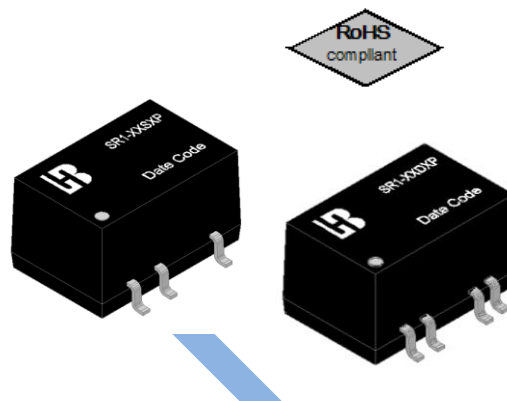


Features

- Compact SMD package
- Input / Output Isolation Voltage: 1.5K Vdc
- High Efficiency
- Lead Free Design, RoHS Compliant
- Operating temperature: -40°C to +85°C
- Continuous Short -Circuit Protection
- Meet Safety Standard / Approval: IEC / EN60950-1



Applications

These converters are well suitable for battery operated equipment, measurement equipment, telecom, wireless network, Industry control system, everywhere where isolated, tightly regulated voltages and compact size are required.

Technical Specification All specifications are typical at nominal input, full load and 25°C unless otherwise stated.

Model Number	Input Voltage Range(V)	Output Voltage (V)	Output Current (mA) ⁽¹⁾ Full Load	Input Current (mA) Typ.		Eff. (%) ⁽²⁾ Typ.	Capacitive Load, max. ⁽³⁾ (uF)
				No Load	Full Load		
SR1-05S1P	4.5-5.5 Nominal:5	5	200	28	260	77	220
SR1-05SAP		9	110		248	80	
SR1-05S2P		12	83		249	81	
SR1-05S3P		15	67		252	81	
SR1-12S1P	10.8-13.2 Nominal:12	5	200	17	107	78	
SR1-12SAP		9	110		106	78	
SR1-12S2P		12	83		105	80	
SR1-12S3P		15	67		107	80	
SR1-24S1P	21.6-26.4 Nominal:24	5	200	12	54	78	
SR1-24SAP		9	110		53	78	
SR1-24S2P		12	83		53	80	
SR1-24S3P		15	67		54	80	

Model Number	Input Voltage Range(V)	Output Voltage	Output Current (mA) ⁽¹⁾	Input Current (mA) Typ.		Eff. (%) ⁽²⁾ Typ.	Capacitive Load, max. ⁽³⁾ (uF)
		(V)	Full Load	No Load	Full Load		
SR1-05D1P	4.5-5.5 Nominal:5	±5	±100	28	260	77	200/200
SR1-05DAP		±9	±55		248	80	
SR1-05D2P		±12	±42		249	81	
SR1-05D3P		±15	±34		252	81	
SR1-12D1P	10.8-13.2 Nominal:12	±5	±100	17	107	78	
SR1-12DAP		±9	±55		106	78	
SR1-12D2P		±12	±42		105	80	
SR1-12D3P		±15	±34		107	80	
SR1-24D1P	21.6-26.4 Nominal:24	±5	±100	12	54	78	
SR1-24DAP		±9	±55		53	78	
SR1-24D2P		±12	±42		53	80	
SR1-24D3P		±15	±34		54	80	

Input Specifications

5V nominal input	4.5-5.5V
12V nominal input	10.8-13.2V
15V nominal input	13.5-16.5V

Input filter Capacitor

Environmental Specifications

Operating ambient temperature (1)	@ Ambient temperature with natural convection	-40°C to +85°C
Operating ambient temperature (2)	@ Case surface temperature	-40°C to +95°C
Storage temperature range		-55°C to +125°C
Relative humidity		95% RH max.

Output Specifications

Output power 1Watts max.

Voltage accuracy	Nominal Vin	
	5Vdc (Nominal Vin and at 60% load)	-5%+3%V
	9Vdc(Nominal Vin and at 80% load)	±3%%V
	12Vdc(Nominal Vin and at 80% load)	±3%%V
	15Vdc(Nominal Vin and at 80% load)	±3%%V

Voltage balance Dual output ±1% max.

