TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

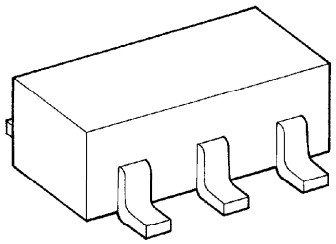
TC7SZU04F, TC7SZU04FU

INVERTER (UNBUFFER)

FEATURES

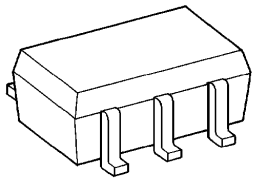
- High Output Drive : ±16mA (Typ.) @V_{CC} = 4.5V
- Super High Speed Operation : t_{PD} 2.4ns (Typ.) @V_{CC} = 5V, 50pF
- Operation Voltage Range : $V_{CC\ (opr)}$ = 1.8~5.5V

TC7SZU04F



SSOP5-P-0.95

TC7SZU04FU



SSOP5-P-0.65A

Weight
SSOP5-P-0.95 : 0.016g (Typ.)
SSOP5-P-0.65A : 0.006g (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	200	mW
Storage Temperature	T_{stg}	−65~150	°C
Lead Temperature (10s)	T_L	260	°C

DC ELECTRICAL CHARACTERISTICS

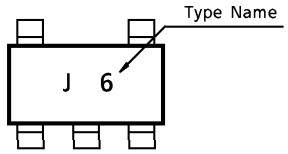
CHARACTERISTIC	SYMBOL	TEST CONDITION		V_{CC} (V)	Ta = 25°C MIN.	Ta = 25°C TYP.	Ta = 25°C MAX.	Ta = −40~85°C MIN.	Ta = −40~85°C MAX.	UNIT
High-Level Input Voltage	V_{IH}			1.8 – 2.7	0.85 × V_{CC}	—	—	0.85 × V_{CC}	—	V
				3.0 – 5.5	0.8 × V_{CC}	—	—	0.8 × V_{CC}	—	
Low-Level Input Voltage	V_{IL}			1.8 – 2.7	—	—	0.15 × V_{CC}	—	0.15 × V_{CC}	V
				3.0 – 5.5	—	—	0.2 × V_{CC}	—	0.2 × V_{CC}	
High-Level Output Voltage	V_{OH}	$V_{IN} = V_{IL}$	I_{OH} = −100μA	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	—	
			I_{OH} = −4mA	2.3	1.9	2.14	—	1.9	—	
			I_{OH} = −8mA	3.0	2.4	2.75	—	2.4	—	
			I_{OH} = −12mA	3.0	2.3	2.61	—	2.3	—	
			I_{OH} = −16mA	4.5	3.8	4.13	—	3.8	—	
Low-Level Output Voltage	V_{OL}	$V_{IN} = V_{IH}$	I_{OH} = 100μA	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	
			I_{OH} = 4mA	2.3	—	0.1	0.3	—	0.3	
			I_{OH} = 8mA	3.0	—	0.17	0.4	—	0.4	
			I_{OH} = 12mA	3.0	—	0.25	0.55	—	0.55	
			I_{OH} = 16mA	4.5	—	0.26	0.55	—	0.55	
Input Leakage Current	I_{IN}	V_{IN} = 5.5V 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 $t_r = t_f = 3ns$)

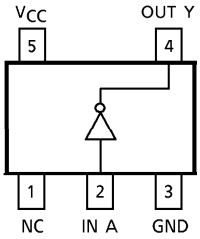
CHARACTERISTIC	SYMBOL	TEST CONDITION		Ta = 25°C			Ta = −40~85°C		UNIT
			V_{CC} (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t_{PLH} t_{PHL}	$C_L = 15pF$, $R_L = 1M\Omega$	1.8	1.0	—	8.5	1.0	9.0	ns
			2.5 ± 0.2	0.8	—	6.2	0.8	6.5	
			3.3 ± 0.3	0.5	—	4.5	0.5	4.8	
			5.0 ± 0.5	0.5	—	3.9	0.5	4.1	
		$C_L = 50pF$, $R_L = 500\Omega$	3.3 ± 0.3	1.0	—	6.0	1.5	6.5	
			5.0 ± 0.5	0.8	—	5.0	0.8	5.5	
Input Capacitance	C_{IN}		0 – 5.5	—	4.5	—	—	—	pF
Power Dissipation Capacitance	C_{PD}	(Note 1)	3.3	—	6.3	—	—	—	pF
			5.5	—	9.5	—	—	—	

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

MARKING



PIN ASSIGNMENT (TOP VIEW)



