

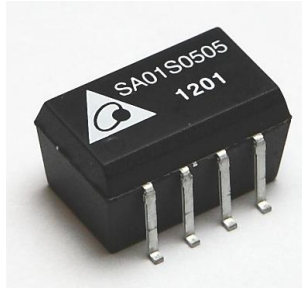


**THE DATASHEET OF
SA01S1209A**



FEATURES

- Efficiency up to 82%
- SMD Package with Industry Standard Pinout
- Moisture sensitivity level (MSL) 3
- Operating Temperature Range -40° to +85°C
- Low ripple and noise
- Isolation Voltage 1000 VDC
- Lead free, RoHs Compliant
- >2 MHours MTBF
- 3 Years Product Warranty



The SA01S series are miniature, SMD Package, isolated 1W DC/DC converters with 1,000VDC isolation. It offers short circuit protection and allows a wide operating temperature range of -40°C to +85°C. These isolated DC/DC converters are the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc

Model List

Model Number	Input Voltage (Range) VDC	Output Voltage VDC	Output Current		Input Current		Load Regulation % (max.)	Max. capacitive Load uF	Efficiency (typ.)			
			Max.	Min.	@Max. Load	@No Load			@Max. Load			
			mA	mA	mA(typ.)	mA(typ.)			%			
SA01S0503A	5 (4.5 ~ 5.5)	3.3	300	6	264	30	10	33	75			
SA01S0503ATR												
SA01S0505A		5	200	4	250							80
SA01S0505ATR												
SA01S0509A		9	110	2	254							78
SA01S0509ATR												
SA01S0512A		12	84	1.5	252							80
SA01S0512ATR												
SA01S0515A		15	67	1	248							81
SA01S0515ATR												
SA01S1203A	12 (10.8 ~ 13.2)	3.3	300	6	110	15	8	33	75			
SA01S1203ATR												
SA01S1205A		5	200	4	103							81
SA01S1205ATR												
SA01S1209A		9	110	2	106							78
SA01S1209ATR												
SA01S1212A		12	84	1.5	104							81
SA01S1212ATR												
SA01S1215A		15	67	1	102							82
SA01S1215ATR												
SA01S2403A	24 (21.6 ~ 26.4)	3.3	300	6	57	8	8	33	73			
SA01S2403ATR												
SA01S2405A		5	200	4	53							79
SA01S2405ATR												
SA01S2409A		9	110	2	54							77
SA01S2409ATR												
SA01S2412A		12	84	1.5	53							80
SA01S2412ATR												
SA01S2415A		15	67	1	52							80
SA01S2415ATR												



Input Characteristics

Parameter	Model	Min.	Typ.	Max.	Unit
Input Voltage Range	5V Input Models	4.5	5	5.5	VDC
	12V Input Models	10.8	12	13.2	
	24V Input Models	21.6	24	26.4	
Input Surge Voltage (1 sec. max.)	5V Input Models	-0.7	---	9	VDC
	12V Input Models	-0.7	---	18	
	24V Input Models	-0.7	---	30	
Reverse Polarity Input Current	All Models	---	---	0.3	A
Input Filter		Internal Capacitor			
Internal Power Dissipation		---	---	450	mW

Output Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		---	±1.0	±3.0	%
Line Regulation	For Vin Change of 1%	---	±1.2	±1.5	%
Load Regulation	Io=20% to 100%	See Model Selection Guide			
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	60	120	mV _{p-p}
Ripple & Noise (20MHz)		---	---	150	mV _{p-p}
Ripple & Noise (20MHz)		---	---	15	mV rms
Temperature Coefficient		---	±0.01	±0.02	%/°C
Short Circuit Protection	0.5 Second Max.				

General Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage (rated)	60 Seconds	1000	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100KHz, 1V	---	40	100	pF
Switching Frequency		50	100	140	KHz
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	2,000,000	---	---	Hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D	Level 3			

