



**THE DATASHEET OF
SH01S0515A**





FEATURES

- Efficiency up to 80%
- SMD Package with Industry Standard Pinout
- Operating Temperature Range -40°C to $+85^{\circ}\text{C}$
- Moisture sensitivity level (MSL) 2
- Isolation Voltage 1500 VDC
- High Accuracy of Pin Planarity
- Lead free, RoHS Compliant
- 3 Years Product Warranty
- UL/cUL 62368-1, UL/cUL 60950-1 approval



The SH01S/D series is miniature, SMD Package, isolated 1W DC/DC converters with 1,500VDC isolation. It allows a wide operating temperature range of -40°C to $+85^{\circ}\text{C}$. 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. mA | Min. mA | @Max. Load mA(typ.) | @No Load mA(typ.) | | | @Max. Load % | | |
| SH01S0503A | 5 (4.5 ~ 5.5) | 3.3 | 300 | 6 | 271 | 30 | 10 | 33 | 73 | | |
| SH01S0505A | | 5 | 200 | 4 | 256 | | 10 | | 78 | | |
| SH01S0509A | | 9 | 110 | 2 | 254 | | 10 | | 78 | | |
| SH01S0512A | | 12 | 84 | 1.5 | 259 | | 8 | 78 | | | |
| SH01S0515A | | 15 | 67 | 1 | 254 | | 7 | 79 | | | |
| SH01D0505A | | ± 5 | ± 100 | ± 2 | 270 | | 10 | 74 | | | |
| SH01D0512A | | ± 12 | ± 42 | ± 0.8 | 259 | | 8 | 33* | 78 | | |
| SH01D0515A | | ± 15 | ± 33 | ± 0.7 | 254 | | 7 | 78 | | | |
| SH01S1203A | | 12 (10.8 ~ 13.2) | 3.3 | 300 | 6 | | 112 | 15 | 8 | 33 | 74 |
| SH01S1205A | | | 5 | 200 | 4 | | 109 | | 8 | | 76 |
| SH01S1209A | 9 | | 110 | 2 | 106 | 8 | 78 | | | | |
| SH01S1212A | 12 | | 84 | 1.5 | 106 | 5 | 79 | | | | |
| SH01S1215A | 15 | | 67 | 1 | 105 | 5 | 80 | | | | |
| SH01D1205A | ± 5 | | ± 100 | ± 2 | 113 | 8 | 74 | | | | |
| SH01D1212A | ± 12 | | ± 42 | ± 0.8 | 108 | 5 | 33* | | 78 | | |
| SH01D1215A | ± 15 | | ± 33 | ± 0.7 | 104 | 5 | 79 | | | | |
| SH01S1512A | 15 (13.5 ~ 16.5) | | 12 | 84 | 1.5 | 86 | 14 | | 5 | 33 | 78 |
| SH01S1515A | | | 15 | 67 | 1 | 86 | | | 5 | | 78 |
| SH01S2403A | | 3.3 | 300 | 6 | 58 | 8 | | 72 | | | |
| SH01S2405A | | 5 | 200 | 4 | 54 | 8 | | 78 | | | |
| SH01S2409A | | 9 | 110 | 2 | 54 | 8 | | 33 | 77 | | |
| SH01S2412A | | 12 | 84 | 1.5 | 55 | 5 | | 77 | | | |
| SH01S2415A | 24 (21.6 ~ 26.4) | 15 | 67 | 1 | 53 | 8 | 5 | 33 | 79 | | |
| SH01D2405A | | ± 5 | ± 100 | ± 2 | 57 | | 8 | | 73 | | |
| SH01D2412A | | ± 12 | ± 42 | ± 0.8 | 54 | | 5 | | 33* | 78 | |
| SH01D2415A | | ± 15 | ± 33 | ± 0.7 | 53 | | 5 | 78 | | | |

