

TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

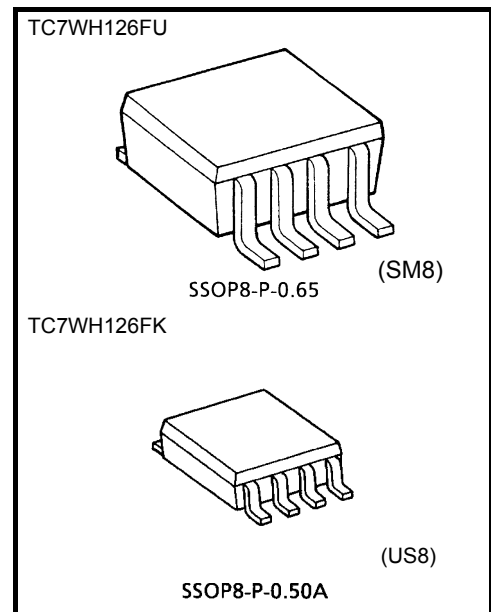
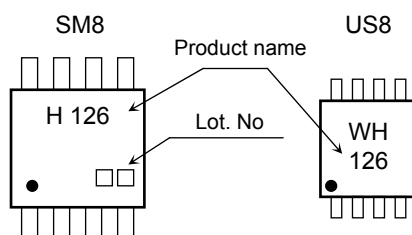
TC7WH126FU, TC7WH126FK

Bus Buffer with 3-STATE Output

Features

- High speed: $t_{pd} = 3.8 \text{ ns (typ.)}$ at $V_{CC} = 5.0V$, $C_L = 15pF$
- Low power dissipation: $I_{CC} = 2\mu A \text{ (max)}$ at $T_a = 25^\circ C$
- High noise immunity: $V_{NIH} = V_{NIL} = 28\% V_{CC} \text{ (min)}$
- 5.5 V tolerant inputs
- Balanced propagation delays : $t_{pLH} \approx t_{pHL}$
- Wide operating voltage range: $V_{CC} = 2.0 \text{ to } 5.5V$
- Low Noise : $V_{OLP} = 0.8V \text{ (max)}$

Marking



Weight

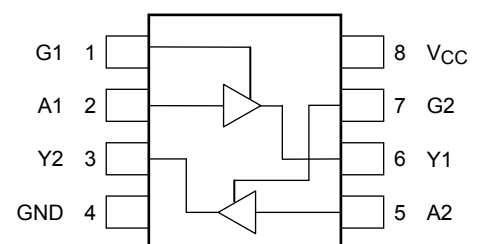
SSOP8-P-0.65 : 0.02 g (typ.)

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

Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	-0.5 to 7.0	V
DC input voltage	V_{IN}	-0.5 to 7.0	V
DC output voltage	V_{OUT}	-0.5 to $V_{CC} + 0.5$	V
Input diode current	I_{IK}	-20	mA
Output diode current	I_{OK}	± 20 (Note1)	mA
DC output current	I_{OUT}	± 25	mA
DC V_{CC} /ground current	I_{CC}	± 50	mA
Power dissipation	P_D	300(SM8) 200(US8)	mW
Storage temperature	T_{stg}	-65 to 150	$^\circ C$
Lead temperature (10 s)	T_L	260	$^\circ C$

Pin Assignment (top view)

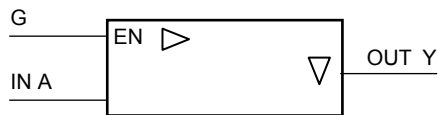


Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: $V_{OUT} < GND, V_{OUT} > V_{CC}$

IEC Logic Symbol



Truth Table

G	A	Y
L	X	Z
H	L	L
H	H	H

X: Don't care
Z: High impedance

Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V _{CC}	2.0 to 5.5	V
Input voltage	V _{IN}	0 to 5.5	V
Output voltage	V _{OUT}	0 to V _{CC}	V
Operating temperature	T _{opr}	−40 to 85	°C
Input rise and fall time	dt/dv	0 to 100 (V _{CC} = 3.3 V ± 0.3 V)	ns/V
		0 to 20 (V _{CC} = 5.0V ± 0.5 V)	