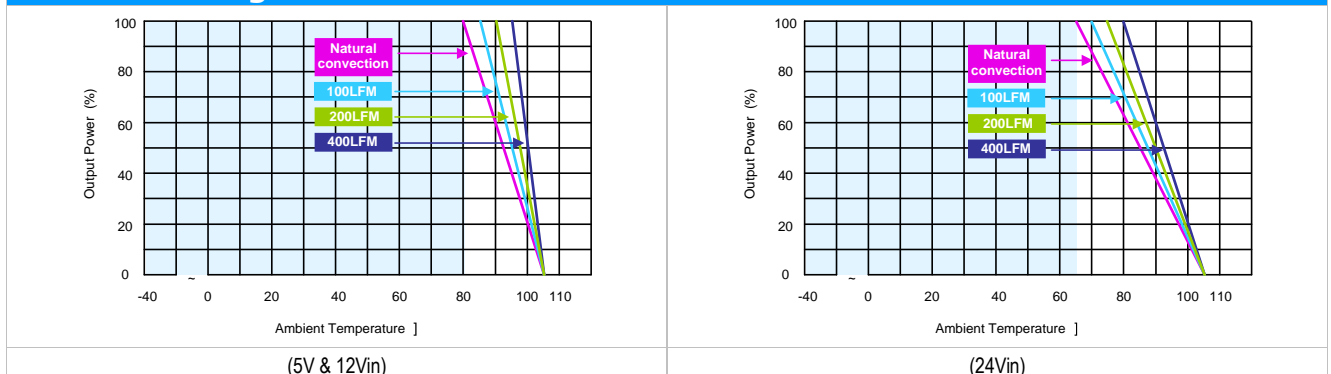
Recommended Input Fuse

5V Input Models	12V Input Models	24V Input Models
500mA Slow-Blow Type	200mA Slow-Blow Type	100mA Slow-Blow Type

Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature Range (with Derating)	Ambient	-40	+85	°C
Case Temperature		---	+90	°C
Storage Temperature Range		-50	+125	°C
Humidity (non condensing)		---	95	% rel. H
Cooling	Free-Air convection			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	°C

Power Derating Curve

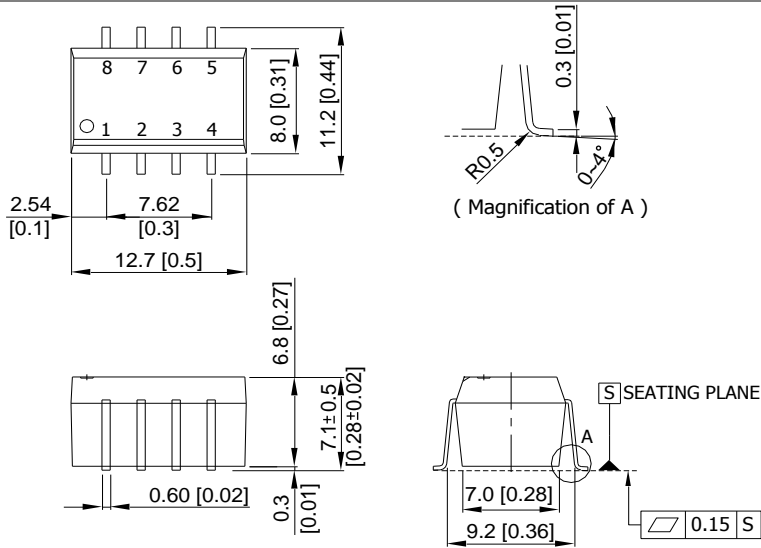


Notes

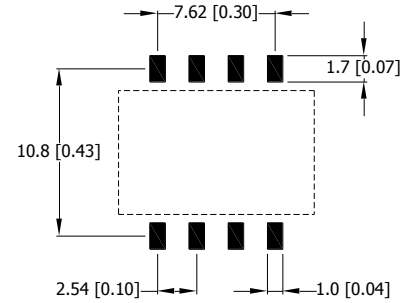
- 1 Specifications typical at $T_a=+25^{\circ}\text{C}$, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Ripple & Noise measurement bandwidth is 0-20MHz.
- 3 These power converters require a minimum output loading to maintain specified regulation, operation under no-load conditions will not damage these modules; however they may not meet all specifications listed.
- 4 All DC/DC converters should be externally fused at the front end for protection.
- 5 Specifications subject to change without notice.

