TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7WH08FU, TC7WH08FK

DUAL 2-INPUT AND GATE

The TC7WH08 is an advanced high speed CMOS 2-INPUT AND GATE fabricated with silicon gate CMOS technology. It achieves the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation. The internal circuit is composed of 4 stages including buffer output, which provide high noise immunity and stable output. An input protection circuit ensures that 0 to 7V can be applied to the input pins without regard to the supply voltage. This device can be used to interface 5V to 3V systems and two supply systems such as battery back up. This circuit prevents device destruction due to mismatched supply and input voltages.

FEATURES

•	High Speed	 $t_{pd} = 4.3r$	ns (Typ.)	at
		1/ 51/		

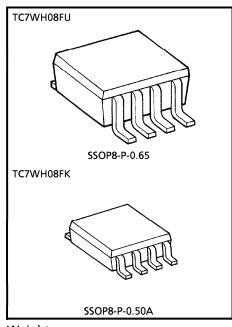
• Low Power Dissipation $I_{CC} = 2\mu A$ (Max.) at

High Noise Immunity V_{NIH} = V_{NIL} = 28% V_{CC} (Min.)

Power Down Protection is provided on all inputs.

Balanced Propagation Delays ····· t_{pLH}=t_{pHL}

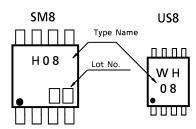
Wide Operating Voltage Range… VCC (opr) = 2~5.5V



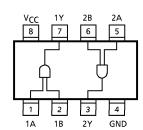
Weight

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

MARKING



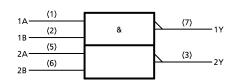
PIN ASSIGNMENT (TOP VIEW)



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT				
Supply Voltage Range	Vcc	-0.5~7.0	V				
DC Input Voltage	VIN	-0.5~7.0	V				
DC Output Voltage	Vout	-0.5~V _{CC} +0.5	V				
Input Diode Current	lικ	- 20	mA				
Output Diode Current	lок	± 20	mA				
DC Output Current	IOUT	± 25	mA				
DC V _{CC} /Ground Current	lcc	± 50	mA				
Payer Dissination	D-	>					
Power Dissipation	PD	200 (US8)	mA mA mA — mW				
Storage Temperature	T _{stg}	-65∼150	°C				
Lead Temperature (10 s)	TL	260	°C				

LOGIC DIAGRAM



TRUTH TABLE

Α	В	Υ
L	L	L
L	Н	L
Н	L	L
Н	Η	Н

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	Vcc	2.0~5.5	V
Input Voltage	V _{IN}	0~5.5	٧
Output Voltage	Vout	0~V _{CC}	٧
Operating Temperature	T _{opr}	- 40∼85	°C
Input Rise and Fall Time	dt/dv	$0 \sim 100 \text{ (V}_{CC} = 3.3 \pm 0.3 \text{V)}$	ns / V
Input Rise and Fan Time	at/av	$0\sim20 (V_{CC} = 5 \pm 0.5V)$	115 / V

DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION		Vcc	٦	Γa = 25°0	C	Ta = −40~85°C		UNIT
CHARACTERISTIC	STIVIBOL			V _C C (V)	MIN.	TYP.	MAX.	MIN.	MAX.	UNIT
High Loyal				2.0	1.50	_	_	1.50	_	
High-Level Input Voltage	V _{IH}		<u> </u>		V _{CC} ×0.7	_	_	V _C C × 0.7	-	V
Low-Level				2.0	_	_	0.50	_	0.50	
Input Voltage	VIL		<u> </u>		_	_	V _C C × 0.3	_	V _C C × 0.3	V
				2.0	1.9	2.0	_	1.9	_	
High Loyal	Voн	V _{IN} = V _{IH}	$I_{OH} = -50\mu A$	3.0	2.9	3.0	_	2.9	_	V
High-Level Output Voltage				4.5	4.4	4.5	_	4.4	_	
Output Voltage			$I_{OH} = -4mA$	3.0	2.58	_	_	2.48		
			$I_{OH} = -8mA$	4.5	3.94	_	_	3.80		
	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 50μA	2.0		0.0	0.1	_	0.1	V
Low-Level				3.0		0.0	0.1	_	0.1	
Output Voltage				4.5		0.0	0.1	_	0.1	
Catput Voltage			$I_{OL} = 4mA$	3.0		_	0.36	_	0.44	
			$I_{OL} = 8mA$	4.5	1	_	0.36	_	0.44	
Input Leakage Current	IIN	V _{IN} = 5.5V or GND		0~ 5.5			± 0.1		± 1.0	μ A
Quiescent Supply Current	lcc	V _{IN} = V _{CC} or GND		5.5		_	2.0	_	20.0	μ A

