



**THE DATASHEET OF
SH01S0509A**



FEATURES

- Efficiency up to 80%
- SMD Package with Industry Standard Pinout
- Operating Temperature Range -40°C to $+85^{\circ}\text{C}$
- Moisture sensitivity level (MSL) 2
- Isolation Voltage 1500 VDC
- High Accuracy of Pin Planarity
- Lead free, RoHS Compliant
- 3 Years Product Warranty
- UL/cUL 62368-1, UL/cUL 60950-1 approval



The SH01S/D series is miniature, SMD Package, isolated 1W DC/DC converters with 1,500VDC isolation. It allows a wide operating temperature range of -40°C to $+85^{\circ}\text{C}$. These isolated DC/DC converters are the latest offering from a world leader in power systems technology and manufacturing — Delta Electronics, Inc

Model List

Model Number	Input Voltage (Range) VDC	Output Voltage VDC	Output Current		Input Current		Load Regulation % (max.)	Max. capacitive Load uF	Efficiency (typ.)		
			Max. mA	Min. mA	@Max. Load mA(typ.)	@No Load mA(typ.)			@Max. Load %		
SH01S0503A	5 (4.5 ~ 5.5)	3.3	300	6	271	30	10	33	73		
SH01S0505A		5	200	4	256		10		78		
SH01S0509A		9	110	2	254		10		78		
SH01S0512A		12	84	1.5	259		8	78			
SH01S0515A		15	67	1	254		7	79			
SH01D0505A		± 5	± 100	± 2	270		10	74			
SH01D0512A		± 12	± 42	± 0.8	259		8	33*	78		
SH01D0515A		± 15	± 33	± 0.7	254		7	78			
SH01S1203A		12 (10.8 ~ 13.2)	3.3	300	6		112	15	8	33	74
SH01S1205A			5	200	4		109		8		76
SH01S1209A	9		110	2	106	8	78				
SH01S1212A	12		84	1.5	106	5	79				
SH01S1215A	15		67	1	105	5	80				
SH01D1205A	± 5		± 100	± 2	113	8	74				
SH01D1212A	± 12		± 42	± 0.8	108	5	33*		78		
SH01D1215A	± 15		± 33	± 0.7	104	5	79				
SH01S1512A	15 (13.5 ~ 16.5)		12	84	1.5	86	14		5	33	78
SH01S1515A			15	67	1	86			5		78
SH01S2403A		3.3	300	6	58	8		72			
SH01S2405A		5	200	4	54	8		78			
SH01S2409A		9	110	2	54	8		33	77		
SH01S2412A		12	84	1.5	55	5		77			
SH01S2415A	24 (21.6 ~ 26.4)	15	67	1	53	8	5	33	79		
SH01D2405A		± 5	± 100	± 2	57		8		73		
SH01D2412A		± 12	± 42	± 0.8	54		5		33*	78	
SH01D2415A		± 15	± 33	± 0.7	53		5	78			

* For each output



Input Characteristics

Parameter	Model	Min.	Typ.	Max.	Unit
Input Voltage Range	5V Input Models	4.5	5	5.5	VDC
	12V Input Models	10.8	12	13.2	
	15V Input Models	13.5	15	16.5	
	24V Input Models	21.6	24	26.4	
Input Surge Voltage (1 sec. max.)	5V Input Models	-0.7	---	9	
	12V Input Models	-0.7	---	18	
	15V Input Models	-0.7	---	20	
	24V Input Models	-0.7	---	30	
Reverse Polarity Input Current	All Models	---	---	0.3	A
Input Filter		Internal Capacitor			
Internal Power Dissipation		---	---	450	mW

Output Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Balance	Dual Output, Balanced Loads	---	±0.1	±1.0	%
Line Regulation	For Vin Change of 1%	---	±1.2	±1.5	%
Load Regulation	Io=20% to 100%	See Model Selection Guide			
Ripple & Noise (20MHz)		---	60	120	mV _{P-P}
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	150	mV _{P-P}
Ripple & Noise (20MHz)		---	---	15	mV rms
Temperature Coefficient		---	±0.01	±0.02	%/°C
Short Circuit Protection		0.5 Second Max.			

