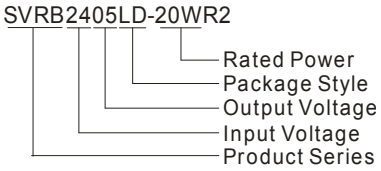
SVRA_LD-20WR2 & SVRB_LD-20WR2 SERIES

20W,WIDE INPUT, ISOLATED & REGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER

FEATURES

- Efficiency up to 90%
- 2:1 wide input voltage range
- Low temperature rise
- Short circuit protection
- 1.5KVDC isolation
- Operating temperature range: -40°C ~ +85°C
- Six-sided metal shield
- Industry standard pinout
- Industrial level specifications
- Meet CISPR22/EN55022 CLASS A

PART NUMBER SYSTEM



APPLICATION

SVRA_LD-20WR2 & SVRB_LD-20WR2 series are applied to wide voltage range input situation such as data transmission device, battery power supply device, telecommunication device、distributed power supply system, remote control system, industrial robot system etc.

SELECTION GUIDE

Model Number ①	Input Voltage(VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load ③ (μF)	Efficiency (%, typ.) @Max. Load
	Nominal (Range)	Max ②		Max.	Min.	@Max. Load	@No Load			
SVRA1205LD-20WR2	12 (9-18)	20	±5	±2000	±100	1938	30	30	4800	86
SVRA1212LD-20WR2			±12	±834	±42	1895	25		800	88
SVRA1215LD-20WR2			±15	±667	±33	1895	25		500	88
SVRA1224LD-20WR2			±24	±417	±21	1895	20		300	88
SVRB1203LD-20WR2			3.3	5000	250	1600	65		18700	86
SVRB1205LD-20WR2			5	4000	200	1872	60		9600	89
SVRB1212LD-20WR2			12	1667	84	1872	25		1600	89
SVRB1215LD-20WR2			15	1333	67	1872	25		1000	89
SVRB1224LD-20WR2			24	834	42	1853	30		470	90
SVRA2405LD-20WR2	24 (18-36)	40	±5	±2000	±100	969	25		4800	86
SVRA2412LD-20WR2			±12	±834	±42	948	20		800	88
SVRA2415LD-20WR2			±15	±667	±34	948	20		500	88
SVRA2424LD-20WR2			±24	±417	±21	948	20		300	88
SVRB2403LD-20WR2			3.3	5000	250	800	40		18700	86
SVRB2405LD-20WR2			5	4000	200	926	40		9600	90
SVRB2412LD-20WR2			12	1667	84	937	20		1600	89
SVRB2415LD-20WR2			15	1333	67	926	20		1000	90
SVRB2424LD-20WR2			24	834	42	916	20		470	91
SVRA4805LD-20WR2	48 (36-75)	80	±5	±2000	±100	484	20		4800	86
SVRA4812LD-20WR2			±12	±834	±42	474	15		800	88
SVRA4815LD-20WR2			±15	±667	±34	468	15		500	89
SVRA4824LD-20WR2			±24	±417	±21	468	15		300	89
SVRB4803LD-20WR2			3.3	5000	250	400	25		18700	86
SVRB4805LD-20WR2			5	4000	200	463	25		9600	90
SVRB4812LD-20WR2			12	1667	84	469	10		1600	89

SVRB4815LD-20WR2			15	1333	67	463	10		1000	90
SVRB4824LD-20WR2			24	834	42	468	10		470	89

Note:
□. series with suffix “H” are heat sink mounting; series with suffix “A2S” are chassis mounting， with suffix “A4S” are DIN-Rail mounting,
for exampleSVRA2405LD-20WR2HA2S is chassis mounting of with heatsink,SVRB2405D-20WR2A2S is chassis mounting of without heat sink;
The efficiency of “A2S”and “A4S”is 2% lower;
if the application has a higher requirement for heat dissipation, you can choose modules with heat sink;
□. Input voltage can’t exceed this value, or will cause the permanent damage.
□. For each output

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec.max.)	12VDC input	--	--	25	VDC
	24VDC input	--	--	50	
	48VDC input	--	--	100	
Start-up Voltage	12VDC input	--	--	9	
	24VDC input	--	--	17.8	
	48VDC input	--	--	35.8	
Under Voltage Shutdown	12VDC input	7.5	--	--	
	24VDC input	16	--	--	
	48VDC input	32	--	--	
Start-up Time	Nominal input& constant resistance load	--	10	--	ms
Ctrl*	Models ON	Ctrl open or connect TTL high level (2.5-12VDC)			
	Models OFF	Ctrl connect GND or low level (0-1.2VDC)			
	Input current (Models OFF)	--	1	--	mA
Input Filter		π Filter			

Note: *The CTRL control pin voltage is refer to GND.

