



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. | Min. | @Max. Load | @No Load | | | @Max. 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 _{P-P} |
| Ripple & Noise (20MHz) | Over Line, Load & Temp. | --- | --- | 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 | | | |

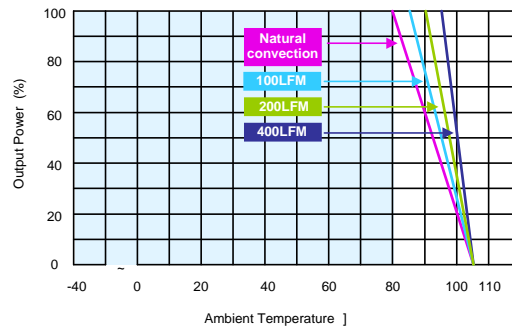
Recommended Input Fuse

| 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

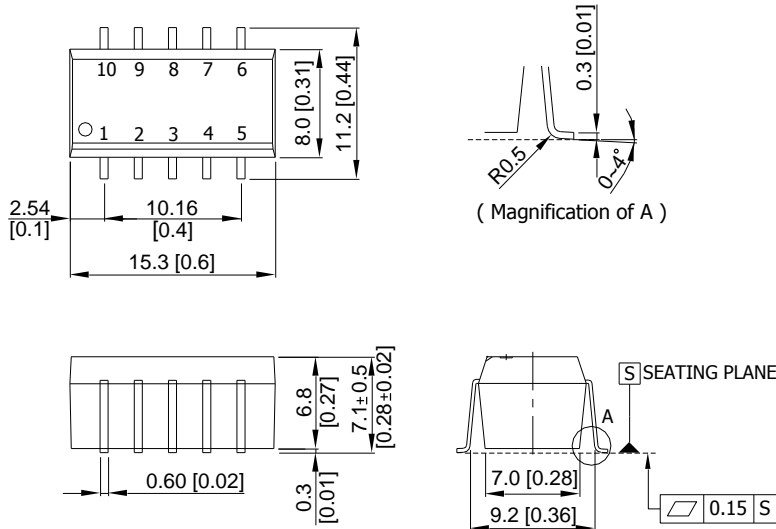


Notes

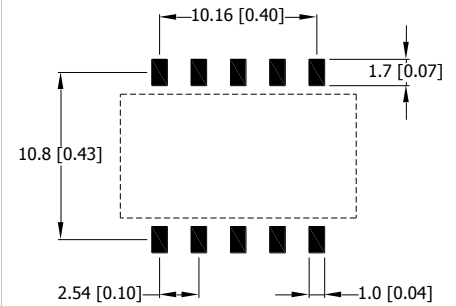
- 1 Specifications typical at $T_a=+25^{\circ}\text{C}$, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Ripple & Noise measurement bandwidth is 0-20MHz.
- 3 These power converters require a minimum output loading to maintain specified regulation, operation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

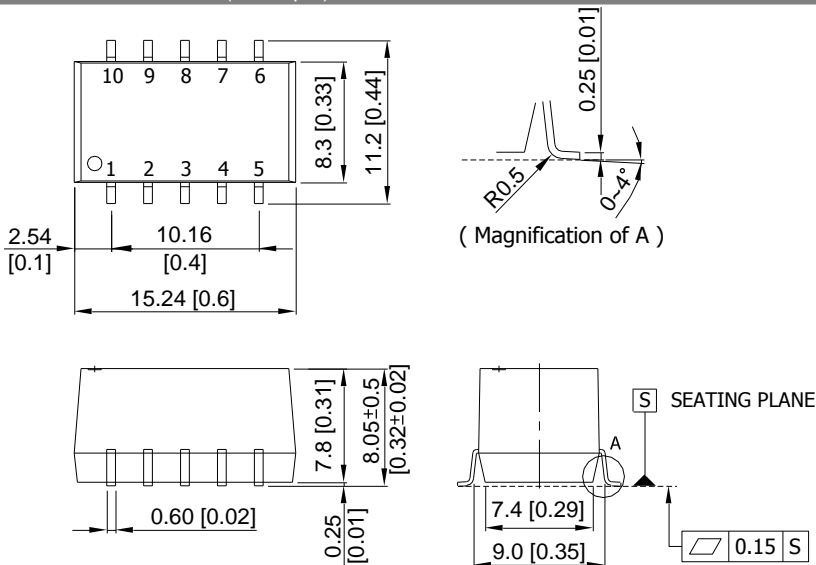
Mechanical Dimensions (5V & 12V Input)



Connecting Pin Patterns



Mechanical Dimensions (24V Input)



Pin Connections

| Pin | Function |
|-----|----------|
| 1 | -Vin |
| 2 | +Vin |
| 3 | NA |
| 4 | 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)