* For each output



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 | |
| | 15V Input Models | 13.5 | 15 | 16.5 | |
| | 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 | |
| | 15V Input Models | -0.7 | --- | 20 | |
| | 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 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 | 1500 | --- | --- | 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 |
| Safety Approvals | UL/cUL 62368-1, UL/cUL 60950-1 recognition(CSA certificate) | | | | |
| Moisture Sensitivity Level (MSL) | IPC/JEDEC J-STD-020D | Level 2 | | | |

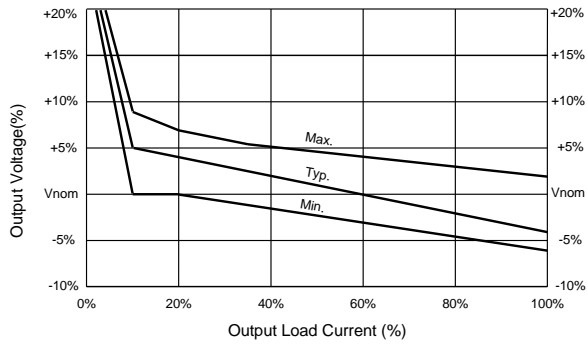
Recommended Input Fuse

| 5V Input Models | 12V Input Models | 15V Input Models | 24V Input Models |
|----------------------|----------------------|----------------------|----------------------|
| 500mA Slow-Blow Type | 200mA Slow-Blow Type | 150mA Slow-Blow Type | 100mA Slow-Blow Type |

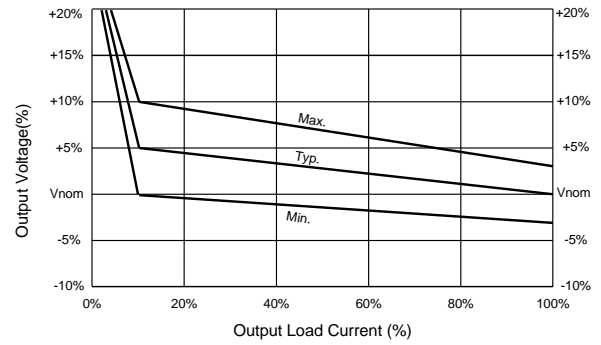
Environmental Specifications

| 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 |

Output Voltage Tolerance

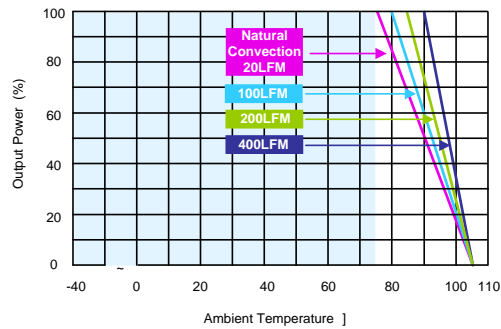


(3.3V & 5V Output)



(All other Output)

