

DC/DC Converter

SPWB_ZP- 3WR2 Series



SCHMID-M

3W, 4:1 wide input isolated & regulated



FEATURES

- Wide range of input voltage (4:1)
- DIP package
- Efficiency up to 83%
- 1.5KVDC isolation
- Short circuit protection(automatic recovery)
- Operating temperature range:-40°C ~ +85°C
- Meet CISPR22/EN55022 CLASS A

The SPWB_ZP-3WR2 Series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to where:

- 1) Input voltage range $\leq 4:1$;
- 2) 1.5KVDC input and output isolation;
- 3) Output regulated and low ripple noise is required.

Selection Guide

Part No.	Input Voltage (VDC)		Output		Efficiency (%Min./Typ.) @ Full Load	Max. Capacitive Load (μ F)
	Nominal (Range)	Max.*	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
SPWB2403ZP-3WR2	24 (9-36)	40	3.3	909/45	73/75	2700
SPWB2405ZP-3WR2			5	600/30	78/80	2200
SPWB2409ZP-3WR2			9	333/17	78/80	1000
SPWB2412ZP-3WR2			12	250/13	79/81	680
SPWB2415ZP-3WR2			15	200/10	80/82	680
SPWB2424ZP-3WR2			24	125/6	80/82	470
SPWB4803ZP-3WR2	48 (18-75)	80	3.3	909/45	74/76	2700
SPWB4805ZP-3WR2			5	600/30	77/79	2200
SPWB4809ZP-3WR2			9	333/17	79/81	1000
SPWB4812ZP-3WR2			12	250/13	80/82	680
SPWB4815ZP-3WR2			15	200/10	81/83	680
SPWB4824ZP-3WR2			24	125/6	79/81	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	--	156/10	--	mA
	48VDC input		79/8		
Reflected Ripple Current	24VDC input	--	30	--	
	48VDC input				
Input Impulse Voltage (1sec. max.)	24VDC input	-0.7	--	50	VDC
	48VDC input		--	100	
Starting Voltage	24VDC input	4.5	7	9	
	48VDC input	11	16	18	
Input Filter		TT filter			

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Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	5%-100% load	--	±1	±3	%
No load output Voltage Accuracy	Input voltage range	--	±1.5	±5	
Linear Regulation	Full load, the input voltage is from low voltage to high voltage	--	±0.2	±0.5	
Load Regulation	5%-100% load	--	±0.2	±1	
Transient Recovery Time	25% load step change	--	0.5	3	ms
Transient Response Deviation		--	±2	±5	%
Temperature Coefficient	Full load	--	±0.02	±0.03	%/°C
Ripple*	20MHz bandwidth	--	30	45	mV p-p
Noise*		--	35	85	
Output Power Protection	Input voltage range	120	--	--	%
Short circuit Protection		Continuous, self-recovery			

Note: * Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Insolation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	1500	--	--	VDC
Insolation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	120	--	pF
Operating Temperature	Derating if the temperature is ≥71°C (see Fig. 1)	-40	--	85	°C
Storage Temperature		-55	--	125	
Casing Temperature Rise	Ta=25°C	--	25	--	
Hand Soldering	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency(PFM mode)	100% load, nominal input voltage	--	250	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

Physical Specifications

Casing Material	Aluminum Alloy
Dimensions	32.00*20.00*10.80 mm
Weight	14g(Typ.)
Cooling	Free convection

EMC Specifications

EMI	Conducted emission	CISPR22/EN55022	CLASS A(Bare component)/CLASS B (see Fig.3-② for recommended circuit)	
	Radiated emission	CISPR22/EN55022	CLASS A(Bare component)/CLASS B (see Fig.3-② for recommended circuit)	
EMS	Electrostatic discharge	IEC/EN61000-4-2	Contact ±4KV/ Air ±8KV perf. Criteria B	
	Radiation immunity	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 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

