



### FEATURES

- Efficiency up to 81%
- DIP Package with Industry Standard Pinout
- Wide 2:1 Input Range
- Fully regulated Output
- Operating Temperature Range  $-40^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$
- Low Ripple and Noise
- Isolation Voltage 1500 VDC
- Complies EN55022 class A
- Lead free, RoHs Compliant
- 3 Years Product Warranty

The DB02S/D series are miniature, DIP Package, isolated 2W DC/DC converters with 1,500VDC isolation. The DB02S/D series features fully regulated output and wide 2:1 input voltage ranges. The most convenient advantage is the modules with a low height of just 7.60 mm (0.30 inch) on the PCB. It offers short circuit protection and allows a wide operating temperature range of  $-40^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$ . 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. apacitive Load uF	Efficiency (typ.) @Max. Load %
			Max. mA	Min. mA	@Max. Load mA(typ.)	@No Load mA(typ.)			
DB02S0503A	5 (4.5 ~ 9)	3.3	500	125	471	40	100	2200	70
DB02S0505A		5	400	100	548			1000	73
DB02S0512A		12	167	42	534			170	75
DB02S0515A		15	134	33	582			110	73
DB02D0505A		$\pm 5$	$\pm 200$	$\pm 50$	667			470*	64
DB02D0512A		$\pm 12$	$\pm 83$	$\pm 21$	615			100*	69
DB02D0515A		$\pm 15$	$\pm 67$	$\pm 17$	598			47*	71
DB02S1203A	12 (9 ~ 18)	3.3	500	125	184	20	25	2200	73
DB02S1205A		5	400	100	217			1000	77
DB02S1212A		12	167	42	209			170	80
DB02S1215A		15	134	33	220			110	80
DB02D1205A		$\pm 5$	$\pm 200$	$\pm 50$	242			470*	73
DB02D1212A		$\pm 12$	$\pm 83$	$\pm 21$	224			100*	78
DB02D1215A		$\pm 15$	$\pm 67$	$\pm 17$	226			47*	78
DB02S2403A	24 (18 ~ 36)	3.3	500	125	96	10	15	2200	72
DB02S2405A		5	400	100	109			1000	77
DB02S2412A		12	167	42	109			170	80
DB02S2415A		15	134	33	108			110	81
DB02D2405A		$\pm 5$	$\pm 200$	$\pm 50$	119			470*	74
DB02D2412A		$\pm 12$	$\pm 83$	$\pm 21$	112			100*	78
DB02D2415A		$\pm 15$	$\pm 67$	$\pm 17$	110			47*	80
DB02S4803A	48 (36 ~ 75)	3.3	500	125	49	8	10	2200	71
DB02S4805A		5	400	100	57			1000	73
DB02S4812A		12	167	42	53			170	79
DB02S4815A		15	134	33	55			110	79
DB02D4805A		$\pm 5$	$\pm 200$	$\pm 50$	62			470*	71
DB02D4812A		$\pm 12$	$\pm 83$	$\pm 21$	57			100*	77
DB02D4815A		$\pm 15$	$\pm 67$	$\pm 17$	57			47*	77

\* For each output



## Input Characteristics

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 Voltage	5V Input Models	3.5	4	4.5	
	12V Input Models	4.5	7	9	
	24V Input Models	8	12	18	
	48V Input Models	16	24	36	
Under Voltage Shutdown	5V Input Models	---	3.5	4	
	12V Input Models	---	6.5	8.5	
	24V Input Models	---	11	17	
	48V Input Models	---	22	34	
Reverse Polarity Input Current	All Models	---	---	1	A
Short Circuit Input Power		---	---	1500	mW
Internal Power Dissipation		---	---	1800	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	V <sub>in</sub> =Min. to Max.	---	±0.3	±0.5	%
Load Regulation	I <sub>o</sub> =25% to 100%	---	±0.5	±0.75	%
Ripple & Noise (20MHz)		---	30	50	mV <sub>P-P</sub>
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	75	mV <sub>P-P</sub>
Ripple & Noise (20MHz)		---	---	15	mV rms
Transient Recovery Time	25% Load Step Change	---	100	300	µS
Transient Response Deviation		---	±3	±5	%
Temperature Coefficient		---	±0.01	±0.02	%/°C
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	---	250	420	pF
Switching Frequency		---	300	---	KHz
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	1,000,000	---	---	Hours

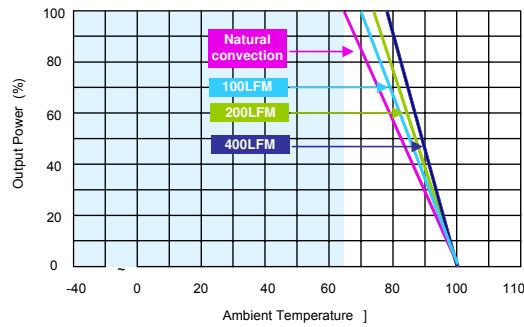
## Recommended Input Fuse

5V Input Models	12V Input Models	24V Input Models	48V Input Models
1000mA Slow-Blow Type	500mA Slow-Blow Type	250mA Slow-Blow Type	120mA Slow-Blow Type

## Environmental Characteristics

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature Range (with Derating)	Ambient	-40	+80	°C
Case Temperature		---	+90	°C
Storage Temperature Range		-55	+105	°C
Humidity (non condensing)		---	95	% rel. H
Cooling	Free-Air convection			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	°C

## Power Derating Curve

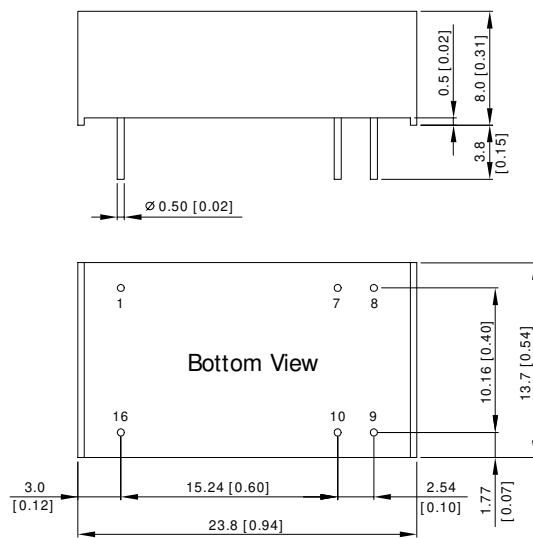


## Notes

- 1 Specifications typical at  $T_a=+25^{\circ}\text{C}$ , 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 0-20 MHz.
- 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 Specifications subject to change without notice.

## Mechanical Drawing

### Mechanical Dimensions



### Pin Connections

Pin	Single Output	Dual Output
1	-Vin	-Vin
7	NC	NC
8	NC	Common
9	+Vout	+Vout
10	-Vout	-Vout
16	+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  $\Rightarrow 0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )

## Physical Outline

Case Size	: 23.8x13.7x8.0mm(0.94x0.54x0.31 )inches)
Case Material	: Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
Weight	: 5.1g



## Part Numbering System

D	B	02	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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