

TC7W00F, TC7W00FU, TC7W00FK

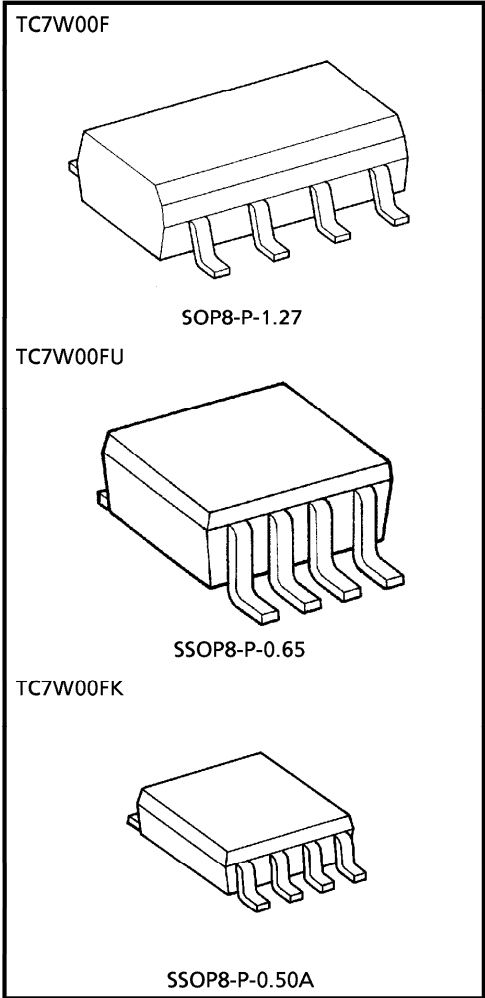
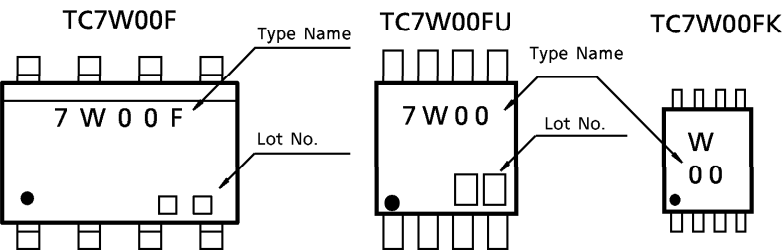
DUAL 2-INPUT NAND GATE

The TC7W00 is a high speed C²MOS 2-INPUT NAND GATE fabricated with silicon gate C²MOS technology. It achieves the high speed operation similar to equivalent LSTTL while maintaining the C²MOS low power dissipation. The internal circuit is composed of 3 stages including buffer output, which enables high noise immunity and stable output. All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES

- High Speed $t_{pd} = 6ns$ (Typ.) at $V_{CC} = 5V$
- Low Power Dissipation $I_{CC} = 1\mu A$ (Max.) at $T_a = 25^{\circ}C$
- 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 $t_{pLH} \cong t_{pHL}$
- Wide Operating Voltage Range ... $V_{CC} (opr) = 2 \sim 6V$

MARKING



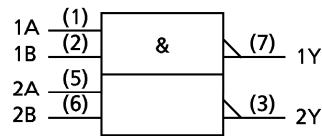
Weight

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

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

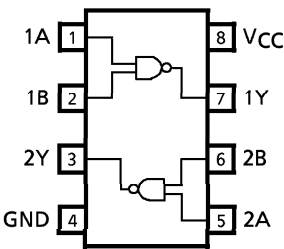
LOGIC DIAGRAM



TRUTH TABLE

A	B	Y
L	L	H
L	H	H
H	L	H
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
Input Rise and Fall Time	tr, tf	0~1000 (VCC = 2.0V)	ns
		0~ 500 (VCC = 4.5V)	
		0~ 400 (VCC = 6.0V)	

DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION		Ta = 25°C			Ta = -40~85°C		UNIT
				V _{CC}	MIN.	TYP.	MAX.	MIN.	MAX.
High-Level Input Voltage	V _{IH}	—		2.0 4.5 6.0	1.5 3.15 4.2	— — —	— — —	1.5 3.15 4.2	V
Low-Level Input Voltage	V _{IL}	—		2.0 4.5 6.0	— — —	— — —	0.5 1.35 1.8	— — —	V
High-Level Output Voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -20 μ A	2.0 4.5 6.0	1.9 4.4 5.9	2.0 4.5 6.0	— — —	1.9 4.4 5.9	V
			I _{OH} = -4mA	4.5	4.18	4.31	—	4.13	
			I _{OH} = -5.2mA	6.0	5.68	5.80	—	5.63	
Low-Level Output Voltage	V _{OL}	V _{IN} = V _{IH}	I _{OL} = 20 μ A	2.0 4.5 6.0	— — —	0.0 0.0 0.0	0.1 0.1 0.1	— — —	V
			I _{OL} = 4mA	4.5	—	0.17	0.26	—	
			I _{OL} = 5.2mA	6.0	—	0.18	0.26	—	
Input Leakage Current	I _{IN}	V _{IN} = V _{CC} or GND		6.0	—	—	±0.1	—	μ A
Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND		6.0	—	—	1.0	—	

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

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	V _{CC}	Ta = 25°C			Ta = - 40~85°C		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	t _{TLH} t _{THL}	—	2.0	—	25	75	—	95	ns
			4.5	—	7	15	—	19	
			6.0	—	6	13	—	16	
Propagation Delay Time	t _{pLH} t _{pHL}	—	2.0	—	27	75	—	95	ns
			4.5	—	9	15	—	19	
			6.0	—	8	13	—	16	
Input Capacitance	C _{IN}	—	—	5	10	—	10	pF	
Power Dissipation Capacitance	C _{PD}	(Note 1)	—	20	—	—	—		