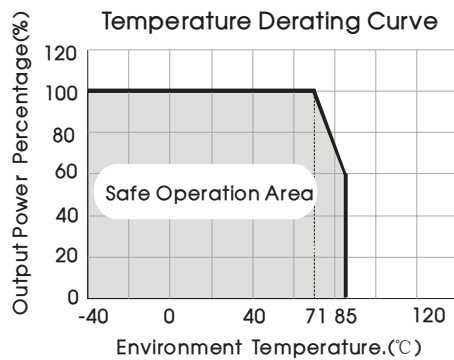
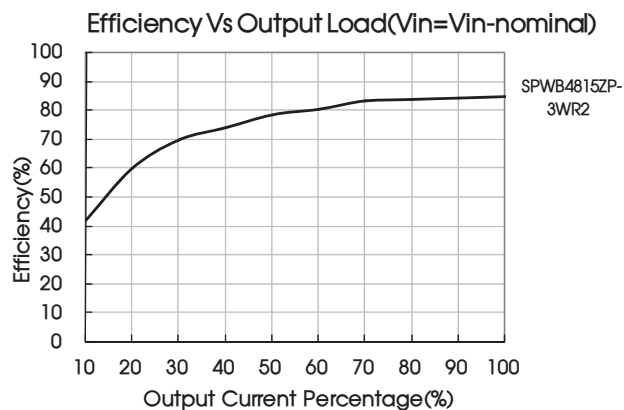
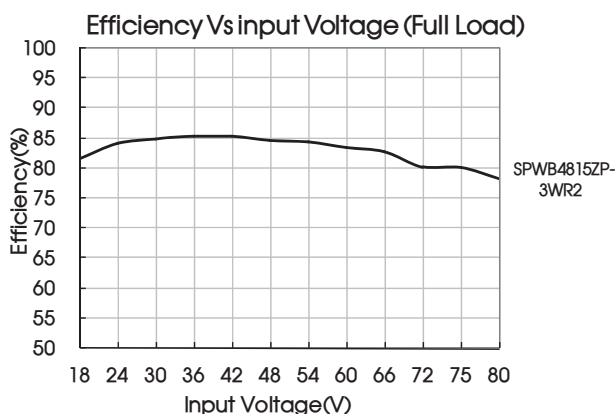
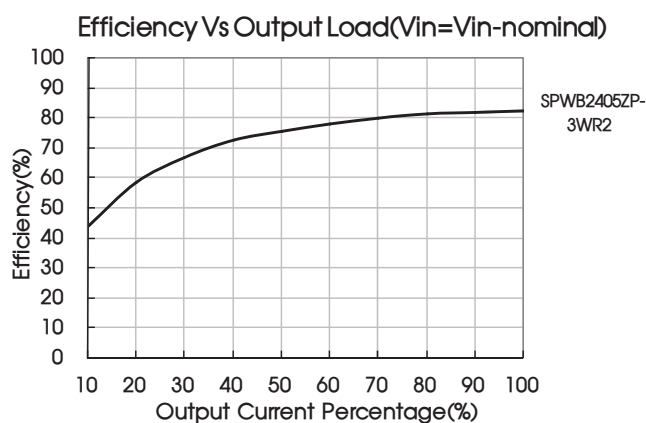
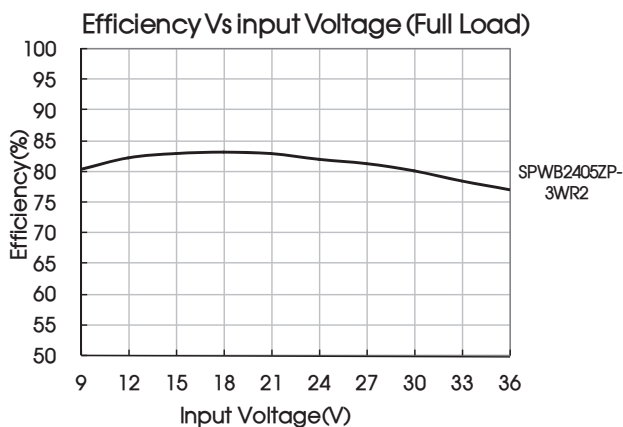


Fig. 1



Design Reference

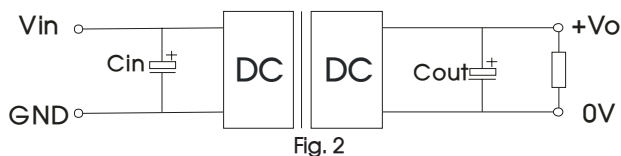
1. Output load requirements

To ensure that the module can work efficiently and reliably, its output min. load shall be no lower than 5% of the rated load when using, or the output ripple may increase rapidly. Ensure that the product working load must be higher than 5% of the rated load.

2. 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}	24V&48V
C_{in}	10 μ F~47 μ F
C_{out}	10 μ F

3. EMC solution-recommended circuit

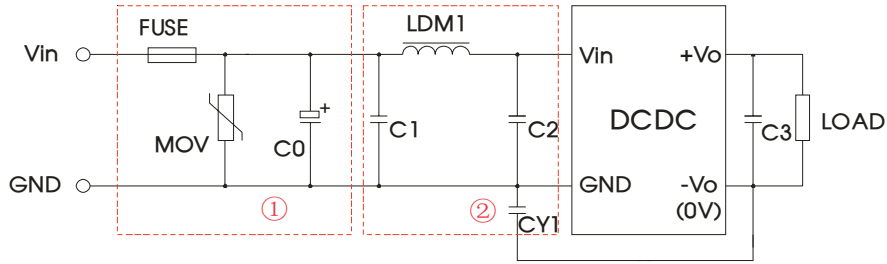


Fig. 3

Parameter description:

Model	Vin:24V	Vin:48V
FUSE	Slow blown fuses according to the actual input current selections of the clients	
MOV	S14K35	S14K60
C0	330 μ F/50V	330 μ F/100V
C1	4.7 μ F/50V	4.7 μ F/100V
LDM1	12 μ H	
C2	4.7 μ F/50V	4.7 μ F/100V
C3	10 μ F	
CY1	1nF/2KV	

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

②. If there is no recommended parameters, the model no require the external component.