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Power		1	--	20	W
Positive Voltage Accuracy	Refer to recommended circuit	--	±1	±3	%
Negative Voltage Accuracy					
Output Voltage Balance	Dual output, balanced loads	--	±0.5	±1	
Line Regulation	Full load, input voltage from low to high	--	±0.2	±0.5	
Load Regulation	10% to 100% load	--	±0.5	±1	
Cross Regulation	Dual output, main output 50% load, Supplement output from 10% to 100% load	--	--	±5	
Transient Recovery Time	25% load step change	--	300	500	μs
Transient Response Deviation		--	±3	±5	%
Temperature Drift	Full load	--	±0.02	--	%/°C
Ripple & Noise*	20MHz bandwidth	--	70	100	mVp-p
Trim		--	±10%	--	VDC
Output Over Voltage Protection	3.3VDC output	--	3.9	--	
	5VDC output	--	6.2	--	
	12VDC output	--	15	--	
	15VDC output	--	18	--	
	24VDC output	--	30	--	
Over Current Protection	Input voltage range	--	150	--	%
Short Circuit Protection		Hiccup, Continuous, automatic recovery			

Note: * Ripple and noise tested by “parallel cable” method. See detailed operation instructions at Testing of Power Converter section, application notes.

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	--	1000	--	pF
Switching Frequency		--	300	--	KHz
MTBF	MIL-HDBK-217F@25□	1000	--	--	K hours

Case Material		Aluminum Alloy			
Size	PCB mounting （Without heat sink）	50.80×25.40×11.80mm			
	PCB mounting （With heat sink）	50.80×25.40×16.30mm			
	A2S Chassis mounting（Without heat sink）	76.00×31.50×21.20mm			
	A2S Chassis mounting（With heat sink）	76.00×31.50×25.70mm			
	A4S DIN-Rail mounting（Without heat sink）	76.00×31.50×25.80mm			
	A4S DIN-Rail mounting（With heat sink）	76.00×31.50×30.30mm			
Weight	Without heat sink（Without heat sink）	--	28	--	g
	With heat sink（With heat sink）	--	36	--	
	A2S Chassis mounting（Without heat sink）	--	50	--	
	A2S Chassis mounting（With heat sink）	--	58	--	
	A4S DIN-Rail mounting（Without heat sink）	--	70	--	
	A4S DIN-Rail mounting（With heats ink）	--	78	--	

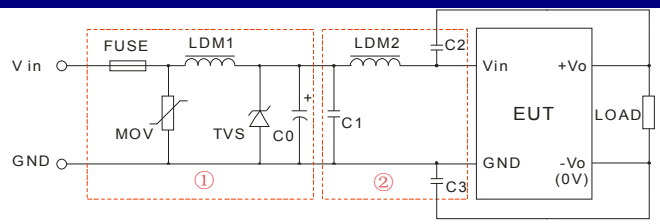
ENVIRONMENTAL SPECIFICATIONS

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	°C
The Max. Case Temperature	Operating Temperature curve range	--	--	105	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			
Shake		10-55Hz, 10G, 30 Min. along X, Y and Z			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022	CLASS A（Without External Circuit）/ CLASS B（External Circuit Refer to Figure1-②）	
	RE	CISPR22/EN55022	CLASS A（Without External Circuit）/ CLASS B（External Circuit Refer to Figure1-②）	
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	perf. Criteria B（External Circuit Refer to Figure1-①）
	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B（External Circuit Refer to Figure1-①）
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
	Voltage dips,short and interruptions immunity	IEC/EN61000-4-29	0%-70%	perf. Criteria B

EMC RECOMMENDED CIRCUIT



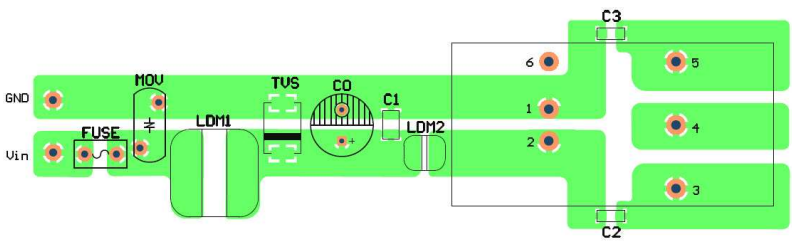
(Figure1)

Note: 1. In Figure 1,part①is EMS Recommended external circuit, part②is EMI recommended external circuit. Choose according to requirements.
2. If there is no recommended parameters, the model no require the external component.

