CMOS Digital Integrated Circuits Silicon Monolithic

Features

High speed: tpd = 15 ns (typ.) at V_{CC} = 5 V
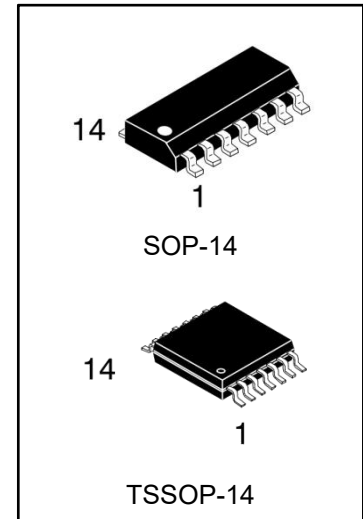
Low power dissipation: I_{CC} = 4.0μA (max) at Ta = 25

Balanced propagation delays: $t_{PLH} \approx t_{PHL}$

Wide operating voltage range: $V_{CC(opr)}$ = 2.0 to 6.0 V

Functional Description

● 8-Channel Multiplexer

14

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SOP-14

14

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TSSOP-14

Ordering Information

| DEVICE	Package Type	MARKING	Packing	Packing Qty
74HC151DRG	SOP-14	74HC151	REEL	2500pcs/reel
74HC151PWRG	TSSOP-14	HC151	REEL	2500pcs/reel

Genearl Description

The 74HC151 is a high speed CMOS 8-CHANNEL MULTIPLEXER fabricated with silicon gate C^2MOS technology.

It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

One of eight date input signals (D0-D7) is selected by decoding of the three-bit address input (A, B, C). The selected data appears on two outputs: non-inverting (Y) and inverting (W).

The strobe input provides two output conditions; a low level on the strobe input transfers the selected data to the outputs. A high level on the strobe input sets the Y output low and the W output high without regard to the data or select input conditions.

All inputs are equipped with protection circuits against static discharge or transient excess voltage.

