

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7SZ02F, TC7SZ02FU

2 INPUT NOR GATE

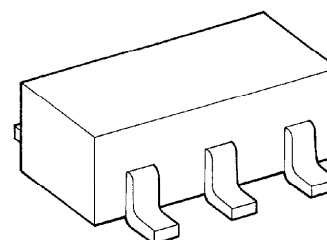
FEATURES

- 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 : $V_{CC(opr)} = 1.8 \sim 5.5$ 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 ($T_a = 25^\circ\text{C}$)

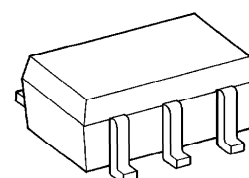
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage Range	V_{CC}	$-0.5 \sim 6$	V
DC Input Voltage	V_{IN}	$-0.5 \sim 6$	V
DC Output Voltage	V_{OUT}	$-0.5 \sim 6$	V
Input Diode Current	I_{IK}	± 20	mA
Output Diode Current	I_{OK}	± 20	mA
DC Output Current	I_{OUT}	± 50	mA
DC V_{CC} /Ground Current	I_{CC}	± 50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

TC7SZ02F



SSOP5-P-0.95

TC7SZ02FU



SSOP5-P-0.65A

Weight

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

980910EBA1

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DC ELECTRICAL CHARACTERISTICS

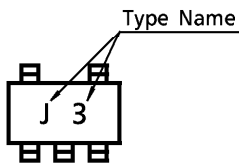
CHARACTERISTIC	SYMBOL	TEST CONDITION		V_{CC} (V)	Ta = 25°C			Ta = -40~85°C		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Input Voltage	V_{IH}			1.8	0.88 $\times V_{CC}$	—	—	0.88 $\times V_{CC}$	—	V
				2.3~ 5.5	0.75 $\times V_{CC}$	—	—	0.75 $\times V_{CC}$	—	
Low-Level Input Voltage	V_{IL}			1.8	—	—	0.12 $\times V_{CC}$	—	0.12 $\times V_{CC}$	V
				2.3~ 5.5	—	—	0.25 $\times V_{CC}$	—	0.25 $\times V_{CC}$	
High-Level Output Voltage	V_{OH}	$V_{IN} = V_{IL}$	$I_{OH} = -100 \mu A$	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	—	
			$I_{OH} = -8 \text{ mA}$	2.3	1.9	2.15	—	1.9	—	
			$I_{OH} = -16 \text{ mA}$	3.0	2.4	2.8	—	2.4	—	
			$I_{OH} = -24 \text{ mA}$	3.0	2.3	2.68	—	2.3	—	
			$I_{OH} = -32 \text{ mA}$	4.5	3.8	4.2	—	3.8	—	
Low-Level Output Voltage	V_{OL}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 100 \mu A$	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	
			$I_{OL} = 8 \text{ mA}$	2.3	—	0.1	0.3	—	0.3	
			$I_{OL} = 16 \text{ mA}$	3.0	—	0.15	0.4	—	0.4	
			$I_{OL} = 24 \text{ mA}$	3.0	—	0.22	0.55	—	0.55	
			$I_{OL} = 32 \text{ mA}$	4.5	—	0.22	0.55	—	0.55	
Input Leakage Current	I_{IN}	$V_{IN} = 5.5 \text{ V or GND}$		0~ 5.5	—	—	± 1	—	± 10	μA
Power Off Leakage Current	I_{OFF}	$V_{IN} \text{ or } V_{OUT} = 5.5 \text{ V}$		0.0	—	—	1	—	10	μA
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC} \text{ or GND}$		5.5	—	—	2	—	20	μA

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

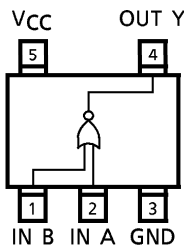
CHARACTERISTIC	SYMBOL	TEST CONDITION	Ta = 25°C				Ta = - 40~85°C		UNIT
			V _{CC} (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t _{PLH} t _{PHL}	C _L = 15 pF, R _L = 1 MΩ	1.8	2.0	4.4	9.5	2.0	10.0	ns
			2.5 ± 0.2	0.8	2.9	6.5	0.8	7.0	
			3.3 ± 0.3	0.5	2.3	4.5	0.5	4.7	
		C _L = 50 pF, R _L = 500 Ω	5.0 ± 0.5	0.5	1.9	3.9	0.5	4.1	
			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	—	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



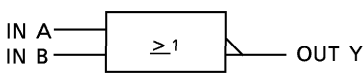
PIN ASSIGNMENT (TOP VIEW)



