

SCHMID-M

DC/DC Power Supply Module

SURH_P-6WR3 Series



6W, Ultra wide input, isolated & regulated single output, DIP packaging, DC-DC converter



FEATURES

- Ultra wide range of input voltage (4:1)
- Efficiency up to 85%
- No-load power consumption as low as 0.2W
- Enhanced isolation, 6KVDC isolation
- Operating temperature range: -40°C to +85°C
- Input under-voltage protection, output short circuit, over-voltage, over-load protection
- Meets EN60601-1/UL60601-1 certification
- International standard pin-out

SURH_P-6WR3 series products are of 6W output power, extremely ultra wide range of voltage input of 9-36VDC, 18-75VDC, isolation voltage of 6000VDC, output over-voltage protection and output short circuit protection, Meets EN60601-1/UL60601-1 certification; these products are dedicated to medical field. Low no-load power consumption widely used in energy storage system.

Selection Guide

Part No.	Input Voltage (VDC)		Output		Efficiency (%Typ.) @ Full Load	Max. Capacitive Load(μF)
	Nominal (Range)	Max.*	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
SURH2405P-6WR3	24 (9-36)	40	5	1200/60	79/81	2700
SURH2406P-6WR3			6	1000/50	79/81	2200
SURH2409P-6WR3			9	667/33	81/83	1800
SURH2412P-6WR3			12	500/25	82/84	1000
SURH2415P-6WR3			15	400/20	83/85	680
SURH2424P-6WR3			24	250/13	82/84	470
SURH4805P-6WR3	48 (18-75)	80	5	1200/60	79/81	2700
SURH4809P-6WR3			9	667/33	81/83	1800
SURH4812P-6WR3			12	500/25	82/84	1000
SURH4815P-6WR3			15	400/20	83/85	680
SURH4824P-6WR3			24	250/13	82/84	470

Note:*Absolute maximum rating without damage on the converter, but it isn't recommended.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC input	--	308/5	--	mA
	48VDC input	--	154/4	--	
Reflected Ripple Current	24VDC input	--	20	--	mA
	48VDC input	--	20	--	
Input Impulse Voltage (1sec. max.)	24VDC input	-0.7	--	50	VDC
	48VDC input	-0.7	--	100	
Starting Voltage	24VDC input	--	--	9	VDC
	48VDC input	--	--	18	
Input Under-voltage Protection	24VDC input	5.5	6.5	--	VDC
	48VDC input	14	15.5	--	
Input Filter		PI filter			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±3	%
Line Voltage Regulation	Full load, the input voltage is from low voltage to high voltage	--	±0.2	±0.5	
Load Regulation	5%-100% load	--	±0.5	±1	
Transient Recovery Time	25% load step change	--	300	500	μs
Transient Response Deviation		--	±3	±5	%

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Temperature Drift Coefficient	Full load	--	--	±0.03	%/°C
Ripple & Noise*	20MHz bandwidth	--	100	180	mVp-p
Output Over-current Protection		110	150	260	%Io
Output Over-voltage Protection	Input voltage range	110	--	160	%Vo
Output Short circuit Protection		Continuous, self-recovery			

Note: * Ripple and noise tested with "parallel cable" method, oscilloscope using the 1X probe, please see *DC-DC Converter Application Notes* for specific operation methods.

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	6000	--	--	VDC
Insulation Resistance	Input-output, insulation voltage 500VDC	10000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	13	20	pF
Enhanced Isolation	Transformer creepage	5.0	--	--	mm
	Transformer clearance	2.4	--	--	
	PCB creepage & clearance	6.0	--	--	
	Optocoupler creepage	6.0	--	--	
Operating Temperature	Derating if the temperature is $\geq 71^\circ\text{C}$ (see Fig. 1)	-40	--	85	°C
Storage Humidity	Without condensation	5	--	95	%
Storage Temperature		-55	--	125	
Max. Operating Temperature for Casing	Within the operating temperature curve	--	--	105	°C
Lead Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
Switching Frequency*	PWM mode(nominal, full load)	--	300	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

Note:* This series of products using reduced frequency technology, the switching frequency is test value for full load, When the load is reduced to below 50%, the switching frequency decreases with decreasing load.

Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94-V0)
Package Dimensions	31.60*20.30*10.20 mm
Weight	13g(Typ.)
Cooling method	Free air convection

EMC Specifications

EMI	Conducted disturbance	CISPR22/EN55022	CLASS A (Bare component)	
EMS	Electrostatic discharge	IEC/EN61000-4-2	Contact ±6KV Air ±8KV	perf. Criteria B
	EFT	IEC/EN61000-4-4	±2KV (see Fig.3-① for recommended circuit)	perf. Criteria B
	Surge Immunity	IEC/EN61000-4-5	±2KV (see Fig.3-① for recommended circuit)	perf. Criteria B
	Conducted disturbance immunity	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

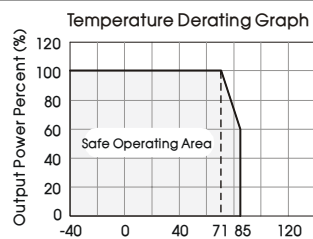
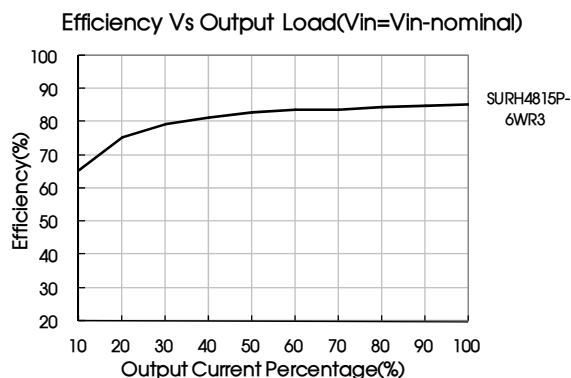
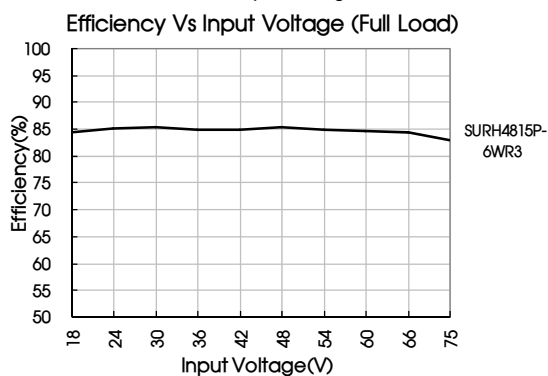
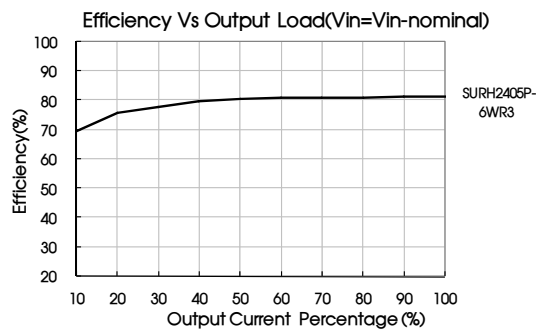
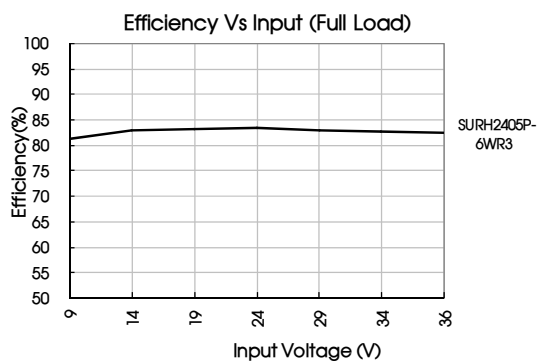


Fig. 1

DC/DC Power Supply Module

SURH_P-6WR3 Series

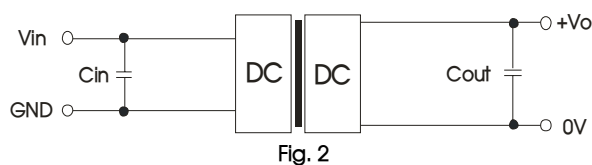


Design Reference

1. Typical application

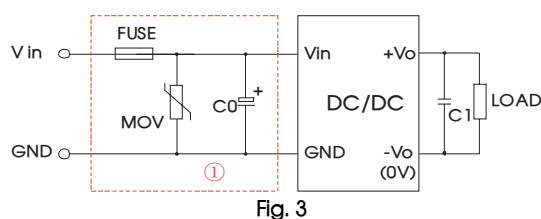
All the DC/DC converters of this series are tested according to the recommended circuit (see Fig. 2) before delivery.

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.



