

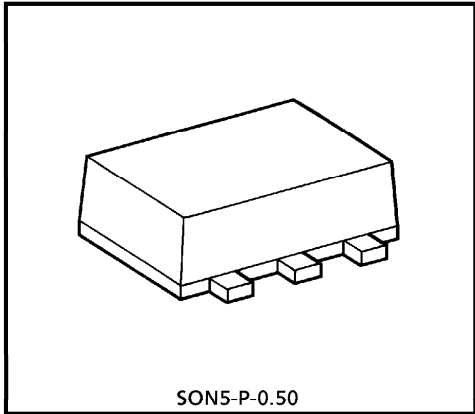
TENTATIVE
(UNDER DEVELOPMENT) TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7SZ04AFE

INVERTER

FEATURES

- High Output Drive : $\pm 24\text{ mA}$ (Typ.)
@ $V_{CC} = 3\text{ V}$
- Super High Speed Operation : $t_{pD} 2.4\text{ ns}$ (Typ.)
@ $V_{CC} = 5\text{ V}$, 50 pF
- Operation Voltage Range : $V_{CC}(\text{opr}) = 1.8\sim 5.5\text{ V}$
- Supply Voltage Data Retention : $V_{CC} = 1.5\sim 5.5\text{ V}$
- Latch-up Performance : $\pm 500\text{ mA}$
- ESD Performance : Human Body Model $> \pm 2000\text{ V}$
Machine Model $> \pm 200\text{ V}$
- Power Down Protection is provided on all inputs.
- Matches the Performance of TC74LCX Series when
Operated at $3.3\text{ V } V_{CC}$
- Input Rise and Fall Time (t_r , t_f) (Recommended Operation Condition)
@ $V_{CC} = 1.8\text{ V}$, $2.5\text{ V} \pm 0.2\text{ V}$: $0\sim 20\text{ ns/V}$
@ $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$: $0\sim 10\text{ ns/V}$
@ $V_{CC} = 5.5\text{ V} \pm 0.5\text{ V}$: $0\sim 5\text{ ns/V}$



SON5-P-0.50
Weight : 0.003 g (Typ.)

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}	$-0.5\sim V_{CC} + 0.5$	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	150	mW
Storage Temperature	T_{stg}	$-65\sim 150$	$^\circ\text{C}$
Lead Temperature (10 s)	T_L	260	$^\circ\text{C}$

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DC ELECTRICAL CHARACTERISTICS

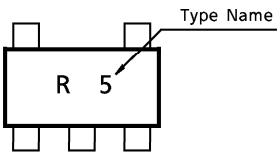
CHARACTERISTIC	SYMBOL	TEST CONDITION		V _{CC} (V)	Ta = 25°C			Ta = -40~85°C		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Input Voltage	V _{IH}			1.8	0.75 × V _{CC}	—	—	0.75 × V _{CC}	—	V
				2.3 – 5.5	0.7 × V _{CC}	—	—	0.7 × V _{CC}	—	
Low-Level Input Voltage	V _{IL}			1.8	—	—	0.25 × V _{CC}	—	0.25 × V _{CC}	V
				2.3 – 5.5	—	—	0.3 × V _{CC}	—	0.3 × V _{CC}	
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}	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
Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND		5.5	—	—	2	—	20	μA

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

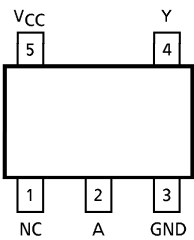
CHARACTERISTIC	SYMBOL	TEST CONDITION	Ta = 25°C				Ta = - 40~85°C		UNIT
			V _{CC} (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t _{PLH} t _{PHL}	C _L = 15 pF, R _L = 1 MΩ	1.8	2.0	4.4	9.5	2.0	10.0	ns
			2.5 ± 0.2	0.8	2.9	6.5	0.8	7.0	
			3.3 ± 0.3	0.5	2.1	4.5	0.5	4.7	
			5.0 ± 0.5	0.5	1.8	3.9	0.5	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	—	21	—	—	—	pF
			5.5	—	34	—	—	—	

(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



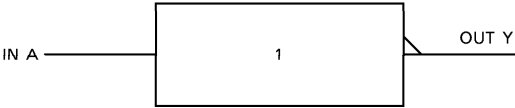
PIN ASSIGNMENT (TOP VIEW)



TRUTH TABLE

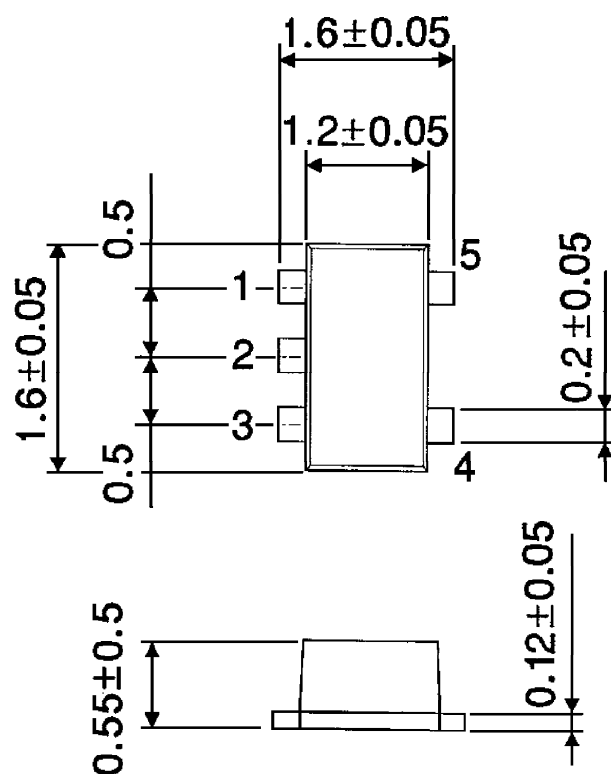
A	Y
L	H
H	L

LOGIC DIAGRAM



OUTLINE DRAWING
SON5-P-0.50

Unit : mm



Weight : 0.003 g (Typ.)

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