

## Buffered H-Bridge

### FEATURES

- 1.0-A H-Bridge
- 200-kHz Switching Rate
- Shoot-Through Limited
- TTL Compatible Inputs
- 3.8- to 13.2-V Operating Range
- Surface Mount Packaging

### APPLICATIONS

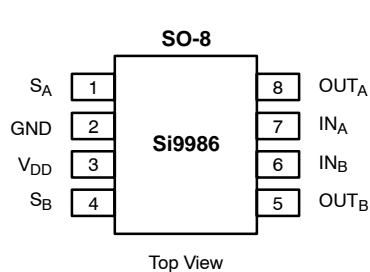
- VCM Driver
- Brushed Motor Driver
- Stepper Motor Driver
- Power Converter
- Optical Disk Drives
- Power Supplies
- High Performance Servo

### DESCRIPTION

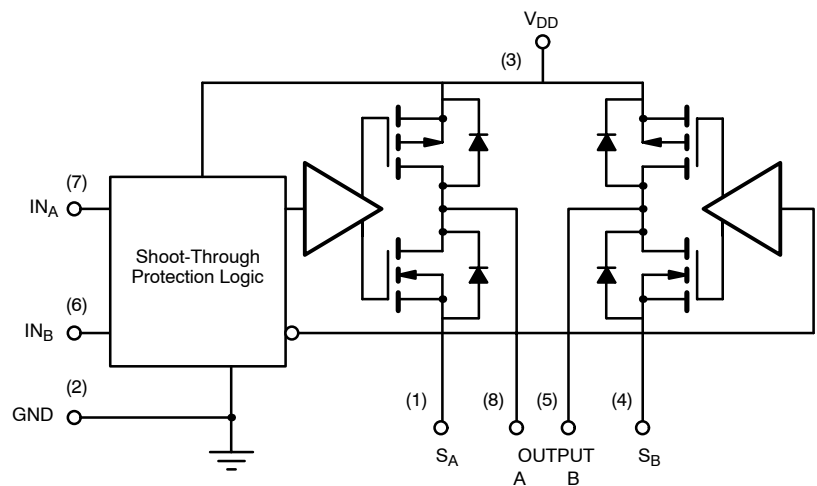
The Si9986 is an integrated, buffered H-bridge with TTL compatible inputs and the capability of delivering a continuous 1.0 A @  $V_{DD} = 12\text{ V}$  (room temperature) at switching rates up to 200 kHz. Internal logic prevents the upper and lower outputs of either half-bridge from being turned on simultaneously. Unique input codes allow both outputs to be forced low (for braking) or forced to a high impedance level.

The Si9986 is available in both standard and lead (Pb)-free, 8-pin SOIC packages, specified to operate over a voltage range of 3.8 V to 13.2 V, and the commercial temperature range of 0 to 70°C (C suffix) and the industrial temperature range of -40 to 85°C (D suffix).

### FUNCTIONAL BLOCK DIAGRAM, PIN CONFIGURATION AND TRUTH TABLE



TRUTH TABLE			
IN <sub>A</sub>	IN <sub>B</sub>	OUT <sub>A</sub>	OUT <sub>B</sub>
1	0	1	0
0	1	0	1
0	0	0	0
1	1	HiZ	HiZ



ORDERING INFORMATION		
Part Number	Temperature Range	Package
Si9986CY-T1	0 to 70°C	Tape and Reel
Si9986DY-T1	-40 to 85°C	
Si9986CY-T1—E3	0 to 70°C	Lead Free Tape and Reel
Si9986DY-T1—E3	-40 to 85°C	
Si9986CY	0 to 70°C	Bulk (tubes)
Si9986DY	-40 to 85°C	