Recommended external circuit parameters:

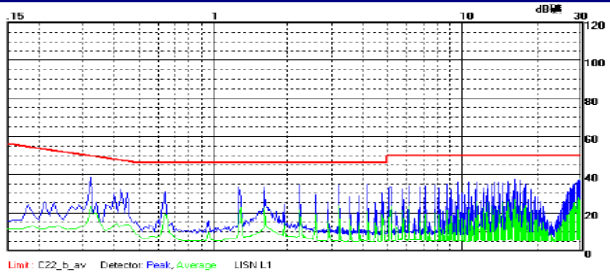
Model	Vin:12V	Vin:24V	Vin:48V
FUSE	Choose according to practical input current		
MOV	--	10D560	10D101
LDM1	--	56μH	
TVS	SMCJ28A	SMCJ48A	SMCJ90A
C0	680μF/25V	120μF/50V	120μF/100V
C1	1μF /50V	1μF /50V	1μF /100V
LDM2	4.7μH		
C2、C3	1nF/2KV		

EMC RECOMMENDED CIRCUIT PCB LAYOUT

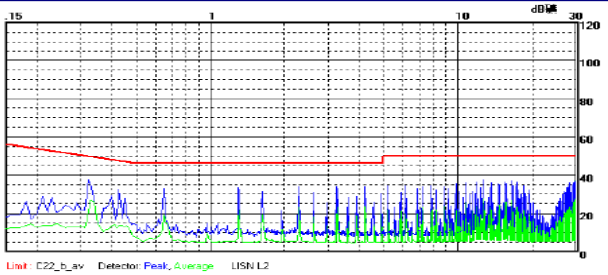


(Figure 2)

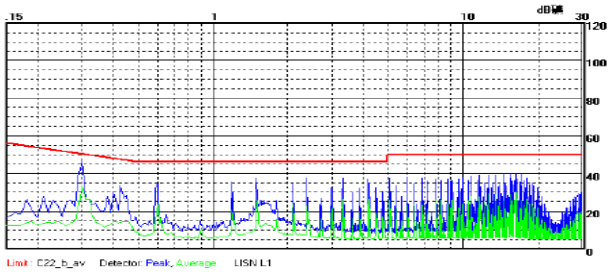
EMC TEST WAVEFORM(CLASS B APPLY CIRCUIT)



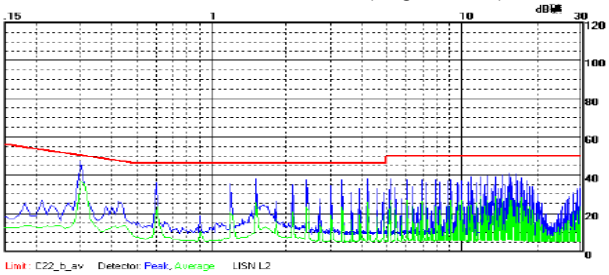
SVRA2405LD-20WR2 CE (Positive line)



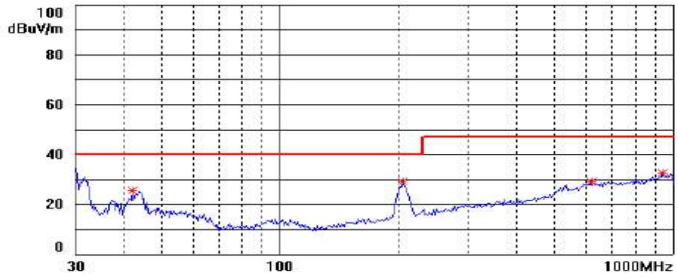
SVRA2405LD-20WR2 CE (Negative line)



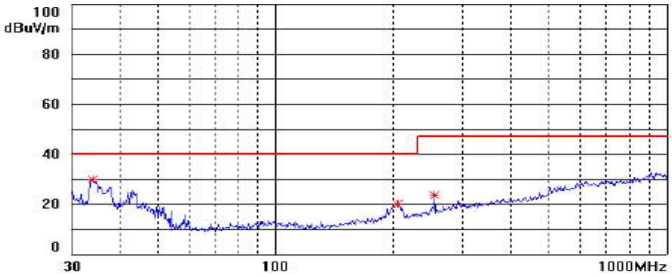
SVRA4815LD-20WR2 CE (Positive line)