Minimum load 10% load of full load

Line regulation For Vin change of 1% ±1.2% Typ.

Load regulation	Nominal Vin and 10%-100% load	
	5Vdc	13% Typ.
	9Vdc	9% Typ.
	12Vdc	8% Typ.
	15Vdc	7% Typ.

Ripple and Noise (20MHz Bandwidth) 50mVp-p Typ.
100mVp-p Max.

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Maximum capacitive load		See table
Output short circuit protection	Other models	Continuous, Automatic recovery
Temperature coefficient		±0.03%/°C Typ.

General Specifications

Efficiency	Nominal input and full load	See table
Isolation voltage	Input to output	1500VDC (60 second)
Isolation resistance	500VDC	1000MΩ min.
Isolation capacitance		30pF typ.
Switching frequency		150kHz typ. 300kHz max.
Reliability, calculated MTBF		2×10 ⁶ Hrs

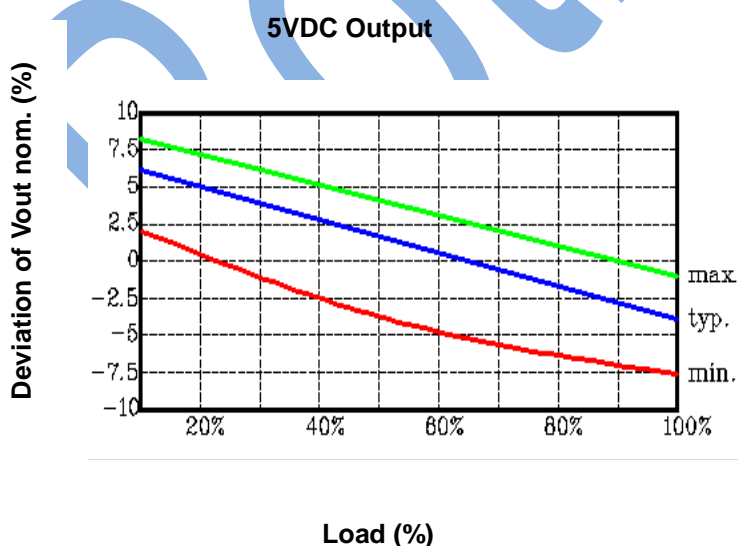
Physical Specifications

Case material		Plastic (UL94 V-0)
Potting material		PU (UL94 V-0)
Dimensions (Single output)		13.6× 8.8× 7.85 mm
Dimensions (Dual output)		15.2× 8.4× 7.6 mm
Weight		1.4g Typ.

Note

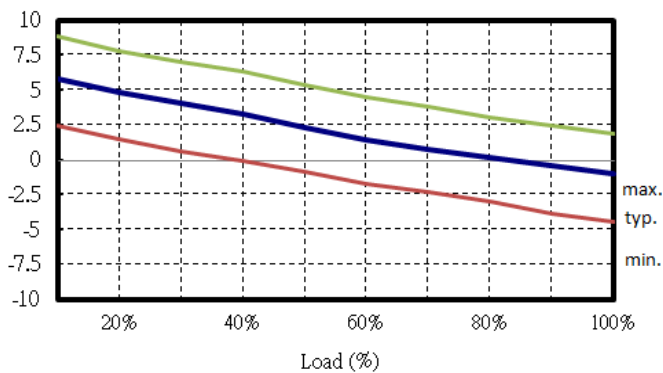
1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. For each output.
4. In case of long input lines or hot plug-in requirements, we recommended to use an external low ESR capacitor (22uF) near to the converter's input pins.
5. Specifications subject to change without notice.

