



Buffered H-Bridge

FEATURES

- 0.65-A H-Bridge
- 200-kHz Switching Rate
- Shoot-Through Limited
- TTL Compatible Inputs
- 3.8- to 13.2-V Operating Range
- Surface Mount Packaging
- Total $r_{DS(on)}$ for N- and P-Channel: 1.8 Ω @ V_{DD} = 4.5 V and T_A = 85°C

APPLICATIONS

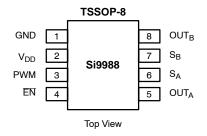
- VCM Driver
- Brushed Motor Driver
- Stepper Motor Driver
- Power Converter
- Optical Disk Drives
- Power Supplies
- High Performance Servo

DESCRIPTION

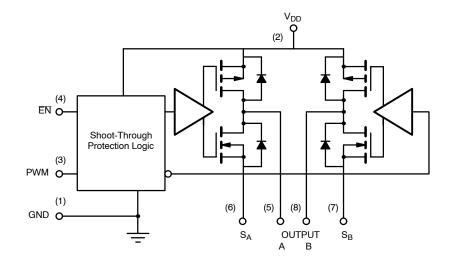
The Si9988 is an integrated, buffered H-bridge with TTL compatible inputs and the capability of delivering a continuous 0.65 A @ $V_{DD} = 5$ V (room temperature) at switching rates up to 200 kHz. Internal logic prevents the upper and lower outputs of either half-bridge from being turned on simultaneously. Both outputs may be forced low (for motor braking) by pulling $\overline{\text{EN}}$ to logic high.

The Si9988 is available in both standard and lead (Pb)-free, 8-pin TSSOP packages, specified to operate over a voltage range of 3.8 V to 13.2 V, and the industrial temperature range of -40 to 85°C (D suffix).

FUNCTIONAL BLOCK DIAGRAM, PIN CONFITURATION AND TRUTH TABLE



TRUTH TABLE					
EN	PWM	OUTA	OUTB		
0	0	0	1		
0	1	1	0		
1	0	0	0		
1	1	0	0		



ORDERING INFORMATION				
Part Number	Marking Temperature Range		Package	
Si9988DQ-T1	988	−40 to 85°C	Tape and Reel	
Si9988DQ-T1—E3	968	−40 to 85°C	rape and Reel	

Si9988

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ABSOLUTE MAXIMUM RATINGS^a

V _{DD}	5 V
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 6, 70.3 V to GND +	1 V
Peak Output Current	1 A
Storage Temperature	٥°C
Junction Temperature (T _J)	o°C

Continous I _{out} current (T _J = 135°C, Y _{DD} = 5V)
$T_A = 25$ °C
$T_A = 85$ °C 0.47A
Power Dissipation ^b
θ_{JA}
Operating Temperature Range –40 to 85°C

Notes

- holds a. Device mounted with all leads soldered or welded to PC board. b. Derate 8.3 mW/ $^{\circ}$ C above 25 $^{\circ}$ C. c. $T_J = T_A + (P_D)(\theta_{JA}), P_D = Power Dissipation.$

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING RANGE

V _{DD}	13.2 V
Maximum Junction Temperature (T _J)	135°C

SPECIFICATIONS							1
		Test Conditions Unless Otherwise Specified $V_{DD} = 3.8 \text{ to } 13.2 \text{ V}$ $S_A @ \text{ GND, } S_B @ \text{ GND}$		Limits D Suffix, -40 to 85°C		35°C	
Parameter	Symbol			Mina	Турь	Maxa	Unit
Input (EN, PWM)							
Input Voltage High	V _{INH}			2			.,
Input Voltage Low	V _{INL}					1	V
Input Current with Input Voltage High	I _{INH}	V _{IN} =	13.2 V			1	
Input Current with Input Voltage Low	I _{INL}	V _{IN} :	= 0 V	-1			μΑ
Output							
			V _{DD} = 10.8 V	10.55	10.70		
Output Voltage High ^c	V _{OUTH}	I _{OUT} = -300 mA	V _{DD} = 4.5 V	4.20	4.35		v
			V _{DD} = 3.8 V	3.40	3.62		
	V _{OUTL}	I _{OUT} = 300 mA	V _{DD} = 10.8 V		0.09	0.20	
Output Voltage Low ^c			V _{DD} = 4.5 V		0.12	0.25	
			V _{DD} = 3.8 V		0.14	0.30	
Output V Clamp High	V _{CLH}	EN DWW - OV	I _{OUT} = 100 mA		V _{DD} +0.7	V _{DD} +1.0	٧
Output V Clamp Low	V_{CLL}	EN = PWM ≥ 2 V	I _{OUT} = -100 mA	-1.0	-0.7		
Supply				-		•	
		$\overline{EN} = 0V, PWM = 1$	100 kHz, V _{DD} = 5 V		1.0	1.5	mA
V _{DD} Supply Current	I _{DD}	EN = 4.5 V, PWM = 100 kHz, V _{DD} = 5.5 V			60	140	^
		$\overline{EN} = PWM = 4.$	EN = PWM = 4.5 V, V _{DD} = 5.5 V		55	110	μΑ