V_{in}	C_{in}	C_{out}
24VDC	100 μ F	10 μ F
48VDC	10 μ F - 47 μ F	10 μ F

2. EMC solution-recommended circuit

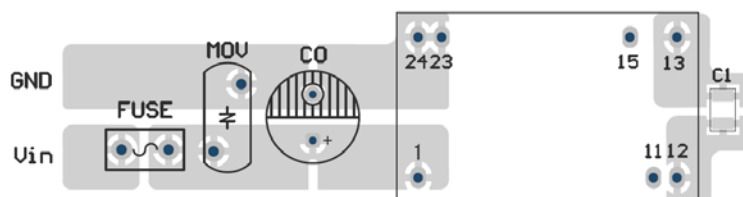


Notes: Part ① in the Fig. 3 is used for EMS test.

Parameter description

Model	V_{in} :24V	V_{in} :48V
FUSE	Choose according to actual input current	
MOV	S14K35	S14K60
C0	330 μ F/50V	330 μ F/100V
C1	Refer to the C_{out} in Fig.2	

EMC solution-recommended circuit PCB layout

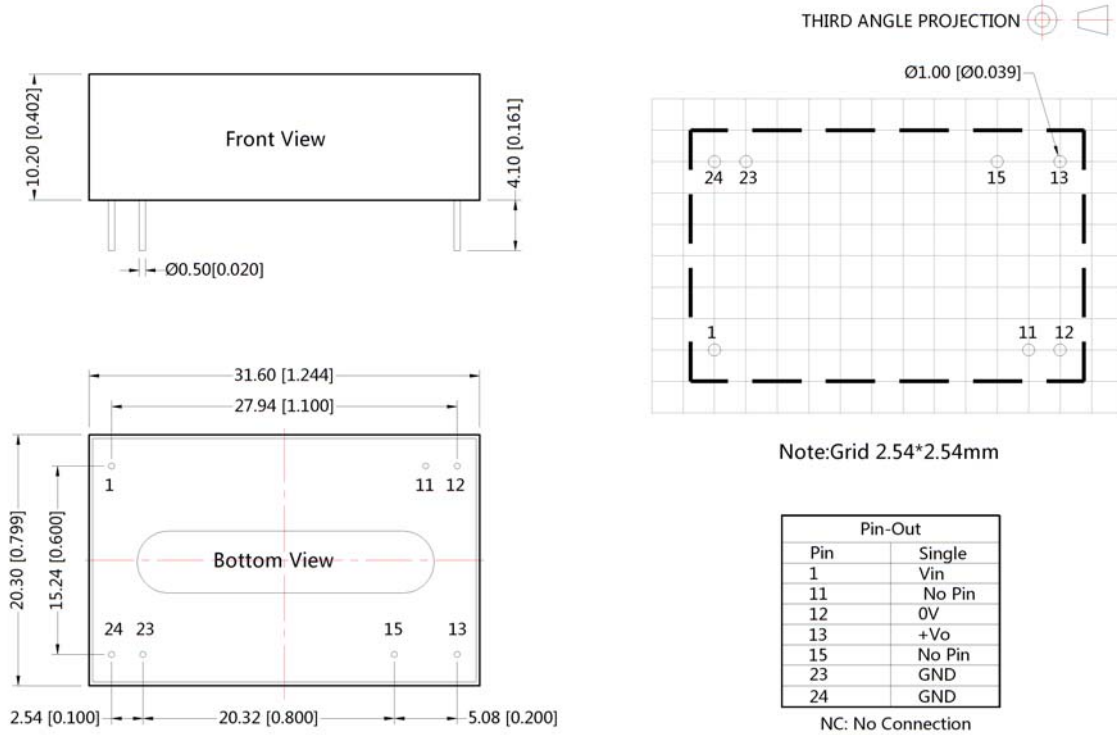


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- The product does not support output in parallel with power per liter or hot-plug use
- For more information Please find the application note on www.schmid-m.com

Dimensions and Recommended Layout



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

1104003403-A0

- Note:
- Packing Information please refer to 'Product Packing Information'. The Packing bag number: 58210008;
 - 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;
 - The max. capacitive load should be tested within the input voltage range and under full load conditions;
 - Unless otherwise specified, data in this datasheet should be tested under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75% when inputting nominal voltage and outputting rated load;
 - All index testing methods in this datasheet are based on our Company's corporate standards;
 - 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;
 - We can provide product customization service;
 - Specifications of this product are subject to changes without prior notice.