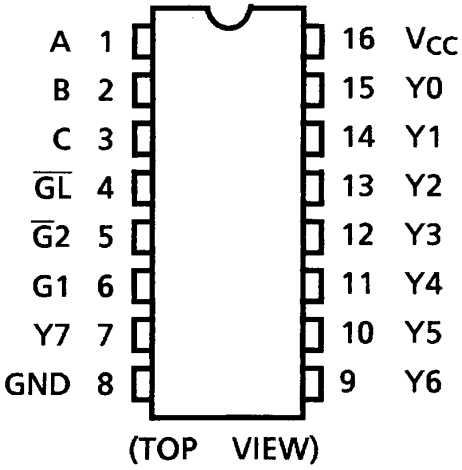
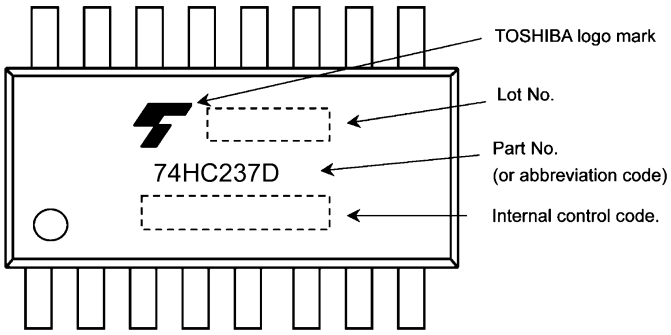
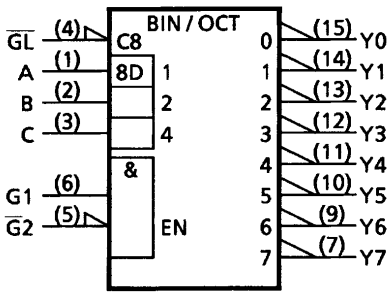
5. Pin Assignment

