SA-0.5W Series

0.5W Unregulated Single output

Features

- 4 Pin SIL / 8 Pin DIL Package
- 1000 VDC Isolation
- Up to 3000 VDC Isolation
- Low Ripple and Noise
- Efficiency up to 83%
- -40 ~ 85°C Operation Temperature Range
- Non-Conductive Black Plastic Case
- EMI Complies With EN55022 Class B

The SA series is a family of cost effective 0.5W single output DC-DC converters. These converters achieve low cost and ultra-miniature SIP 4 pin or DIP 8 pin size. Devices are encapsulated using flame retardant resin. The models operate from input voltage of 3.3, 5, 12, 15, 24, 48 Vdc with output voltage of 3.3, 5,7.2, 9, 12,15, 18, 24 Vdc. High performance features include 1000Vdc~3000Vdc input/output isolation, high efficiency operation and output voltage accuracy of ±3% maximum. Standard features include an input range of ±10% tolerance and low output noise and ripple.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS

Voltage accuracy	±3%
Line regulation	±1.2% / Per 1% Vin Change
Load regulation	(From 20% to 100% Load) ±10% (Output 3.3V Model) ±20%
Ripple & noise (20 MHz bandwidth)(1)	100mV pk-pk
Temperature coefficient	±0.02%/°C
Capacitor load(2)	See table

INPUT SPECIFICATIONS

Voltage Range	±10%
Max. Input Current	See table
No-Load Input Current	See table
Input Filter	Capacitors
Input Reflected Ripple Current(3)	20mA pk-pk

GENERAL SPECIFICATIONS

Efficiency	See table
I/O Isolation Voltage(3 sec)	
Input/Output	1000~3000Vdc
I/O Isolation Capacitance	60 pF Typ.
I/O Isolation Resistance	1000M Ohm
Switching Frequency	Variable 80kHz
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>1.121Mhrs
Safety Standard : (designed to meet)	IEC 60950-1

ENVIRONMENT SPECIFICATIONS

Operating Temperature	-40°C~85°C (See Derating Curve)
Maximum Case Temperature	100°C
Storage Temperature	-40°C~125°C
Cooling	Nature Convection

Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	
SIP Case	0.5mm Alloy42 Solder-coated
DIP Case	Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	(SIP/1.5g) (DIP/1.8g)
Dimensions	SIP Case 0.46"x0.24"x0.40" DIP Case 0.50"x0.40"x0.27"

ABSOLUTE MAXIMUM RATINGS(4)

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

Input Surge Voltage(100mS)	
3.3 Models	6 Vdc ,max.
5 Models	7 Vdc ,max.
12 Models	15 Vdc ,max.
15 Models	18 Vdc ,max.
24 Models	28 Vdc ,max.
48 Models(for SIP)	54 Vdc ,max.
Soldering Temperature (1.5mm from case 10sec. max.)	260°C ,max.

EMC SPECIFICATIONS

Radiated Emissions	EN55022	CLASS B
Conducted Emissions (6)	EN55022	CLASS B
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT (7)	IEC 61000-4-4	Perf. Criteria A
Surge (7)	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

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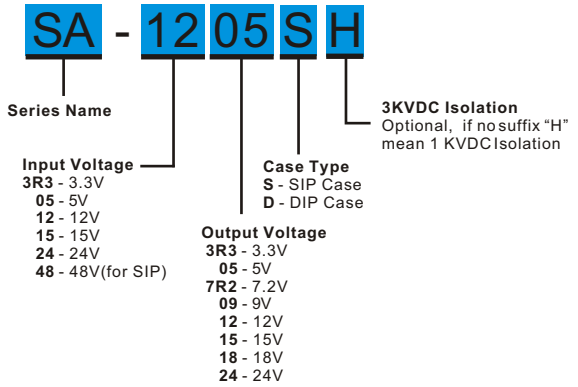
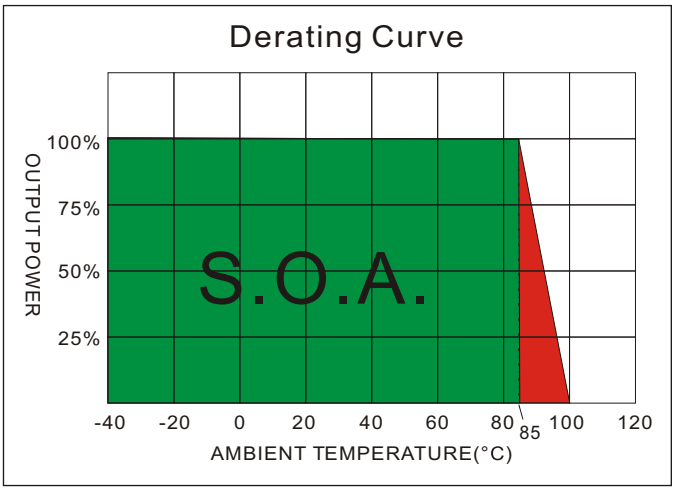
PART NUMBER STRUCTURE





MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA)	INPUT Current Full Load (mA)	OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
SA-3R33R3S	3.3	20	205	3.3	152	76	100
SA-3R305S	3.3	25	216	5	100	70	100
SA-3R37R2S	3.3	25	216	7.2	69	70	100
SA-3R309S	3.3	25	216	9	56	70	100
SA-3R312S	3.3	25	201	12	42	72	100
SA-3R315S	3.3	25	208	15	33	73	100
SA-3R318S	3.3	25	208	18	28	73	100
SA-3R324S	3.3	25	208	24	21	73	100
SA-053R3 S	5	20	132	3.3	152	76	100
SA-0505 S	5	13	121	5	100	83	100
SA-057R2 S	5	15	134	7.2	69	75	100
SA-0509 S	5	15	128	9	56	78	100
SA-0512 S	5	18	127	12	42	79	100
SA-0515 S	5	22	130	15	33	77	100
SA-0518 S	5	20	127	18	28	79	100
SA-0524 S	5	25	134	24	21	75	100
SA-123R3 S	12	15	58	3.3	152	72	100
SA-1205 S	12	10	54	9	100	78	100
SA-127R2 S	12	15	57	7.2	69	73	100
SA-1209 S	12	15	57	9	56	73	100
SA-1212 S	12	20	58	12	42	72	100
SA-1215 S	12	20	61	15	33	69	100
SA-1218 S	12	15	61	18	28	68	100
SA-1224 S	12	15	59	24	21	71	100
SA-153R3 S	15	10	44	3.3	152	75	100
SA-1505 S	15	8	43	5	100	78	100
SA-157R2 S	15	12	44	7.2	69	75	100
SA-1509 S	15	12	44	9	56	75	100
SA-1512 S	15	10	44	12	42	77	100
SA-1515 S	15	15	48	15	33	70	100
SA-1518 S	15	12	51	18	28	66	100
SA-1524 S	15	10	51	24	21	66	100

Suffix "H" means 3 KVdc isolation

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MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA)	INPUT Current Full Load (mA)	OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
SA-243R3 S	24	8	31	3.3	152	69	100
SA-2405 S	24	8	29	5	100	73	100
SA-247R2 S	24	10	30	7.2	69	70	100
SA-2409 S	24	10	30	9	56	71	100
SA-2412 S	24	8	30	12	42	71	100
SA-2415 S	24	10	29	15	33	73	100
SA-2418 S	24	10	29	18	28	73	100
SA-2424 S	24	10	29	24	21	72	100
SA-483R3 S	48	6	17	3.3	152	60	100
SA-4805 S	48	6	16	5	100	66	100
SA-487R2 S	48	6	17	7.2	69	60	100
SA-4809 S	48	6	17	9	56	62	100
SA-4812 S	48	6	17	12	42	64	100
SA-4815 S	48	6	17	15	33	62	100
SA-4818 S	48	6	17	18	28	62	100
SA-4824 S	48	10	18	24	21	61	100
SA-3R33 R3D	3.3	20	205	3.3	152	76	100
SA-3R3 05D	3.3	25	216	5	100	70	100
SA-3R37 R2D	3.3	25	216	7.2	69	70	100
SA-3R3 09D	3.3	25	216	9	56	70	100
SA-3R3 12D	3.3	25	201	12	42	72	100
SA-3R3 15D	3.3	25	208	15	33	73	100
SA-3R3 18D	3.3	25	208	18	28	73	100
SA-3R3 24D	3.3	25	208	24	21	73	100
SA-053R3D	5	16	132	3.3	152	76	100
SA-0505D	5	15	124	5	100	81	100
SA-057R2D	5	15	134	7.2	69	75	100
SA-0509D	5	15	128	9	56	78	100
SA-0512D	5	18	127	12	42	79	100
SA-0515D	5	22	130	15	33	77	100
SA-0518D	5	20	127	18	28	79	100
SA-0524D	5	25	134	24	21	75	100
SA-123R3D	12	15	58	3.3	152	73	100
SA-1205D	12	12	54	5	100	78	100
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SA-1512D	15	10	44	12	42	77	100
SA-1515D	15	15	48	15	33	70	100
SA-1518D	15	12	51	18	28	66	100
SA-1524D	15	10	51	24	21	66	100

