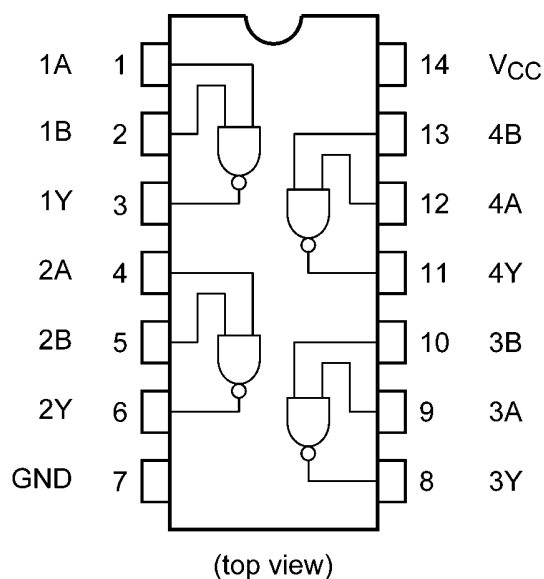
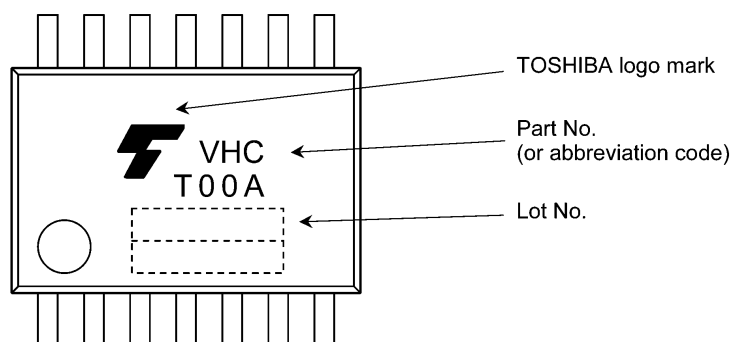


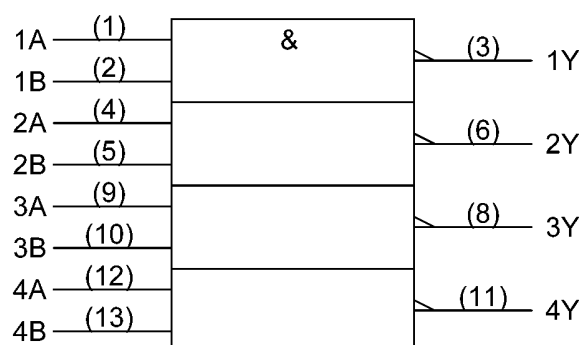
## 5. Pin Assignment



## 6. Marking



## 7. IEC Logic Symbol



## 8. Truth Table

A	B	Y
L	L	H
L	H	H
H	L	H
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	$V_{OUT}$	(Note 1)	-0.5 to 7.0	V
		(Note 2)	-0.5 to $V_{CC} + 0.5$	
Input diode current	$I_{IK}$		-20	mA
Output diode current	$I_{OK}$	(Note 3)	$\pm 20$	mA
Output current	$I_{OUT}$		$\pm 25$	mA
$V_{CC}$ /ground current	$I_{CC}$		$\pm 50$	mA
Power dissipation	$P_D$	(Note 4)	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:  $V_{CC} = 0$  V

Note 2: High (H) or Low (L) state.  $I_{OUT}$  absolute maximum rating must be observed.

Note 3:  $V_{OUT} < GND$ ,  $V_{OUT} > V_{CC}$

Note 4: 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	Note	Rating	Unit
Supply voltage	$V_{CC}$		4.5 to 5.5	V
Input voltage	$V_{IN}$		0 to 5.5	V
Output voltage	$V_{OUT}$	(Note 1)	0 to 5.5	V
		(Note 2)	0 to $V_{CC}$	
Operating temperature	$T_{opr}$		-40 to 125	°C
Input rise and fall times	$dt/dv$		0 to 20	ns/V

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.

Note 1:  $V_{CC} = 0$  V

Note 2: High (H) or Low (L) state.