Pin Assignment
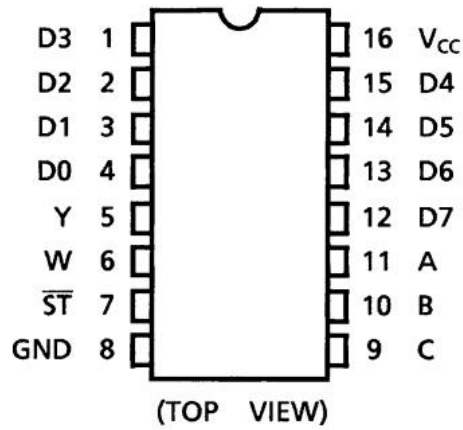
SOP-14/TSSOP-14

IEC Logic Symbol
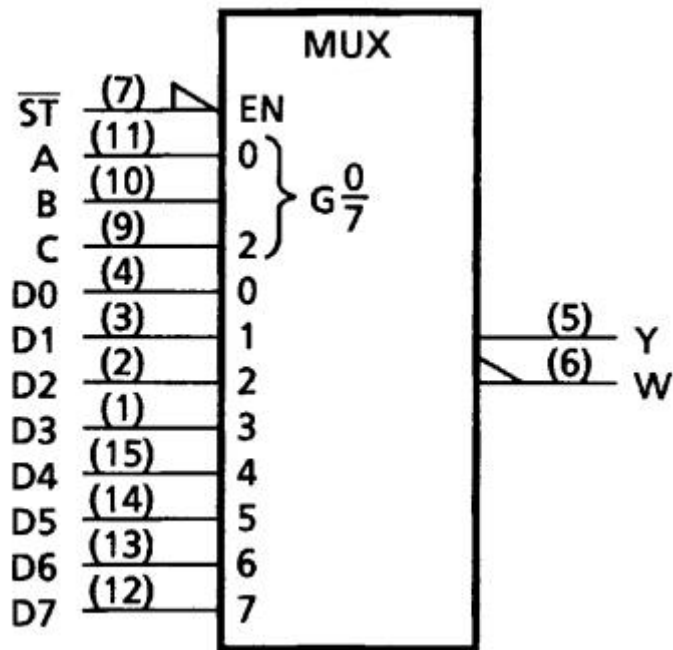
Truth Table

Inputs				Outputs	
Select			Strobe	Y	W
C	B	A	$\overline{ST}$		
X	X	X	H	L	H
L	L	L	L	D0	$\overline{D}0$
L	L	H	L	D1	$\overline{D}1$
L	H	L	L	D2	$\overline{D}2$
L	H	H	L	D3	$\overline{D}3$
H	L	L	L	D4	$\overline{D}4$
H	L	H	L	D5	$\overline{D}5$
H	H	L	L	D6	$\overline{D}6$
H	H	H	L	D7	$\overline{D}7$

X:Don`t care

System Diagram
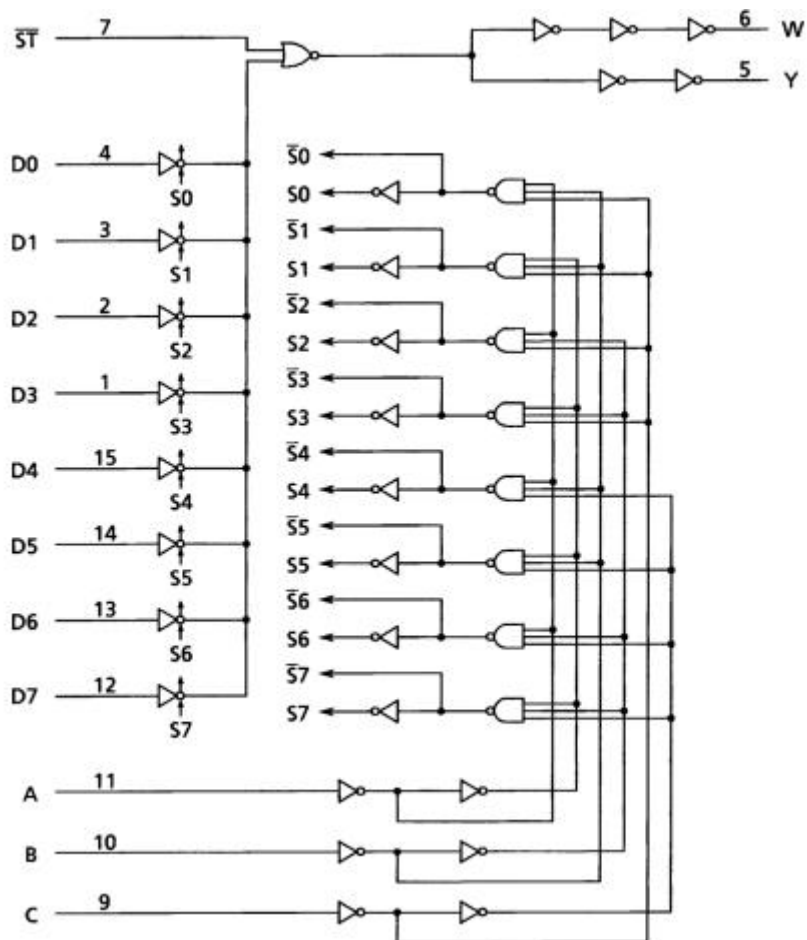
Absolute Maximum Ratings (Note)

Characteristics	Symbol	Note	Rating	Unit
Supply voltage	V_{CC}		-0.5 to 7.0	V
Input voltage	V_{IN}		-0.5 to V_{CC} + 0.5	V
Output voltage	V_{OUT}		-0.5 to V_{CC} + 0.5	V
Input diode current	I_{IK}		20	mA
Output diode current	I_{OK}		20	mA
Output current	I_{OUT}		25	mA
VCC/ground current	I_{CC}		50	mA
Power dissipation	P_D	(Note 1)	500	mW
Storage temperature	Tstg		-65 to 150	°C
Soldering temperature	T_L		245	°C

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Note 1: PD derates linearly with -8 mW/   above 85

Operating Ranges (Note)

Characteristics	Symbol	Test Condition	Rating	Unit
Supply voltage	V_{CC}		2.0 to 6.0	V
Input voltage	V_{IN}		0 to VCC	V
Output voltage	V_{OUT}		0 to VCC	V
Operating temperature	Topr		-40 to 85	°C
Input rise and fall times	tr,tf		0 to 50	µs

Note: The operating ranges must be maintained to ensure the normal operation of the device.

