



### FEATURES

- DIP-24 Plastic Package
- Wide 2:1 Input Range
- Operating Temp. Range -40 to +85°C
- Overload Protection
- No Minimum Load Requirement
- Isolation voltage (optional)  
1500VDC for DN03S/DXXXXA  
3000VDC for DN03S/DXXXXH
- Input Filter meets EN55022, class A and FCC, level A
- Fully compatible with DE03S/D Series
- 3 Years Product Warranty



The DN03S/D series is a range of high performance dc-dc converter modules, designed as a cost optimized replacement for the highly popular DE03S/D series. The converter features wide 2:1 input ranges and tight output voltage regulation. Excellent efficiency allows an operating temperature up to +70°C at full load. The product comes in a DIP-24 plastic package with industry standard footprint. Typical applications for these economical priced dc-dc converters are industrial electronics, instrumentation or communication equipment.

### Model Selection Guide

| Model Number                                                                                                                                                                                                                 | Input Voltage (Range)<br>VDC | Output Voltage<br>VDC | Output Current<br>Max.<br>mA | Input Current          |                      | Reflected Ripple Current<br>mA(typ.) | Max. capacitive Load<br>μF | Efficiency (typ.)<br>@Max. Load<br>% |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------|------------------------------|------------------------|----------------------|--------------------------------------|----------------------------|--------------------------------------|
|                                                                                                                                                                                                                              |                              |                       |                              | @Max. Load<br>mA(typ.) | @No Load<br>mA(typ.) |                                      |                            |                                      |
|                                                                                                                                                                                                                              |                              |                       |                              |                        |                      |                                      |                            |                                      |
| DN03S0503A<br>DN03S0503H<br>DN03S0505A<br>DN03S0505H<br>DN03S0512A<br>DN03S0512H<br>DN03S0515A<br>DN03S0515H<br>DN03S0524A<br>DN03S0524H<br>DN03D0505A<br>DN03D0505H<br>DN03D0512A<br>DN03D0512H<br>DN03D0515A<br>DN03D0515H | 5<br>(4.5 ~ 9)               | 3.3                   | 600                          | 514                    | 65                   | 100                                  | 680                        | 77                                   |
|                                                                                                                                                                                                                              |                              | 5                     | 500                          | 641                    |                      |                                      | 470                        | 78                                   |
|                                                                                                                                                                                                                              |                              | 12                    | 250                          | 732                    |                      |                                      | 330                        | 82                                   |
|                                                                                                                                                                                                                              |                              | 15                    | 200                          | 732                    |                      |                                      | 220                        | 82                                   |
|                                                                                                                                                                                                                              |                              | 24                    | 125                          | 741                    |                      |                                      | 100                        | 81                                   |
|                                                                                                                                                                                                                              |                              | ±5                    | ±250                         | 649                    |                      |                                      | 220#                       | 77                                   |
|                                                                                                                                                                                                                              |                              | ±12                   | ±125                         | 741                    |                      |                                      | 150#                       | 81                                   |
|                                                                                                                                                                                                                              |                              | ±15                   | ±100                         | 741                    |                      |                                      | 100#                       | 81                                   |
| DN03S1203A<br>DN03S1203H<br>DN03S1205A<br>DN03S1205H<br>DN03S1212A<br>DN03S1212H<br>DN03S1215A<br>DN03S1215H<br>DN03S1224A<br>DN03S1224H<br>DN03D1205A<br>DN03D1205H<br>DN03D1212A<br>DN03D1212H<br>DN03D1215A<br>DN03D1215H |                              | 3.3                   | 600                          | 209                    |                      |                                      | 680                        | 79                                   |
|                                                                                                                                                                                                                              |                              | 5                     | 500                          | 257                    |                      |                                      | 470                        | 81                                   |
|                                                                                                                                                                                                                              |                              | 12                    | 250                          | 294                    |                      |                                      | 330                        | 85                                   |
|                                                                                                                                                                                                                              |                              | 15                    | 200                          | 294                    |                      |                                      | 220                        | 85                                   |
|                                                                                                                                                                                                                              |                              | 24                    | 125                          | 298                    |                      |                                      | 100                        | 84                                   |
|                                                                                                                                                                                                                              |                              | ±5                    | ±250                         | 260                    |                      |                                      | 220#                       | 80                                   |
|                                                                                                                                                                                                                              |                              | ±12                   | ±125                         | 298                    |                      |                                      | 150#                       | 84                                   |
|                                                                                                                                                                                                                              |                              | ±15                   | ±100                         | 298                    |                      |                                      | 100#                       | 84                                   |

