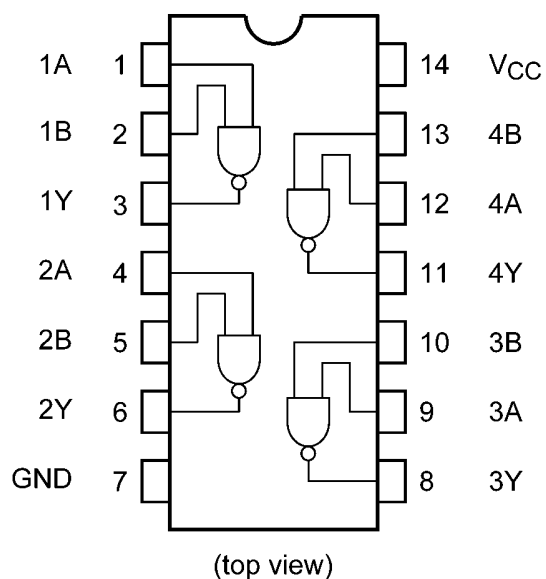
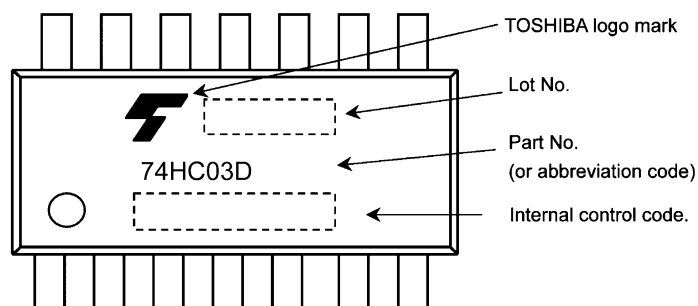


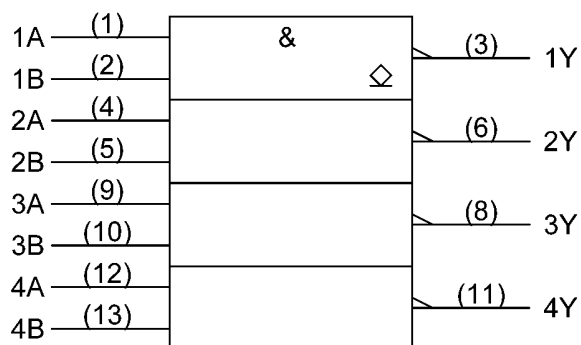
5. Pin Assignment



6. Marking



7. IEC Logic Symbol

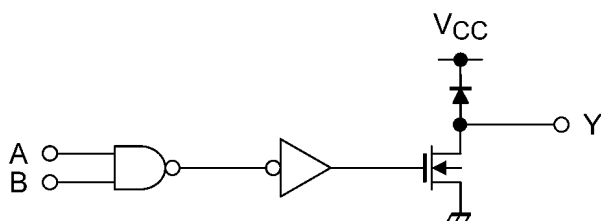


8. Truth Table

A	B	Y
L	L	Z
L	H	Z
H	L	Z
H	H	L

Z: High impedance

9. System Diagram (per gate)



10. 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
V_{CC} /ground current	I_{CC}		± 50	mA
Power dissipation	P_D	(Note 1)	500	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: P_D derates linearly with -8 mW/°C above 85 °C

11. 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 V_{CC}	V
Output voltage	V_{OUT}	—	0 to V_{CC}	V
Operating temperature	T_{opr}	—	-40 to 125	°C
Input rise and fall times	t_r, t_f	—	0 to 50	μs

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

Unused inputs and bus inputs must be tied to either V_{CC} or GND.

