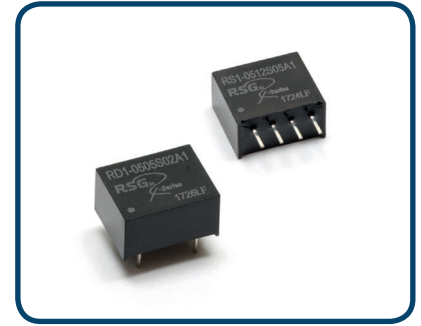


- 4 Pin SIL / 8 Pin DIL Package
- ± 10 % Input Range
- 1000 or 3000 VDC Isolation
- EMI Complies with EN55032 Class B
- Efficiency up to 83%
- Operating Temperature Range: – 40 °C ~ + 85 °C
- Optional Continuous Short Circuit Protection On Request
- Low Ripple and Noise
- Non Conductive Black Plastic Case

Picture similar



Output Specifications	
Voltage Accuracy	± 3 %, max.
Maximum Output Current	See table
Line Regulation	± 1.2 % max. (per ± 1 % $V_{in}$ Change)
Load Regulation	from 20 % to 100 % Load: ± 10 % max. Output 3.3 V Model: ± 20 %
Cross Regulation (Dual Output)	–
Short Circuit Protection	Optional Continuous SCP on request
Ripple & Noise (20 MHz Bandwidth)	100 mV pk-pk
Temperature Coefficient	± 0.02 % / °C

Input Specifications	
Voltage Range	See table
Start-up Time	–
No-Load / Full-Load Input Current	See table
Input Filter	C / L (see filter details on following pages)
Input Reflected Ripple Current	20 mA pk-pk typ.
Surge Voltage (100 ms) <sup>1)</sup>	
3.3 V Models	6 VDC max.
5 V Models	7 VDC max.
12 V Models	15 VDC max.
15 V Models	18 VDC max.
24 V Models	28 VDC max.
48 V Models	54 VDC max.

General Specifications	
I/O Isolation Voltage (60 sec)	1000 ~ 3000 VDC
Out1 / Out2 Isolation Voltage (Dual Separate)	–
I/O Isolation Capacitance	60 pF typ.
I/O Isolation Resistance	1000 MΩ, min.
Switching Frequency	Variable 80 kHz
Humidity	95 % rel H
Reliability Calculated MTBF	> 1.121 Mhrs (MIL-HDBK-217 f)
Safety Standard(s)	IEC / EN60950-1 (designed to meet)

Environmental Specifications	
Operating Temperature Range	– 40 °C ~ + 85 °C (see Derating Curve)
Maximum Case Temperature	100 °C
Storage Temperature	– 40 °C ~ + 125 °C
Cooling	Natural Convection
Soldering Profile and Peak Temperature	Wave Flow: 260 °C (1.5 mm from case), 10 s, max.

Physical Specifications	
Case Material	Non-conductive Black Plastic (UL94V-0 rated)
Pin Material SIP Case	0.5 mm Alloy42 Solder-coated
Pin Material DIP Case	0.5 mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight SIP Case	1.5 g
Weight DIP Case	1.8 g
Dimensions SIP Case	0.46" x 0.24" x 0.40"
Dimensions DIP Case	0.50" x 0.40" x 0.27"

EMC Specifications	
Radiated / Conducted Emissions	EN55032 Class B see EMI Filter
ESD	IEC 61000-4-2 Perf. Criteria A
Rad. RF	IEC 61000-4-3 Perf. Criteria A
EFT	IEC 61000-4-4 Perf. Criteria A
Surge	IEC 61000-4-5 Perf. Criteria A
Cond. RF	IEC 61000-4-6 Perf. Criteria A
PFMF	IEC 61000-4-8 Perf. Criteria A
VD/SI/VV	–

<sup>1)</sup> These are stress ratings; exposure of devices to any of these conditions may adversely affect long-term reliability.

All specifications typical at  $T_a = 25\text{ °C}$ , nominal input voltage and full load, unless otherwise specified.

