

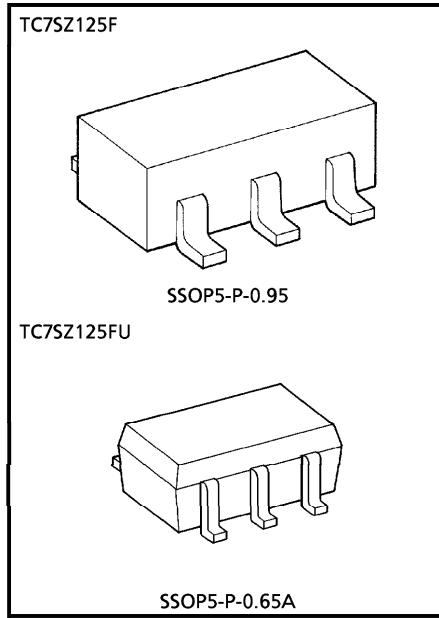
TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

**TC7SZ125F, TC7SZ125FU****BUS BUFFER****3-STATE OUTPUT****FEATURES**

- High Output Drive :  $\pm 24 \text{ mA}$  (Typ.)  
( $V_{CC} = 3 \text{ V}$ )
- Super High Speed Operation :  $t_{PD} = 2.6 \text{ ns}$  (Typ.)  
( $V_{CC} = 5 \text{ V}, 50 \text{ pF}$ )
- Operation Voltage Range :  $V_{CC(\text{opr})} = 1.8 \sim 5.5 \text{ V}$
- Supply Voltage Data Retention :  $V_{CC} = 1.5 \sim 5.5 \text{ V}$
- 5 V Tolerant Function
- Matches the Performance of TC74LCX Series when Operated at 3.3 V  $V_{CC}$

**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage Range	$V_{CC}$	-0.5~6	V
DC Input Voltage	$V_{IN}$	-0.5~6	V
DC Output Voltage	$V_{OUT}$	-0.5~6	V
Input Diode Current	$I_{IK}$	$\pm 20$	mA
Output Diode Current	$I_{OK}$	$\pm 20$	mA
DC Output Current	$I_{OUT}$	$\pm 50$	mA
DC $V_{CC}$ / Ground Current	$I_{CC}$	$\pm 50$	mA
Power Dissipation	$P_D$	200	mW
Storage Temperature	$T_{stg}$	-65~150	°C
Lead Temperature (10 s)	$T_L$	260	°C



Weight  
 SSOP5-P-0.95 : 0.016 g (Typ.)  
 SSOP5-P-0.65A : 0.006 g (Typ.)

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## 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	VIH		1.8	0.88 × $V_{CC}$	—	—	0.88 × $V_{CC}$	—	V
			2.3~5.5	0.75 × $V_{CC}$	—	—	0.75 × $V_{CC}$	—	
Low-Level Input Voltage	VIL		1.8	—	—	0.12 × $V_{CC}$	—	0.12 × $V_{CC}$	V
			2.3~5.5	—	—	0.25 × $V_{CC}$	—	0.25 × $V_{CC}$	
High-Level Output Voltage	VOH	$V_{IN} = V_{IH}$	$I_{OH} = -100 \mu A$	1.8	1.7	1.8	—	1.7	V
				2.3	2.2	2.3	—	2.2	
				3.0	2.9	3.0	—	2.9	
				4.5	4.4	4.5	—	4.4	
			$I_{OH} = -8 mA$	2.3	1.9	2.15	—	1.9	V
				3.0	2.4	2.8	—	2.4	
				3.0	2.3	2.68	—	2.3	
				4.5	3.8	4.2	—	3.8	
Low-Level Output Voltage	VOL	$V_{IN} = V_{IL}$	$I_{OL} = 100 \mu A$	1.8	—	0	0.1	—	V
				2.3	—	0	0.1	—	
				3.0	—	0	0.1	—	
				4.5	—	0	0.1	—	
			$I_{OL} = 8 mA$	2.3	—	0.1	0.3	—	V
				3.0	—	0.15	0.4	—	
				3.0	—	0.22	0.55	—	
				4.5	—	0.22	0.55	—	
Input Leakage Current	$I_{IN}$	$V_{IN} = 5.5 V$ or GND	0~5.5	—	—	±1	—	±10	$\mu A$
Power Off Leakage Current	$I_{OFF}$	$V_{IN}$ or $V_{OUT} = 5.5 V$	0.0	—	—	1	—	10	$\mu A$
Quiescent Supply Current	$I_{CC}$	$V_{IN} = V_{CC}$ or GND	5.5	—	—	2	—	20	$\mu A$