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	---	40	100	pF
Switching Frequency		50	100	140	KHz
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	2,000,000	---	---	Hours
Safety Approvals	UL/cUL 62368-1, UL/cUL 60950-1 recognition(CSA certificate)				
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D	Level 2			

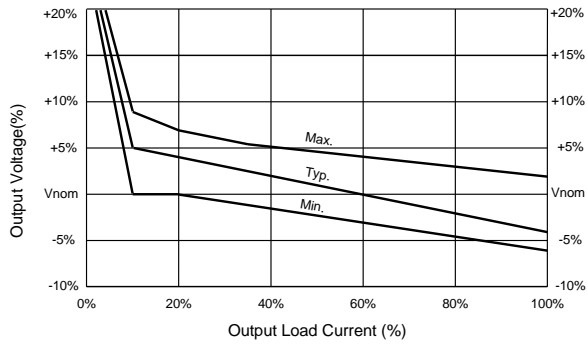
Recommended Input Fuse

5V Input Models	12V Input Models	15V Input Models	24V Input Models
500mA Slow-Blow Type	200mA Slow-Blow Type	150mA Slow-Blow Type	100mA Slow-Blow Type

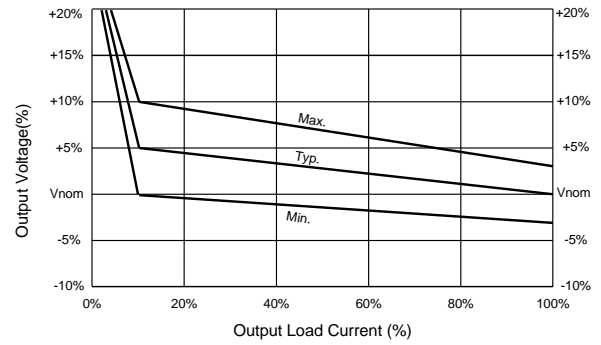
Environmental Specifications

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

Output Voltage Tolerance

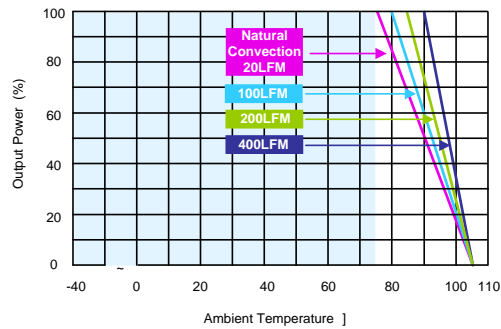


(3.3V & 5V Output)



(All other Output)

