

TENTATIVE (UNDER DEVELOPMENT)

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TC7SZ05F, TC7SZ05FU

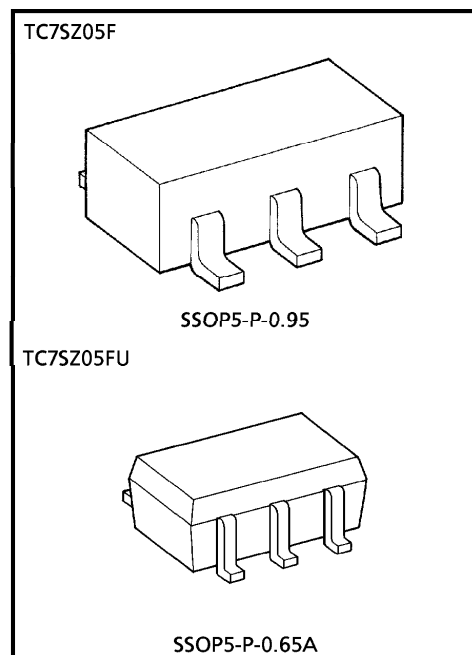
## INVERTER (OPEN DRAIN)

### 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.)  
( $V_{CC} = 5\text{V}$ ,  $50\text{pF}$ )
- Operation Voltage Range :  $V_{CC}(\text{opr}) = 1.8\sim 5.5\text{V}$
- 5V Tolerant Function

### 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	$V_{OUT}$	-0.5~6	V
Input Diode Current	$I_{IK}$	$\pm 20$	mA
Output Diode Current	$I_{OK}$	$\pm 20$	mA
DC Output Current	$I_{OUT}$	$\pm 50$	mA
DC $V_{CC}$ / Ground Current	$I_{CC}$	$\pm 50$	mA
Power Dissipation	$P_D$	200	mW
Storage Temperature	$T_{stg}$	-65~150	°C
Lead Temperature (10s)	$T_L$	260	°C



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

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## DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40~85°C		UNIT		
				MIN.	TYP.	MAX.	MIN.	MAX.			
High-Level Input Voltage	V <sub>IH</sub>		1.8	0.88 × V <sub>CC</sub>	—	—	0.88 × V <sub>CC</sub>	—	V		
			2.3~5.5	0.75 × V <sub>CC</sub>	—	—	0.75 × V <sub>CC</sub>	—	V		
Low-Level Input Voltage	V <sub>IL</sub>		1.8	—	—	0.12 × V <sub>CC</sub>	—	0.12 × V <sub>CC</sub>	V		
			2.3~5.5	—	—	0.25 × V <sub>CC</sub>	—	0.25 × V <sub>CC</sub>	V		
High Level Output Leakage	I <sub>LKG</sub>	V <sub>IN</sub> = V <sub>IL</sub>	1.8~5.5	—	—	±5	—	±10	μA		
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>IN</sub> = V <sub>IH</sub>	I <sub>OH</sub> = 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 <sub>OH</sub> = 8mA	2.3	—	0.1	0.3	—	0.3	V	
				I <sub>OH</sub> = 16mA	3.0	—	0.15	0.4	—		0.4
				I <sub>OH</sub> = 24mA	3.0	—	0.22	0.55	—		0.55
I <sub>OH</sub> = 32mA	4.5	—	0.22	0.55	—	0.55					
Input Leakage Current	I <sub>IN</sub>	V <sub>IN</sub> = 5.5V or GND	0~5.5	—	—	±1	—	±10	μA		
Power Off Leakage Current	I <sub>OFF</sub>	V <sub>IN</sub> or V <sub>OUT</sub> = 5.5V	0.0	—	—	1	—	10	μA		
Quiescent Supply Current	I <sub>CC</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5	—	—	2	—	20	μA		

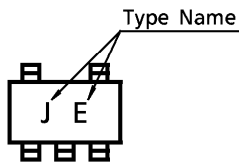
**AC ELECTRICAL CHARACTERISTICS (Input  $t_r = t_f = 3\text{ns}$ )**

CHARACTERISTIC	SYMBOL	TEST CONDITION	V <sub>CC</sub> (V)	T <sub>a</sub> = 25°C			T <sub>a</sub> = -40~85°C		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t <sub>pZL</sub>	C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω	1.8	1.5	4.6	10.5	1.5	11.0	ns
			2.5 ± 0.2	0.8	3.0	7.0	0.8	7.5	
			3.3 ± 0.3	0.8	2.4	5.0	0.8	5.2	
			5.0 ± 0.5	0.5	1.9	4.3	0.5	4.5	
	t <sub>pLZ</sub>	C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω	1.8	1.5	4.1	10.5	1.5	11.0	
			2.5 ± 0.2	0.8	2.5	7.0	0.8	7.5	
			3.3 ± 0.3	0.8	2.1	5.0	0.8	5.2	
			5.0 ± 0.5	0.5	1.2	4.3	0.5	4.5	
Input Capacitance	C <sub>IN</sub>		0~5.5	—	4	—	—	—	pF
Power Dissipation Capacitance	C <sub>PD</sub>	(Note 1)	3.3	—	3.6	—	—	—	pF
			5.5	—	6.5	—	—	—	

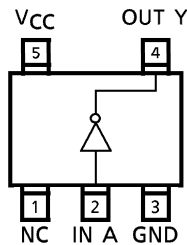
(Note 1) C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.  
Average operating current can be obtained by the equation.