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SA-2405D	24	10	29	5	100	74	100
SA-247R2D	24	10	31	7.2	69	69	100
SA-2409D	24	10	30	9	56	71	100
SA-2412D	24	10	31	12	42	69	100
SA-2415D	24	9	31	15	33	69	100
SA-2418D	24	10	29	18	28	73	100
SA-2424D	24	10	29	24	21	72	100

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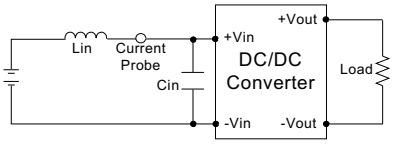
TEST CONFIGURATIONS

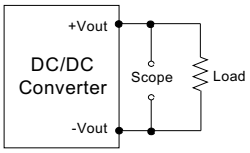
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor Lin(12uH) and a source capacitor Cin(47uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

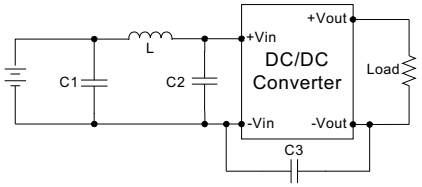
The Scope measurement bandwidth is 20MHz.



EMI Filter

Input filter components (C1 , L , C2 , C3) are used to help meet conducted emissions requirement for the module.

These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1	L	C2	C3
SA-3R3XXXXX	1210, 2.2uF/100V	18uH		
SA-05XXXXX	1210, 2.2uF/100V	18uH		
SA-12XXXXX	1210, 2.2uF/100V	18uH		
SA-15XXXXX	1210, 2.2uF/100V	18uH		
SA-24XXXXX	1210, 2.2uF/100V	18uH	1210, 2.2uF/100V	1206, 470pF/2KV
SA-48XXXXX	Electrolytic capacitor, 10uF/100V	18uH	1210, 2.2uF/100V	1206, 470pF/2KV

NOTE

1. Ripple/Noise measured with 20MHz bandwidth.
2. Tested by minimal Vin and constant resistive load.
3. Measured Input reflected ripple current with a simulated source inductance of 12uH.
4. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
5. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
6. Input filter components are be required to help meet conducted emission class B, which application refer to the EMI Filter of design & feature configuration.
7. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5. The filter capacitor Schmid-M suggest: Nippon - chemi - con KY series, 470uF/100V.

