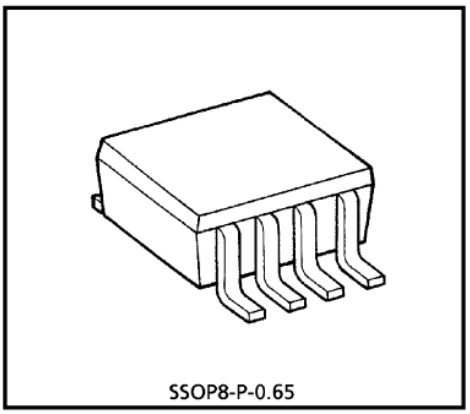
TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7WT125FU

DUAL BUS BUFFER

The TC7WT125FU 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.
The require 3-state control input $\overline{G}$ to be set high to place the output into the high impedance.
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

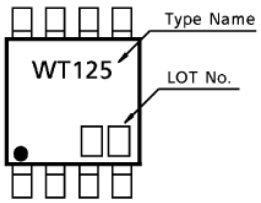


Weight : 0.02g (Typ.)

FEATURES

- High Speed ····· t_{pd} = 13ns (Typ.) at V_{CC} = 5V
- Low Power Dissipation ····· I_{CC} = 2μA (Max.) at Ta = 25°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.)

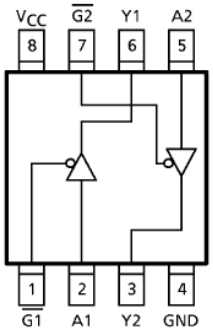
MARKING



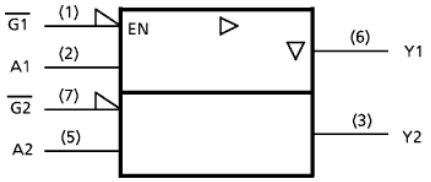
MAXIMUM RATINGS (Ta = 25°C)

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}	± 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	T_{stg}	−65~150	°C
Lead Temperature (10 s)	T_L	260	°C

PIN ASSIGNMENT (TOP VIEW)



LOGIC DIAGRAM



TRUTH TABLE

INPUTS		OUTPUTS
$\overline{G}$	A	Y
H	×	Z
L	L	L
L	H	H

× : Don't Care
Z : High Impedance

RECOMMENDED OPERATING CONDITIONS

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)	Ta = 25°C			Ta = −40~85°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_{IH} or V_{IL}	I_{OH} = −20 μA	4.5	4.4	4.5	—	4.4	—	V
			I_{OH} = −6mA	4.5	4.18	4.31	—	4.13	—	
Low-Level Output Voltage	V_{OL}	V_{IN} = V_{IL}	I_{OL} = 20 μA	4.5	—	0.0	0.10	—	0.10	V
			I_{OL} = 6mA	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 $t_r = t_f = 6ns$)

CHARACTERISTIC	SYMBOL	TEST CONDITION			Ta = 25°C			Ta = −40~85°C		UNIT
			C_L	V_{CC}	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}	$R_L = 1k\Omega$	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}	$R_L = 1k\Omega$	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 1)	—	—	—	32	—	—	—	pF

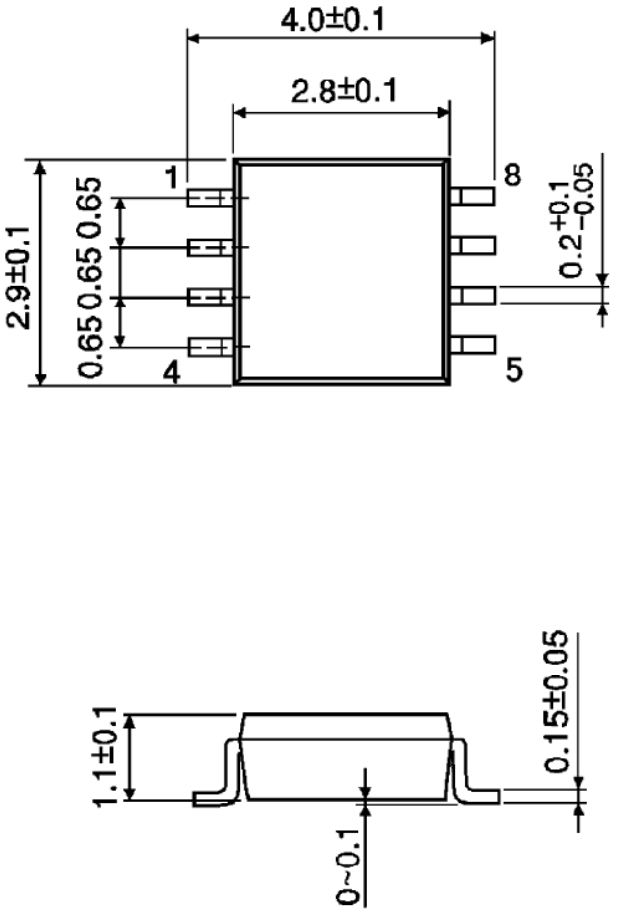
(Note 1) : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation :

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

PACKAGE DIMENSIONS

SSOP8-P-0.65

Unit : mm



Weight : 0.02g (Typ.)

RESTRICTIONS ON PRODUCT USE

20070701-EN GENERAL

- The information contained herein is subject to change without notice.
- TOSHIBA is continually working to improve the quality and 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 comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products 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 TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc.
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.).These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in his document shall be made at the customer’s own risk.
- The products described in this document shall not be used or embedded to any downstream products of which manufacture, use and/or sale are prohibited under any applicable laws and regulations.
- Please contact your sales representative for product-by-product details in this document regarding RoHS compatibility. Please use these products in this document in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances. Toshiba assumes no liability for damage or losses occurring as a result of noncompliance with applicable laws and regulations.