



**THE DATASHEET OF
SD02D2405A**





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 VDC
- Complies with 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 1,500VDC 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. mA	Min. mA	@Max. Load mA(typ.)	@No Load mA(typ.)			@Max. Load %
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	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	Vin=Min. to Max.	---	±0.3	±0.5	%
Load Regulation	Io=25% to 100%	---	±0.5	±0.75	%
Ripple & Noise (20MHz)		---	30	50	mV _{P-P}
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	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				

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	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
Cooling	Free-Air convection			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	°C

Power Derating Curve



Notes

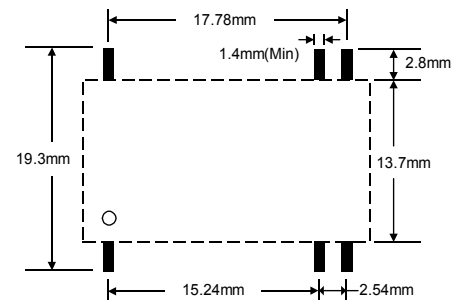
- 1 Specifications typical at $T_a=+25^{\circ}\text{C}$, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%
- 3 Ripple & Noise measurement bandwidth is 0-20MHz.
- 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 All DC/DC converters should be externally fused at the front end 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	
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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