

TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

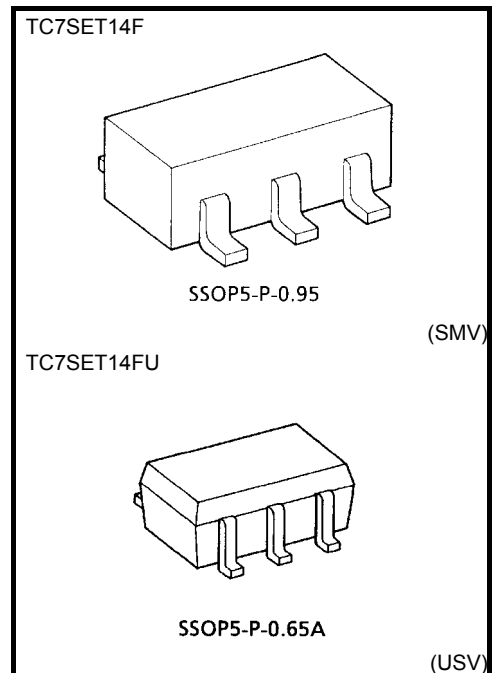
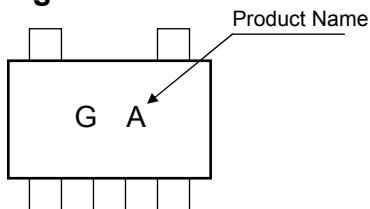
TC7SET14F, TC7SET14FU

Schmitt Inverter

Features

- High speed $t_{pd} = 5.0 \text{ ns (typ.)}$
at $V_{CC} = 5 \text{ V}$, $C_L = 15 \text{ pF}$
- Low power dissipation $I_{CC} = 2 \mu\text{A (max)}$ at $T_a = 25^\circ\text{C}$
- Compatible with TTL outputs.
- 5.5V tolerant input.

Marking

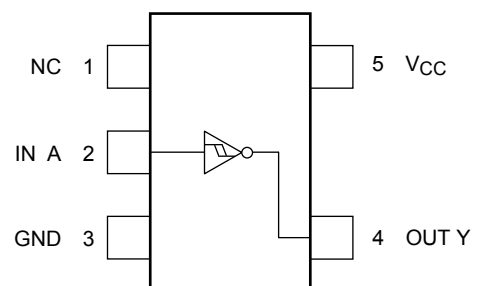


Weight
 SSOP5-P-0.95 : 0.016 g (typ.)
 SSOP5-P-0.65A : 0.006 g (typ.)

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

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 (Note 1)	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 to 150	$^\circ\text{C}$
Lead temperature (10 s)	T_L	260	$^\circ\text{C}$

Pin Assignment (top view)

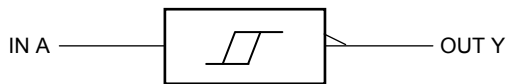


Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

Note1: $V_{OUT} < \text{GND}$, $V_{OUT} > V_{CC}$

IEC Logic Symbol



Truth Table

A	Y
L	H
H	L

Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	4.5 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 tp 85	°C

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	
				Min	Typ.	Max	Min	Max		
Positive Threshold Voltage	V_P	—	4.5	—	—	1.90	—	1.90	V	
			5.5	—	—	2.10	—	2.10		
Negative Threshold Voltage	V_N	—	4.5	0.50	—	—	0.50	—		
			5.5	0.60	—	—	0.60	—		
Hysteresis Voltage	V_H	—	4.5	0.40	—	1.40	0.40	1.40		
			5.5	0.40	—	1.50	0.40	1.50		
High-level output voltage	V_{OH}	$V_{IN} = V_{IL}$	$I_{OH} = -50 \mu\text{A}$	4.5	4.4	4.5	—	4.4	V	
			$I_{OH} = -8 \text{ mA}$	4.5	3.94	—	—	3.80		—
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH}$	$I_{OL} = 50 \mu\text{A}$	4.5	—	0.0	0.10	—		0.10
			$I_{OL} = 8 \text{ mA}$	4.5	—	—	0.36	—		0.44
Input leakage current	I_{IN}	$V_{IN} = 5.5 \text{ V or GND}$	0 to 5.5	—	—	± 0.1	—	± 1.0	μA	
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC} \text{ or GND}$	5.5	—	—	2.0	—	20.0	μA	
	I_{CCT}	Per Input Other Input	$V_{IN} = 3.4 \text{ V}$ $V_{CC} \text{ or GND}$	5.5	—	—	1.35	—	1.50	mA

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

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40 to 85°C		Unit
		VCC (V)	CL (pF)	Min	Typ.	Max	Min	Max	
Propagation delay time	t _{pLH} t _{pHL}	5.0 ± 0.5	15	—	5.0	7.6	1.0	9.0	ns
			50	—	6.5	9.6	1.0	11.0	
Input capacitance	C _{IN}			—	4	10	—	10	pF
Power dissipation capacitance	C _{PD}	(Note 2)		—	18	—	—	—	pF

