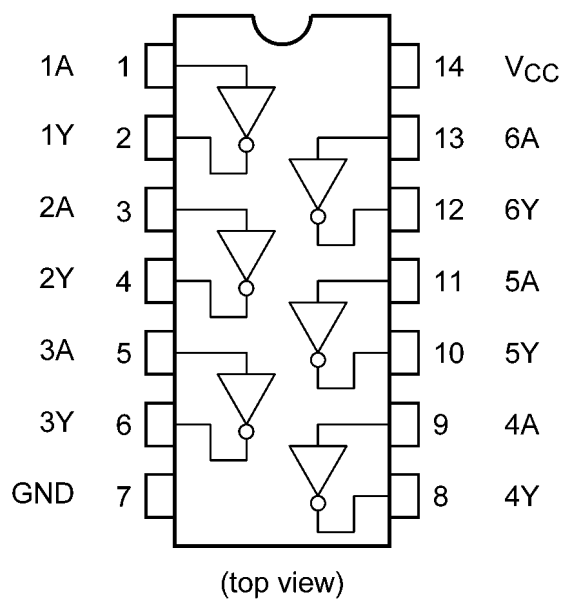
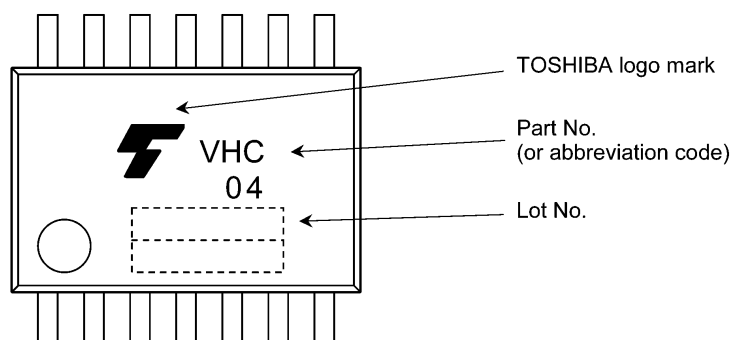


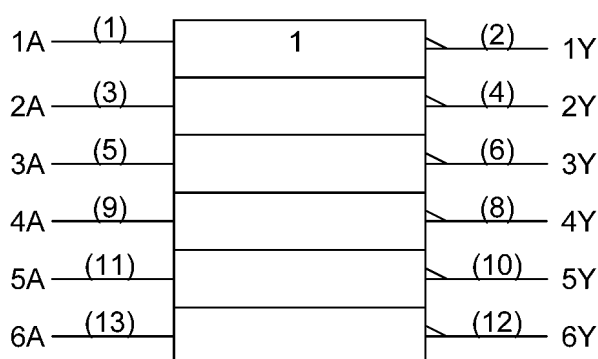
5. Pin Assignment



6. Marking



7. IEC Logic Symbol



8. Truth Table

A	Y
L	H
H	L

9. 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 7.0	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
V_{CC} /ground current	I_{CC}		± 50	mA
Power dissipation	P_D	(Note 1)	180	mW
Storage temperature	T_{stg}		-65 to 150	°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.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: 180 mW in the range of $T_a = -40$ to 85 °C. From $T_a = 85$ to 125 °C a derating factor of -3.25 mW/°C shall be applied until 50 mW.

10. Operating Ranges (Note)

Characteristics	Symbol	Test Condition	Rating	Unit
Supply voltage	V_{CC}		2.0 to 5.5	V
Input voltage	V_{IN}		0 to 5.5	V
Output voltage	V_{OUT}		0 to V_{CC}	V
Operating temperature	T_{opr}		-40 to 125	°C
Input rise and fall times	dt/dv	$V_{CC} = 3.3 \pm 0.3$ V	0 to 100	ns/V
		$V_{CC} = 5.0 \pm 0.5$ V	0 to 20	

Note: The operating ranges are required to ensure the normal operation of the device. Unused inputs must be tied to either V_{CC} or GND.

11. Electrical Characteristics

11.1. DC Characteristics (Unless otherwise specified, $T_a = 25\text{ }^{\circ}\text{C}$)

Characteristics	Symbol	Test Condition		V_{CC} (V)	Min	Typ.	Max	Unit
High-level input voltage	V_{IH}	—		2.0	1.50	—	—	V
				3.0 to 5.5	$V_{CC} \times 0.7$	—	—	
Low-level input voltage	V_{IL}	—		2.0	—	—	0.50	V
				3.0 to 5.5	—	—	$V_{CC} \times 0.3$	
High-level output voltage	V_{OH}	$V_{IN} = V_{IL}$	$I_{OH} = -50\text{ }\mu\text{A}$	2.0	1.9	2.0	—	V
				3.0	2.9	3.0	—	
				4.5	4.4	4.5	—	
			$I_{OH} = -4\text{ mA}$	3.0	2.58	—	—	
			$I_{OH} = -8\text{ mA}$	4.5	3.94	—	—	
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH}$	$I_{OL} = 50\text{ }\mu\text{A}$	2.0	—	0.0	0.1	V
				3.0	—	0.0	0.1	
				4.5	—	0.0	0.1	
			$I_{OL} = 4\text{ mA}$	3.0	—	—	0.36	
			$I_{OL} = 8\text{ mA}$	4.5	—	—	0.36	
Input leakage current	I_{IN}	$V_{IN} = 5.5\text{ V or GND}$		0 to 5.5	—	—	± 0.1	μA
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC} \text{ or GND}$		5.5	—	—	2.0	μA

