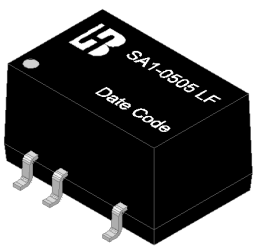
SA1 LF Series

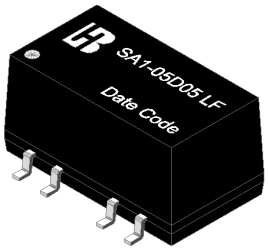
1 Watt SMD O/P DC-DC Converter

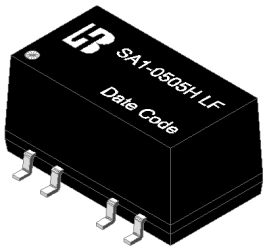
Single and Dual Output

1 . *Features*

- Low Ripple and Noise
- High Efficiency Up To 83%
- Input / Output Isolation : 1K Vdc or 3K Vdc
- 100% Burn-In
- Input Filter With Internal Capacitor
- Custom Design Available
- Net Weight :1.5g or 1.7g Typical
- RoHS Converter Certified By SGS







2 . *Model Selection Guide*

(Specifications typical at Ta= +25℃, Nominal input voltage, Rated output current unless otherwise noted)

Model No.	Input Voltage (Vdc)	Output Voltage (Vdc)	Output Current (mA) Max	Input Current @No Load (mA) Typ.	Input Current @Max. Load (mA) Typ.	Output Ripple (mV) Max.	Load Regulation (%) Max.	Efficiency (%)Typ.
Single Output Series (1 KVdc)								
SA1-3R33R3 LF	3.3	3.3	300	47	446	50	15	68
SA1-3R305 LF		5	200	47	421	60	12	72
SA1-3R309 LF		9	110	47	400	80	12	76
SA1-3R312 LF		12	84	45	410	100	8	74
SA1-3R315 LF		15	67	45	410	120	8	74
SA1-053R3 LF	5	3.3	300	25	274	50	12	77
SA1-0505 LF		5	200	25	260	60	10	81
SA1-0509 LF		9	110	23	270	80	10	78
SA1-0512 LF		12	84	25	263	100	8	80
SA1-0515 LF		15	67	28	260	120	8	81
SA1-123R3 LF	12	3.3	300	14	117	50	10	75
SA1-1205 LF		5	200	15	108	60	8	81
SA1-1209 LF		9	110	15	113	80	8	78
SA1-1212 LF		12	84	15	108	100	5	81
SA1-1215 LF		15	67	14	105	120	5	83

SA1-153R3 LF	15	3.3	300	11	88	50	10	76
SA1-1505 LF		5	200	11	85	60	8	79
SA1-1509 LF		9	110	10	88	80	8	76
SA1-1512 LF		12	84	10	85	100	5	79
SA1-1515 LF		15	67	10	84	120	5	80
SA1-243R3 LF	24	3.3	300	6	66	50	8	67
SA1-2405 LF		5	200	7	62	60	5	71
SA1-2409 LF		9	110	6	60	80	5	73
SA1-2412 LF		12	84	8	58	100	5	76
SA1-2415 LF		15	67	8	58	120	5	77
Dual Output Series (1 KVdc)								
SA1-3R3D3R3 LF	3.3	±3.3	±150	48	446	50	15	68
SA1-3R3D05 LF		±5	±100	48	433	60	12	70
SA1-3R3D09 LF		±9	±56	47	410	80	12	74
SA1-3R3D12 LF		±12	±42	46	400	100	8	76
SA1-3R3D15 LF		±15	±34	46	410	120	8	74
SA1-05D3R3 LF	5	±3.3	±150	35	270	50	12	74
SA1-05D05 LF		±5	±100	35	257	60	10	78
SA1-05D09 LF		±9	±56	33	267	80	10	75
SA1-05D12 LF		±12	±42	33	259	100	8	77
SA1-05D15 LF		±15	±34	33	257	120	8	78
SA1-12D3R3 LF	12	±3.3	±150	16	117	50	10	72
SA1-12D05 LF		±5	±100	15	108	60	8	78
SA1-12D09 LF		±9	±56	15	113	80	8	75
SA1-12D12 LF		±12	±42	15	108	100	5	78
SA1-12D15 LF		±15	±34	14	105	120	5	80
SA1-15D3R3 LF	15	±3.3	±150	12	93	50	10	72
SA1-15D05 LF		±5	±100	11	88	60	8	76
SA1-15D09 LF		±9	±56	11	88	80	8	76
SA1-15D12 LF		±12	±42	11	86	100	5	78
SA1-15D15 LF		±15	±34	10	86	120	5	78
SA1-24D3R3 LF	24	±3.3	±150	8	58	50	8	72
SA1-24D05 LF		±5	±100	8	58	60	5	72
SA1-24D09 LF		±9	±56	7	58	80	5	73
SA1-24D12 LF		±12	±42	7	55	100	5	76
SA1-24D15 LF		±15	±34	7	56	120	5	75