## Model Selection Guide

| Model Number             | Input Voltage (Range) | Output Voltage | Output Current | Input Current |          | Reflected Ripple Current | Max. capacitive Load | Efficiency (typ.) |
|--------------------------|-----------------------|----------------|----------------|---------------|----------|--------------------------|----------------------|-------------------|
|                          |                       |                | Max.           | @Max. Load    | @No Load |                          |                      | @Max. Load        |
|                          | VDC                   | VDC            | mA             | mA(typ.)      | mA(typ.) | mA(typ.)                 | μF                   | %                 |
| DN03S2403A<br>DN03S2403H | 24<br>(18 ~ 36)       | 3.3            | 600            | 104           | 20       | 15                       | 680                  | 79                |
| DN03S2405A<br>DN03S2405H |                       | 5              | 500            | 129           |          |                          | 470                  | 81                |
| DN03S2412A<br>DN03S2412H |                       | 12             | 250            | 147           |          |                          | 330                  | 85                |
| DN03S2415A<br>DN03S2415H |                       | 15             | 200            | 147           |          |                          | 220                  | 85                |
| DN03S2424A<br>DN03S2424H |                       | 24             | 125            | 149           |          |                          | 100                  | 84                |
| DN03D2405A<br>DN03D2405H |                       | ±5             | ±250           | 130           |          |                          | 220#                 | 80                |
| DN03D2412A<br>DN03D2412H |                       | ±12            | ±125           | 149           |          |                          | 150#                 | 84                |
| DN03D2415A<br>DN03D2415H |                       | ±15            | ±100           | 149           |          |                          | 100#                 | 84                |
| DN03S4803A<br>DN03S4803H | 48<br>(36 ~ 75)       | 3.3            | 600            | 52            | 15       | 10                       | 680                  | 79                |
| DN03S4805A<br>DN03S4805H |                       | 5              | 500            | 64            |          |                          | 470                  | 81                |
| DN03S4812A<br>DN03S4812H |                       | 12             | 250            | 74            |          |                          | 330                  | 85                |
| DN03S4815A<br>DN03S4815H |                       | 15             | 200            | 74            |          |                          | 220                  | 85                |
| DN03S4824A<br>DN03S4824H |                       | 24             | 125            | 74            |          |                          | 100                  | 84                |
| DN03D4805A<br>DN03D4805H |                       | ±5             | ±250           | 65            |          |                          | 220#                 | 80                |
| DN03D4812A<br>DN03D4812H |                       | ±12            | ±125           | 74            |          |                          | 150#                 | 84                |
| DN03D4815A<br>DN03D4815H |                       | ±15            | ±100           | 74            |          |                          | 100#                 | 84                |