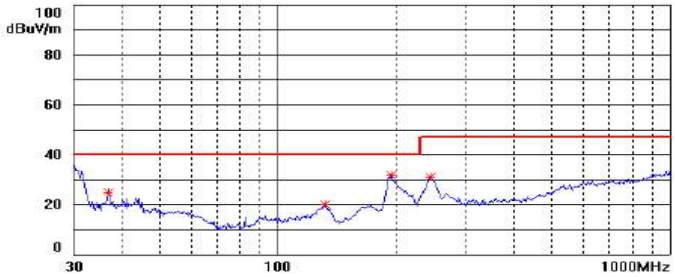
SVRA4815LD-20WR2 CE (Negative line)



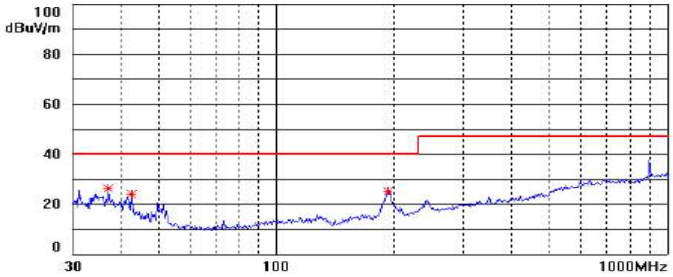
SVRA2405LD-20WR2 RE(Horizontal)



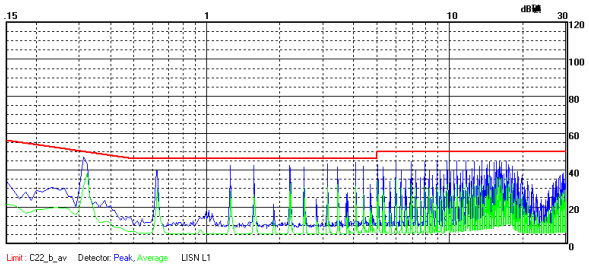
SVRA2405LD-20WR2 RE(Vertical)



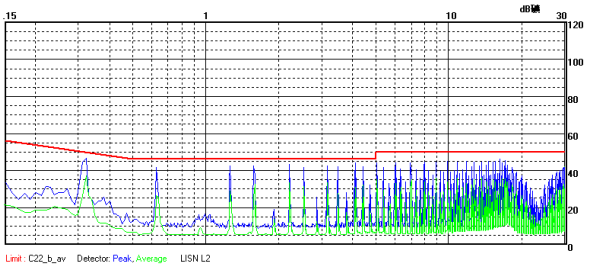
SVRA4815LD-20WR2 RE(Horizontal)



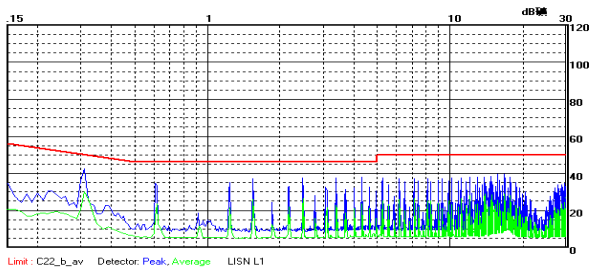
SVRA4815LD-20WR2 RE(Vertical)



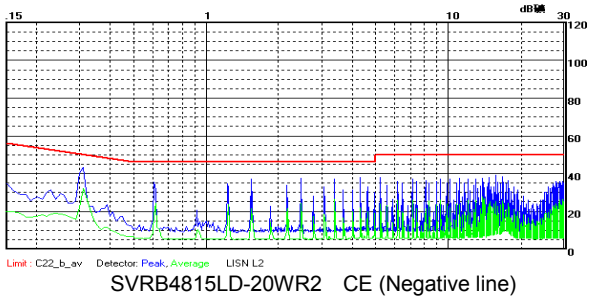
SVRB2405LD-20WR2 CE (Positive line)



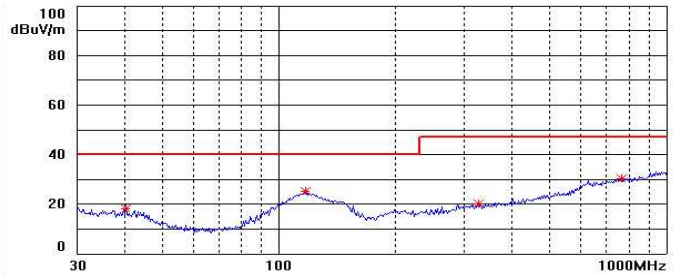
SVRB2405LD-20WR2 CE (Negative line)



