DC/DC Converter

SVRB_LD-40W(H)R3 Series

40W isolated DC/DC converter,
Wide input and regulated single output

CE Patent Protection RoHS

FEATURES

- Wide 2:1 input voltage range
- High efficiency up to 91%
- No-load power consumption as low as 0.3W
- I/O isolation test voltage: 1.5K VDC
- Output short-circuit, over-voltage, over-current protection
- Operating ambient temperature range: -40℃ to +85℃.
- Six-sided metal shielded package
- EN62368 approved

SVRB_LD-40WHR3 series are isolated 40W DC-DC products with 2:1 input voltage. They feature efficiency up to 91%, 1500VDC isolation, operating temperature of -40℃ to +85℃, output short circuit protection, over-voltage protection, over-current protection , which make them widely applied in data transmission device, battery power supply device, telecommunication device, distributed power supply system, remote control system, industrial robot fields.

Selection Guide

Certification	Part No.①	Input Voltage (VDC)		Output		Full Load Efficiency®(%) Min./Typ.	Max. Capacitive Load(μF)
		Nominal (Range)	Max. ②	Voltage (VDC)	Current (mA) Max./Min.		
--	SVRB2405LD-40W(H)R3	24 (18-36)	40	05	8000/0	86/88	10000
CE	SVRB2412LD-40W(H)R3			12	3333/0	88/90	2700
	SVRB2415LD-40W(H)R3			15	2667/0	90/91	1680
	SVRB2424LD-40W(H)R3			24	1667/0	90/91	680
	SVRB4812LD-40W(H)R3	48 (36-75)	80	12	3333/0	88/90	2700
	SVRB4815LD-40W(H)R3			15	2667/0	90/91	1680
	SVRB4824LD-40W(H)R3			24	1667/0	90/91	680

Notes:
①Use "H" suffix for heat sink mounting, with "H" products EN62368 approved, without "H" products meets EN62368 test standards;
②Exceeding the maximum input voltage may cause permanent damage;
③Efficiency is measured In nominal input voltage and rated output load.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC input	SVRB2405LD-40W(H)R3	--	1894/60	1938/100	mA
		Other outputs	--	1852/12	1894/25	
	48VDC input		--	926/12	947/25	mA
Reflected Ripple Current	Nominal input voltage		--	30	--	
Surge Voltage (1sec. max.)	24VDC input		-0.7	--	50	VDC
	48VDC input		-0.7	--	100	
Input Under-voltage Protection	24VDC input		13	15.5	--	
	48VDC input		26	33	--	
Start-up Voltage	24VDC input		--	--	18	
	48VDC input		--	--	36	
Start-up Time	Nominal input voltage & constant resistance load		--	10	150	ms
Input Filter			Pi filter			
Hot Plug			Unavailable			
Ctrl *	Module on		Ctrl pin open or pulled high (3.5-12VDC)			
	Module off		Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off		--	5	10	mA

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

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Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	SVRB2405LD-40W(H)R3①	5%-100% load	--	±1	±3	%
	Other outputs	0%-100% load				
Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
Load Regulation	SVRB2405LD-40W(H)R3②	5%-100% load	--	±0.5	±1	
	Other outputs	0%-100% load				
Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
Transient Response Deviation		SVRB2405LD-40W(H)R3	--	±5	±8	%
		Other outputs	--	±3	±5	
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Ripple & Noise③	20MHz bandwidth, nominal input voltage, 100% load		--	50	100	Mv p-p
Trim			--	±10	--	%Vo
Over-voltage Protection	Input voltage range		110	--	160	
Over-current Protection			110	--	190	%Io
Short-circuit Protection			Hiccup, continuous, self-recovery			

Note:
①SVRB2405LD-40W(H)R3 0%-100% output voltage accuracy 5% max;
②SVRB2405LD-40W(H)R3 0%-100% Load Regulation 5% max;
③The "parallel cable" method is used for Ripple and Noise test, please refer to *DC-DC Converter Application Notes* for specific information.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	2000	--	pF
Operating Temperature	See Fig. 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	℃
Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
Switching Frequency *	PWM mode	--	300	--	KHz
MTBF	MIL-HDBK-217F@25℃	500	--	--	K hours

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

Mechanical Specifications

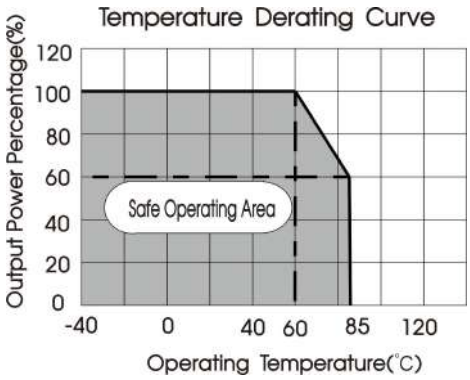
Case Material	Aluminum alloy	
Dimensions	Without heatsink	50.80 x 25.40 x 11.80 mm
	With heatsink	51.40 x 26.20 x 16.50 mm
Weight	Without heatsink	26.8g(Typ.)
	With heatsink	36.0g(Typ.)
Cooling Method	Free air convection	

