



### FEATURES

- Efficiency up to 84%e
- DIP Package with Industry Standard Pinout
- 2:1 Wide Input Range
- Operating Temperature Range -40°C to +85°C
- Short Circuit Protection
- Overload Protection
- Isolation Voltage 1500VDC /3000VDC(Optional)
- Complies with EN 55022 Class A
- Lead free, RoHs Compliant
- 3 Years Product Warranty



The DH06S/D series is a new range of high performance dc-dc converter modules with 6W output power, featuring wide 2:1 input voltage ranges and tight output voltage regulation. The product comes in a DIP-24 package with industry standard footprint. Excellent efficiency allows an operation temperature range of -40°C to +85°C (with derating). Standard features include overload protection. Typical applications for these cost optimized converters are battery powered equipment, instrumentation, datacom and industrial electronics.

### Model List

Model Number	Input Voltage (Range) VDC	Output Voltage VDC	Output Current Max. mA	Input Current		Reflected Ripple Current mA(typ.)	Max. capacitive Load uF	Efficiency (typ.)
				@Max. Load mA(typ.)	@No Load mA(typ.)			@Max. Load
								%
DH06S1203A	12 (9 ~ 18)	3.3	1200	440	40	30	470	75
DH06S1205A		5	1200	641			470	78
DH06S1212A		12	500	609			100	82
DH06S1215A		15	400	609			100	82
DH06S1224A		24	250	595			47	84
DH06D1205A		±5	±500	534			100*	78
DH06D1212A		±12	±250	609			100*	82
DH06D1215A		±15	±200	609			100*	82
DH06S2403A	24 (18 ~ 36)	3.3	1200	214	20	20	470	77
DH06S2405A		5	1200	313			470	80
DH06S2412A		12	500	298			100	84
DH06S2415A		15	400	298			100	84
DH06S2424A		24	250	298			47	84
DH06D2405A		±5	±500	260			100*	80
DH06D2412A		±12	±250	298			100*	84
DH06D2415A		±15	±200	298			100*	84
DH06S4803A	48 (36 ~ 75)	3.3	1200	107	10	15	470	77
DH06S4805A		5	1200	156			470	80
DH06S4812A		12	500	149			100	84
DH06S4815A		15	400	149			100	84
DH06S4824A		24	250	149			47	84
DH06D4805A		±5	±500	130			100*	80
DH06D4812A		±12	±250	149			100*	84
DH06D4815A		±15	±200	149			100*	84

\* For each output



## Input Characteristics

Parameter	Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	12V Input Models	-0.7	---	25	VDC
	24V Input Models	-0.7	---	50	
	48V Input Models	-0.7	---	100	
Start-Up Voltage	12V Input Models	7	8	9	
	24V Input Models	14	16	18	
	48V Input Models	32	34	36	
Under Voltage Shutdown	12V Input Models	---	---	8.5	
	24V Input Models	---	---	16	
	48V Input Models	---	---	35	
Short Circuit Input Power	All Models	---	---	3000	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 Accuracy		---	±1.0	±2.0	%
Output Voltage Balance	Dual Output, Balanced Loads	---	±1.0	±2.0	%
Line Regulation	Vin=Min. to Max.	---	±0.1	±0.5	%
Load Regulation	Io=0% to 100%	---	±0.6	±1.2	%
Min.Load	No minimum Load Requirement				
Ripple & Noise (20MHz)		---	50	80	mV <sub>P-P</sub>
Ripple & Noise (20MHz)	Over Line, Load % Temp.	---	---	100	mV <sub>P-P</sub>
Transient Recovery Time	25% Load Step Change	---	300	600	µS
Transient Response Deviation		---	±3	---	%
Temperature Coefficient		---	±0.01	±0.02	%/°C
Over Load Protection	Foldback	110	145	---	%
Short Circuit Protection	Continuous				

## General Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit	
I/O Isolation Voltage (rated)	60 Seconds	Standard	1500	---	---	VDC
		Suffix H(note 6)	3000	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ	
I/O Isolation Capacitance	100KHz, 1V	---	1000	---	pF	
Switching Frequency		---	330	---	KHz	
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	1,000,000	---	---	Hours	
Safety Approvals(pending)	UL/cUL 60950-1 recognition(CSA certificate), IEC/EN 60950-1(CB-scheme)					

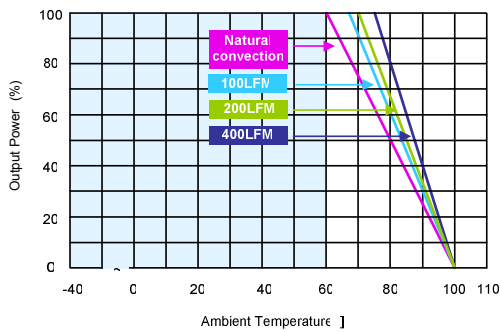
## Recommended Input Fuse

12V Input Models	24V Input Models	48V Input Models
1500mA Slow-Blow Type	700mA Slow-Blow Type	350mA Slow-Blow Type

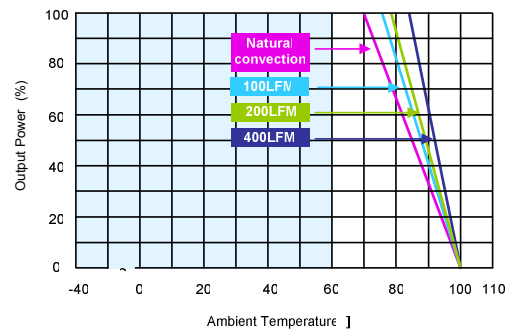
## Environmental Characteristics

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature Range (with Derating)	Ambient	-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

## Power Derating Curve



(3.3 & 5V Output Models)



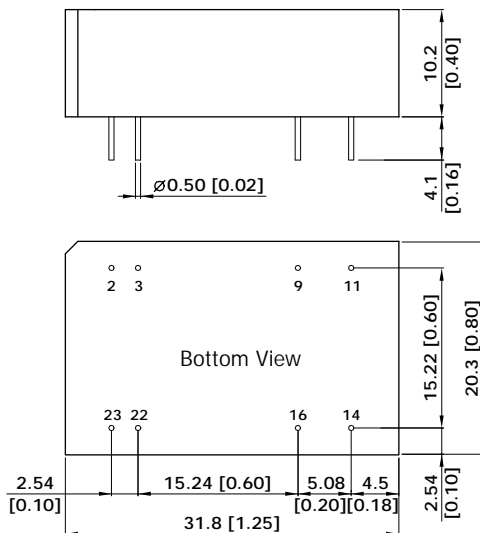
(Other Output Models)

## 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 Ripple & Noise measurement bandwidth is 0-20MHz.
- 4 All DC/DC converters should be externally fused at the front end for protection.
- 5 PH06S/D series at 3KVDC isolation is available, order code PH06S with part number option code(last 1 digits).
- 6 Specifications subject to change without notice.

## Mechanical Drawing

### 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:  $X.X \pm 0.25$  ( $X.XX \pm 0.01$ )  
 $X.XX \pm 0.13$  ( $X.XXX \pm 0.005$ )
- ▶ Pin diameter  $\leftrightarrow 0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )

## 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)

Weight : 12.7g



## Part Numbering System

D	H	06	S	12	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.

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.