Unused inputs must be tied to either VCC or GND.

Electrical Characteristics

DC Characteristics (Unless otherwise specified, Ta = 25°C)

Characteristics	Symbol	Test Condition		V_CC (V)	Min	Typ.	Max	Unit
High-level input voltage	V_{IH}			2.0	1.50			V
				4.5	3.15			
				6.0	4.20			
Low-level input voltage	V_{IL}			2.0			0.50	V
				4.5			1.35	
				6.0			1.80	
High-level output voltage	V_{OH}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -20\mu A$	2.0	1.9	2.0		V
				4.5	4.4	4.5		
				6.0	5.9	6.0		
			$I_{OH} = -4$ mA	4.5	4.18	4.31		
			$I_{OH} = -5.2$ mA	6.0	5.68	5.80		
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 20\mu A$	2.0		0.0	0.1	V
				4.5		0.0	0.1	
				6.0		0.0	0.1	
			$I_{OL} = 4$ mA	4.5		0.17	0.26	
			$I_{OL} = 5.2$ mA	6.0		0.18	0.26	
Input leakage current	I_{IN}	$V_{IN} = V_{CC}$ or GND		6.0			±0.1	µA
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC}$ or GND		6.0			4.0	µA

DC Characteristics (Unless otherwise specified, Ta = -40 to 85°C)

Characteristics	Symbol	Test Condition		V_CC (V)	Min	Max	Unit
High-level input voltage	V_{IH}			2.0	1.50		V
				4.5	3.15		
				6.0	4.20		
Low-level input voltage	V_{IL}			2.0		0.50	V
				4.5		1.35	
				6.0		1.80	
High-level output voltage	V_{OH}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -20\mu A$	2.0	1.9		V
				4.5	4.4		
				6.0	5.9		
			$I_{OH} = -4$ mA	4.5	4.13		
			$I_{OH} = -5.2$ mA	6.0	5.63		
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 20\mu A$	2.0		0.1	V
				4.5		0.1	
				6.0		0.1	
			$I_{OL} = 4$ mA	4.5		0.33	
			$I_{OL} = 5.2$ mA	6.0		0.33	
Input leakage current	I_{IN}	$V_{IN} = V_{CC}$ or GND		6.0		±1.0	µA
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC}$ or GND		6.0		40.0	µA

74HC151

AC Characteristics

(Unless otherwise specified, C_L = 15 pF, V_{CC} = 5 V, Ta = 25°C, Input: tr = tf = 6 ns)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Output transition time	t_{TLH}, t_{THL}			4	8	ns
Propagation delay time (D-Y)	t_{PLH}, t_{PHL}			15	24	ns
Propagation delay time (D-W)	t_{PLH}, t_{PHL}			15	24	ns
Propagation delay time (ST-Y)	t_{PLH}, t_{PHL}			10	17	ns
Propagation delay time (ST-W)	t_{PLH}, t_{PHL}			10	17	ns
Propagation delay time (A, B, C-Y)	t_{PLH}, t_{PHL}			19	31	ns
Propagation delay time (A, B, C-W)	t_{PLH}, t_{PHL}			19	31	ns

AC Characteristics

(Unless otherwise specified, CL = 50 pF, Ta = 25°C, Input: tr = tf = 6 ns)