Mechanical Drawing

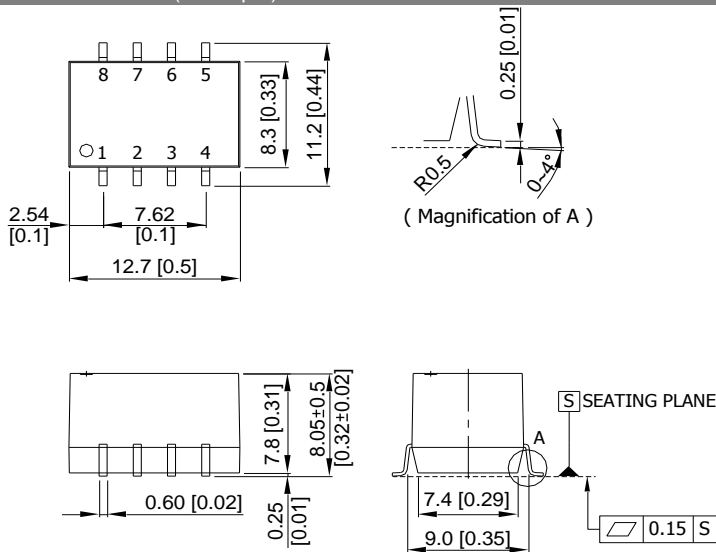
Mechanical Dimensions (5V & 12V Input)



Connecting Pin Patterns



Mechanical Dimensions (24V Input)



Pin Connections

Pin	Function
1	-Vin
2	+Vin
3	NA
4	-Vout
5	+Vout
6	NA
7	NA
8	NA

NA : Not Available for Electrical Connection

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.25 (X.XX±0.01)
X.XX±0.13 (X.XXX±0.005)
- ▶ Pins ±0.05 (±0.002)

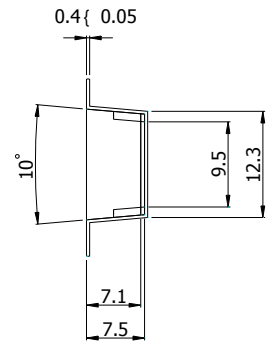
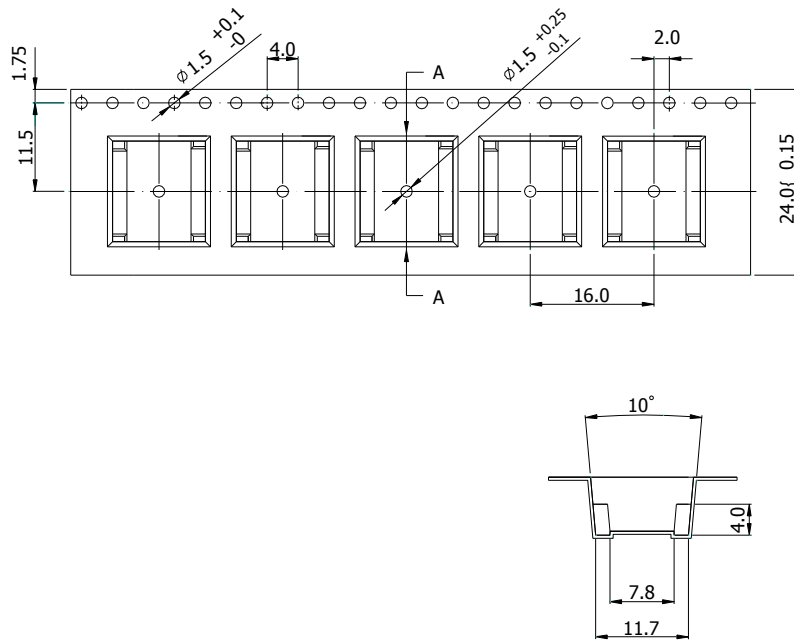
Physical Outline

Case Size (5V&12V Input)	: 12.7x8.0x6.8mm (0.50x0.31x0.27 Inches)
Case Size (24V Input)	: 12.7x8.3x7.8mm (0.50x0.33x0.31 Inches)
Case Material	: Molding (flammability to UL 94V-0 rated)