Output voltage variation dependent on load (at nominal input voltage)



Other Output

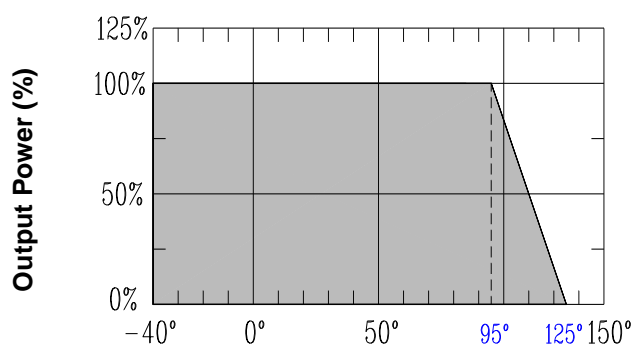
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 Website: bothhandww.com



Load (%)

Power Derating Curve

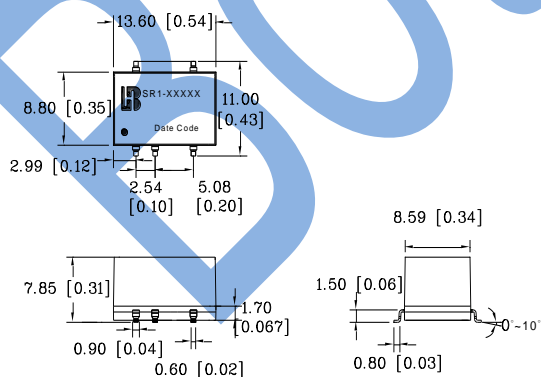
Power Derating Curve



Ambient Temp. TA (°C)

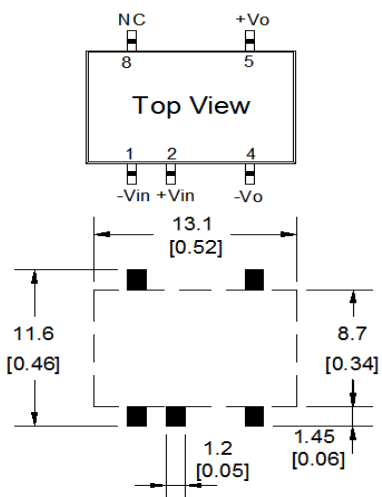
Mechanical Dimensions

Single output



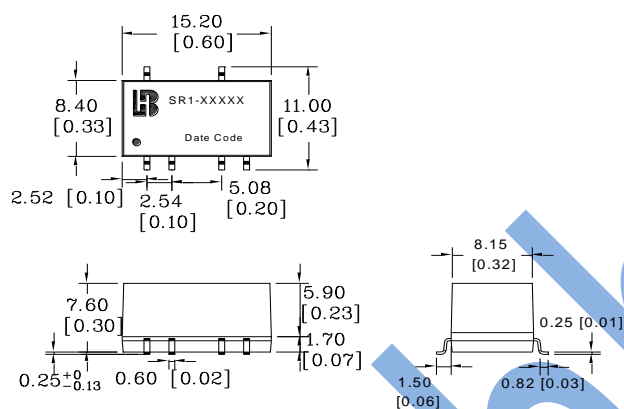
Pin	1.5KVdc - Single		Pin
1	-Vin	NC	8
2	+Vin	---	7
3	---	---	6
4	Vo (-)	Vo (+)	5

Solder Pad Dimension



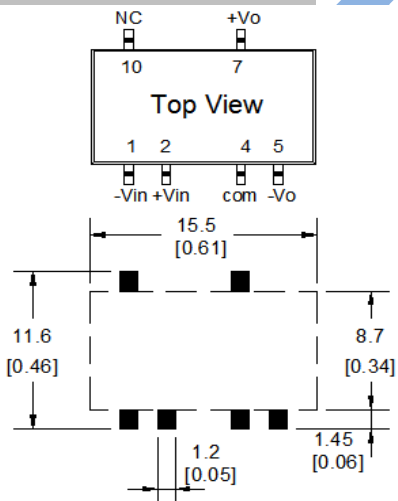
Units : mm (inch)
 Pin pitch tolerances: ± 0.10 (± 0.004)
 Other tolerances: ± 0.25 (± 0.01)

