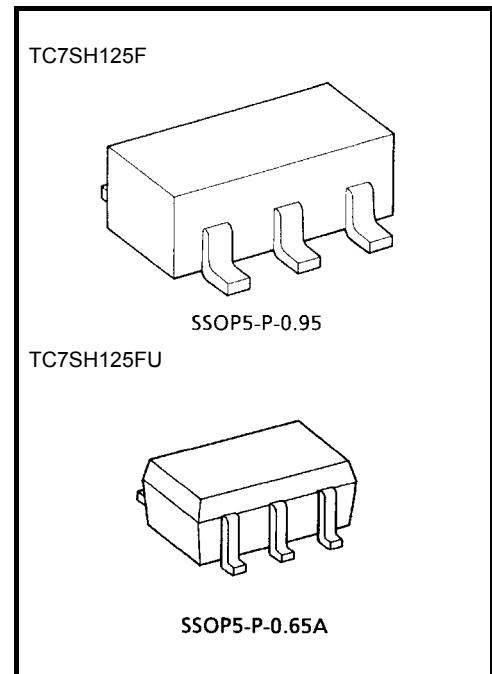


# TC7SH125F, TC7SH125FU

Bus Buffer

## Features

High speed:  $t_{pd} = 3.8$  ns (typ.) at  $V_{CC} = 5$  V  
 Low power dissipation:  $I_{CC} = 2$   $\mu$ A (max) at  $T_a = 25^\circ\text{C}$   
 High noise immunity:  $V_{NIH} = V_{NIL} = 28\%$   $V_{CC}$  (min)  
 5.5V tolerant input.  
 Wide operating voltage range:  $V_{CC}$  (opr) = 2~5.5 V

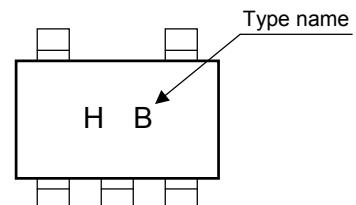


Weight  
 SSOP5-P-0.95 : 0.016 g (typ.)  
 SSOP5-P-0.65A : 0.006 g (typ.)

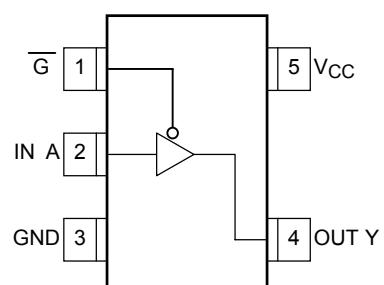
## Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

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

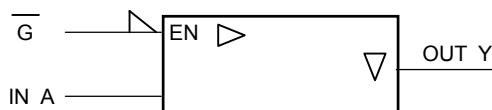
## Marking



## Pin Assignment (top view)



## Logic Diagram



## Truth Table

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

## Recommended Operating Conditions

Characteristics	Symbol	Rating			Unit
Supply voltage	$V_{CC}$	2~5.5			V
Input voltage	$V_{IN}$	0~5.5			V
		0~ $V_{CC}$			
Operating temperature	$T_{opr}$	-40~85			°C
Input rise and fall time	$dt/dv$	0~100 ( $V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$ )			ns/V
		0~20 ( $V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$ )			

## DC Electrical Characteristics

Characteristics	Symbol	Test Circuit	Test Condition	$V_{CC}$ (V)	Ta = 25°C			Ta = -40~85°C		Unit
					Min	Typ.	Max	Min	Max	
High-level input voltage	$V_{IH}$	—	—	2.0	1.5	—	—	1.5	—	V
				3.0~5.5	$V_{CC} \times 0.7$	—	—	$V_{CC} \times 0.7$	—	
Low-level input voltage	$V_{IL}$	—	—	2.0	—	—	0.5	—	0.5	V
				3.0~5.5	—	—	$V_{CC} \times 0.3$	—	$V_{CC} \times 0.3$	
High-level output voltage	$V_{OH}$	—	$V_{IN} = V_{IH}$	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	—	
				$I_{OH} = -4 \text{ mA}$	3.0	2.58	—	—	2.48	—
				$I_{OH} = -8 \text{ mA}$	4.5	3.94	—	—	3.80	—
Low-level output voltage	$V_{OL}$	—	$V_{IN} = V_{IH}$ or $V_{IL}$	2.0	—	0	0.1	—	0.1	V
				3.0	—	0	0.1	—	0.1	
				4.5	—	0	0.1	—	0.1	
				$I_{OL} = 4 \text{ mA}$	3.0	—	0.36	—	0.44	
				$I_{OL} = 8 \text{ mA}$	4.5	—	0.36	—	0.44	
Input leakage current	$I_{IN}$	—	$V_{IN} = 5.5 \text{ V}$ or GND	0~5.5	—	—	$\pm 0.1$	—	$\pm 1.0$	μA
Quiescent supply current	$I_{CC}$	—	$V_{IN} = V_{CC}$ or GND	5.5	—	—	2.0	—	20.0	μA

AC Characteristics (input:  $t_r = t_f = 3$  ns)

