

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7W14F, TC7W14FU, TC7W14FK

SCHMITT INVERTER

The TC7W14 is high speed C²MOS SCHMITT INVERTER fabricated with silicon gate C²MOS technology. It achieves the high speed operation similar to equivalent LSTTL while maintaining the C²MOS low power dissipation.

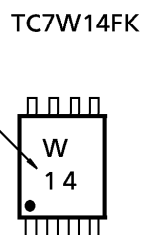
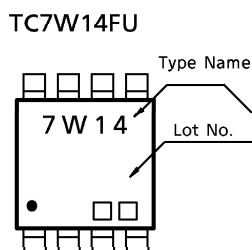
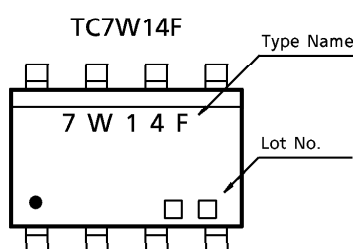
Pin configuration and function are the same as the TC7WU04 but the inputs have 25% V_{CC} hysteresis and with its schmitt trigger function, the TC7W14 can be used as a line receivers which will receive slow input signals.

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

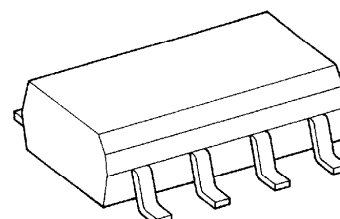
FEATURES

- High Speed $t_{pd} = 11\text{ns}$ (Typ.) at V_{CC} = 5V
- Low Power Dissipation I_{CC} = 1 μ A (Max.) at T_a = 25°C
- High Noise Immunity V_H = 1.1V at V_{CC} = 5V
- Output Drive Capability 10 LSTTL Loads
- Symmetrical Output Impedance ... |I_{OH}| = I_{OL} = 4mA
- Balanced Propagation Delays $t_{pLH} \cong t_{pHL}$
- Wide Operating Voltage Range ... V_{CC} (opr) = 2~6V

MARKING

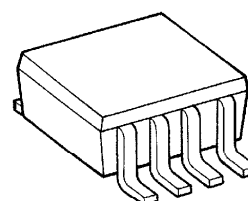


TC7W14F



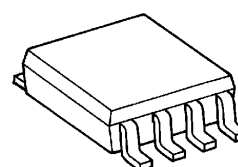
SOP8-P-1.27

TC7W14FU



SSOP8-P-0.65

TC7W14FK



SSOP8-P-0.50A

Weight	
SOP8-P-1.27	: 0.05g (Typ.)
SSOP8-P-0.65	: 0.02g (Typ.)
SSOP8-P-0.50A	: 0.01g (Typ.)

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● The information contained herein is subject to change without notice.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage Range	VCC	-0.5~7	V
DC Input Voltage	VIN	-0.5~VCC + 0.5	V
DC Output Voltage	VOUT	-0.5~VCC + 0.5	V
Input Diode Current	IIK	± 20	mA
Output Diode Current	IOK	± 20	mA
DC Output Current	IOUT	± 25	mA
DC VCC / Ground Current	ICC	± 25	mA
Power Dissipation	PD	300 (FM8, SM8)	mW
		200 (US8)	
Storage Temperature	Tstg	- 65~150	°C
Lead Temperature (10s)	TL	260	°C

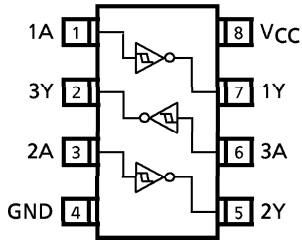
LOGIC DIAGRAM



TRUTH TABLE

A	Y
L	H
H	L

PIN ASSIGNMENT (TOP VIEW)



RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	VCC	2~6	V
Input Voltage	VIN	0~VCC	V
Output Voltage	VOUT	0~VCC	V
Operating Temperature	Topr	- 40~85	°C

DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION		V _{CC}	Ta = 25°C			Ta = - 40~85°C		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
Positive Threshold Voltage	V _P	—		2.0 4.5 6.0	1.0 2.3 3.0	1.25 2.7 3.5	1.5 3.15 4.2	1.0 2.3 3.0	1.5 3.15 4.2	V
Negative Threshold Voltage	V _N	—		2.0 4.5 6.0	0.3 1.13 1.5	0.65 1.6 2.3	0.9 2.0 2.6	0.3 1.13 1.5	0.9 2.0 2.6	V
Hysteresis Voltage	V _H	—		2.0 4.5 6.0	0.3 0.6 0.8	0.6 1.1 1.2	1.0 1.4 1.7	0.3 0.6 0.8	1.0 1.4 1.7	V
High-Level Output Voltage	V _{OH}	V _{IN} = V _{IL}	I _{OH} = - 20μA	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} = - 4mA I _{OH} = - 5.2mA	4.5 6.0	4.18 5.68	4.31 5.80	— —	4.13 5.63	— —	
Low-Level Output Voltage	V _{OL}	V _{IN} = V _{IH}	I _{OL} = 20μA	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} = 4mA I _{OL} = 5.2mA	4.5 6.0	— —	0.17 0.18	0.26 0.26	— —	0.33 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	