Dual output



Pin	1.5 KVdc	- Dual	Pin
1	-Vin	N.C.	10
2	+Vin	---	9
3	---	---	8
4	Com	Vo (+)	7
5	Vo (-)	---	6

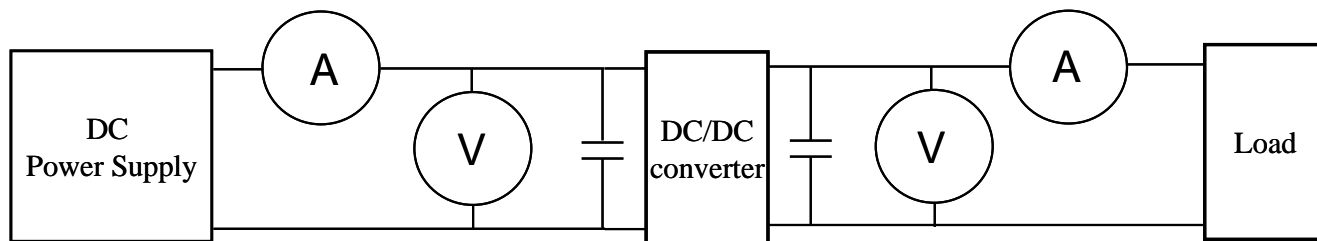
Solder Pad Dimension



Units : mm (inch)
 Pin pitch tolerances: ± 0.10 (± 0.004)
 Other tolerances: ± 0.25 (± 0.01)

Test Configurations

All specifications are typical at nominal input, full load and 25°C unless otherwise stated.



⊙DC Power Supply: It offers a wide voltage and current range precisely.

⊙Current meter (A): Accuracy → 200μA ~ 200mA 4 ranges $\pm(0.2\% \text{ rdg} + 2 \text{ digits})$
 2000mA ~ 20A 2 ranges $\pm(0.3\% \text{ rdg} + 2 \text{ digits})$.

⊙Voltage meter (V): Accuracy → $\pm(0.03\% \text{ rdg} + 4 \text{ digits})$.

⊙Load: At full load.

⊙Wires: The resistance of the wires must be small.

1. Input voltage range: Narrow input voltage range ($\pm 10\%$) · wide input voltage range (2:1 and 4:1) ·

EX: Narrow input voltage range ($\pm 10\%$)

5V nominal input	→	4.5~5.5V
12V nominal input	→	10.8~13.2V
24V nominal input	→	21.6~26.4V

Wide input voltage range 2:1

5V nominal input	→	4.5~9V
12V nominal input	→	9~18V
24V nominal input	→	18~36V
48V nominal input	→	36~75V

Wide input voltage range 4:1 (W)

24V nominal input	→	9~36V
48V nominal input	→	18~75V

2. Input power :

$$P_{in} = V_{in} \times I_{in}$$

V_{in} : Input voltage
 I_{in} : Input current

3. Output power :

$$P_{out} = V_{out} \times I_{out}$$

V_{out} : Output voltage
 I_{out} : Output current

4. Efficiency :

$$\text{Efficiency} = \frac{P_{out}}{P_{in}} \times 100\%$$

P_{out} : Output power
 P_{in} : Input power

5. Voltage accuracy:

$$\frac{|V_{out} - V_{out(nominal)}|}{V_{out}} \times 100\%$$

V_{out} : Output voltage
 $V_{out(nominal)}$: Nominal output voltage

6. Line regulation:

Narrow input voltage range ($\pm 10\%$) and unregulated output voltage series.

$$\text{Line regulation} = \frac{\Delta V_{out}}{\Delta V_{in}}$$

$$\Delta V_{out} = \frac{V_{out(+10\%)} - V_{out(-10\%)}}{V_{out}} \times 100\%$$

$V_{out(+10\%)}$: Output voltage at $V_{in} = 1.1 \times V_{in}(\text{nominal})$ & full load

$V_{out(-10\%)}$: Output voltage at $V_{in} = 0.9 \times V_{in}(\text{nominal})$ & full load