12. Electrical Characteristics

12.1. 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
				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	
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 20\text{ }\mu\text{A}$	2.0	—	0.0	0.1	V
				4.5	—	0.0	0.1	
				6.0	—	0.0	0.1	
			$I_{OL} = 4\text{ mA}$	4.5	—	0.17	0.26	
			$I_{OL} = 5.2\text{ mA}$	6.0	—	0.18	0.26	
Output OFF-state leakage current	I_{OZ}	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $V_{OUT} = V_{CC}$		6.0	—	—	± 0.5	μA
Input leakage current	I_{IN}	$V_{IN} = V_{CC} \text{ or GND}$		6.0	—	—	± 0.1	μA
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC} \text{ or GND}$		6.0	—	—	1.0	μA

12.2. 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
				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	
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 20\text{ }\mu\text{A}$	2.0	—	0.1	V
				4.5	—	0.1	
				6.0	—	0.1	
			$I_{OL} = 4\text{ mA}$	4.5	—	0.33	
			$I_{OL} = 5.2\text{ mA}$	6.0	—	0.33	
Output OFF-state leakage current	I_{OZ}	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $V_{OUT} = V_{CC}$		6.0	—	± 5.0	μA
Input leakage current	I_{IN}	$V_{IN} = V_{CC} \text{ or GND}$		6.0	—	± 1.0	μA
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC} \text{ or GND}$		6.0	—	10.0	μA

12.3. 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
				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	
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 20\text{ }\mu\text{A}$	2.0	—	0.1	V
				4.5	—	0.1	
				6.0	—	0.1	
			$I_{OL} = 4\text{ mA}$	4.5	—	0.4	
			$I_{OL} = 5.2\text{ mA}$	6.0	—	0.4	
Output OFF-state leakage current	I_{OZ}	$V_{IN} = V_{IH}$ or V_{IL} $V_{OUT} = V_{CC}$		6.0	—	± 10.0	μA
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

12.4. AC Characteristics

(Unless otherwise specified, $C_L = 15\text{ pF}$, $V_{CC} = 5\text{ V}$, $T_a = 25\text{ }^\circ\text{C}$, Input: $t_r = t_f = 6\text{ ns}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Output transition time	t_{TLH}, t_{THL}	—	—	4	8	ns
Propagation delay time	t_{PLZ}	$R_L = 1\text{ k}\Omega$	—	5	12	ns
	t_{PZL}		—	5	12	

12.5. AC Characteristics (Unless otherwise specified, $C_L = 50\text{ pF}$, $T_a = 25\text{ }^\circ\text{C}$, Input: $t_r = t_f = 6\text{ ns}$)

Characteristics	Symbol	Note	Test Condition	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	t_{PLZ}		$R_L = 1\text{ k}\Omega$	2.0	—	20	75	ns
				4.5	—	10	15	
				6.0	—	9	13	
Propagation delay time	t_{PZL}		$R_L = 1\text{ k}\Omega$	2.0	—	24	75	ns
				4.5	—	8	15	
				6.0	—	7	13	
Input capacitance	C_{IN}		—	—	—	3	—	pF
Output capacitance	C_{OUT}		—	—	—	4	—	pF
Power dissipation capacitance	C_{PD}	(Note 1)	—	—	—	3	—	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.

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

12.6. AC Characteristics(Unless otherwise specified, $C_L = 50 \text{ pF}$, $T_a = -40 \text{ to } 85 \text{ }^\circ\text{C}$, Input: $t_r = t_f = 6 \text{ ns}$)