AC ELECTRICAL CHARACTERISTICS ($C_L = 15\text{pF}$, $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	$T_a = 25^\circ\text{C}$			UNIT
			MIN.	TYP.	MAX.	
Output Transition Time	t_{TLH} t_{THL}	—	—	4	8	ns
Propagation Delay Time	t_{pLH} t_{pHL}	—	—	11	21	ns

AC ELECTRICAL CHARACTERISTICS ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	V_{CC}	$T_a = 25^\circ\text{C}$			$T_a = -40 \sim 85^\circ\text{C}$		UNIT
				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	
Propagation Delay Time	t_{pLH} t_{pHL}	—	2.0	—	42	125	—	155	ns
			4.5	—	14	25	—	31	
			6.0	—	12	21	—	26	
Input Capacitance	C_{IN}	—	—	—	5	10	—	10	pF
Power Dissipation Capacitance	C_{PD}	(Note 1)	—	—	28	—	—	—	

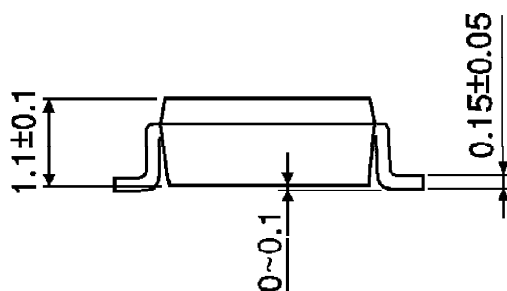
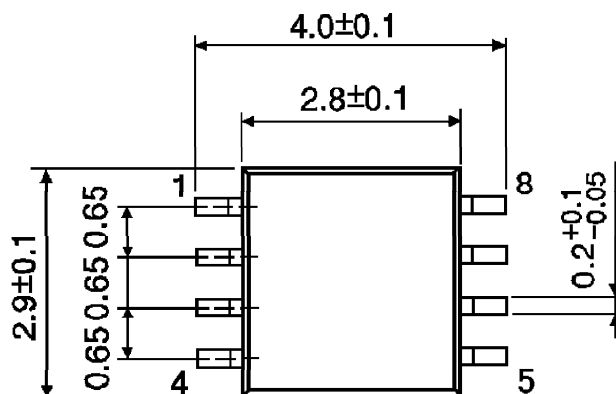
(Note 1) : C_{PD} is defined as the value of internal equivalent capacitance of IC which is calculated from the operating current consumption without load (refer to Test Circuit).

Average operating current can be obtained by the equation hereunder.

$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/2 \text{ (per gate)}$$

OUTLINE DRAWING
SSOP8-P-0.65

Unit : mm

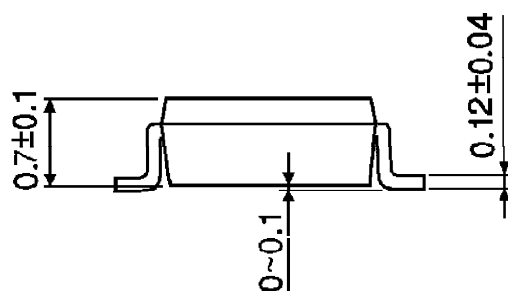
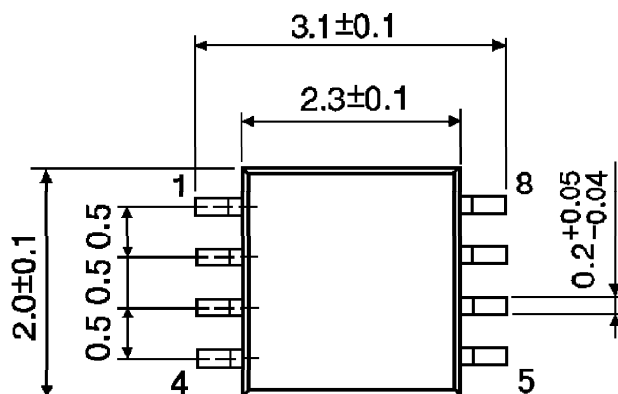


Weight : 0.02g (Typ.)

OUTLINE DRAWING

SSOP8-P-0.50A

Unit : mm



Weight : 0.01g (Typ.)