

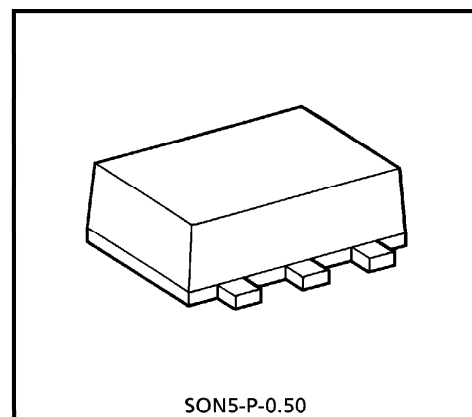
TENTATIVE (UNDER DEVELOPMENT) TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7SZU04AFE

INVERTER

FEATURES

- High Output Drive : ± 16 mA (Typ.)
@ $V_{CC} = 4.5$ V
- Low Quiescent Power : $I_{CC} < 2 \mu A$ (Max.)
@ $V_{CC} = 5.5$ V, $T_a = 25^\circ C$
- Operation Voltage Range : $V_{CC} (opr) = 1.8 \sim 5.5$ V
- Supply Voltage Data Retention : $V_{CC} = 1.5 \sim 5.5$ V
- Latch-up Performance : ± 500 mA
- ESD Performance : Human Body Model $> \pm 2000$ V
Machine Model $> \pm 200$ V
- Power Down Protection is provided on all inputs.



SON5-P-0.50

Weight : 0.003 g (Typ.)

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

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

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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	0.85	—	—	0.85	—	V	
				2.3 – 5.5	× V _{CC}	—	—	0.8 × V _{CC}	—		
Low-Level Input Voltage	V _{IL}	V _{IN} = V _{IH} or V _{IL}		1.8	—	—	0.15	—	0.15	V	
				2.3 – 5.5	—	—	× V _{CC}	—	0.2 × V _{CC}		
High-Level Output Voltage	V _{OH}	V _{IN} = V _{IL}	I _{OH} = -100 μA	1.8	1.6	1.8	—	1.6	—	V	
				2.3	2.1	2.3	—	2.1	—		
				3.0	2.7	3.0	—	2.7	—		
				4.5	4.0	4.4	—	4.0	—		
	V _{IN} = GND	I _{OH} = -4 mA	2.3	1.9	2.14	—	1.9	—			
			I _{OH} = -8 mA	3.0	2.4	2.75	—	2.4	—		
				I _{OH} = -12 mA	3.0	2.3	2.61	—	2.3		—
					I _{OH} = -16 mA	4.5	3.8	4.13	—		3.8
Low-Level Output Voltage	V _{OL}	V _{IN} = V _{IH}	I _{OL} = 100 μA	1.8	—	0	0.2	—	0.2	V	
				2.3	—	0	0.2	—	0.2		
				3.0	—	0	0.3	—	0.3		
				4.5	—	0	0.5	—	0.5		
	V _{IN} = V _{CC}	I _{OL} = 4 mA	2.3	—	0.1	0.3	—	0.3			
			I _{OL} = 8 mA	3.0	—	0.17	0.4	—	0.4		
				I _{OL} = 12 mA	3.0	—	0.25	0.55	—		0.55
					I _{OL} = 16 mA	4.5	—	0.26	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	

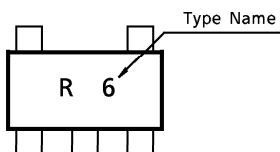
AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3 \text{ ns}$)

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	1.0	—	8.5	1.0	9.0	ns
			2.5 ± 0.2	0.8	—	6.2	0.8	6.5	
			3.3 ± 0.3	0.5	—	4.5	0.5	4.8	
		C _L = 50 pF, R _L = 500 Ω	5.0 ± 0.5	0.5	—	3.9	0.5	4.1	
			3.3 ± 0.3	1.0	—	6.0	1.0	6.5	
			5.0 ± 0.5	0.8	—	5.0	0.8	5.5	
Input Capacitance	C _{IN}		0 - 5.5	—	5	—	—	pF	
Power Dissipation Capacitance	C _{PD}	(Note 1)	3.3	—	9	—	—	pF	
			5.5	—	25	—	—		

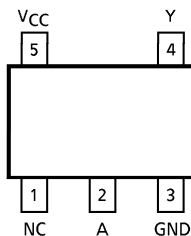
(Note 1) : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation.

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

MARKING



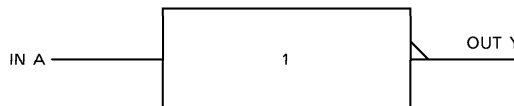
PIN ASSIGNMENT (TOP VIEW)



TRUTH TABLE

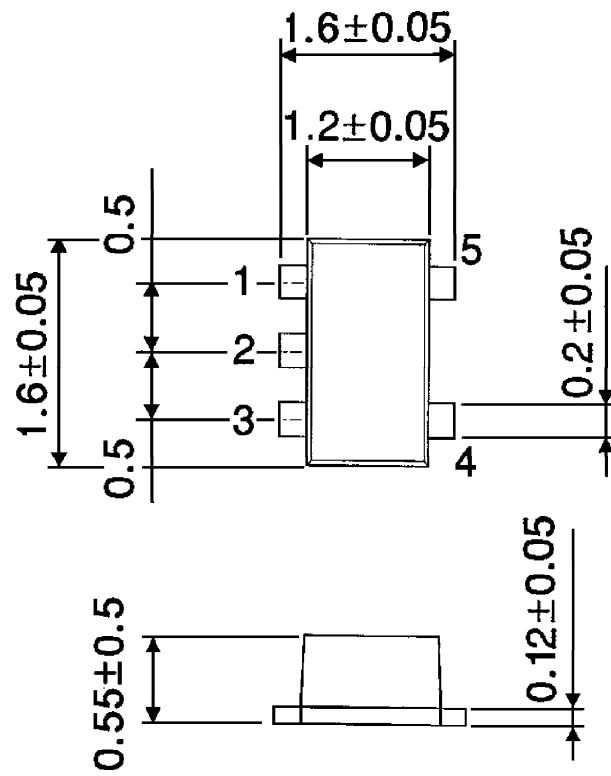
A	Y
L	H
H	L

LOGIC DIAGRAM



OUTLINE DRAWING
SON5-P-0.50

Unit : mm



Weight : 0.003 g (Typ.)