



FEATURES

- Efficiency up to 84%
- DIP Package with Industry Standard Pinout
- Ultra-wide 4:1 Input Range
- Isolation Voltage 1500VDC
- Operating Temperature Range -40°C to +85°C
- Complies with EN55022 Class A
- Short Circuit Protection
- CSA 60950-1 Safety Approval
- 3 Years Product Warranty



The DL03S/D series are miniature, DIP Package, isolated 3W DC/DC converters with 1,500VDC isolation. The DL03S/D series feature fully regulated output and ultra wide 4:1 input voltage ranges. 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. 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 | | Reflected Ripple Current mA(typ.) | Max. capacitive Load µF | Efficiency (typ.) |
|--------------|------------------------------|-----------------------|----------------|------|---------------|----------|--------------------------------------|----------------------------|-------------------|
| | | | Max. | Min. | @Max. Load | @No Load | | | @Max. Load |
| | | | mA | mA | mA(typ.) | mA(typ.) | | | % |
| DL03S2403A | 24 (9 ~ 36) | 3.3 | 750 | 93 | 138 | 20 | 15 | 680 | 75 |
| DL03S2405A | | 5 | 600 | 75 | 158 | | | 470 | 79 |
| DL03S2412A | | 12 | 250 | 32 | 154 | | | 330 | 81 |
| DL03S2415A | | 15 | 200 | 25 | 152 | | | 220 | 82 |
| DL03D2412A | | ±12 | ±125 | ±16 | 156 | | | 150* | 80 |
| DL03D2415A | | ±15 | ±100 | ±13 | 156 | | | 100* | 80 |
| DL03S4803A | 48 (18 ~ 75) | 3.3 | 750 | 93 | 68 | 10 | 10 | 680 | 76 |
| DL03S4805A | | 5 | 600 | 75 | 78 | | | 470 | 80 |
| DL03S4812A | | 12 | 250 | 32 | 75 | | | 330 | 83 |
| DL03S4815A | | 15 | 200 | 25 | 74 | | | 220 | 84 |
| DL03D4812A | | ±12 | ±125 | ±16 | 76 | | | 150* | 82 |
| DL03D4815A | | ±15 | ±100 | ±13 | 76 | | | 100* | 82 |

* For each output

Input Characteristics

| Parameter | Model | Min. | Typ. | Max. | Unit |
|-----------------------------------|------------------|--|------|------|------|
| Input Surge Voltage (1 sec. max.) | 24V Input Models | -0.7 | --- | 50 | VDC |
| | 48V Input Models | -0.7 | --- | 100 | |
| Start-Up Threshold Voltage | 24V Input Models | 6 | 7.5 | 9 | |
| | 48V Input Models | 12 | 15 | 18 | |
| Under Voltage Shutdown | 24V Input Models | --- | --- | 8.5 | |
| | 48V Input Models | --- | --- | 16 | |
| Reverse Polarity Input Current | All Models | --- | --- | 0.5 | A |
| Short Circuit Input Power | | --- | --- | 2000 | mW |
| Internal Power Dissipation | | --- | --- | 2500 | mW |
| Conducted EMI | | Compliance to EN 55022,class A and FCC part 15,class A | | | |



Output Characteristics

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------------------|-----------------------------|------------|-------|-------|-------------------|
| Output Voltage Setting Accuracy | At 50% Load and Nominal Vin | --- | --- | ±2.0 | %Vom. |
| Output Voltage Balance | Dual Output, Balanced Loads | --- | ±0.5 | ±3.0 | % |
| Line Regulation | Vin=Min. to Max. | --- | ±0.2 | ±1.0 | % |
| Load Regulation | Io=Min. to Max. | --- | ±0.3 | ±1.0 | % |
| Ripple & Noise (20MHz) | | --- | 40 | 75 | mV _{P-P} |
| Transient Recovery Time | 25% Load Step Change | --- | 150 | 500 | μsec |
| Transient Response Deviation | | --- | ±3 | --- | % |
| Temperature Coefficient | | --- | ±0.01 | ±0.02 | %/°C |
| Over Load Protection | Foldback | 110 | 300 | --- | % |
| Short Circuit Protection | | Continuous | | | |

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 | --- | 380 | 500 | pF |
| Switching Frequency | | --- | 350 | --- | KHz |
| MTBF (calculated) | MIL-HDBK-217F@25°C, Ground Benign | 1,000,000 | --- | --- | Hours |
| Safety Approvals | UL/cUL 60950-1 recognition(CSA certificate), IEC/EN 60950-1 | | | | |

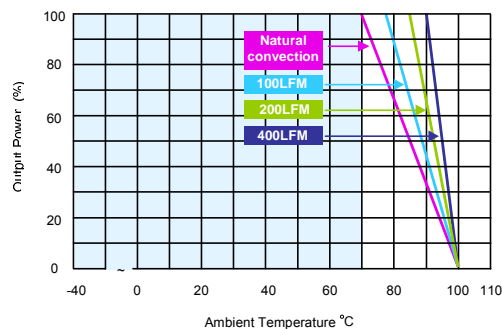
Recommended Input Fuse

| 24V Input Models | 48V Input Models |
|-----------------------|----------------------|
| 1000mA Slow-Blow Type | 500mA Slow-Blow Type |