Single Output Series (3 KVdc)								
SA1-3R33R3H LF	3.3	3.3	300	47	446	50	15	68
SA1-3R305H LF		5	200	47	421	60	12	72
SA1-3R309H LF		9	110	47	400	80	12	76
SA1-3R312H LF		12	84	45	410	100	8	74
SA1-3R315H LF		15	67	45	410	120	8	74
SA1-053R3H LF	5	3.3	300	25	274	50	12	77
SA1-0505H LF		5	200	25	260	60	10	81
SA1-0509H LF		9	110	23	270	80	10	78
SA1-0512H LF		12	84	25	263	100	8	80
SA1-0515H LF		15	67	28	260	120	8	81
SA1-123R3H LF	12	3.3	300	14	117	50	10	75
SA1-1205H LF		5	200	15	108	60	8	81
SA1-1209H LF		9	110	15	113	80	8	78
SA1-1212H LF		12	84	15	108	100	5	81
SA1-1215H LF		15	67	14	105	120	5	83
SA1-153R3H LF	15	3.3	300	11	88	50	10	76
SA1-1505H LF		5	200	11	85	60	8	79
SA1-1509H LF		9	110	10	88	80	8	76
SA1-1512H LF		12	84	10	85	100	5	79
SA1-1515H LF		15	67	10	84	120	5	80
SA1-243R3H LF	24	3.3	300	6	66	50	8	67
SA1-2405H LF		5	200	7	62	60	5	71
SA1-2409H LF		9	110	6	60	80	5	73
SA1-2412H LF		12	84	8	58	100	5	76
SA1-2415H LF		15	67	8	58	120	5	77
Dual Output Series (3 KVdc)								
SA1-3R3D3R3H LF	3.3	±3.3	±150	48	446	50	15	68
SA1-3R3D05H LF		±5	±100	48	433	60	12	70
SA1-3R3D09H LF		±9	±56	47	410	80	12	74
SA1-3R3D12H LF		±12	±42	46	400	100	8	76
SA1-3R3D15H LF		±15	±34	46	410	120	8	74
SA1-05D3R3H LF	5	±3.3	±150	35	270	50	12	74
SA1-05D05H LF		±5	±100	35	257	60	10	78
SA1-05D09H LF		±9	±56	33	267	80	10	75
SA1-05D12H LF		±12	±42	33	259	100	8	77

