

# SCHMID-M

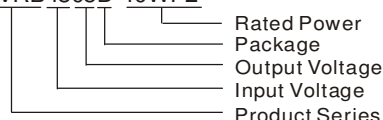
## SVRB\_D40-WF2 Series

**40W, WIDE INPUT, ISOLATED & REGULATED  
SINGLE OUTPUT DC-DC CONVERTER**



### PART NUMBER SYSTEM

SVRB4805D-40WF2



### PRODUCT FEATURES

- Efficiency up to 90%
- High power density
- 2:1 wide input range
- 1.5KVDC Isolation
- Over Current Protection
- Over Temperature Protection
- Short Circuit Protection
- Over Output Voltage Protection
- Under Input Voltage Protection
- Remote Voltage Compensate
- Operating temperature Range: -40°C to +85°C
- Internal SMD Construction
- With heatsink
- MTBF>1,000,000 hours
- Industrial level specifications

### APPLICATIONS

The SVRB\_D40-WF2 series are particularly suited to data transfer equipments, battery operated equipments, tele-communication equipments, distributing power system, mix analog/digital system, remote control system, industrial robot system and other wide input voltage application fields.

### SELECTION GUIDE

Model	Input Voltage(VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load(μF)	Efficiency (%. typ.) @Max. Load
	Nominal (Range)	Max*		Max.	Min.	@Max. Load	@No Load			
SVRB1203D-40WF2	12 (9-18)	20	3.3	8000	800	2599	100	50	21000	84
SVRB1205D-40WF2			5	8000	800	3796	106		13600	86
SVRB1212D-40WF2			12	3300	330	3831	12		2360	86
SVRB1215D-40WF2			15	2666	267	3790	11		1510	88
SVRB1224D-40WF2			24	1670	167	3801	10		470	88
SVRB2403D-40WF2	24 (18-36)	40	3.3	8000	800	1277	41	100	21000	87
SVRB2405D-40WF2			5	8000	800	1877	66		13600	89
SVRB2412D-40WF2			12	3300	330	1859	10		2360	89
SVRB2415D-40WF2			15	2666	267	1860	13		1510	90
SVRB2424D-40WF2			24	1670	167	1858	17		470	90
SVRB4803D-40WF2	48 (36-75)	80	3.3	8000	800	636	39	200	21000	85
SVRB4805D-40WF2			5	8000	800	931	38		13600	88
SVRB4812D-40WF2			12	3300	330	922	8		2360	90
SVRB4815D-40WF2			15	2666	267	920	8		1510	90
SVRB4824D-40WF2			24	1670	167	942	8		470	89

Note:1.\*Input voltage can't exceed this value, or will cause the permanent damage.

2.Add suffix "H" for heatsink mounted, for example SVRB4805D-40WF2H.

### INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage(1sec. max.)	12VDC Input Models	-0.7	--	25	VDC
	24VDC Input Models	-0.7	--	50	
	48VDC Input Models	-0.7	--	100	

Under Voltage Shutdown	12VDC Input Models	--	--	9	VDC
	24VDC Input Models	--	--	18	
	48VDC Input Models	--	--	36	
Start-up Time	Nominal input& constant resistance load	--	5	--	ms
Ctrl*	Models ON	3.5 - 12VDC or open circuit			
	Models OFF	0-1.2VDC			
	Input current(Models OFF)	--	--	1	mA
Short Circuit Input Power		--	--	4.5	W
Input Filter		π Filter			
*The CTRL control pin voltage is refer to GND.					

## OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Power		4	--	40	W
Output Voltage Accuracy	Refer to recommended circuit	--	±1	--	%
Line Regulation	Full load, Input voltage from low to high	--	±0.2	--	
Load Regulation	10% to 100% load	--	±0.5	--	
Transient Recovery Time	25%~ 50%~25% load or	--	200	500	μs
Transient Response Deviation	50%~75%~50% load step change	--	±3	±5	%
Temperature Drift	100% full load	--	±0.02	--	%/°C
Ripple*	20MHz Bandwidth	--	40	75	mVp-p
Noise*		--	100	150	
Over Current Protection		120-150%Po			
Over Voltage Protection	Full input voltage	110-130%Vo			
Over Temp. Protection		--	115	--	°C
Trim	Nominal light load	--	±10%Vo	--	VDC
Sense	Remote Voltage compensation	--	10%Vo	--	
Short Circuit Protection	Full input voltage	Hiccup, Continuous, automatic recovery			
Note: *Ripple and noise tested by "parallel cable" method. See detailed operation instructions at <i>DC-DC Application Notes</i> .					

## COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Tested for 1 minute and leakage current less than 1 mA	1500	--	--	VDC
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input/Output,100KHz/0.1V	--	2000	--	pF
Switching Frequency	Full load, nominal input	--	300	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours
Case Material		Aluminum Alloy			
Weight	Without heatsink	--	60	--	g
	With heatsink	--	85	--	

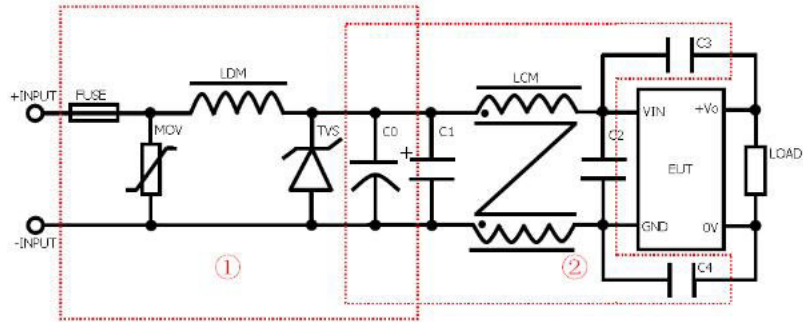
## ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	5	--	95	%
Operating Temperature	See Temperature Derating Curve	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise allowed at full load	Operating Temperature curve range	--	--	105	
Soldering Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

## EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS A (External Circuit Refer to Figure1-②)
EMS	ESD	IEC/EN61000-4-2 Contact $\pm 4KV$ perf. Criteria B
	EFT	IEC/EN61000-4-4 $\pm 2KV$ perf. Criteria B(External Circuit Refer to Figure 1-①)
	Surge	IEC/EN61000-4-5 $\pm 2KV$ perf. Criteria B(External Circuit Refer to Figure 1-①)

## EMC RECOMMENDED CIRCUIT



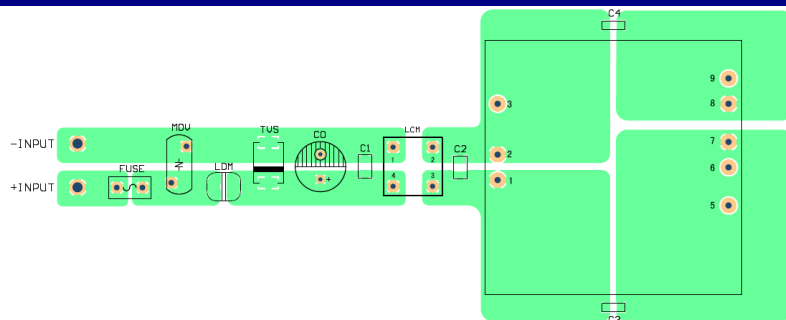
(Figure1)

Recommended external circuit parameters:

Model		SVRB12_D-40WF2	SVRB24_D-40WF2	SVRB48_D-40WF2
EMS	FUSE	Choose according to load		
	MOV	--	S10K35	S10K75
	LDM1	--	82 $\mu$ H CD53	82 $\mu$ H CD53
	TVS	SMCJ28A	SMCJ48A	SMCJ100A
	C0	680 $\mu$ F/25V	120 $\mu$ F/50V	120 $\mu$ F/100V
EMI	C0	680 $\mu$ F/25V	--	120 $\mu$ F/100V
	C1	--	4.7 $\mu$ F/50V 1210	--
	LCM	--	--	3.8mH
	C2	--	4.7 $\mu$ F/50V 1210	--
	C3	--	1000pF/2KV 1206	--
	C4	100pF/2KV 1206	1000pF/2KV 1206	--

