

Buffered H-Bridge

FEATURES

- 1.0-A H-Bridge
- 500-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

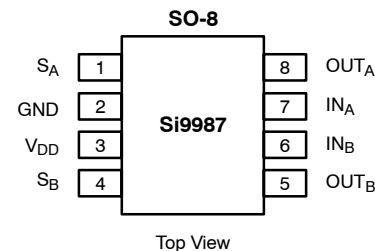
DESCRIPTION

The Si9987 is an integrated, buffered H-bridge with TTL compatible inputs and the capability of delivering a continuous 1.0 A @ $V_{DD} = 5.0$ V (room temperature) at switching rates up to 500 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

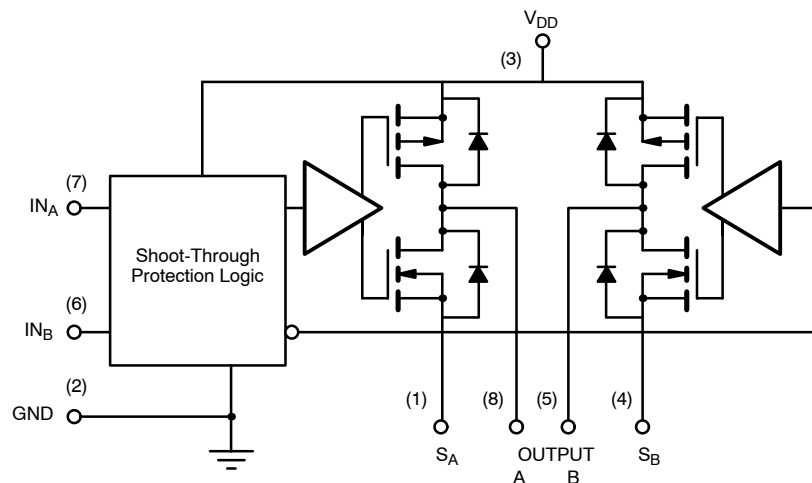
forced to a high impedance level.

The Si9987 is available in an 8-Pin SOIC package, 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 -40 to 85°C (D suffix). The Si9987 is available in lead free.

FUNCTIONAL BLOCK DIAGRAM, PIN CONFIGURATION AND TRUTH TABLE



TRUTH TABLE			
IN _A	IN _B	OUT _A	OUT _B
1	0	1	0
0	1	0	1
0	0	0	0
1	1	HiZ	HiZ



ORDERING INFORMATION

Part Number	Temperature Range	Package
Si9987CY-T1	0 to 70°C	Tape and Reel
Si9987DY-T1	-40 to 85°C	
Si9987CY-T1—E3	0 to 70°C	Lead Free Tape and Reel
Si9987DY-T1—E3	-40 to 85°C	
Si9987CY	0 to 70°C	Bulk (tubes)
Si9987DY	-40 to 85°C	

ABSOLUTE MAXIMUM RATINGS^a

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
Maximum V_{DD}	15 V
Peak Output Current	1.5 A
Storage Temperature	−65 to 150°C
Maximum Junction Temperature (T_J)	150°C
Power Dissipation ^b	1 W
θ_{JA}	100°C/W

Continuous I_{OUT} Current ($T_J = 135^\circ\text{C}$)^c

$T_A = 25^\circ\text{C}$	± 1.02 A
$T_A = 70^\circ\text{C}$	± 0.75 A
$T_A = 85^\circ\text{C}$	± 0.65 A

Operating Temperature Range

Si9987CY	0 to 70°C
Si9987DY	−40 to 85°C

Notes

- Device mounted with all leads soldered or welded to PC board.
- Derate 10 mW/°C above 25°C.
- $T_J = T_A + (P_D \times \theta_{JA})$, P_D = Power Dissipation.