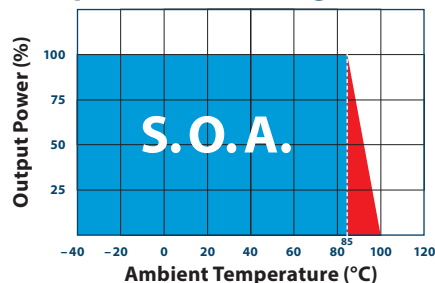
The information and specification contained in this data sheet are believed to be correct at time of publication. However, AcAl BFi accepts no responsibility for consequences arising from printing errors or inaccuracies. Specifications are subject to change without notice.

## Number structure RS1 / RD1 Series

RS1	–	05	15	S	10	A	3
Name / package		V-input nom.	V-output	Output type	Power	Int. Code	Isolation
RS1 = SIL4 RD1 = DIL8		03 = 3.3 V 05 = 5 V ... 48 = 48 V	03 = 3.3 V 05 = 5 V ... 24 = 24 V	S = Single D = Dual* E = Separate*	02 = 0.25 W 05 = 0.50 W ... 30 = 3.00 W	Logistics Code	1 = 1.0 kVDC 3 = 3.0 kVDC

(\*RD1 only)

### Temperature Derating Curve



## Model Selection Guide

Suffix X = 1 means 1 kVDC and X = 3 means 3 kVDC Isolation Voltage

Model Number	Input			Output		Efficiency	Capacitor Load
	Voltage (VDC)	No-Load Current (mA, max.)	Full Load Current (mA, typ.)	Voltage (VDC)	Full Load Current (mA)	@ Full Load (% , typ.)	@ Full Load (µF, max.)
RS1-0303S10AX	3.3	25	421	3.3	303	72	220
RS1-0305S10AX	3.3	25	394	5	200	77	220
RS1-0307S10AX	3.3	25	384	7.2	138,9	79	220
RS1-0309S10AX	3.3	30	404	9	111,1	75	220
RS1-0312S10AX	3.3	45	473	12	100	77	220
RS1-0315S10AX	3.3	35	384	15	66,6	79	220
RS1-0318S10AX	3.3	35	399	18	55,5	76	220
RS1-0324S10AX	3.3	53	461	24	50	79	220
RS1-0503S10AX	5	20	257	3.3	303	78	220
RS1-0505S10AX	5	25	247	5	200	81	220
RS1-0507S10AX	5	16	241	7.2	138,9	83	220
RS1-0509S10AX	5	26	250	9	111,1	80	220
RS1-0512S10AX	5	25	300	12	100	80	220
RS1-0515S10AX	5	35	244	15	66,6	82	220
RS1-0518S10AX	5	25	247	18	55,5	81	220
RS1-0524S10AX	5	35	289	24	50	83	220
RS1-1203S10AX	12	15	107	3.3	303	78	220
RS1-1205S10AX	12	16	105	5	200	79	220
RS1-1207S10AX	12	16	100	7.2	138,9	83	220
RS1-1209S10AX	12	15	107	9	111,1	78	220
RS1-1212S10AX	12	20	125	12	100	80	220
RS1-1215S10AX	12	15	105	15	66,6	79	220
RS1-1218S10AX	12	20	104	18	55,5	80	220
RS1-1224S10AX	12	25	123	24	50	71	220
RS1-1503S10AX	15	15	89	3.3	303	75	220
RS1-1505S10AX	15	9	82	5	200	81	220
RS1-1507S10AX	15	12	88	7.2	138,9	76	220
RS1-1509S10AX	15	10	90	9	111,1	74	220
RS1-1512S10AX	15	13	100	12	100	80	220
RS1-1515S10AX	15	15	84	15	66,6	79	220
RS1-1518S10AX	15	12	85	18	55,5	78	220
RS1-1524S10AX	15	10	99	24	50	81	220

continued on the next page

## Model Selection Guide, continued

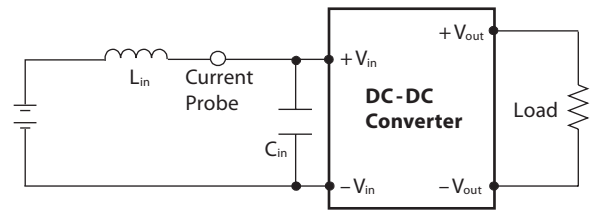
Suffix X = 1 means 1 kVDC and X = 3 means 3 kVDC Isolation Voltage

