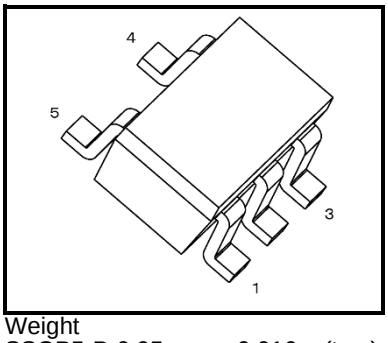
TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC4S584F

Schmitt Trigger



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

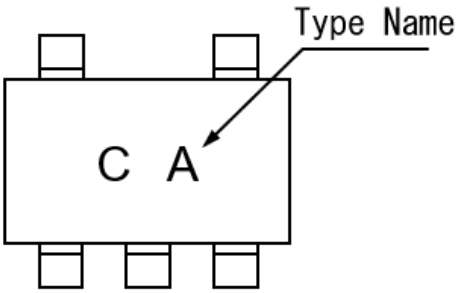
TC4S584F is the one circuit inverter having the Schmitt trigger function at the input terminal. That is, since the circuit threshold level voltage at the leading and trailing edges of input waveform are different (VP, VN), the TC4S584F can be used in the broad range applications, including line receivers, waveform shaping circuit, astable multivibrators, and monostable multivibrators.

Absolute Maximum Ratings (Ta = 25 °C) (Note)

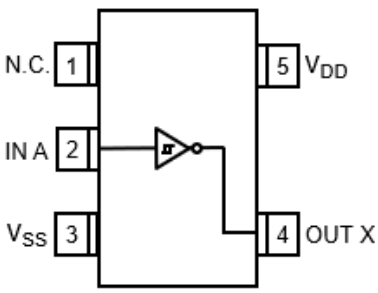
Characteristics	Symbol	Rating	Unit
DC supply voltage	V_{DD}	V_{SS} − 0.5 to V_{SS} + 20	V
Input voltage	V_{IN}	V_{SS} − 0.5 to V_{DD} + 0.5	V
Output voltage	V_{OUT}	V_{SS} − 0.5 to V_{DD} + 0.5	V
DC input current	I_{IN}	±10	mA
Power dissipation	P_D	200	mW
Operating temperature range	T_{opr}	−40 to 85	°C
Storage temperature range	T_{stg}	−65 to 150	°C
Lead temperature (10 s)	T_L	260	°C

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.
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).

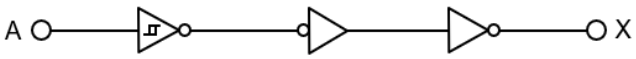
Marking



Pin Assignment



Logic Diagram



Start of commercial production
1988-05

Operating Ranges (V_{SS} = 0 V)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
DC supply voltage	V_{DD}	—	3	—	18	V
Input voltage	V_{IN}	—	0	—	V_{DD}	V

Static Electrical Characteristics (V_{SS} = 0 V)

