



### FEATURES

- Efficiency up to 80%
- SMD Package with Industry Standard Pinout
- Dual Outputs
- Isolation Voltage 1000 VDC
- Operating Temperature Range -40° to +85°C
- Low ripple and noise
- Lead free, RoHs Compliant
- Moisture sensitivity level (MSL) 3
- 3 Years Product Warranty



The SA01D series are miniature, SMD Package, isolated 1W DC/DC converters with 1,000VDC isolation. It 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. With creative design technology and optimization of component placement, these converters possess outstanding electrical and thermal performance, as well as extremely high reliability under highly stressful operating conditions.

### 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. Load			
			Max.	Min.	@Max. Load	@No Load						
			mA	mA	mA(typ.)	mA(typ.)			%			
SA01D0505A	5 (4.5 ~ 5.5)	±5	±100	±2	267	30	10	33	75			
SA01D0505ATR												
SA01D0509A		±9	±55	±1	260				10	76		
SA01D0509ATR												
SA01D0512A		±12	±42	±0.8	255				8	79		
SA01D0512ATR												
SA01D0515A		±15	±33	±0.7	251				7	79		
SA01D0515ATR												
SA01D1205A	12 (10.8 ~ 13.2)	±5	±100	±2	111	15	8	33	75			
SA01D1205ATR												
SA01D1209A		±9	±55	±1	109				8	76		
SA01D1209ATR												
SA01D1212A		±12	±42	±0.8	105				5	80		
SA01D1212ATR												
SA01D1215A		±15	±33	±0.7	103				5	80		
SA01D1215ATR												
SA01D2405A	24 (21.6 ~ 26.4)	±5	±100	±2	56	9	8	33	74			
SA01D2405ATR												
SA01D2409A		±9	±55	±1	55				8	75		
SA01D2409ATR												
SA01D2412A		±12	±42	±0.8	53				5	79		
SA01D2412ATR												
SA01D2415A		±15	±33	±0.7	52				5	79		
SA01D2415ATR												



## 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	
	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	%
Output Voltage Balance	Dual Output, Balanced Loads	---	±0.1	±1.0	%
Line Regulation	For Vin Change of 1%	---	±1.2	±1.5	%
Load Regulation	Io=20% to 100%	See Model Selection Guide			
Ripple & Noise (20MHz)		---	60	120	mV <sub>P-P</sub>
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	150	mV <sub>P-P</sub>
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			

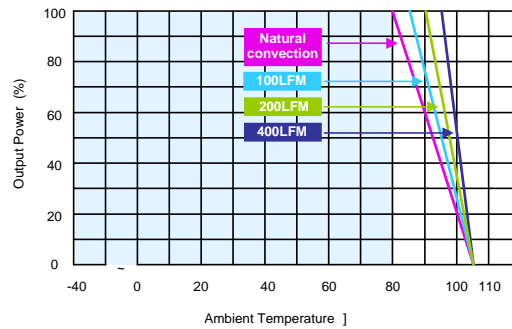
## Recommended Input Fuse

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

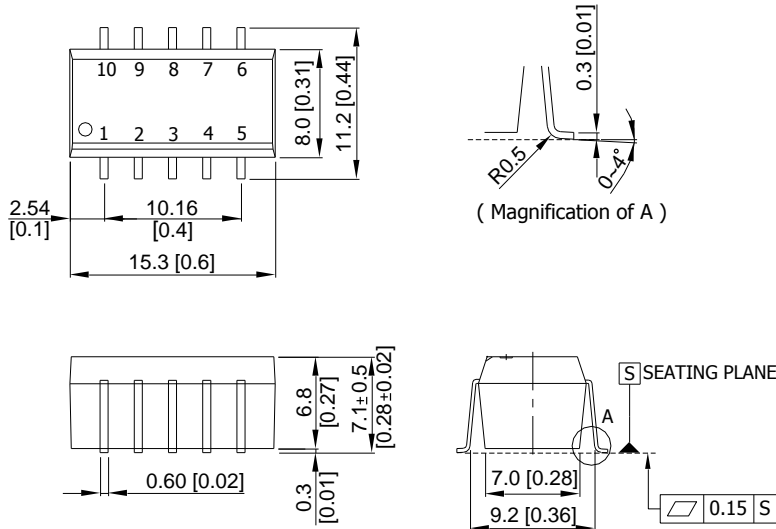


## Notes

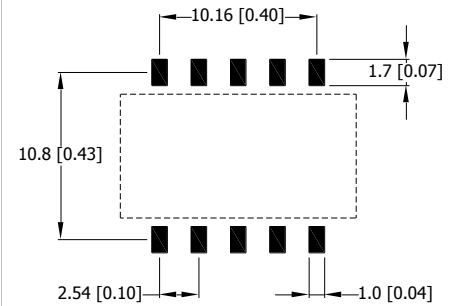
- 1 Specifications typical at  $T_a=+25^{\circ}\text{C}$ , resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Ripple & Noise measurement bandwidth is 0-20MHz.
- 3 These power converters require a minimum output loading to maintain specified regulation, operation 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

