

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

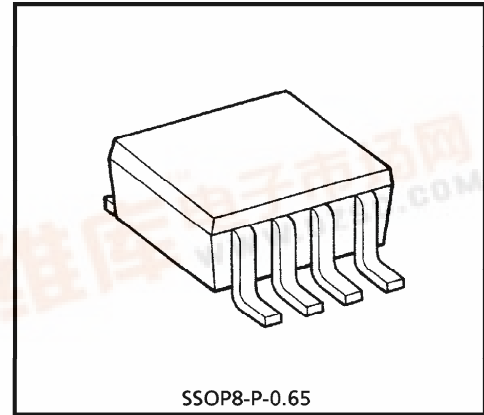
TC7W125FU

DUAL BUS BUFFER

The TC7W125FU is a high speed C²MOS DUAL BUS BUFFERS fabricated with silicon gate C²MOS technology. It achieve the high speed operation similar to equivalent LSTTL while maintaining the C²MOS low power dissipation.

The require 3-state control input \bar{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.



SSOP8-P-0.65

Weight : 0.02g (Typ.)

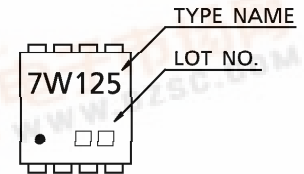
FEATURES

- High Speed $t_{pd} = 10ns$ (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.)
- Output Drive Capability 15 LSTTL Loads
- Symmetrical Output Impedance $|I_{OH}| = I_{OL} = 6mA$ (Min.)
- Balanced Propagation Delays $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range $V_{CC} (opr) = 2\sim 6V$

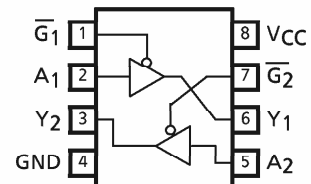
MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	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	$^\circ C$
Lead Temperature (10s)	T_L	260	$^\circ C$

MARKING



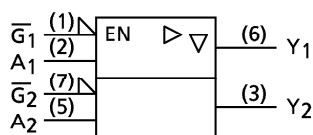
PIN ASSIGNMENT (TOP VIEW)



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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
\overline{G}	A	Y
H	X	Z
L	L	L
L	H	H

X : Don't Care
Z : High Impedance

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	2~6	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	0~1000 ($V_{CC} = 2.0V$) 0~500 ($V_{CC} = 4.5V$) 0~400 ($V_{CC} = 6.0V$)	ns

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CIRCUIT	TEST CONDITION	Ta = 25°C			Ta = -40~85°C		UNIT						
				V_{CC}	MIN.	TYP.	MAX.	MIN.		MAX.					
High-Level Input Voltage	V_{IH}	—	—	2.0	1.5	—	—	1.5	—	V					
				4.5	3.15	—	—	3.15	—						
				6.0	4.2	—	—	4.2	—						
Low-Level Input Voltage	V_{IL}	—	—	2.0	—	—	0.5	—	0.5	V					
				4.5	—	—	1.35	—	1.35						
				6.0	—	—	1.8	—	1.8						
High-Level Output Voltage	V_{OH}	—	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -20\mu A$	2.0	1.9	2.0	—	1.9	—	V				
					4.5	4.4	4.5	—	4.4	—					
					6.0	5.9	6.0	—	5.9	—					
Low-Level Output Voltage	V_{OL}	—	$V_{IN} = V_{IL}$	$I_{OL} = 20\mu A$	2.0	—	0.0	0.1	—	0.1	V				
					4.5	—	0.0	0.1	—	0.1					
					6.0	—	0.0	0.1	—	0.1					
3-State Output Off-State Current	I_{OZ}	—	$V_{IN} = V_{IH}$ or V_{IL} $V_{OUT} = V_{CC}$ or GND		6.0	—	—	±0.5	—	±5.0	μA				
					Input Leakage Current	I_{IN}	—	$V_{IN} = V_{CC}$ or GND	6.0	—		—	±0.1	—	±1.0

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

PARAMETER	SYMBOL	TEST CIR-CUIT	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	2.0	—	20	60	—	75	ns
					4.5	—	6	12	—	15	
					6.0	—	5	10	—	13	
Propagation Delay Time	t _{PLH} t _{pHL}	—	—	50	2.0	—	30	90	—	115	
					4.5	—	11	18	—	23	
					6.0	—	10	15	—	20	
				150	2.0	—	42	130	—	165	
					4.5	—	14	26	—	33	
					6.0	—	12	22	—	28	
Output Enable Time	t _{pZL} t _{pZH}	—	R _L = 1kΩ	50	2.0	—	30	90	—	115	
					4.5	—	11	18	—	23	
					6.0	—	10	15	—	20	
				150	2.0	—	42	130	—	165	
					4.5	—	14	26	—	33	
					6.0	—	12	22	—	28	
Output Disable Time	t _{pLZ} t _{pHZ}	—	R _L = 1kΩ	50	2.0	—	24	100	—	125	
					4.5	—	12	20	—	25	
					6.0	—	10	17	—	21	
Input Capacitance	C _{IN}	—	—	—	—	—	5	10	—	10	pF
Output Capacitance	C _{OUT}	—	—	—	—	—	10	—	—	—	
Power Dissipation Capacitance	C _{PD}	—	Note (1)	—	—	—	32	—	—	—	

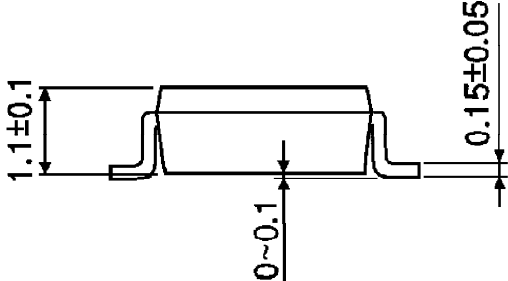
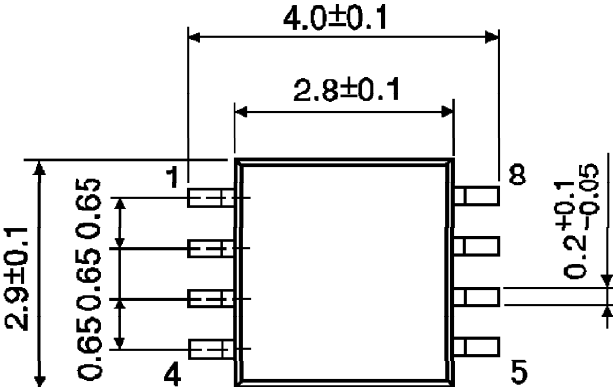
Note (1) : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

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

OUTLINE DRAWING
SSOP8-P-0.65

Unit : mm



Weight : 0.02g (Typ.)