SA1-05D15H LF		±15	±34	33	257	120	8	78
SA1-12D3R3H LF	12	±3.3	±150	16	117	50	10	72
SA1-12D05H LF		±5	±100	15	108	60	8	78
SA1-12D09H LF		±9	±56	15	113	80	8	75
SA1-12D12H LF		±12	±42	15	108	100	5	78
SA1-12D15H LF		±15	±34	14	105	120	5	80
SA1-15D3R3H LF	15	±3.3	±150	12	93	50	10	72
SA1-15D05H LF		±5	±100	11	88	60	8	76
SA1-15D09H LF		±9	±56	11	88	80	8	76
SA1-15D12H LF		±12	±42	11	86	100	5	78
SA1-15D15H LF		±15	±34	10	86	120	5	78
SA1-24D3R3H LF	24	±3.3	±150	8	58	50	8	72
SA1-24D05H LF		±5	±100	8	58	60	5	72
SA1-24D09H LF		±9	±56	7	58	80	5	73
SA1-24D12H LF		±12	±42	7	55	100	5	76
SA1-24D15H LF		±15	±34	7	56	120	5	75

Notes :

1. Load regulation is for output current change from 10% to 100% Max .Load.

3 . *Absolute Maximum Ratings*

(Exceeding these values may damage the module. These are not continuous operating ratings)

Parameter	Condition	Min.	Typ.	Max.	Unit
Input Absolute Voltage Range	5V Input Model	-0.7	5	7.5	Vdc
	12V Input Model	-0.7	12	15	
	24V Input Model	-0.7	24	30	
Max. Output Power		---	---	1.0	W
Output Short Circuit Duration		---	---	1.0	Second
Operation Temperature (Ambient Temperature)	Output Full Load	-40	---	+85	℃
Storage Temperature		-55	---	+125	
Lead Temperature 1.5 mm From Case For 10 Seconds		---	---	+300	
Peak Airflow Temperature With CECC 00802 Profile		---	---	+280	

4 . Nominal Input/Output Electrical Specifications

(Specifications typical at Ta= +25℃ , Nominal input voltage, Rated output current unless otherwise noted)

Parameter	Condition	Min.	Typ.	Max.	Unit
Input Voltage Range	5V Input Model	4.5	5	5.5	Vdc
	12V Input Model	10.8	12	13.2	
	24V Input Model	21.6	24	26.4	
Output Voltage Accuracy	Nominal Input	---	1.0	3.0	%
Output Voltage Balance		---	---	±1.0	---
Switching Frequency		70	100	150	KHz
Temperature Coefficient		---	±0.01	±0.02	%/ ℃
Isolation Voltage	60 Second	1000	---	---	Vdc
	60 Second	3000	---	---	Vdc
Isolation Resistance	500Vdc	1000	---	---	MΩ
Isolation Capacitance	5V Input Model	8	14 / 15	20	pF
	12V Input Model	6 / 7	18	24	
	24V Input Model	8	20	28	
Max. Line Regulation (Per1.0% change in input change)	---	---	---	1.2	%

5 . General Specification

Parameter	Specification	Condition
Isolation Voltage	1000 Vdc	Test Duration 60 Seconds / 0.5 mA
Isolation Resistance	1000 MΩ Min.	@ 500 Vdc
Operating Temperature (1)	-40℃ ~ +85℃	@ Ambient Temperature With Natural Convention
Operating Temperature (2)	-40℃ ~ +95℃	@ Case Surface Temperature
Storage Temperature	-55℃ ~ +125℃	---
Humidity	Up To 90 %	---
Cooling	Free Air Convection	---