**ABSOLUTE MAXIMUM RATINGS<sup>a</sup>**

Voltage on any pin with respect to ground	-0.3 V to $V_{DD} + 0.3$ V
Voltage on pins 5, 8 with respect to GND	-1 V to $V_{DD} + 1$ V
Voltage on pins 1, 4	-0.3 V to GND +1 V
Peak Output Current	1.5 A
Storage Temperature	-65 to 150°C
Maximum Junction Temperature ( $T_J$ )	150°C
Maximum $V_{DD}$	15 V

Power Dissipation <sup>b</sup>	1 W
$\theta_{JA}$	100°C/W
Operating Temperature Range	
Si9986CY	0 to 70°C
Si9986DY	-40 to 85°C

**Notes**

- a. Device mounted with all leads soldered or welded to PC board.  
b. Derate 10 mW/°C above 25°C.

**RECOMMENDED OPERATING RANGE**

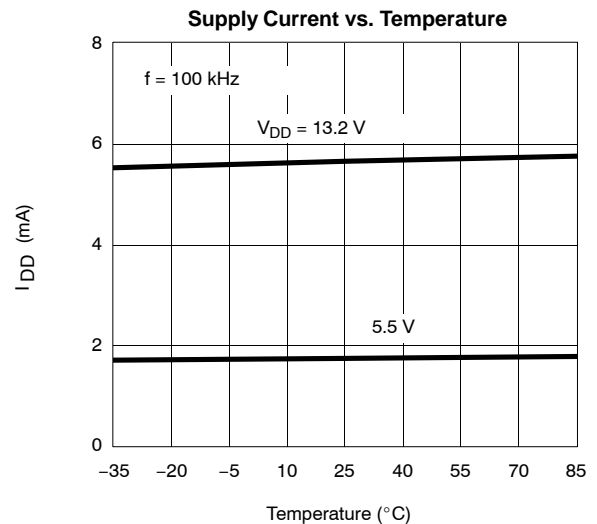
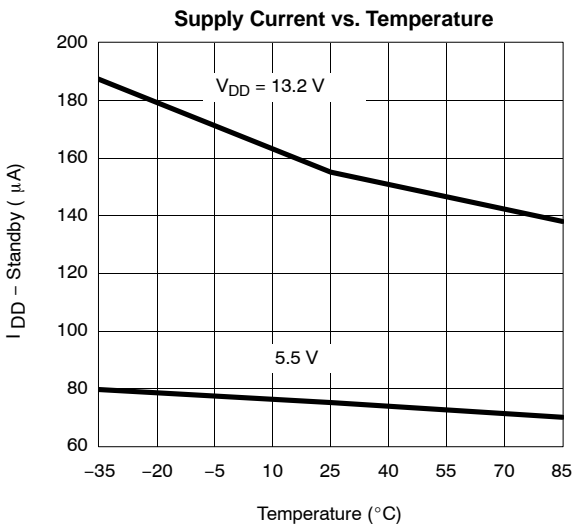
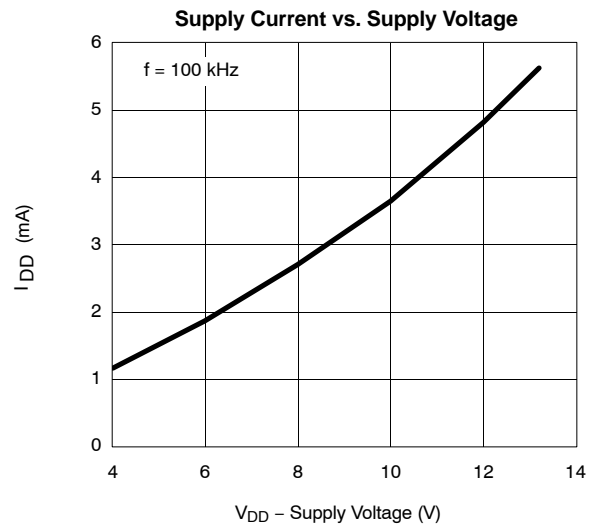
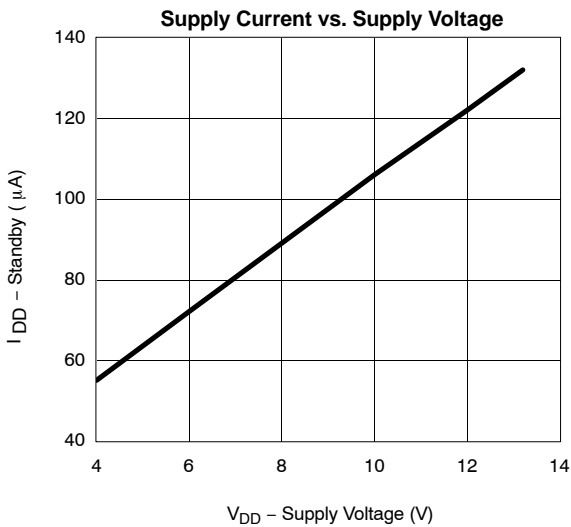
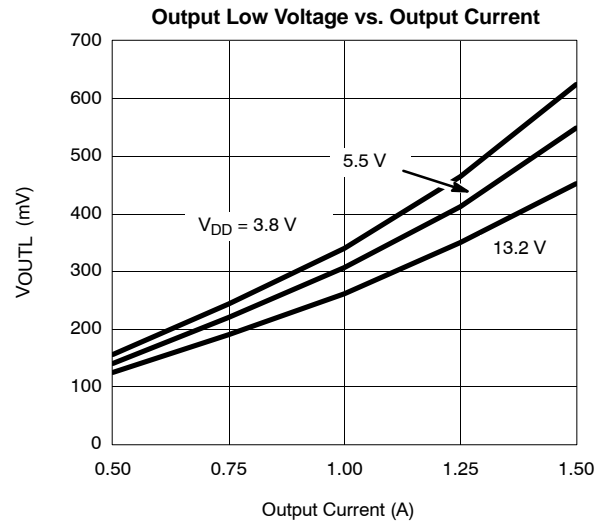
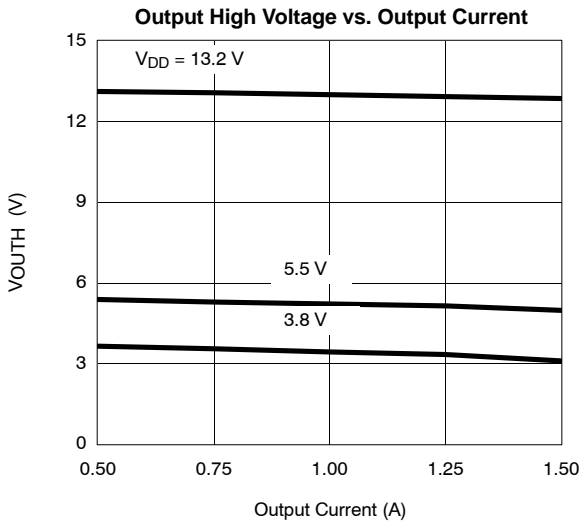
$V_{DD}$	3.8 V to 13.2 V
Maximum Junction Temperature ( $T_J$ )	125°C