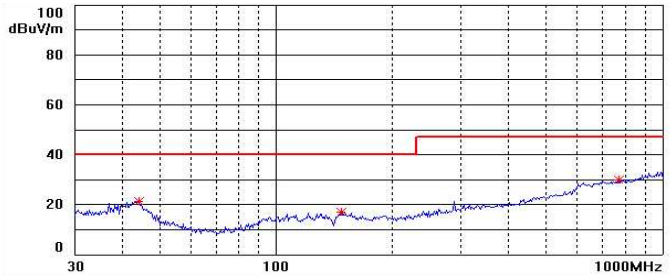
SVRB4815LD-20WR2 CE (Positive line)



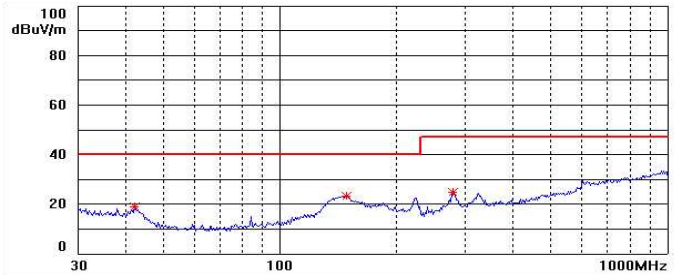
SVRB4815LD-20WR2 CE (Negative line)



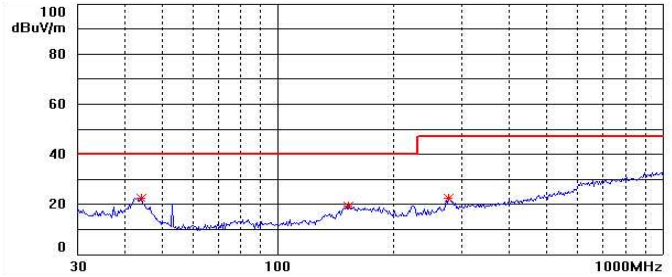
SVRB2405LD-20WR2 RE(Horizontal)



SVRB2405LD-20WR2 RE(Vertical)



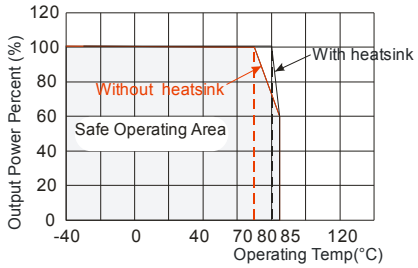
SVRB4815LD-20WR2 RE(Horizontal)



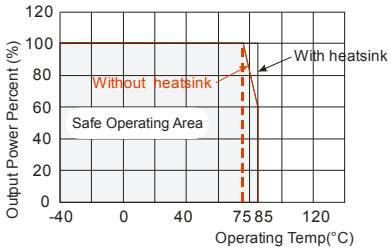
SVRB4815LD-20WR2 RE(Vertical)