Characteristics	Symbol	Note	V_{CC} (V)	Min	Typ.	Max	Unit
Output transition time	t_{TLH}, t_{THL}		2.0		30	75	ns
			4.5		8	15	
			6.0		7	13	
Propagation delay time (D-Y)	t_{PLH}, t_{PHL}		2.0		65	140	ns
			4.5		18	28	
			6.0		15	24	
Propagation delay time (D-W)	t_{PLH}, t_{PHL}		2.0		65	140	ns
			4.5		18	28	
			6.0		15	24	
Propagation delay time (ST-Y)	t_{PLH}, t_{PHL}		2.0		36	100	ns
			4.5		12	20	
			6.0		10	17	
Propagation delay time (ST-W)	t_{PLH}, t_{PHL}		2.0		36	100	ns
			4.5		12	20	
			6.0		10	17	
Propagation delay time (A, B, C-Y)	t_{PLH}, t_{PHL}		2.0		80	180	ns
			4.5		23	36	
			6.0		19	31	
Propagation delay time (A, B, C-W)	t_{PLH}, t_{PHL}		2.0		80	180	ns
			4.5		23	36	
			6.0		19	31	
Input capacitance	C_{IN}				3		pF
Power dissipation capacitance	C_{PD}	(Note 1)			15		pF

Note 1: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation.

$I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}$

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6 / 10

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AC Characteristics

(Unless otherwise specified, C_L = 50 pF, T_a = -40 to 85°C, Input: t_r = t_f = 6 ns)

Characteristics	Symbol	V_{cc} (V)	Min	Max	Unit
Output transition time	t_{TLH}, t_{THL}	2.0		95	ns
		4.5		19	
		6.0		16	
Propagation delay time (D-Y)	t_{PLH}, t_{PHL}	2.0		175	ns
		4.5		35	
		6.0		30	
Propagation delay time (D-W)	t_{PLH}, t_{PHL}	2.0		175	ns
		4.5		35	
		6.0		30	
Propagation delay time (ST-Y)	t_{PLH}, t_{PHL}	2.0		125	ns
		4.5		25	
		6.0		21	
Propagation delay time (ST-W)	t_{PLH}, t_{PHL}	2.0		125	ns
		4.5		25	
		6.0		21	
Propagation delay time (A, B, C-Y)	t_{PLH}, t_{PHL}	2.0		225	ns
		4.5		45	
		6.0		38	
Propagation delay time (A, B, C-W)	t_{PLH}, t_{PHL}	2.0		225	ns
		4.5		45	
		6.0		38	

Physical Dimensions

SOP-14
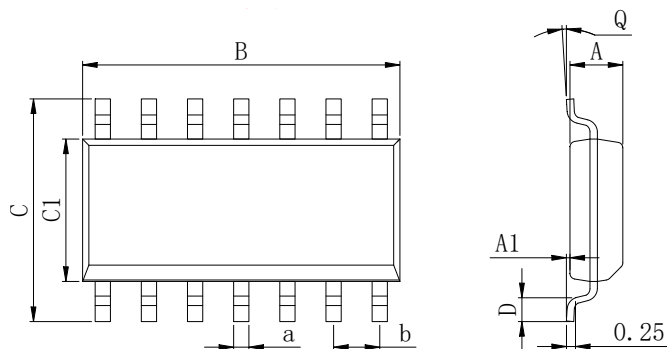
Dimensions In Millimeters(SOP14)								
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	8.55	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	8.75	6.20	4.00	0.80	8°	0.45	

TSSOP-14
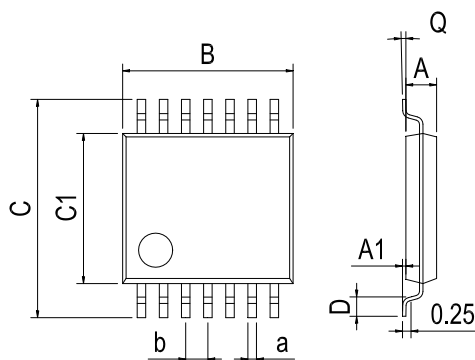
Dimensions In Millimeters(TSSOP14)								
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.85	0.05	4.90	6.20	4.30	0.40	0°	0.20	0.65 BSC
Max:	0.95	0.20	5.10	6.60	4.50	0.80	8°	0.25	

Revision History

DATE	REVISION	PAGE
2014-6-8	New	1-10
2023-7-22	Update encapsulation type、Update Soldering temperature	1、4

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