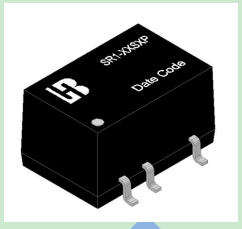
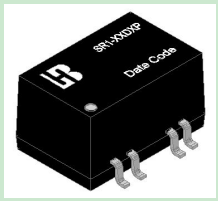
SR1 Series 1 Watt

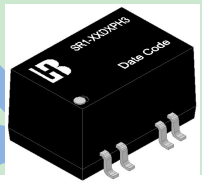
Isolated DC-DC Converters

BOTHHAND

Features







- Compact SMD package
- Input / Output Isolation Voltage: 1.5K Vdc or 3K Vdc
- High Efficiency
- Lead Free Design, RoHS Compliant
- Operating temperature: -40°C to +105°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. No Load	Input Current (mA) Typ. Full Load	Eff .(%) (2) Typ.	Capacitive Load, max. (3) (uF)
Single Output Series (1.5 KVdc)							
SR1-03S0P	2.97-3.63 Nominal:3.3	3.3	300	35	405	74	220
SR1-03S1P		5	200		394	77	
SR1-05S0P	4.5-5.5 Nominal:5	3.3	300	28	264	75	
SR1-05S1P		5	200		260	77	
SR1-05SAP		9	110		248	80	
SR1-05S2P		12	83		247	81	
SR1-05S3P		15	67		247	81	
SR1-12S0P	10.8-13.2 Nominal:12	3.3	300	17	109	76	
SR1-12S1P		5	200		107	78	
SR1-12SAP		9	110		107	78	
SR1-12S2P		12	83		104	80	
SR1-12S3P		15	67		104	80	
SR1-15S0P	13.5-16.5 Nominal:15	3.3	300	15	86	75	
SR1-15S1P		5	200		85	77	
SR1-15SAP		9	110		84	80	
SR1-15S2P		12	83		84	81	
SR1-15S3P		15	67		84	81	
SR1-24S0P	21.6-26.4 Nominal:24	3.3	300	12	58	76	
SR1-24S1P		5	200		57	78	
SR1-24SAP		9	110		55	78	
SR1-24S2P		12	83		55	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		
Dual Output Series (1.5 KVdc)							
SR1-03D0P	2.97-3.63 Nominal:3.3	±3.3	±150	35	405	74	100/100
SR1-03D1P		±5	±100		404	75	
SR1-05D0P	4.5-5.5 Nominal:5	±3.3	±150	28	264	75	
SR1-05D1P		±5	±100		260	77	
SR1-05DAP		±9	±55		248	80	
SR1-05D2P		±12	±42		247	81	
SR1-05D3P		±15	±34		247	81	
SR1-12D0P	10.8-13.2 Nominal:12	±3.3	±150	17	109	76	
SR1-12D1P		±5	±100		107	78	
SR1-12DAP		±9	±55		107	78	
SR1-12D2P		±12	±42		104	80	
Single Output Series (3 KVdc)							
SR1-05S1PH3	4.5-5.5 Nominal:5	5	200	28	260	77	100/100
Dual Output Series (3KVdc)							
SR1-05D2PH3	4.5-5.5 Nominal:5	±12	±42	28	248	80	100/100

Input Specifications		
	3.3V nominal input	2.97-3.63V
	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		-40°C to +105°C
Maximum case temperature		+125°C
Storage temperature range		-55°C to +125°C
Relative humidity		95% RH max.
Output Specifications		
Output power		1Watts max.
Voltage accuracy	Nominal Vin and full load 3.3Vdc 5Vdc 9Vdc 12Vdc 15Vdc	 3.135-3.399V 4.75-5.15V 8.73-9.18V 11.64-12.24V 14.55-15.30V
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 3.3Vdc 5Vdc 9Vdc 12Vdc 15Vdc	 15% Typ. 13% Typ. 9% Typ. 8% Typ. 7% Typ.
Ripple and Noise (20MHz Bandwidth)		50mVp-p Typ. 100mVp-p Max.
Maximum capacitive load		See table
Output short circuit protection	SR1-03SXP	3S Max.
	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/3000VDC (60 second)
Isolation resistance	500VDC	1000MΩ min.
Isolation capacitance		30pF typ.
Switching frequency		150kHz typ. 300kHz max.
Reliability, calculated MTBF		2×10^{6} Hrs

