



### FEATURES

- ◆ Efficiency up to 81%
- ◆ 2:1 Wide Input Range
- ◆ Fully regulated Output
- ◆ Operating Temperature Range -40°C to +85°C
- ◆ Moisture sensitivity level (MSL) 2
- ◆ Isolation Voltage 1500 V<sub>DC</sub>
- ◆ Conducted EMI meets EN55022, class A
- ◆ Lead free, RoHs Compliant
- ◆ Short circuit protection
- ◆ 3 Years Product Warranty



The SD02S/D series are miniature, SMD Package, isolated 2W DC/DC converters with 1500VDC isolation. The SD02S/D series features fully regulated output and wide 2:1 input voltage ranges. The most convenient advantage is the modules with a small footprint and low package height of 8.0 mm (0.31 inch) on the PCB. These isolated DC/DC converters are the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc.

### Model List

Model Number	Input Voltage (Range) VDC	Output Voltage VDC	Output Current		Input Current		Reflected Ripple Current mA(typ.)	Max. capacitive Load uF	Efficiency (typ.) @Max. Load %
			Max. mA	Min. mA	@Max. Load mA(typ.)	@No Load mA(typ.)			
SD02S0503A	5 (4.5 ~ 9)	3.3	500	125	471	40	100	2200	70
SD02S0505A		5	400	100	548			1000	73
SD02S0512A		12	167	42	534			170	75
SD02S0515A		15	134	33	582			110	73
SD02D0505A		±5	±200	±50	667			470*	64
SD02D0512A		±12	±83	±21	615			100*	69
SD02D0515A		±15	±67	±17	598			47*	71
SD02S1203A		12 (9 ~ 18)	3.3	500	125			184	20
SD02S1205A	5		400	100	217	1000	77		
SD02S1212A	12		167	42	209	170	80		
SD02S1215A	15		134	33	220	110	80		
SD02D1205A	±5		±200	±50	242	470*	73		
SD02D1212A	±12		±83	±21	224	100*	78		
SD02D1215A	±15		±67	±17	226	47*	78		
SD02S2403A	24 (18 ~ 36)		3.3	500	125	96	10	15	
SD02S2405A		5	400	100	109	1000			77
SD02S2412A		12	167	42	109	170			80
SD02S2415A		15	134	33	108	110			81
SD02D2405A		±5	±200	±50	119	470*			74
SD02D2412A		±12	±83	±21	112	100*			78
SD02D2415A		±15	±67	±17	110	47*			80
SD02S4803A		48 (36 ~ 75)	3.3	500	125	49			8
SD02S4805A	5		400	100	57	1000	73		
SD02S4812A	12		167	42	53	170	79		
SD02S4815A	15		134	33	55	110	79		
SD02D4805A	±5		±200	±50	62	470*	71		
SD02D4812A	±12		±83	±21	57	100*	77		
SD02D4815A	±15		±67	±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	V <sub>DC</sub>
	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	
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			

## 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	uS
Transient Response Deviation		---	±3	±5	%
Temperature Coefficient		---	±0.01	±0.02	%/°C
Short Circuit Protection	Continuous, Automatic Revery				

## 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
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 2			

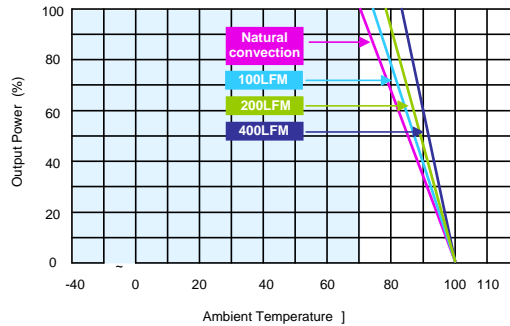
## Recommended Input Fuse

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 Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature Range (with Derating)	Ambient	-40	+85	°C
Case Temperature		---	+90	°C
Storage Temperature Range		-50	+125	°C
Humidity (non condensing)		---	95	% rel. H
Lead-free Reflow Solder Process		IPC/JEDEC J-STD-020D.1		°C

## Power Derating Curve

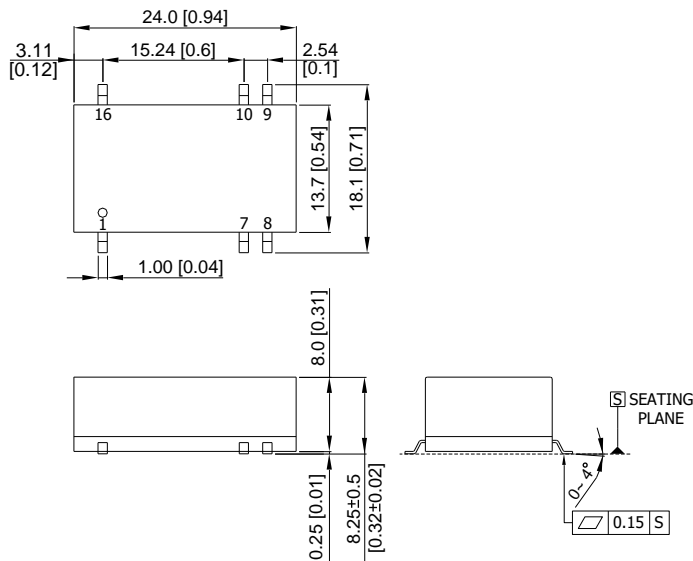


## Notes

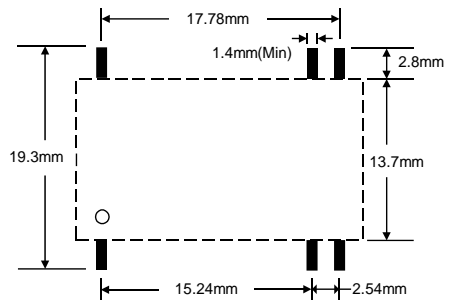
- 1 Specifications typical at  $T_a=+25^{\circ}\text{C}$ , resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%
- 3 Ripple & Noise measurement bandwidth is 0-20MHz.
- 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 We recommend to protect the converter by a slow blow fuse in the input supply line for protection.
- 6 Specifications subject to change without notice.
- 7 It is not recommended to use water-washing process on SMT units.

## Mechanical Drawing

### Mechanical Dimensions



### Connecting Pin Patterns



- ▶ All dimensions in mm (inches)
- ▶ Tolerance:  $X.X \pm 0.25$  ( $X.XX \pm 0.01$ )  
 $X.XX \pm 0.13$  ( $X.XXX \pm 0.005$ )
- ▶ Pins  $\pm 0.05$  ( $\pm 0.002$ )

### 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

### Physical Outline

Case Size	: 24.0x13.7x8.0mm (0.94x0.54x0.31 Inches)
Case Material	: Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
Weight	: 5.1g

### Part Numbering System

S	D	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	ATR - Std. Functions with Tape and Reel
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 (2) years limited warranty. Complete warranty information is listed on our web site or is available upon request from Delta.

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