



### FEATURES

- Efficiency up to 81%
- SIP Package with Industry Standard Pinout
- Package Dimension:  
5V&12V Models:  
19.5 x 10.2 x 6.1 mm (0.77"x 0.4"x 0.24")  
15V&24V Models  
19.5 x 10.2 x 7.1 mm (0.77"x 0.4"x 0.28")
- Isolation Voltage 1000 VDC
- OperatingTemp. Range -40°C to +85°C
- Lead free , RoSH Compliant
- Single and Dual Outputs
- >2 MHours MTBF
- 3 Years Product Warranty

The PB01S/D series are miniature, SIP Package, isolated 1W DC/DC converters with 1,000VDC isolation. It offers single and dual output models, 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 | Max capacitive Load | Efficiency (typ.) |
|--------------|-----------------------|----------------|----------------|------|---------------|----------|-----------------|---------------------|-------------------|
|              |                       |                | Max.           | Min. | @Max. Load    | @No Load |                 |                     |                   |
|              |                       |                | mA             | mA   | mA(typ.)      | mA(typ.) |                 | uF                  | %                 |
| PB01S0503A   | 5<br>(4.5 ~ 5.5)      | 3.3            | 260            | 5    | 235           | 30       | 10              | 220                 | 73                |
| PB01S0505A   |                       | 5              | 200            | 4    | 281           |          | 10              |                     | 71                |
| PB01S0509A   |                       | 9              | 110            | 2    | 260           |          | 8               |                     | 76                |
| PB01S0512A   |                       | 12             | 84             | 1.5  | 258           |          | 7               |                     | 78                |
| PB01S0515A   |                       | 15             | 67             | 1    | 258           |          | 7               | 100*                | 78                |
| PB01D0505A   |                       | ±5             | ±100           | ±2   | 278           |          | 10              |                     | 72                |
| PB01D0509A   |                       | ±9             | ±56            | ±1   | 262           |          | 8               |                     | 77                |
| PB01D0512A   |                       | ±12            | ±42            | ±0.8 | 258           |          | 7               |                     | 78                |
| PB01D0515A   |                       | ±15            | ±34            | ±0.7 | 258           |          | 7               |                     | 79                |
| PB01S1203A   | 12<br>(10.8 ~ 13.2)   | 3.3            | 260            | 5    | 96            | 12       | 8               | 220                 | 74                |
| PB01S1205A   |                       | 5              | 200            | 4    | 114           |          | 8               |                     | 73                |
| PB01S1209A   |                       | 9              | 110            | 2    | 106           |          | 5               |                     | 78                |
| PB01S1212A   |                       | 12             | 84             | 1.5  | 105           |          | 5               |                     | 80                |
| PB01S1215A   |                       | 15             | 67             | 1    | 104           |          | 5               | 100*                | 80                |
| PB01D1205A   |                       | ±5             | ±100           | ±2   | 113           |          | 8               |                     | 74                |
| PB01D1209A   |                       | ±9             | ±56            | ±1   | 106           |          | 5               |                     | 79                |
| PB01D1212A   |                       | ±12            | ±42            | ±0.8 | 104           |          | 5               |                     | 81                |
| PB01D1215A   |                       | ±15            | ±34            | ±0.7 | 105           |          | 5               |                     | 81                |
| PB01S1505A   | 15<br>(13.5 ~ 16.5)   | 5              | 200            | 4    | 93            | 11       | 8               | 220                 | 72                |
| PB01S1512A   |                       | 12             | 84             | 1.5  | 85            |          | 5               |                     | 79                |
| PB01S1515A   |                       | 15             | 67             | 1    | 85            |          | 5               |                     | 79                |
| PB01D1505A   |                       | ±5             | ±100           | ±2   | 93            |          | 8               | 100*                | 72                |
| PB01D1512A   |                       | ±12            | ±42            | ±0.8 | 85            |          | 5               |                     | 80                |
| PB01D1515A   |                       | ±15            | ±34            | ±0.7 | 85            |          | 5               |                     | 80                |
| PB01S2403A   | 24<br>(21.6 ~ 26.4)   | 3.3            | 260            | 5    | 49            | 7        | 8               | 220                 | 73                |
| PB01S2405A   |                       | 5              | 200            | 4    | 59            |          | 8               |                     | 71                |
| PB01S2409A   |                       | 9              | 110            | 2    | 54            |          | 5               |                     | 76                |