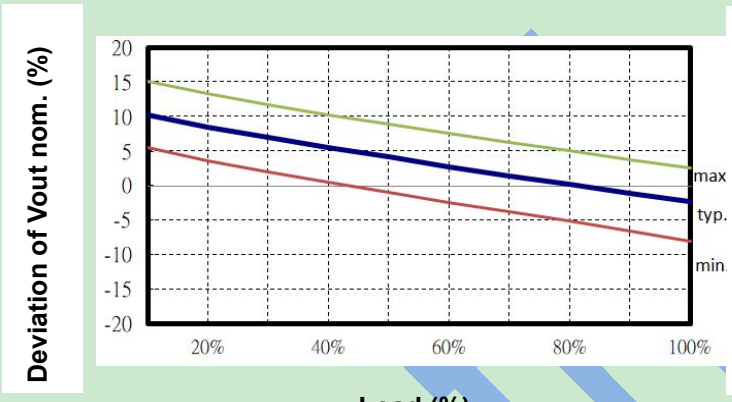
Physical Specifications	
Case material	Plastic (UL94 V-0)
Dimensions（Single output）	13.6× 8.8× 7.85 mm
Dimensions（Dual output）	15.2× 8.4× 7.6 mm
Weight	1.4g Typ.

Note

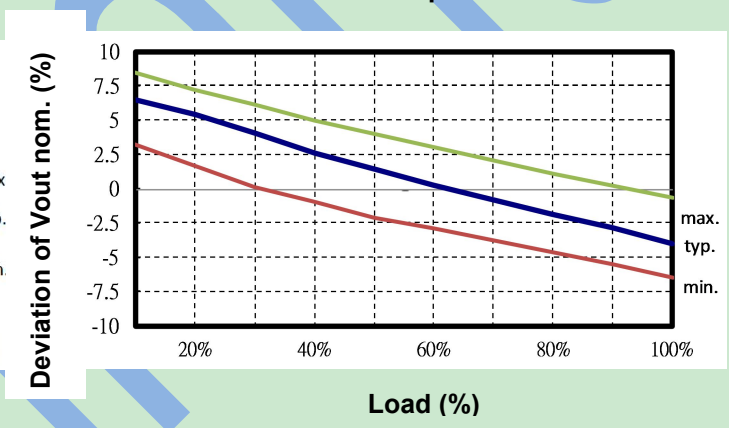
1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. In case of long input lines or hot plug-in requirements, we recommended to use an external low ESR capacitor (22uF) near to the converter's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

