



FEATURES

- ◆ Efficiency up to 81%
- ◆ 2:1 Wide Input Range
- ◆ Fully regulated Output
- ◆ Operating Temperature Range -40°C to $+85^{\circ}\text{C}$
- ◆ Moisture sensitivity level (MSL) 2
- ◆ Isolation Voltage 1500 V_{DC}
- ◆ 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		3.3	500	125	184			2200	73
SD02S1205A	12 (9 ~ 18)	5	400	100	217	20	25	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		3.3	500	125	96	10	15	2200	72
SD02S2405A		5	400	100	109			1000	77
SD02S2412A	24 (18 ~ 36)	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		3.3	500	125	49	8	10	2200	71
SD02S4805A	48 (36 ~ 75)	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 _{DC}
	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			

Output Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Dual Output, Balanced Loads	---	±1.0	±2.0	%
Output Voltage Balance		---	±1.0	±2.0	%
Line Regulation		---	±0.3	±0.5	%
Load Regulation	V _{in} =Min. to Max. I _o =25% to 100%	---	±0.5	±0.75	%
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	30	50	mV _{P-P}
Ripple & Noise (20MHz)		---	---	75	mV _{P-P}
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, 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			

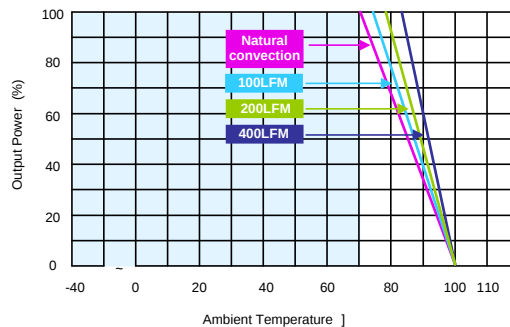
Recommended Input Fuse

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

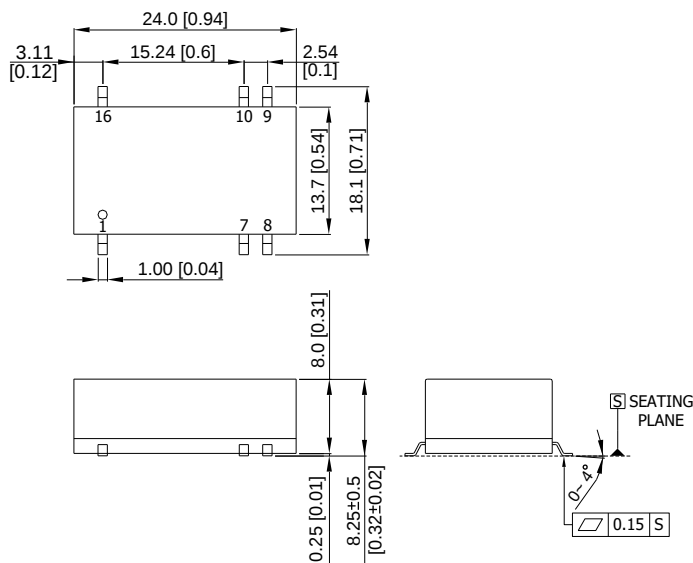


Notes

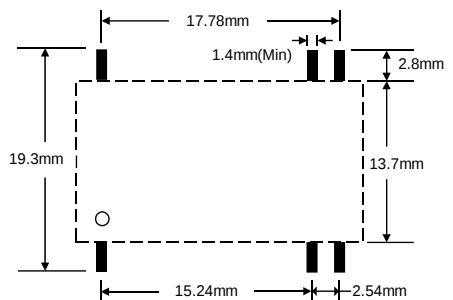
- 1 Specifications typical at $T_a = +25^{\circ}\text{C}$, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%.
- 3 Ripple & Noise measurement bandwidth is 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 ± 0.05 (± 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.

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.