

**CD4001B**

Preliminary

CMOS IC

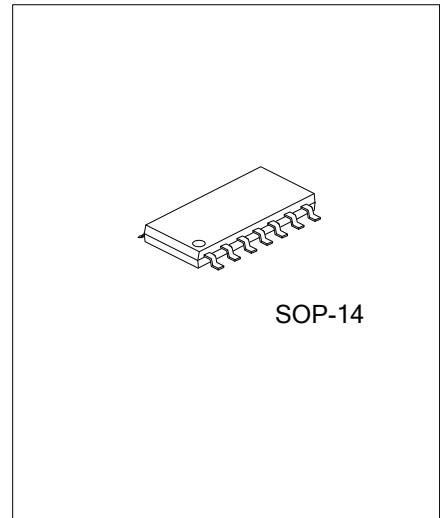
**QUAD 2-INPUT NOR
BUFFERED B SERIES GATE**

■ DESCRIPTION

The **UTC CD4001B** contains four independent 2-input NOR gates, they perform the function $Y=A+B$ in positive logic.

■ FEATURES

- * 5V-10V-15V Parametric Ratings
- * Quad 2-Input NOR Gate
- * Symmetrical Output Characteristics
- * Maximum Input Current of 1uA at 15V Over Full Package Temperature Range
- * Low Power TTL:
Fan Out of 2 Driving 74L Compatibility or 1 Driving 74LS

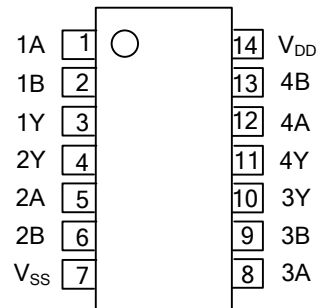


■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
CD4001BL-S14-R	CD4001BG-S14-R	SOP-14	Tape Reel

CD4011BL-S14-R (1) Packing Type (2) Package Type (3) Lead Free		(1) R: Tape Reel (2) S14: SOP-14 (3) G: Halogen Free, L: Lead Free
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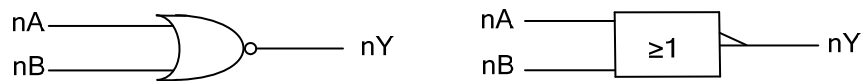
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

INPUT(A)	INPUT(B)	OUTPUT(Y)
H	H	L
H	L	L
L	H	L
L	L	H

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING($T_a=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	-0.5 ~ 18	V
Input Voltage	$V(nA,nB)$	-0.5 ~ $V_{DD} + 0.5$	V
Output Voltage	$V(nY)$	-0.5 ~ $V_{DD} + 0.5$	V
Storage Temperature	T_{STG}	-65 ~ + 150	$^{\circ}\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	3 ~ 15	V
Operating Temperature	T_{OP}	-40 ~ 125	$^{\circ}\text{C}$

■ ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	High	V_{IH}	$V_{DD}=5\text{V}, V_O=0.5\text{V}$	3.5	3		V
			$V_{DD}=10\text{V}, V_O=1.0\text{V}$	7.0	6		
			$V_{DD}=15\text{V}, V_O=1.5\text{V}$	11.0	9		
	Low	V_{IL}	$V_{DD}=5\text{V}, V_O=4.5\text{V}$		2	1.5	V
			$V_{DD}=10\text{V}, V_O=9.0\text{V}$		4	3.0	
			$V_{DD}=15\text{V}, V_O=13.5\text{V}$		6	4.0	
Output Voltage	High	V_{OH}	$V_{DD}=5\text{V}, I_{OH}=-1\mu\text{A}$	4.95	5		V
			$V_{DD}=10\text{V}, I_{OH}=-1\mu\text{A}$	9.95	10		
			$V_{DD}=15\text{V}, I_{OH}=-1\mu\text{A}$	14.95	15		
	Low	V_{OL}	$V_{DD}=5\text{V}, I_{OL}=1\mu\text{A}$		0	0.05	V
			$V_{DD}=10\text{V}, I_{OL}=1\mu\text{A}$		0	0.05	
			$V_{DD}=15\text{V}, I_{OL}=1\mu\text{A}$		0	0.05	
Output Current (Note)	High	I_{OH}	$V_{DD}=5\text{V}, V_O=4.6\text{V}$	-0.51	-0.88		mA
			$V_{DD}=10\text{V}, V_O=9.5\text{V}$	-1.3	-2.25		
			$V_{DD}=15\text{V}, V_O=13.5\text{V}$	-3.4	-8.8		
	Low	I_{OL}	$V_{DD}=5\text{V}, V_O=0.4\text{V}$	0.51	0.88		
			$V_{DD}=10\text{V}, V_O=0.5\text{V}$	1.3	2.25		
			$V_{DD}=15\text{V}, V_O=1.5\text{V}$	3.4	8.8		
Input Leakage Current		$I_{I(LEAK)}$	$V_{DD}=15\text{V}, V_{IN}=V_{DD}$ or GND			0.1	μA
Quiescent Supply Current		I_Q	$V_{DD}=5\text{V}, V_{IN}=V_{DD}$ or $V_{SS}, I_{OUT}=0$		0.004	0.25	μA
			$V_{DD}=10\text{V}, V_{IN}=V_{DD}$ or $V_{SS}, I_{OUT}=0$		0.005	0.5	
			$V_{DD}=15\text{V}, V_{IN}=V_{DD}$ or $V_{SS}, I_{OUT}=0$		0.006	1.0	

