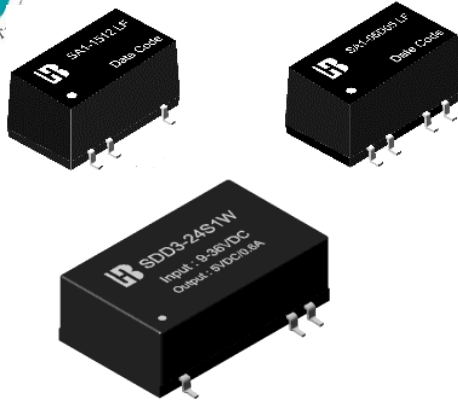


# DC-DC Converters (1kV, 1.5kV & 3kV Isolation) 1W to 2W SMT

SA1/SA2/SR1/SDD- series



a YAGEO company



- Ⓢ Input Voltage Range: 3.3V, 5V, 12V, 15V, 24V and 9-36V
- Ⓢ Output Voltage Range: 3.3V to 24V, Single and Dual (+/-Vout)
- Ⓢ Power Level: 1W to 2W
- Ⓢ Isolation: 1kVdc, 1.5kVdc and 3kVdc
- Ⓢ Efficiency : up to 83% , no heatsinks required
- Ⓢ Operating Temperature Range: -40°C to +85°C
- Ⓢ Additional Features:
  - Ⓢ IEC/EN 62368-1 Approved
  - Ⓢ Low Ripple and Noise,
  - Ⓢ Thermal Shut-Down
  - Ⓢ SMD - Peak reflow Temperature 245°C

Electrical Specification @ 25°C ( For SA1 1K Vdc Isolation )

Model Number	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.
SA1-3R33R3 LF	3.3	3.3	300	62	459	50	15	70
SA1-3R305 LF		5	200	68	446	60	15	72
SA1-053R3 LF	5	3.3	300	41	290	50	15	73
SA1-0505 LF		5	200	40	282	60	15	75
SA1-0512 LF		12	84	25	263	100	10	80
SA1-0515 LF		15	67	44	270	120	10	78
SA1-123R3 LF	12	3.3	300	14	117	50	15	75
SA1-1205 LF		5	200	15	108	60	15	81
SA1-1209 LF		9	110	15	113	80	12	78
SA1-1212 LF		12	84	15	108	100	10	81
SA1-1215 LF		15	67	14	105	120	10	83
SA1-1515 LF	15	15	67	10	84	120	10	80
SA1-2405 LF	24	5	200	7	62	60	15	71
SA1-2412 LF		12	84	8	58	100	10	76
SA1-2415 LF		15	67	8	58	120	10	77
SA1-05D3R3 LF	5	±3.3	±150	35	270	50	15	74
SA1-05D05 LF		±5	±100	35	257	60	15	78
SA1-05D09 LF		±9	±55	33	267	80	12	75
SA1-05D15 LF		±15	±34	33	257	120	10	78
SA1-12D12 LF	12	±12	±42	15	108	100	10	78
SA1-12D15 LF		±15	±34	14	105	120	10	80
SA1-24D05 LF	24	±5	±100	8	58	60	15	72
SA1-24D09 LF		±9	±55	7	58	80	12	73



Electrical Specification @ 25°C ( For SA1 3K Vdc Isolation )								
Model Number	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.
SA1-0505H LF	5	5	200	25	260	60	15	81
SA1-0512H LF		12	84	25	263	100	10	80
SA1-1205H LF	12	5	200	20	117	60	15	75
SA1-1215H LF		15	67	14	109	120	10	83
SA1-2424H LF	24	24	42	8	55	150	5	76

Electrical Specification @ 25°C ( For SR1P 1.5K Vdc Isolation )							
Model Number	Input Voltage Range(V)	Output Voltage(V)	Output Current (mA)	Input Current (mA) Typ.		Eff .(%) Typ.	Capacitive Load, max. (uF)
			Full. Load	No Load	Full Load		
SR1-05S1P	4.5-5.5 Nominal:5	5	200	28	260	77	220