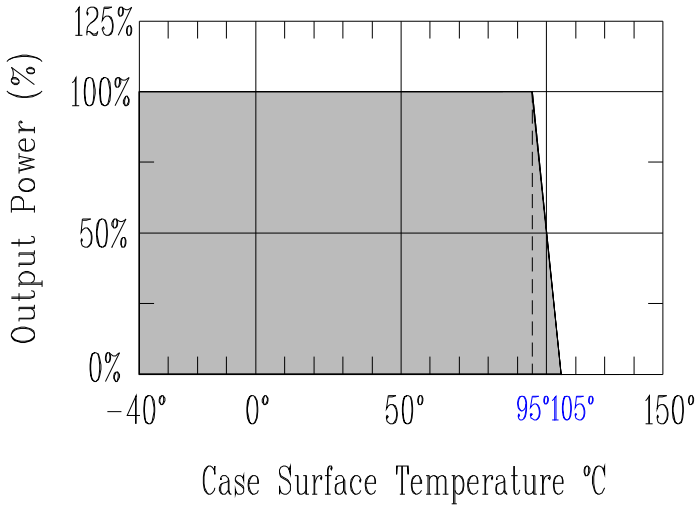
6 . Ordering Information

SA1-xxSyyH LF

- Device Family
- Input Voltage
- "S"for Single Output;"D"for Dual Output
- Output Voltage
- Suffix"H"for Isolation Voltage 3KVdc; Nothing for Isolation Voltage 1KVdc
- RoHS Converter Certified By SGS

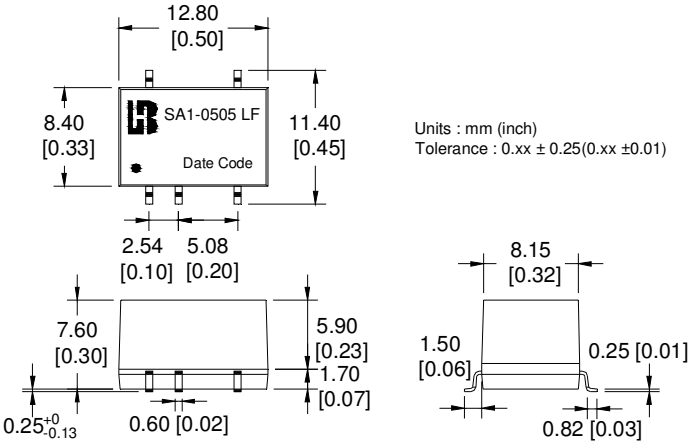
7 . Performance Characteristics

Temperature derating graph



8 . Mechanical & Pin Connections

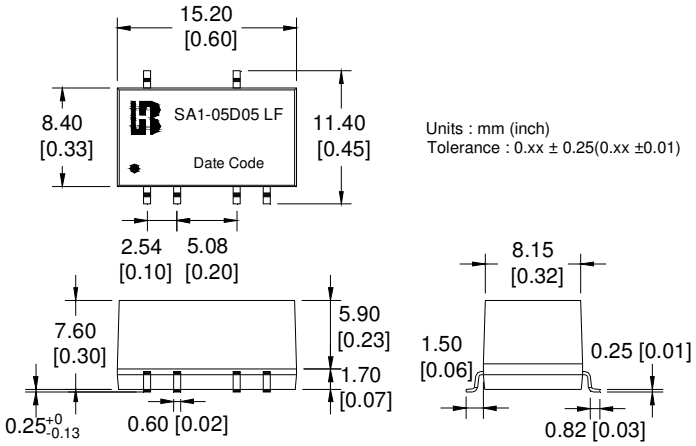
Single Output Series (For Isolation Voltage 1KVdc)



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

Pin	1K Vdc - Single		Pin
1	-Vin	NC	14
3	+Vin	No Pin	12
5	No Pin		10
7	-Vo	+Vo	8

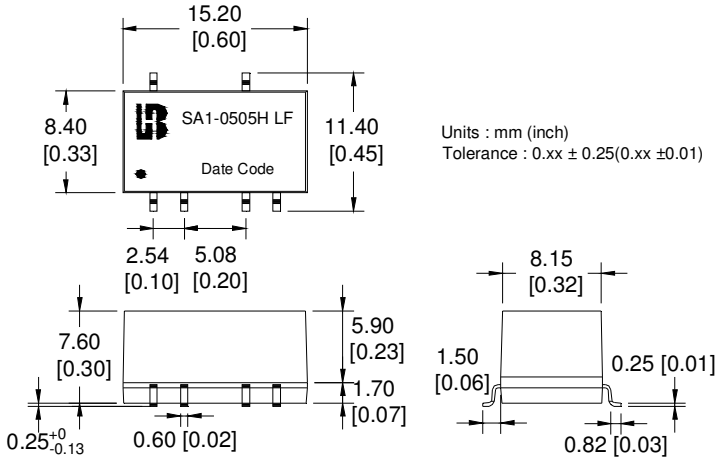
Dual Output Series (For Isolation Voltage 1KVdc)