Power Derating Curve

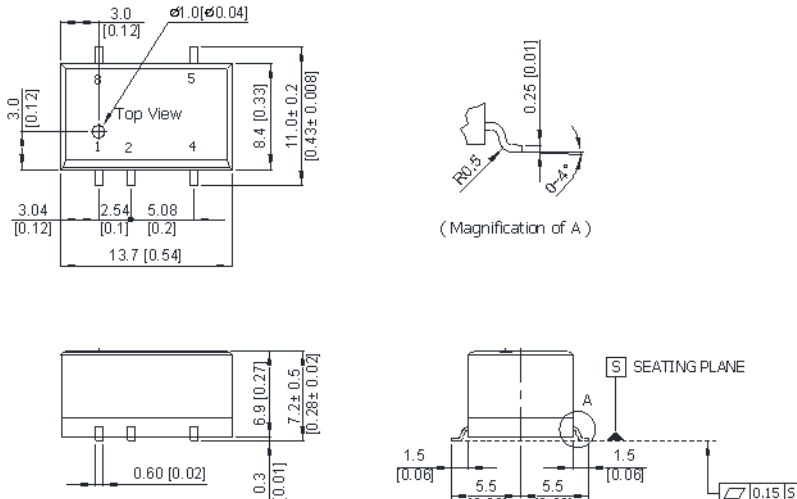


Notes

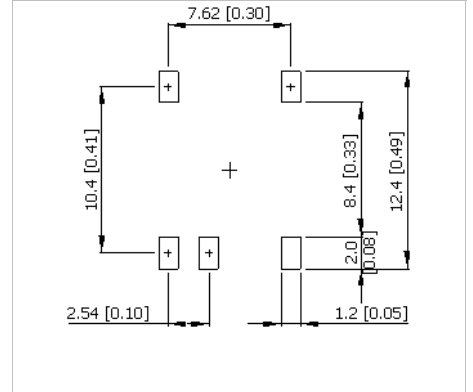
- 1 Specifications typical at $T_a=+25^{\circ}\text{C}$, resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Ripple & Noise measurement bandwidth is 0-20MHz.
- 3 These power converters require a minimum output loading to maintain specified regulation, operation under no-load conditions will not damage these modules; however they may not meet all specifications listed.
- 4 All DC/DC converters should be externally fused at the front end for protection.
- 5 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- 6 Specifications subject to change without notice.
- 7 It is not recommended to use water-washing process on SMT units.

Mechanical Drawing

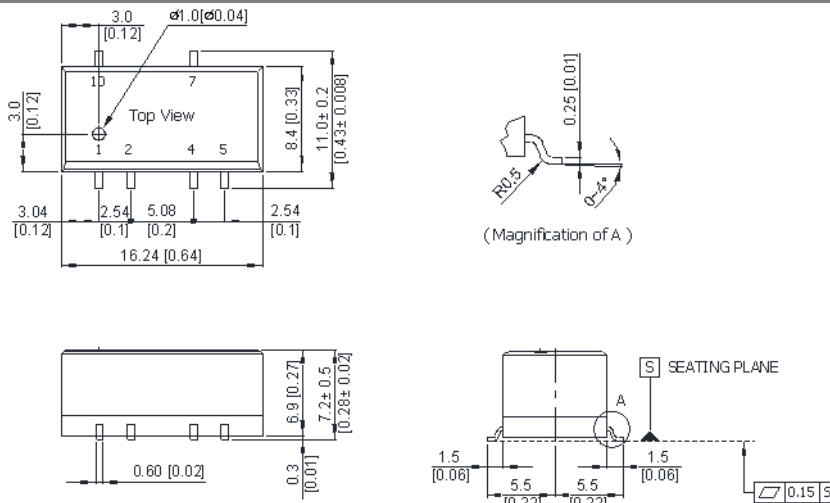
Mechanical Dimensions (Single Output)



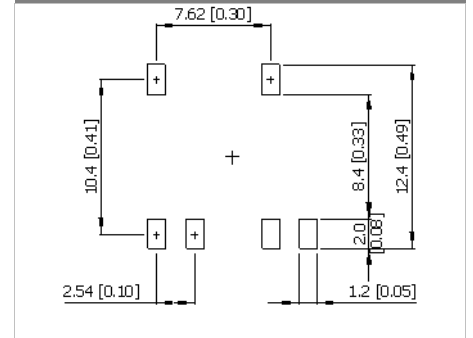
Connecting Pin Patterns



Mechanical Dimensions (Dual Output)



Connecting Pin Patterns



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

Pin Connections

Pin	Single Output	Dual Output
1	-Vin	-Vin
2	+Vin	+Vin
3	No Pin	No Pin
4	-Vout	Common
5	+Vout	-Vout
6	No Pin	No Pin
7	No Pin	+Vout
8	NA	No Pin
9	---	No Pin
10	---	NA

NA : Not Available for Electrical Connection

Physical Outline

Case Size (Single Output)	: 13.7x8.0x6.7mm (0.54x0.31x0.26 Inches)
Case Size (Dual Output)	: 16.24x8.0x6.7mm (0.64x0.31x0.26 Inches)
Case Material	: Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
Weight (Single Output)	: 1.7g
Weight (Dual Output)	: 2.0g



Part Numbering System

S	H	01	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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