Electrical Specification @ 25°C ( For SA2 1K Vdc Isolation )								
Model Number	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.
SA2-0505 LF	5	5	400	30	526	100	15	76
SA2-1205 LF	12	5	400	25	219	100	15	76
SA2-1212 LF		12	167	25	211	120	12	79

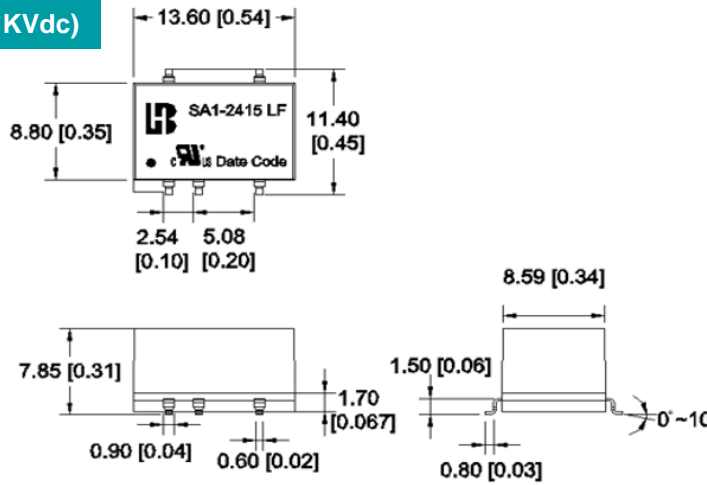
Electrical Specification @ 25°C ( For SDD3W 1.5K Vdc Isolation )								
Model Number	Input Voltage Range	Output Voltage(V)	Output Current (mA)		Input Current (mA)		Eff .(%)	Capacitive Load, max. (uF)
			Min. Load	Full. Load	No Load	Full Load		
SDD3-24D1W	9~36V Nominal:24Vdc	±5	0	±300	8	167	79	470

## Process and Materials

- Storage Temperature: Refer to the specification for details
- Compliance to J-STD:
  - J-STD-002: Solderability of Dipping at 255~260°C
  - J-STD-020: Moisture Sensitive Level 1
  - Reflow peak Temperature 245°C - see page 5 for more details
- All parts are packaged in tubes - see page 6 for details
- For full electrical characteristics, curves and applications, please refer to the detailed specification sheets available on request.
- Lead Frame: Cooper Alloy  
 Underplated: Half Hard Ductile Nickel 40-118" (1.0-3.0um)  
 Over plated: 100% Tin electro-deposited per 240~400u"Min(6~10um)  
 Finish: Matte finish 100% Tin solder

Mechanical

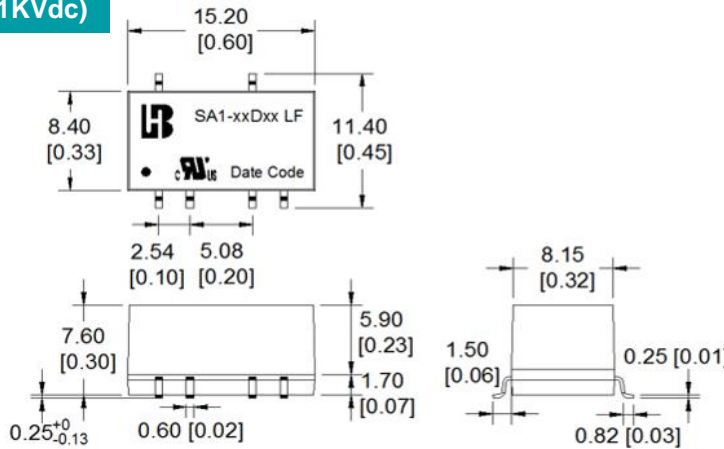
SA1 Single Output Series  
(For Isolation Voltage 1KVdc)