11.2. DC Characteristics (Unless otherwise specified, $T_a = -40\text{ to }85\text{ }^{\circ}\text{C}$)

Characteristics	Symbol	Test Condition		V_{CC} (V)	Min	Max	Unit
High-level input voltage	V_{IH}	—		2.0	1.50	—	V
				3.0 to 5.5	$V_{CC} \times 0.7$	—	
Low-level input voltage	V_{IL}	—		2.0	—	0.50	V
				3.0 to 5.5	—	$V_{CC} \times 0.3$	
High-level output voltage	V_{OH}	$V_{IN} = V_{IL}$	$I_{OH} = -50\text{ }\mu\text{A}$	2.0	1.9	—	V
				3.0	2.9	—	
				4.5	4.4	—	
			$I_{OH} = -4\text{ mA}$	3.0	2.48	—	
			$I_{OH} = -8\text{ mA}$	4.5	3.80	—	
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH}$	$I_{OL} = 50\text{ }\mu\text{A}$	2.0	—	0.1	V
				3.0	—	0.1	
				4.5	—	0.1	
			$I_{OL} = 4\text{ mA}$	3.0	—	0.44	
			$I_{OL} = 8\text{ mA}$	4.5	—	0.44	
Input leakage current	I_{IN}	$V_{IN} = 5.5\text{ V or GND}$		0 to 5.5	—	± 1.0	μA
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC} \text{ or GND}$		5.5	—	20.0	μA

11.3. DC Characteristics (Unless otherwise specified, $T_a = -40$ to $125\text{ }^\circ\text{C}$)

Characteristics	Symbol	Test Condition		V_{CC} (V)	Min	Max	Unit
High-level input voltage	V_{IH}	—		2.0	1.50	—	V
				3.0 to 5.5	$V_{CC} \times 0.7$	—	
Low-level input voltage	V_{IL}	—		2.0	—	0.50	V
				3.0 to 5.5	—	$V_{CC} \times 0.3$	
High-level output voltage	V_{OH}	$V_{IN} = V_{IL}$	$I_{OH} = -50\text{ }\mu\text{A}$	2.0	1.9	—	V
				3.0	2.9	—	
				4.5	4.4	—	
			$I_{OH} = -4\text{ mA}$	3.0	2.40	—	
			$I_{OH} = -8\text{ mA}$	4.5	3.70	—	
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH}$	$I_{OL} = 50\text{ }\mu\text{A}$	2.0	—	0.1	V
				3.0	—	0.1	
				4.5	—	0.1	
			$I_{OL} = 4\text{ mA}$	3.0	—	0.55	
			$I_{OL} = 8\text{ mA}$	4.5	—	0.55	
Input leakage current	I_{IN}	$V_{IN} = 5.5\text{ V or GND}$		0 to 5.5	—	± 2.0	μA
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC}\text{ or GND}$		5.5	—	40.0	μA

11.4. AC Characteristics (Unless otherwise specified, $T_a = 25\text{ }^\circ\text{C}$, Input: $t_r = t_f = 3\text{ ns}$)

Characteristics	Symbol	Note	V_{CC} (V)	C_L (pF)	Min	Typ.	Max	Unit
Propagation delay time	t_{PLH}, t_{PHL}		3.3 ± 0.3	15	—	5.0	7.1	ns
				50	—	7.5	10.6	
			5.0 ± 0.5	15	—	3.8	5.5	
				50	—	5.3	7.5	
Input capacitance	C_{IN}				—	4	10	pF
Power dissipation capacitance	C_{PD}	(Note 1)			—	18	—	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.

$$I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/6 \text{ (per gate)}$$

11.5. AC Characteristics

(Unless otherwise specified, $T_a = -40$ to $85\text{ }^\circ\text{C}$, Input: $t_r = t_f = 3\text{ ns}$)

Characteristics	Symbol	V_{CC} (V)	C_L (pF)	Min	Max	Unit
Propagation delay time	t_{PLH}, t_{PHL}	3.3 ± 0.3	15	1.0	8.5	ns
			50	1.0	12.0	
		5.0 ± 0.5	15	1.0	6.5	
			50	1.0	8.5	
Input capacitance	C_{IN}			—	10	pF

11.6. AC Characteristics

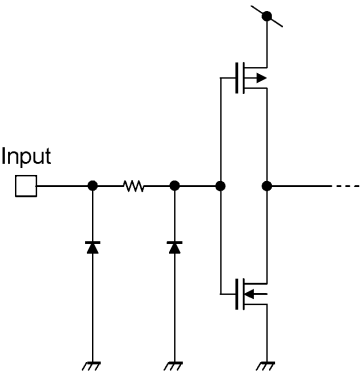
(Unless otherwise specified, $T_a = -40$ to $125\text{ }^\circ\text{C}$, Input: $t_r = t_f = 3\text{ ns}$)