PRODUCT TYPICAL CURVE

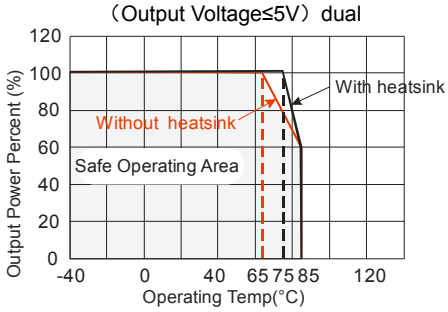
(Output Voltage≤5V) single



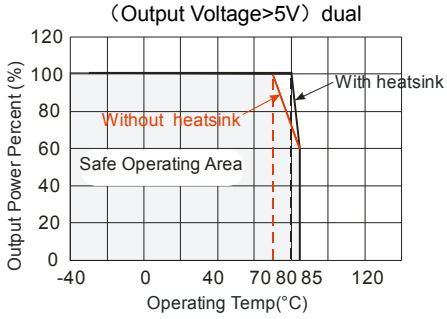
(Output Voltage >5V)single



（Output Voltage≤5V）dual

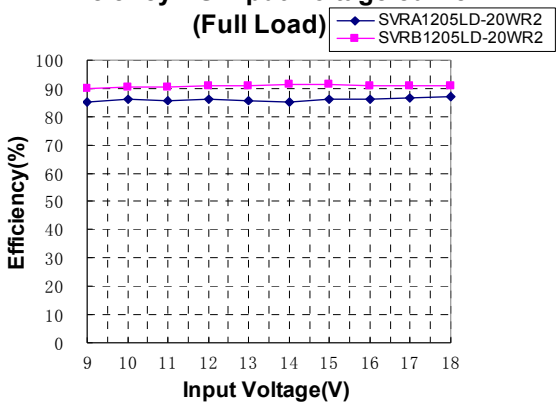


（Output Voltage>5V）dual



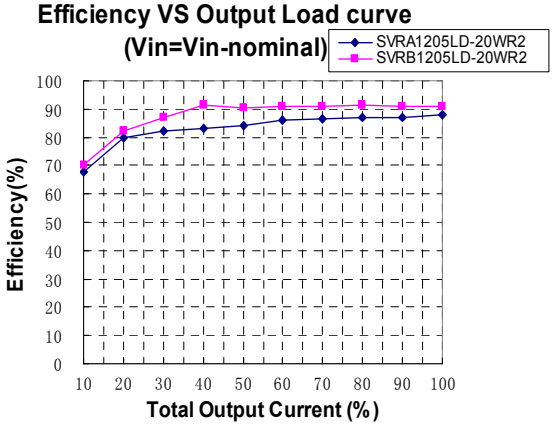
Efficiency VS Input Voltage curve

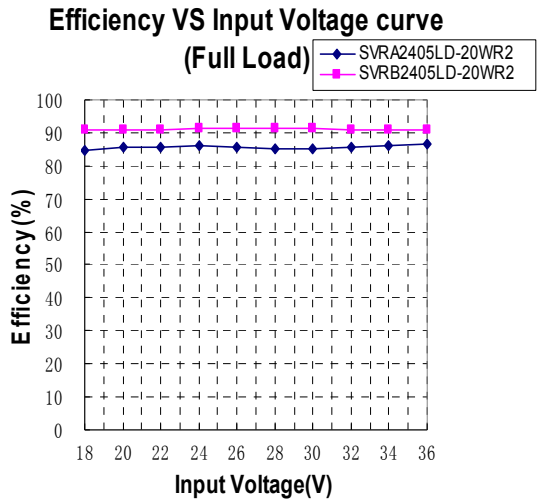
(Full Load)

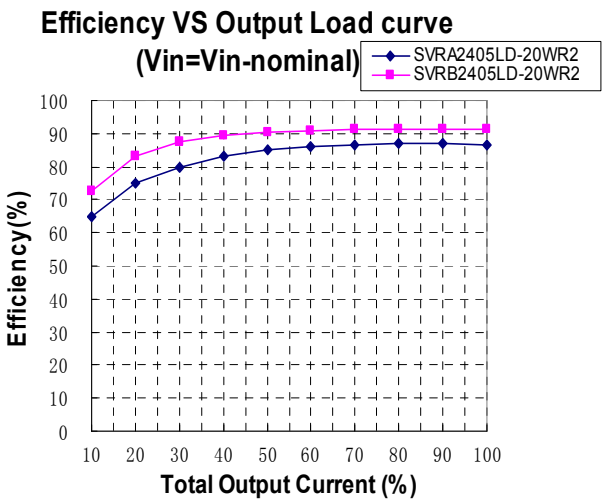


Efficiency VS Output Load curve

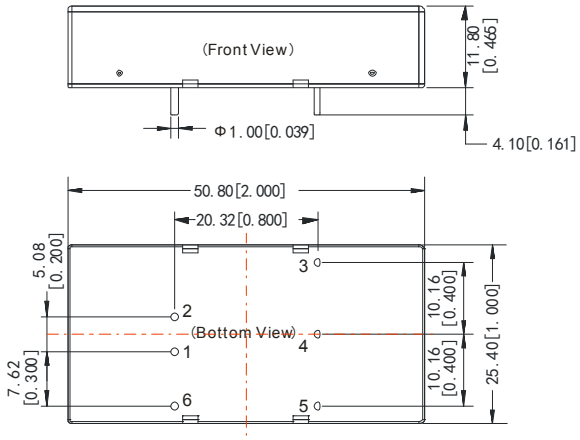
(Vin=Vin-nominal)



