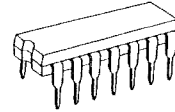


TC4001UBP TC4011UBP/UBFN

TC4001UB QUAD 2 INPUT NOR GATE
TC4011UB QUAD 2 INPUT NAND GATE

TC4001UB and TC4011UB are 2 input NOR gate and 2 input NAND gate respectively. The pin connections are same as TC4001B and TC4011B but the internal circuits consist of only basic NAND (NOR) circuit without the waveform shaping inverters.

Therefore, these are suitable for the applications in linear circuits such as oscillator circuits and amplifier circuits, and these have advantage in the applications of logical processing systems with faster operating speed.



P (DIP14-P-300)

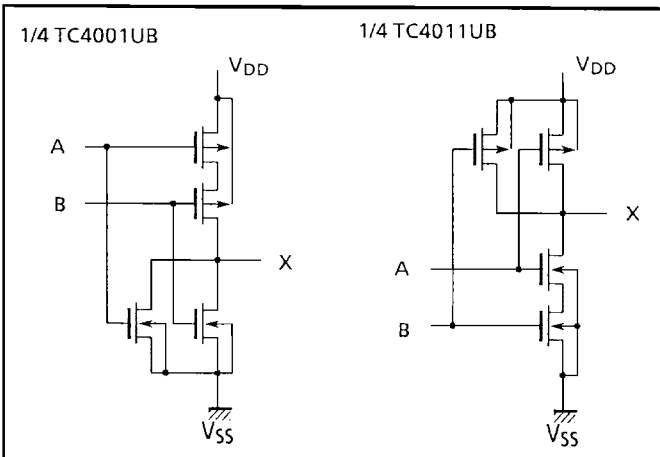


FN (SOP14-P-150)

ABSOLUTE MAXIMUM RATINGS

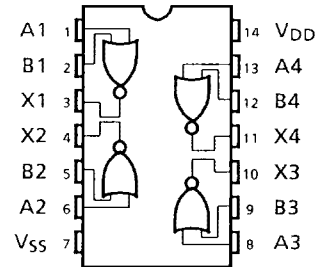
CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{DD}	$V_{SS} - 0.5 \sim V_{SS} + 20$	V
Input Voltage	V_{IN}	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
Output Voltage	V_{OUT}	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
DC Input Current	I_{IN}	± 10	mA
Power Dissipation	P_D	300 (DIP) / 180 (SOIC)	mW
Operating Temperature Range	T_A	- 40~85	°C
Storage Temperature Range	T_{STG}	- 65~150	°C
Lead Temp./Time	T_{SOL}	260°C · 10sec	

LOGIC DIAGRAM

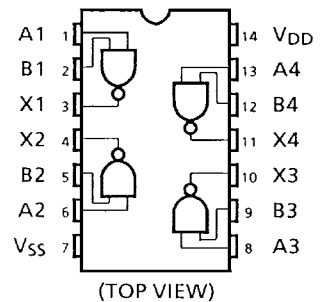


PIN ASSIGNMENT

TC4001UB



TC4011UB



TC4001UBP TC4011UBP/UBFN

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

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS
DC Supply Voltage	V_{DD}	3	-	18	V
Input Voltage	V_{IN}	0	-	V_{DD}	V

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

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	V_{DD} (V)	-40°C		25°C			85°C		UNITS	
				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}	$V_{OH} = 4.6V$ $V_{OH} = 2.5V$ $V_{OH} = 9.5V$ $V_{OH} = 13.5V$ $V_{IN} = V_{SS}, V_{DD}$	5	-0.61	-	-0.51	-1.0	-	-0.42	-	mA	
			10	-2.5	-	-2.1	-4.0	-	-1.7	-		
			10	-1.5	-	-1.3	-2.2	-	-1.1	-		
			15	-4.0	-	-3.4	-9.0	-	-2.8	-		
Output Low Current	I_{OL}	$V_{OL} = 0.4V$ $V_{OL} = 0.5V$ $V_{OL} = 1.5V$ $V_{IN} = V_{SS}, V_{DD}$	5	0.61	-	0.51	1.2	-	0.42	-	mA	
			10	1.5	-	1.3	3.2	-	1.1	-		
			10	4.0	-	3.4	12.0	-	2.8	-		
			15	4.0	-	4.0	3.0	-	4.0	-		
Input High Voltage	V_{IH}	$V_{OUT} = 0.5V$ $V_{OUT} = 1.0V$ $V_{OUT} = 1.5V$ $ I_{OUT} < 1\mu A$	5	4.0	-	4.0	3.0	-	4.0	-	V	
			10	8.0	-	8.0	6.5	-	8.0	-		
			15	12.0	-	12.0	9.5	-	12.0	-		
Input Low Voltage	V_{IL}	$V_{OUT} = 4.5V$ $V_{OUT} = 9.0V$ $V_{OUT} = 13.5V$ $ I_{OUT} < 1\mu A$	5	-	1.5	-	2.0	1.0	-	1.0	V	
			10	-	2.0	-	3.5	2.0	-	2.0		
			10	-	3.0	-	5.5	3.0	-	3.0		
			15	-	3.0	-	5.5	3.0	-	3.0		
Input Current	"H" Level	I_{IH}	$V_{IH} = 18V$	18	-	0.1	-	10^{-5}	0.1	-	1.0	μA
	"L" Level	I_{IL}	$V_{IL} = 0V$	18	-	-0.1	-	-10^{-5}	-0.1	-	-1.0	
Quiescent Device Current	I_{DD}	$V_{IN} = V_{SS}, V_{DD}^*$	5	-	0.25	-	0.001	0.25	-	7.5	μA	
			10	-	0.5	-	0.001	0.5	-	15		
			15	-	1.0	-	0.002	1.0	-	30		

* All valid input combinations.

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

CHARACTERISTICS	SYMBOL	TEST CONDITION	VDD (V)	MIN.	TYP.	MAX.	UNITS
			5				
Output Transition Time (TC4001UB)	t _{TLH}		5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output Transition Time (TC4001UB)	t _{THL}		5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output Transition Time (TC4011UB)	t _{TLH}		5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output Transition Time (TC4011UB)	t _{THL}		5	—	60	200	ns
			10	—	25	100	
			15	—	20	80	
Propagation Delay Time (TC4001UB)	t _{pLH} t _{pHL}		5	—	50	120	ns
			10	—	25	60	
			15	—	20	50	
Propagation Delay Time (TC4011UB)	t _{pLH} t _{pHL}		5	—	50	110	ns
			10	—	28	60	
			15	—	22	50	
Input Capacitance	C _{IN}			—	5	7.5	pF

CIRCUIT AND WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