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

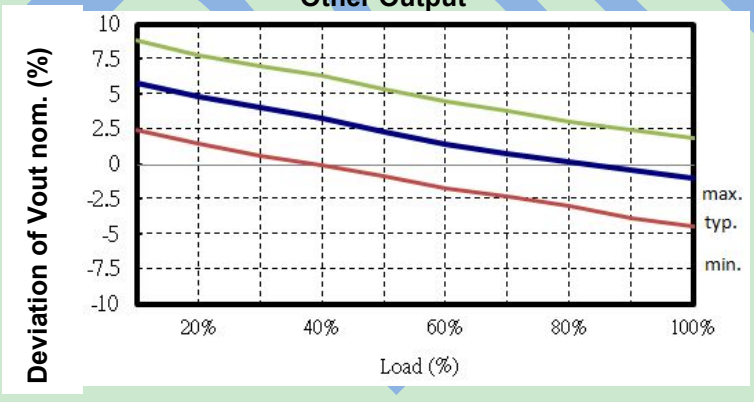
3.3VDC Output



5VDC Output

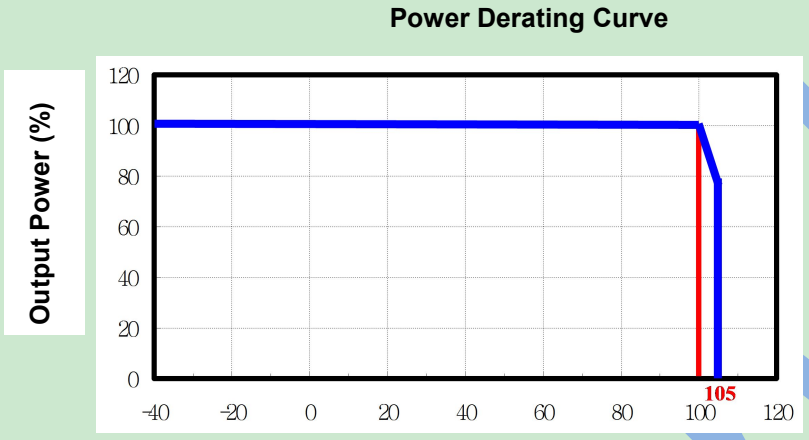


Other Output



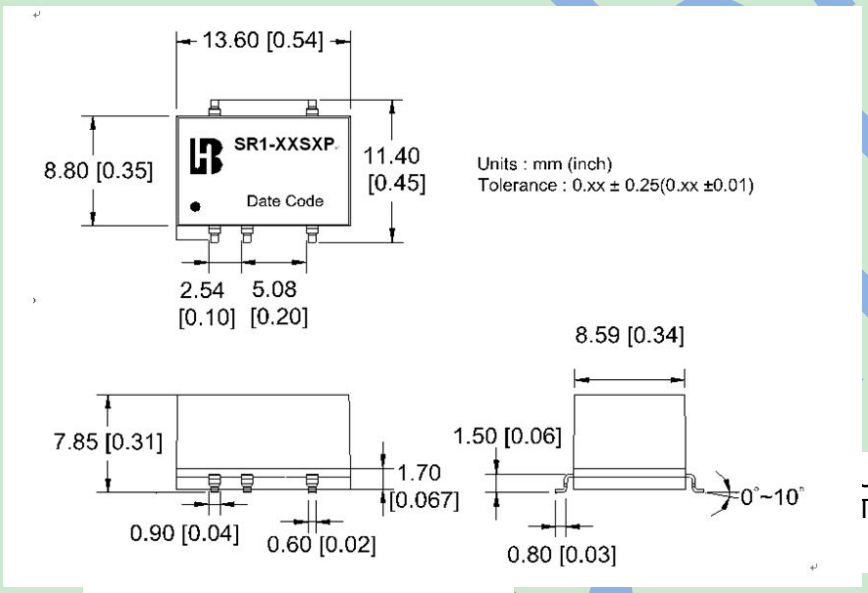
Load (%)

Power Derating Curve



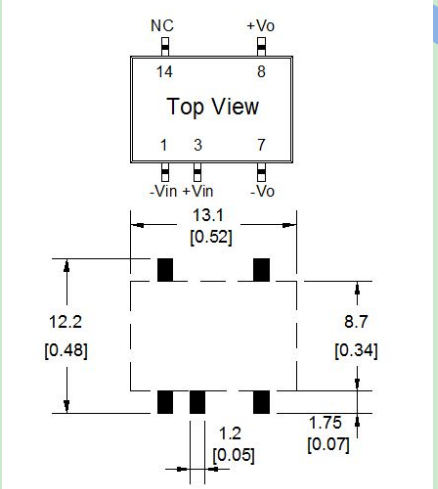
Mechanical Dimensions

Single output



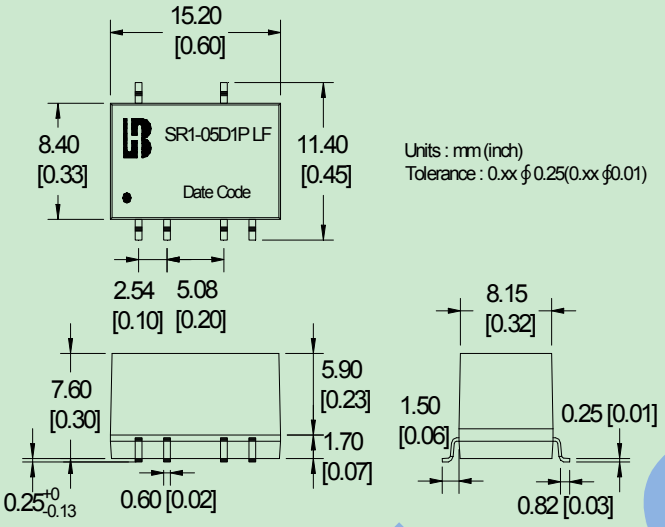
Pin	1.5KVdc - Single		Pin
1	-Vin	NC	14
3	+Vin	---	12
5	---	---	10
7	Vo (-)	Vo (+)	8