RECOMMENDED OPERATING RANGE

V_{DD}	3.8 V to 13.2 V
Maximum Junction Temperature (T_J)	135°C

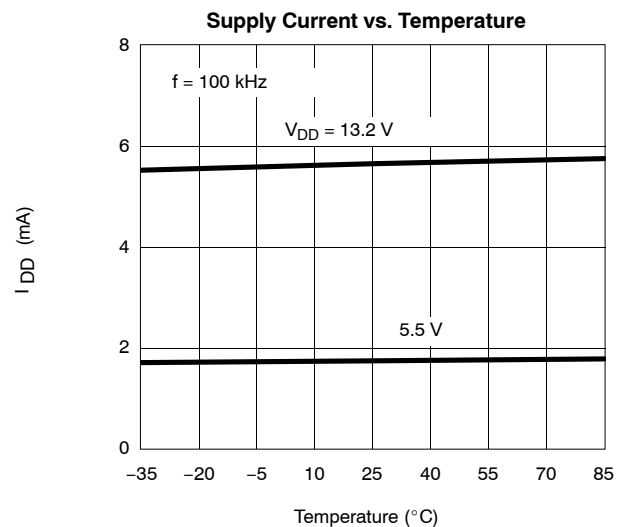
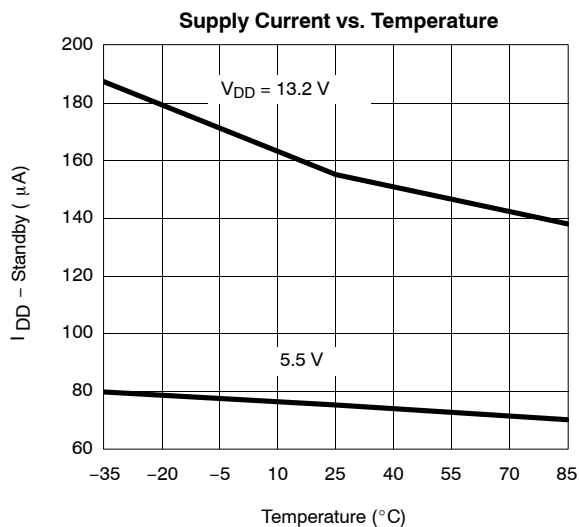
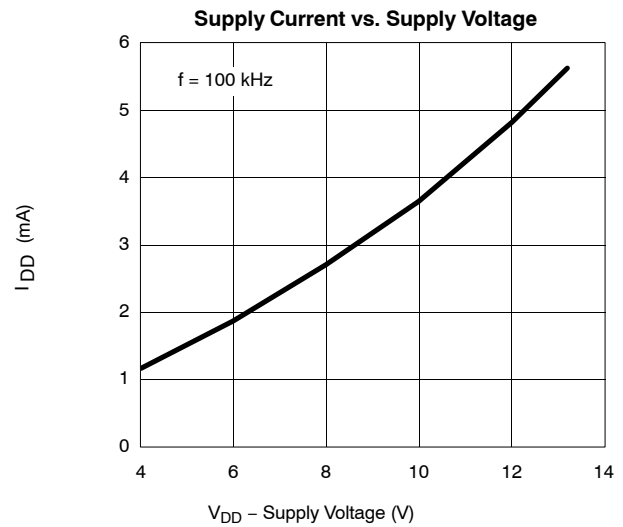
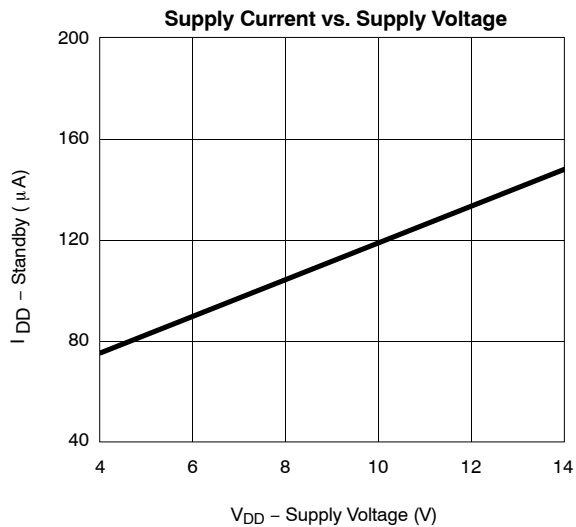
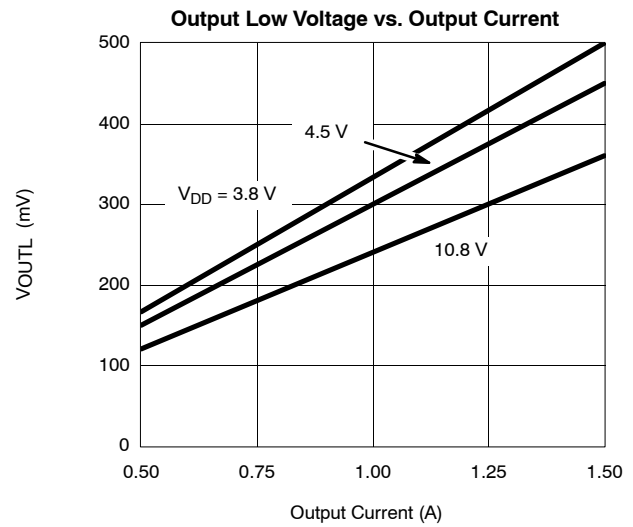
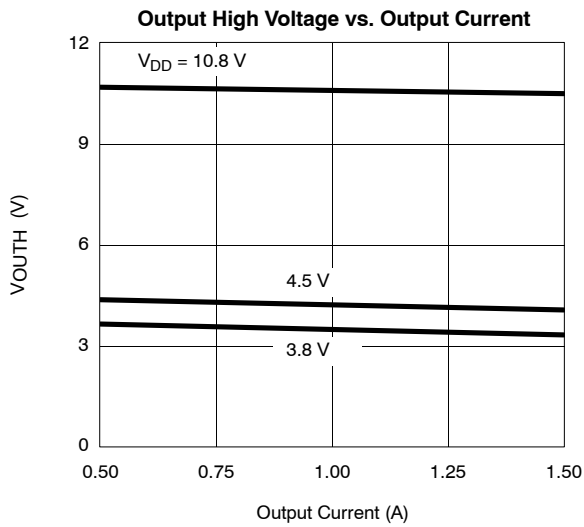
SPECIFICATIONS							
Parameter	Symbol	Test Conditions Unless Specified $V_{DD} = 3.8$ to 13.2 V S_A @ GND, S_B @ GND		Limits			Unit
				Min ^a	Typ ^b	Max ^a	
Input							
Input Voltage High	V_{INH}			2			V
Input Voltage Low	V_{INL}					1	
Input Current with Input Voltage High	I_{INH}	$V_{IN} = 2$ V				1	μ A
Input Current with Input Voltage Low	I_{INL}	$V_{IN} = 0$ V		−1			
Output							
Output Voltage High ^c	V_{OUTH}	$I_{OUT} = -1$ A	$V_{DD} = 10.8$ V	10.40	10.56		V
			$V_{DD} = 4.5$ V	4.00	4.20		
		$I_{OUT} = -500$ mA	$V_{DD} = 10.8$ V	10.60	10.68		
