TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC7W34FU,TC7W34FK

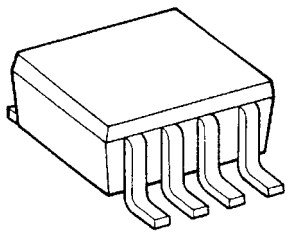
Triple Non-Inverter

The TC7W34 is high speed CMOS BUFFER fabricated with silicon gate CMOS technology.

The internal circuit is composed of 2 stage including buffer output, which enable high noise immunity and stable output.

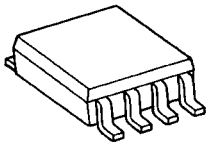
All inputs are equipped with protection circuits against static dichage or transient excess voltage.

TC7W34FU



SSOP8-P-0.65

TC7W34FK



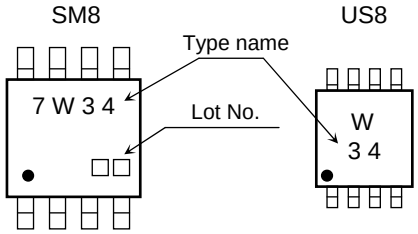
SSOP8-P-0.50A

Weight
SSOP8-P-0.65: 0.02 g (typ.)
SSOP8-P-0.50A: 0.01 g (typ.)

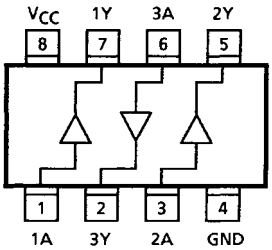
Features

- High speed: t_{pd} = 6 ns (typ.) at V_{CC} = 5 V
- Low power dissipation: I_{CC} = 1 μA (max) at Ta = 25°C
- High noise immunity: $V_{NIH} = V_{NIL}$ = 28% V_{CC} (min)
- Output drive capability: 10 LSTTL Loads
- Symmetrical output impedance: $|I_{OH}| = I_{OL}$=4mA(min)
- Balanced propagation delays: $t_{pLH} \approx t_{pHL}$
- Wide operating voltage range: V_{CC} (opr) = 2~5.5 V

Marking



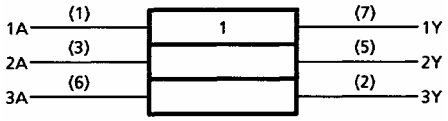
Pin Assignment (top view)



Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	−0.5~7.0	V
DC input voltage	V_{IN}	−0.5~V_{CC} + 0.5	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}	±25	mA
DC V_{CC}/ground current	I_{CC}	±50	mA
Power dissipation	P_D	300 (SM8)	mW
		200 (US8)	
Storage temperature	T_{stg}	−65~150	°C
Lead temperature (10 s)	T_L	260	°C

Logic Diagram



Truth Table

A	Y
L	L
H	H

Recommended Operating Conditions

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	2.0~6.0	V
Input voltage	V_{IN}	0~ V_{CC}	V
Output voltage	V_{OUT}	0~V_{CC}	V
Operating temperature	T_{opr}	−40~85	°C
Input rise and fall time	dt/dv	0~1000 (V_{CC} = 2.0 V)	ns/V
		0~500 (V_{CC} = 4.5 V)	
		0~400 (V_{CC} = 6.0 V)	

Electrical Characteristics

DC Characteristics

Characteristics	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}	—		2.0	1.5	—	—	1.5	—	V
				4.5	3.15	—	—	3.15	—	
				6.0	4.2			4.2		
Low-level input voltage	V_{IL}	—		2.0	—	—	0.5	—	0.5	V
				4.5	—	—	1.35	—	1.35	
				6.0	—	—	1.8	—	1.8	
High-level output voltage	V_{OH}	$V_{IN} = V_{IH}$	$I_{OH} = -20$ μA	2.0	1.9	2.0	—	1.9	—	V
				4.5	4.4	4.5	—	4.4	—	
				6.0	5.9	6.0	—	5.9	—	
			$I_{OH} = -4$ mA	4.5	4.18	4.31	—	4.13	—	
			$I_{OH} = -5.2$ mA	6.0	5.68	5.80	—	5.63	—	
Low-level output voltage	V_{OL}	$V_{IN} = V_{IL}$	$I_{OL} = 20$ μA	2.0	—	0.0	0.1	—	0.1	V
				4.5	—	0.0	0.1	—	0.1	
				6.0	—	0.0	0.1	—	0.1	
			$I_{OL} = 4$ mA	4.5	—	0.17	0.26	—	0.33	
			$I_{OL} = 5.2$ mA	6.0	—	0.18	0.26	—	0.33	
Input leakage current	I_{IN}	$V_{IN} = V_{CC}$ or GND		6.0	—	—	±0.1	—	±1.0	μA
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC}$ or GND		6.0	—	—	1.0	—	10.0	μA

AC Characteristics (C_L = 15pF, V_{CC} = 5V, Ta = 25°C)

Characteristics	Symbol	Test Condition	Ta = 25°C			Unit
			Min	Typ.	Max	
Output transition Time	t_{TLH} t_{THL}	—	—	4	8	ns
Propagation delay time	t_{pLH} t_{pHL}	—	—	6	12	ns

AC Characteristics (C_L = 15pF, Input: $t_r = t_f$ = 3 ns)