Characteristics		Symbol	Test Condition		V_{DD} (V)	−40°C Min	−40°C Max	25°C Min	25°C Typ.	25°C Max	85°C Min	85°C Max	Unit
High-level output voltage		V_{OH}	$\|I_{OUT}\|$ < 1 μA V_{IN} = V_{SS}		5 10 15	4.95 9.95 14.95	— — —	4.95 9.95 14.95	5.00 10.00 15.00	— — —	4.95 9.95 14.95	— — —	V
Low-level output voltage		V_{OL}	$\|I_{OUT}\|$ < 1 μA V_{IN} = V_{DD}		5 10 15	— — —	0.05 0.05 0.05	— — —	0 0 0	0.05 0.05 0.05	— — —	0.05 0.05 0.05	V
Output high current		I_{OH}	V_{IN} = V_{SS}	V_{OH} = 4.6 V V_{OH} = 2.5 V V_{OH} = 9.5 V V_{OH} = 13.5 V	5 5 10 15	−0.61 −2.5 −1.5 −4.0	— — — —	−0.51 −2.1 −1.3 −3.4	−1.0 −4.0 −2.2 −9.0	— — — —	−0.42 −1.7 −1.1 −2.8	— — — —	mA
Output low current		I_{OL}	V_{IN} = V_{DD}	V_{OL} = 0.4 V V_{OL} = 0.5 V V_{OL} = 1.5 V	5 10 15	0.61 1.5 4.0	— — —	0.51 1.3 3.4	1.5 3.8 15.0	— — —	0.42 1.1 2.8	— — —	mA
Positive trigger threshold voltage*		V_P	V_{OUT} = 0.5 V V_{OUT} = 1.0 V V_{OUT} = 1.5 V		5 10 15	19.5 4.3 6.9	3.65 7.1 10.7	2.05 4.5 7.1	2.9 5.9 9.0	3.35 7.1 10.6	2.05 4.7 7.1	3.75 7.2 10.8	V
Negative trigger threshold voltage*		V_N	V_{OUT} = 4.5 V V_{OUT} = 9.0 V V_{OUT} = 13.5 V		5 10 15	1.05 2.1 3.2	2.75 4.9 7.0	1.1 2.2 3.3	2.1 3.5 5.0	2.6 4.7 6.8	0.95 2.0 3.1	2.65 4.8 6.9	V
Hysteresis voltage*		V_H	—		5 10 15	0.1 1.7 3.1	1.35 3.2 4.8	0.4 1.8 3.2	0.75 2.4 4.0	1.3 3.2 4.8	0.4 1.7 3.2	1.50 3.4 4.9	V
Input current	“H” level	I_{IH}	V_{IH} = 18 V		18	—	0.1	—	10^{-5}	0.1	—	1.0	μA
	“L” level	I_{IL}	V_{IL} = 0 V		18	—	−0.1	—	-10^{-5}	−0.1	—	−1.0	
Quiescent supply current		I_{DD}	V_{IN} = V_{SS}, V_{DD}		5 10 15	— — —	1 2 4	— — —	0.001 0.002 0.004	1 2 4	— — —	7.5 15.0 30.0	μA

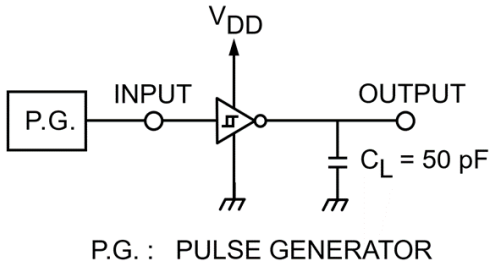
Note: Values are different to TC4584BP, TC4584BF marked* (V_P, V_N, V_H).

Switching Characteristics (Ta = 25°C, V_{SS} = 0 V, C_L = 50 pF)

Characteristics	Symbol	Test Condition	V_{DD} (V)	Min	Typ.	Max	Unit
Output transition time	t_{TLH} t_{THL}	—	5 10 15	— — —	80 50 40	200 100 80	ns
Propagation delay time	t_{pLH} t_{pHL}	—	5 10 15	— — —	170 80 60	300 160 120	ns
Input capacitance	C_{IN}	—		—	5	7.5	pF

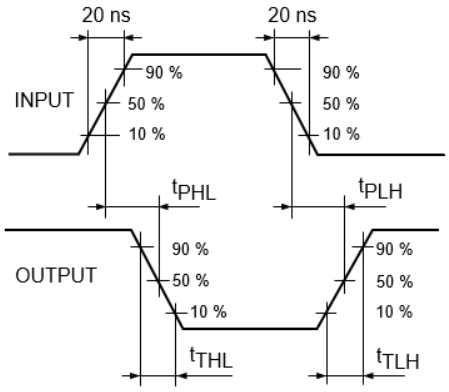
Circuit and Waveform for Measurement of Dynamic Characteristics

