

### FEATURES

- Efficiency up to 80%
- SMD Package with Industry Standard Pinout
- Operating Temperature Range  $-40^{\circ}\text{C}$  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



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  $-40^{\circ}\text{C}$  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		$\pm 5$	$\pm 100$	$\pm 2$	270		10		74				
SH01D0512A		$\pm 12$	$\pm 42$	$\pm 0.8$	259		8		33*	78			
SH01D0515A		$\pm 15$	$\pm 33$	$\pm 0.7$	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	$\pm 5$		$\pm 100$	$\pm 2$	113	8	74						
SH01D1212A	$\pm 12$		$\pm 42$	$\pm 0.8$	108	5	33*	78					
SH01D1215A	$\pm 15$		$\pm 33$	$\pm 0.7$	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		8	33		72		
SH01S2405A		5	200	4	54			8			78		
SH01S2409A		9	110	2	54			8			77		
SH01S2412A		12	84	1.5	55			5			77		
SH01S2415A		15	67	1	53			5			79		
SH01D2405A		$\pm 5$	$\pm 100$	$\pm 2$	57			9			8	33*	73
SH01D2412A		$\pm 12$	$\pm 42$	$\pm 0.8$	54						5		78
SH01D2415A		$\pm 15$	$\pm 33$	$\pm 0.7$	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 <sub>P-P</sub>
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	150	mV <sub>P-P</sub>
Ripple & Noise (20MHz)		---	---	15	mV <sub>rms</sub>
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
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D	Level 2			

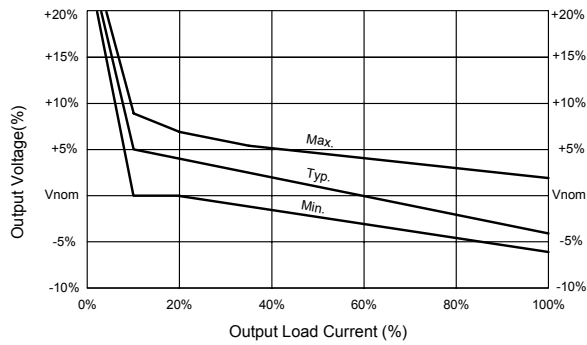
## Recommended Input Fuse

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

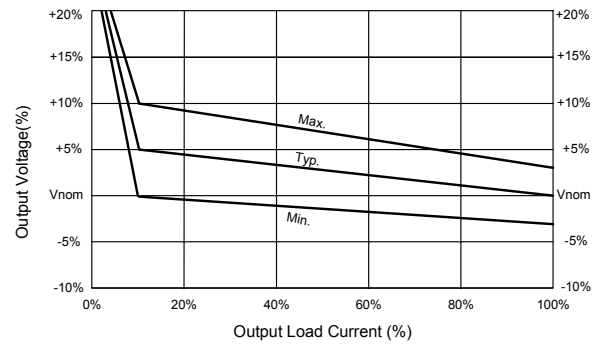
## Environmental Specifications

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

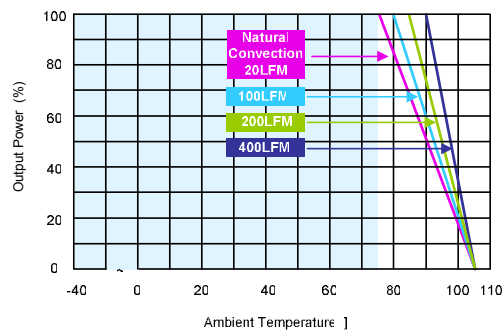


(3.3V & 5V Output)



(All other Output)

## Power Derating Curve

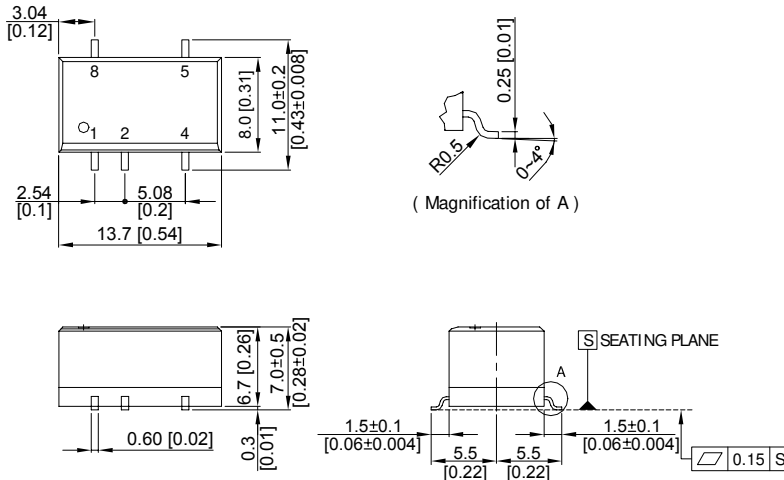


## Notes

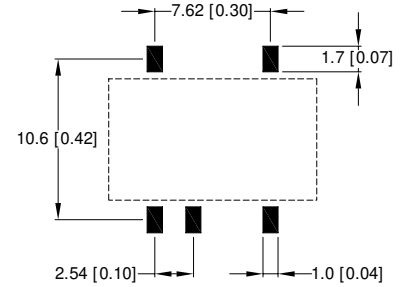
- 1 Specifications typical at  $T_a = +25^\circ\text{C}$ , resistive load, nominal input voltage and rated output current unless otherwise noted.
- 2 Ripple & Noise measurement bandwidth is 0-20MHz.
- 3 These power converters require a minimum output loading to maintain specified regulation, operation 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

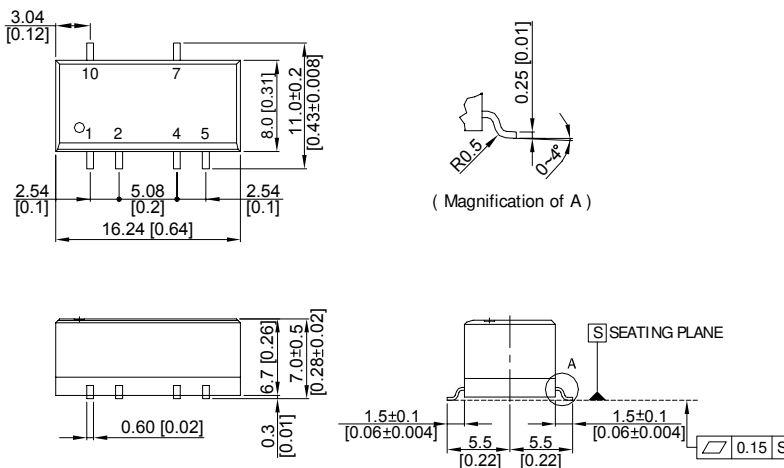
### Mechanical Dimensions (Single Output)



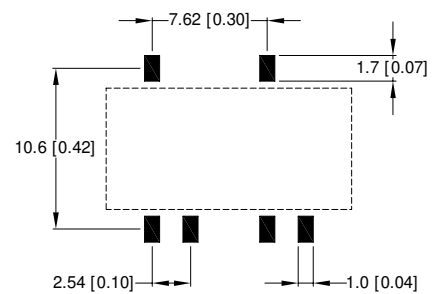
### Connecting Pin Patterns



### 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)  
Output)

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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