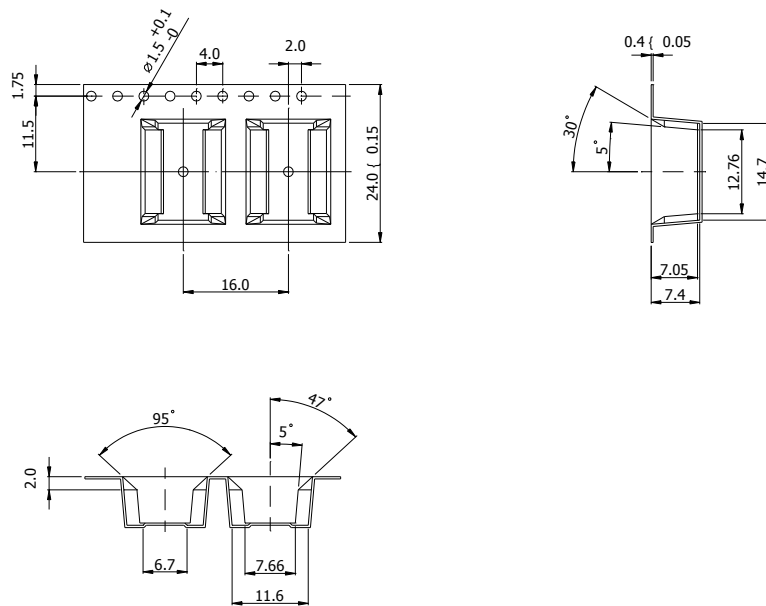
Physical Outline

| | |
|--------------------------|--|
| 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) |

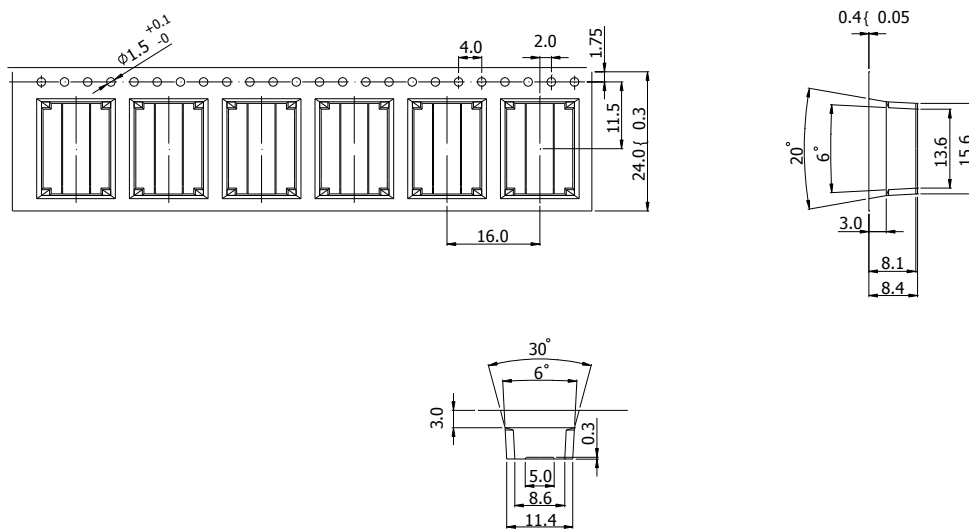
| | |
|-----------------------|--------|
| Weight (5V&12V Input) | : 1.8g |
| Weight (24V Input) | : 2.2g |

Reel Taping Package

Tape(5V & 12V Input)



Tape(24V Input)

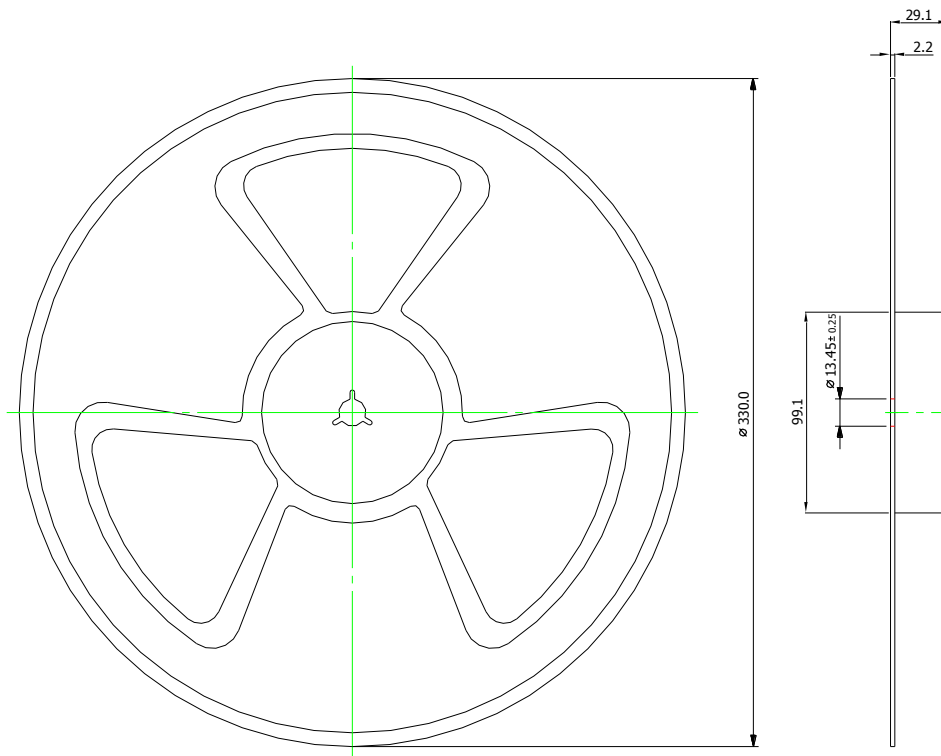


▶ All dimensions in mm

▶ Tolerance: ± 0.1

Reel Taping Package

Packaging Specifications



- ▶ All dimensions in mm
- ▶ Tolerance: ± 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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