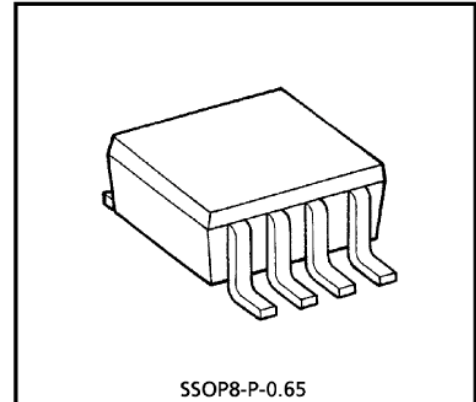


TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TC7WT241FU

## NON-INVERTED, 3-STATE OUTPUT

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 Bipolar Schottky TTL while maintaining the CMOS low power dissipation. The input threshold levels are compatible with TTL output voltage. It is an 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.



SSOP8-P-0.65  
Weight : 0.02g (Typ.)

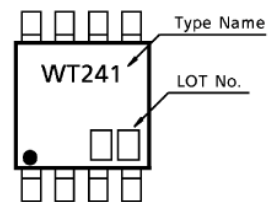
### FEATURES

- High Speed .....  $t_{pd} = 13ns$  (Typ.) at  $V_{CC} = 5V$
- Low Power Dissipation .....  $I_{CC} = 2\mu A$  (Max.) at  $T_a = 25^\circ C$
- Compatible with TTL outputs .....  $V_{IL} = 0.8V$  (Max.),  $V_{IH} = 2.0V$  (Min.)
- Output Drive Capability ..... 15 LSTTL Loads
- Symmetrical Output Impedance ...  $|I_{OH}| = I_{OL} = 6mA$  (Min.)

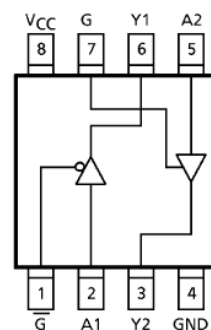
### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ C$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage Range	$V_{CC}$	-0.5~7	V
DC Input Voltage	$V_{IN}$	-0.5~ $V_{CC} + 0.5$	V
DC Output Voltage	$V_{OUT}$	-0.5~ $V_{CC} + 0.5$	V
Input Diode Current	$I_{IK}$	$\pm 20$	mA
Output Diode Current	$I_{OK}$	$\pm 20$	mA
DC Output Current	$I_{OUT}$	$\pm 35$	mA
DC $V_{CC}$ / Ground Current	$I_{CC}$	$\pm 37.5$	mA
Power Dissipation	$P_D$	300	mW
Storage Temperature	$T_{stg}$	-65~150	$^\circ C$
Lead Temperature (10 s)	$T_L$	260	$^\circ C$

### MARKING

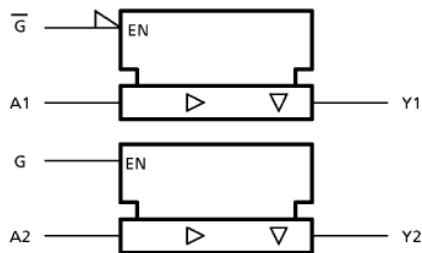


### PIN ASSIGNMENT (TOP VIEW)



Start of commercial production  
1996-09

### LOGIC DIAGRAM



### TRUTH TABLE

INPUTS			OUTPUTS
$\bar{G}$	G	A	Y
L	H	L	L
L	H	H	H
H	L	x	Z

x : Don't Care  
Z : High Impedance

### OPERATING RANGES

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{CC}$	4.5~5.5	V
Input Voltage	$V_{IN}$	0~ $V_{CC}$	V
Output Voltage	$V_{OUT}$	0~ $V_{CC}$	V
Operating Temperature	$T_{opr}$	-40~85	°C
Input Rise and Fall Time	$t_r, t_f$	0~500	ns

### DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	$V_{CC}$ (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \sim 85^\circ\text{C}$		UNIT	
				MIN.	TYP.	MAX.	MIN.	MAX.		
High-Level Input Voltage	$V_{IH}$		4.5~5.5	2.0	—	—	2.0	—	V	
Low-Level Input Voltage	$V_{IL}$		4.5~5.5	—	—	0.8	—	0.8	V	
High-Level Output Voltage	$V_{OH}$	$V_{IN} = V_{IL}$ or $V_{IL}$	$I_{OH} = -20\mu\text{A}$	4.5	4.4	4.5	—	4.4	—	V
			$I_{OH} = -6\text{mA}$	4.5	4.18	4.31	—	4.13	—	
Low-Level Output Voltage	$V_{OL}$	$V_{IN} = V_{IH}$ or $V_{IL}$	$I_{OL} = 20\mu\text{A}$	4.5	—	0.0	0.10	—	0.10	V
			$I_{OL} = 6\text{mA}$	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	—	—	$\pm 0.5$	—	$\pm 5.0$	$\mu\text{A}$	
Input Leakage Current	$I_{IN}$	$V_{IN} = V_{CC}$ or GND	5.5	—	—	$\pm 0.1$	—	$\pm 1.0$	$\mu\text{A}$	
Quiescent Supply Current	$I_{CC}$	$V_{IN} = V_{CC}$ or GND	5.5	—	—	2.0	—	20.0	$\mu\text{A}$	
	$I_{CCT}$	PER INPUT : $V_{IN} = 0.5\text{V}$ or 2.4V OTHER INPUT: $V_{CC}$ or GND	5.5	—	—	2.0	—	2.9	mA	

**AC ELECTRICAL CHARACTERISTICS** (Input  $t_r = t_f = 6\text{ns}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	Ta = 25°C			Ta = -40~85°C		UNIT		
			CL	VCC	MIN.	TYP.	MAX.		MIN.	MAX.
Output Transition Time	t <sub>TLH</sub>	—	50	4.5	—	7	12	—	15	ns
	t <sub>THL</sub>			5.5	—	6	11	—	14	
Propagation Delay Time	t <sub>pLH</sub>	—	50	4.5	—	15	25	—	31	ns
				5.5	—	13	22	—	28	
	t <sub>pHL</sub>		150	4.5	—	21	33	—	41	
				5.5	—	18	29	—	37	
Output Enable Time	t <sub>pZL</sub>	R <sub>L</sub> = 1kΩ	50	4.5	—	17	30	—	38	ns
				5.5	—	14	27	—	34	
	t <sub>pZH</sub>		150	4.5	—	23	38	—	48	
				5.5	—	20	34	—	43	
Output Disable Time	t <sub>pLZ</sub>	R <sub>L</sub> = 1kΩ	50	4.5	—	16	30	—	38	ns
				5.5	—	13	27	—	34	
t <sub>pHZ</sub>	150		4.5	—	16	30	—	38		
			5.5	—	13	27	—	34		
Input Capacitance	C <sub>IN</sub>	—	—	—	—	5	10	—	10	pF
Output Capacitance	C <sub>OUT</sub>	—	—	—	—	10	—	—	—	pF
Power Dissipation Capacitance	C <sub>PD</sub>	(Note 1)	—	—	—	32	—	—	—	pF

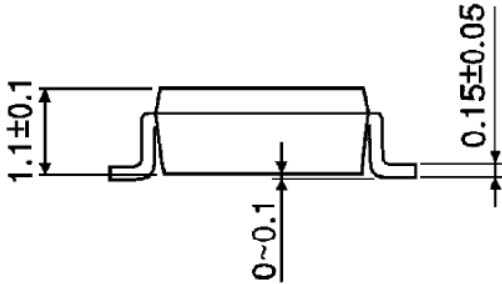
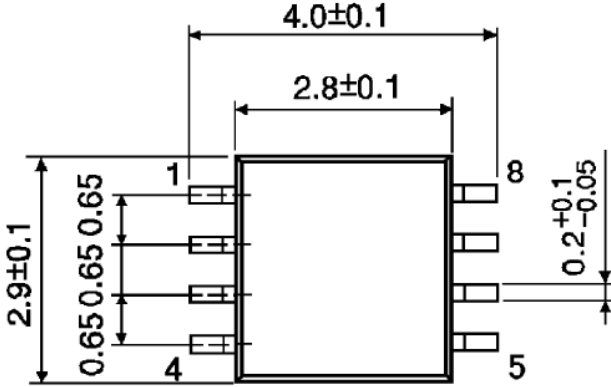
(Note 1) : C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 2 \text{ (per Gate)}$$

**PACKAGE DIMENSIONS**  
SSOP8-P-0.65

Unit : mm



Weight : 0.02g (Typ.)

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