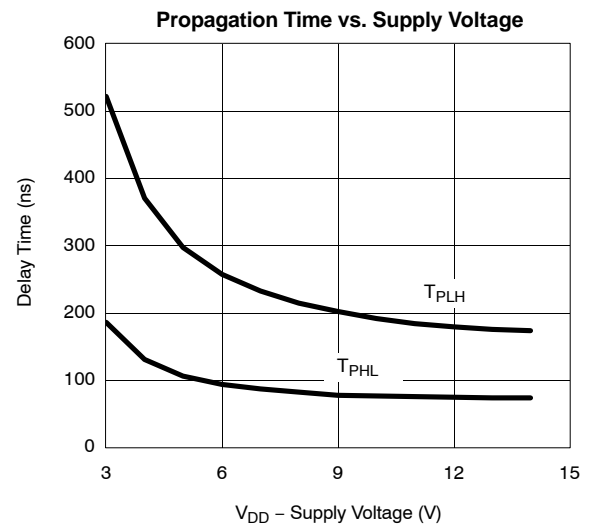
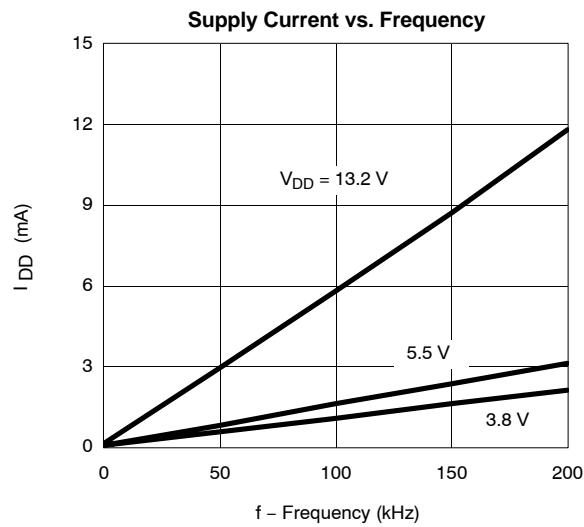
SPECIFICATIONS							
Parameter	Symbol	Test Conditions Unless Otherwise Specified $V_{DD} = 3.8$ to $13.2$ V $S_A$ @ GND, $S_B$ @ GND		Limits			Unit
				Min <sup>a</sup>	Typ <sup>b</sup>	Max <sup>a</sup>	
<b>Input</b>							
Input Voltage High	$V_{INH}$		2				V
Input Voltage Low	$V_{INL}$				1		
Input Current with Input Voltage High	$I_{INH}$	$V_{IN} = 2$ V			1		$\mu$ A
Input Current with Input Voltage Low	$I_{INL}$	$V_{IN} = 0$ V	-1				
<b>Output</b>							
Output Voltage High	$V_{OUTH}$	$I_{OUT} = -500$ mA	$V_{DD} = 10.8$ V	10.5	10.7		V
			$V_{DD} = 4.5$ V	4.1	4.3		
		$I_{OUT} = -300$ mA, $V_{DD} = 3.8$ V		3.4	3.7		
Output Voltage Low	$V_{OUTL}$	$I_{OUT} = 500$ mA	$V_{DD} = 10.8$ V		0.2	0.3	
			$V_{DD} = 4.5$ V		0.2	0.4	
		$I_{OUT} = 300$ mA, $V_{DD} = 3.8$ V			0.1	0.4	
Output Leakage Current High	$I_{OLH}$	$I_{NA} = I_{NB} \geq 2$ V, $V_{OUT} = V_{DD} = 13.2$ V	-10	0			$\mu$ A
Output Leakage Current Low	$I_{OLL}$	$V_{OUT} = 0$ , $V_{DD} = 13.2$ V		0	10		
Output V Clamp High	$V_{CLH}$	$I_{NA} = I_{NB} \geq 2$ V	$I_{OUT} = 100$ mA		$V_{DD} + 0.7$		V
Output V Clamp Low	$V_{CLL}$		$I_{OUT} = -100$ mA		-0.7		
<b>Supply</b>							
$V_{DD}$ Supply Current	$I_{DD}$	$I_N = 100$ kHz, $V_{DD} = 5$ V			2		mA
		$I_{NA} = I_{NB} = 4.5$ V, $V_{DD} = 5.5$ V				300	$\mu$ A
<b>Dynamic</b>							
Propagation Delay Time	$T_{PLH}$	$V_{DD} = 5$ V			300		nS
	$T_{PHL}$				100		

**Notes**

- a. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.  
b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**



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