

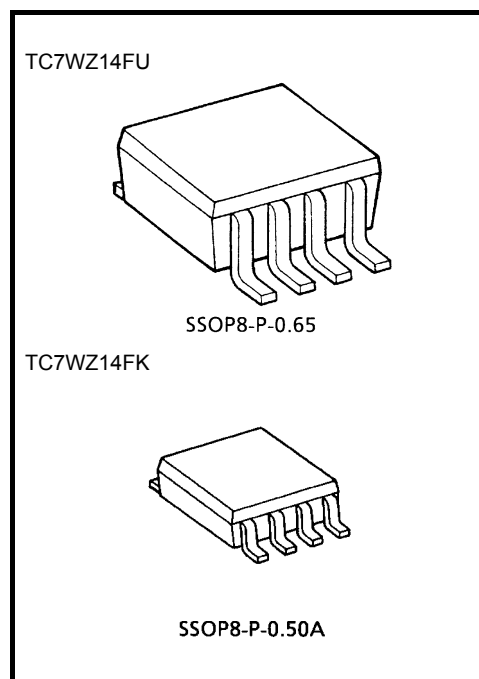
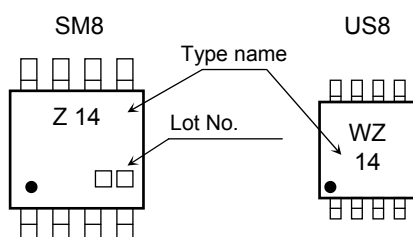
TC7WZ14FU, TC7WZ14FK

Triple Schmitt Inverter

Features

- High output drive : ± 24 mA (min) at $V_{CC} = 3$ V
- Super high speed operation : $t_{pd} = 3.7$ ns (typ.)
at $V_{CC} = 5$ V, 50 pF
- Operation voltage range : $V_{CC} (opr) = 1.65 \sim 5.5$ V
- 5.5-V tolerant inputs
- 5.5-V power down protection outputs
- Matches the performance of TC74LCX series when operated at 3.3-V V_{CC}

Marking

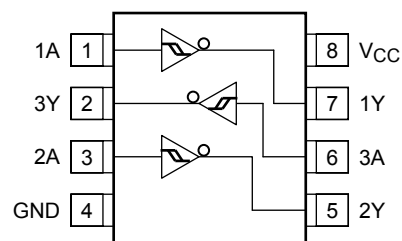


Weight
 SSOP8-P-0.65 : 0.02 g (typ.)
 SSOP8-P-0.50A : 0.01 g (typ.)

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	$-0.5 \sim 6$	V
DC input voltage	V_{IN}	$-0.5 \sim 6$	V
DC output voltage	V_{OUT}	$-0.5 \sim 6$	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	300 (SM8) 200 (US8)	mW
Storage temperature	T_{stg}	$-65 \sim 150$	$^\circ\text{C}$
Lead temperature (10 s)	T_L	260	$^\circ\text{C}$

Pin Assignment (top view)



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

INPUT	OUTPUT
A	Y
L	H
H	L

Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	1.65~5.5	V
		1.5~5.5 (Note 1)	
Input voltage	V_{IN}	0~5.5	V
Output voltage	V_{OUT}	0~5.5 (Note 2)	V
		0~ V_{CC} (Note 3)	
Operating temperature	T_{opr}	-40~85	°C

Note 1 : Data retention only

Note 2 : $V_{CC} = 0$ V

Note 3 : High or low state

Electrical Characteristics
DC Characteristics

Characteristics		Symbol	Test Condition		Ta = 25°C			Ta = -40~85°C		Unit	
					V _{CC} (V)	Min	Typ.	Max	Min		Max
Threshold voltage	High-level	V _P	—	1.65	0.6	1.0	1.4	0.6	1.4	V	
				1.8	0.7	1.1	1.5	0.7	1.5		
				2.3	1.0	1.4	1.8	1.0	1.8		
				3.0	1.3	1.75	2.2	1.3	2.2		
				4.5	1.9	2.45	3.1	1.9	3.1		
				5.5	2.2	2.9	3.6	2.2	3.6		
	Low-level	V _N	—	1.65	0.2	0.5	0.8	0.2	0.8		
				1.8	0.25	0.55	0.9	0.25	0.9		
				2.3	0.4	0.75	1.15	0.4	1.15		
				3.0	0.6	1.0	1.5	0.6	1.5		
				4.5	1.0	1.43	2.0	1.0	2.0		
				5.5	1.2	1.7	2.4	1.2	2.4		
Hysteresis voltage		V _H	—	1.65	0.1	0.48	0.9	0.1	0.9		
				1.8	0.15	0.54	1.0	0.15	1.0		
				2.3	0.25	0.65	1.1	0.25	1.1		
				3.0	0.4	0.77	1.2	0.4	1.2		
				4.5	0.6	1.01	1.5	0.6	1.5		
				5.5	0.7	1.18	1.7	0.7	1.7		
High-level output voltage		V _{OH}	V _{IN} = V _{IL}	I _{OH} = -100μA	1.65	1.55	1.65	—	1.55	—	
					2.3	2.2	2.3	—	2.2	—	
					3.0	2.9	3.0	—	2.9	—	
					4.5	4.4	4.5	—	4.4	—	
				I _{OH} = -4 mA	1.65	1.29	1.52	—	1.29	—	
				I _{OH} = -8 mA	2.3	1.9	2.14	—	1.9	—	
				I _{OH} = -16 mA	3.0	2.4	2.75	—	2.4	—	
				I _{OH} = -24 mA	3.0	2.3	2.62	—	2.3	—	
				I _{OH} = -32 mA	4.5	3.8	4.13	—	3.8	—	
Low-level output voltage		V _{OL}	V _{IN} = V _{IH}	I _{OH} = 100 μA	1.65	—	0	0.1	—	0.1	
					2.3	—	0	0.1	—	0.1	
					3.0	—	0	0.1	—	0.1	
					4.5	—	0	0.1	—	0.1	
				I _{OH} = 4 mA	1.65	—	0.08	0.24	—	0.24	
				I _{OH} = 8 mA	2.3	—	0.1	0.3	—	0.3	
				I _{OH} = 6 mA	3.0	—	0.16	0.4	—	0.4	
				I _{OH} = 24 mA	3.0	—	0.24	0.55	—	0.55	
				I _{OH} = 32 mA	4.5	—	0.25	0.55	—	0.55	
				Input leakage current		I _{IN}	V _{IN} = 5.5 V or GND		0~5.5	—	—
Power off leakage current		I _{OFF}	V _{IN} or V _{OUT} = 5.5 V		0.0	—	—	1	—	10	μA
Quiescent supply current		I _{CC}	V _{IN} = 5.5 V or GND		1.65~5.5	—	—	1	—	10	μA

