

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TC4584BP, TC4584BF, TC4584BFN

## TC4584B HEX SCHMITT TRIGGER

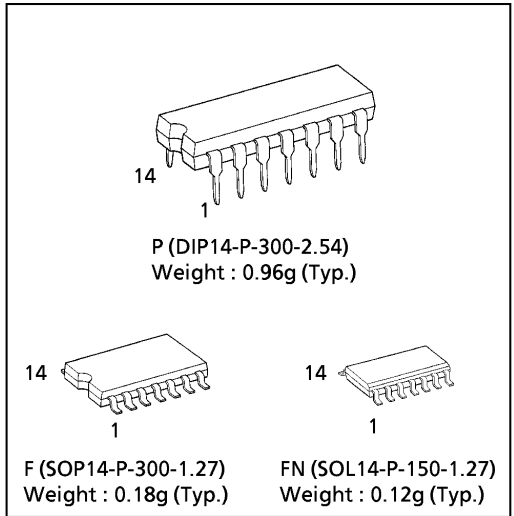
The TC4584B is the 6-circuit inverter having the Schmitt trigger function at the input terminal.

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, etc.

In addition to ordinary inverter.

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

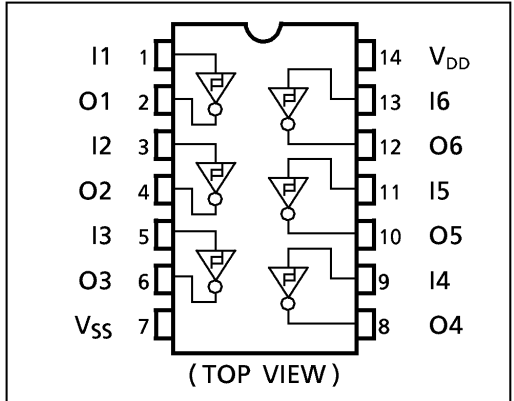
(Note) The JEDEC SOP (FN) is not available in Japan.



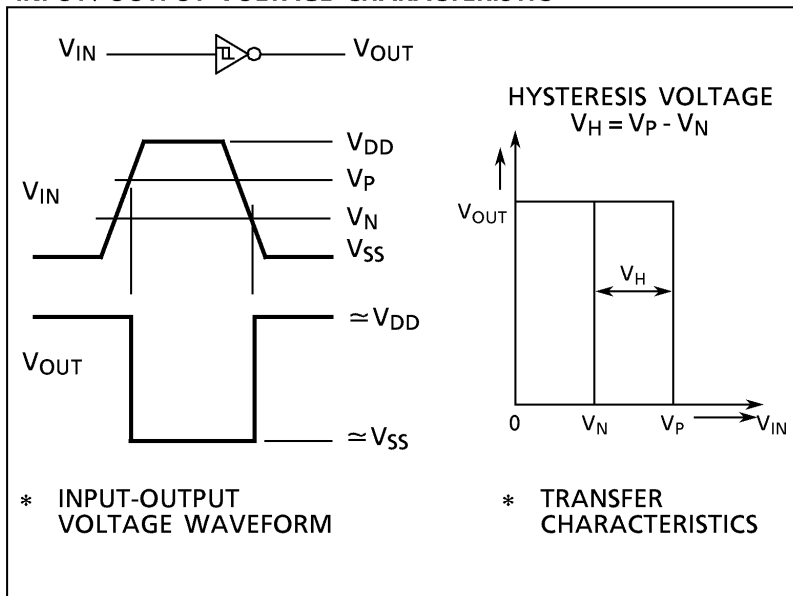
### MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	$V_{DD}$	$V_{SS} - 0.5 \sim V_{SS} + 20$	V
Input Voltage	$V_{IN}$	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
Output Voltage	$V_{OUT}$	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
DC Input Current	$I_{IN}$	$\pm 10$	mA
Power Dissipation	$P_D$	300 (DIP) / 180 (SOIC)	mW
Operating Temperature Range	$T_{opr}$	-40~85	°C
Storage Temperature Range	$T_{stg}$	-65~150	°C

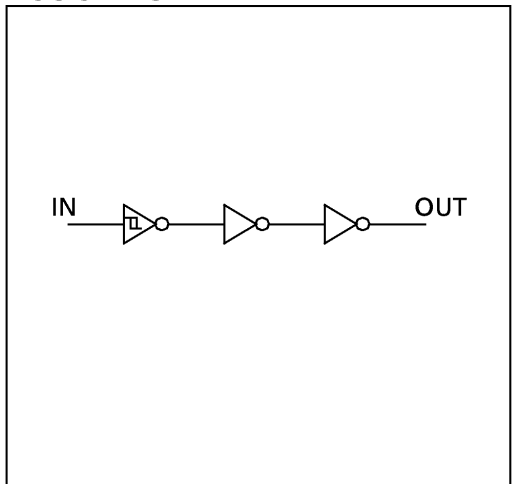
### PIN ASSIGNMENT



### INPUT / OUTPUT VOLTAGE CHARACTERISTIC



### LOGIC DIAGRAM



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● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

