

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

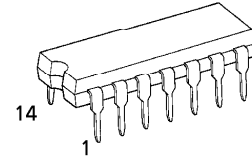
# TC4081BP, TC4081BF, TC4081BFN

## TC4081B QUAD 2 INPUT AND GATE

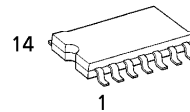
TC4081B is positive logic AND gates with two inputs respectively.

Since all the outputs of these gates are equipped with the buffer circuits of inverters, the input/output propagation characteristic has been improved and variation of propagation time caused by increase of load capacity is kept minimum.

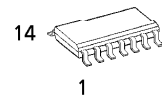
(Note) The JEDEC SOP (FN) is not available in Japan.



P (DIP14-P-300-2.54)  
Weight : 0.96g (Typ.)



F (SOP14-P-300-1.27)  
Weight : 0.18g (Typ.)



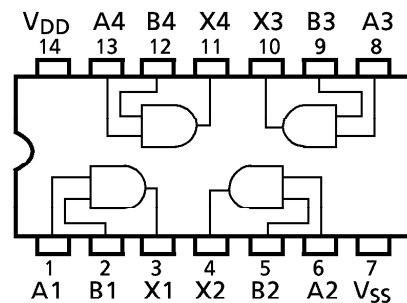
FN (SOL14-P-150-1.27)  
Weight : 0.12g (Typ.)

## 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	$T_{Ope}$	-40~85	°C
Storage Temperature Range	$T_{stg}$	-65~150	°C

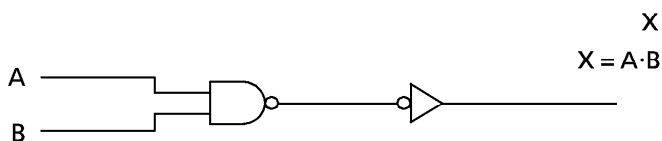
## PIN ASSIGNMENT (TOP VIEW)

TC4081B



## LOGIC DIAGRAM

1/4 TC4081B



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

CHARACTERISTIC	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 ( $V_{SS} = 0V$ )**

CHARACTERISTIC	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\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	$I_{OH}$	$V_{IN} = V_{SS}, V_{DD}$	$V_{OH} = 4.6V$	5	-0.61	—	-0.51	-1.0	—	-0.42	—	mA
			$V_{OH} = 2.5V$	5	-2.50	—	-2.10	-4.0	—	-1.70	—	
			$V_{OH} = 9.5V$	10	-1.50	—	-1.30	-2.2	—	-1.10	—	
			$V_{OH} = 13.5V$	15	-4.00	—	-3.40	-9.0	—	-2.80	—	
Output Low Current	$I_{OL}$	$V_{IN} = V_{SS}, V_{DD}$	$V_{OL} = 0.4V$	5	0.61	—	0.51	1.2	—	0.42	—	mA
			$V_{OL} = 0.5V$	10	1.50	—	1.30	3.2	—	1.10	—	
			$V_{OL} = 1.5V$	15	4.00	—	3.40	12.0	—	2.80	—	
Input High Voltage	$V_{IH}$	$ I_{OUT}  < 1\mu A$	$V_{OUT} = 0.5V, 4.5V$	5	3.5	—	3.5	2.75	—	3.5	—	V
			$V_{OUT} = 1.0V, 9.0V$	10	7.0	—	7.0	5.50	—	7.0	—	
			$V_{OUT} = 1.5V, 13.5V$	15	11.0	—	11.0	8.25	—	11.0	—	
Input Low Voltage	$V_{IL}$	$ I_{OUT}  < 1\mu A$	$V_{OUT} = 0.5V, 4.5V$	5	—	1.5	—	2.25	1.5	—	1.5	V
			$V_{OUT} = 1.0V, 9.0V$	10	—	3.0	—	4.50	3.0	—	3.0	
			$V_{OUT} = 1.5V, 13.5V$	15	—	4.0	—	6.75	4.0	—	4.0	
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	—	0.25	—	0.001	0.25	—	7.5	$\mu A$	
			10	—	0.50	—	0.001	0.50	—	15.0		
			15	—	1.00	—	0.002	1.00	—	30.0		

\* All valid input combinations.

