

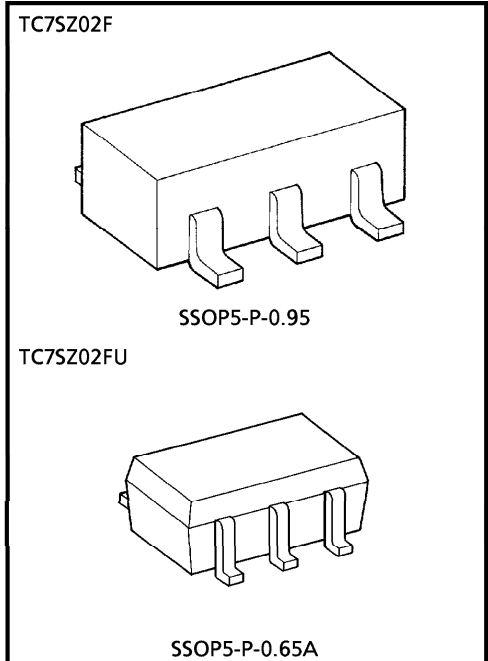
TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7SZ02F, TC7SZ02FU**2 INPUT NOR 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 : $V_{CC}(\text{opr}) = 1.8\sim 5.5$ V
- Supply Voltage Data Retention : $V_{CC} = 1.5\sim 5.5$ V
- 5 V Tolerant Function
- Matches the Performance of TC74LCX Series when Operated at 3.3 V V_{CC}

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

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	$^\circ\text{C}$
Lead Temperature (10 s)	T_L	260	$^\circ\text{C}$



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

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}			1.8	0.88	—	—	0.88	—	V
				2.3~ 5.5	× V _{CC}	—	—	0.75	—	
Low-Level Input Voltage	V _{IL}			1.8	—	—	0.12	—	0.12	V
				2.3~ 5.5	—	—	× V _{CC}	—	0.25	
High-Level Output Voltage	V _{OH}	V _{IN} = 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} or V _{IL}	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 $t_r = t_f = 3 \text{ ns}$)

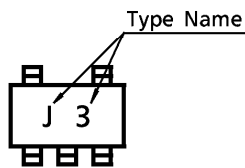
CHARACTERISTIC	SYMBOL	TEST CONDITION	Ta = 25°C			Ta = -40~85°C		UNIT	
			VCC (V)	MIN.	TYP.	MAX.	MIN.		MAX.
Propagation Delay Time	tPLH	CL = 15 pF, RL = 1 MΩ	1.8	2.0	4.4	9.5	2.0	10.0	ns
			2.5 ± 0.2	0.8	2.9	6.5	0.8	7.0	
	3.3 ± 0.3		0.5	2.3	4.5	0.5	4.7		
	5.0 ± 0.5		0.5	1.9	3.9	0.5	4.1		
	tPHL		3.3 ± 0.3	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	CIN		0~5.5	—	4	—	—	pF	
Power Dissipation Capacitance	CpD	(Note 1)	3.3	—	23	—	—	—	pF
			5.5	—	30	—	—	—	

(Note 1) CpD is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

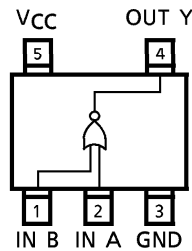
Average operating current can be obtained by the equation.

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

MARKING



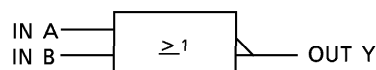
PIN ASSIGNMENT (TOP VIEW)