Characteristics	Symbol	Note	Test Condition	V_{CC} (V)	C_L (pF)	Min	Max	Unit
Propagation delay time	t_{PLH}, t_{PHL}		—	3.3 ± 0.3	15	1.0	10.0	ns
					50	1.0	13.5	
				5.0 ± 0.5	15	1.0	7.5	
					50	1.0	9.5	
Input capacitance	C_{IN}		—			—	10	pF

11.7. Noise Characteristics (Unless otherwise specified, $T_a = 25\text{ }^{\circ}\text{C}$, Input: $t_r = t_f = 3\text{ ns}$)

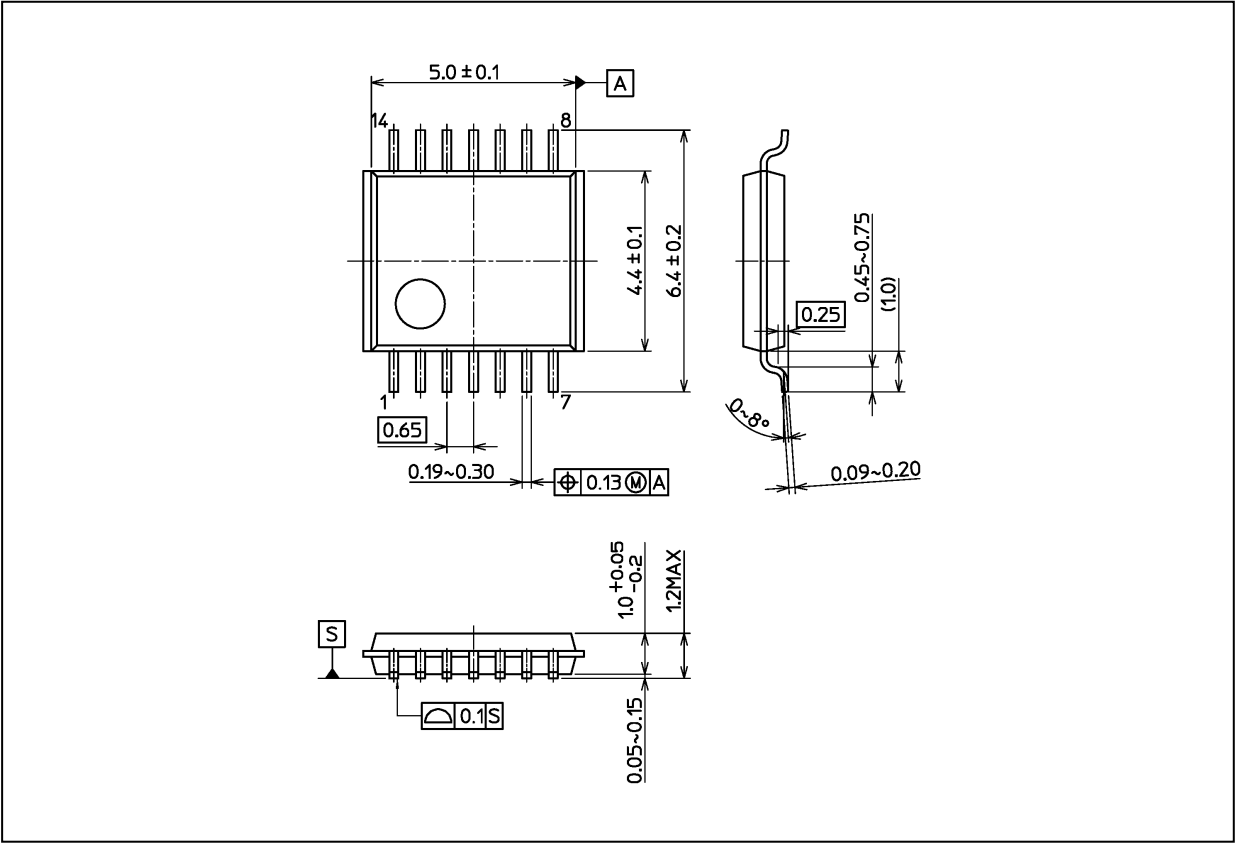
Characteristics	Symbol	Test Condition	V_{CC} (V)	Typ.	Limit	Unit
Quiet output maximum dynamic V_{OL}	V_{OLP}	$C_L = 50\text{ pF}$	5.0	0.4	0.8	V
Quiet output minimum dynamic V_{OL}	V_{OLV}	$C_L = 50\text{ pF}$	5.0	-0.4	-0.8	V
Minimum high-level dynamic input voltage	V_{IHD}	$C_L = 50\text{ pF}$	5.0	—	3.5	V
Maximum low-level dynamic input voltage	V_{ILD}	$C_L = 50\text{ pF}$	5.0	—	1.5	V

11.8. Input Equivalent Circuit



Package Dimensions

Unit: mm



Weight: 0.054 g (typ.)

Package Name(s)
Nickname: TSSOP14B

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