# For each output

## Input Specifications

| Parameter                         | Model            | Min.      | Typ. | Max. | Unit |
|-----------------------------------|------------------|-----------|------|------|------|
| Input Surge Voltage (1 sec. max.) | 5V Input Models  | -0.7      | ---  | 11   | VDC  |
|                                   | 12V Input Models | -0.7      | ---  | 25   |      |
|                                   | 24V Input Models | -0.7      | ---  | 50   |      |
|                                   | 48V Input Models | -0.7      | ---  | 100  |      |
| Start-Up Threshold Voltage        | 5V Input Models  | ---       | ---  | 4.5  |      |
|                                   | 12V Input Models | ---       | ---  | 9    |      |
|                                   | 24V Input Models | ---       | ---  | 18   |      |
|                                   | 48V Input Models | ---       | ---  | 36   |      |
| Under Voltage Shutdown            | 5V Input Models  | ---       | ---  | 4    |      |
|                                   | 12V Input Models | ---       | ---  | 8.5  |      |
|                                   | 24V Input Models | ---       | ---  | 17.5 |      |
|                                   | 48V Input Models | ---       | ---  | 35.5 |      |
| Internal Filter Type              | All Models       | Pi Filter |      |      |      |
| Short Circuit Input Power         |                  | ---       | ---  | 2000 | mW   |
| Internal Power Dissipation        |                  | ---       | ---  | 1200 | mW   |

## Output Specifications

| Parameter                       | Conditions                  | Min. | Typ.  | Max.  | Unit              |
|---------------------------------|-----------------------------|------|-------|-------|-------------------|
| Output Voltage Setting Accuracy |                             | ---  | ---   | ±2.0  | %Vnom.            |
| Output Voltage Balance          | Dual Output, Balanced Loads | ---  | ±0.5  | ±2.0  | %                 |
| Line Regulation                 | Vin=Min. to Max.            | ---  | ±0.3  | ±1.0  | %                 |
| Load Regulation                 | Io=0% to 100%               | ---  | ±0.3  | ±1.0  | %                 |
| Min.Load                        | No minimum Load Requirement |      |       |       |                   |
| Ripple & Noise                  | 0-20 MHz Bandwidth          | ---  | ---   | 70    | mV <sub>P-P</sub> |
| Transient Recovery Time         | 25% Load Step Change        | ---  | 300   | 500   | μsec              |
| Transient Response Deviation    |                             | ---  | ±3    | ±5    | %                 |
| Temperature Coefficient         |                             | ---  | ±0.01 | ±0.02 | %/°C              |
| Over Load Protection            | Foldback                    | 120  | 150   | ---   | %                 |
| Short Circuit Protection        | Continuous                  |      |       |       |                   |

## General Specifications

| Parameter                     | Conditions                                                 |                         | Min.      | Typ. | Max. | Unit  |
|-------------------------------|------------------------------------------------------------|-------------------------|-----------|------|------|-------|
| I/O Isolation Voltage (rated) | 60 Seconds                                                 | Standard                | 1500      | ---  | ---  | VDC   |
|                               |                                                            | Suffix H <sub>(6)</sub> | 3000      | ---  | ---  | VDC   |
| I/O Isolation Resistance      | 500 VDC                                                    |                         | 1000      | ---  | ---  | MΩ    |
| I/O Isolation Capacitance     | 100KHz, 1V                                                 |                         | ---       | ---  | 300  | pF    |
| Switching Frequency           |                                                            |                         | 90        | ---  | ---  | KHz   |
| MTBF (calculated)             | MIL-HDBK-217F@25°C, Ground Benign                          |                         | 1,000,000 |      |      | Hours |
| Safety Approvals (Pending)    | UL/cUL 60950-1 recognition(UL certificate), IEC/EN 60950-1 |                         |           |      |      |       |

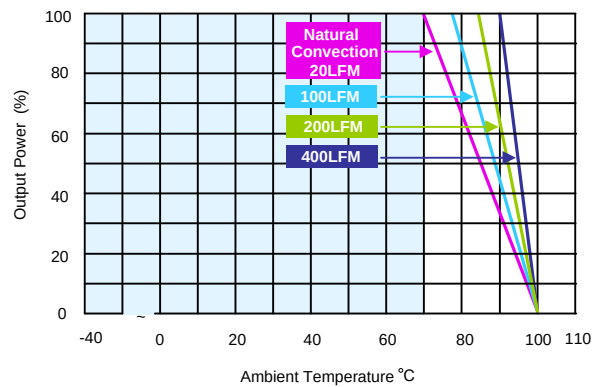
## Environmental Specifications

| Parameter                                                      | Conditions          | Min. | Max. | Unit     |
|----------------------------------------------------------------|---------------------|------|------|----------|
| Operating Ambient Temperature Range (See Power Derating Curve) | Natural Convection  | -40  | +85  | °C       |
| Case Temperature                                               |                     | ---  | +100 | °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       |

