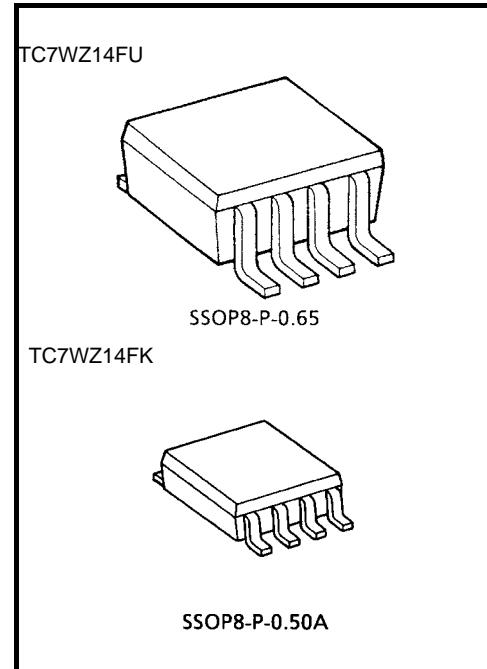


# TC7WZ14FU, TC7WZ14FK

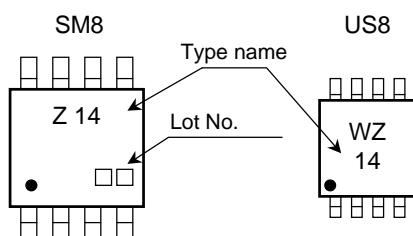
Schmitt Inverter

## Features

- High output drive :  $\pm 24$  mA (min)@VCC = 3 V
- Super high speed operation :  $t_{pd}$  3.7 ns(typ)@VCC = 5 V, 50 pF
- Operation voltage range : VCC (opr) = 1.65~5.5 V
- Power down protection is provided on all inputs and outputs.
- Matches the performance of TC74LCX series when operated at 3.3 V VCC.



## Marking

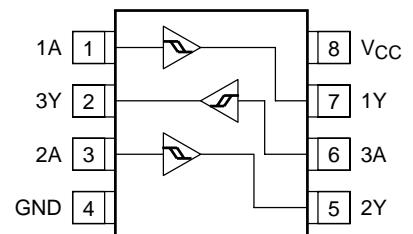


Weight  
 SSOP8-P-0.65 : 0.02 g (typ.)  
 SSOP8-P-0.50A : 0.01 g (typ.)

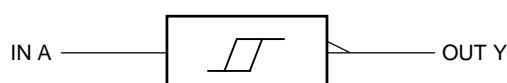
## Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V <sub>CC</sub>	-0.5~6	V
DC input voltage	V <sub>IN</sub>	-0.5~6	V
DC output voltage	V <sub>OUT</sub>	-0.5~6	V
Input diode current	I <sub>IK</sub>	-20	mA
Output diode current	I <sub>OK</sub>	-20	mA
DC output current	I <sub>OUT</sub>	$\pm 50$	mA
DC V <sub>CC</sub> /ground current	I <sub>CC</sub>	$\pm 50$	mA
Power dissipation	P <sub>D</sub>	300 (SM8) 200 (US8)	mW
Storage temperature	T <sub>stg</sub>	-65~150	°C
Lead temperature (10 s)	T <sub>L</sub>	260	°C

## Pin Assignment (top view)



## Logic Diagram



## Truth Table

INPUT	OUTPUT
A	Y
L	H
H	L

## Recommended Operating Conditions

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
Input rise and fall time	dt/dv	0~20 ( $V_{CC} = 1.8 \text{ V} \pm 0.15 \text{ V}$ , $2.5 \text{ V} \pm 0.2 \text{ V}$ )	ns/V
		0~10 ( $V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$ )	
		0~5 ( $V_{CC} = 5.5 \text{ V} \pm 0.5 \text{ V}$ )	

Note 1 : Data retention only

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

Note 3 : High or low state

## Electrical Characteristics

Characteristics	Symbol	Test Condition	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40~85°C		Unit
				Min	Typ.	Max	Min	Max	
Positive Threshold Voltage	V <sub>P</sub>	—	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	
Negative Threshold Voltage	V <sub>N</sub>	—	1.65	0.2	0.5	0.8	0.2	0.8	V
			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 <sub>H</sub>	—	1.65	0.1	0.48	0.9	0.1	0.9	V
			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 <sub>OH</sub>	V <sub>IN</sub> = V <sub>IL</sub>	I <sub>OH</sub> = -100 µA	1.65	1.55	1.65	—	1.55	V
				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 <sub>OH</sub> = -4 mA	1.65	1.29	1.52	—	1.29	
			I <sub>OH</sub> = -8 mA	2.3	1.9	2.14	—	1.9	
			I <sub>OH</sub> = -16 mA	3.0	2.4	2.75	—	2.4	
			I <sub>OH</sub> = -24 mA	3.0	2.3	2.62	—	2.3	
Low-level output voltage	V <sub>OL</sub>	V <sub>IN</sub> = V <sub>IH</sub>	I <sub>OH</sub> = 100 µA	1.65	—	0	0.1	—	V
				2.3	—	0	0.1	—	
				3.0	—	0	0.1	—	
				4.5	—	0	0.1	—	
			I <sub>OH</sub> = 4 mA	1.65	—	0.08	0.24	—	
			I <sub>OH</sub> = 8 mA	2.3	—	0.1	0.3	—	
			I <sub>OH</sub> = 6 mA	3.0	—	0.16	0.4	—	
			I <sub>OH</sub> = 24 mA	3.0	—	0.24	0.55	—	
Input leakage current	I <sub>IN</sub>	V <sub>IN</sub> = 5.5 V or GND	0~5.5	—	—	±1	—	±10	µA
	I <sub>OFF</sub>	V <sub>IN</sub> or V <sub>OUT</sub> = 5.5 V	0.0	—	—	1	—	10	µA
	I <sub>CC</sub>	V <sub>IN</sub> = 5.5 V or GND	1.65~5.5	—	—	1	—	10	µA