Characteristics	Symbol	Test Circuit	Test Condition		Ta = 25°C			Ta = -40~85°C		Unit		
			V <sub>CC</sub> (V)	C <sub>L</sub> (pF)	Min	Typ.	Max	Min	Max			
Propagation delay time	t <sub>pLH</sub>	—	—	3.3 ± 0.3	15	—	5.6	8.0	1.0	9.5		
					50	—	8.1	11.5	1.0	13.0		
	t <sub>pHL</sub>			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 <sub>pZL</sub>	—	—	3.3 ± 0.3	15	—	5.4	8.0	1.0	9.5		
					50	—	7.9	11.5	1.0	13.0		
	t <sub>pZH</sub>			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 <sub>pLZ</sub>	—	—	3.3 ± 0.3	50	—	9.5	13.2	1.0	15.0		
	t <sub>pHZ</sub>			5.0 ± 0.5	50	—	6.1	8.8	1.0	10.0		
Input capacitance	C <sub>IN</sub>	—	—			—	4	10	—	10	pF	
Output capacitance	C <sub>OUT</sub>	—	—			—	6	—	—	—	pF	
Power dissipation capacitance	C <sub>PD</sub>	—	(Note)			—	14	—	—	—	pF	

Note: C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

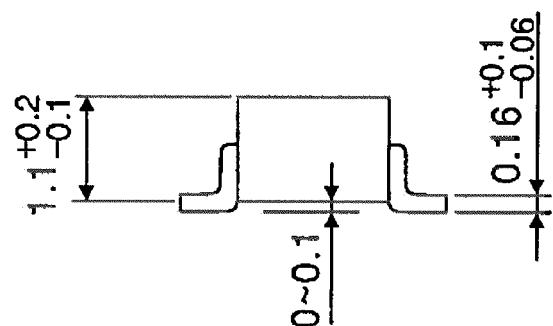
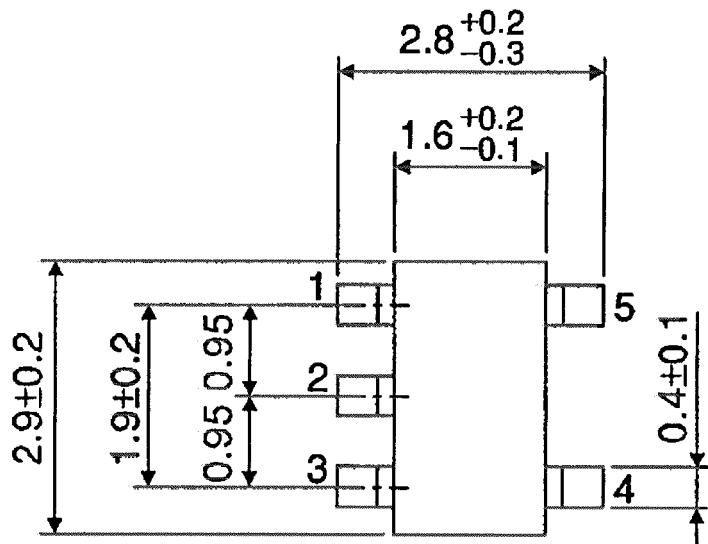
Average operating current can be obtained by the equation:

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

## Package Dimensions

SSOP5-P-0.95

Unit : mm

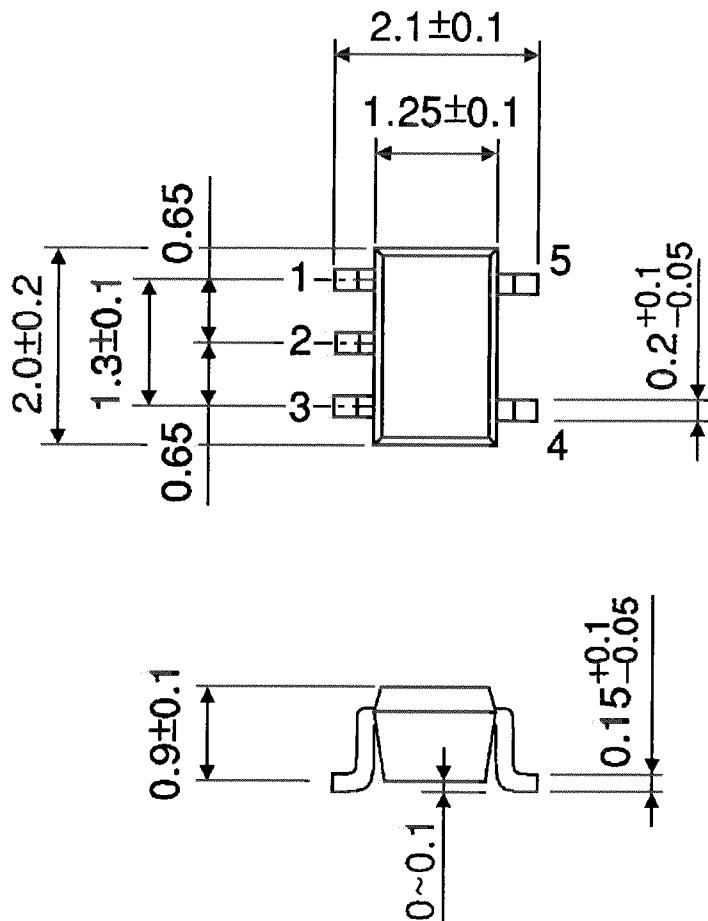


Weight: 0.016 g (typ.)

**Package Dimensions**

SSOP5-P-0.65A

Unit : mm



Weight: 0.006 g (typ.)

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