Jnit: mm (inch)
Tolerance: 0.XX ±0.25 (0.XX±0.01)

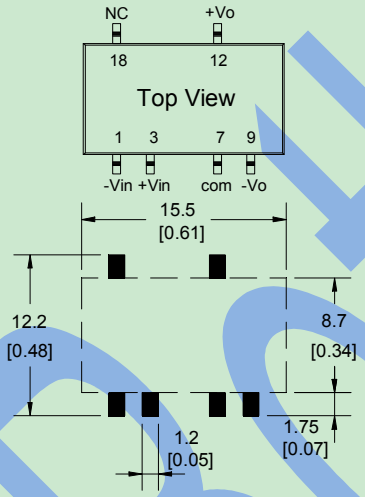


Units : mm (inch)
Tolerance : 0.xx ∮ 0.25(0.xx ∮0.01)

Dual output



Pin	1.5 KVdc /3KVdc - Dual		Pin
1	-Vin	N.C.	18
3	+Vin	---	16
5	---	---	14
7	Com	Vo (+)	12
9	Vo (-)	---	10

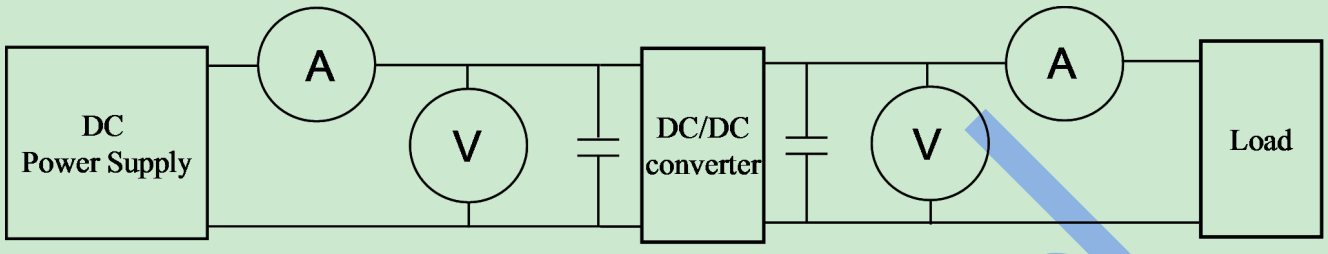


(SR1-xxDxxP)

Units : mm (inch)
Tolerance : 0.xx ± 0.25 (0.xx ± 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±(0.2% rdg + 2 digits)

2000mA ~ 20A 2 ranges±(0.3% rdg + 2 digits).

◎Voltage meter (V): Accuracy➔ ±(0.03% rdg + 4 digits).

◎Load: At full load.

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

1. Input voltage range: Narrow input voltage range（±10%）、wide input voltage range (2:1 and 4:1)。

EX: Narrow input voltage range（±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 :

Pin = Vin x Iin

Vin：Input voltage
Iin：Input current

3. Output power :

Pout = Vout x Iout

Vout：Output voltage
Iout：Output current

4. Efficiency :

$$\text{Efficiency} = \frac{Pout}{Pin} \times 100\%$$

Pout: Output power
Pin: Input power

5. Voltage accuracy:

$$\frac{|\text{Vout-Vout(nominal)}|}{\text{Vout}} \times 100\%$$

Vout：Output voltage

Vout(nominal)：Nominal output voltage

6. Line regulation:

Narrow input voltage range（±10%）and unregulated output voltage series.

$$\text{Line regulation} = \left| \frac{\Delta \text{Vout}}{\Delta \text{Vin}} \right|$$

