DC/DC Converter
SURB_MT-3WR3 Series

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

3 years Warranty

c UL us CE CB 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℃ to +85℃
- International standard pin-out
- IEC60950 , UL60950 , EN60950 approval

SURB_MT-3WR3series products are of 3W output power, extremely 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		Efficiency② (%, Min./Typ.) @ Full Load	Max. Capacitive Load(μF)
		Nominal (Range)	Max.①	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
--	SURB2403MT-3WR3	24 (9-36)	40	3.3	728/0	73/75	2200
UL /CE/ CB	SURB2405MT-3WR3			5	600/0	78/80	2200
--	SURB2409MT-3WR3			9	333/0	78/80	1000
UL/ CE/ CB	SURB2412MT-3WR3			12	250/0	80/82	680
	SURB2415MT-3WR3			15	200/0	81/83	470
	SURB2424MT-3WR3			24	125/0	80/82	100
CE	SURB4803MT-3WR3	48 (18-75)	80	3.3	728/0	73/75	2200
	SURB4805MT-3WR3			5	600/0	77/79	2200
	SURB4812MT-3WR3			12	250/0	80/82	680
	SURB4815MT-3WR3			15	200/0	82/84	470
	SURB4824MT-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)	24VDC input series nominal input voltage	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	--	
	Nominal 48VDC input series		--	60	--	
Surge Voltage (1sec. max.)	Nominal 24VDC input series		-0.7	--	50	VDC
	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 voltage to high voltage	--	±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	%/℃
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	see Fig. 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Casing Temperature Rise	Ta=25℃, nominal input voltage, full load output	--	+40	--	
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	3.5g(Typ.)
Cooling Method	Free air convection

EMC Specifications

EMI	CE	CISPR32/EN55032	CLASS B (see Fig.3-② for recommended circuit)	
	RE	CISPR32/EN55032	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	line to line ±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

Product Characteristic Curve

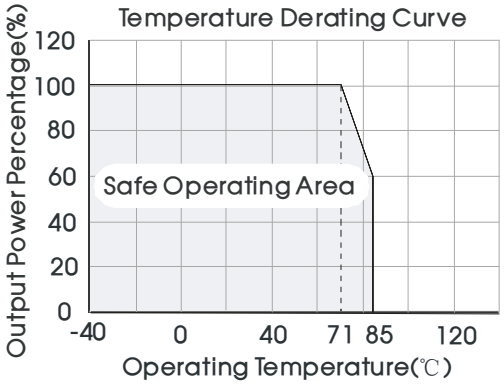
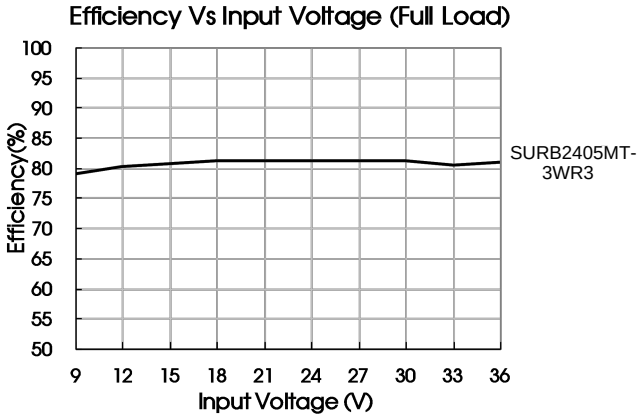
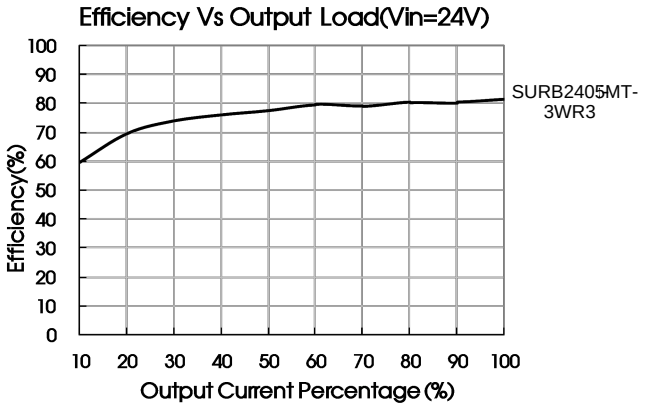
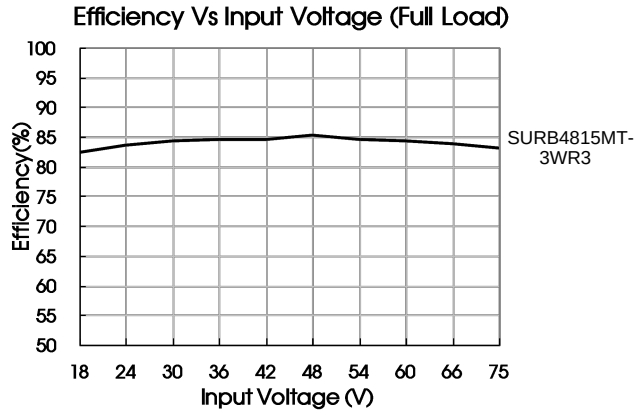
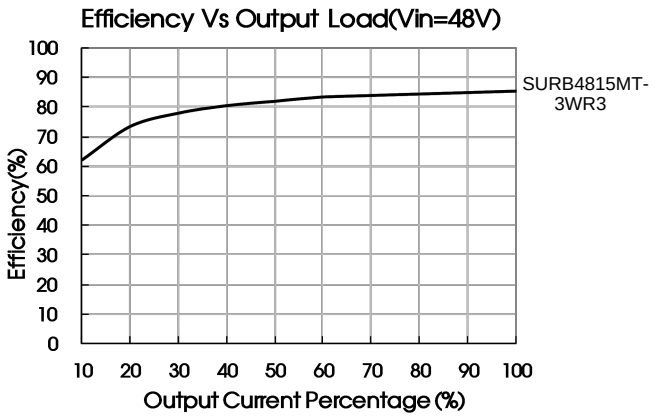