SA1-xxxx LF			
PIN	Single		PIN
1	-Vin	N/C	14
3	+Vin	No Pin	12
5	No Pin	No Pin	10
7	-Vout	+Vout	8

Unit: mm (inch for reference only)  
Pin Section tolerances +/-0.1  
General tolerances +/-0.5

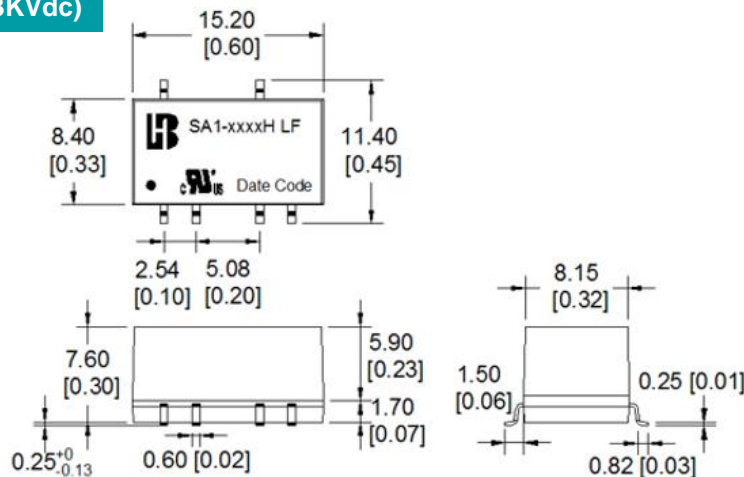
SA1 Dual Output Series  
(For Isolation Voltage 1KVdc)



SA1-xxxx LF			
PIN	Dual		PIN
1	-Vin	N/C	18
3	+Vin	No Pin	16
5	No Pin	No Pin	14
7	com	+Vout	12
9	-Vout	No Pin	10

Unit: mm (inch for reference only)  
Pin Section tolerances +/-0.1  
General tolerances +/-0.5

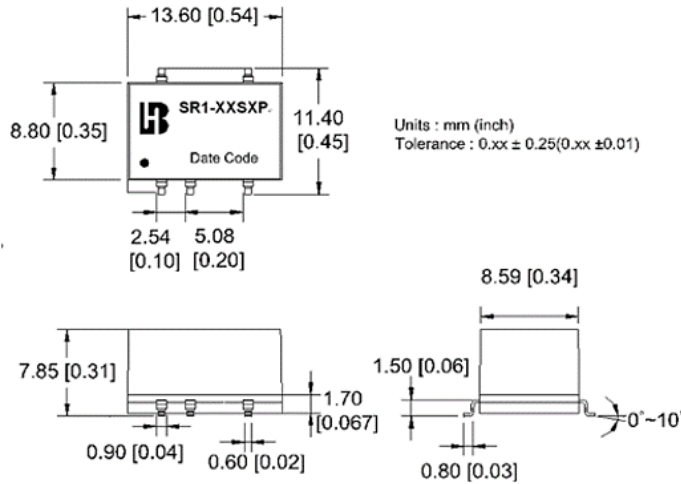
SA1 Single Output Series  
(For Isolation Voltage 3KVdc)



SA1-xxxx LF			
PIN	Dual		PIN
1	-Vin	N/C	18
3	+Vin	No Pin	16
5	No Pin	No Pin	14
7	-Vout	+Vout	12
9	N/C	No Pin	10

Unit: mm (inch for reference only)  
Pin Section tolerances +/-0.1  
General tolerances +/-0.5