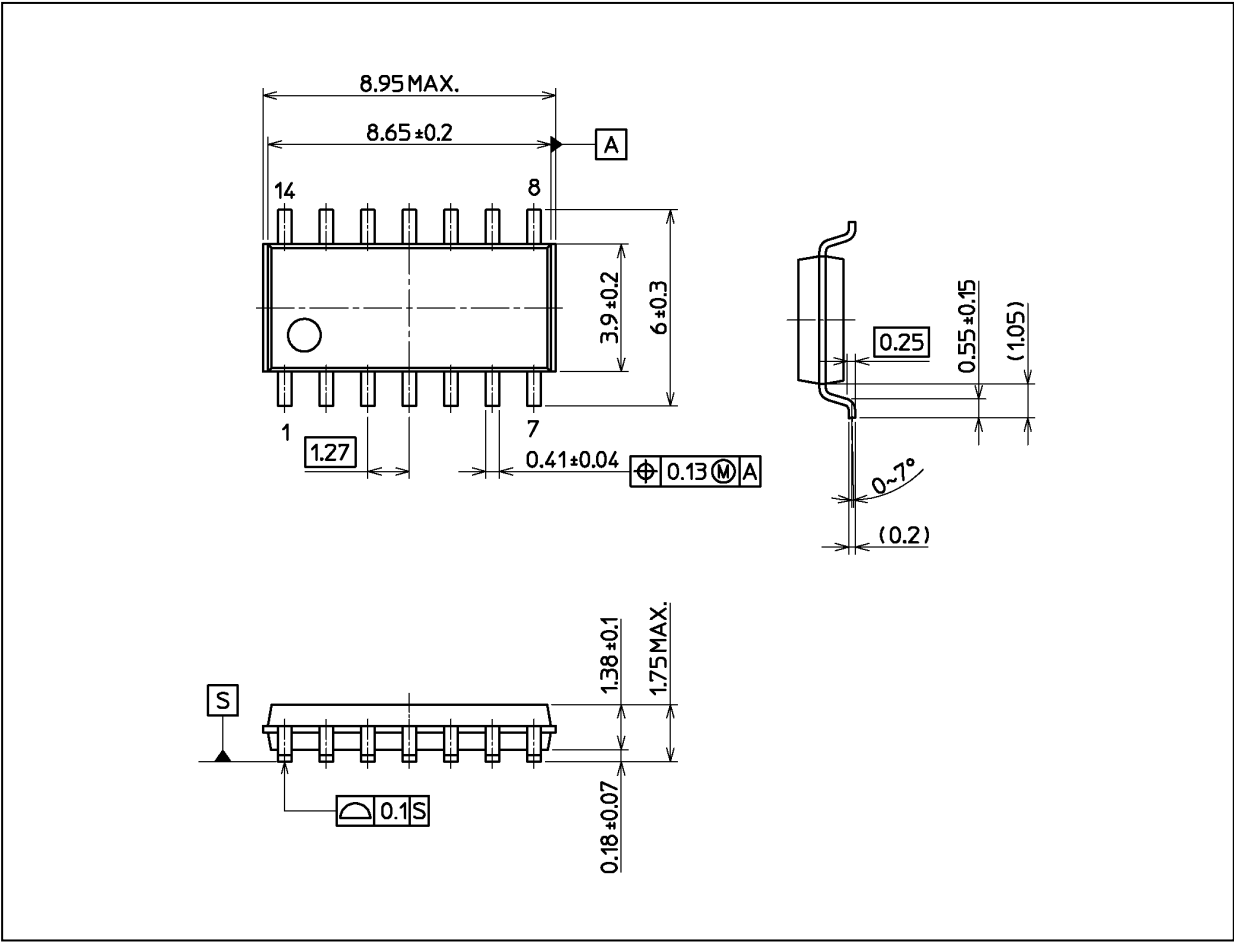
Characteristics	Symbol	Test Condition	V_{CC} (V)	Min	Max	Unit
Output transition time	t_{TLH}, t_{THL}	—	2.0	—	95	ns
			4.5	—	19	
			6.0	—	16	ns
Propagation delay time	t_{PLZ}	$R_L = 1 \text{ k}\Omega$	2.0	—	95	ns
			4.5	—	19	
			6.0	—	16	
Propagation delay time	t_{PZL}	$R_L = 1 \text{ k}\Omega$	2.0	—	95	ns
			4.5	—	19	
			6.0	—	16	

12.7. AC Characteristics(Unless otherwise specified, $C_L = 50 \text{ pF}$, $T_a = -40 \text{ to } 125 \text{ }^\circ\text{C}$, Input: $t_r = t_f = 6 \text{ ns}$)

Characteristics	Symbol	Test Condition	V_{CC} (V)	Min	Max	Unit
Output transition time	t_{TLH}, t_{THL}	—	2.0	—	110	ns
			4.5	—	22	
			6.0	—	19	
Propagation delay time	t_{PLZ}	$R_L = 1 \text{ k}\Omega$	2.0	—	145	ns
			4.5	—	29	
			6.0	—	25	
Propagation delay time	t_{PZL}	$R_L = 1 \text{ k}\Omega$	2.0	—	145	ns
			4.5	—	29	
			6.0	—	25	

Package Dimensions

Unit: mm



Weight: 0.13 g (typ.)

Package Name(s)
Nickname: SOIC14

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