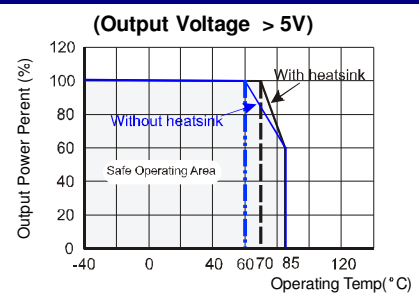
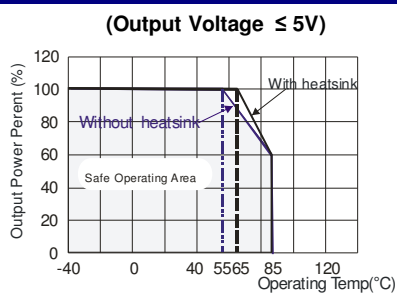
Note: 1. In Figure 1, part ① is EMS Recommended external circuit, part ② is EMI recommended external circuit. Choose according to requirements.  
2. If there is no recommended parameters, the model no require the external component.

## EMC RECOMMENDED CIRCUIT PCB LAYOUT



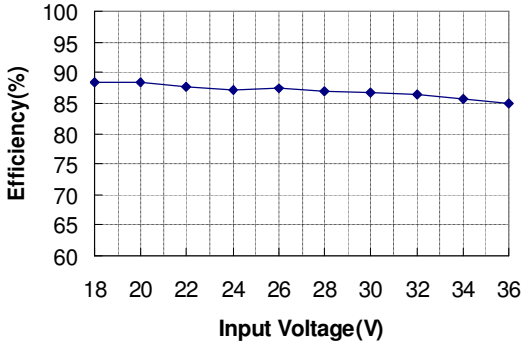
(Figure 2) SVRB\_D-40W F 2 Series

## PRODUCT TYPICAL CURVE



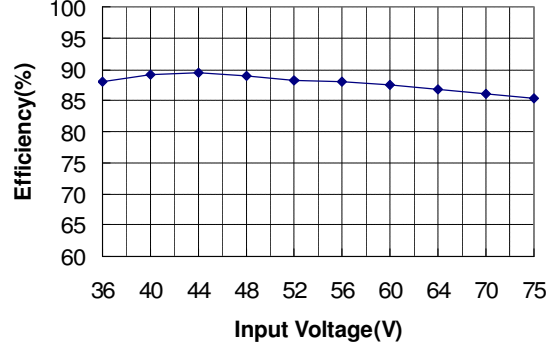
**Efficiency VS Input Voltage curve**

(Full Load) — SVRB2405D-40WF2



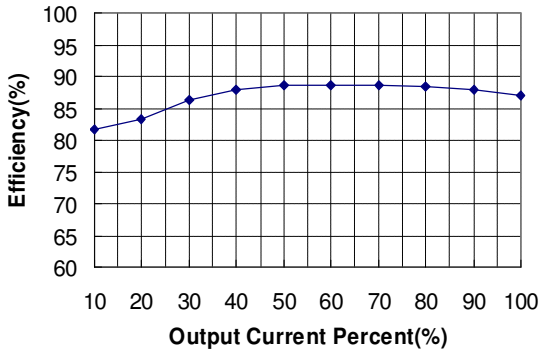
**Efficiency VS Input Voltage curve**

(Full Load) — SVRB4805D-40WF2



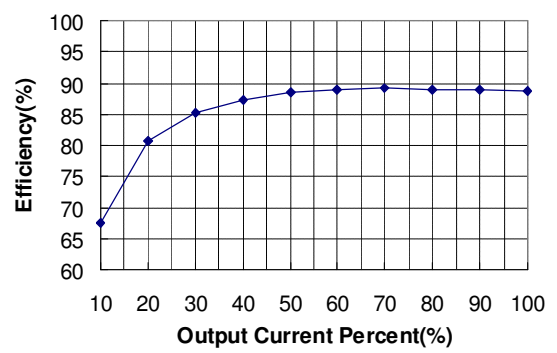
**Efficiency VS Output Load curve**

(Vin=Vin-nominal) — SVRB2405D-40WF2



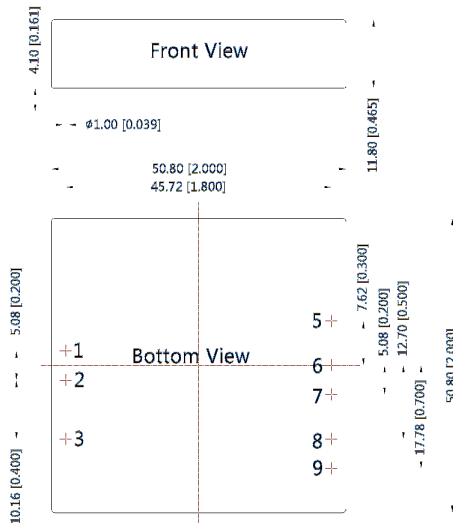
**Efficiency VS Output Load curve**

(Vin=Vin-nominal) — SVRB4805D-40WF2



**OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING**

**MECHANICAL DIMENSIONS**

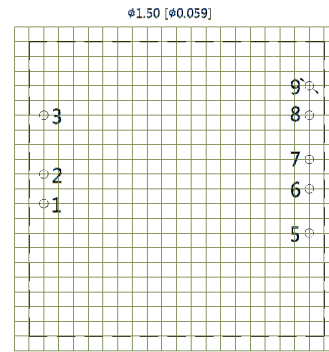