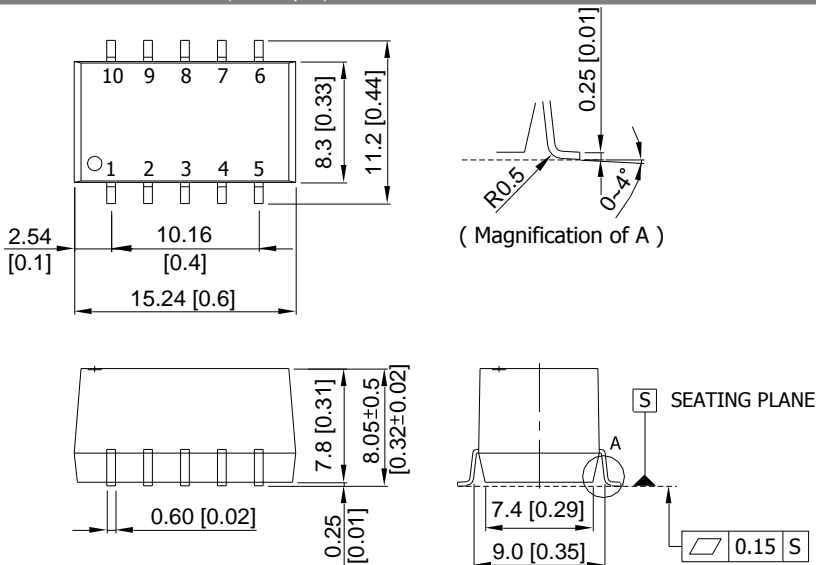
### Mechanical Dimensions (5V & 12V Input)



### Connecting Pin Patterns



### Mechanical Dimensions (24V Input)



### Pin Connections

Pin	Function
1	-Vin
2	+Vin
3	NA
4	Common
5	-Vout
6	NA
7	+Vout
8	NA
9	NA
10	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)

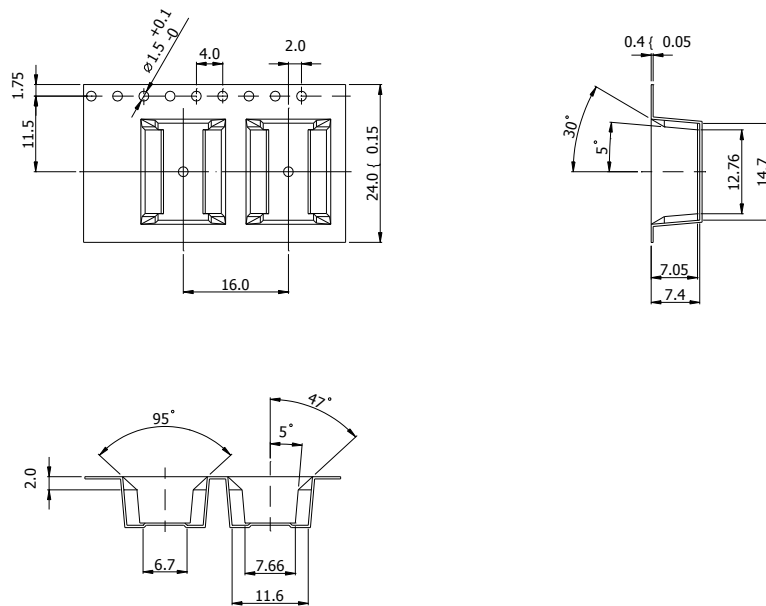
## Physical Outline

Case Size (5V&12V Input)	: 15.24x8.0x6.8mm (0.60x0.31x0.27 Inches)
Case Size (24V Input)	: 15.24 x8.3x7.8mm (0.60x0.33x0.31 Inches)
Case Material	: Molding (flammability to UL 94V-0 rated)