AC ELECTRICAL CHARACTERISTICS (Input tr

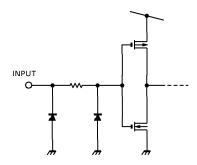
CHARACTERISTIC	SYMBOL	TEST C	ONDITIONO	7	٦	Га = 25°C	2	Ta = -4	l0∼85°C	LINIT
CHARACTERISTIC	STIVIBOL		V _{CC} (V)	C _L (pF)	MIN.	TYP.	MAX.	MIN.	MAX.	UNIT
			3.3 ± 0.3	15	_	6.2	8.8	1.0	10.5	ns
Propagation Delay	t _{pLH}	_	3.3 ± 0.3	50	_	8.7	12.3	1.0	14.0	
Time	tpHL		5.0 ± 0.5	15	_	4.3	5.9	1.0	7.0	
				50		5.8	7.9	1.0	9.0	
Input Capacitance	CIN		_			4	10	_	10	рF
Power Dissipation	Coo	(Note 1)	•	·		18				рF
Capacitance	C _{PD}	PD (Note I)				10				ρı

(Note 1): 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) = $C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$

NOISE CHARACTERISTICS (Ta = 25°C, Input $t_r = t_f = 3ns$)

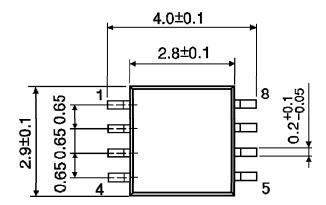
CHARACTERISTIC	SYMBOL	TEST CONDITION	V _{CC} (V)	TYP.	LIMIT	UNIT
Quiet Output Maximum Dynamic V _{OL}	V _{OLP}	C _L = 50pF	5.0	0.3	0.8	٧
Quiet Output Minimum Dynamic V _{OL}	V _{OLV}	C _L = 50pF	5.0	-0.3	-0.8	٧
Minimum High Level Dynamic Input Voltage	V _{IHD}	C _L = 50pF	5.0	_	3.5	٧
Maximum Low Level Dynamic Input Voltage	V _{ILD}	C _L = 50pF	5.0	_	1.5	V

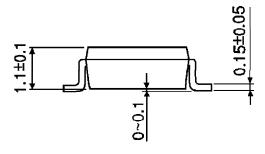
INPUT EQUIVALENT CIRCUIT



PACKAGE DIMENSIONS SSOP8-P-0.65

Unit: mm

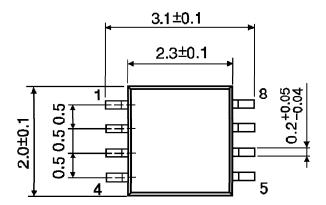


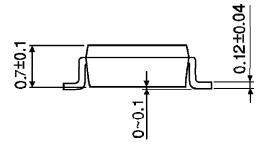


Weight: 0.02g (Typ.)

PACKAGE DIMENSIONS SSOP8-P-0.50A

Unit: mm





Weight: 0.01g (Typ.)

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