RECOMMENDED OPERATING CONDITIONS ( $V_{SS} = 0V$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
DC Supply Voltage	$V_{DD}$		3	—	18	V
Input Voltage	$V_{IN}$		0	—	$V_{DD}$	V

STATIC ELECTRICAL CHARACTERISTICS ( $V_{SS} = 0V$ )

CHARACTERISTIC	SYMBOL	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\mu A$ $V_{IN} = V_{SS}, V_{DD}$	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\mu A$ $V_{IN} = V_{SS}, V_{DD}$	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	$I_{OH}$	$V_{OH} = 4.6V$ $V_{OH} = 2.5V$ $V_{OH} = 9.5V$ $V_{OH} = 13.5V$ $V_{IN} = V_{SS}$	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	$I_{OL}$	$V_{OL} = 0.4V$ $V_{OL} = 0.5V$ $V_{OL} = 1.5V$ $V_{IN} = V_{DD}$	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	—		
			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					
Positive Trigger Threshold Voltage	$V_P$	$V_{OUT} = 0.5V$ $V_{OUT} = 1.0V$ $V_{OUT} = 1.5V$	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	$V_N$	$V_{OUT} = 4.5V$ $V_{OUT} = 9.0V$ $V_{OUT} = 13.5V$	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	$I_{IH}$	$V_{IH} = 18V$	18	—	0.1	—	$10^{-5}$	0.1	—	1.0	$\mu A$
	"L" Level	$I_{IL}$	$V_{IL} = 0V$	18	—	-0.1	—	$-10^{-5}$	-0.1	—	-1.0	
Quiescent Supply Current	$I_{DD}$	$V_{IN} = V_{SS}, V_{DD} *$	5	—	1	—	0.001	1	—	7.5	$\mu A$	
			10	—	2	—	0.002	2	—	15.0		
			15	—	4	—	0.004	4	—	30.0		

\* All valid input combinations.

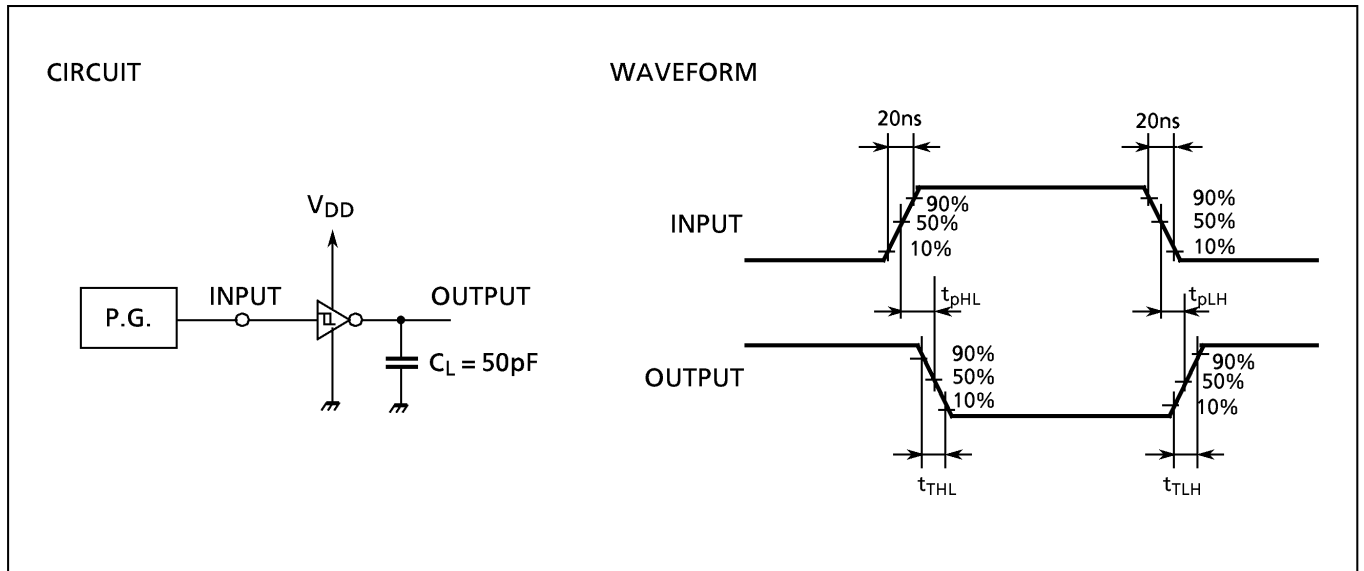
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**DYNAMIC ELECTRICAL CHARACTERISTICS (Ta = 25°C, Vss = 0V, CL = 50pF)**