Model Number	Input			Output		Efficiency	Capacitor Load
	Voltage (VDC)	No-Load Current (mA, max.)	Full Load Current (mA, typ.)	Voltage (VDC)	Full Load Current (mA)	@ Full Load (% , typ.)	@ Full Load (µF, max.)
RS1-2403S10AX	24	8	54	3.3	303	77	220
RS1-2405S10AX	24	8	52	5	200	80	220
RS1-2407S10AX	24	10	54	7.2	138,9	77	220
RS1-2409S10AX	24	7	54	9	111,1	77	220
RS1-2412S10AX	24	8	62	12	100	80	220
RS1-2415S10AX	24	8	51	15	66,6	81	220
RS1-2418S10AX	24	8	52	18	55,5	80	220
RS1-2424S10AX	24	9	60	24	50	83	220
RS1-4803S10AX	48	6	29	3.3	303	73	220
RS1-4805S10AX	48	6	28	5	200	74	220
RS1-4807S10AX	48	7	27	7.2	138,9	77	220
RS1-4809S10AX	48	5	27	9	111,1	78	220
RS1-4812S10AX	48	5	32	12	100	77	220
RS1-4815S10AX	48	5	27	15	66,6	76	220
RS1-4818S10AX	48	8	28	18	55,5	75	220
RS1-4824S10AX	48	8	31	24	50	80	220
RD1-0303S10AX	3.3	25	410	3.3	303	74	220
RD1-0305S10AX	3.3	25	394	5	200	77	220
RD1-0307S10AX	3.3	30	404	7.2	138,9	75	220
RD1-0309S10AX	3.3	30	399	9	111,1	76	220
RD1-0312S10AX	3.3	45	485	12	100	75	220
RD1-0315S10AX	3.3	25	384	15	66,6	79	220
RD1-0318S10AX	3.3	35	399	18	55,5	76	220
RD1-0324S10AX	3.3	90	485	24	50	75	220
RD1-0503S10AX	5	16	256	3.3	303	78	220
RD1-0505S10AX	5	15	253	5	200	79	220
RD1-0507S10AX	5	16	241	7.2	138,9	83	220
RD1-0509S10AX	5	25	253	9	111,1	79	220
RD1-0512S10AX	5	25	296	12	100	81	220
RD1-0515S10AX	5	25	244	15	66,6	82	220
RD1-0518S10AX	5	25	241	18	55,5	83	220
RD1-0524S10AX	5	28	293	24	50	82	220
RD1-1203S10AX	12	15	108	3.3	303	77	220
RD1-1205S10AX	12	16	105	5	200	79	220
RD1-1207S10AX	12	16	100	7.2	138,9	83	220
RD1-1209S10AX	12	15	105	9	111,1	79	220
RD1-1212S10AX	12	20	125	12	100	80	220
RD1-1215S10AX	12	17	105	15	66,6	79	220
RD1-1218S10AX	12	15	103	18	55,5	81	220
RD1-1224S10AX	12	25	127	24	50	79	220
RD1-1503S10AX	15	15	89	3.3	303	75	220
RD1-1505S10AX	15	10	83	5	200	80	220
RD1-1507S10AX	15	12	88	7.2	138,9	76	220
RD1-1509S10AX	15	10	85	9	111,1	78	220
RD1-1512S10AX	15	13	98	12	100	82	220
RD1-1515S10AX	15	15	83	15	66,6	80	220
RD1-1518S10AX	15	12	85	18	55,5	78	220
RD1-1524S10AX	15	10	99	24	50	81	220
RD1-2403S10AX	24	8	53	3.3	303	79	220
RD1-2405S10AX	24	8	53	5	200	79	220
RD1-2407S10AX	24	10	56	7.2	138,9	74	220
RD1-2409S10AX	24	7	53	9	111,1	79	220
RD1-2412S10AX	24	8	63	12	100	80	220
RD1-2415S10AX	24	8	52	15	66,6	80	220
RD1-2418S10AX	24	8	51	18	55,5	82	220
RD1-2424S10AX	24	9	61	24	50	82	220