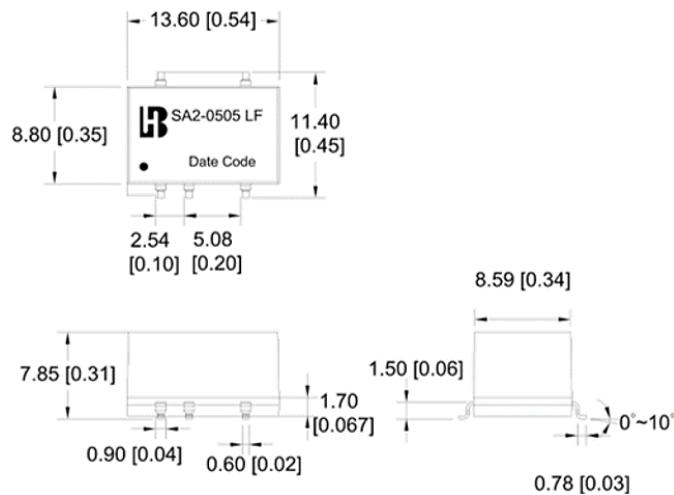
**SR1**



SR1-xxSxP			
PIN	Single		PIN
1	-Vin	N/C	14
3	+Vin	No Pin	12
5	No Pin	No Pin	10
7	-Vout	+Vout	8

Unit: mm (inch for reference only)  
Pin Section tolerances +/-0.1  
General tolerances +/-0.5

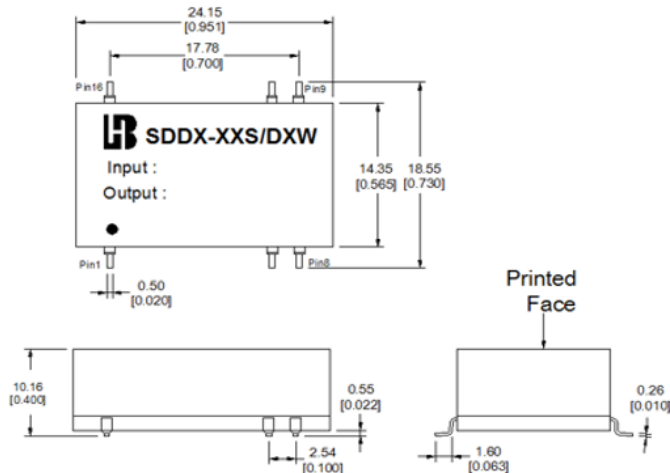
**SA2**



SA2-xxxx LF			
PIN	Single		PIN
1	-Vin	N/C	14
3	+Vin	No Pin	12
5	No Pin	No Pin	10
7	-Vout	+Vout	8

Unit: mm (inch for reference only)  
Pin Section tolerances +/-0.1  
General tolerances +/-0.5

**SDD3W**



SDDX-XXS/DXW		
PIN	Single	Dual
1	-Vin	-Vin
7	N/C	N/C
8	N/C	Common
9	+Vout	+Vout
10	-Vout	-Vout
16	+Vin	+Vin

Unit: mm (inch for reference only)  
Pin Section tolerances +/-0.1  
General tolerances +/-0.5

## Pb-free SMD Package AIR Reflow Profile

Reference condition:

Step#	Profile Feature	Condition / Duration
Step1	Temperature (T <sub>smin</sub> to T <sub>smax</sub> )	150 - 200°C
	The Time (t <sub>s</sub> )	60 - 120sec
Step2	Ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )	3°C/sec max
Step3	Liquidous Temperature (T <sub>L</sub> )	217°C
	The Time (t <sub>L</sub> )	60 - 150sec
Step4	Peak package body temperature (T <sub>p</sub> )	See classification temp in Table 1
	The Time (t <sub>p</sub> )	30sec max
Step5	Ramp-down rate	6°C/sec max
Note1	All temperatures refer to topside of the package, measured on the package body surface.	
Note2	Time 25°C to peak temperature: 8 minutes max	
Note3	It is not allowed to make a forced cooling in temperature falling range.	
Note4	The applicable condition refer to IPC/JEDEC J-STD-020E standard	

Table 1 Pb-Free Process - Classification Temperatures (T<sub>p</sub>)

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >2000
<1.6 mm	260°C	260°C	260°C
1.6 mm - 2.5 mm	260°C	250°C	245°C
>2.5 mm	250°C	245°C	245°C