			$V_{DD} = 4.5$ V	4.25	4.35		
		$I_{OUT} = -300$ mA, $V_{DD} = 3.8$ V			3.63	3.70	
Output Voltage Low ^c	V_{OUTL}	$I_{OUT} = 1$ A	$V_{DD} = 10.8$ V		0.24	0.40	
			$V_{DD} = 4.5$ V		0.30	0.50	
		$I_{OUT} = 500$ mA	$V_{DD} = 10.8$ V		0.12	0.20	
			$V_{DD} = 4.5$ V		0.15	0.25	
		$I_{OUT} = 300$ mA, $V_{DD} = 3.8$ V				0.10	
Output Leakage Current Low	I_{OLL}	$I_{NA} = I_{NB} \geq 2$ V, $V_{OUT} = V_{DD} = 13.2$ V			0	10	μ A
Output Leakage Current High	I_{OLH}	$V_{OUT} = 0$, $V_{DD} = 13.2$ V		−10	0		
Output V Clamp High	V_{CLH}	$I_{NA} = I_{NB} \geq 2$ V	$I_{OUT} = 100$ mA		$V_{DD} + 0.7$	$V_{DD} + 0.9$	V
Output V Clamp Low	V_{CLL}		$I_{OUT} = -100$ mA	−0.9	−0.7		
Supply							
V_{DD} Supply Current	I_{DD}	$I_N = 100$ kHz, $V_{DD} = 5.5$ V			1.8	2.5	mA
		$I_{NA} = I_{NB} = 4.5$ V, $V_{DD} = 5.5$ V			75	125	μ A
Dynamic							
Propogation Delay Time	T_{PLH}	$V_{DD} = 5$ V			300		nS
	T_{PHL}				100		