Note 2: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

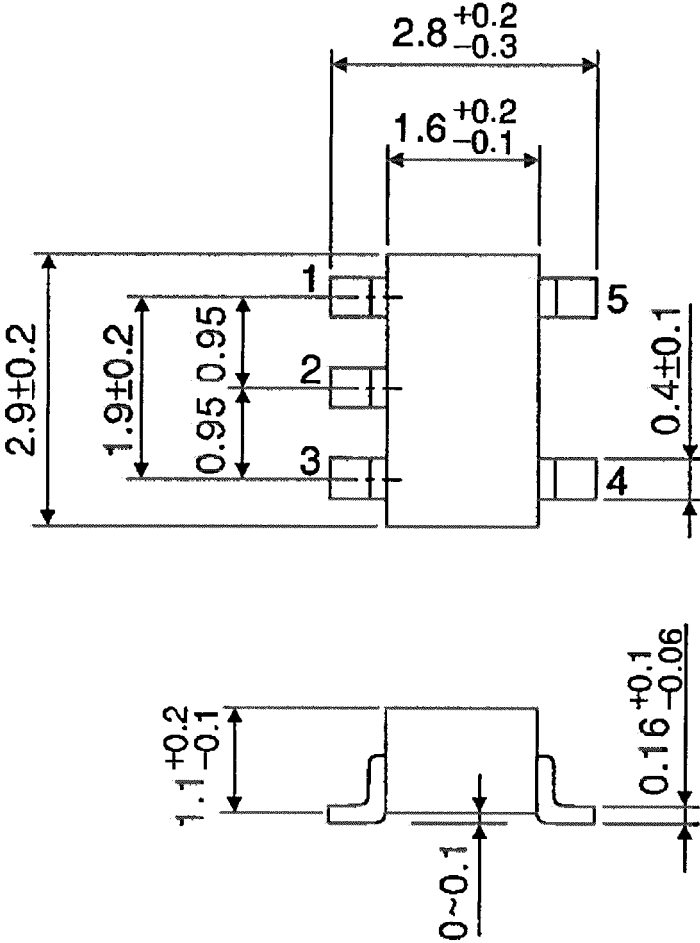
Average operating current can be obtained by the equation:

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

Package Dimensions

SSOP5-P-0.95

Unit : mm

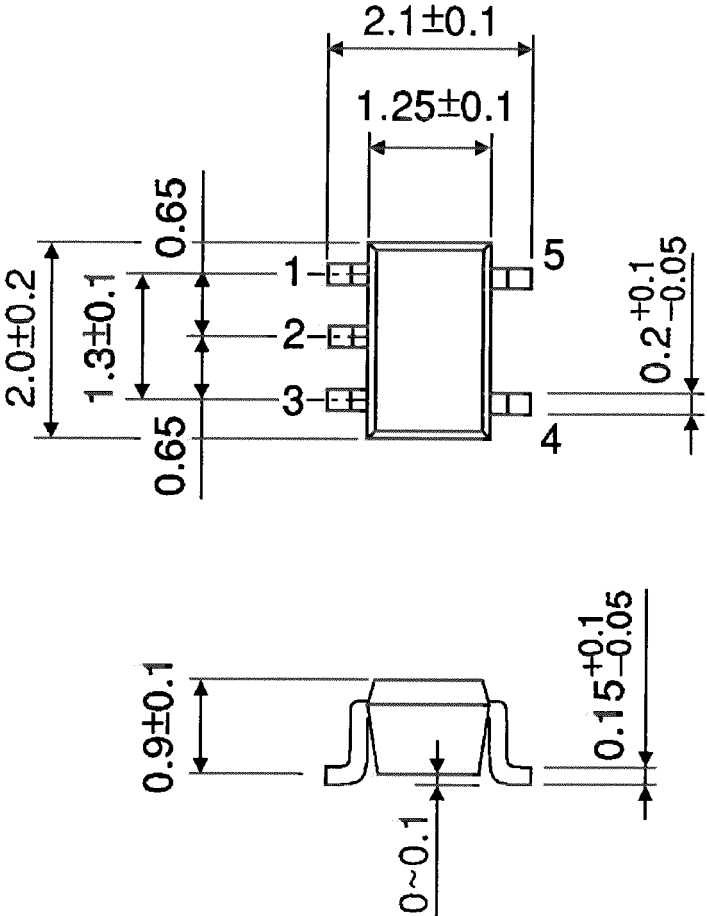


Weight: 0.016 g (typ.)

Package Dimensions

SSOP5-P-0.65A

Unit : mm



Weight: 0.006 g (typ.)

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