TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC7WT241FU

Non-Inverted, 3-State Outputs

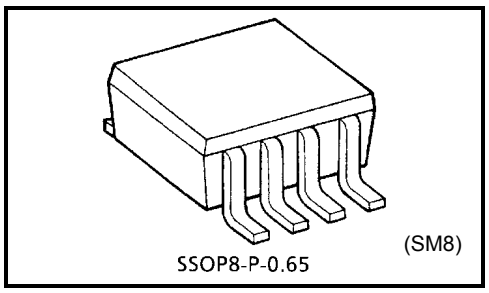
The TC7WT241FU is a high speed CMOS Dual Bus Buffers fabricated with silicon gate CMOS technology.

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

The input threshold levels are compatible with TTL output voltage.

It is a non-inverting 3-state buffer has one active-high and one active-low output enable.

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

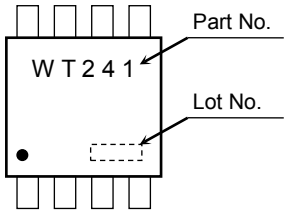


Weight: 0.02 g (typ.)

Features

- High speed: t_{pd} = 13 ns (typ.) at V_{CC} = 5 V
- Low power dissipation: I_{CC} = 2 μA (max) at Ta = 25 °C
- High noise immunity: V_{IL} = 0.8 V (max), V_{IH} = 2.0 V (min)
- Output drive capability: 15 LSTTL loads
- Symmetrical output impedance: $|I_{OH}| = I_{OL}$ = 6 mA (min)

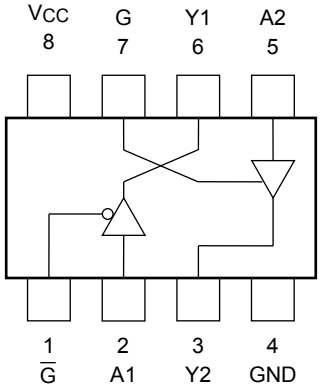
Marking



Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	−0.5 to 7	V
DC input voltage	V_{IN}	−0.5 to V_{CC} + 0.5	V
DC 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
DC output current	I_{OUT}	±35	mA
DC V_{CC}/ground current	I_{CC}	±37.5	mA
Power dissipation	P_D	300	mW
Storage temperature range	T_{stg}	−65 to 150	°C
Lead temperature (10 s)	T_L	260	°C

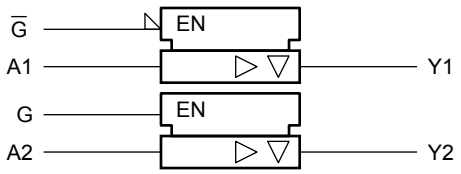
Pin Configuration (top view)



Note: 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.).

Start of commercial production
1996-09

Logic Diagram



Truth Table

Inputs			Output
$\overline{G}$	G	A	Y
L	H	L	L
L	H	H	H
H	L	X	Z

X: Don't care
Z: High impedance

Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	4.5 to 5.5	V
Input voltage	V_{IN}	0 to V_{CC}	V
Output voltage	V_{OUT}	0 to V_{CC}	V
Operating temperature range	T_{opr}	−40 to 85	°C
Input rise and fall time	t_r, t_f	0 to 500	ns