Fig. 1









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.

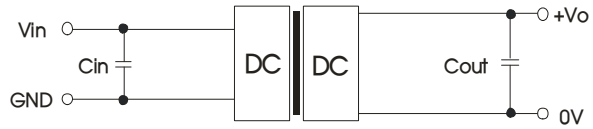


Fig. 2

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

2. EMC solution-recommended circuit

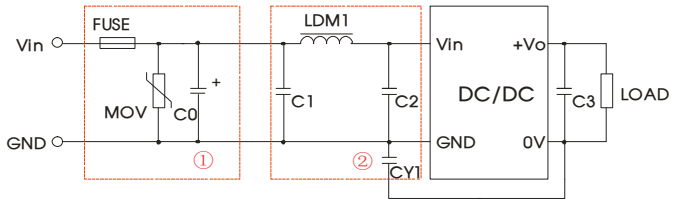


Fig. 3
Notes: Part ① in the Fig. 3 is used for EMS test and part ② for EMI filtering; selected based on needs.

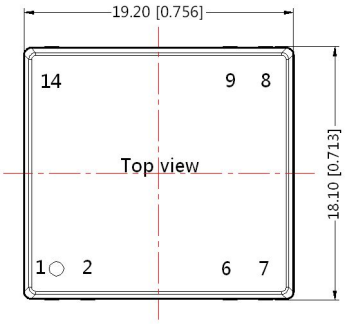
Parameter description

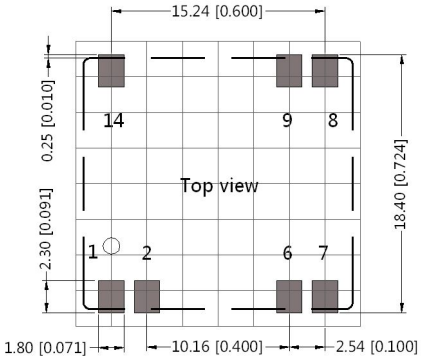
Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	680μF/50V	680μF/100V
C1,C2	4.7μF/50V	4.7μF/100V
C3	Refer to the Cout in Fig.2	
LDM1	12μH	
CY1	1nF/2KV	

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

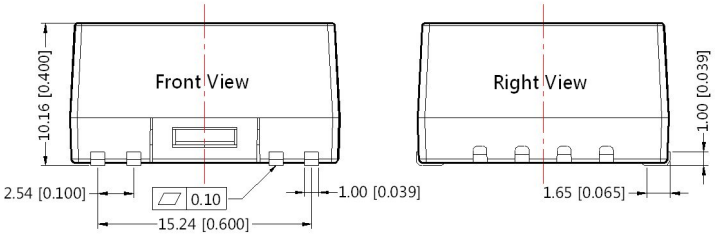
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm



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

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

NC: Pin to be isolated from circuitry

Notes:

1. The max. capacitive load should be tested within the input voltage range and under full load conditions;
2. If the product needs to be cleaned after welding, please wait to completely dried before electrical use it;
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 our Company's corporate standards;
5. We can provide product customization service, please directly contact our technicians for specific information;
6. Specifications of this product are subject to changes without prior notice.