



### FEATURES

- Efficiency up to 80%
- SIP Package with Industry Standard Pinout
- Package Dimension:  
3.3V&5V & 12V Models:  
11.5 x6.1 x10.2mm (0.45" x0.24" x0.40")  
24V Models, :  
11.5 x7.1 x10.2mm (0.45" x0.28" x0.40")
- Isolation Voltage 1000VDC
- Operating Temperature range - 40°C to +85°C
- Lead free ,RoHs Compliant
- >2 MHours MTBF
- 3 Years Product Warranty



The PA01S series are miniature, SIP 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) | Output Voltage | Output Current |      | Input Current |          | Load Regulation | Maxcapacitive Load | Efficiency (typ.) |
|--------------|-----------------------|----------------|----------------|------|---------------|----------|-----------------|--------------------|-------------------|
|              |                       |                | Max.           | Min. | @Max. Load    | @No Load |                 |                    | @Max. Load        |
|              | VDC                   | VDC            | mA             | mA   | mA(typ.)      | mA(typ.) | % (max.)        | uF                 | %                 |
| PA01S0303A   | 3.3                   | 3.3            | 260            | 6    | 351           | 35       | 14              | 33                 | 74                |
| PA01S0305A   | (2.97 ~ 3.63)         | 5              | 200            | 4    | 394           |          | 14              |                    | 77                |
| PA01S0503A   |                       | 3.3            | 260            | 6    | 238           |          | 11              |                    | 72                |
| PA01S0505A   | 5<br>(4.5 ~ 5.5)      | 5              | 200            | 4    | 290           | 30       | 11              | 33                 | 69                |
| PA01S0509A   |                       | 9              | 110            | 2    | 260           |          | 8               |                    | 76                |
| PA01S0512A   |                       | 12             | 84             | 1.5  | 262           |          | 7               |                    | 77                |
| PA01S0515A   |                       | 15             | 67             | 1    | 258           |          | 6               |                    | 78                |
| PA01S1205A   | 12<br>(10.8 ~ 13.2)   | 5              | 200            | 4    | 117           | 13       | 9               | 33                 | 71                |
| PA01S1209A   |                       | 9              | 110            | 2    | 107           |          | 5               |                    | 77                |
| PA01S1212A   |                       | 12             | 84             | 1.5  | 106           |          | 5               |                    | 79                |
| PA01S1215A   |                       | 15             | 67             | 1    | 105           |          | 4               |                    | 80                |
| PA01S2405A   | 24<br>(21.6 ~ 26.4)   | 5              | 200            | 4    | 60            | 7        | 8               | 33                 | 70                |
| PA01S2409A   |                       | 9              | 110            | 2    | 54            |          | 5               |                    | 76                |
| PA01S2412A   |                       | 12             | 84             | 1.5  | 53            |          | 4               |                    | 79                |
| PA01S2415A   |                       | 15             | 67             | 1    | 53            |          | 4               |                    | 79                |

### Input Characteristics

| Item                              | Model             | Min.               | Typ. | Max. | Unit |
|-----------------------------------|-------------------|--------------------|------|------|------|
| Input Voltage Range               | 3.3V Input Models | 2.97               | 3.3  | 3.63 | VDC  |
|                                   | 5V Input Models   | 4.5                | 5    | 5.5  |      |
|                                   | 12V Input Models  | 10.8               | 12   | 13.2 |      |
|                                   | 24V Input Models  | 21.6               | 24   | 26.4 |      |
| Input Surge Voltage (1 sec. max.) | 3.3V Input Models | -0.7               | ---  | 6    |      |
|                                   | 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

| Item                     | 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 -List |       |       |                   |
| Ripple & Noise (20MHz)   |                         | ---             | 100   | 150   | mV <sub>p-p</sub> |
| Ripple & Noise (20MHz)   | Over Line, Load & Temp. | ---             | ---   | 200   | mV <sub>p-p</sub> |
| Ripple & Noise (20MHz)   |                         | ---             | ---   | 15    | mV <sub>rms</sub> |
| Temperature Coefficient  |                         | ---             | ±0.01 | ±0.02 | %/°C              |
| Short Circuit Protection |                         | 0.5 Second Max. |       |       |                   |

