

TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC4584BP, TC4584BF

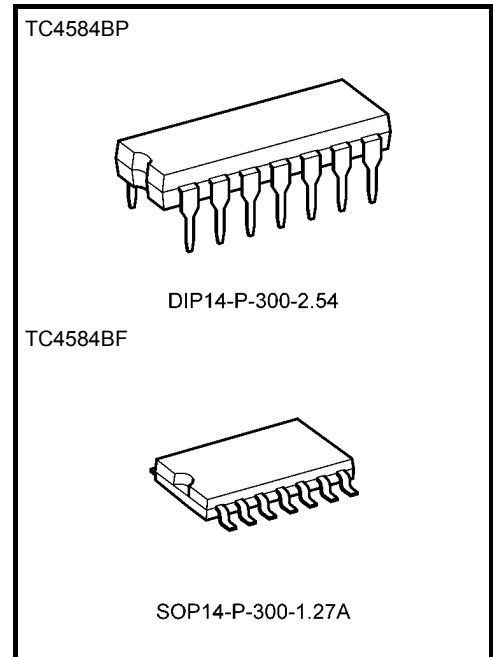
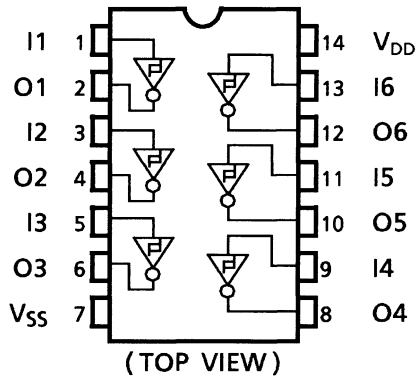
TC4584B Hex Schmitt Trigger

The TC4584B is the 6-circuit inverter having the Schmitt trigger function at the input terminal.

That is, since the circuit threshold level voltages at the leading and trailing edges of input waveform are different (V_P , V_N), the TC4584B can be used in the broad range application including line receiver, waveform shaping circuit, astable multivibrator, monostable multivibrator in addition to ordinary inverter.

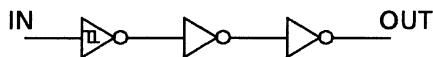
Since the pins are compatible with the TC4069UB, the substitution is also possible.

Pin Assignment

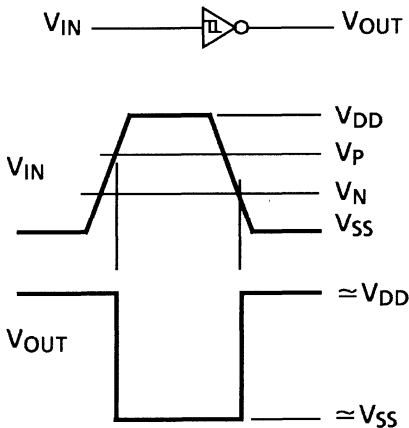


Weight	
DIP14-P-300-2.54	: 0.96 g (typ.)
SOP14-P-300-1.27A	: 0.18 g (typ.)

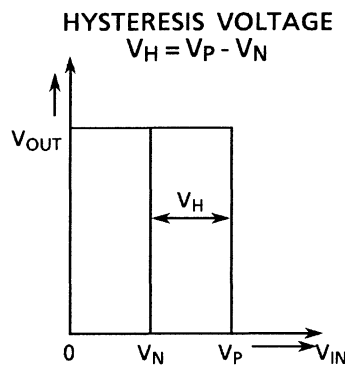
Logic Diagram



Input/Output Voltage Characteristic



Input-Output Voltage Waveform



Transfer Characteristics

Start of commercial production
1978-05

Absolute Maximum Ratings (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	300 (DIP)/180 (SOIC)	mW
Operating temperature range	T_{opr}	-40 to 85	°C
Storage temperature range	T_{stg}	-65 to 150	°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).

Operating Ranges ($V_{SS} = 0$ V) (Note)

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

Note 1: The operating ranges must be maintained to ensure the normal operation of the device.
Unused inputs must be tied to either V_{DD} or V_{SS} .