Pin	Function
1	Vin
2	GND
3	Ctrl
5	Sense-
6	Sense+
7	+Vo
8	0V
9	Trim

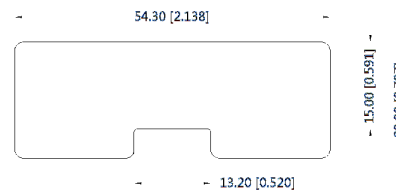
Note:  
 Unit :mm[inch]  
 Pin diameter tolerances : $\pm 0.10$  [ $\pm 0.004$ ]  
 Pin height tolerances : $\pm 0.50$  [ $\pm 0.020$ ]  
 General tolerances : $\pm 0.30$  [ $\pm 0.012$ ]

THIRD ANGLE PROJECTION

**RECOMMENDED FOOTPRINT DETAILS**



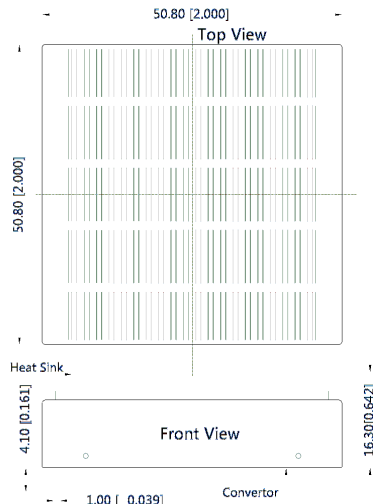
**TUBE PACKAGING DIMENSIONS**



Note:  
 Unit :mm[inch]  
 General tolerances : $\pm 0.50$  [ $\pm 0.020$ ]  
 L=230[9.055] Tube Quantity:7 pcs  
 Inner carton(S): L\*W\*H=255\*170\*80  
 Outer carton(S): L\*W\*H=375\*280\*270, 6 inner cartons(S)

# HEATSINK ASSEMBLY & PACKAGE DIAGRAM

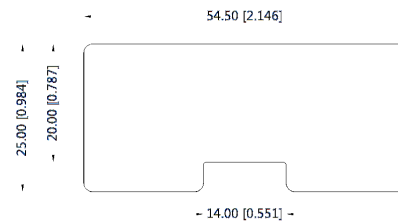
## MECHANICAL DIMENSIONS (WITH HEATSINK)



Note:  
Unit :mm[inch]  
General tolerances:±0.30[±0.012]  
If use heat sinks, make sure there is enough space for a specific size in the above graph.