AC ELECTRICAL CHARACTERISTICS (Input  $t_r = t_f = 3$  ns)

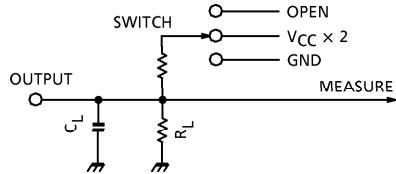
CHARACTERISTIC	SYMBOL	TEST CONDITION	$T_a = 25^\circ\text{C}$			$T_a = -40\sim85^\circ\text{C}$		UNIT
			$V_{CC}$ (V)	MIN.	TYP.	MAX.	MIN.	
Propagation Delay Time	$t_{PLH}$	$C_L = 15 \text{ pF}, R_L = 1 \text{ M}\Omega$ (Figure 1)	1.8	2.0	5.3	11.0	2.0	11.5
			$2.5 \pm 0.2$	0.8	3.4	7.5	0.8	8.0
			$3.3 \pm 0.3$	0.5	2.5	5.2	0.5	5.5
			$5.0 \pm 0.5$	0.5	2.1	4.5	0.5	4.8
	$t_{PHL}$	$C_L = 50 \text{ pF}, R_L = 500 \Omega$ (Figure 1)	$3.3 \pm 0.3$	1.5	3.2	5.7	1.5	6.0
			$5.0 \pm 0.5$	0.8	2.6	5.0	0.8	5.3
			1.8	2.0	7.0	12.5	2.0	13.0
			$2.5 \pm 0.2$	1.5	4.6	8.5	1.5	9.0
Output Enable Time	$t_{PZL}$	$C_L = 50 \text{ pF}, R_L = 500 \Omega$ (Figure 1)	$3.3 \pm 0.3$	1.5	3.5	6.2	1.5	6.5
			$5.0 \pm 0.5$	0.8	2.8	5.5	0.8	5.8
	$t_{PZH}$	$C_L = 50 \text{ pF}, R_L = 500 \Omega$ (Figure 1)	1.8	2.0	5.4	11.0	2.0	12.0
			$2.5 \pm 0.2$	1.5	3.5	8.0	1.5	8.5
Output Disable Time	$t_{PLZ}$	$C_L = 50 \text{ pF}, R_L = 500 \Omega$ (Figure 1)	$3.3 \pm 0.3$	1.0	2.8	5.7	1.0	6.0
			$5.0 \pm 0.5$	0.5	2.1	4.7	0.5	5.0
Input Capacitance	$C_{IN}$		0~5.5	—	4	—	—	—
Power Dissipation Capacitance	$C_{PD}$	(Note 1)	3.3	—	17	—	—	—
			5.5	—	24	—	—	—

(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.

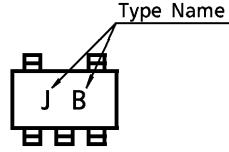
$$I_{CC(\text{opr})} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

Figure 1 AC Characteristics Measurement Circuit



CHARACTERISTICS	SWITCH
$t_{PLH}, t_{PHL}$	OPEN
$t_{PLZ}, t_{PZL}$	$V_{CC} \times 2$
$t_{PZH}$	GND

## MARKING

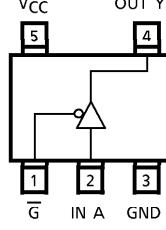


## TRUTH TABLE

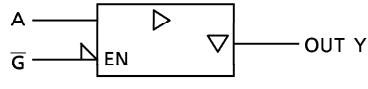
INPUT	OUTPUT
A	$\bar{G}$
X	H
L	L
H	L
X : Don't Care	Z : High Impedance