## 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	$V_{IH}$	—	4.5 to 5.5	2.0	—	—	V
Low-level input voltage	$V_{IL}$	—	4.5 to 5.5	—	—	0.8	V
High-level output voltage	$V_{OH}$	$V_{IN} = V_{IH}$ or $V_{IL}$	$I_{OH} = -50\text{ }\mu\text{A}$	4.5	4.4	4.5	V
			$I_{OH} = -8\text{ mA}$	4.5	3.94	—	
Low-level output voltage	$V_{OL}$	$V_{IN} = V_{IH}$	$I_{OL} = 50\text{ }\mu\text{A}$	4.5	—	0.0	V
			$I_{OL} = 8\text{ mA}$	4.5	—	0.36	
Input leakage current	$I_{IN}$	$V_{IN} = 5.5\text{ V}$ or GND	0 to 5.5	—	—	$\pm 0.1$	$\mu\text{A}$
Quiescent supply current	$I_{CC}$	$V_{IN} = V_{CC}$ or GND	5.5	—	—	2.0	$\mu\text{A}$
	$I_{CCT}$	Per input: $V_{IN} = 3.4\text{ V}$ Other input: $V_{CC}$ or GND	5.5	—	—	1.35	mA
Output leakage current (Power-OFF)	$I_{OPD}$	$V_{OUT} = 5.5\text{ V}$	0	—	—	0.5	$\mu\text{A}$

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	$V_{IH}$	—	4.5 to 5.5	2.0	—	V
Low-level input voltage	$V_{IL}$	—	4.5 to 5.5	—	0.8	V
High-level output voltage	$V_{OH}$	$V_{IN} = V_{IH}$ or $V_{IL}$	$I_{OH} = -50\text{ }\mu\text{A}$	4.5	4.4	V
			$I_{OH} = -8\text{ mA}$	4.5	3.80	
Low-level output voltage	$V_{OL}$	$V_{IN} = V_{IH}$	$I_{OL} = 50\text{ }\mu\text{A}$	4.5	—	V
			$I_{OL} = 8\text{ mA}$	4.5	—	
Input leakage current	$I_{IN}$	$V_{IN} = 5.5\text{ V}$ or GND	0 to 5.5	—	$\pm 1.0$	$\mu\text{A}$
Quiescent supply current	$I_{CC}$	$V_{IN} = V_{CC}$ or GND	5.5	—	20.0	$\mu\text{A}$
	$I_{CCT}$	Per input: $V_{IN} = 3.4\text{ V}$ Other input: $V_{CC}$ or GND	5.5	—	1.50	mA
Output leakage current (Power-OFF)	$I_{OPD}$	$V_{OUT} = 5.5\text{ V}$	0	—	5.0	$\mu\text{A}$

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

Characteristics	Symbol	Test Condition	$V_{CC}$ (V)	Min	Max	Unit
High-level input voltage	$V_{IH}$	—	4.5 to 5.5	2.0	—	V
Low-level input voltage	$V_{IL}$	—	4.5 to 5.5	—	0.8	V
High-level output voltage	$V_{OH}$	$V_{IN} = V_{IH}$ or $V_{IL}$	$I_{OH} = -50\text{ }\mu\text{A}$	4.5	4.4	V
			$I_{OH} = -8\text{ mA}$	4.5	3.70	
Low-level output voltage	$V_{OL}$	$V_{IN} = V_{IH}$	$I_{OL} = 50\text{ }\mu\text{A}$	4.5	—	V
			$I_{OL} = 8\text{ mA}$	4.5	—	
Input leakage current	$I_{IN}$	$V_{IN} = 5.5\text{ V}$ or GND	0 to 5.5	—	$\pm 2.0$	$\mu\text{A}$
Quiescent supply current	$I_{CC}$	$V_{IN} = V_{CC}$ or GND	5.5	—	40.0	$\mu\text{A}$
Quiescent supply current	$I_{CCT}$	Per input: $V_{IN} = 3.4\text{ V}$ Other input: $V_{CC}$ or GND	5.5	—	1.50	mA
Output leakage current (Power-OFF)	$I_{OPD}$	$V_{OUT} = 5.5\text{ V}$	0	—	20.0	$\mu\text{A}$

#### 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	$t_{PLH}, t_{PHL}$		$5.0 \pm 0.5$	15	—	5.0	6.9	ns
				50	—	5.5	7.9	
Input capacitance	$C_{IN}$				—	4	10	pF
Power dissipation capacitance	$C_{PD}$	(Note 1)			—	17	—	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.