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

Characteristics	Sym- bol	Test Condition	V _{DD} (V)	-40°C		25°C			85°C		Unit	
				Min	Max	Min	Typ.	Max	Min	Max		
High-level output voltage	V _{OH}	I _{OUT} < 1 μA V _{IN} = V _{SS} , V _{DD}	5	4.95	—	4.95	5.00	—	4.95	—	V	
			10	9.95	—	9.95	10.00	—	9.95	—		
			15	14.95	—	14.95	15.00	—	14.95	—		
Low-level output voltage	V _{OL}	I _{OUT} < 1 μA V _{IN} = V _{SS} , V _{DD}	5	—	0.05	—	0.00	0.05	—	0.05	V	
			10	—	0.05	—	0.00	0.05	—	0.05		
			15	—	0.05	—	0.00	0.05	—	0.05		
Output high current	I _{OH}	V _{OH} = 4.6 V V _{OH} = 2.5 V V _{OH} = 9.5 V V _{OH} = 13.5 V V _{IN} = V _{SS}	5	-0.61	—	-0.51	-1.0	—	-0.42	—	mA	
			5	-2.50	—	-2.10	-4.0	—	-1.70	—		
			10	-1.50	—	-1.30	-2.2	—	-1.10	—		
			15	-4.00	—	-3.40	-9.0	—	-2.80	—		
Output low current	I _{OL}	V _{OL} = 0.4 V V _{OL} = 0.5 V V _{OL} = 1.5 V V _{IN} = V _{DD}	5	0.61	—	0.51	1.5	—	0.42	—	mA	
			10	1.50	—	1.30	3.8	—	1.10	—		
			15	4.00	—	3.40	15.0	—	2.80	—		
Positive trigger threshold voltage	V _P	V _{OUT} = 0.5 V V _{OUT} = 1.0 V V _{OUT} = 1.5 V	5	2.05	3.75	2.15	3.0	3.75	2.15	3.85	V	
			10	4.80	7.60	4.90	6.4	7.60	4.90	7.70		
			15	7.80	11.60	7.90	9.9	11.60	7.90	11.70		
Negative trigger threshold voltage	V _N	V _{OUT} = 4.5 V V _{OUT} = 9.0 V V _{OUT} = 13.5 V	5	1.25	2.95	1.25	2.3	2.85	1.15	2.85	V	
			10	2.40	5.20	2.40	3.8	5.10	2.30	5.10		
			15	3.40	7.20	3.40	5.2	7.10	3.30	7.10		
Hysteresis voltage	V _H	—	5	0.10	1.25	0.25	0.65	1.25	0.25	1.40	V	
			10	1.80	3.50	1.90	2.60	3.50	1.90	3.60		
			15	3.70	5.60	3.80	4.70	5.60	3.80	5.70		
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} (Note)	5	—	1	—	0.001	1	—	7.5	μA	
			10	—	2	—	0.002	2	—	15.0		
			15	—	4	—	0.004	4	—	30.0		

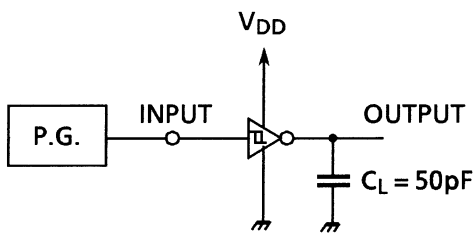
Note: All valid input combinations.

Dynamic Electrical Characteristics (Ta = 25°C, VSS = 0 V, CL = 50 pF)

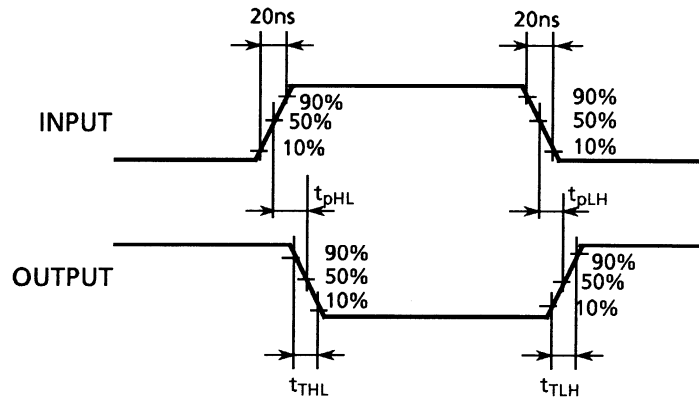
Characteristics	Symbol	Test Condition		Min	Typ.	Max	Unit
			VDD (V)				
Output transition time (low to high)	t _{TLH}	—	5	—	80	200	ns
			10	—	50	100	
			15	—	40	80	
Output transition time (high to low)	t _{THL}	—	5	—	80	200	ns
			10	—	50	100	
			15	—	40	80	
Propagation delay time	t _{pLH}	—	5	—	170	340	ns
	t _{pHL}		10	—	80	160	
			15	—	60	120	
Input capacitance	C _{IN}	—		—	5	7.5	pF

Circuit and Waveform for Measurement of Dynamic Characteristics

Circuit



Waveform



Package Dimensions

DIP14-P-300-2.54

Unit : mm



Weight: 0.96 g (typ.)

Package Dimensions

SOP14-P-300-1.27A

Unit: mm



Weight: 0.18 g (typ.)

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