Electromagnetic Compatibility (EMC)

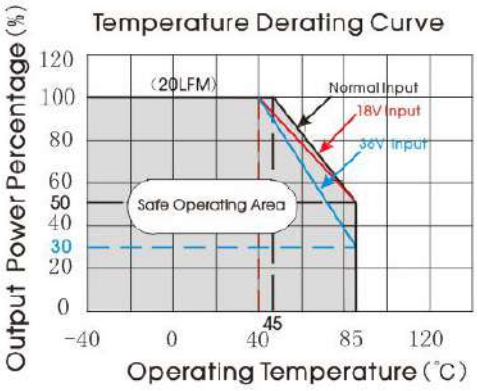
Emissions	CE		CISPR32/EN55032	CLASS B (see Fig.3-② for recommended circuit)	
	RE		CISPR32/EN55032	CLASS B (see Fig.3-② for recommended circuit)	
Immunity	ESD	Other outputs	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria A
		SVRB2405LD-40W(H)R3	IEC/EN61000-4-2	Contact ±4KV	perf. Criteria B
	RS		IEC/EN61000-4-3	10V/m	perf. Criteria A

Immunity	EFT	Other outputs	IEC/EN61000-4-4	±2KV (see Fig.3-① for recommended circuit)	perf. Criteria A
		SVRB2405LD-40W(H)R3	IEC/EN61000-4-4	±2KV (see Fig.3-① for recommended circuit)	perf. Criteria B
	Surge	Other outputs	IEC/EN61000-4-5	line to line ±2KV (see Fig.3-①for recommended circuit)	perf. Criteria A
		SVRB2405LD-40W(H)R3	IEC/EN61000-4-5	line to line ±2KV (see Fig.3-①for recommended circuit)	perf. Criteria B
	CS	Other outputs	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
		SVRB2405LD-40W(H)R3	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

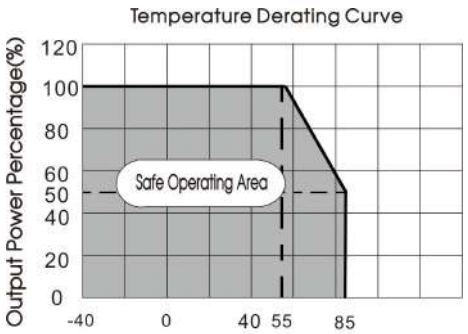
Typical Characteristic Curves



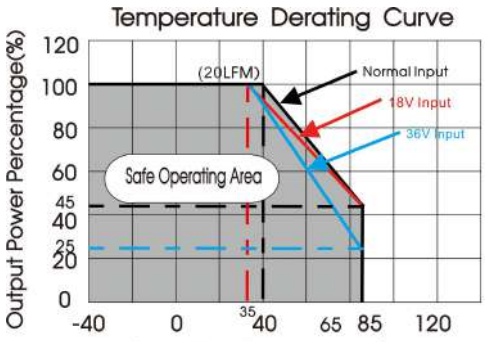
Other outputs(with heatsink)