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

**MARKING**



**PIN ASSIGNMENT (TOP VIEW)**

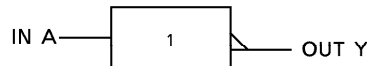


**TRUTH TABLE**

A	Y
L	* H
H	L

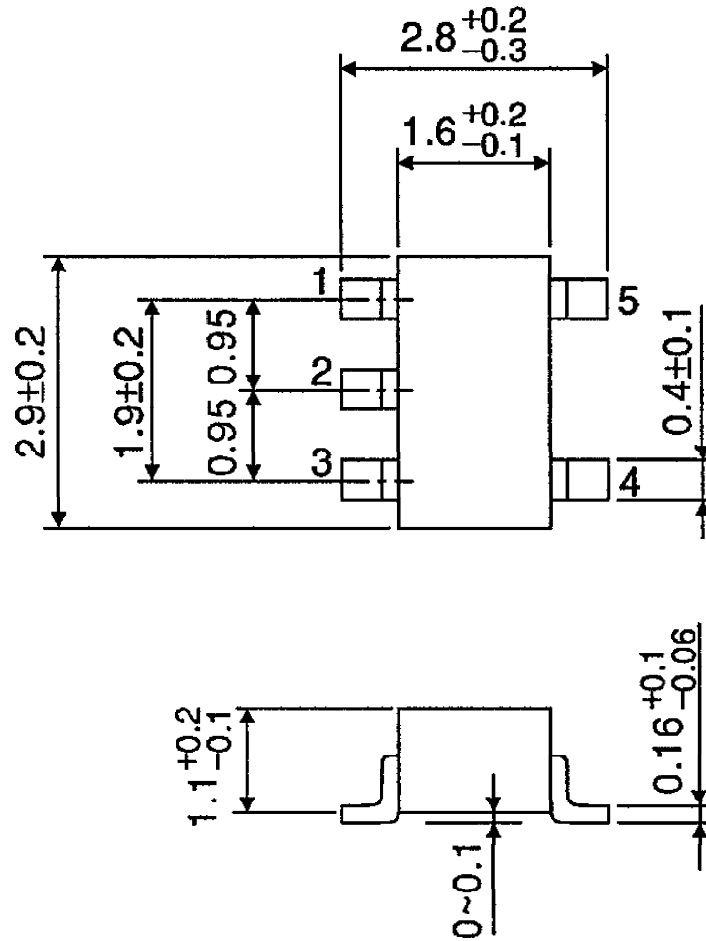
\* : High Impedance

**LOGIC DIAGRAM**



OUTLINE DRAWING  
SSOP5-P-0.95

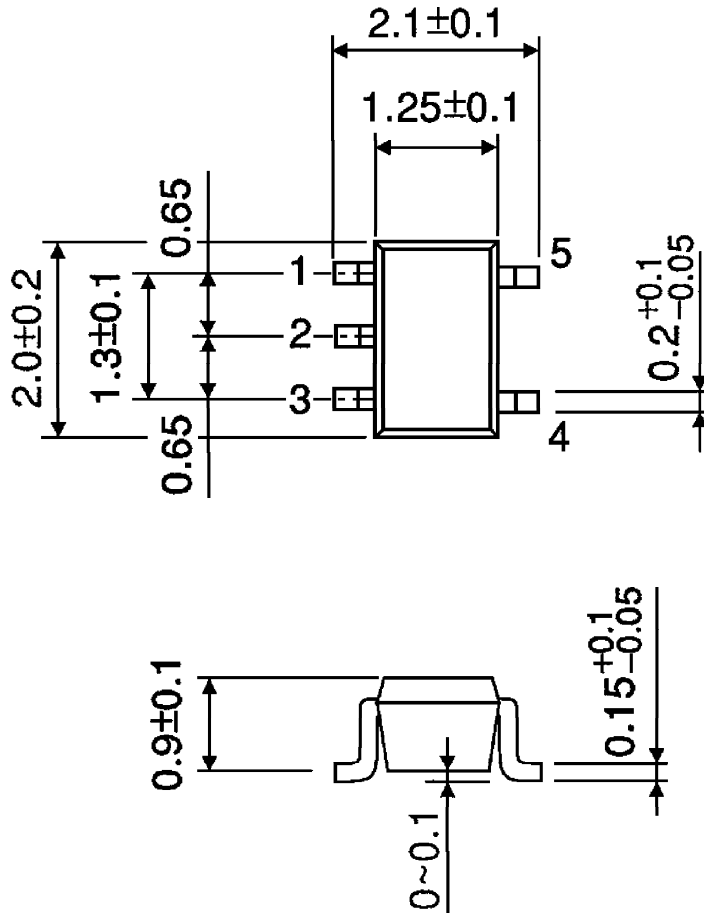
Unit : mm



Weight : 0.016g (Typ.)

OUTLINE DRAWING  
SSOP5-P-0.65A

Unit : mm



Weight : 0.006g (Typ.)