THIRD ANGLE PROJECTION

## TUBE PACKAGING DIMENSIONS (WITH HEATSINK)

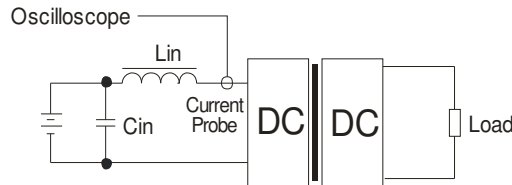


Note:  
Unit :mm[inch]  
General tolerances :±0.50[±0.020]  
L=220mm[8.661 inch] Tube Quantity:4 PCS  
Inner carton(S):L\*W\*H=255\*170\*80  
Outer carton(S):L\*W\*H=375\*280\*270,6 inner cartons(S)

## TEST CONFIGURATIONS

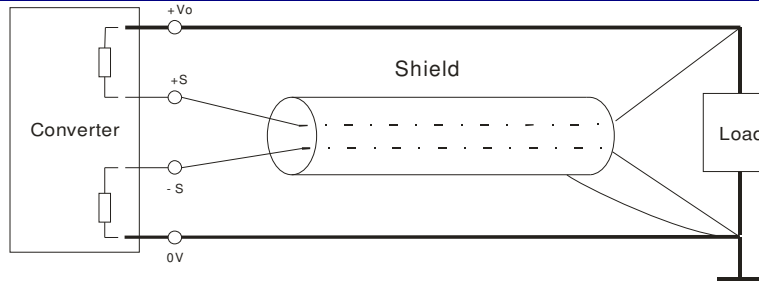
### Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor  $L_{in}$  and Capacitor  $C_{in}$  to simulate source impedance.



$L_{in}(4.7\mu H)$   $C_{in}(220\mu F, ESR < 1.0\Omega \text{ at } 100 \text{ KHz})$

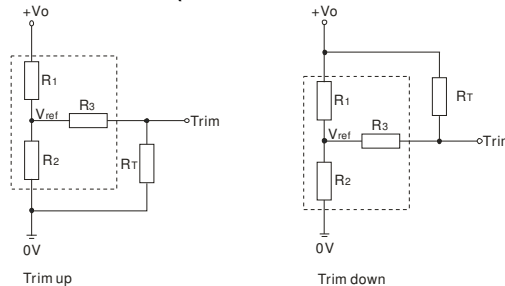
## SENSE USE ( REMOTE VOLTAGE COMPENSATION)



Sense Connection

## TRIM APPLICATION & TRIM RESISTANCE

Application circuit for TRIM (Part in broken line is the interior of models)



Formula for resistance of Trim

$$\begin{aligned} \text{up: } R_T &= \frac{aR_2}{R_2-a} - R_3 & a &= \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{aR_1}{R_1-a} - R_3 & a &= \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

Note: Value for R1, R2, R3, and Vref refer to the following table.

R<sub>T</sub>: Resistance of Trim

a: User-defined parameter, no actual meanings.

Vo': The trim up/down voltage

Vo Parameter	3.3(VDC)	5(VDC)	12(VDC)	15(VDC)	24(VDC)
R1(KΩ)	4.80	2.88	10.97	14.50	24.87
R2(KΩ)	2.86	2.86	2.86	2.86	2.86
R3(KΩ)	15	10	17.8	17.8	20
Vref(V)	1.24	2.5	2.5	2.5	2.5

## DESIGN CONSIDERATIONS

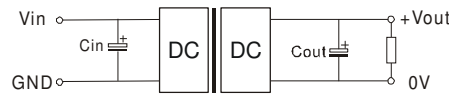
### 1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load **could not be less than 10% of the full load**. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load.

### 2) Recommended circuit

All the SVRB\_D40-WF2 series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load. Never be tested under no load (see Figure 3).

If you want to further decrease the output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance can# exceed the maximum capacitor load in the list (Table 1).



(Figure 3)

EXTERNAL CAPACITOR TABLE (TABLE 1)

Output Voltage	Capacitance Cout(μF)	Cin(μF)(12V,24V, 48V input)
3.3V、5V	220	100
12V、15V	100	
24V	47	

### 3) Cannot use in parallel and hot swap

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. Max. Capacitive Load tested at input voltage range and full load.
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.
5. All characteristics are for listed model only, non-standard models may perform differently, please contact our technical person for more detail.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.