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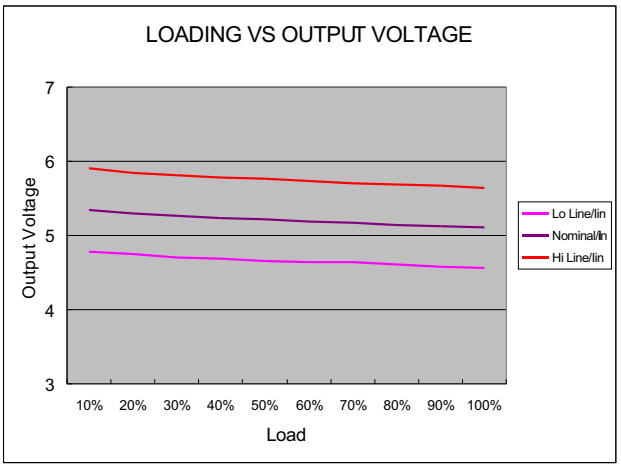
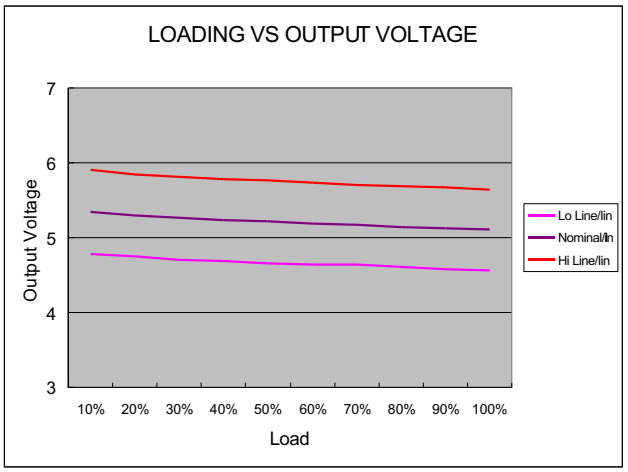
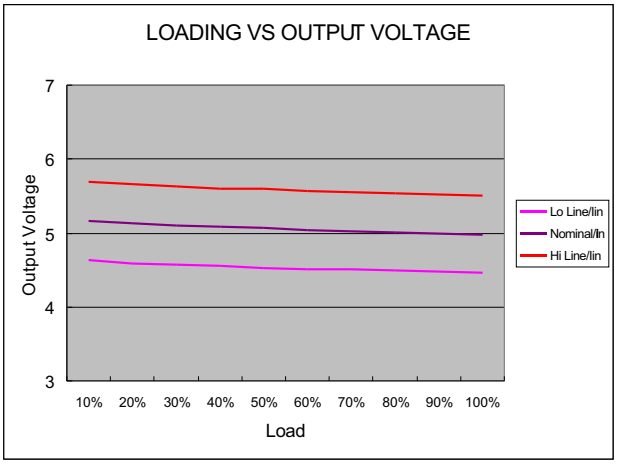


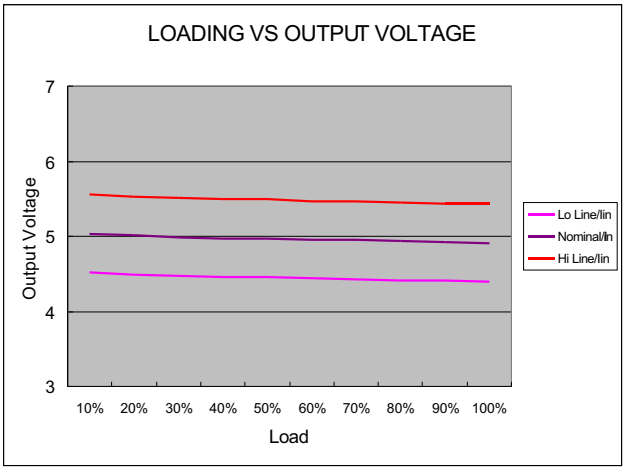
05 Models



12 Models

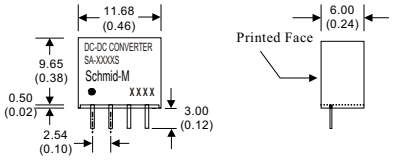


24 Models

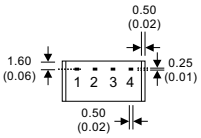


48 Models

MECHANICAL SPECIFICATIONS



* The thickness of 48V input voltage model is 7.50(0.29)

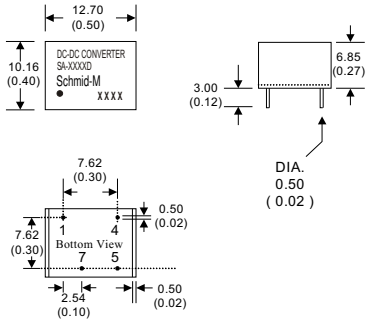


4 Pin SIL Package

Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5±0.05 (0.02±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)

PIN CONNECTIONS	
PIN NUMBER	SINGLE
1	−V Input
2	+V Input
3	−V Output
4	+V Output

(The Pin Connection of high isolation one is the same with normal one.)



8 Pin DIL Package

Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5±0.05 (0.02±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)

PIN CONNECTIONS	
PIN NUMBER	SINGLE
1	−V Input
4	+V Input
5	+V Output
7	−V Output

(The Pin Connection of high isolation one is the same with normal one.)