## Test Configurations

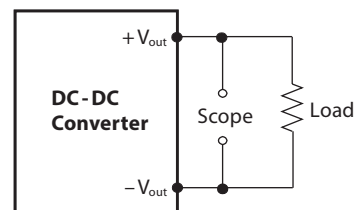
### Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor  $L_{in}$  (12  $\mu$ H) and a source capacitor  $C_{in}$  (47  $\mu$ F, ESR < 1.0  $\Omega$  at 100 kHz) at nominal input and full load.



### Output Ripple & Noise Measurement Test

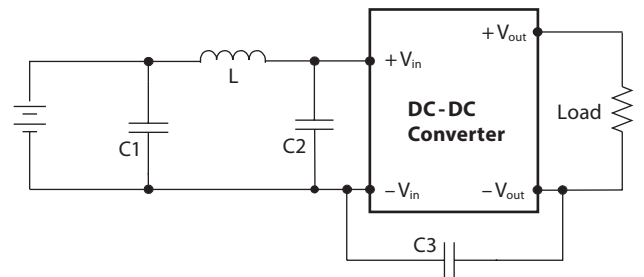
The Scope measurement bandwidth is 20 MHz.



### EMI Filter

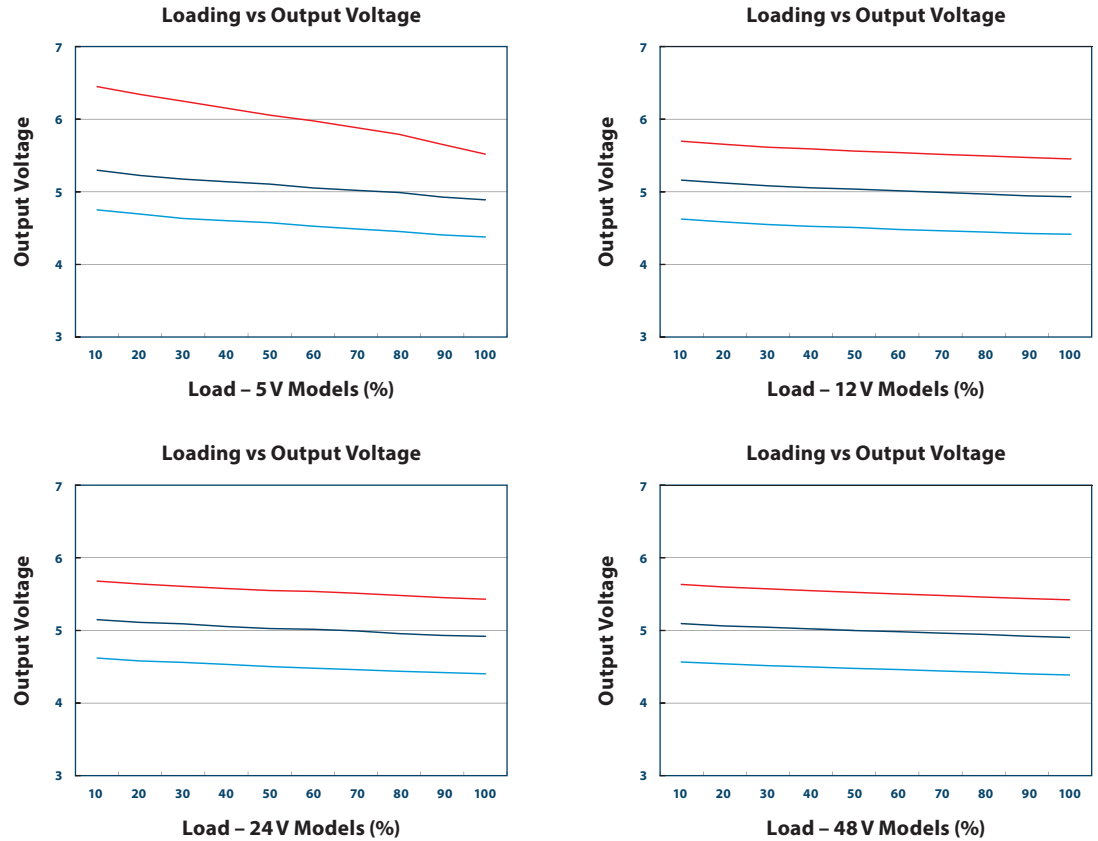
Input filter components ( $C_1$ ,  $L$ ,  $C_2$ ,  $C_3$ ) are used to help meet conducted emissions requirement for the module.