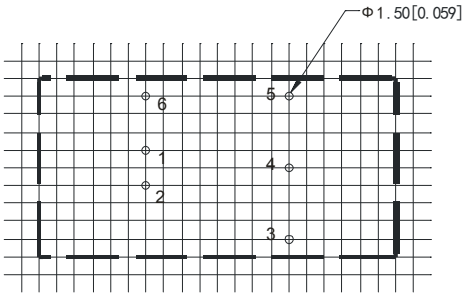




SVR-LD-20WR2& SVRB-LD-20WR2 PCB MOUNTING (WITHOUT HEATSINK)OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT



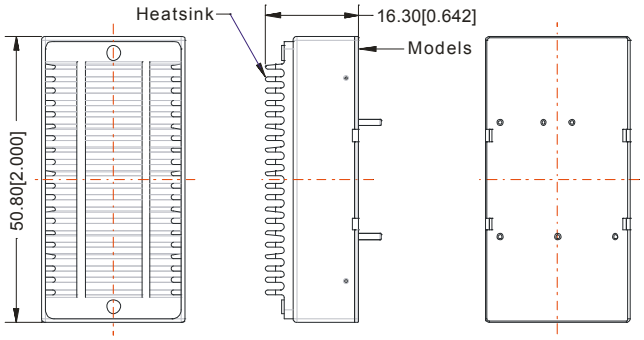
Note:
Unit:mm[inch]
Pin diameter tolerances: ±0.10mm[±0.004inch]
Pin height tolerances: ±0.50mm[±0.020inch]
General tolerances: ±0.30mm[±0.012inch]

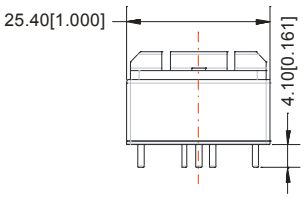


Note: grid 2.54*2.54mm

FOOTPRINT DETAILS		
Pin	SINGLE	DUAL
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	Trim	0V
5	0V	-Vo
6	Ctrl	Ctrl

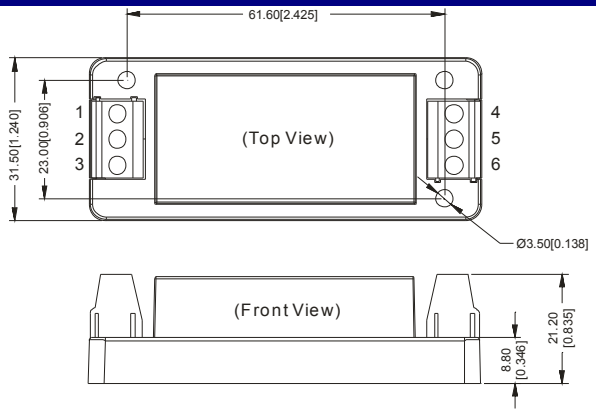
SVRA-LD-20WR2& SVRB-LD-20WR2 PCB MOUNTING (WITH HEATSINK)OUTLINE DIMENSIONS





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

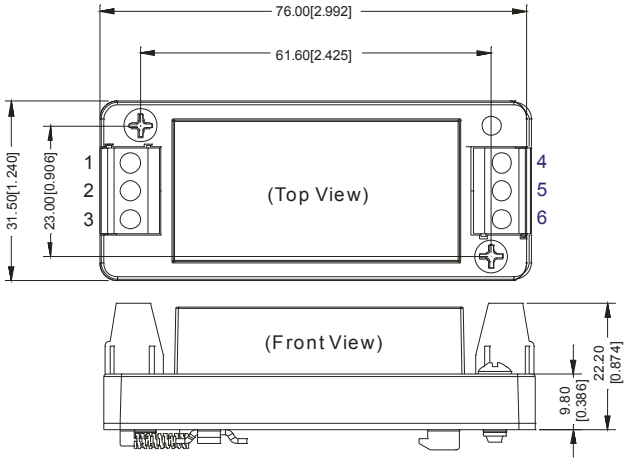
SVRA-LD-20WR2A2S& SVRB-LD20WR2A2 SCHASSIS MOUNTINGOUTLINE DIMENSIONS



Footprint Details						
Pin	1	2	3	4	5	6
SVRA_LD	Ctrl	GND	V in	-Vo	0V	+Vo
SVRB_LD	Ctrl	GND	V in	0V	Trim	+Vo

Note:
Unit: mm[inch]
General tolerances: ±0.50mm[±0.020inch]

SVRA-LD-20WR2A4S & SVRB-LD-20WR2A4S DIN-RAIL MOUNTING OUTLINE DIMENSIONS

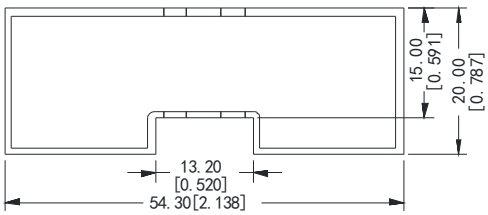


Footprint Details						
Pin	1	2	3	4	5	6
SVRA LD	Ctrl	GND	V in	-Vo	0V	+Vo
SVRB LD	Ctrl	GND	V in	0V	Trim	+Vo

Note:
Unit: mm[inch]
General tolerances: ±0.50mm[±0.020inch]