TRUTH TABLE

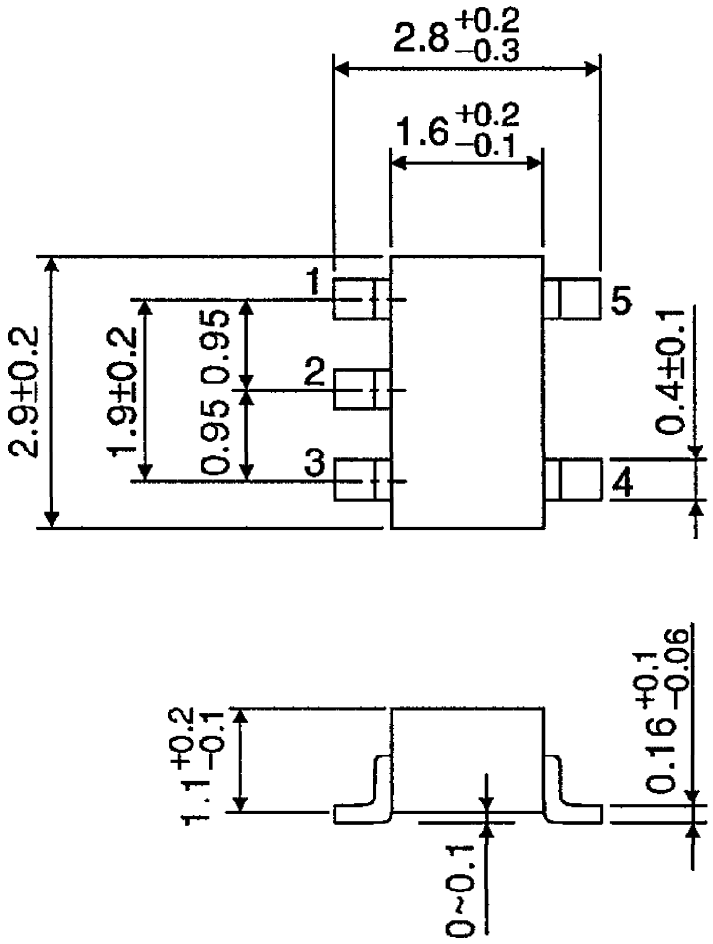
A	Y
L	H
H	L

LOGIC DIAGRAM

OUTLINE DRAWING

SSOP5-P-0.95

Unit : mm

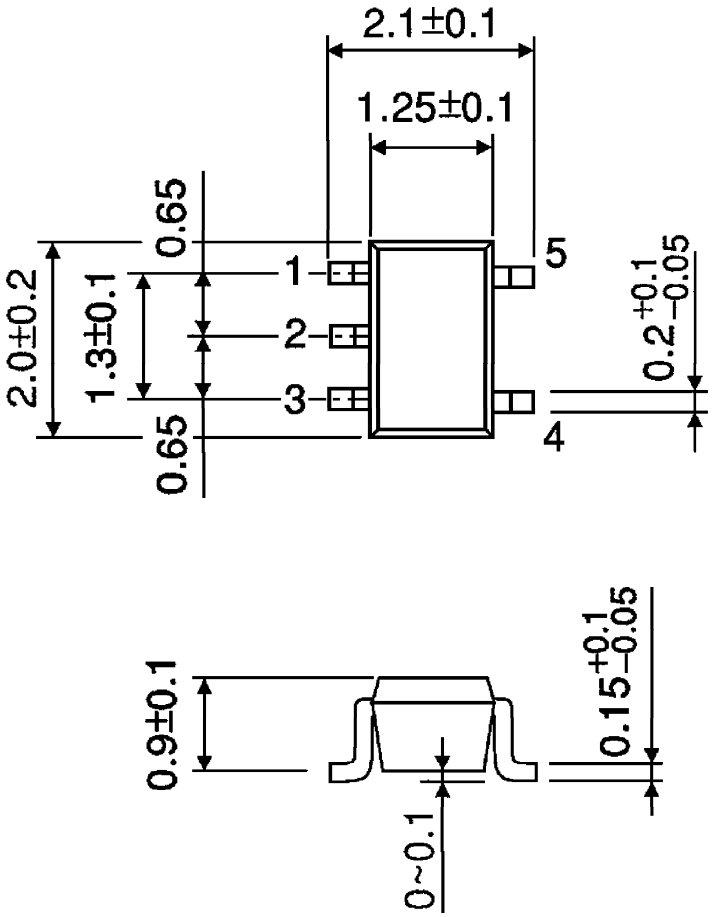


Weight : 0.016g (Typ.)

OUTLINE DRAWING

SSOP5-P-0.65A

Unit : mm



Weight : 0.006g (Typ.)