Note: I_{OL} and I_{OH} are tested one output at a time

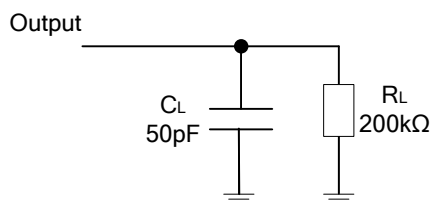
■ SWITCHING CHARACTERISTICS($T_A=25^{\circ}\text{C}$, Input: $t_R=t_F=20\text{ns}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from Input(A or B) to Output(Y)	t_{PLH}	$V_{DD}=5\text{V}$, $C_L=50\text{pF}$, $R_L=200\text{k}\Omega$		110	250	ns
		$V_{DD}=10\text{V}$, $C_L=50\text{pF}$, $R_L=200\text{k}\Omega$		50	100	
		$V_{DD}=15\text{V}$, $C_L=50\text{pF}$, $R_L=200\text{k}\Omega$		35	70	
	t_{PHL}	$V_{DD}=5\text{V}$, $C_L=50\text{pF}$, $R_L=200\text{k}\Omega$		120	250	
		$V_{DD}=10\text{V}$, $C_L=50\text{pF}$, $R_L=200\text{k}\Omega$		50	100	
		$V_{DD}=15\text{V}$, $C_L=50\text{pF}$, $R_L=200\text{k}\Omega$		35	70	
Transition Time	t_{TLH} t_{THL}	$V_{DD}=5\text{V}$, $C_L=50\text{pF}$, $R_L=200\text{k}\Omega$		90	200	ns
		$V_{DD}=10\text{V}$, $C_L=50\text{pF}$, $R_L=200\text{k}\Omega$		50	100	
		$V_{DD}=15\text{V}$, $C_L=50\text{pF}$, $R_L=200\text{k}\Omega$		40	80	

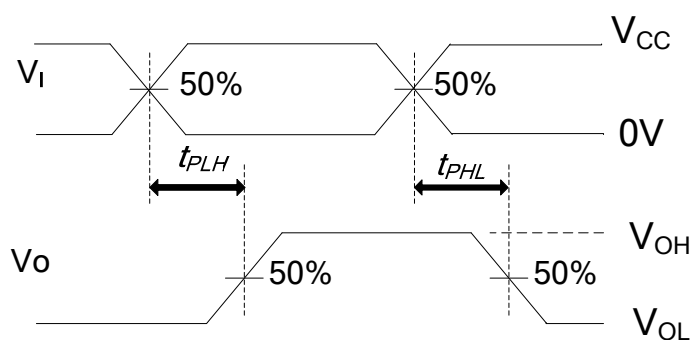
■ OPERATING CHARACTERISTICS($T_a=25^{\circ}\text{C}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Average Input Capacitance	C_{IN}	Any Input		5	7.5	pF
Power Dissipation Capacitance	C_{PD}	Any Gate		14		

■ TEST CIRCUIT AND WAVEFORMS



Definitions for test circuit



Propagation Delay Times

Note: C_L includes probe and jig capacitance.

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