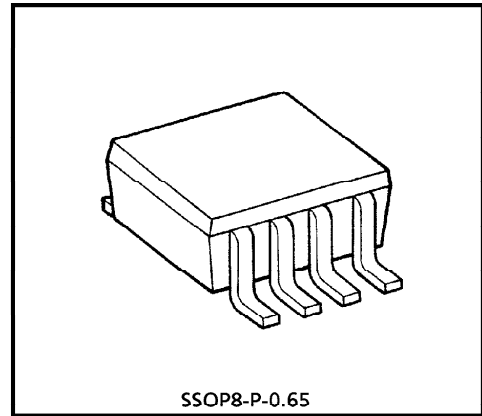


TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TC7WT240FU

## INVERTED, 3-STATE OUTPUT

The TC7WT240FU 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 inverting 3-state buffer having two active-low output enables. All inputs are equipped with protection circuits against static discharge or transient excess voltage.

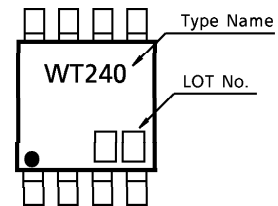


Weight : 0.02g (Typ.)

### FEATURES

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

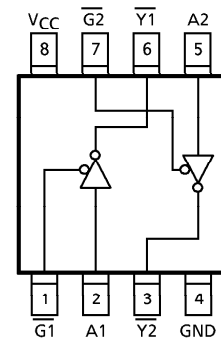
### MARKING



### MAXIMUM RATINGS (Ta = 25°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	°C
Lead Temperature (10 s)	$T_L$	260	°C

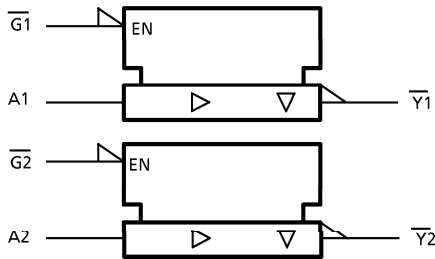
### PIN ASSIGNMENT (TOP VIEW)



961001EBA2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

LOGIC DIAGRAM



TRUTH TABLE

INPUTS		OUTPUTS
G	A	Y
L	L	H
L	H	L
H	x	Z

x : Don't Care  
Z : High Impedance

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V <sub>CC</sub>	4.5~5.5	V
Input Voltage	V <sub>IN</sub>	0~V <sub>CC</sub>	V
Output Voltage	V <sub>OUT</sub>	0~V <sub>CC</sub>	V
Operating Temperature	T <sub>opr</sub>	-40~85	°C
Input Rise and Fall Time	t <sub>r</sub> , t <sub>f</sub>	0~500	ns

DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40~85°C		UNIT	
				MIN.	TYP.	MAX.	MIN.	MAX.		
High-Level Input Voltage	V <sub>IH</sub>		4.5~5.5	2.0	—	—	2.0	—	V	
Low-Level Input Voltage	V <sub>IL</sub>		4.5~5.5	—	—	0.8	—	0.8	V	
High-Level Output Voltage	V <sub>OH</sub>	V <sub>IN</sub> = V <sub>IL</sub>	I <sub>OH</sub> = -20μA	4.5	4.4	4.5	—	4.4	—	V
			I <sub>OH</sub> = -6mA	4.5	4.18	4.31	—	4.13	—	
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 20μA	4.5	—	0.0	0.10	—	0.10	V
			I <sub>OL</sub> = 6mA	4.5	—	0.17	0.26	—	0.33	
3-State Output Off-State Current	I <sub>OZ</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> V <sub>OUT</sub> = V <sub>CC</sub> or GND	5.5	—	—	±0.5	—	±5.0	μA	
Input Leakage Current	I <sub>IN</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5	—	—	±0.1	—	±1.0	μA	
Quiescent Supply Current	I <sub>CC</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5	—	—	2.0	—	20.0	μA	
	I <sub>CC</sub> T	PER INPUT : V <sub>IN</sub> = 0.5V or 2.4V OTHER INPUT: V <sub>CC</sub> or GND	5.5	—	—	2.0	—	2.9	mA	

961001EBA2'

● The products described in this document are subject to foreign exchange and foreign trade control laws.  
 ● The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.  
 ● The information contained herein is subject to change without notice.

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	Ta = 25°C			Ta = -40~85°C		UNIT				
			C <sub>L</sub>	V <sub>CC</sub>	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			
Input Capacitance	C <sub>IN</sub>		—	—	—	—	5	10	—		10	pF
							10	—	—		—	
Output Capacitance	C <sub>OUT</sub>	—	—	—	—	10	—	—	—	pF		
Power Dissipation Capacitance	C <sub>PD</sub>	(Note 1)	—	—	—	32	—	—	—	pF		

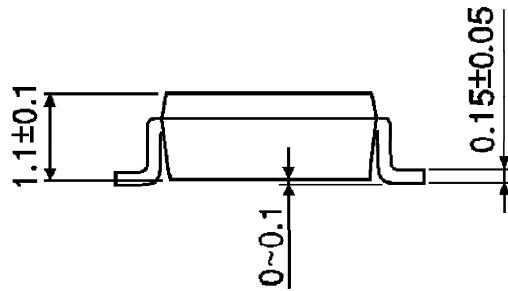
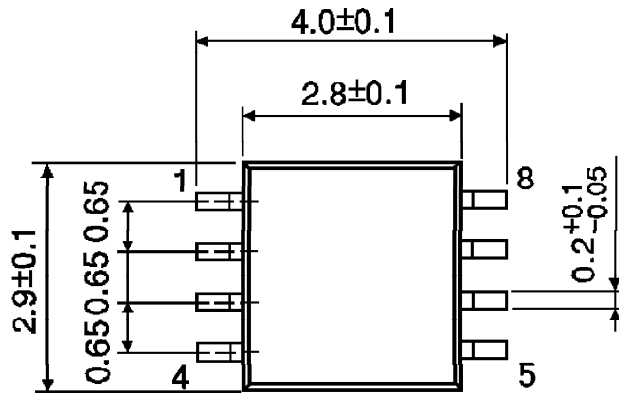
(Note 1) : C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

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

OUTLINE DRAWING  
SSOP8-P-0.65

Unit : mm



Weight : 0.02g (Typ.)