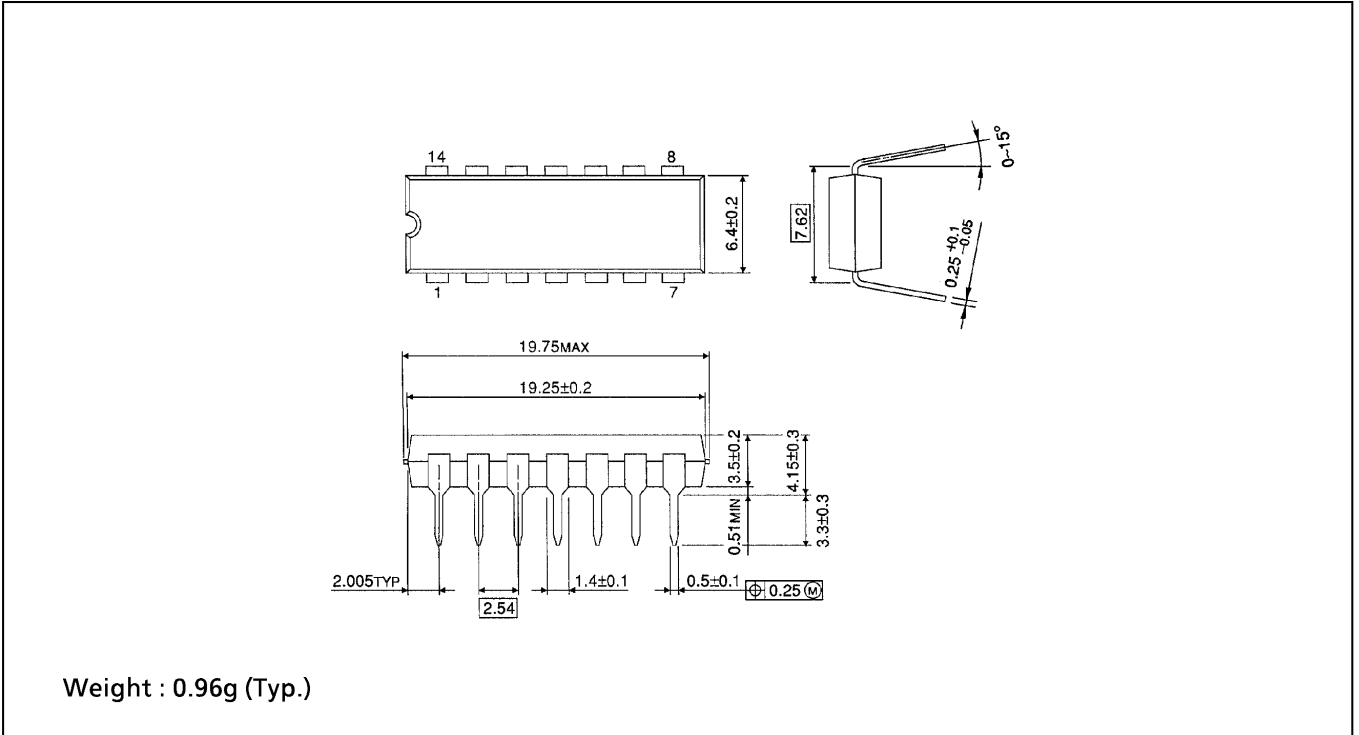
CHARACTERISTIC	SYMBOL	TEST CONDITION	$V_{DD}(V)$	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	$t_{TLH}$		5	—	80	200	ns
			10	—	50	100	
			15	—	40	80	
Output Transition Time (High to Low)	$t_{THL}$		5	—	80	200	
			10	—	50	100	
			15	—	40	80	
Propagation Delay Time	$t_{pLH}$ $t_{pHL}$		5	—	170	340	
			10	—	80	160	
			15	—	60	120	
Input Capacitance	$C_{IN}$			—	5	7.5	pF

