TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

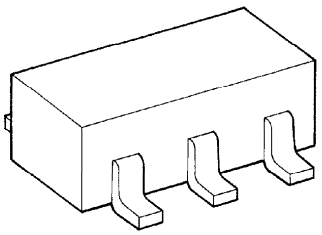
TC7SZ00F, TC7SZ00FU

2 INPUT NAND GATE

FEATURES

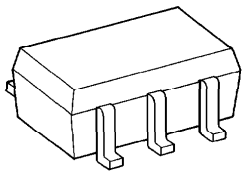
- High Output Drive : ±24 mA (Typ.) @V_{CC} = 3 V
- Super High Speed Operation : t_{PD} 2.4 ns (Typ.) @V_{CC} = 5 V, 50 pF
- Operation Voltage Range : $V_{CC\,(opr)}$ = 1.8~5.5 V
- Supply Voltage Data Retention : V_{CC} = 1.5~5.5 V
- 5 V Tolerant Function
- Matches the Performance of TC74LCX Series when Operated at 3.3 V V_{CC}

TC7SZ00F



SSOP5-P-0.95

TC7SZ00FU



SSOP5-P-0.65A

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

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}	±20	mA
Output Diode Current	I_{OK}	±20	mA
DC Output Current	I_{OUT}	±50	mA
DC V_{CC} / Ground Current	I_{CC}	±50	mA
Power Dissipation	P_D	200	mW
Storage Temperature	T_{stg}	−65~150	°C
Lead Temperature (10 s)	T_L	260	°C

DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION		V_{CC} (V)	Ta = 25°C MIN.	Ta = 25°C TYP.	Ta = 25°C MAX.	Ta = −40~85°C MIN.	Ta = −40~85°C MAX.	UNIT
High-Level Input Voltage	V_{IH}			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	V_{IL}			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	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = −100 μA	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	—	
			I_{OH} = −16 mA	3.0	2.4	2.8	—	2.4	—	
			I_{OH} = −24 mA	3.0	2.3	2.68	—	2.3	—	
			I_{OH} = −32 mA	4.5	3.8	4.2	—	3.8	—	
Low-Level Output Voltage	V_{OL}	V_{IN} = V_{IH}	I_{OL} = 100 μA	1.8	—	0	0.1	—	0.1	V
				2.3	—	0	0.1	—	0.1	
				3.0	—	0	0.1	—	0.1	
				4.5	—	0	0.1	—	0.1	
			I_{OL} = 8 mA	2.3	—	0.1	0.3	—	0.3	
			I_{OL} = 16 mA	3.0	—	0.15	0.4	—	0.4	
			I_{OL} = 24 mA	3.0	—	0.22	0.55	—	0.55	
			I_{OL} = 32 mA	4.5	—	0.22	0.55	—	0.55	
Input Leakage Current	I_{IN}	V_{IN} = 5.5 V or GND		0 – 5.5	—	—	±1	—	±10	μA
Power Off Leakage Current	I_{OFF}	V_{IN} or V_{OUT} = 5.5 V		0.0	—	—	1	—	10	μA
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		5.5	—	—	2	—	20	μA

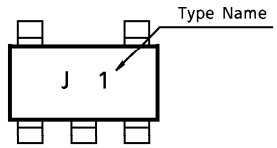
AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3$ ns)

CHARACTERISTIC	SYMBOL	TEST CONDITION		Ta = 25°C			Ta = −40~85°C		UNIT
			V_{CC} (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t_{PLH} t_{PHL}	C_L = 15 pF, R_L = 1 MΩ	1.8	2.0	4.5	9.5	2.0	10.0	ns
			2.5 ± 0.2	0.8	3.0	6.5	0.8	7.0	
			3.3 ± 0.3	0.5	2.4	4.5	0.5	4.7	
			5.0 ± 0.5	0.5	2.0	3.9	0.5	4.1	
		C_L = 50 pF, R_L = 500 Ω	3.3 ± 0.3	1.5	2.9	5.0	1.5	5.2	
			5.0 ± 0.5	0.8	2.4	4.3	0.8	4.5	
Input Capacitance	C_{IN}		0 − 5.5	—	4	—	—	—	pF
Power Dissipation Capacitance	C_{PD}	(Note 1)	3.3	—	24	—	—	—	pF
			5.5	—	30	—	—	—	

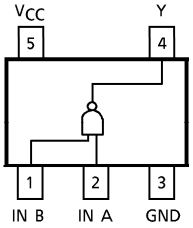
(Note 1) C_{PD} is defined as the value of the internal equivalent capacitance which is Calculated from the operating current consumption without load.
Average operating current can be obtained by the equation.

