

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7W08F, TC7W08FU, TC7W08FK

DUAL 2-INPUT AND GATE

The TC7W08 is a high speed C²MOS 2-INPUT AND GATE fabricated with silicon gate C²MOS technology. It achieves the high speed operation similar to equivalent LSTTL while maintaining the C²MOS low power dissipation.

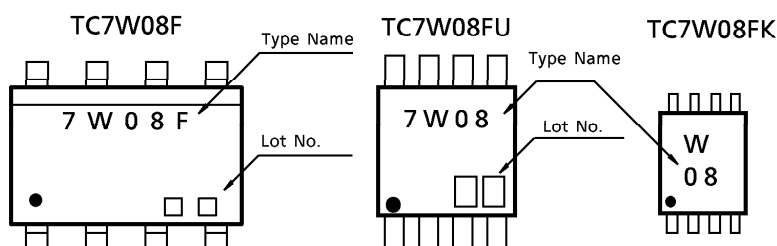
The internal circuit is composed of 3 stages including buffer output, which enables high noise immunity and stable output.

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

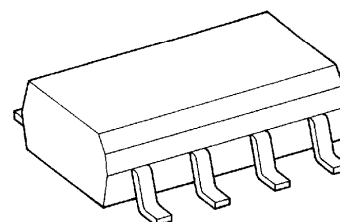
FEATURES

- High Speed $t_{pd} = 6\text{ns}$ (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 $t_{pLH} \cong t_{pHL}$
- Wide Operating Voltage Range ... $V_{CC}(\text{opr}) = 2 \sim 6\text{V}$

MARKING

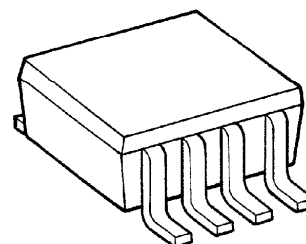


TC7W08F



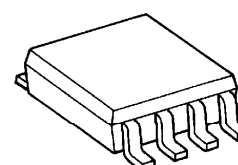
SOP8-P-1.27

TC7W08FU



SSOP8-P-0.65

TC7W08FK



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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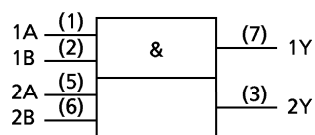
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MAXIMUM RATINGS (Ta = 25°C)

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	VOOUT	-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

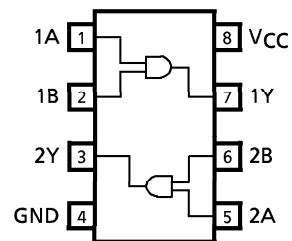
LOGIC DIAGRAM



TRUTH TABLE

A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

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	VOOUT	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}	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} or V _{IL}	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 ($C_L = 15\text{pF}$, $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$)

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}	—	—	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}	$T_a = 25^\circ\text{C}$			$T_a = -40 \sim 85^\circ\text{C}$		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	t_{TLH} t_{THL}	—	2.0	—	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	—	8	15	—	19	
			6.0	—	7	13	—	16	
Input Capacitance	C_{IN}	—	—	—	5	10	—	10	pF
Power Dissipation Capacitance	C_{PD}	(Note 1)	—	—	19	—	—	—	

