



### 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) VDC	Output Voltage VDC	Output Current Max. mA	Input Current		Reflected Ripple Current mA(typ.)	Max. capacitive Load μF	Efficiency (typ.) @Max. Load %
				@Max. Load mA(typ.)	@No Load mA(typ.)			
DN03S0503A DN03S0503H DN03S0505A DN03S0505H DN03S0512A DN03S0512H DN03S0515A DN03S0515H DN03S0524A DN03S0524H DN03D0505A DN03D0505H DN03D0512A DN03D0512H DN03D0515A DN03D0515H	5 (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 DN03S1203H DN03S1205A DN03S1205H DN03S1212A DN03S1212H DN03S1215A DN03S1215H DN03S1224A DN03S1224H DN03D1205A DN03D1205H DN03D1212A DN03D1212H DN03D1215A 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 DN03S2403H	24 (18 ~ 36)	3.3	600	104	20	15	680	79
DN03S2405A DN03S2405H		5	500	129			470	81
DN03S2412A DN03S2412H		12	250	147			330	85
DN03S2415A DN03S2415H		15	200	147			220	85
DN03S2424A DN03S2424H		24	125	149			100	84
DN03D2405A DN03D2405H		±5	±250	130			220#	80
DN03D2412A DN03D2412H		±12	±125	149			150#	84
DN03D2415A DN03D2415H		±15	±100	149			100#	84
DN03S4803A DN03S4803H	48 (36 ~ 75)	3.3	600	52	15	10	680	79
DN03S4805A DN03S4805H		5	500	64			470	81
DN03S4812A DN03S4812H		12	250	74			330	85
DN03S4815A DN03S4815H		15	200	74			220	85
DN03S4824A DN03S4824H		24	125	74			100	84
DN03D4805A DN03D4805H		±5	±250	65			220#	80
DN03D4812A DN03D4812H		±12	±125	74			150#	84
DN03D4815A 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					

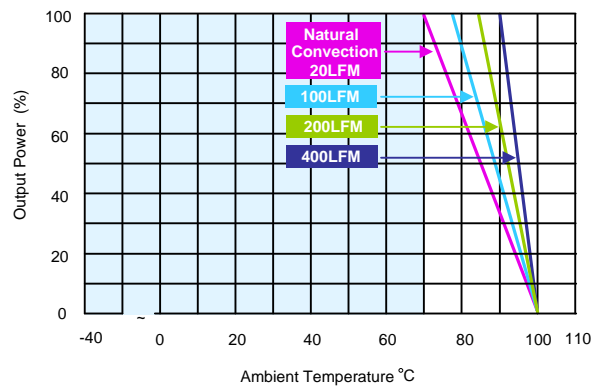
## Environmental Specifications

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

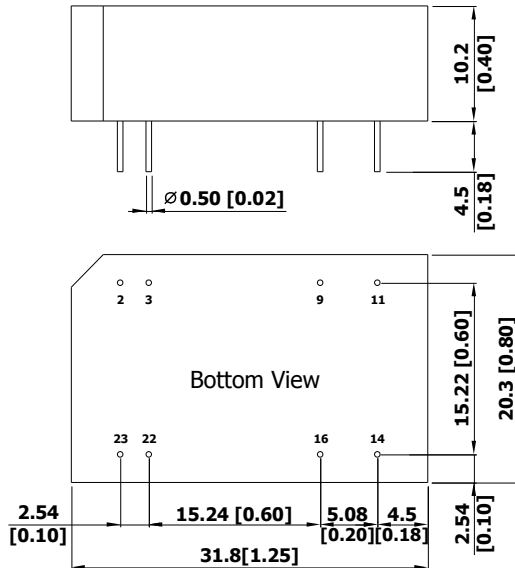


## Notes

- 1 Specifications typical at  $T_a = +25^\circ\text{C}$ , 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 We recommend to protect the converter by a slow blow fuse in the input supply line.
- 4 Other input and output voltage may be available, please contact factory.
- 5 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.
- 6 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- 7 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.

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