AC Characteristics (input:  $t_r = t_f = 3$  ns)

Characteristics	Symbol	Test Condition	$V_{CC}$ (V)	Ta = 25°C			Ta = -40~85°C		Unit
				Min	Typ.	Max	Min	Max	
Propagation delay time	$t_{pLH}$ $t_{pHL}$	$C_L = 15$ pF, $R_L = 1$ MΩ	$1.8 \pm 0.15$	2.0	9.1	15.0	2.0	15.6	ns
			$2.5 \pm 0.2$	1.0	5.0	9.0	1.0	9.5	
			$3.3 \pm 0.3$	1.0	3.7	6.3	1.0	6.5	
			$5.0 \pm 0.5$	0.5	3.1	5.2	0.5	5.5	
		$C_L = 50$ pF, $R_L = 500$ Ω	$3.3 \pm 0.3$	1.5	4.4	7.2	1.5	7.5	
			$5.0 \pm 0.5$	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.

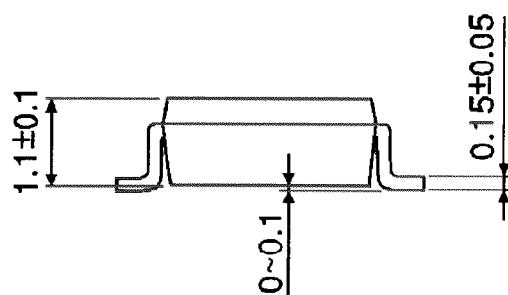
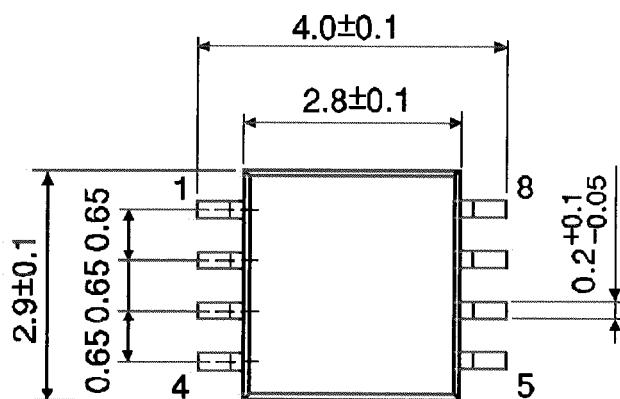
Average operating current can be obtained by the equation:

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

**Package Dimensions**

SSOP8-P-0.65

Unit : mm

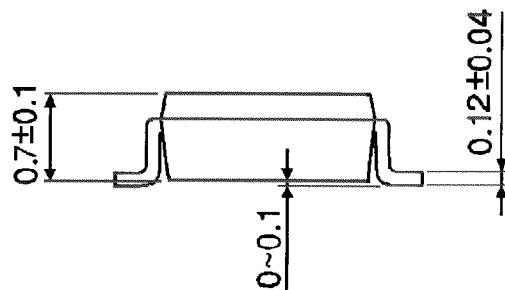
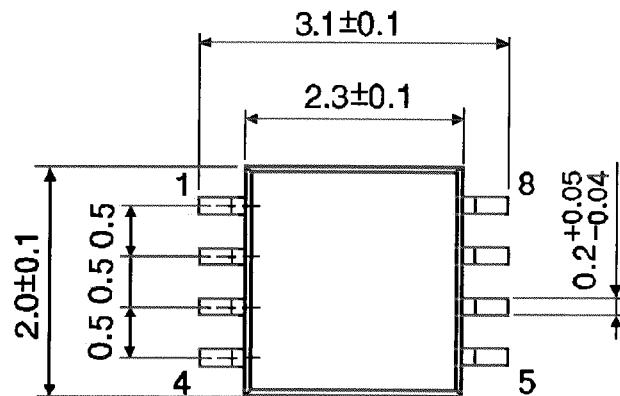


Weight: 0.02 g (typ.)

**Package Dimensions**

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)

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