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

Vout(+10%)：Output voltage at Vin = 1.1xVin(nominal)&full load

Vout(-10%)：Output voltage at Vin = 0.9xVin(nominal)&full load

Vout：Output voltage at Vin = Vin(nominal)&full load

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

Vin(+10%)：Input voltage = 1.1xVin(nominal)

Vin(-10%)：Input voltage = 0.9xVin(nominal)

Vin(nominal)：Nominal Input voltage

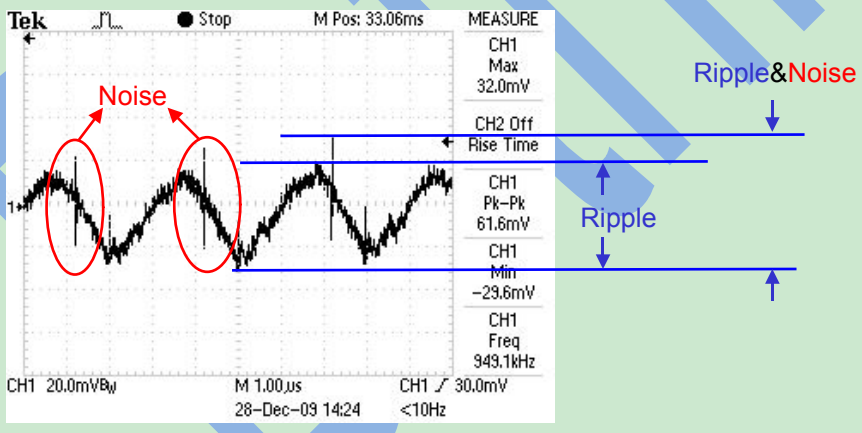
7. Load regulation :

$$\frac{|\text{Vout(FL)-Vout(NL)}|}{\text{Vout(FL)}} \times 100\%$$

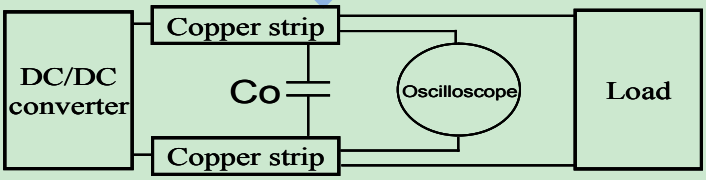
Vout(FL): Output voltage at full load

Vout(NL): Output voltage at 10% full load

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

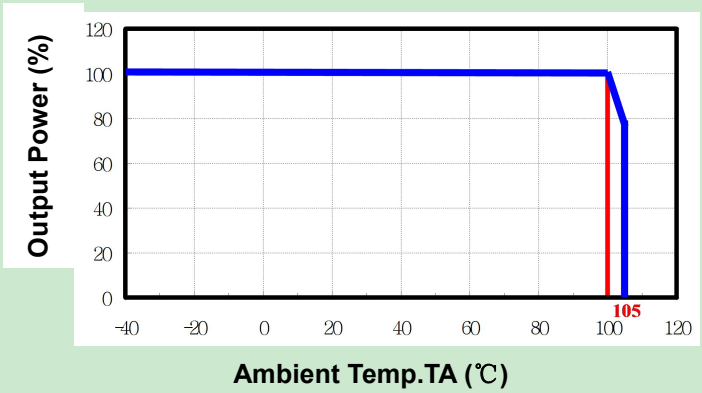


Output Ripple&Noise measurement test circuit: as shown below.



Co: usually 0.47uF.

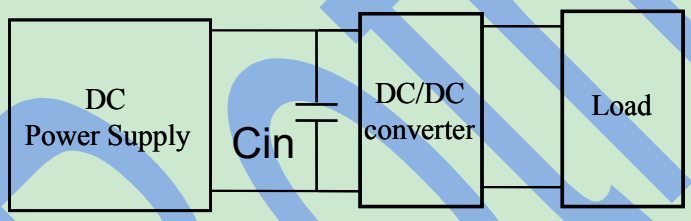
9. Temperature derating curve: The DC-DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below.



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.



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>>Bothhand(帛汉(帛漢))