Electrical Characteristics
DC Characteristics

Characteristics	Symbol	Test Condition		Ta = 25°C				Ta = -40 to 85°C		Unit
				VCC (V)	Min	Typ.	Max	Min	Max	
High-level input voltage	VIH	—		2.0	1.5	—	—	1.5	—	V
				3.0 to 5.5	VCC × 0.7	—	—	VCC × 0.7	—	
Low-level input voltage	VIL	—		2.0	—	—	0.5	—	0.5	V
				3.0 to 5.5	—	—	VCC × 0.3	—	VCC × 0.3	
High-level output voltage	VOH	VIN = VIH	IOH = -50 μA	2.0	1.9	2.0	—	1.9	—	V
				3.0	2.9	3.0	—	2.9	—	
				4.5	4.4	4.5	—	4.4	—	
			IOH = -4 mA	3.0	2.58	—	—	2.48	—	
			IOH = -8 mA	4.5	3.94	—	—	3.8	—	
Low-level output voltage	VOL	VIN = VIH or VIL	IOL = 50 μA	2.0	—	0.0	0.1	—	0.1	V
				3.0	—	0.0	0.1	—	0.1	
				4.5	—	0.0	0.1	—	0.1	
			IOL = 4 mA	3.0	—	—	0.36	—	0.44	
			IOL = 8 mA	4.5	—	—	0.36	—	0.44	
3-state output off-state current	I _{OZ}	VIN = VIH or VIL VOUT = VCC or GND		5.5	—	—	±0.25	—	±2.5	μA
Input leakage current	IIN	VIN = 5.5V or GND		0 to 5.5	—	—	±0.1	—	±1.0	μA
Quiescent supply current	ICC	VIN = VCC or GND		5.5	—	—	2.0	—	20.0	μA

AC Characteristics (unless otherwise specified, input: $t_r = t_f = 3 \text{ ns}$)

Characteristics	Symbol	Test Condition			Ta = 25°C			Ta = −40 to 85°C		Unit
			V _{CC} (V)	C _L (pF)	Min	Typ.	Max	Min	Max	
Propagation delay time	t _{pLH} t _{pHL}	—	3.3 ± 0.3	15	—	5.6	8.0	1.0	9.5	ns
				50	—	8.1	11.5	1.0	13.0	
			5.0 ± 0.5	15	—	3.8	5.5	1.0	6.5	
				50	—	5.3	7.5	1.0	8.5	
3-state output enable time	t _{pZL} t _{pZH}	R _L =1kΩ	3.3 ± 0.3	15	—	5.4	8.0	1.0	9.5	ns
				50	—	7.9	11.5	1.0	13.0	
			5.0 ± 0.5	15	—	3.6	5.1	1.0	6.0	
				50	—	5.1	7.1	1.0	8.0	
3-state output disable time	t _{pLZ} t _{pHZ}	R _L =1kΩ	3.3 ± 0.3	50	—	9.5	13.2	1.0	15.0	ns
			5.0 ± 0.5	50	—	6.1	8.8	1.0	10.0	
Output to Output Slew	t _{osLH} t _{osHL}	(Note 2)	3.3 ± 0.3	50	—	—	1.5	—	1.5	ns
			5.0 ± 0.5	50	—	—	1.0	—	1.0	
Input capacitance	C _{IN}	—			—	4	10	—	10	pF
Output capacitance	C _{OUT}	—			—	6	—	—	—	pF
Power dissipation capacitance	C _{PD}	(Note3)			—	15	—	—	—	pF

Note 2: Parameter guaranteed by design. $t_{osLH} = |t_{pLHm} - t_{pLHn}|$, $t_{osHL} = |t_{pHLm} - t_{pHLn}|$

Note 3: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

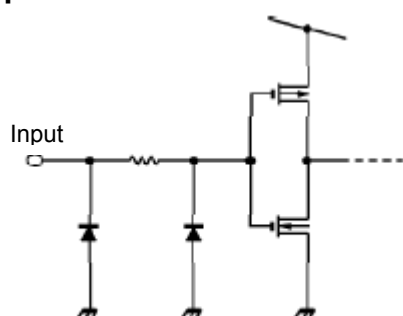
Average operating current can be obtained by the equation:

