

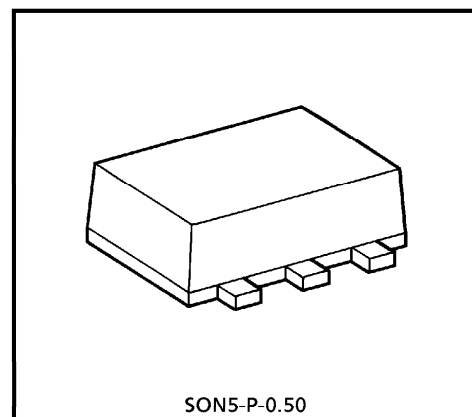
TENTATIVE (UNDER DEVELOPMENT) TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7SZ04AFE

INVERTER

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
- Latch-up Performance : ± 500 mA
- ESD Performance : Human Body Model > ± 2000 V
Machine Model > ± 200 V
- Power Down Protection is provided on all inputs.
- Matches the Performance of TC74LCX Series when Operated at 3.3 V V_{CC}
- Input Rise and Fall Time (tr, tf) (Recommended Operation Condition)
 - @V_{CC} = 1.8 V, 2.5 V \pm 0.2 V : 0~20 ns/V
 - @V_{CC} = 3.3 V \pm 0.3 V : 0~10 ns/V
 - @V_{CC} = 5.5 V \pm 0.5 V : 0~5 ns/V



SON5-P-0.50
Weight : 0.003 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~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}	-65~150	°C
Lead Temperature (10 s)	T _L	260	°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	—	—	0.75	—	V	
				2.3 – 5.5	0.7 × V _{CC}	—	—	0.7 × V _{CC}	—		
Low-Level Input Voltage	V _{IL}			1.8	—	—	0.25	—	0.25	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	

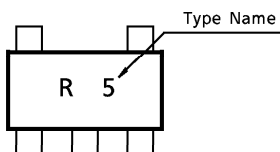
AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3 \text{ ns}$)

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	
		C _L = 50 pF, R _L = 500 Ω	5.0 ± 0.5	0.5	1.8	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	—	21	—	—	pF	
			5.5	—	34	—	—		

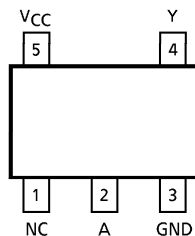
(Note 1) : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation.

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

MARKING



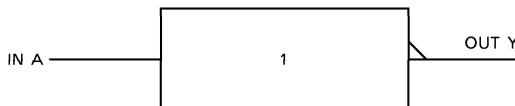
PIN ASSIGNMENT (TOP VIEW)



TRUTH TABLE

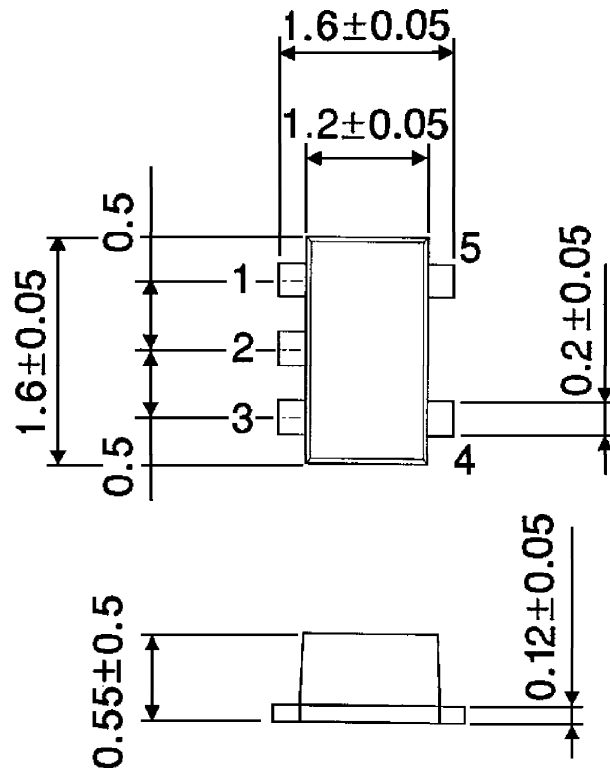
A	Y
L	H
H	L

LOGIC DIAGRAM



OUTLINE DRAWING
SON5-P-0.50

Unit : mm



Weight : 0.003 g (Typ.)