Electrical Characteristics

DC Electrical Characteristics

Characteristics		Symbol	Test Condition		V_{CC} (V)	Ta = 25°C Min	Ta = 25°C Typ.	Ta = 25°C Max	Ta = −40 to 85°C Min	Ta = −40 to 85°C Max	Unit
Input voltage	High level	V_{IH}	—		4.5 to 5.5	2.0	—	—	2.0	—	V
	Low level	V_{IL}	—		4.5 to 5.5	—	—	0.8	—	0.8	
Output voltage	High level	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = −20 μA	4.5	4.4	4.5	—	4.4	—	V
				I_{OH} = −6 mA	4.5	4.18	4.31	—	4.13	—	
	Low level	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20 μA	4.5	—	0	0.1	—	0.1	
				I_{OL} = 6 mA	4.5	—	0.17	0.26	—	0.33	
3-state output off-state current		I_{OZ}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = V_{CC} or GND		5.5	—	—	±0.5	—	±5.0	μA
Input leakage current		I_{IN}	V_{IN} = V_{CC} or GND		5.5	—	—	±0.1	—	±1.0	μA
Quiescent supply current		I_{CC}	V_{IN} = V_{CC} or GND		5.5	—	—	2.0	—	20.0	μA
		I_{CCT}	PER INPUT : V_{IN} = 0.5V or 2.4V OTHER INPUT : V_{CC} or GND		5.5	—	—	2.0	—	2.9	mA

AC Electrical Characteristics (input $t_r = t_f = 6$ ns)

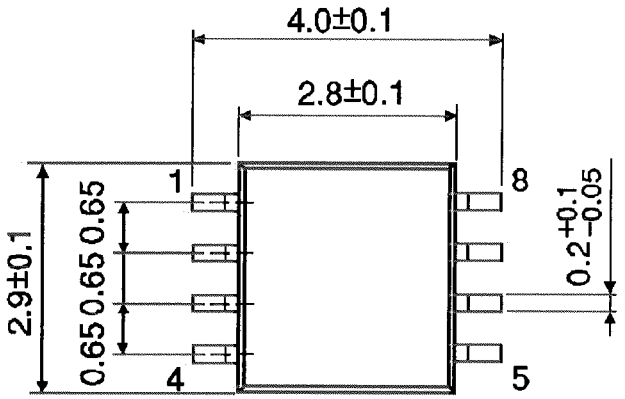
Characteristics	Symbol	Test Condition			Ta = 25°C			Ta = −40 to 85°C		Unit
			$C_{L(pF)}$	V_{CC} (V)	Min	Typ.	Max	Min	Max	
Output transition time	t_{TLH} t_{THL}	—	50	4.5	—	7	12	—	15	ns
				5.5	—	6	11	—	14	
Propagation delay time	t_{pLH} t_{pHL}	—	50	4.5	—	15	25	—	31	ns
				5.5	—	13	22	—	28	
			150	4.5	—	21	33	—	41	
				5.5	—	18	29	—	37	
Output enable time	t_{pZL} t_{pZH}	R_L = 1 kΩ	50	4.5	—	17	30	—	38	ns
				5.5	—	14	27	—	34	
			150	4.5	—	23	38	—	48	
				5.5	—	20	34	—	43	
Output disable time	t_{pLZ} t_{pHZ}	R_L = 1 kΩ	50	4.5	—	16	30	—	38	ns
				5.5	—	13	27	—	34	
Input capacitance	C_{IN}	—	—	—	—	5	10	—	10	pF
Output capacitance	C_{OUT}	—	—	—	—	10	—	—	—	pF
Power dissipation capacitance	C_{PD}	(Note)	—	—	—	32	—	—	—	pF

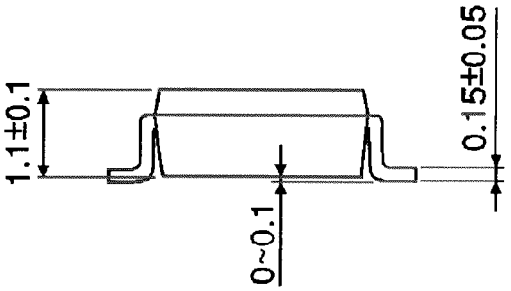
Note: C_{PD} is defined as the value of internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation:

$I_{CC\ (opr.)} = C_{PD} \bullet V_{CC} \bullet f_{IN} + I_{CC}/2$ (per gate)

Package Dimensions

SSOP8-P-0.65 Unit : mm





Weight: 0.02 g (typ.)

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