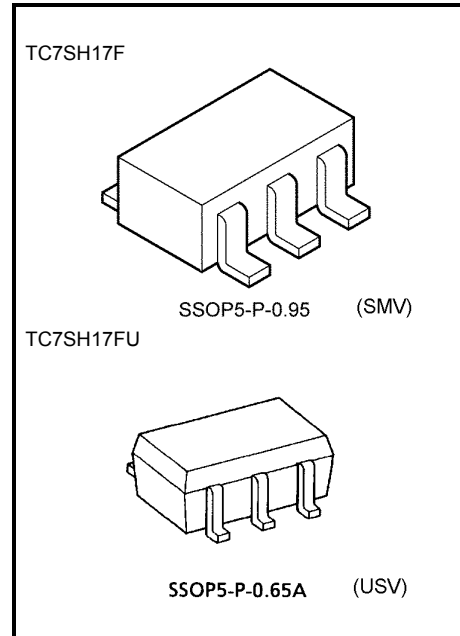


TC7SH17F, TC7SH17FU

Schmitt Buffer

Features

- High speed : $t_{pd} = 5.5 \text{ ns (typ.)}$ at $V_{CC} = 5 \text{ V}$, 15 pF
- Low power dissipation : $I_{CC} = 2 \mu\text{A (max)}$ at $T_a = 25^\circ\text{C}$
- High noise immunity : $V_{NIH} = V_{NIL} = 28\% V_{CC} \text{ (min)}$
- Wide operating voltage range: $V_{CC} \text{ (opr.)} = 2\sim 5.5 \text{ V}$
- 5.5-V tolerant input



Weight
 SSOP5-P-0.95 : 0.016 g (typ.)
 SSOP5-P-0.65A : 0.006 g (typ.)

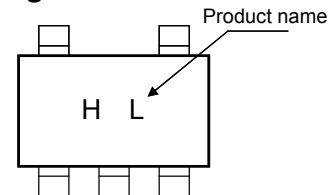
Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	-0.5~7	V
DC input voltage	V_{IN}	-0.5~7	V
DC output voltage	V_{OUT}	-0.5~ $V_{CC} + 0.5$	V
Input diode current	I_{IK}	-20	mA
Output diode current	I_{OK}	±20	mA
DC output current	I_{OUT}	±25	mA
DC V_{CC} /ground current	I_{CC}	±50	mA
Power dissipation	P_D	200	mW
Storage temperature	T_{stg}	-65~150	°C
Lead temperature (10 s)	T_L	260	°C

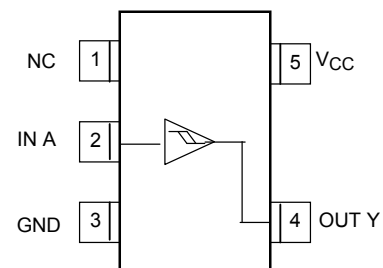
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

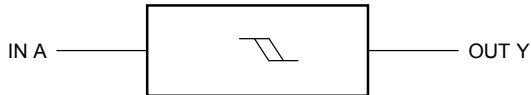
Marking



Pin Assignment (top view)



Logic Diagram



Truth Table

A	Y
L	L
H	H

Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	2~5.5	V
Input voltage	V_{IN}	0~5.5	V
Output voltage	V_{OUT}	0~ V_{CC}	V
Operating temperature	T_{opr}	-40~85	°C

Electrical Characteristics

DC Characteristics

Characteristics		Symbol	Test Condition	Ta = 25°C			Ta = -40~85°C		Unit		
				V _{CC} (V)	Min	Typ.	Max	Min		Max	
Threshold Voltage	High level	V_P	—	3.0	—	—	2.20	—	V		
				4.5	—	—	3.15	—			
				5.5	—	—	3.85	—			
	Low level	V_N		3.0	0.90	—	—	0.90		—	
				4.5	1.35	—	—	1.35		—	
				5.5	1.65	—	—	1.65		—	
Hysteresis Voltage		V_H	—	3.0	0.30	—	1.20	0.30	1.20	V	
			4.5	0.40	—	1.40	0.40	1.40			
			5.5	0.50	—	1.60	0.50	1.60			
Output voltage	High level	V_{OH}	$V_{IN} = V_{IH}$	$I_{OH} = -50 \mu A$	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	—	
				$I_{OH} = -4 mA$	3.0	2.58	—	—	2.48	—	
					4.5	3.94	—	—	3.80	—	
					5.5	—	—	—	—	—	
	Low level	V_{OL}	$V_{IN} = V_{IL}$	$I_{OL} = 50 \mu A$	2.0	—	0	0.1	—	0.1	
					3.0	—	0	0.1	—	0.1	
					4.5	—	0	0.1	—	0.1	
				$I_{OL} = 4 mA$	3.0	—	—	0.36	—	0.44	
					4.5	—	—	0.36	—	0.44	
					5.5	—	—	—	—	—	
Input leakage current		I_{IN}	$V_{IN} = 5.5 V \text{ or GND}$	0~5.5	—	—	±0.1	—	±1	μA	
Quiescent supply current		I_{CC}	$V_{IN} = V_{CC} \text{ or GND}$	5.5	—	—	2.0	—	20	μA	