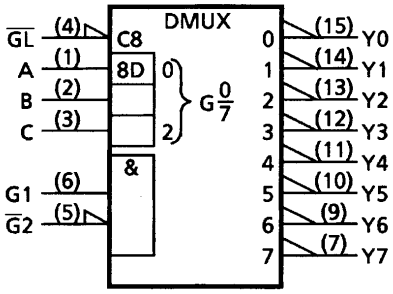


6. Marking



7. IEC Logic Symbol



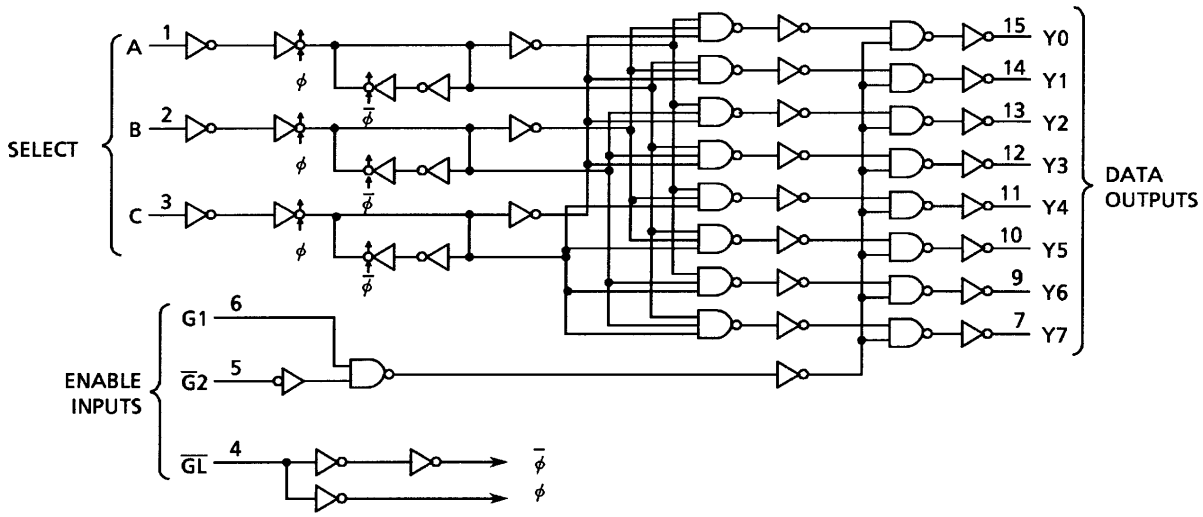


8. Truth Table

Inputs						Outputs							
Enable			Address			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
$\overline{GL}$	$\overline{G2}$	G1	C	B	A								
X	X	L	X	X	X	L	L	L	L	L	L	L	L
X	H	X	X	X	X	L	L	L	L	L	L	L	L
L	L	H	L	L	L	H	L	L	L	L	L	L	L
L	L	H	L	L	H	L	H	L	L	L	L	L	L
L	L	H	L	H	L	L	L	H	L	L	L	L	L
L	L	H	L	H	H	L	L	L	H	L	L	L	L
L	L	H	H	L	L	L	L	L	L	H	L	L	L
L	L	H	H	L	H	L	L	L	L	L	H	L	L
L	L	H	H	H	L	L	L	L	L	L	L	H	L
L	L	H	H	H	H	L	L	L	L	L	L	L	H
H	L	H	X	X	X	Depends upon the address previously applied while $\overline{GL}$ was at a low level							

X: Don't care

9. Logic Diagram



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	
Output voltage	V_{OUT}		-0.5 to V_{CC} + 0.5	
Input diode current	I_{IK}		±20	mA
Output diode current	I_{OK}		±20	
Output current	I_{OUT}		±25	
V_{CC}/ground current	I_{CC}		±50	
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 are required to ensure the normal operation of the device. Unused inputs must be tied to either V_{CC} or GND.

12. Electrical Characteristics

12.1. DC Characteristics (Unless otherwise specified, T_a = 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 μA	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 μA	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

12.2. DC Characteristics (Unless otherwise specified, T_a = -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 μA	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 μA	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

12.3. DC Characteristics (Unless otherwise specified, T_a = -40 to 125 °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 μA	2.0	1.9	—	V
				4.5	4.4	—	
				6.0	5.9	—	
			I_{OH} = -4 mA	4.5	3.7	—	
			I_{OH} = -5.2 mA	6.0	5.2	—	
Low-level output voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20 μA	2.0	—	0.1	V
				4.5	—	0.1	
				6.0	—	0.1	
			I_{OL} = 4 mA	4.5	—	0.4	
			I_{OL} = 5.2 mA	6.0	—	0.4	
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	—	160.0	μA

13. Timing Requirements (Unless otherwise specified, T_a = 25 °C, Input: t_r = t_f = 6 ns)

Characteristics	Symbol	Test Condition	V_{CC} (V)	Typ.	Limit	Unit
Minimum pulse width ($\overline{GL}$)	$t_{w(L)}$	—	2.0	—	75	ns
			4.5	—	15	
			6.0	—	13	
Minimum setup time (A, B, C - $\overline{GL}$)	t_s	—	2.0	—	50	ns
			4.5	—	10	
			6.0	—	9	
Minimum hold time (A, B, C - $\overline{GL}$)	t_h	—	2.0	—	25	ns
			4.5	—	5	
			6.0	—	5	

14. Timing Requirements (Unless otherwise specified, T_a = -40 to 85 °C, Input: t_r = t_f = 6 ns)

Characteristics	Symbol	Test Condition	V_{CC} (V)	Limit	Unit
Minimum pulse width ($\overline{GL}$)	$t_{w(L)}$	—	2.0	95	ns
			4.5	19	
			6.0	16	
Minimum setup time (A, B, C - $\overline{GL}$)	t_s	—	2.0	65	ns
			4.5	13	
			6.0	11	
Minimum hold time (A, B, C - $\overline{GL}$)	t_h	—	2.0	30	ns
			4.5	6	
			6.0	5	