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

MARKING



PIN ASSIGNMENT (TOP VIEW)



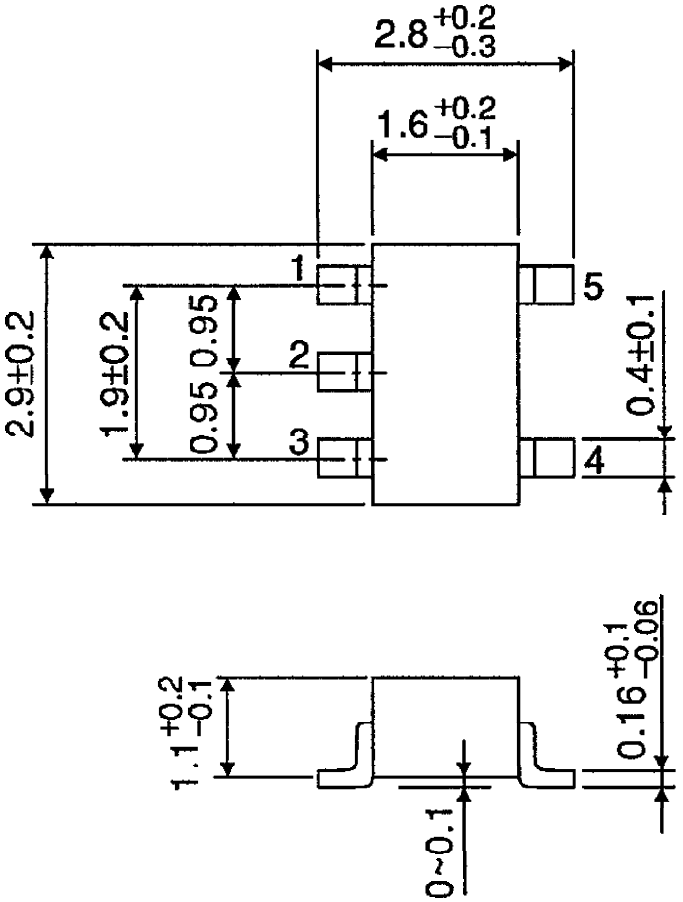
TRUTH TABLE

A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

LOGIC DIAGRAM

PACKAGE DIMENSIONS

SSOP5-P-0.95 Unit : mm

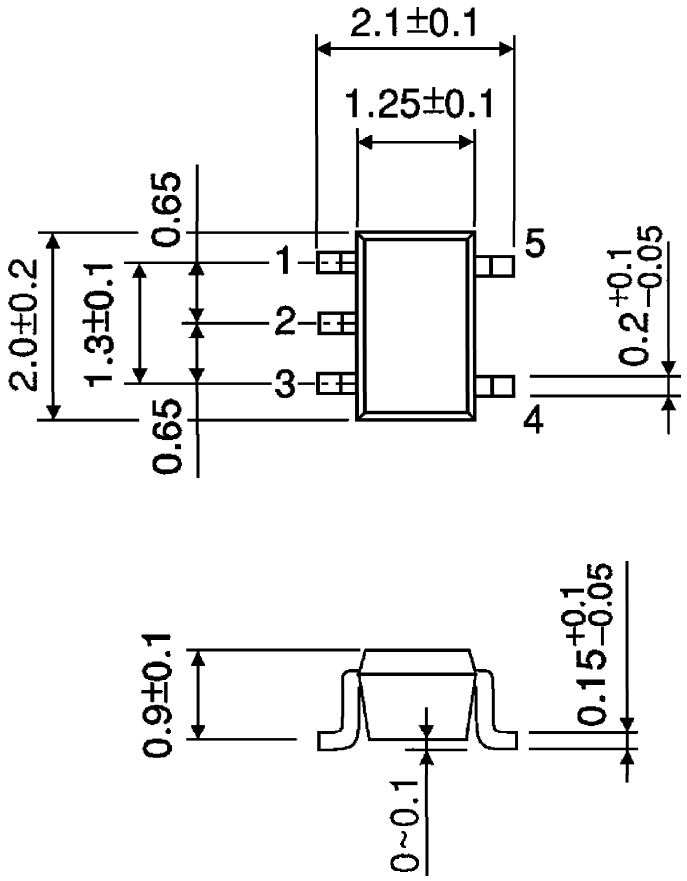


Weight : 0.016 g (Typ.)

PACKAGE DIMENSIONS

SSOP5-P-0.65A

Unit : mm



Weight : 0.006 g (Typ.)

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