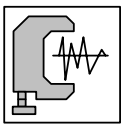
S210RA

2W, Low Cost DIP, Dual Output DC/DC Converters

Key Features

- *Low Cost*
- *500VDC Isolation*
- *MTBF > 800,000 Hours*
- *40mV P−P Ripple and Noise*
- *Input 12VDC*
- *Output ±15VDC*
- *Temperature Performance −25°C to +71°C*
- *Short Circuit Protection*
- *UL 94V−0 Package Material*
- *Internal SMD Construction*

Low Cost


Low Noise

I/O Isolation

Absolute Maximum Ratings

Parameter		Min.	Max.	Unit
Input Surge Voltage (1000 mS)	12VDC Input Models	−0.7	15	VDC
Lead Temperature (1.5mm from case for 10 Sec.)		−−−	260	°C
Internal Power Dissipation		−−−	3,000	mW

Exceeding the absolute maximum ratings of the unit could cause damage. These are not continuous operating ratings.

Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature	Ambient	−25	+71	°C
Operating Temperature	Case	−25	+90	°C
Storage Temperature		−40	+125	°C
Humidity		−−−	95	%
Cooling	Free−Air Convection			

Model Guide

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Efficiency
			Max.	Min.	@Max. Load	@No Load		@Max. Load
	VDC	VDC	mA	mA	mA (Typ.)	mA (Typ.)	mA (Typ.)	% (Typ.)
S210RA	12 (10.8 ~ 13.2)	±15	±66	0	280	40	30	59

Capacitive Load

Models by Vout	±15V #	Unit
Maximum Capacitive Load	220	uF

 # For each output

Input Fuse Selection Guide

S210RA
700mA Slow – Blow Type

Input Specifications

Parameter	Min.	Typ.	Max.	Unit
Input Voltage Range	10.8	12	13.2	VDC
Reverse Polarity Input Current	---	---	0.5	A
Short Circuit Input Power	---	---	2000	mW
Input Filter	Pi Filter			

Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		---	±2.0	±4.0	%
Output Voltage Balance	Dual Output, Balanced Loads	---	±1.0	±3.0	%
Line Regulation	Vin=Min. to Max.	---	±0.2	±0.5	%
Load Regulation	Io=10% to 100%	---	±0.2	±0.5	%
Ripple & Noise (20MHz)		---	40	50	mV P-P
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	75	mV P-P
Ripple & Noise (20MHz)		---	---	15	mV rms
Temperature Coefficient		---	±0.01	±0.02	%/°C
Output Short Circuit	Continuous				

General Specifications

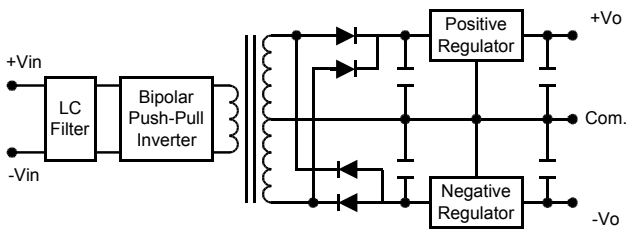
Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage Rated	60 Seconds	500	---	---	VDC
Isolation Voltage Test	Flash Tested for 1 Second	550	---	---	VDC
Isolation Resistance	500VDC	1000	---	---	MΩ
Isolation Capacitance	100KHz,1V	---	100	150	pF
Switching Frequency		40	80	---	KHz
MTBF	MIL-HDBK-217F @ 25°C, Ground Benign	800	---	---	K Hours

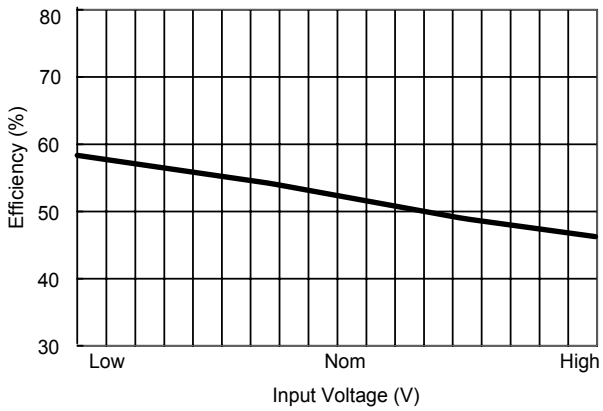
Notes:

1. Specifications typical at Ta=+25°C, resistive load, nominal input voltage, rated output current unless otherwise noted.
2. Ripple & Noise measurement bandwidth is 0-20 MHz.
3. All DC/DC converters should be externally fused at the front end for protection.
4. Other input and output voltage may be available, please contact factory.
5. Specifications subject to change without notice.