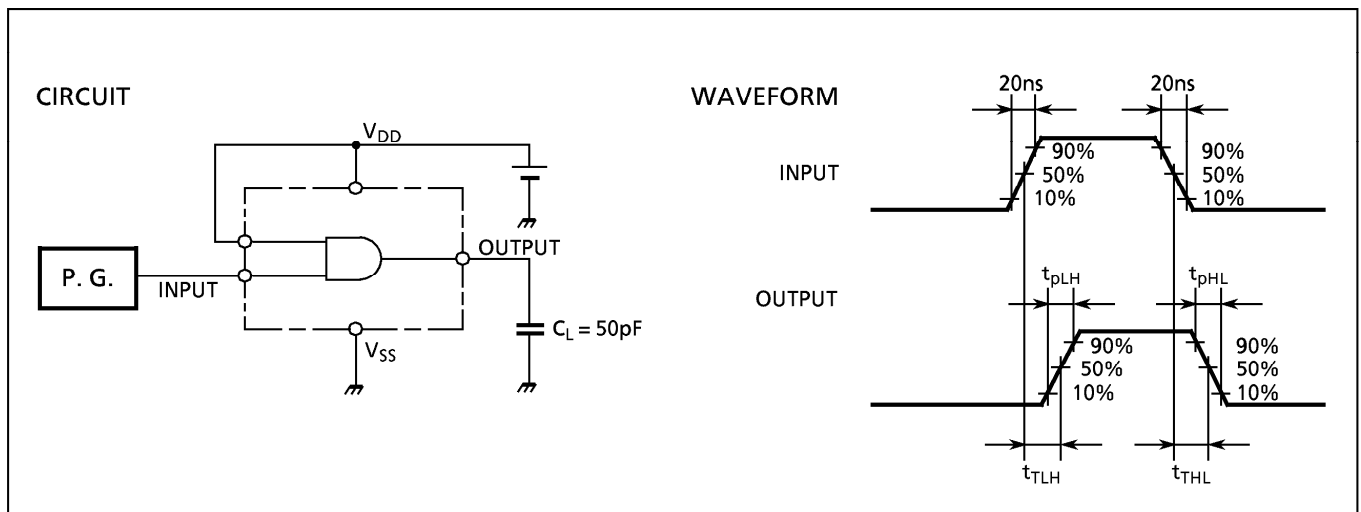
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**DYNAMIC ELECTRICAL CHARACTERISTICS (Ta = 25°C, Vss = 0V, CL = 50pF)**

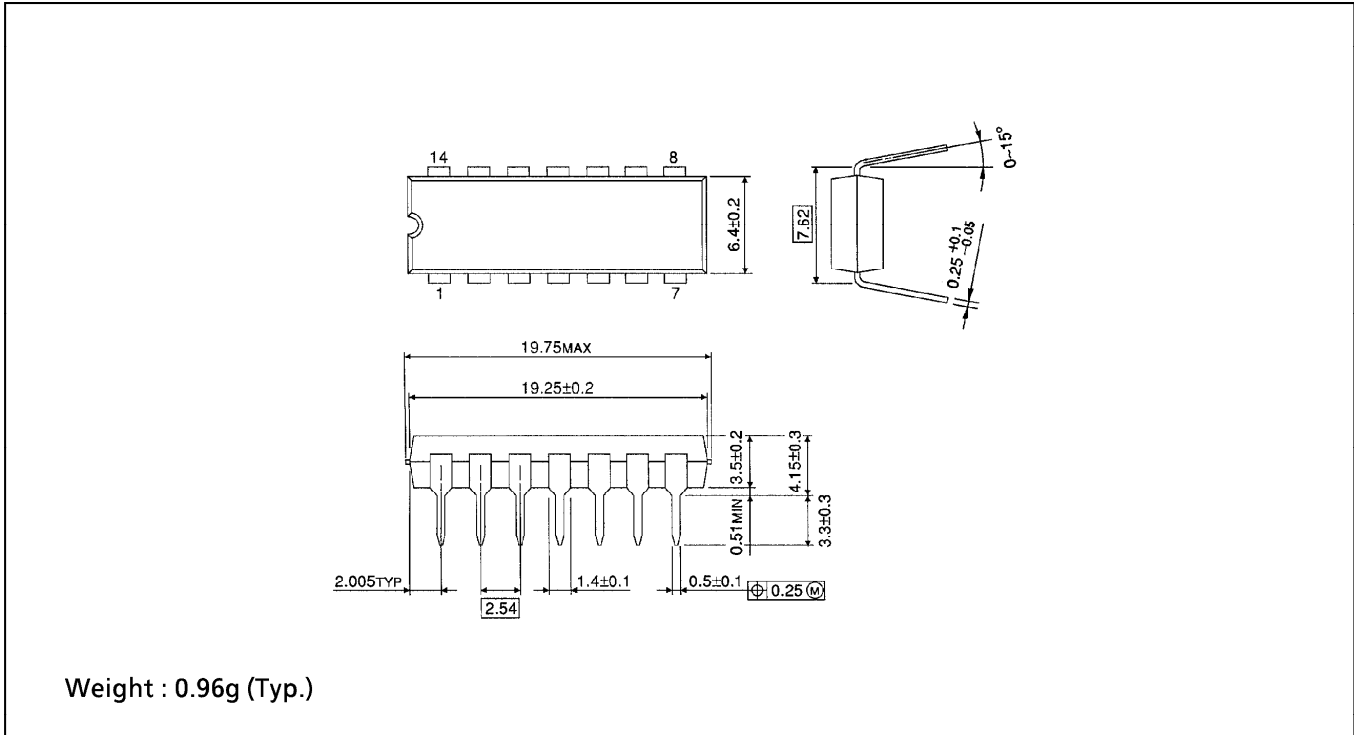
CHARACTERISTIC	SYMBOL	TEST CONDITION	V <sub>DD</sub> (V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time	t <sub>TLH</sub>		5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output Transition Time	t <sub>THL</sub>		5	—	70	200	
			10	—	35	100	
			15	—	30	80	
Propagation Delay Time	t <sub>pLH</sub>		5	—	65	200	
			10	—	30	100	
			15	—	25	80	
Propagation Delay Time	t <sub>pHL</sub>		5	—	65	200	
			10	—	30	100	
			15	—	25	80	
Input Capacitance	C <sub>IN</sub>			—	5	7.5	pF