AC Characteristics (input: $t_r = t_f = 3 \text{ ns}$)

Characteristics	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 ± 0.15	2.0	9.1	15.0	2.0	15.6	ns
			2.5 ± 0.2	1.0	5.0	9.0	1.0	9.5	
			3.3 ± 0.3	1.0	3.7	6.3	1.0	6.5	
			5.0 ± 0.5	0.5	3.1	5.2	0.5	5.5	
		C _L = 50 pF, R _L = 500 Ω	3.3 ± 0.3	1.5	4.4	7.2	1.5	7.5	
			5.0 ± 0.5	0.8	3.7	5.9	0.8	6.2	
Input capacitance	C _{IN}	—	0~5.5	—	3.0	—	—	—	pF
Power dissipation capacitance	C _{PD}	(Note 4)	3.3	—	33	—	—	—	pF
			5.5	—	43	—	—	—	

Note 4: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

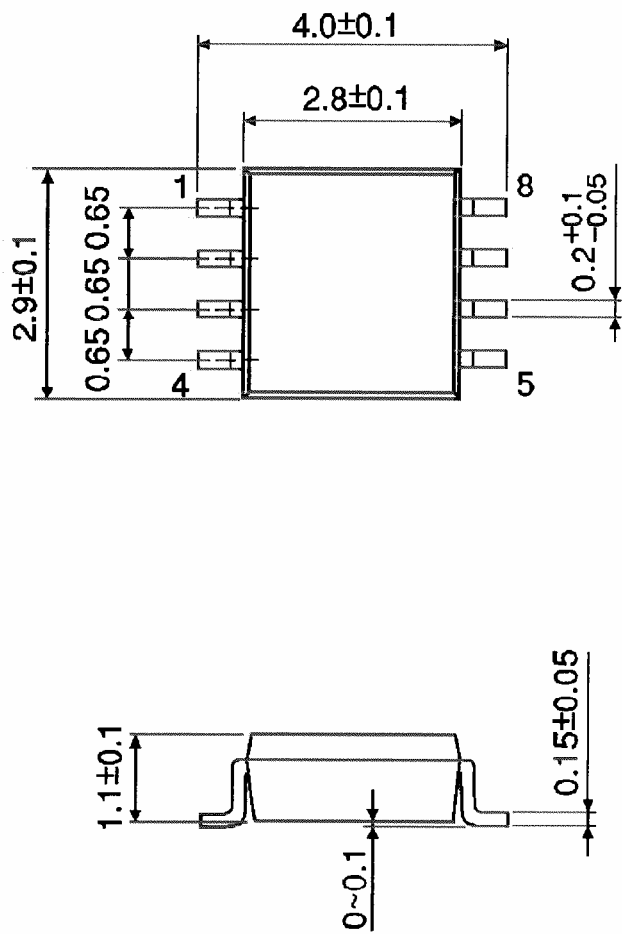
Average operating current can be obtained by the equation:

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

Package Dimensions

SSOP8-P-0.65

Unit : mm

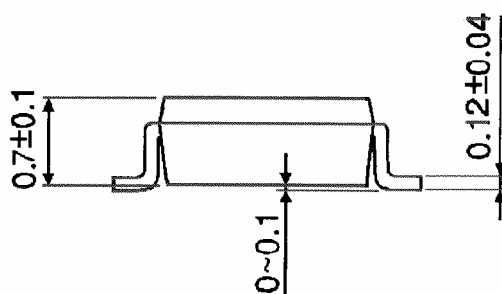
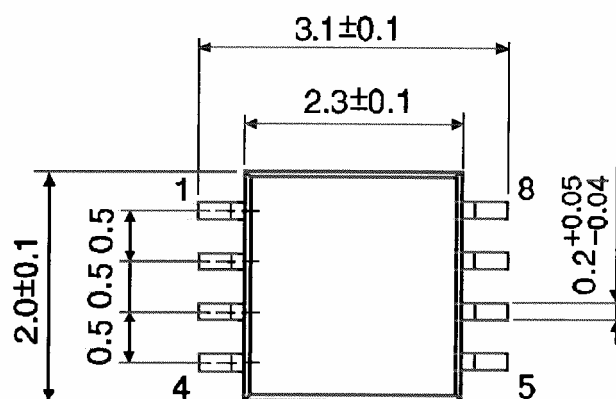


Weight: 0.02 g (typ.)

Package Dimensions

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)

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20070701-EN GENERAL

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