SVRB2405LD-40WHR3

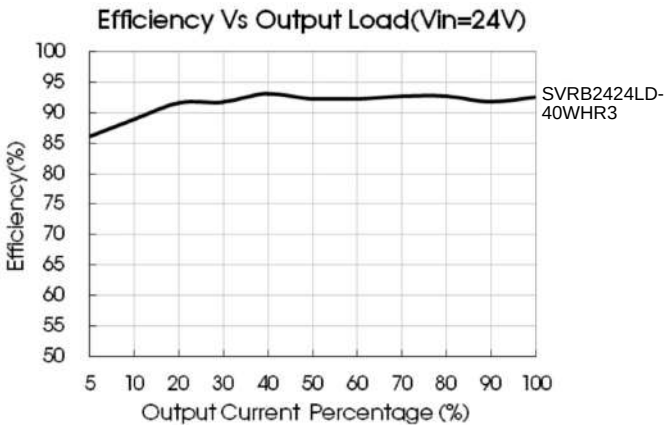


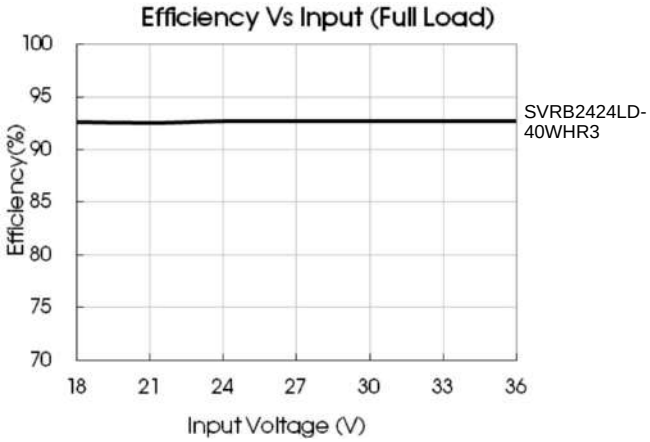
Other outputs(without heatsink)



SVRB2405LD-40WR3

Fig. 1





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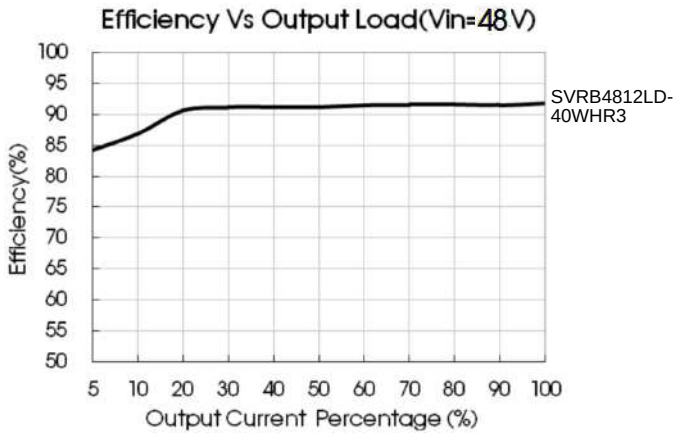
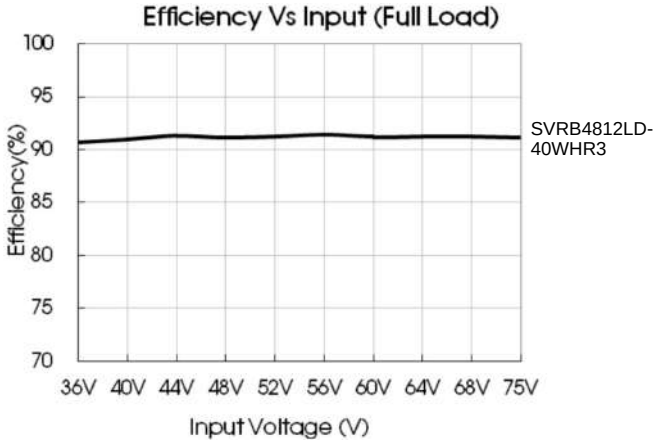




Design Reference

1. Typical application

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the max. capacitive load value of the product.

Fig.2

output voltage (VDC)	Cout (μF)	Cin (μF)
5/12/15/24	100	100

2. EMC solution-recommended circuit

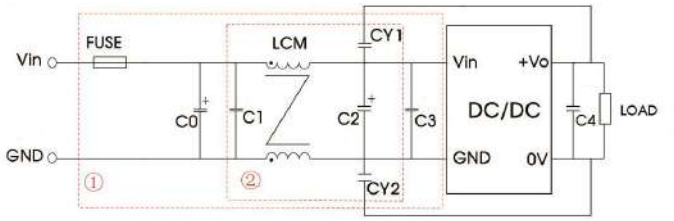


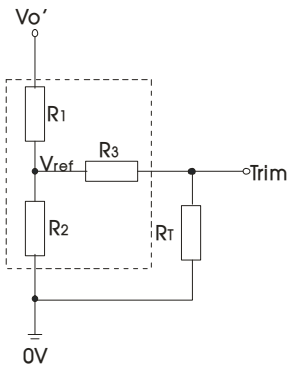
Fig. 3

Notes:For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

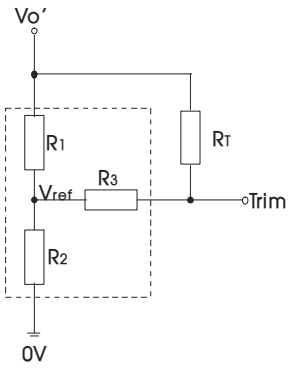
Parameter description

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
C0	680μF/50V	680μF/100V
C1, C3	4.7μF/50V	4.7μF/100V
C2	330μF/50V	330μF/100V
C4	Refer to the Cout in Fig.2	
LCM	2.2mH, recommended to use SFL2D-30-222	
CY1, CY2	2.2nF/2KV	

