

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.

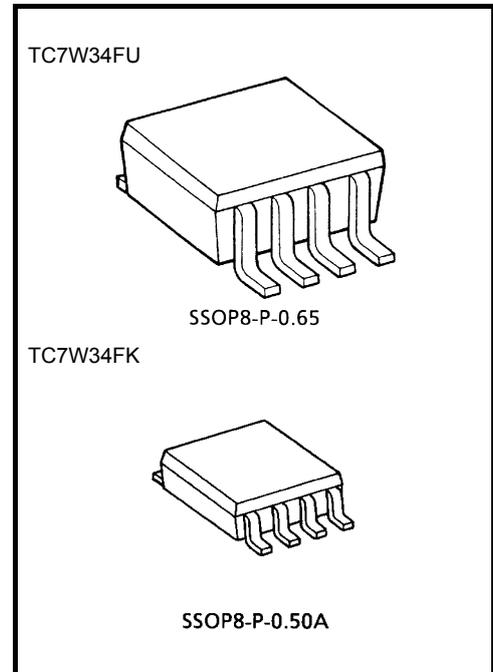
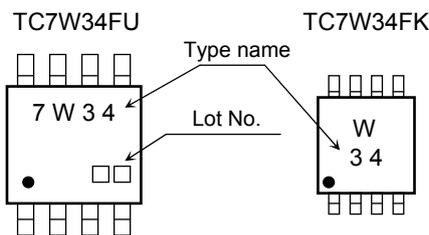
The internal circuit is composed of 2 stage including buffer output, which enable high noise immunity and stable output.

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

Features

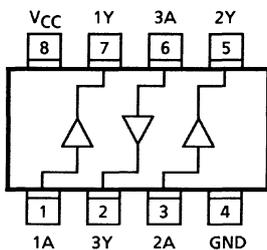
- High speed: $t_{pd} = 6 \text{ ns}$ (typ.) at $V_{CC} = 5 \text{ V}$
- Low power dissipation: $I_{CC} = 1 \mu\text{A}$ (max) at $T_a = 25^\circ\text{C}$
- High noise immunity: $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (min)
- Output drive capability: 10 LSTTL Loads
- Symmetrical output impedance: $|I_{OH}|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

Marking



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

Pin Assignment (top view)



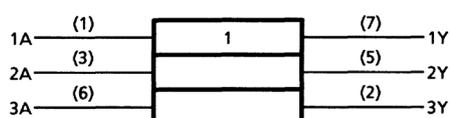
Absolute Maximum Ratings (Ta = 25°C)

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 (TC7W34FU)	mW
		200 (TC7W34FK)	
Storage temperature	T _{stg}	-65~150	°C
Lead temperature (10 s)	T _L	260	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Logic Diagram



Truth Table

A	Y
L	L
H	H

Operating Ranges

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		Ta = 25°C			Ta = -40~85°C		Unit	
				V _{CC} (V)	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 ($C_L = 15\text{pF}$, $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$)

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 ($C_L = 15\text{pF}$, Input: $t_r = t_f = 6\text{ ns}$)

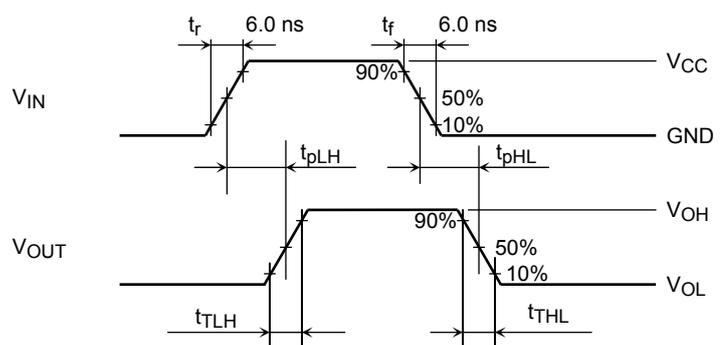
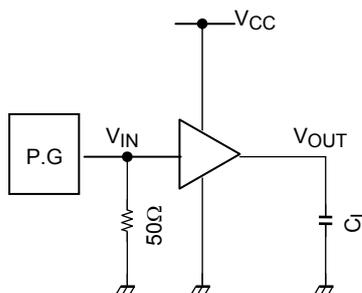
Characteristics	Symbol	Test Condition	Ta = 25°C			Ta = -40~85°C		Unit
			VCC (V)	Min	Typ.	Max	Min	
Output transition Time	t_{TLH}	—	2.0	—	30	75	—	ns
	t_{THL}		4.5	—	8	15	—	
			6.0	—	7	13	—	
Output transition Time	t_{TLH}	—	2.0	—	27	75	—	ns
	t_{THL}		4.5	—	9	15	—	
			6.0	—	8	13	—	
Input capacitance	C_{IN}	—	—	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:

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

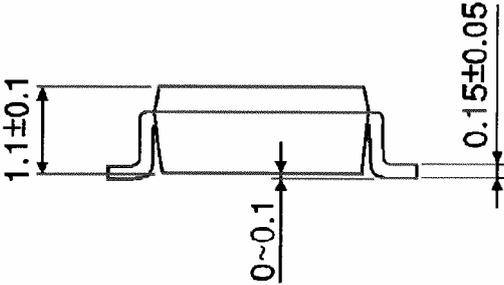
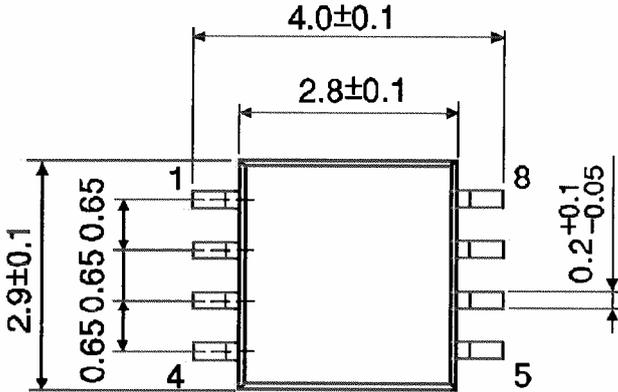
Switching characteristics test circuit



Package Dimensions

SSOP8-P-0.65

Unit : mm

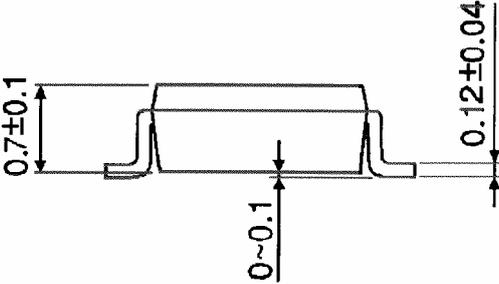
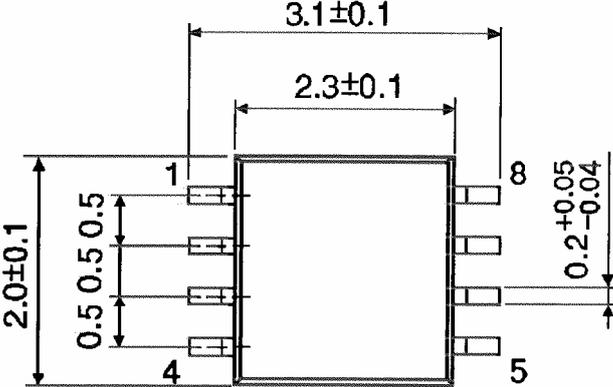


Weight: 0.02 g (typ.)

Package Dimensions

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)

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20070701-EN GENERAL

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