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

Pin	1K Vdc - Dual		Pin
1	-Vin	NC	18
3	+Vin	No Pin	16
5	No Pin		14
7	com	+Vo	12
9	-Vo	No Pin	10

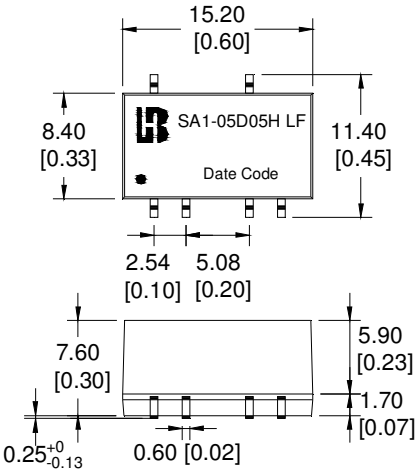
Single Output Series (For Isolation Voltage 3KVdc)



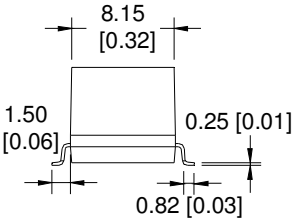
Units : mm (inch)
Tolerance : 0.xx ± 0.25(0.xx ±0.01)

Pin	3K Vdc - Single		Pin
1	-Vin	NC	18
3	+Vin	No Pin	16
5	No Pin		14
7	-Vo	+Vo	12
9	NC	No Pin	10

Dual Output Series (For Isolation Voltage 3KVdc)



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

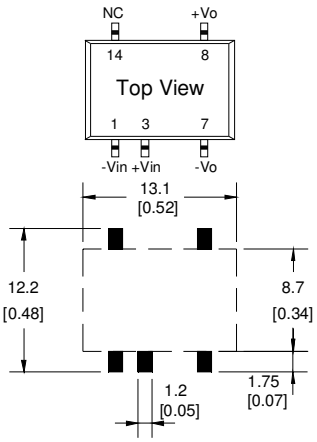


Pin	3K Vdc - Dual		Pin
1	-Vin	NC	18
3	+Vin	No Pin	16
5	No Pin		14
7	com	+Vo	12
9	-Vo	No Pin	10