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



$V_{in}$	$C_1$	$L$	$C_2$	$C_3$
3.3V, 5V, 12V, 15V	1210, 2.2 $\mu$ F / 100 V	18 $\mu$ H		
24V	1210, 2.2 $\mu$ F / 100 V	18 $\mu$ H	1210, 2.2 $\mu$ F / 100 V	1206, 470 pF / 2 kV
48V	Electrolytic capacitor, 10 $\mu$ F / 100 V	18 $\mu$ H	1210, 2.2 $\mu$ F / 100 V	1206, 470 pF / 2 kV

# Electrical Characteristic Curves



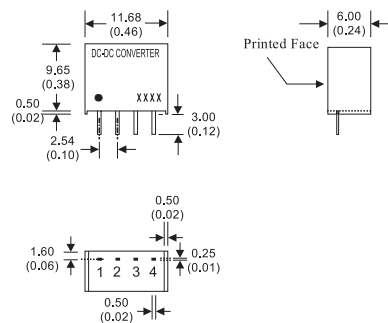
# Mechanical Specifications

## 4 Pin SIL Package

**Notes : All dimensions are typical in millimeters (inches).**

1. Pin diameter:  $0.5 \pm 0.05$  (0.02 ± 0.002)
2. Pin pitch and length tolerance:  $\pm 0.35$  (± 0.014)
3. Case Tolerance:  $\pm 0.5$  (± 0.02)

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



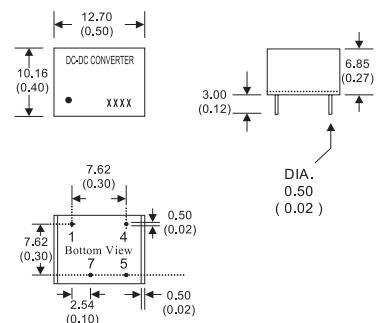
Pin Number	Single
1	-V Input
2	+V Input
3	-V Output
4	+V Output

## 8 Pin DIL Package

**Notes : All dimensions are typical in millimeters (inches).**

1. Pin diameter:  $0.5 \pm 0.05$  (0.02 ± 0.002)
2. Pin pitch and length tolerance:  $\pm 0.35$  (± 0.014)
3. Case Tolerance:  $\pm 0.5$  (± 0.02)

Pin Number	Single
1	-V Input
4	+V Input
5	+V Output
7	-V Output



# Notes

- Ripple/Noise measured with 20MHz bandwidth.
- Capacitive load is tested at minimal  $V_{in}$  and constant resistive load.
- Measured Input reflected ripple current with a simulated source inductance of 12  $\mu H$  and a source capacitor  $C_{in}$  (47  $\mu F$ , ESR < 1.0W at 100kHz).
- Natural Convection is usually about 30~65 LFM but is not equal to still air (0LFM).
- Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
- Input filter components are required to help meet conducted emission class B. Refer to the EMI Filter of design & feature configuration.
- An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.  
 The suggested filter capacitor: Nippon - chemi - con KY series, 470  $\mu F$  / 100V.