AC Characteristics (Input: $t_r = t_f = 3 \text{ ns}$)

Characteristics	Symbol	Test Condition	Ta = 25°C			Ta = -40~85°C		Unit		
			VCC (V)	CL (pF)	Min	Typ.	Max		Min	Max
Propagation delay time	t _{PLH}		3.3 ± 0.3	15	—	8.3	12.8	1.0	15.0	ns
				50	—	10.8	16.3	1.0	18.5	
	5.0 ± 0.5		15	—	5.5	8.6	1.0	10.0		
			50	—	7.0	10.6	1.0	12.0		
Input capacitance	C _{IN}	—	—	4	10	—	10	pF		
Power dissipation capacitance	C _{PD}	(Note)	—	14	—	—	—	pF		

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

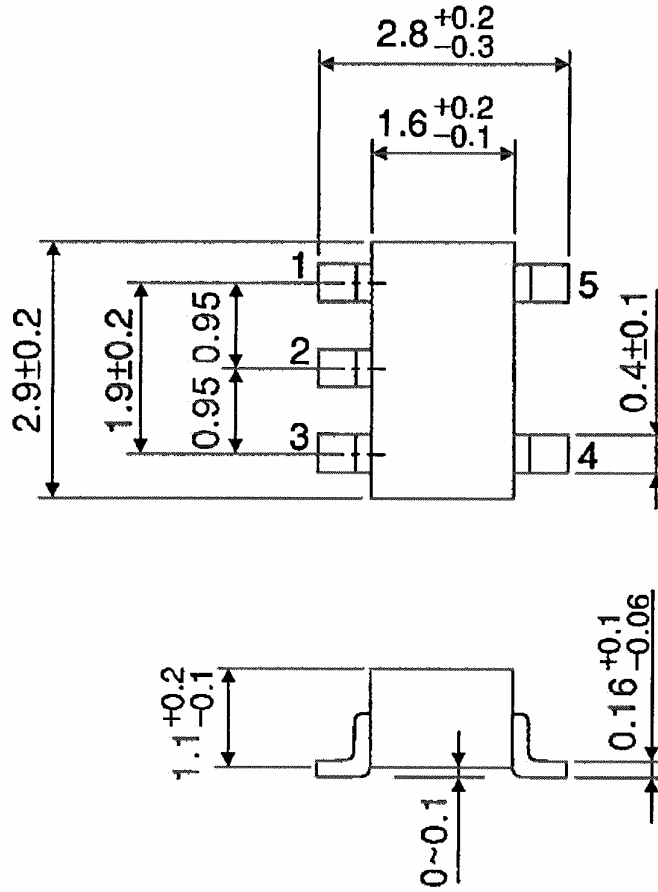
Average operating current can be obtained by the equation.

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

Package Dimensions

SSOP5-P-0.95

Unit : mm

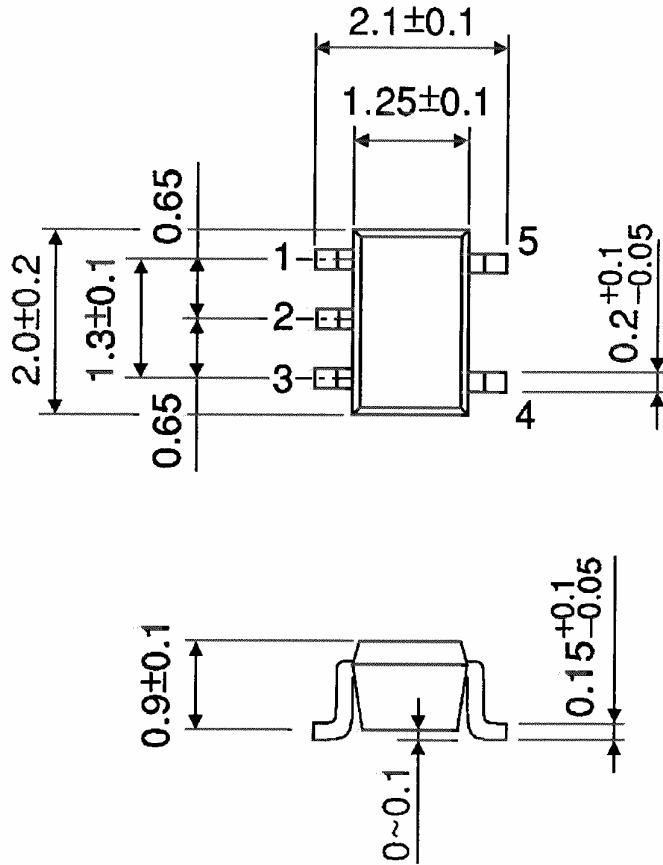


Weight: 0.016 g (typ.)

Package Dimensions

SSOP5-P-0.65A

Unit : mm



Weight: 0.006 g (typ.)

RESTRICTIONS ON PRODUCT USE

20070701-EN GENERAL

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