X : Don't Care  
Z : High Impedance

## PIN ASSIGNMENT (TOP VIEW)

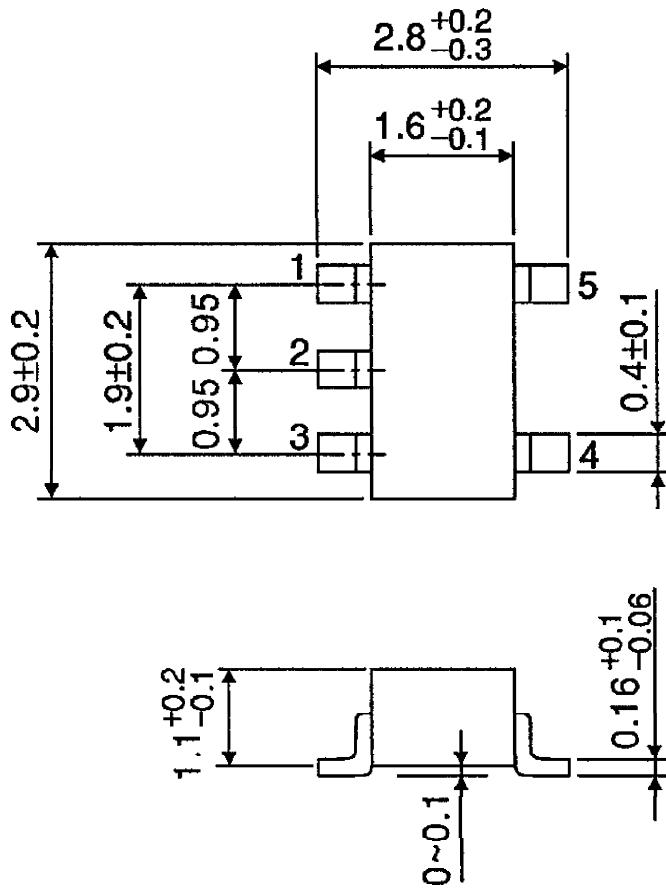


## LOGIC DIAGRAM



**OUTLINE DRAWING**  
SSOP5-P-0.95

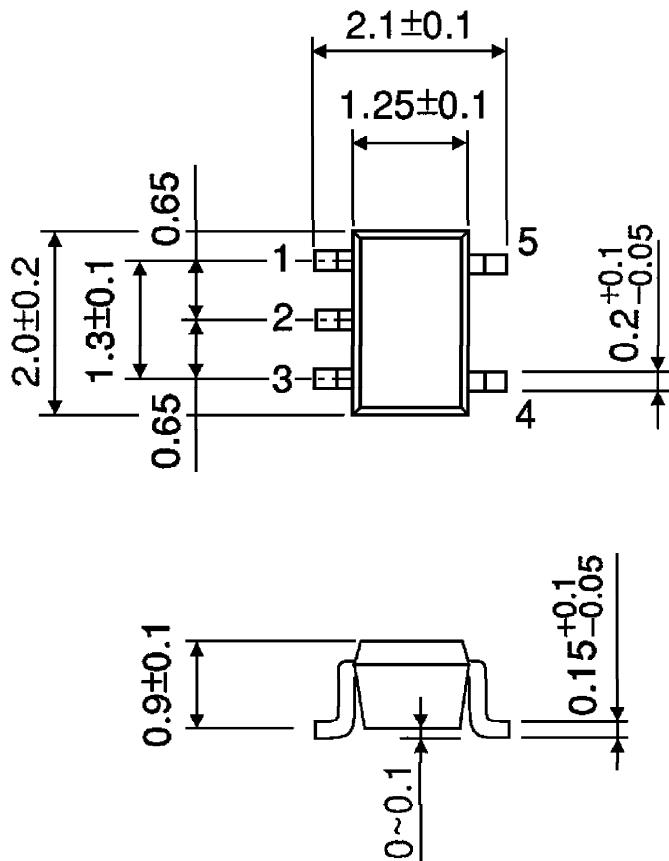
Unit : mm



Weight : 0.016 g (Typ.)

**OUTLINE DRAWING**  
SSOP5-P-0.65A

Unit : mm



Weight : 0.006 g (Typ.)