$$I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/4 \text{ (per gate)}$$

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

Characteristics	Symbol	$V_{CC}$ (V)	$C_L$ (pF)	Min	Max	Unit
Propagation delay time	$t_{PLH}, t_{PHL}$	$5.0 \pm 0.5$	15	1.0	8.0	ns
			50	1.0	9.0	
Input capacitance	$C_{IN}$			—	10	pF

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

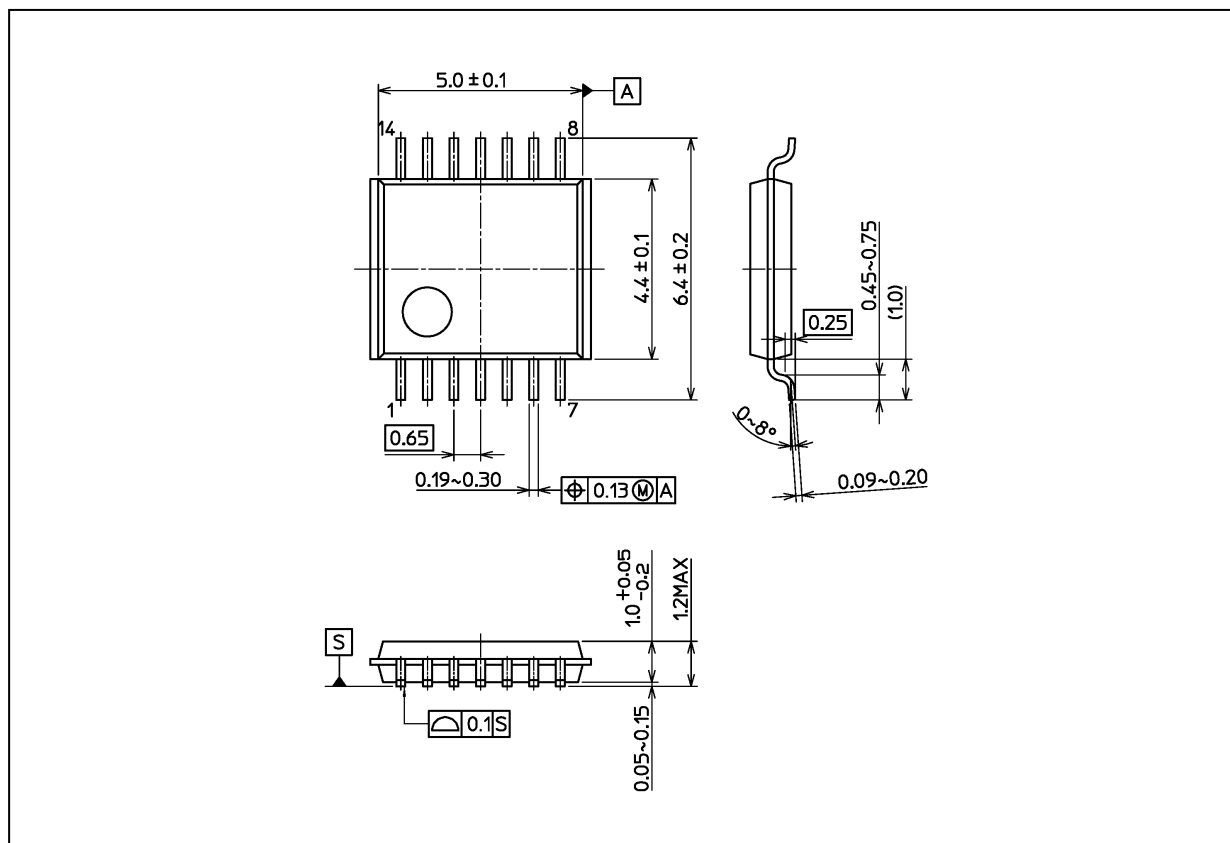
Characteristics	Symbol	Note	Test Condition	$V_{CC}$ (V)	$C_L$ (pF)	Min	Max	Unit
Propagation delay time	$t_{PLH}, t_{PHL}$		—	$5.0 \pm 0.5$	15	1.0	9.0	ns
					50	1.0	10.0	
Input capacitance	$C_{IN}$		—			—	10	pF

#### 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	—	2.0	V
Maximum low-level dynamic input voltage	$V_{ILD}$	$C_L = 50\text{ pF}$	5.0	—	0.8	V

## Package Dimensions

Unit: mm



Weight: 0.054 g (typ.)

Package Name(s)
Nickname: TSSOP14B

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