TRUTH TABLE

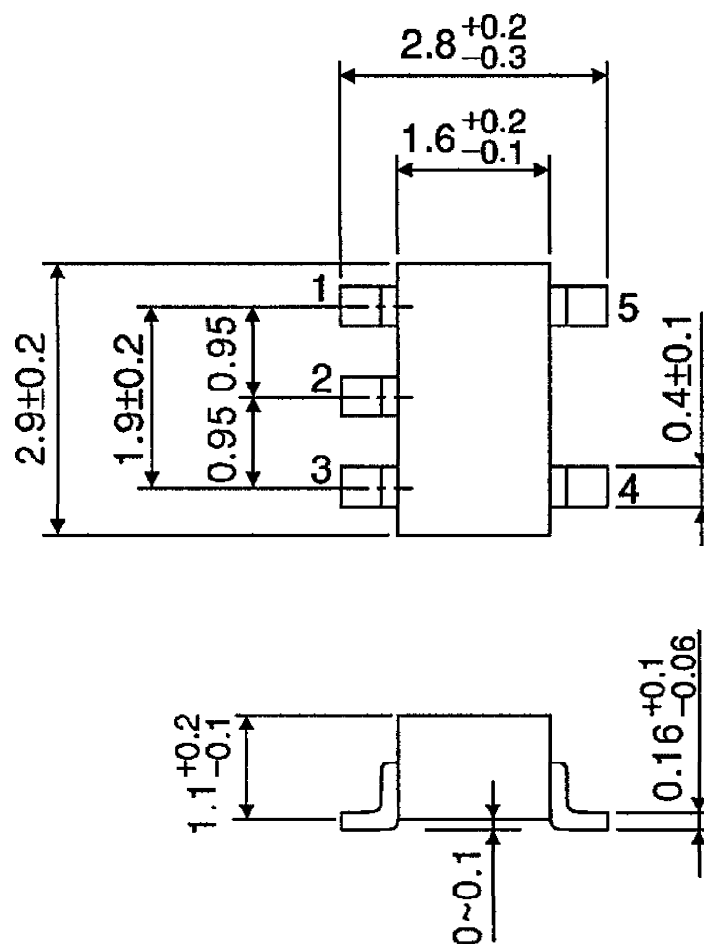
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

LOGIC DIAGRAM



OUTLINE DRAWING
SSOP5-P-0.95

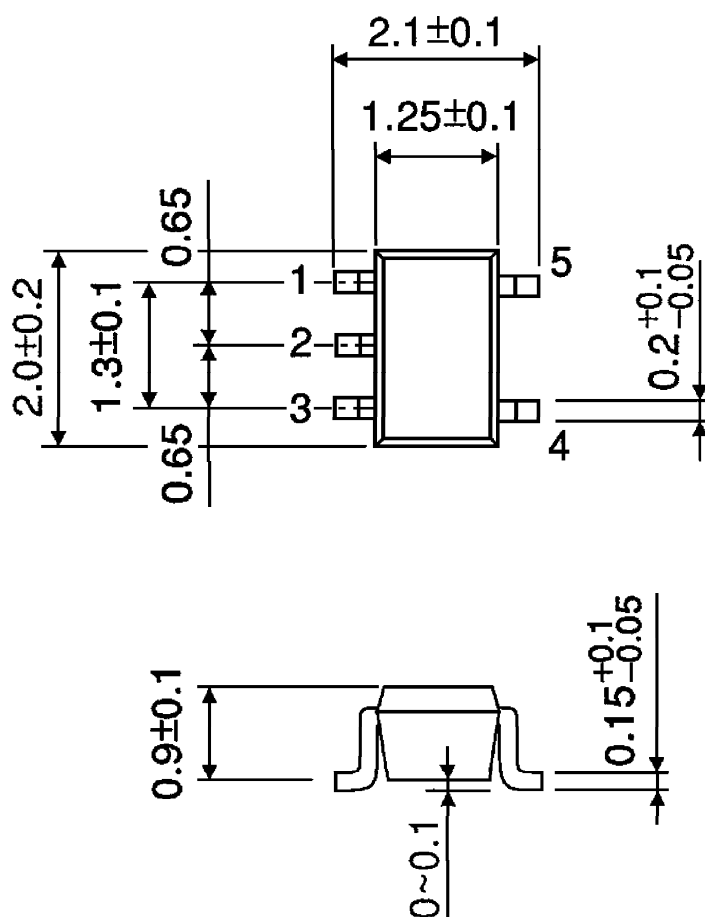
Unit : mm



Weight : 0.016 g (Typ.)

OUTLINE DRAWING
SSOP5-P-0.65A

Unit : mm



Weight : 0.006 g (Typ.)