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



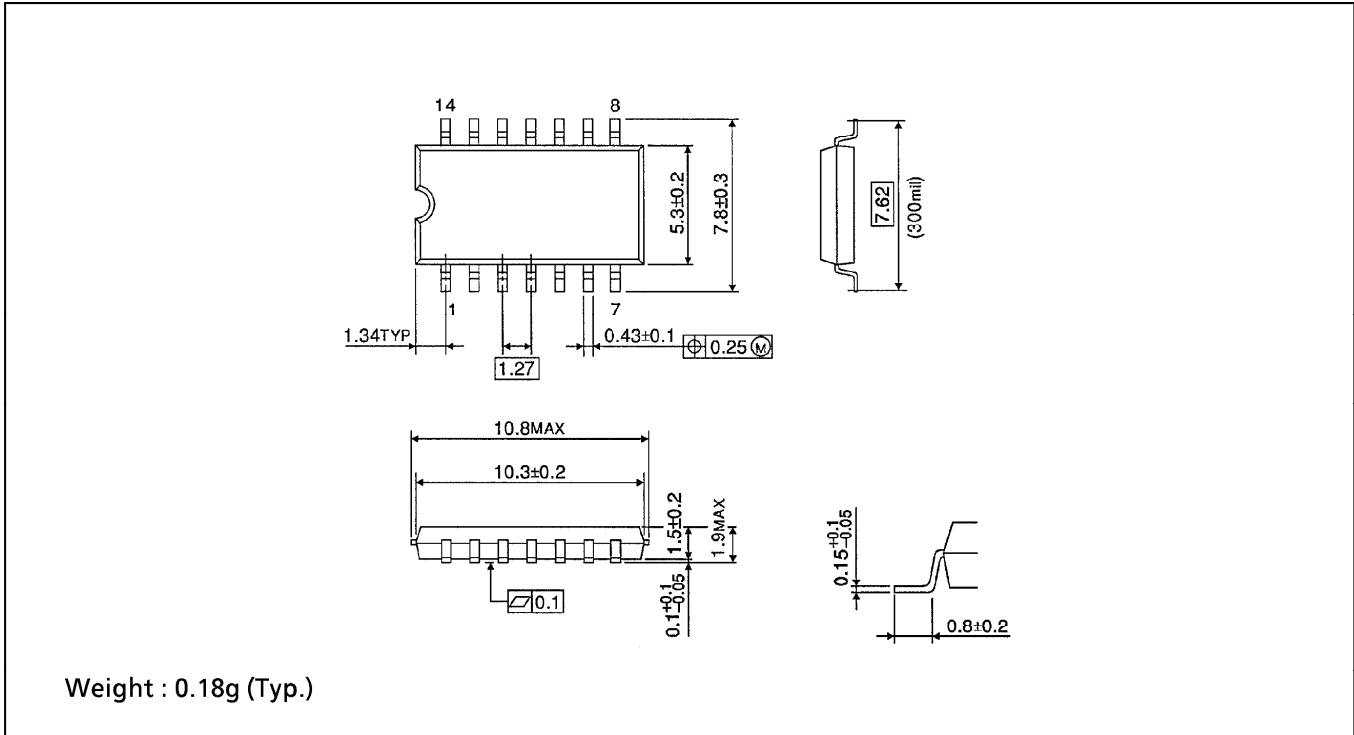
**DIP 14PIN OUTLINE DRAWING (DIP14-P-300-2.54)**

Unit in mm



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

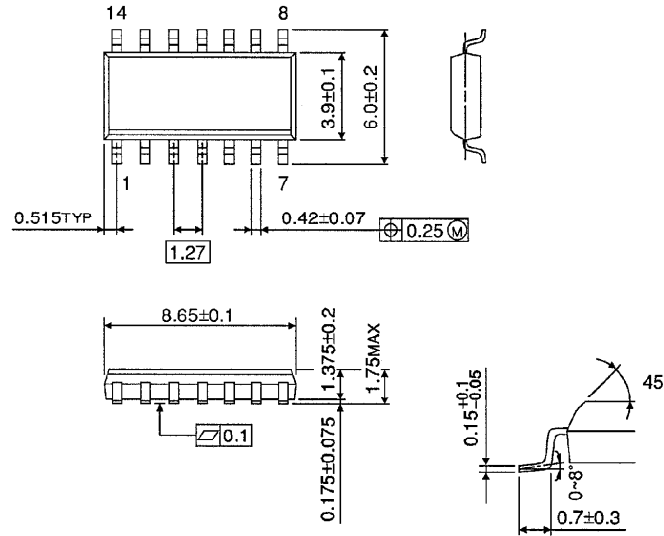
Unit in mm



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.)