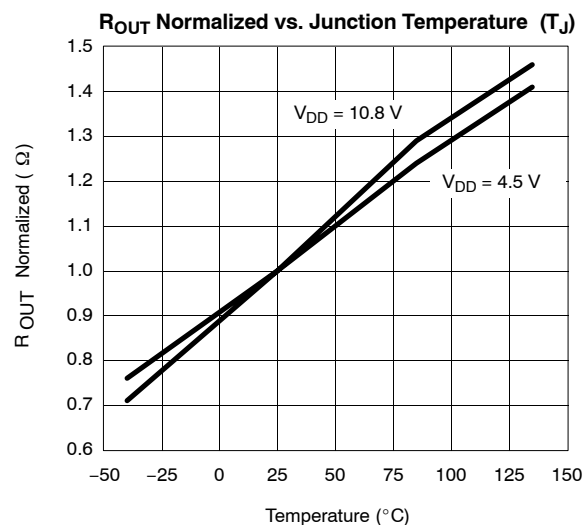
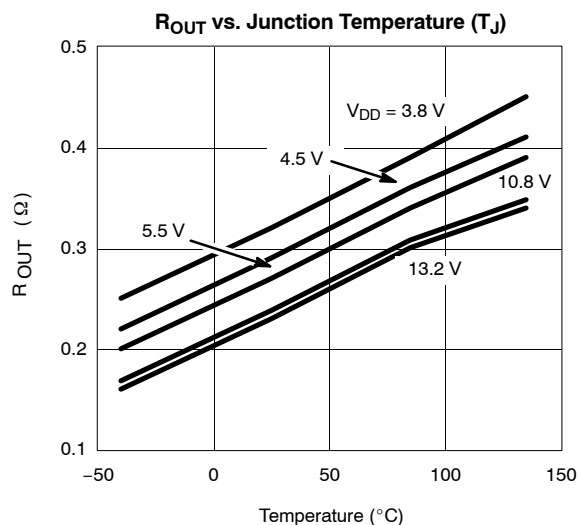
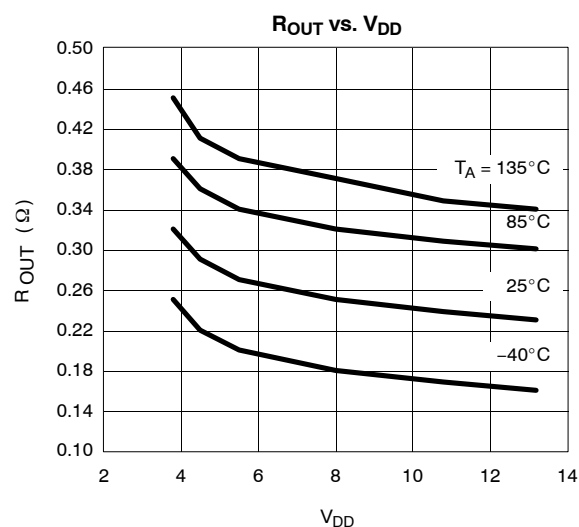
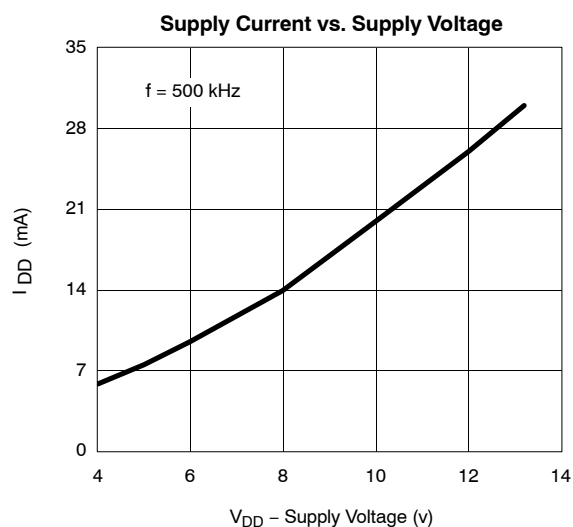
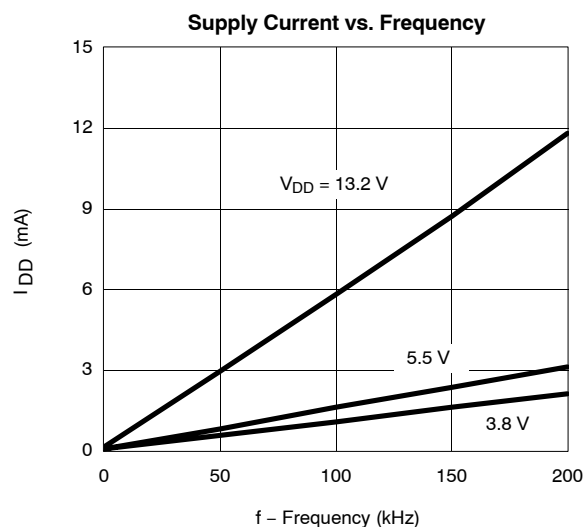
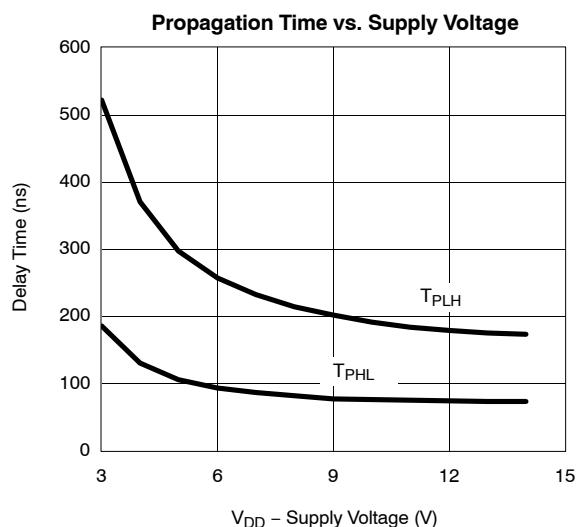
Notes

- The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Maximum value measured at $T_J = 135^\circ\text{C}$. Typical value measured at $T_J = T_A = 25^\circ\text{C}$ (pulse width ≤ 300 μsec , duty cycle $\leq 2\%$).



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)




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