## General Characteristics

| Item                          | 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           | ---       | 60    | 100   | pF    |
| Switching Frequency           |                      | 50        | 90    | 110   | KHz   |
| MTBF (calculated)             | @25°C, Ground Benign | 2,000,000 | ----- | ----- | Hours |

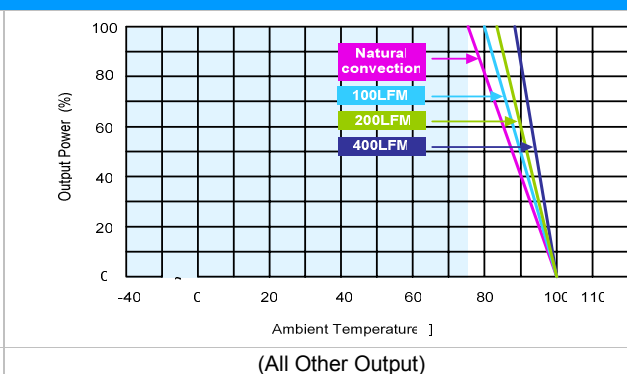
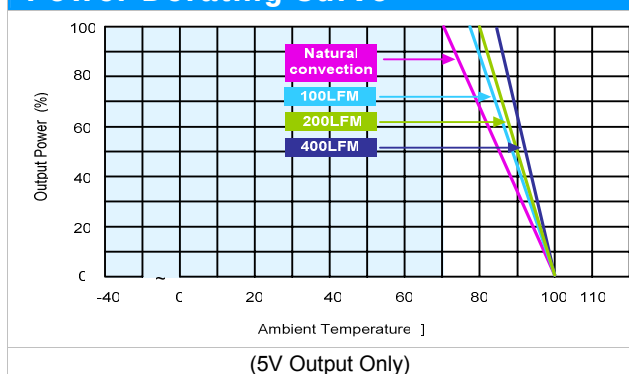
## Recommended Outside Input Fuse

| 3.3V Input Models    | 5V Input Models      | 12V Input Models     | 24V Input Models     |
|----------------------|----------------------|----------------------|----------------------|
| 800mA Slow-Blow Type | 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

- Specifications typical at Ta=+25°C, resistive load, nominal input voltage and rated output current unless otherwise noted.
- Ripple & Noise measurement bandwidth is 0-20MHz.
- 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.
- All DC/DC converters should be externally fused at the front end for protection.
- Specifications are subject to change without notice.

## Mechanical Drawing

### Mechanical Dimensions

Top view dimensions:

- Overall width: 11.5 [0.45]
- Distance from left edge to first pin: 0.5 [0.02]
- Pin pitch: 0.8 [0.03]
- Pin width: 3 X 2.54 [3 X 0.10]
- Distance from last pin to right edge: 0.5 [0.02]
- Distance from top edge to pin centerline: 10.2 [0.40]
- Pin height: 3.2 [0.13]

Bottom view dimensions:

- Overall width: 10.5 [0.41]
- Distance from left edge to first pin: 0.50 [0.02]
- Pin pitch: 2.54 [0.10]
- Pin width: 3 X 2.54 [3 X 0.10]
- Distance from last pin to right edge: 0.5 [0.02]
- Distance from bottom edge to pin centerline: 1.8 [0.07]
- Pin height: 0.25 [0.01]

### Pin Connections

| Pin | Function |
|-----|----------|
| 1   | -Vin     |
| 2   | +Vin     |
| 3   | -Vout    |
| 4   | +Vout    |

T: 6.1mm(0.24 inch) for 3.3V&5V&12V Input Models

T: 7.1mm(0.28 inch) for 24V Input Models

- 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

|                             |                                                                 |
|-----------------------------|-----------------------------------------------------------------|
| CaseSize(3.3V,5V,12V Input) | : 11.5x6.1x10.2mm (0.45x0.24x0.40 Inches)                       |
| Case Size(24V Input)        | : 11.5x7.1x10.2mm (0.45x0.28x0.40 Inches)                       |
| Case Material               | : Non-Conductive Black Plastic (flammability to UL 94V-0 rated) |
| Weight(3.3V,5V, 12V Input)  | : 1.3g                                                          |
| Weight(24V Input)           | : 1.7g                                                          |

## Part Numbering System

| P           | A             | 01    | S                 | 03            | 03             | 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

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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