9. Recommended Footprint Details

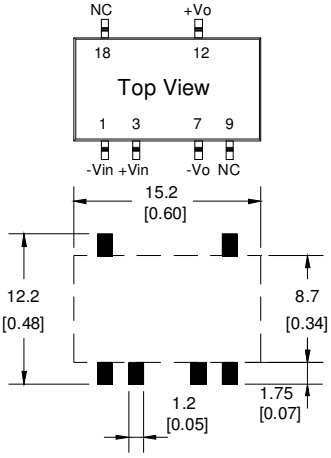
Single Output Series

For Isolation Voltage 1KVdc



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

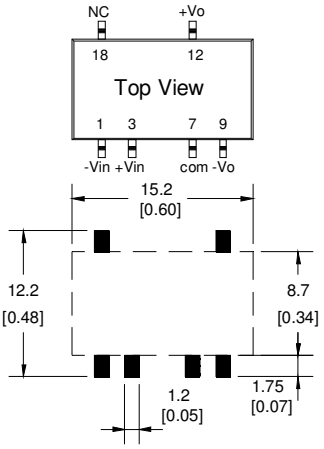
For Isolation Voltage 3KVdc



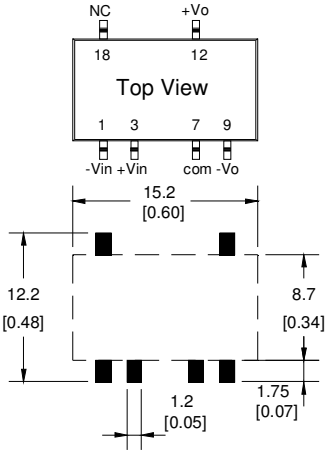
Units : mm (inch)
Tolerance : 0.xx ± 0.25(0.xx ±0.01)

Dual Output Series

For Isolation Voltage 1KVdc

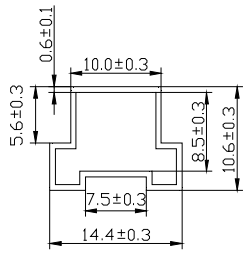


For Isolation Voltage 3KVdc

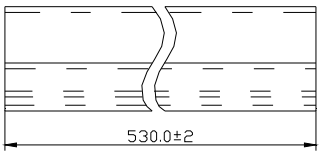


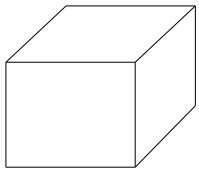
10. *Package*

Single Output Series For Isolation 1KVdc

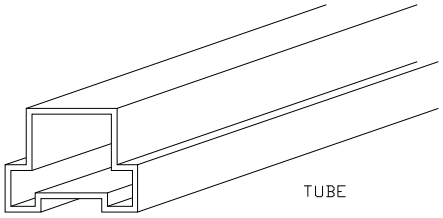


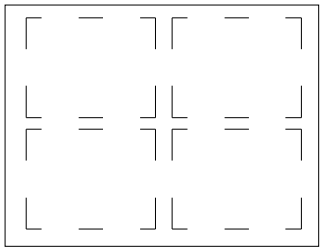
TUBE MECHANICAL DIMENSION





INNER CARTON:565*115*117

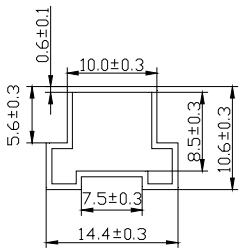




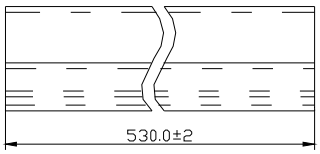
EXPORT CARTON:580*255*265

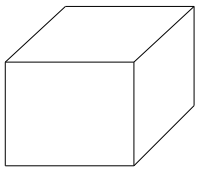
1. TUBE=39PCS
2. INNER CARTON=63 TUBE=63*39=2457PCS
3. EXPORT CARTON=4 INNER CARTON=4*2457=9828PCS

Single Output Series For Isolation 1KVdc
Dual Output Series For Isolation 1KVdc and 3KVdc

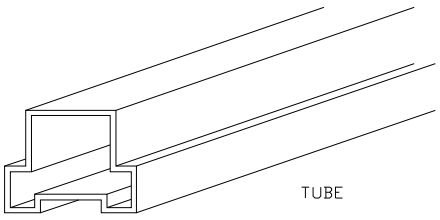


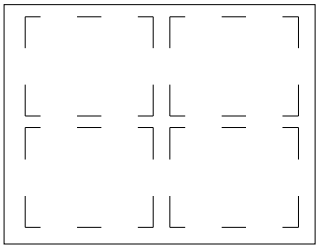
TUBE MECHANICAL DIMENSION





INNER CARTON:565*115*117





EXPORT CARTON:580*255*265

1. TUBE=33PCS
2. INNER CARTON=63 TUBE=63*33=2079PCS
3. EXPORT CARTON=4 INNER CARTON=4*2079=8316PCS