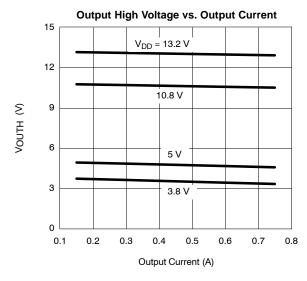
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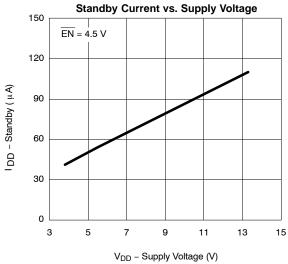
SPECIFICATIONS						
		Test Conditions Unless Otherwise Specified	Limits D Suffix, -40 to 85°C			
Parameter	Symbol	V_{DD} = 3.8 to 13.2 V S_A @ GND, S_B @ GND	Mina	Турь	Maxa	Unit
Dynamic						
Propogation Delay – OUT _A d	T _{PLH}	V _{DD} = 5 V, EN = 0 V		300		
	T _{PHL}			115		1
Propogation Delay – OUT _B d	T _{PLH}			75		nS
	T _{PHL}			330		
Break-Before-Make ^d	BBM _{PLH}			225]
	BBM _{PHL}			215		<u> 1 </u>

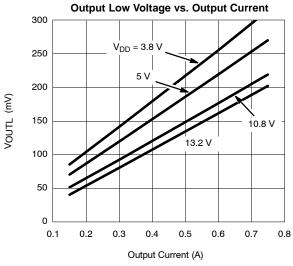
Notes

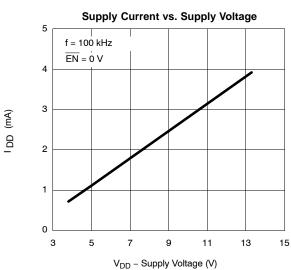
- a. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.
- b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing, measured $T_A = 25$ °C.
- c. Min and Max value mesaured at $T_J = 135^{\circ}$ C.
- d. PLH = PWM low to high, PHL = PWM high to low.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)





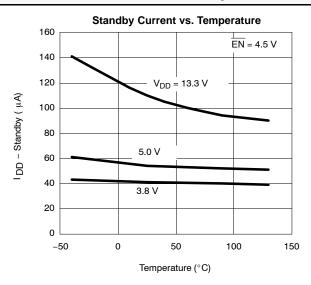


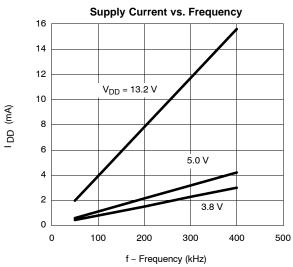


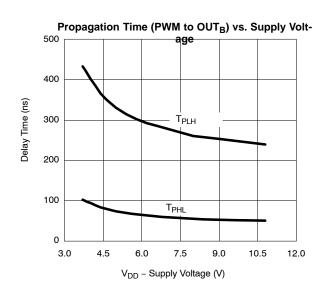
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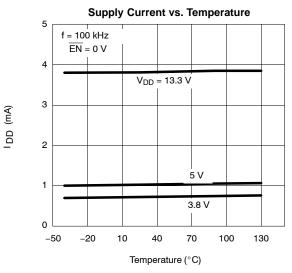


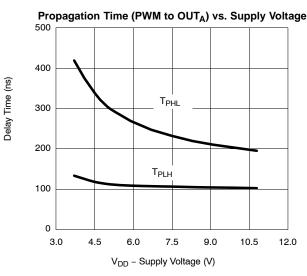
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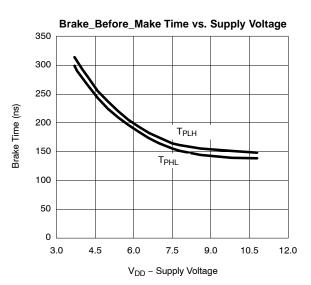








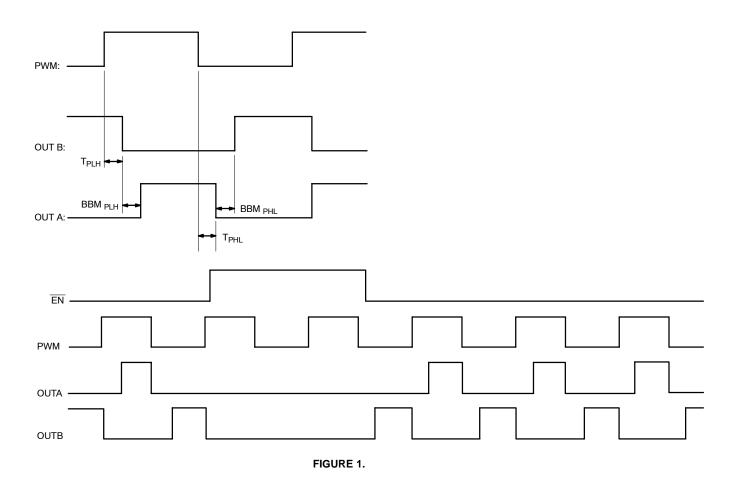








TIMING WAVEFORMS



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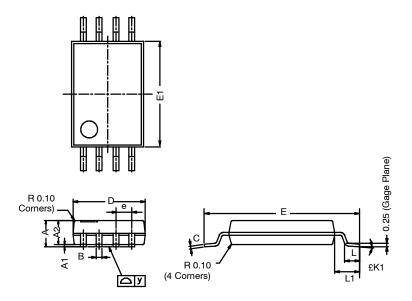
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TSSOP: 8-LEAD (POWER IC ONLY)

JEDEC Part Number: MO-153



	MILLIMETERS			
Dim	Min	Nom	Max	
Α	-	-	1.20	
A ₁	0.05	0.10	0.15	
A ₂	0.80	1.00	1.05	
В	0.19	0.28	0.30	
С	-	0.127	-	
D	2.90	3.00	3.10	
Е	6.20	6.40	6.60	
E ₁	4.30	4.40	4.50	
е	-	0.65	-	
L	0.45	0.60	0.75	
L ₁	0.90	1.00	1.10	
Υ	-	-	0.10	
£ K1	0°	3°	6°	
ECN: S-40079—Rev. A, 02-Feb-04 DWG: 5908				



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