## EMC Specifications

| Parameter                     | Standards & Level                                           | Performance      |
|-------------------------------|-------------------------------------------------------------|------------------|
| Conducted EMI                 | Compliance to EN 55022 and FCC part 15                      | Class A          |
| ESD                           | EN61000-4-2 air $\pm 8\text{KV}$ , Contact $\pm 6\text{KV}$ | Perf. Criteria A |
| Radiated immunity             | EN61000-4-3 10V/m                                           | Perf. Criteria A |
| Fast transient <sup>(5)</sup> | EN61000-4-4 $\pm 2\text{KV}$                                | Perf. Criteria A |
| Surge <sup>(5)</sup>          | EN61000-4-5 $\pm 1\text{KV}$                                | Perf. Criteria A |
| Conducted immunity            | EN61000-4-6 10V/m                                           | Perf. Criteria A |

## Power Derating Curve

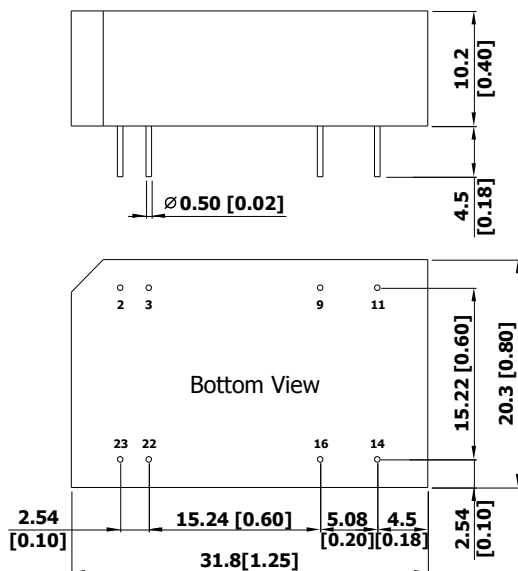


## Notes

- Specifications typical at  $T_a = +25^\circ\text{C}$ , resistive load, nominal input voltage and rated output current unless otherwise noted.
- Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%
- We recommend to protect the converter by a slow blow fuse in the input supply line.
- Other input and output voltage may be available, please contact factory.
- To meet EN61000-4-4 & EN61000-4-5 an external capacitor across the input pins is required. Suggested capacitor: CHEMI-CON KY 220 $\mu\text{F}$ /100V
- That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- Specifications are subject to change without notice.

## Package Specifications

### Mechanical Dimensions



### Pin Connections

| 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        |

NC: No Connection

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.5 (X.XX±0.02)  
X.XX±0.25 (X.XXX±0.01)
- ▶ Pin diameter  $\varnothing$  0.5 ±0.05 (0.02±0.002)

## Physical Characteristics

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 : Copper Alloy with Gold Plate Over Nickel Subplate

Weight : 12.8g



## Part Numbering System

| D           | N             | 03      | S                 | 05            | 03             | A                  |
|-------------|---------------|---------|-------------------|---------------|----------------|--------------------|
| Product typ | 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 - PCB Mount      |
| P - SIP     |               | 02 - 2W | D - Dual          | 05 - 5V       | 05 - 5V        | H - High Isolation |
| 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.

Information furnished by Delta is believed to be accurate and reliable. However, no responsibility is assumed by Delta for its use, nor for any infringements of patents or other rights of third parties, which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Delta. Delta reserves the right to revise these specifications at any time, without notice.



**Стандарт  
Электрон  
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

**Наши контакты:**

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331