Weight (5V&12V Input)	: 1.5g
Weight (24V Input)	: 1.8g

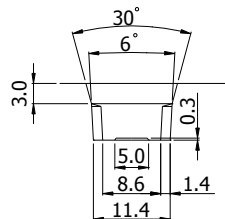
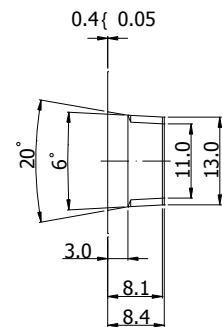
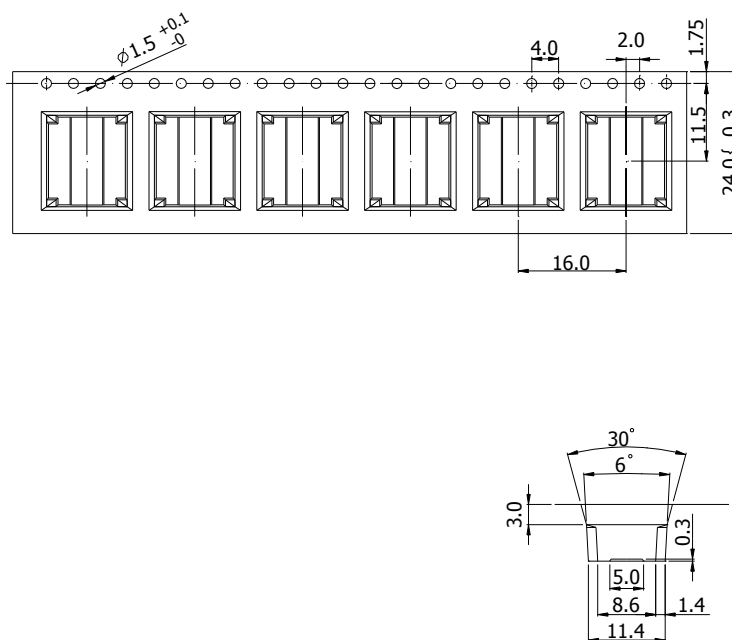
Reel Taping Package

Tape(5V & 12V Input)



SECTION A-A

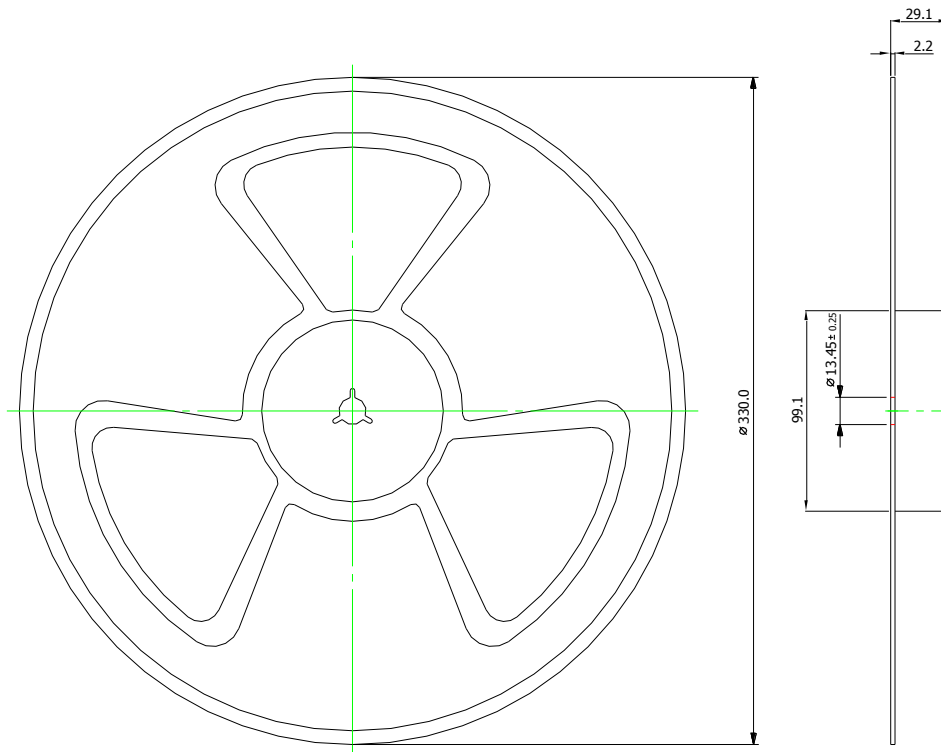
Tape(24V Input)



- ▶ All dimensions in mm
- ▶ Tolerance: ± 0.1

Reel Taping Package

Packaging Specifications



- ▶ All dimensions in mm
- ▶ Tolerance: ± 0.1

Part Numbering System

S	A	01	S	05	05	A
Form factor	Family series	Watt	Number of Outputs	Input Voltage	Output Voltage	Option Code
D-DIP	A-Z	01:1W	S - Single	03:3.3V	03:3.3V	A - Std. Functions
P-SIP		02:2W	D- Dual	05: 5V	05: 5V	ATR - Std. Functions with Tape and Reel
S-SMD		03:3W		12:12V	12:12V	
		04:4W		24: 24V	15: 15V	
		06:6W		48:48V	24: 24V	



WARRANTY

Delta offers a three (3) years limited warranty. Complete warranty information is listed on our web site or is available upon request from Delta.

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