

# Quad 2-input NOR gate

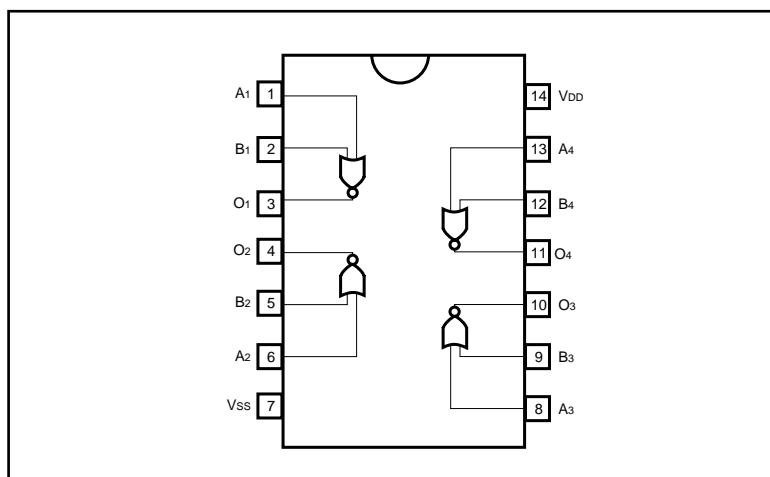
## BU4001B / BU4001BF

The BU4001B and BU4001BF are 2-input positive logic NOR gates, each with four built-in circuits. A buffer achieved by an inverter added at the gate output improves the input / output propagation characteristic and minimizes variation in the propagation time caused by increase of the load capacitance.

### ●Features

- 1) Low power dissipation.
- 2) Wide range of operating power supply voltage.
- 3) High input impedance.
- 4) High fan-out.
- 5) Direct drive of 2 L-TTL inputs and 1 LS-TTL input.

### ●Block diagram



### ●Absolute maximum ratings (V<sub>SS</sub> = 0V, Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>DD</sub>	– 0.3 ~ + 18	V
Power dissipation	P <sub>d</sub>	1000 (DIP), 450 (SOP)	mW
Operating temperature	T <sub>opr</sub>	– 40 ~ + 85	°C
Storage temperature	T <sub>stg</sub>	– 55 ~ + 150	°C
Input voltage	V <sub>IN</sub>	– 0.3 ~ V <sub>DD</sub> + 0.3	V

## ●Electrical characteristics

DC characteristics (unless otherwise noted,  $V_{SS} = 0V$ ,  $T_a = 25^\circ C$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	$V_{DD}$ (V)	Conditions	Measurement circuit
Input high level voltage	$V_{IH}$	3.5	—	—	V	5	—	Fig.1
		7.0	—	—		10		
		11.0	—	—		15		
Input low level voltage	$V_{IL}$	—	—	1.5	V	5	—	Fig.1
		—	—	3.0		10		
		—	—	4.0		15		
Input high level current	$I_{IH}$	—	—	0.3	$\mu A$	15	$V_{IH} = 15V$	Fig.1
Input low level current	$I_{IL}$	—	—	-0.3	$\mu A$	15	$V_{IL} = 0V$	Fig.1
Output high level voltage	$V_{OH}$	4.95	—	—	V	5	$I_o = 0mA$	Fig.1
		9.95	—	—		10		
		14.95	—	—		15		
Output low level voltage	$V_{OL}$	—	—	0.05	V	5	$I_o = 0mA$	Fig.1
		—	—	0.05		10		
		—	—	0.05		15		
Output high level current	$I_{OH}$	-0.16	—	—	mA	5	$V_{OH} = 4.6V$	Fig.1
		-0.4	—	—		10	$V_{OH} = 9.5V$	
		-1.2	—	—		15	$V_{OH} = 13.5V$	
Output low level current	$I_{OL}$	0.44	—	—	mA	5	$V_{OL} = 0.4V$	Fig.1
		1.1	—	—		10	$V_{OL} = 0.5V$	
		3.0	—	—		15	$V_{OL} = 1.5V$	
Static current dissipation	$I_{DD}$	—	—	1	$\mu A$	5	$V_I = V_{DD}$ or GND	—
		—	—	2		10		
		—	—	4		15		

Switching characteristics (unless otherwise noted,  $V_{SS} = 0V$ ,  $T_a = 25^\circ C$ ,  $C_L = 50pF$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	$V_{DD}$ (V)	Conditions	Measurement circuit
Output rise time	$t_{TLH}$	—	180	—	ns	5	—	Fig.2
		—	90	—		10		
		—	65	—		15		
Output fall time	$t_{THL}$	—	100	—	ns	5	—	Fig.2
		—	50	—		10		
		—	40	—		15		
Propagation delay time, "L" to "H"	$t_{PLH}$	—	90	—	ns	5	—	Fig.2
		—	50	—		10		
		—	40	—		15		
Propagation delay time, "H" to "L"	$t_{PHL}$	—	90	—	ns	5	—	Fig.2
		—	50	—		10		
		—	40	—		15		
Input capacitance	$C_{IN}$	—	5	—	pF	—	—	—

### ● Measurement circuits

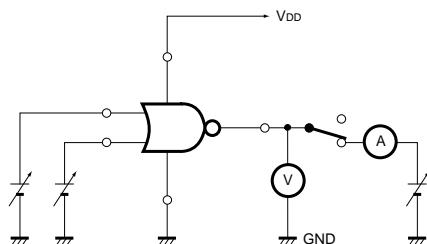


Fig.1 DC characteristics

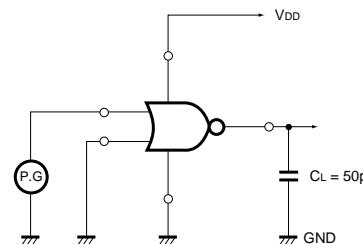


Fig.2 Switching characteristics

### ● Electrical characteristic curve

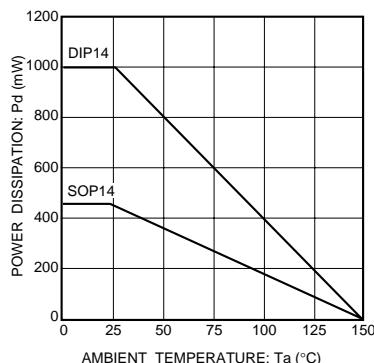
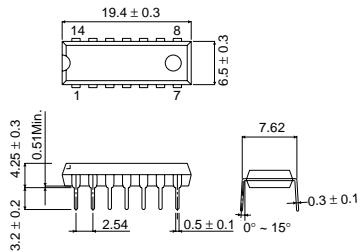


Fig.3 Power dissipation vs.  $T_a$  characteristic

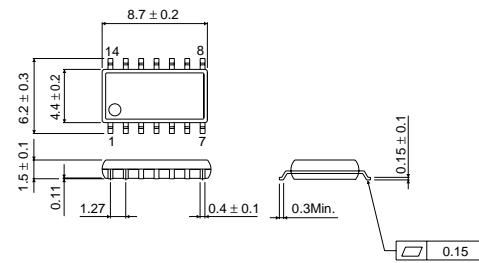
- External dimensions (Units: mm)

BU4001B



DIP14

BU4001BF



SOP14

## Appendix

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