EMC solution-recommended circuit PCB layout

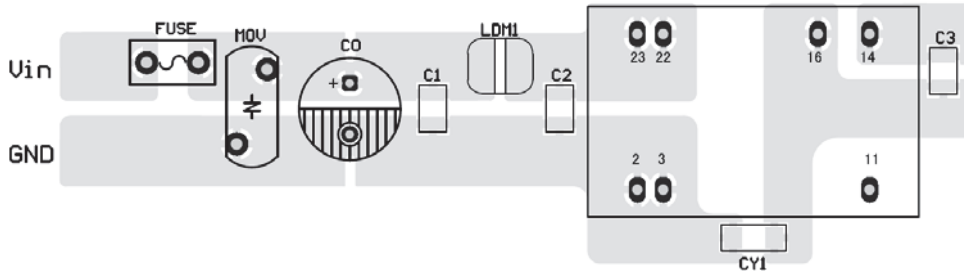


Fig. 4

Note: the min. distance of the bonding pads between input grounding and output grounding shall be ≥ 2 mm.

EMC module-recommended circuit

4. Input current

When the electricity is provided by the unstable power supply, please make sure that the range of the output voltage fluctuation and the ripple voltage of the power supply do not exceed the indicators of the modules. Input current of power supply should afford the flash startup current of this kind of DC/DC module(see Fig.7).

Generally: Vin=24V Iave=640mA
 Vin=48V Iave =320mA

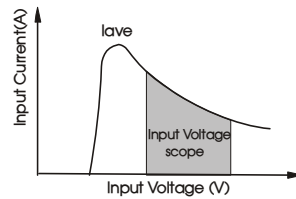


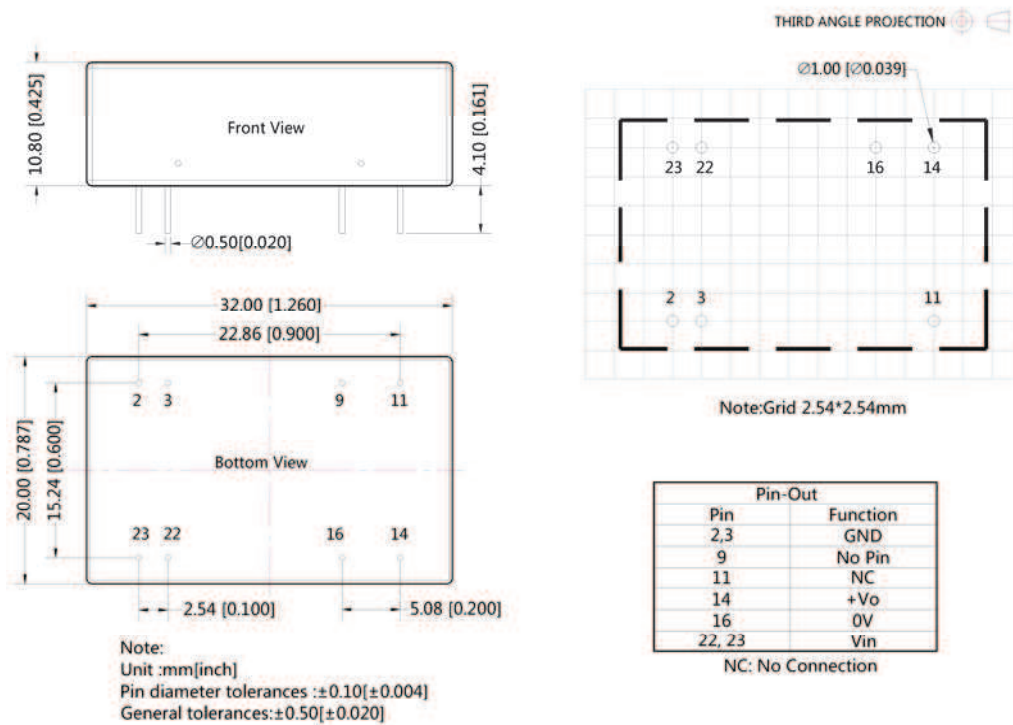
Fig. 7

5. Cannot use in parallel and hot swap

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Dimensions and Recommended Layout



Note:

1. The min. load shall be no lower than 5%, or the output ripple may increase rapidly; If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in the Manual, but the reliability of the product will not be influenced;
2. The max. capacitive load should be tested within the input voltage range and under full load conditions;
3. 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;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. 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;
6. We can provide product customization service;
7. Specifications of this product are subject to changes without prior notice.