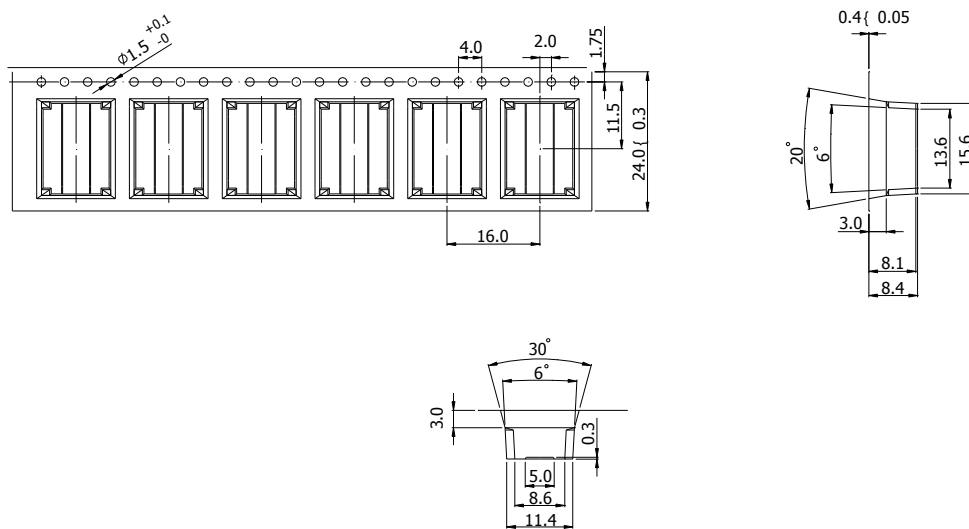
Weight (5V&12V Input)	: 1.8g
Weight (24V Input)	: 2.2g

## Reel Taping Package

Tape(5V & 12V Input)



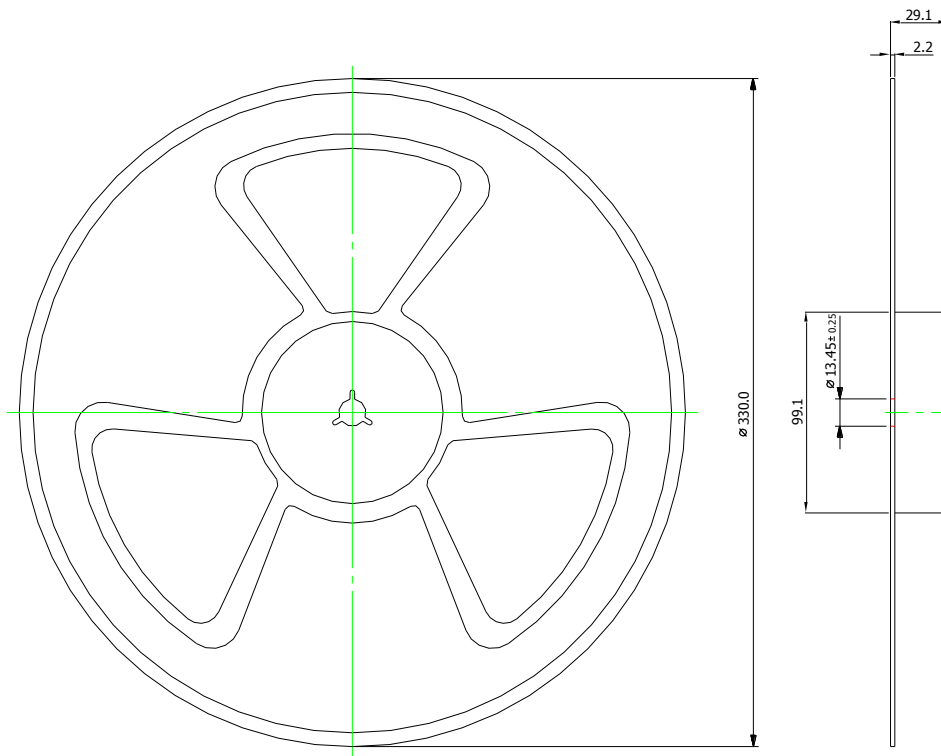
Tape(24V Input)



- ▶ All dimensions in mm
- ▶ Tolerance:  $\pm 0.1$

## Reel Taping Package

### Packaging Specifications



- ▶ All dimensions in mm
- ▶ Tolerance:  $\pm 0.1$

### Part Numbering System

S	A	01	D	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	
S - SMD		03 - 3W		12 - 12V	09 - 9V	
		04 - 4W		24 - 24V	12 - 12V	
		06 - 6W		48 - 48V	15 - 15V	
					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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