TRUTH TABLE

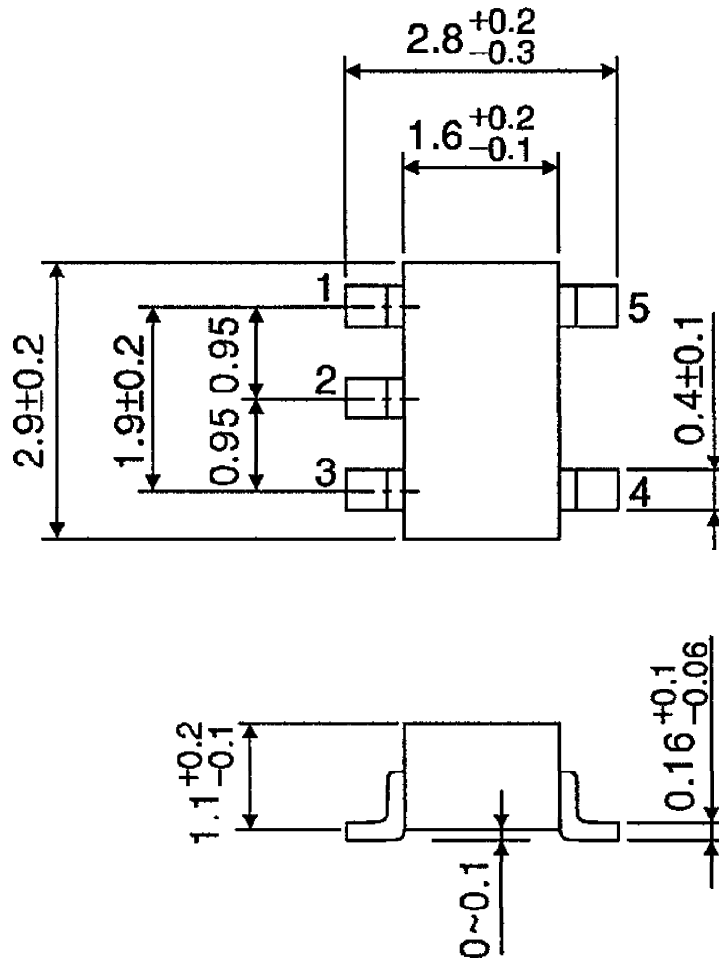
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

LOGIC DIAGRAM



PACKAGE DIMENSIONS
SSOP5-P-0.95

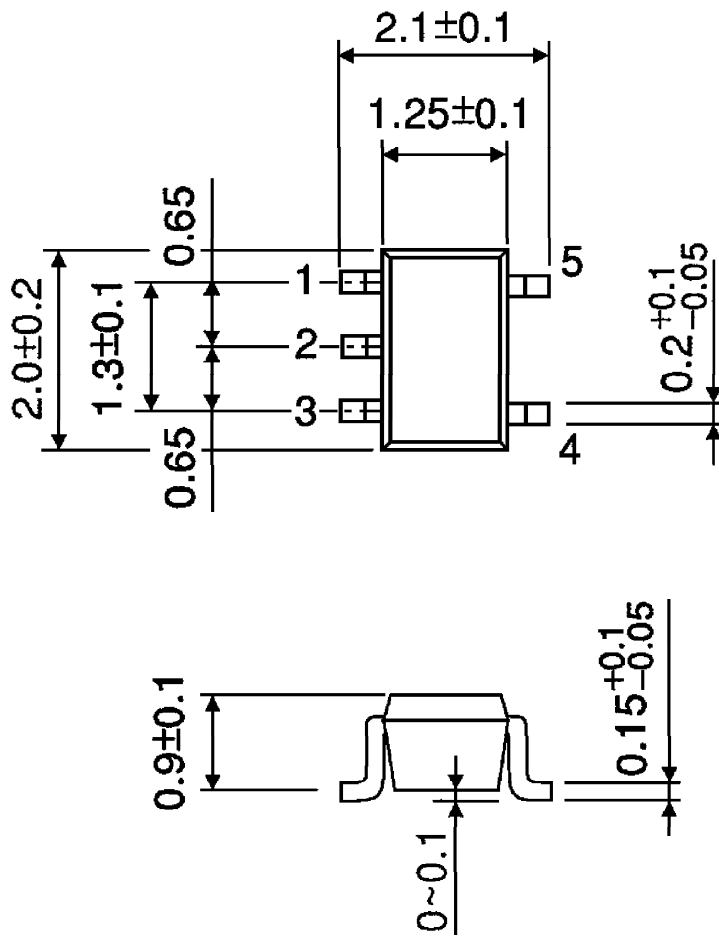
Unit : mm



Weight : 0.016 g (Typ.)

PACKAGE DIMENSIONS
SSOP5-P-0.65A

Unit : mm



Weight : 0.006 g (Typ.)

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000707EBA

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