V_{out} : Output voltage at $V_{in} = V_{in}(\text{nominal})$ & full load

$$\Delta V_{in} = \frac{V_{in(+10\%)} - V_{in(-10\%)}}{V_{in}(\text{nominal})} \times 100\%$$

$V_{in(+10\%)}$: Input voltage = $1.1 \times V_{in}(\text{nominal})$

$V_{in(-10\%)}$: Input voltage = $0.9 \times V_{in}(\text{nominal})$

$V_{in}(\text{nominal})$: Nominal Input voltage

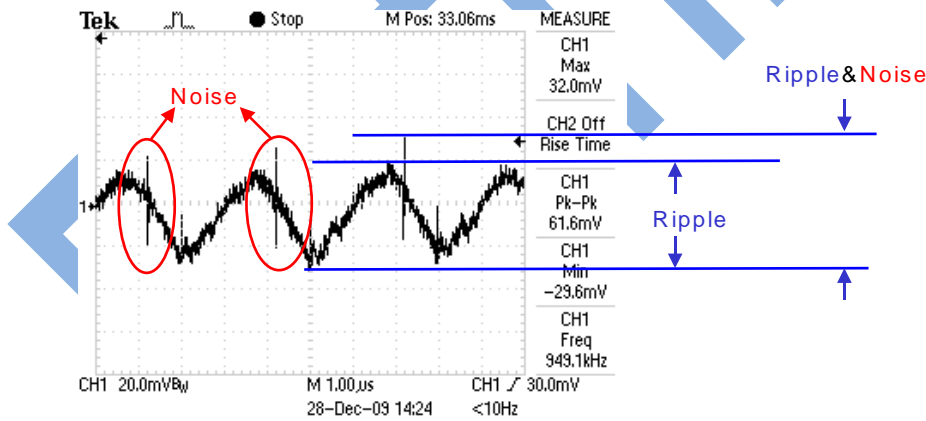
7. Load regulation :

$$\frac{|V_{out(FL)} - V_{out(NL)}|}{V_{out(FL)}} \times 100\%$$

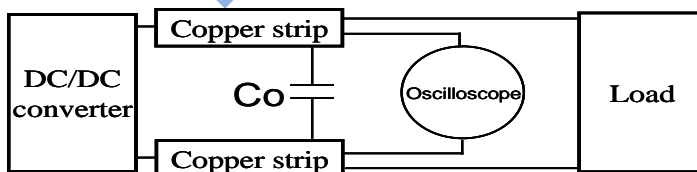
$V_{out(FL)}$: Output voltage at full load

$V_{out(NL)}$: Output voltage at 10% full load

8. Ripple and Noise: as shown below. The bandwidth is 0-20MHz.

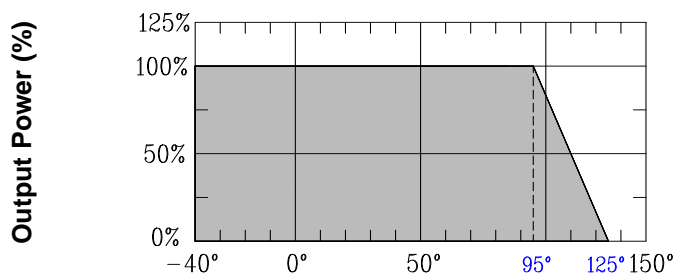


Output Ripple&Noise measurement test circuit: as shown below.



C_o : usually 0.47 μ F.

9. **Temperature derating curve:** The DC-DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below.



Ambient Temp.TA (°C)

10. **Switching frequency:** The nominal operating frequency of the DC-DC converters.
11. **Input to output isolation:** The dielectric breakdown strength test between input and output circuits. This is the isolation voltage the device is capable of withstanding for a specified time, usually 1 second or 1 minute.
12. **Input souce impedance:** The power module should be connected to low ac-impedance input souce. Highly inductive souce impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high , it maybe necessary to use a capacitor at the input to ensure startup. Capacitor mounted close to the power module helps ensure stability of the unit , it is commended to use a good quality low Equivalent Series Resistance (ESR < 0.1Ω at 100KHz) capacitor of a 22uF for the power module.

