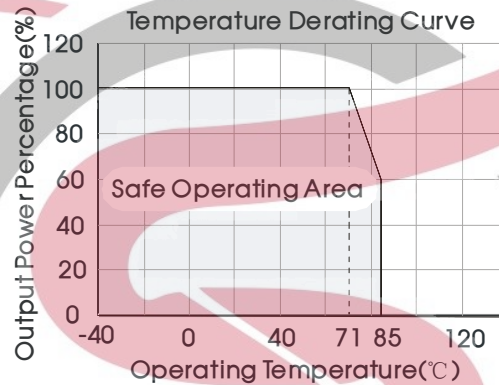
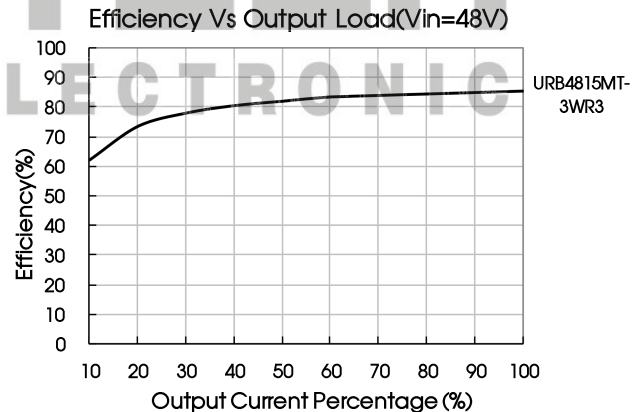
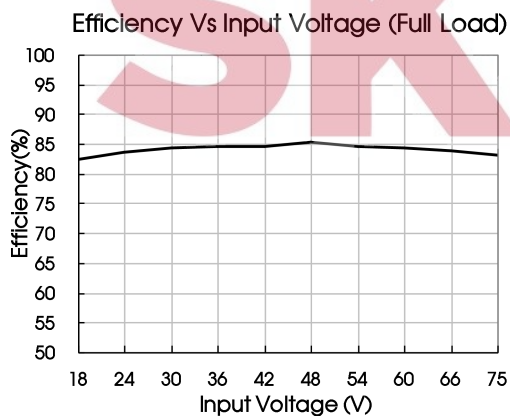
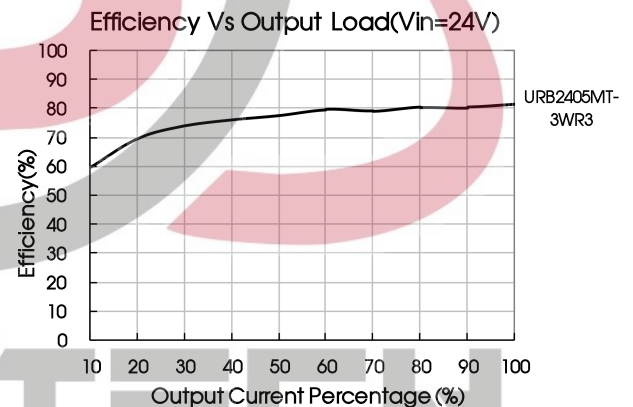
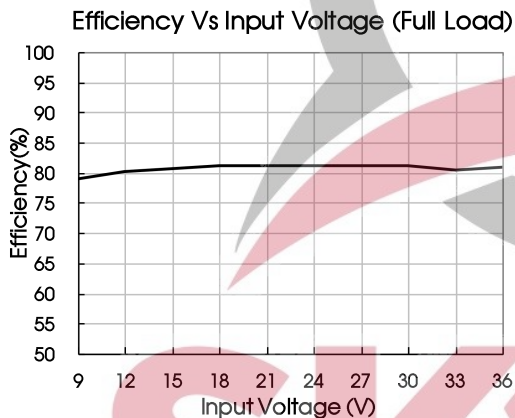


Fig. 1



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 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.