15. Timing Requirements (Unless otherwise specified, T_a = -40 to 125 °C, Input: $t_r = t_f$ = 6 ns)

Characteristics	Symbol	Test Condition	V_{CC} (V)	Limit	Unit
Minimum pulse width ($\overline{GL}$)	$t_{w(L)}$	—	2.0	115	ns
			4.5	23	
			6.0	20	
Minimum setup time (A, B, C - $\overline{GL}$)	t_S	—	2.0	75	ns
			4.5	15	
			6.0	13	
Minimum hold time (A, B, C - $\overline{GL}$)	t_h	—	2.0	40	ns
			4.5	8	
			6.0	7	

15.1. AC Characteristics (Unless otherwise specified, C_L = 15 pF, V_{CC} = 5 V, T_a = 25 °C, Input: $t_r = t_f$ = 6 ns)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Output transition time	t_{TLH},t_{THL}	—	—	4	8	ns
Propagation delay time (G1 - Y)	t_{PLH},t_{PHL}	—	—	12	24	ns
Propagation delay time ($\overline{G2}$ - Y)	t_{PLH},t_{PHL}	—	—	12	24	ns
Propagation delay time ($\overline{GL}$ - Y)	t_{PLH},t_{PHL}	—	—	17	33	ns
Propagation delay time (A, B, C - Y)	t_{PLH},t_{PHL}	—	—	15	31	ns

15.2. AC Characteristics (Unless otherwise specified, C_L = 50pF, T_a = 25 °C, Input: $t_r = t_f$ = 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 (G1 - Y)	t_{PLH},t_{PHL}		2.0	—	45	140	ns
			4.5	—	15	28	
			6.0	—	13	24	
Propagation delay time ($\overline{G2}$ - Y)	t_{PLH},t_{PHL}		2.0	—	45	140	ns
			4.5	—	15	28	
			6.0	—	13	24	
Propagation delay time ($\overline{GL}$ - Y)	t_{PLH},t_{PHL}		2.0	—	65	190	ns
			4.5	—	21	38	
			6.0	—	18	32	
Propagation delay time (A, B, C - Y)	t_{PLH},t_{PHL}		2.0	—	60	180	ns
			4.5	—	19	36	
			6.0	—	16	31	
Input capacitance	C_{IN}		—	—	3	—	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.