Power Derating Curve

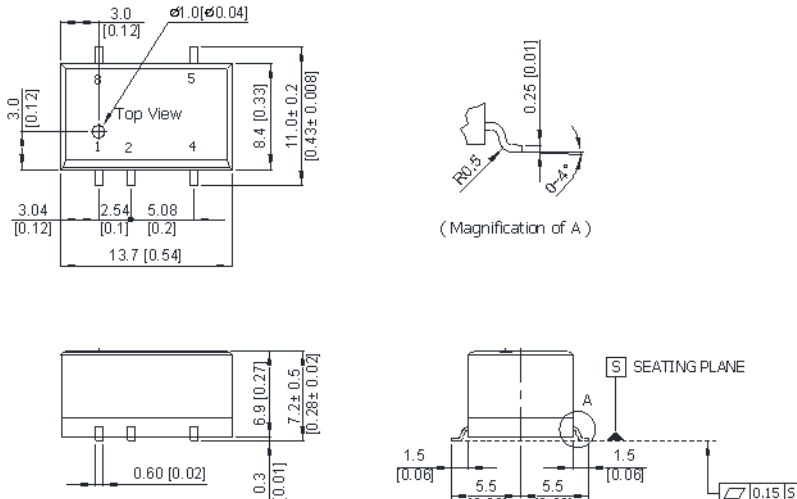


Notes

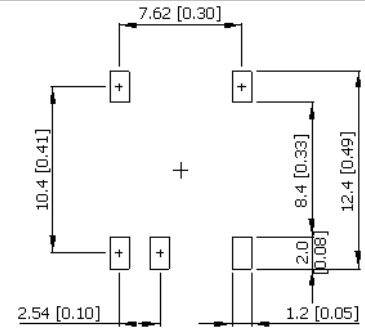
- 1 Specifications typical at $T_a=+25^{\circ}\text{C}$, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Ripple & Noise measurement bandwidth is 0-20MHz.
- 3 These power converters require a minimum output loading to maintain specified regulation, operation 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 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- 6 Specifications subject to change without notice.
- 7 It is not recommended to use water-washing process on SMT units.

Mechanical Drawing

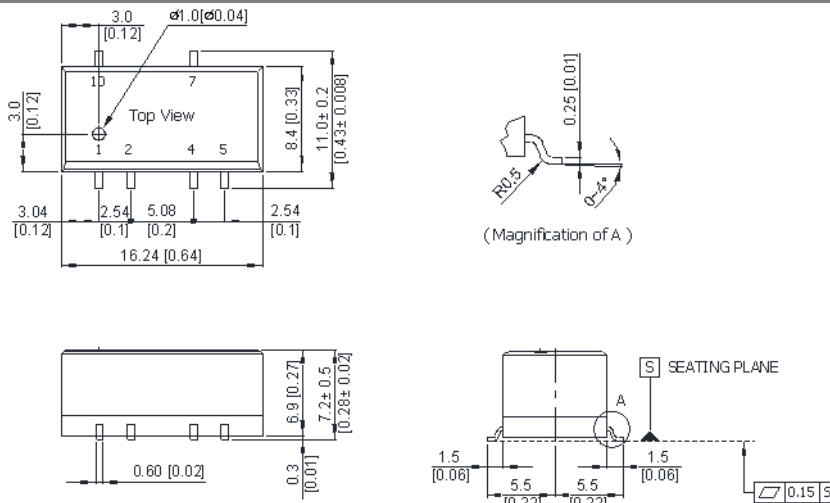
Mechanical Dimensions (Single Output)



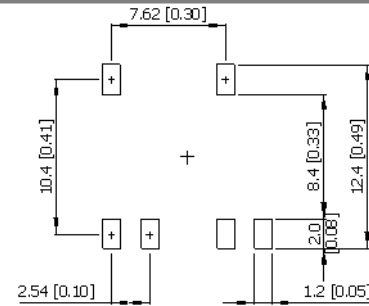
Connecting Pin Patterns



Mechanical Dimensions (Dual Output)



Connecting Pin Patterns



- ▶ 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)

Pin Connections

| Pin | Single Output | Dual Output |
|-----|---------------|-------------|
| 1 | -Vin | -Vin |
| 2 | +Vin | +Vin |
| 3 | No Pin | No Pin |
| 4 | -Vout | Common |
| 5 | +Vout | -Vout |
| 6 | No Pin | No Pin |
| 7 | No Pin | +Vout |
| 8 | NA | No Pin |
| 9 | --- | No Pin |
| 10 | --- | NA |

NA : Not Available for Electrical Connection

Physical Outline

Case Size (Single Output) : 13.7x8.0x6.7mm (0.54x0.31x0.26 Inches)
Output)

Case Size (Dual Output) : 16.24x8.0x6.7mm (0.64x0.31x0.26 Inches)

Case Material : Non-Conductive Black Plastic (flammability to UL 94V-0 rated)

Weight (Single Output) : 1.7g

Weight (Dual Output) : 2.0g



Part Numbering System

| S | H | 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 | |
| S-SMD | | 03:3W | | 12:12V | 12:12V | |
| | | 04:4W | | 24: 24V | 15: 15V | |
| | | 06:6W | | 48:48V | 24: 24V | |

WARRANTY

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