3. Trim function for output voltage adjustment (open if unused)



Trim up



Trim down

Calculation formula of Trim resistance:

$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{Vref}{Vo'-Vref}\cdot R_1$$

$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

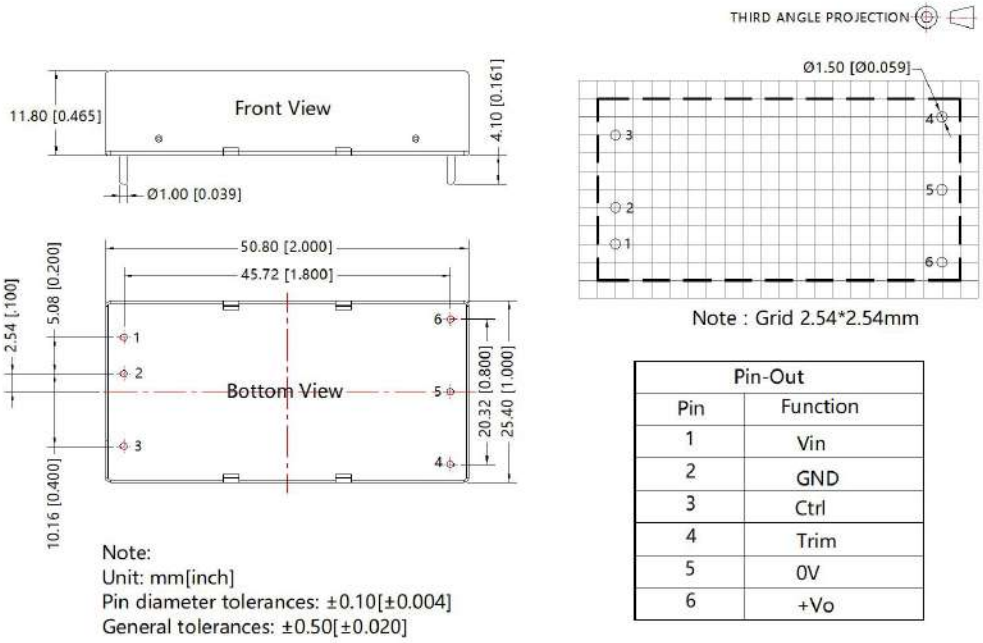
RT = Trim Resistor value;
a = self-defined parameter
Vo' = desired output voltage

TRIM resistor connection (dashed line shows internal resistor network)

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
05	2.880	2.87	10	2.5
12	11.000	2.87	15	2.5
15	14.494	2.87	15	2.5
24	24.872	2.87	15	2.5

4. The products do not support parallel connection of their output

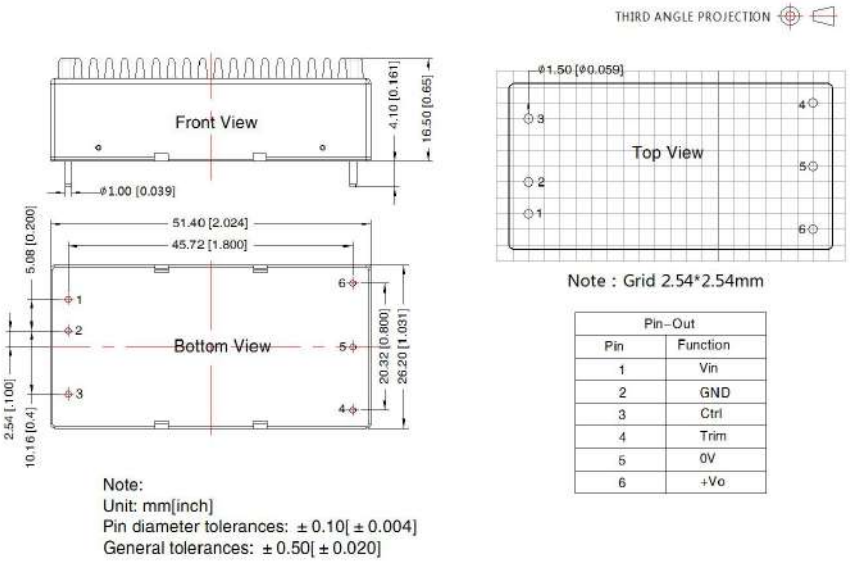
SVRB_LD-40WR3(without heatsink) Dimensions



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

Pin-Out	
Pin	Function
1	Vin
2	GND
3	Ctrl
4	Trim
5	0V
6	+Vo

SVRB_LD-40WHR3(with heatsink) Dimensions



Pin-Out	
Pin	Function
1	Vin
2	GND
3	Ctrl
4	Trim
5	0V
6	+Vo

Notes:

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. 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;
3. All index testing methods in this datasheet are based on company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.