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

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

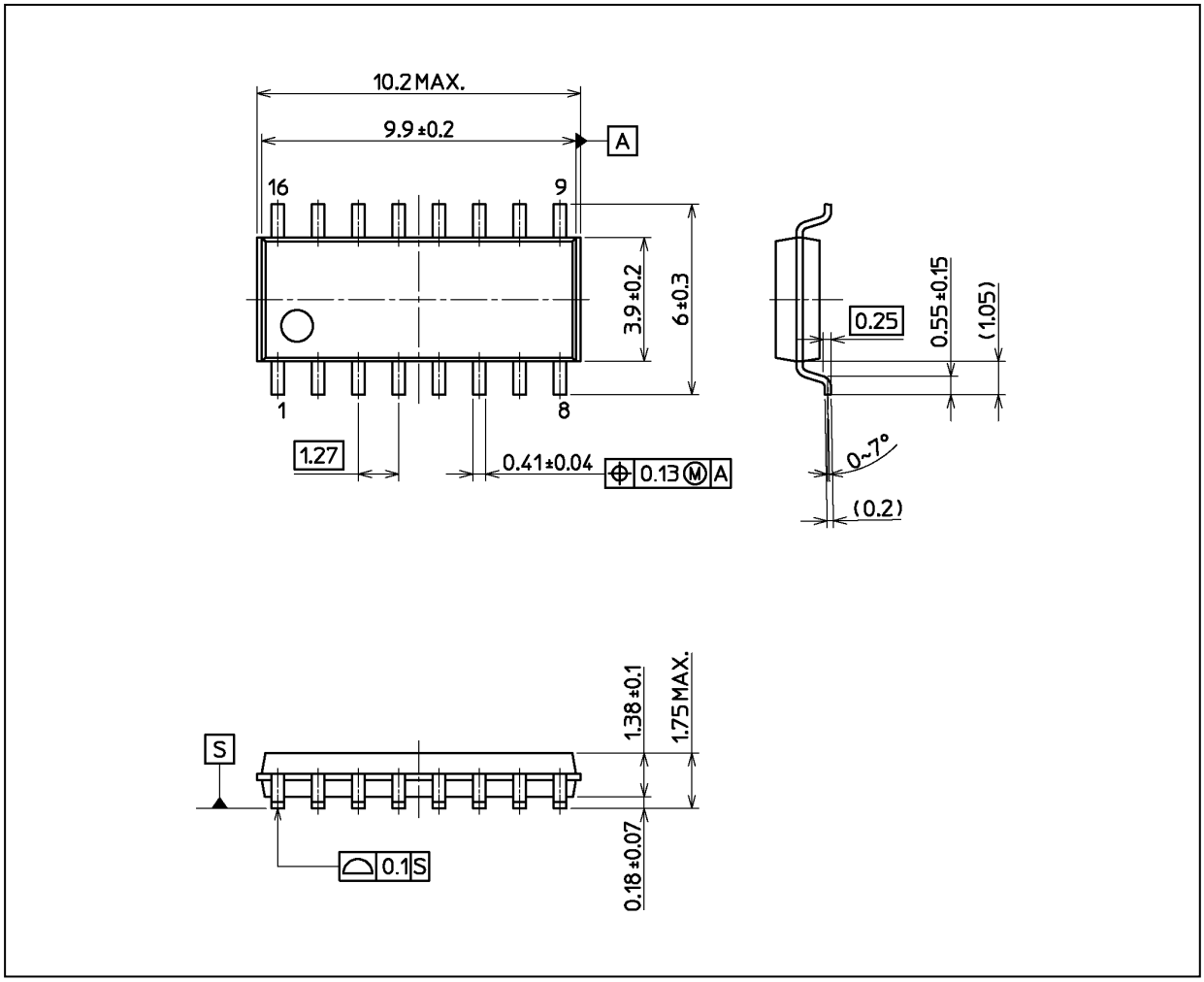
Characteristics	Symbol	V_{CC} (V)	Min	Max	Unit
Output transition time	t_{TLH},t_{THL}	2.0	—	95	ns
		4.5	—	19	
		6.0	—	16	
Propagation delay time (G1 - Y)	t_{PLH},t_{PHL}	2.0	—	175	ns
		4.5	—	35	
		6.0	—	30	
Propagation delay time ($\overline{G2}$ - Y)	t_{PLH},t_{PHL}	2.0	—	175	ns
		4.5	—	35	
		6.0	—	30	
Propagation delay time ($\overline{GL}$ - Y)	t_{PLH},t_{PHL}	2.0	—	240	ns
		4.5	—	48	
		6.0	—	41	
Propagation delay time (A, B, C - Y)	t_{PLH},t_{PHL}	2.0	—	225	ns
		4.5	—	45	
		6.0	—	38	

15.4. AC Characteristics
(Unless otherwise specified, C_L = 50 pF, T_a = -40 to 125 °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	—	110	ns
		4.5	—	22	
		6.0	—	19	
Propagation delay time (G1 - Y)	t_{PLH},t_{PHL}	2.0	—	210	ns
		4.5	—	42	
		6.0	—	36	
Propagation delay time ($\overline{G2}$ - Y)	t_{PLH},t_{PHL}	2.0	—	210	ns
		4.5	—	42	
		6.0	—	36	
Propagation delay time ($\overline{GL}$ - Y)	t_{PLH},t_{PHL}	2.0	—	285	ns
		4.5	—	57	
		6.0	—	48	
Propagation delay time (A, B, C - Y)	t_{PLH},t_{PHL}	2.0	—	270	ns
		4.5	—	54	
		6.0	—	46	

Package Dimensions

Unit: mm



Weight: 0.15 g (typ.)

Package Name(s)
Nickname: SOIC16

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