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

Noise Characteristics (Ta=25°C, Input $t_r = t_f = 3 \text{ ns}$)

Characteristics	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	V
Quiet Output Minimum Dynamic V _{OL}	V _{OLV}	C _L = 50pF	5.0	-0.3	-0.8	V
Minimum High Level Dynamic Input Voltage	V _{IHD}	C _L = 50pF	5.0	—	3.5	V
Maximum Low Level Dynamic Input Voltage	V _{ILD}	C _L = 50pF	5.0	—	1.5	V

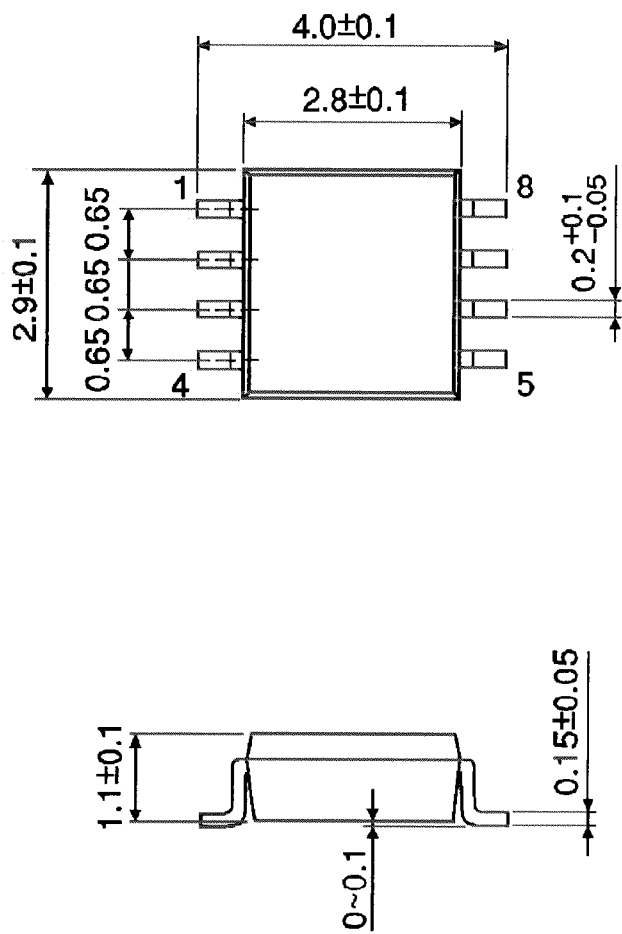
Input Equivalent Circuit



Package Dimensions

SSOP8-P-0.65

Unit : mm

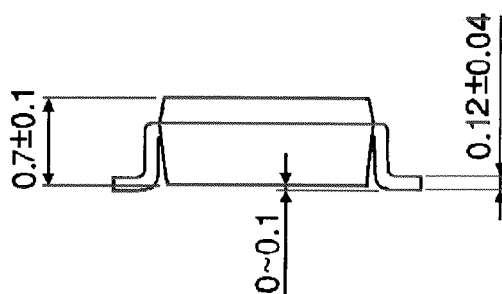
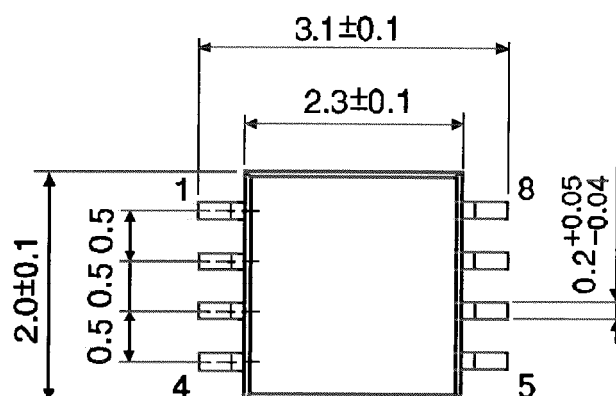


Weight: 0.02 g (typ.)

Package Dimensions

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)

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- Поставка образцов и прототипов;
- Техническая поддержка проекта;
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