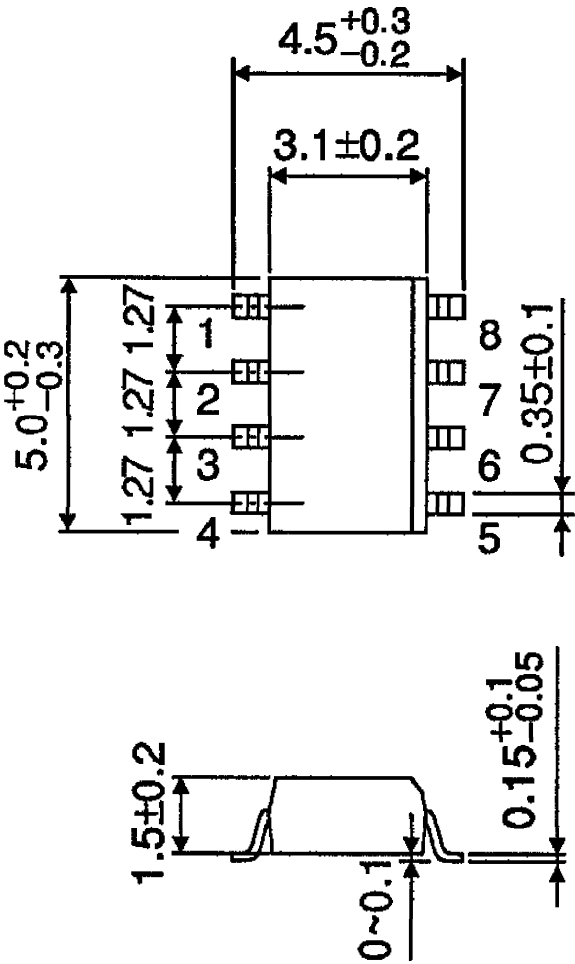
(Note 1) C_{PD} is defined as the value of internal equivalent capacitance of IC which is calculated from the operating current consumption without load (refer to Test Circuit).

Average operating current can be obtained by the equation hereunder.

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

PACKAGE DIMENSIONS
SOP8-P-1.27

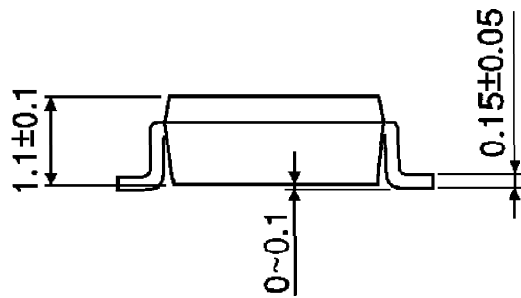
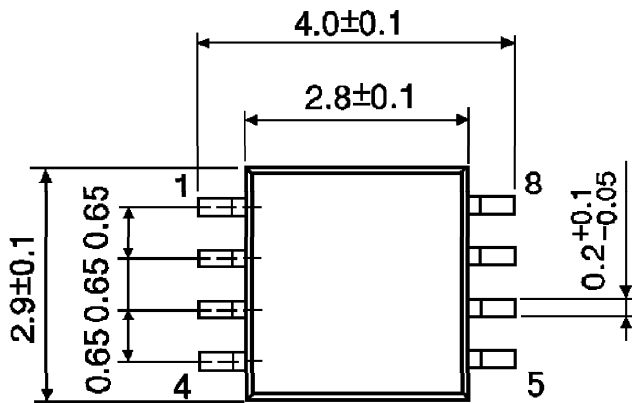
Unit : mm



Weight : 0.05g (Typ.)

PACKAGE DIMENSIONS
SSOP8-P-0.65

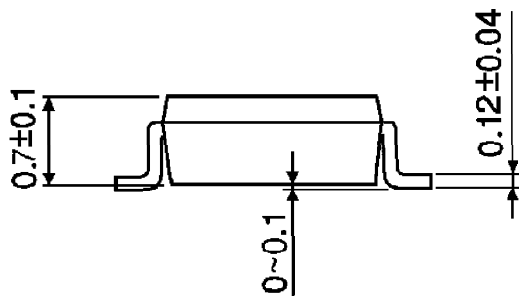
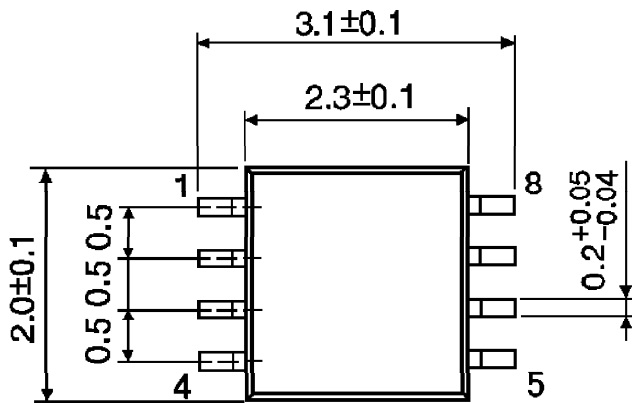
Unit : mm



Weight : 0.02g (Typ.)

PACKAGE DIMENSIONS
SSOP8-P-0.50A

Unit : mm



Weight : 0.01g (Typ.)

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