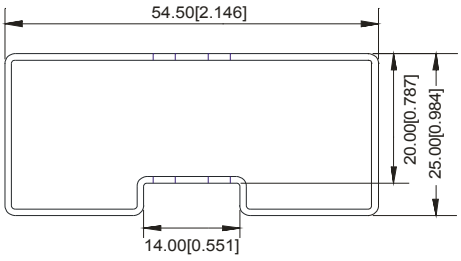
PACKAGE DIAGRAM

PCB mounting Series（Without heat sink）



Unit :mm[inch]
General tolerances: ±0.50mm[±0.020inch]
L=220mm[8.661inch] Pcs/Tube:7
Inner package dimensions: L*W*H= 255*170*80mm
Outer package dimensions(with six inner packaging boxes
L*W*H= 375*280*270mm

PCB mounting Series（With heat sink）



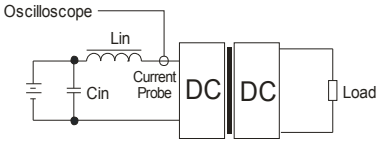
Unit :mm[inch]
General tolerances: ± 0.50mm[± 0.020inch]
L=220mm[8.661inch] Pcs/Tube:7
Inner package dimensions: L*W*H= 255*170*80mm
Outer package dimensions(with six inner packaging boxes)
L*W*H= 375*280*270mm

Special Package Series
（A2S/A4S）

Inner packaging box dimensions:
L*W*H=365*350*105mm
Packaging quantity: 48pcs
Outer packaging box dimensions:
L*W*H=390*360*245mm
Packaging quantity: 96pcs

TEST CONFIGURATIONS

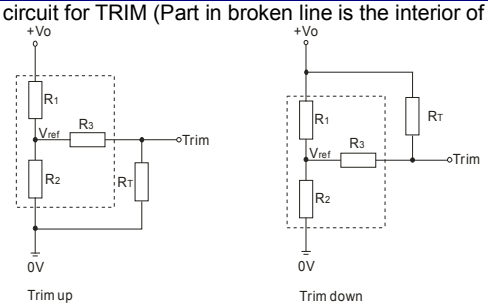
Input Reflected-Ripple Current Test Setup
Input reflected-ripple current is measured with an inductor Lin and Capacitor Cin to simulate source impedance.



Lin(4.7μH) Cin(220μF, ESR < 1.0Ω at 100 KHz)

TRIM APPLICATION & TRIM RESISTANCE

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



Formula for resistance of TRIM

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

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

Note: Leave open if not used. Value for R1, R2, R3, and V_{ref} refer to the above table 1. R_T: Resistance of Trim. a: User-defined parameter, no actual meanings. Vo': The trim up/down voltage.

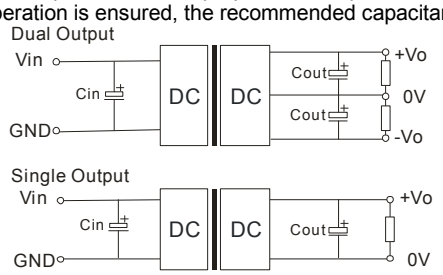
(Table 1)

Parameter \ Vo	3.3(VDC)	5(VDC)	12(VDC)	15(VDC)	24 (VDC)
R1(KΩ)	4.801	2.883	10.971	14.497	24.872
R2(KΩ)	2.863	2.864	2.864	2.864	2.863
R3(KΩ)	15	10	17.8	17.8	20
Vref(V)	1.24	2.5	2.5	2.5	2.5

RECOMMENDED CIRCUIT

If you want to further decrease the input surge voltage and the output ripple etc, an capacitor filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 3).

It should also be noted that the capacitance of filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of its filter capacitor sees (Table 2).



(Figure 3)

EXTERNAL CAPACITOR TABLE (Table 2)

Single Vout (VDC)	Cout (μF)	Cin (μF)	Dual Vout (VDC)	Cout# (μF)	Cin (μF)
3.3/5	470	100	±5	220	100
12/15	220		±12/±15	100	
24	100		±24	47	

Note: # For each output.

Cannot use in parallel and hot swap

Note:

1. Min. load shouldn't be less than 5%, otherwise ripple maybe increase dramatically, If the product operate under min. load, they may not meet all specification listed. Operation under minimum load will not damage the converter.
2. Max. Capacitive Load tested at nominal input voltage 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, non-standard models may perform differently, please contact our technical person for more detail.
6. Contact us for your specific requirement.
7. Specifications can be changed any time without notice.