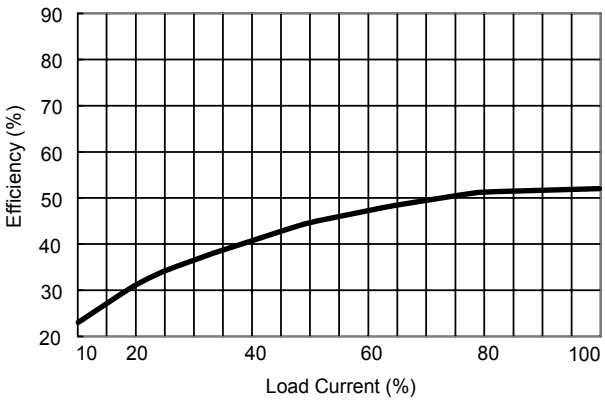
Block Diagram

Dual Output

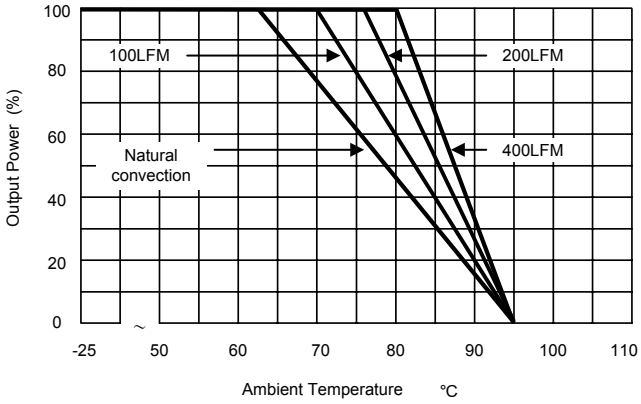




Efficiency vs Input Voltage



Efficiency vs Output Load



Derating Curve

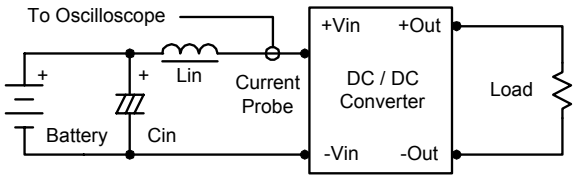
Test Configurations

Input Reflected-Ripple Current Test Setup

Input reflected−ripple current is measured with a inductor Lin (4.7uH) and Cin (220uF, ESR < 1.0Ω at 100 KHz) to simulate source impedance.

Capacitor Cin, offsets possible battery impedance.

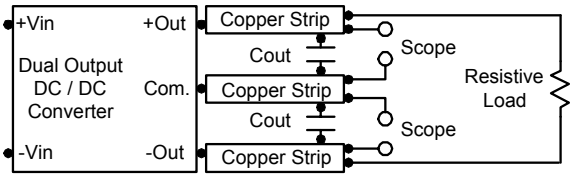
Current ripple is measured at the input terminals of the module, measurement bandwidth is 0−500 KHz.



Peak-to-Peak Output Noise Measurement Test

Use a Cout 0.33uF ceramic capacitor.

Scope measurement should be made by using a BNC socket, measurement bandwidth is 0−20 MHz. Position the load between 50 mm and 75 mm from the DC/DC Converter.



Design & Feature Considerations

Maximum Capacitive Load

The S210RA has limitation of maximum connected capacitance at the output.

The power module may be operated in current limiting mode during start−up, affecting the ramp−up and the startup time.

For optimum performance we recommend 220uF maximum capacitive load for dual outputs and 470uF capacitive load for single outputs.

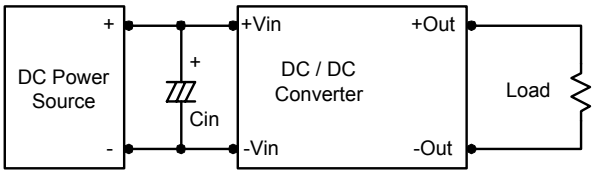
The maximum capacitance can be found in the data sheet.

Input Source Impedance

The power module should be connected to a low ac−impedance input source. Highly inductive source impedances can affect the stability of the power module.

In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.

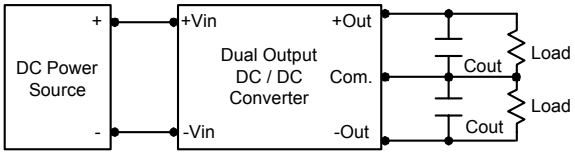
Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100 KHz) capacitor of a 2.2uF for the 5V input devices, a 1.0uF for the 12V input devices and a 0.47uF for the 24V and 48V devices.



Output Ripple Reduction

A good quality low ESR capacitor placed as close as practicable across the load will give the best ripple and noise performance.

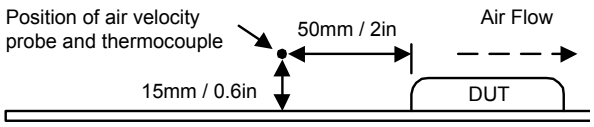
To reduce output ripple, it is recommended to use 1.5uF capacitors at the output.



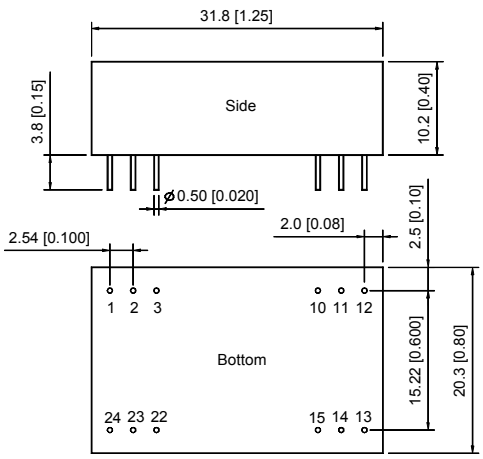
Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 90°C.

The derating curves are determined from measurements obtained in an experimental apparatus.



Mechanical Dimensions



Tolerance	Millimeters	Inches
	X.X±0.25	X.XX±0.01
	X.XX±0.13	X.XXX±0.005
Pin	±0.05	±0.002

Physical Characteristics

Case Size	:	31.8×20.3×10.2 mm 1.25×0.80×0.40 inches
Case Material	:	Black Coated Metal
Weight	:	12.1g
Flammability	:	UL94V−0

Pin Connections

Pin	Function
1	+Vin
2	−Vout
3	Common
10	Common
11	+Vout
12	−Vin
13	−Vin
14	+Vout
15	Common
22	Common
23	−Vout
24	+Vin