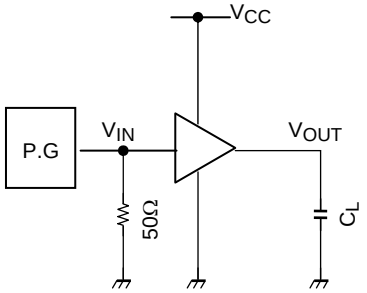
Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = −40~85°C		Unit
			V_{CC} (V)	Min	Typ.	Max	Min	Max	
Output transition Time	t_{TLH} t_{THL}	—	2.0	—	30	75	—	95	ns
			4.5	—	8	15	—	19	
			6.0	—	7	13	—	16	
Output transition Time	t_{TLH} t_{THL}	—	2.0	—	27	75	—	95	
			4.5	—	9	15	—	19	
			6.0	—	8	13	—	16	
Input capacitance	C_{IN}	—		—	5	10	—	10	pF
Power dissipation capacitance	C_{PD}	(Note)		—	20	—	—	—	pF

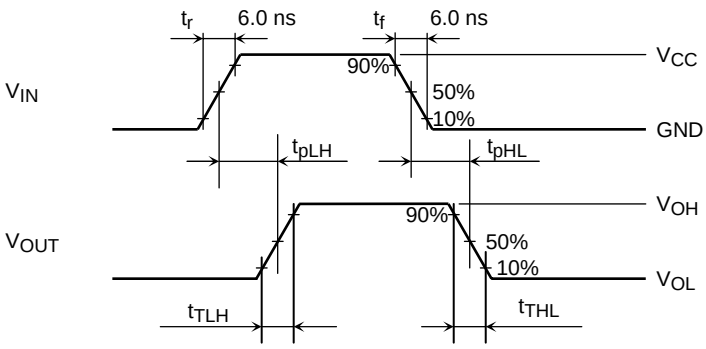
Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation:

$$I_{CC\ (opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC/3}$$

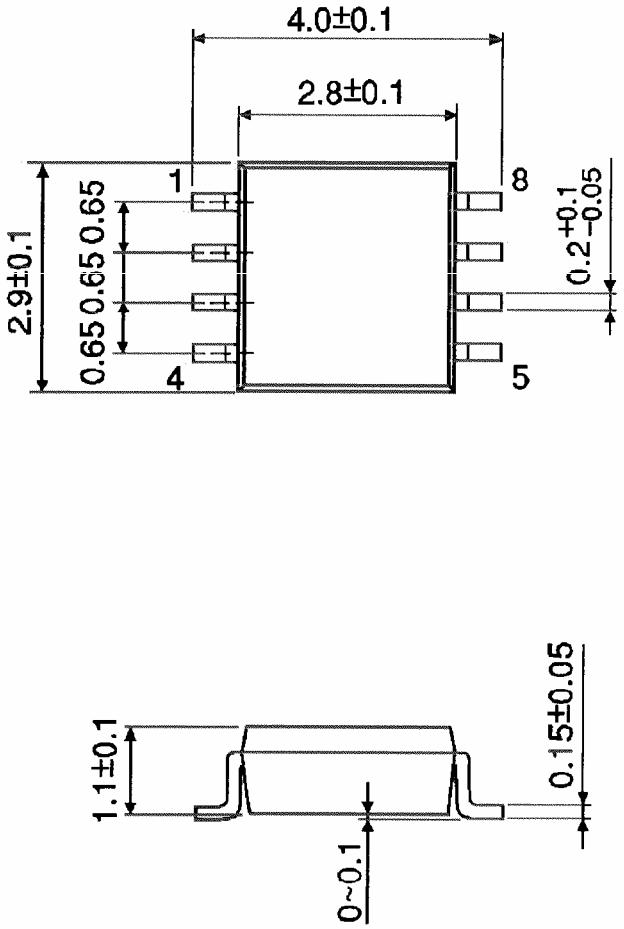
Switching characteristics test circuit





Package Dimensions

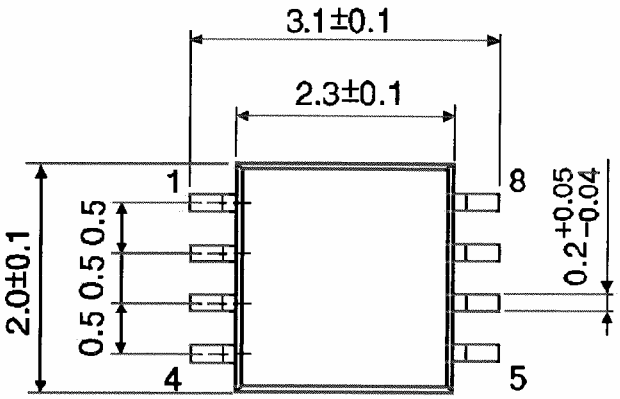
SSOP8-P-0.65 Unit : mm

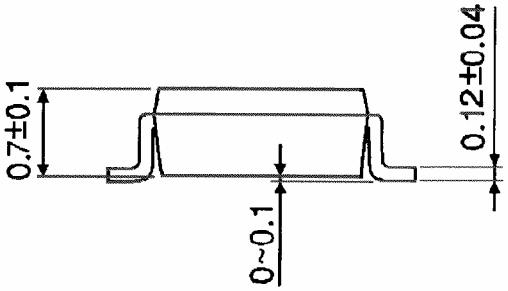


Weight: 0.02 g (typ.)

Package Dimensions

SSOP8-P-0.50A Unit : mm





Weight: 0.01 g (typ.)

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