Environmental Characteristics

| Parameter | Conditions | Min. | Max. | Unit |
|--|---------------------|------|------|----------|
| Operating Ambient Temperature Range (See Power Derating Curve) | Natural Convection | -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 |

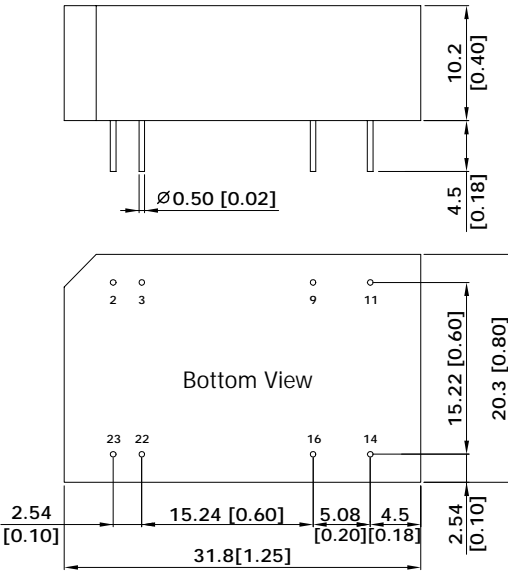
Power Derating Curve



Notes

- 1 Specifications typical at Ta=+25°C, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%
- 3 Ripple & Noise measurement bandwidth is 0-20MHz.
- 4 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.
- 5 All DC/DC converters should be externally fused at the front end for protection.
- 6 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- 7 Specifications subject to change without notice.

Package Specifications

| Mechanical Dimensions | Pin Connections | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|-------------|---------------|-------------|---|------|------|---|------|------|---|--------|--------|----|----|-------|----|-------|-------|----|-------|--------|----|------|------|----|------|------|
|  <p>The drawing shows two views of the module. The top view shows a rectangular component with a width of 31.8 mm [1.25 inches] and a height of 10.2 mm [0.40 inches]. It has four pins on the bottom edge with a diameter of 0.50 mm [0.02 inches]. The bottom view shows the same component from below, with a width of 31.8 mm [1.25 inches] and a height of 20.3 mm [0.80 inches]. The bottom view shows eight pins: pins 2, 3, 9, 11, 14, 16, 22, and 23. Dimensions for the bottom view include a total width of 31.8 mm [1.25 inches], a distance of 2.54 mm [0.10 inches] from the left edge to the center of pins 2 and 3, a distance of 15.24 mm [0.60 inches] between the centers of pins 2 and 3, a distance of 5.08 mm [0.20 inches] between the centers of pins 9 and 11, a distance of 4.5 mm [0.18 inches] between the centers of pins 14 and 16, a distance of 2.54 mm [0.10 inches] from the right edge to the center of pins 22 and 23, and a total height of 20.3 mm [0.80 inches].</p> | <table border="1"> <thead> <tr> <th>Pin</th> <th>Single Output</th> <th>Dual Output</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>-Vin</td> <td>-Vin</td> </tr> <tr> <td>3</td> <td>-Vin</td> <td>-Vin</td> </tr> <tr> <td>9</td> <td>No Pin</td> <td>Common</td> </tr> <tr> <td>11</td> <td>NC</td> <td>-Vout</td> </tr> <tr> <td>14</td> <td>+Vout</td> <td>+Vout</td> </tr> <tr> <td>16</td> <td>-Vout</td> <td>Common</td> </tr> <tr> <td>22</td> <td>+Vin</td> <td>+Vin</td> </tr> <tr> <td>23</td> <td>+Vin</td> <td>+Vin</td> </tr> </tbody> </table> <p>NC: No Connection</p> <ul style="list-style-type: none"> ▶ All dimensions in mm (inches) ▶ Tolerance: X.X±0.25 (X.XX±0.01) X.XX±0.13 (X.XXX±0.005) ▶ Pin diameter ⇔ 0.5 ±0.05 (0.02±0.002) | Pin | Single Output | Dual Output | 2 | -Vin | -Vin | 3 | -Vin | -Vin | 9 | No Pin | Common | 11 | NC | -Vout | 14 | +Vout | +Vout | 16 | -Vout | Common | 22 | +Vin | +Vin | 23 | +Vin | +Vin |
| Pin | Single Output | Dual Output | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | -Vin | -Vin | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | -Vin | -Vin | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | No Pin | Common | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | NC | -Vout | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | +Vout | +Vout | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | -Vout | Common | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | +Vin | +Vin | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | +Vin | +Vin | | | | | | | | | | | | | | | | | | | | | | | | | | |

Physical Outline

Case Size : 31.8x20.3x10.2mm (1.25x0.80x0.40 inches)

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

Pin Material : phosphor bronze

Weight : 12.2g



| Part Numbering System | | | | | | |
|-----------------------|---------------|-------|-------------------|---------------|----------------|--------------------|
| D | L | 03 | S | 24 | 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 | |

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JONHON

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