Circuit

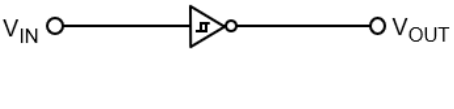


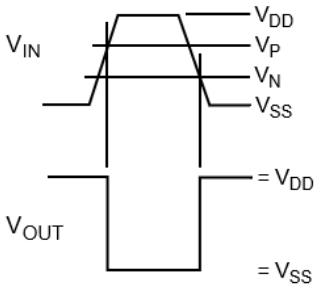
P.G. : PULSE GENERATOR

Waveform

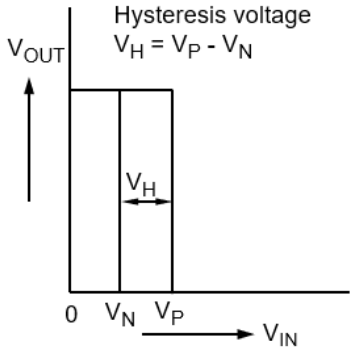


Input-Output Voltage Characteristics





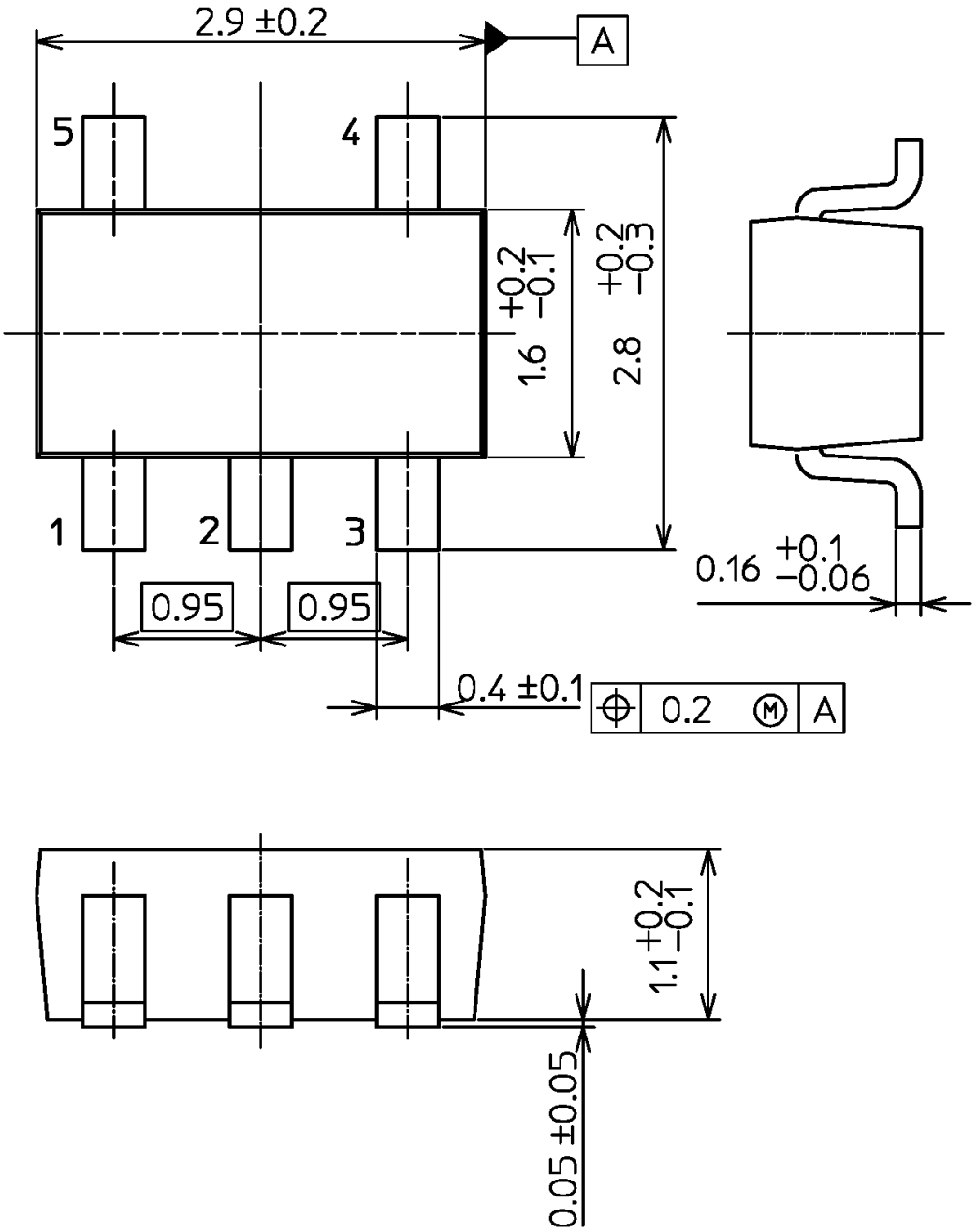
・ Input-Output Voltage waveform



・ Transfer characteristics

Package Dimensions

SSOP5-P-0.95 Unit : mm



Weight: 0.016 g (typ.)

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