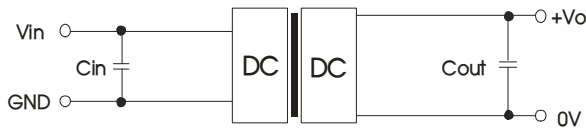


Fig. 2

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

2. EMC solution-recommended circuit

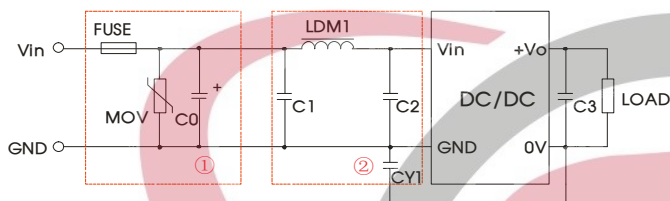


Fig. 3

Notes: Part ① in the Fig. 3 is used for immunity test and part ② for emissions filtering; Selecting based on needs.

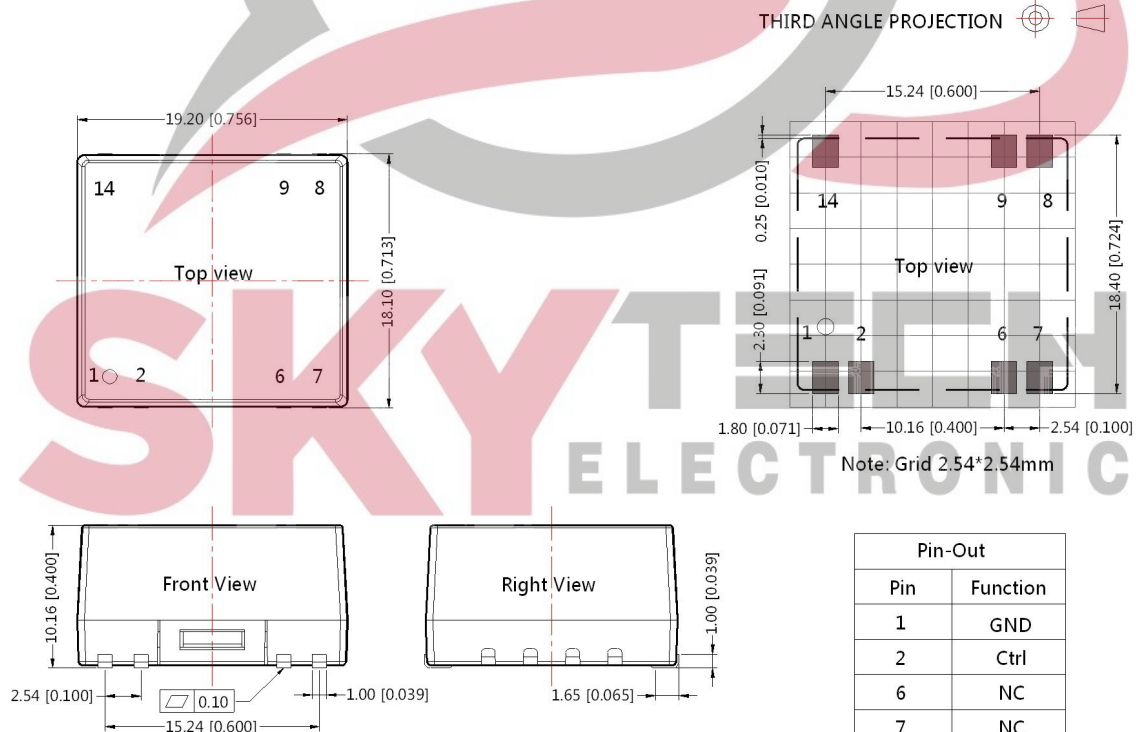
Parameter description

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	680μF/50V	680μF/100V
C1,C2	4.7μF/50V	4.7μF/100V
C3	Refer to the Cout in Fig.2	
LDM1	12μH	
CY1	1nF/2KV	

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

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

NC: Pin to be isolated from circuitry



Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Tube Packaging bag number: 58010114, Roll Packaging bag number: 58010115;
2. We suggest to use module at load of over 5%, if not, the ripple of the product may exceeds the specification, but does not affect the reliability of the product;
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 corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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