## 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                 | %                 |
| PB01S2412A   | 24<br>(21.6 ~ 26.4)   | 12             | 84             | 1.5  | 54            | 7        | 5               | 100*               | 78                |
| PB01S2415A   |                       | 15             | 67             | 1    | 53            |          | 5               |                    | 79                |
| PB01D2405A   |                       | ±5             | ±100           | ±2   | 58            |          | 8               |                    | 72                |
| PB01D2409A   |                       | ±9             | ±56            | ±1   | 55            |          | 5               |                    | 76                |
| PB01D2412A   |                       | ±12            | ±42            | ±0.8 | 53            |          | 5               |                    | 79                |
| PB01D2415A   |                       | ±15            | ±34            | ±0.7 | 53            |          | 5               |                    | 80                |

\* 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               | ---  | 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)   |                             | ---                       | 50    | 75    | 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                        | ---       | 60   | 100  | pF    |
| Switching Frequency           |                                   | 70        | 100  | 120  | KHz   |
| MTBF (calculated)             | MIL-HDBK-217F@25°C, Ground Benign | 2,000,000 | ---  | ---  | Hours |

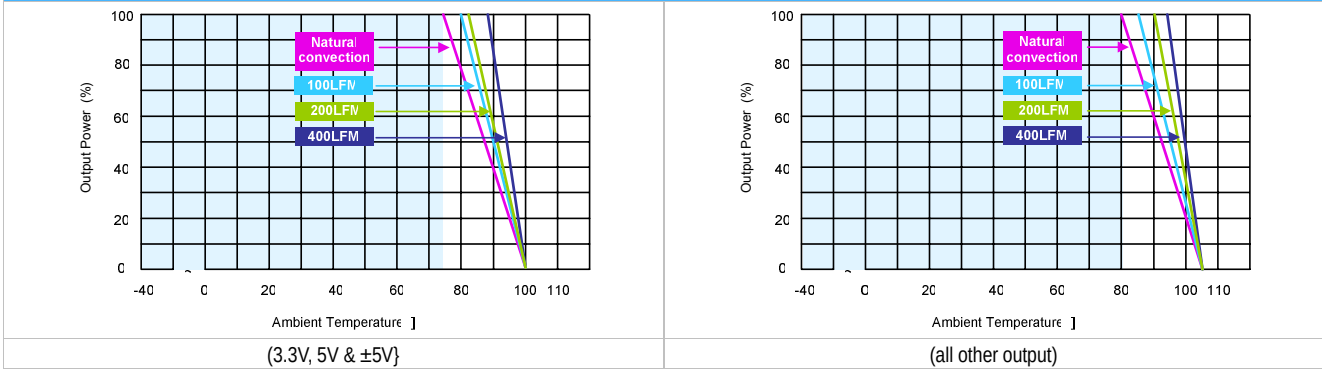
## Recommended Input Fuse

| 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       |

## Power Derating Curve

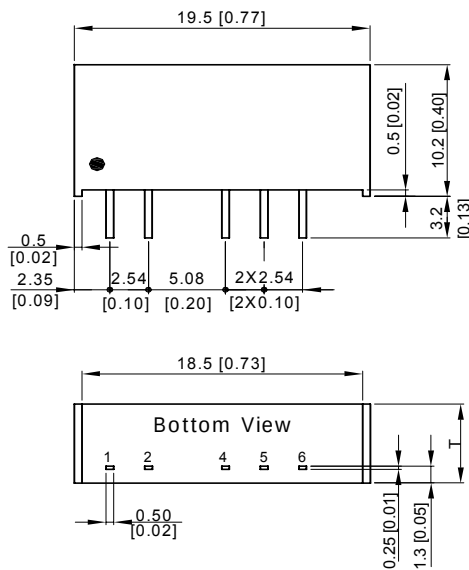


## Notes

- Specifications typical at  $T_a = +25^\circ\text{C}$ , 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 subject to change without notice.

## Mechanical Drawing

### Mechanical Dimensions



### Pin Connections

| Pin | Single Output | Dual Output |
|-----|---------------|-------------|
| 1   | +Vin          | +Vin        |
| 2   | -Vin          | -Vin        |
| 4   | -Vout         | -Vout       |
| 5   | No Pin        | Common      |
| 6   | +Vout         | +Vout       |

5V&12V Input:

T: 6.1mm(0.24 inch)

15V&24V Input:

T: 7.1mm(0.28 inch) for 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

Case Size (5V&12V Input) : 19.5x6.1x10.2mm (0.77x0.24x0.40 Inches)

Case Size (15V&24V Input) : 19.5x7.1x10.2mm (0.77x0.28x0.40 Inches)

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

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

Weight (15V&24V Input) : 2.6g

| Part Numbering System |               |       |                   |               |                |                    |
|-----------------------|---------------|-------|-------------------|---------------|----------------|--------------------|
| P                     | B             | 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

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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