

TENTATIVE TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7WH125FU

(UNDER DEVELOPMENT)

DUAL BUS BUFFER

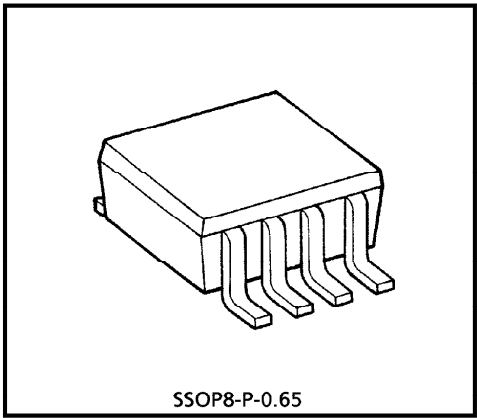
The TC7WH125 is an advanced high speed CMOS DUAL BUS BUFFERS fabricated with silicon gate CMOS technology.

They achieve the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.

The require 3-state control input \overline{G} to be set high to place the output into the impedance.

This device is designed to be used with 3-state memory address drivers, etc.

An input protection circuit ensures that 0 to 7V can be applied to the input pins without regard to the supply voltage. This device can be used to interface 5V to 3V system and two supply system such as battery back up. This circuit prevents device destruction due to mismatched supply and input voltages.



Weight : 0.02g (Typ.)

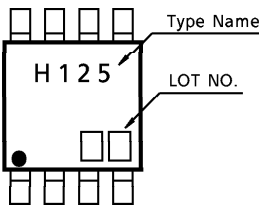
FEATURES

- High Speed $t_{pd} = 3.8ns$ (Typ.) at $V_{CC} = 5V$
- Low Power Dissipation $I_{CC} = 2\mu A$ (Max.) at $T_a = 25^{\circ}C$
- High Noise Immunity $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (Min.)
- Power Down Protection is provided on all inputs.
- Balanced Propagation Delays $t_{pLH} = t_{pHL}$
- Wide Operation Voltage Range... $V_{CC} (opr) = 2 \sim 5.5V$
- Low Noise $V_{OLP} = 0.8V$ (Max.)

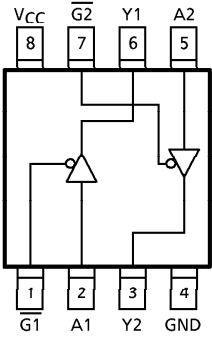
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage Range	V_{CC}	- 0.5~7	V
DC Input Voltage	V_{IN}	- 0.5~7	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}	± 25	mA
DC V_{CC} / Ground Current	I_{CC}	± 50	mA
Power Dissipation	P_D	300	mW
Storage Temperature	T_{stg}	- 65~150	°C
Lead Temperature (10 s)	T_L	260	°C

MARKING



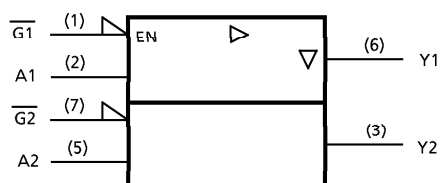
PIN ASSIGNMENT (TOP VIEW)



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LOGIC DIAGRAM



TRUTH TABLE

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

x : Don't Care

Z : High Impedance

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	2~5.5	V
Input Voltage	V_{IN}	0~5.5	V
Output Voltage	V_{OUT}	0~ V_{CC}	V
Operating Temperature	T_{opr}	-40~85	°C
Input Rise and Fall Time	dt / dv	0~100 ($V_{CC} = 3.3 \pm 0.3V$)	ns
		0~20 ($V_{CC} = 5 \pm 0.5V$)	

DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	V_{CC} (V)	$T_a = 25^\circ C$			$T_a = -40 \sim 85^\circ C$		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Input Voltage	V_{IH}	—	2.0	1.5	—	—	1.5	—	V
			3.0~5.5	$V_{CC} \times 0.7$	—	—	$V_{CC} \times 0.7$	—	
Low-Level Input Voltage	V_{IL}	—	2.0	—	—	0.5	—	0.5	V
			3.0~5.5	—	—	$V_{CC} \times 0.3$	—	$V_{CC} \times 0.3$	
High-Level Output Voltage	V_{OH}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -50 \mu A$	2.0	1.9	2.0	—	1.9	V
				3.0	2.9	3.0	—	2.9	
				4.5	4.4	4.5	—	4.4	
			$I_{OH} = -4mA$	3.0	2.58	—	—	2.48	
Low-Level Output Voltage	V_{OL}	$V_{IN} = V_{IL}$	$I_{OL} = 50 \mu A$	2.0	—	0.0	0.1	—	V
				3.0	—	0.0	0.1	—	
				4.5	—	0.0	0.1	—	
			$I_{OL} = 4mA$	3.0	—	—	0.36	—	
3-State Output Off-State Current	I_{OZ}	$V_{IN} = V_{IH}$ or V_{IL} $V_{OUT} = V_{CC}$ or GND	$I_{OL} = 8mA$	4.5	—	—	0.36	—	μA
				5.5	—	—	± 0.25	—	
Input Leakage Current	I_{IN}	$V_{IN} = V_{CC}$ or GND	0~5.5	—	—	± 0.1	—	± 1.0	μA
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC}$ or GND	5.5	—	—	2.0	—	20.0	μA

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AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3\text{ns}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION			Ta = 25°C			Ta = - 40~85°C		UNIT
			V _{CC} (V)	C _L (pF)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t _{pLH} t _{pHL}		3.3 ± 0.3	15	—	5.6	8.0	1.0	9.5	ns
				50	—	8.1	11.5	1.0	13.0	
			5.0 ± 0.5	15	—	3.8	5.5	1.0	6.5	
				50	—	5.3	7.5	1.0	8.5	
3-State Output Enable Time	t _{pZL} t _{pZH}	R _L = 1kΩ	3.3 ± 0.3	15	—	5.4	8.0	1.0	9.5	ns
				50	—	7.9	11.5	1.0	13.0	
			5.0 ± 0.5	15	—	3.6	5.1	1.0	6.0	
				50	—	5.1	7.1	1.0	8.0	
3-State Output Disable Time	t _{pLZ} t _{pHZ}	R _L = 1kΩ	3.3 ± 0.3	50	—	9.5	13.2	1.0	15.0	ns
			5.0 ± 0.5	50	—	6.1	8.8	1.0	10.0	
Output to Output Skew	t _{osLH} t _{osHL}	(Note 1)	3.3 ± 0.3	50	—	—	1.5	—	1.5	ns
			5.0 ± 0.5	50	—	—	1.0	—	1.0	
Input Capacitance	C _{IN}				—	4	10	—	10	pF
Output Capacitance	C _{OUT}				—	6	—	—	—	pF
Power Dissipation Capacitance (Note 2)	C _{PD}				—	14	—	—	—	pF

(Note 1) : Parameter guaranteed by design. $t_{osLH} = |t_{pLHm} - t_{pLHn}|$, $t_{osHL} = |t_{pHLm} - t_{pHLn}|$

(Note 2) : 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 :

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

NOISE CHARACTERISTICS (Ta = 25°C, Input tr = tf = 3ns)

CHARACTERISTIC	SYMBOL	TEST CONDITION	VCC (V)	TYP.	LIMIT	UNIT
Quiet Output Maximum Dynamic VOL	VOLP	CL = 50pF	5.0	0.5	0.8	V
Quiet Output Minimum Dynamic VOL	VOLV	CL = 50pF	5.0	-0.5	-0.8	V
Minimum High Level Dynamic Input Voltage	VIHD	CL = 50pF	5.0	—	3.5	V
Maximum Low Level Dynamic Input Voltage	VILD	CL = 50pF	5.0	—	1.5	V

INPUT EQUIVALENT CIRCUIT