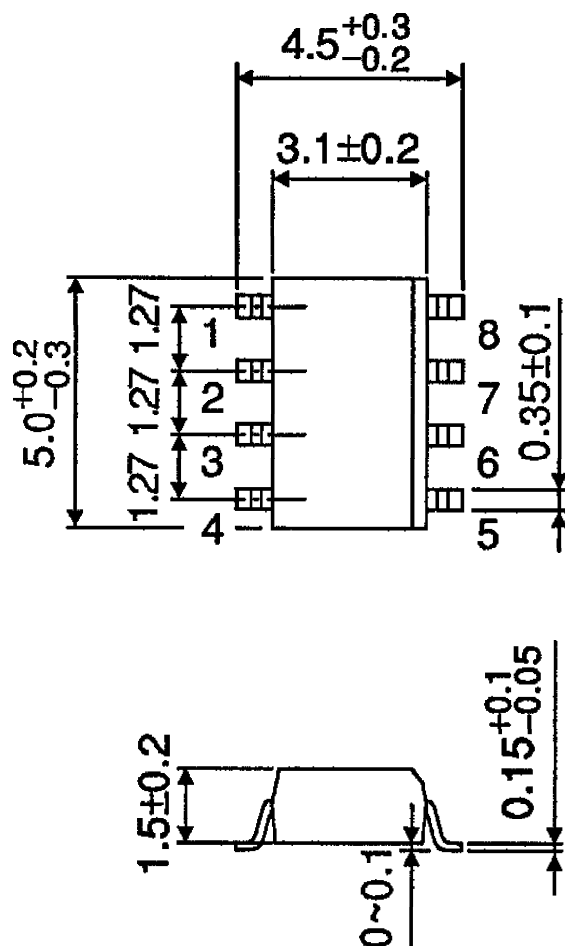
Note 1 : C_{PD} is defined as the value of internal equivalent capacitance of IC which is calculated from the operating current consumption without load (refer to Test Circuit).

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
SOP8-P-1.27

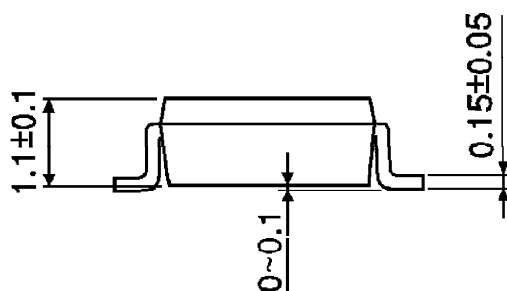
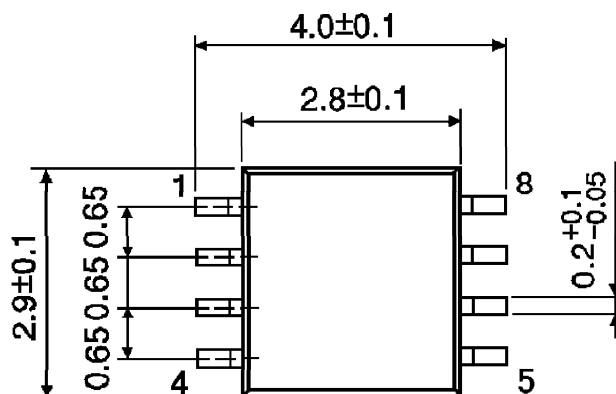
Unit : mm



Weight : 0.05g (Typ.)

OUTLINE DRAWING
SSOP8-P-0.65

Unit : mm

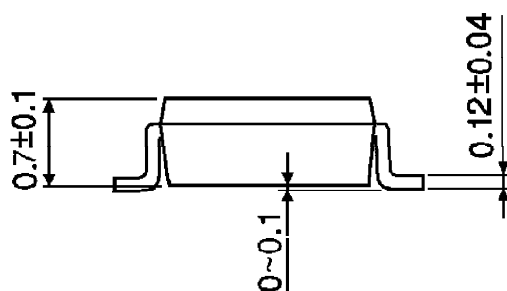
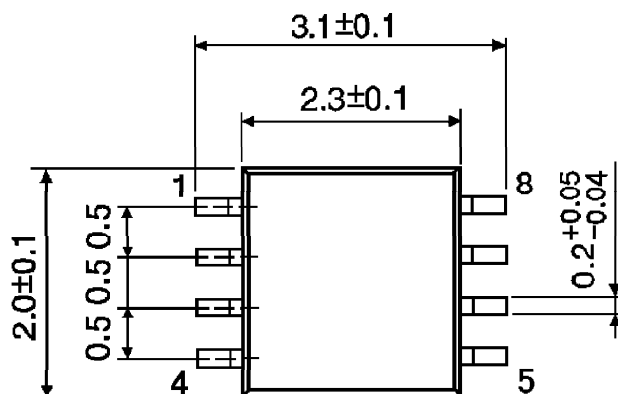


Weight : 0.02g (Typ.)

OUTLINE DRAWING

SSOP8-P-0.50A

Unit : mm



Weight : 0.01g (Typ.)