**CIRCUIT AND WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS**



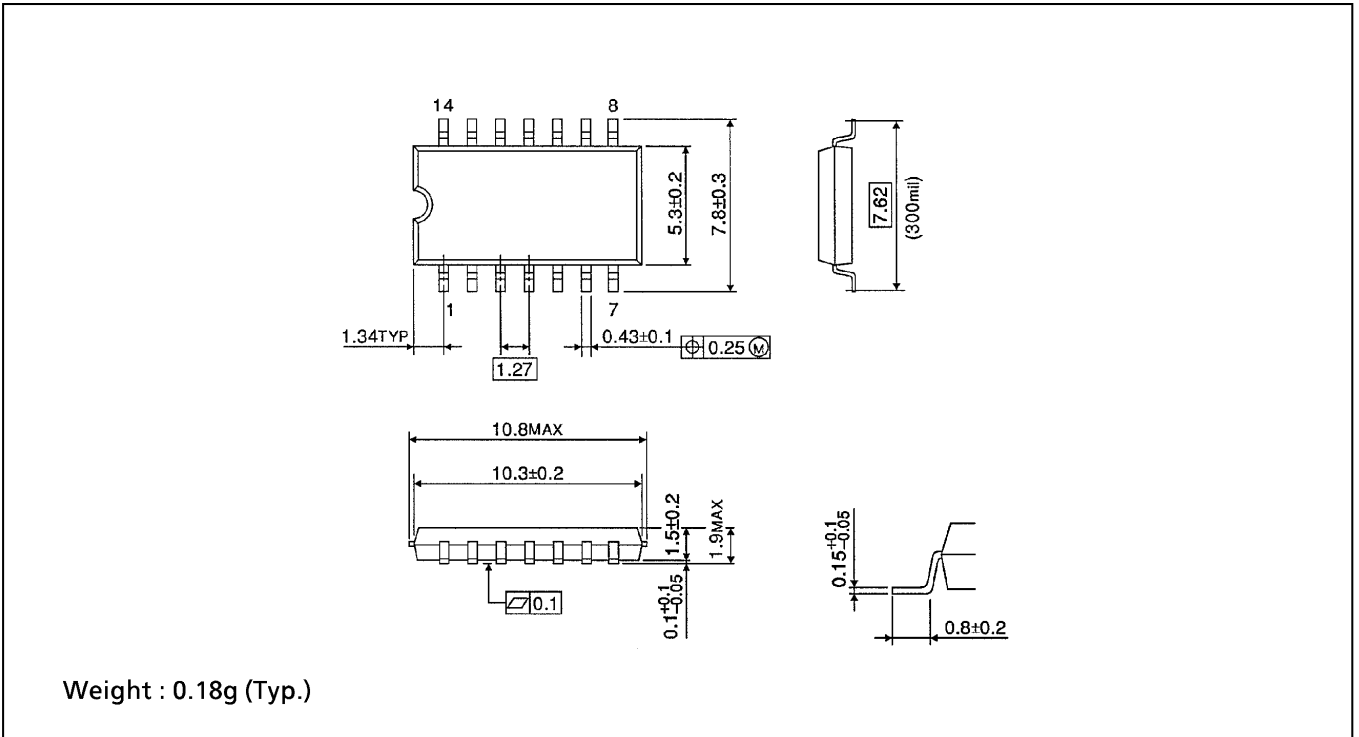
DIP 14PIN OUTLINE DRAWING (DIP14-P-300-2.54)

Unit in mm



SOP 14PIN (200mil BODY) OUTLINE DRAWING (SOP14-P-300-1.27)

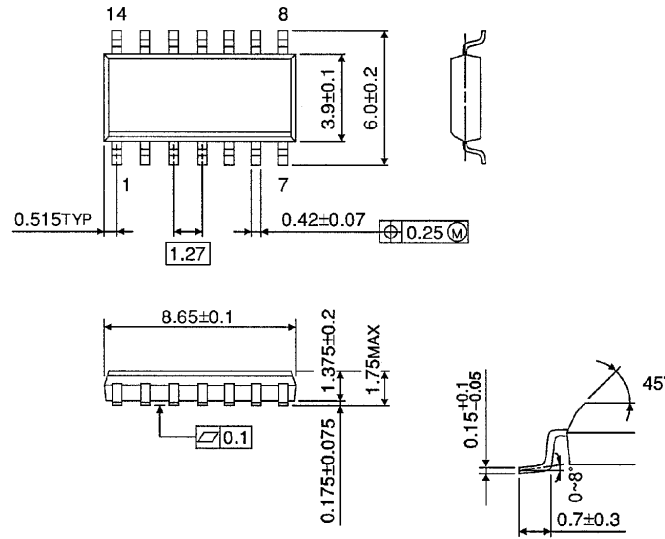
Unit in mm



SOP 14PIN (150mil BODY) OUTLINE DRAWING (SOL14-P-150 -1.27)

Unit in mm

(Note) This package is not available in Japan.



Weight : 0.12g (Typ.)