

# Quad 2-input NAND gate

## BU4011B / BU4011BF / BU4011BFV

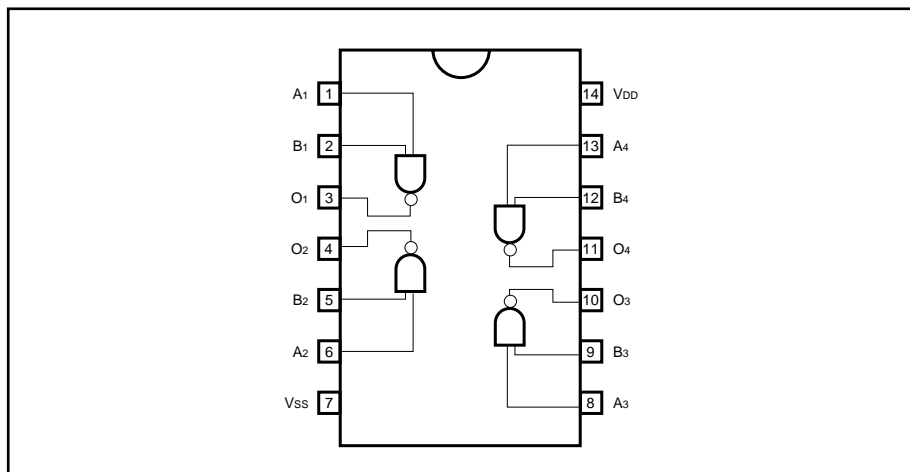
The BU4011B, BU4011BF, and BU4011BFV are dual-input positive logic NAND gates.

Four circuits are contained on a single chip. An inverter-based buffer has been added to the gate output, enabling improved input / output propagation characteristics, and an increased load capacitance minimizes fluctuation in propagation time.

●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 ( $V_{ss} = 0V$ ,  $T_a = 25^\circ C$ )

Parameter	Symbol	Limits	Unit
Power supply voltage	$V_{DD}$	- 0.3 ~ + 18	V
Power dissipation	$P_d$	1000 (DIP), 450 (SOP) 350 (SSOP-B14)	mW
Operating temperature	$T_{opr}$	- 40 ~ + 85	$^\circ C$
Storage temperature	$T_{stg}$	- 55 ~ + 150	$^\circ C$
Input voltage	$V_{IN}$	- 0.3 ~ $V_{DD} + 0.3$	V

## ●Electrical characteristics

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	V <sub>DD</sub> (V)	Conditions	Measurement circuit
Input high-level voltage	V <sub>IH</sub>	3.5	—	—	V	5	—	Fig. 1
		7.0	—	—		10		
		11.0	—	—		15		
Input low-level voltage	V <sub>IL</sub>	—	—	1.5	V	5	—	Fig. 1
		—	—	3.0		10		
		—	—	4.0		15		
Input high-level current	I <sub>IH</sub>	—	—	0.3	μA	15	V <sub>IH</sub> = 15V	Fig. 1
Input low-level current	I <sub>IL</sub>	—	—	-0.3	μA	15	V <sub>IL</sub> = 0V	Fig. 1
Output high-level voltage	V <sub>OH</sub>	4.95	—	—	V	5	I <sub>o</sub> = 0mA	Fig. 1
		9.95	—	—		10		
		14.95	—	—		15		
Output low-level voltage	V <sub>OL</sub>	—	—	0.05	V	5	I <sub>o</sub> = 0mA	Fig. 1
		—	—	0.05		10		
		—	—	0.05		15		
Output high-level current	I <sub>OH</sub>	-0.16	—	—	mA	5	V <sub>OH</sub> = 4.6V	Fig. 1
		-0.4	—	—		10	V <sub>OH</sub> = 9.5V	
		-1.2	—	—		15	V <sub>OH</sub> = 13.5V	
Output low-level current	I <sub>OL</sub>	0.44	—	—	mA	5	V <sub>OL</sub> = 0.4V	Fig. 1
		1.1	—	—		10	V <sub>OL</sub> = 0.5V	
		3.0	—	—		15	V <sub>OL</sub> = 1.5V	
Static current dissipation	I <sub>DD</sub>	—	—	1	μA	5	V <sub>I</sub> = V <sub>DD</sub> or GND	—
		—	—	2		10		
		—	—	4		15		

Switching characteristics (unless otherwise noted, Ta = 25°C, Vss = 0V, CL = 50pF)

Parameter	Symbol	Min.	Typ.	Max.	Unit.	VDD (V)	Conditions	Measurement circuit
						5		
Output rise time	t <sub>TLH</sub>	—	180	360	ns	5	—	Fig. 2
		—	90	180		10		
		—	65	130		15		
Output fall time	t <sub>THL</sub>	—	100	200	ns	5	—	Fig. 2
		—	50	100		10		
		—	40	80		15		
“L” to “H” Propagation delay time	t <sub>PLH</sub>	—	90	180	ns	5	—	Fig. 2
		—	50	100		10		
		—	40	80		15		
“H” to “L” Propagation delay time	t <sub>PHL</sub>	—	90	180	ns	5	—	Fig. 2
		—	50	100		10		
		—	40	80		15		
Input capacitance	C <sub>IN</sub>	—	5	—	pF	—	—	—

● Measurement circuits

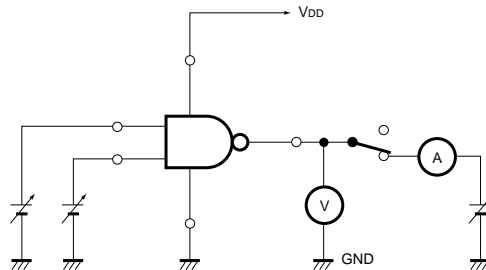


Fig. 1 DC characteristics

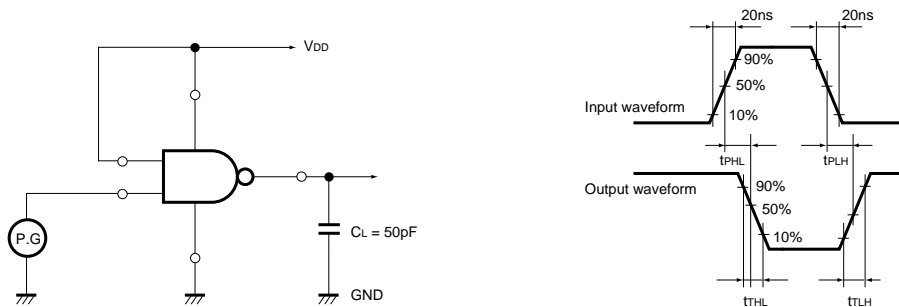


Fig. 2 Switching characteristics

●Electrical characteristic curve

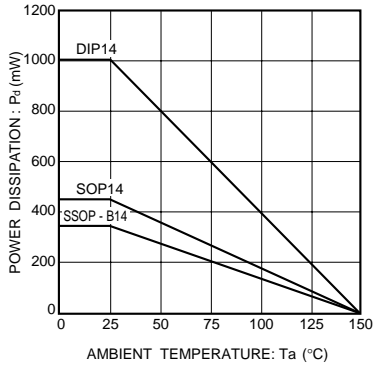
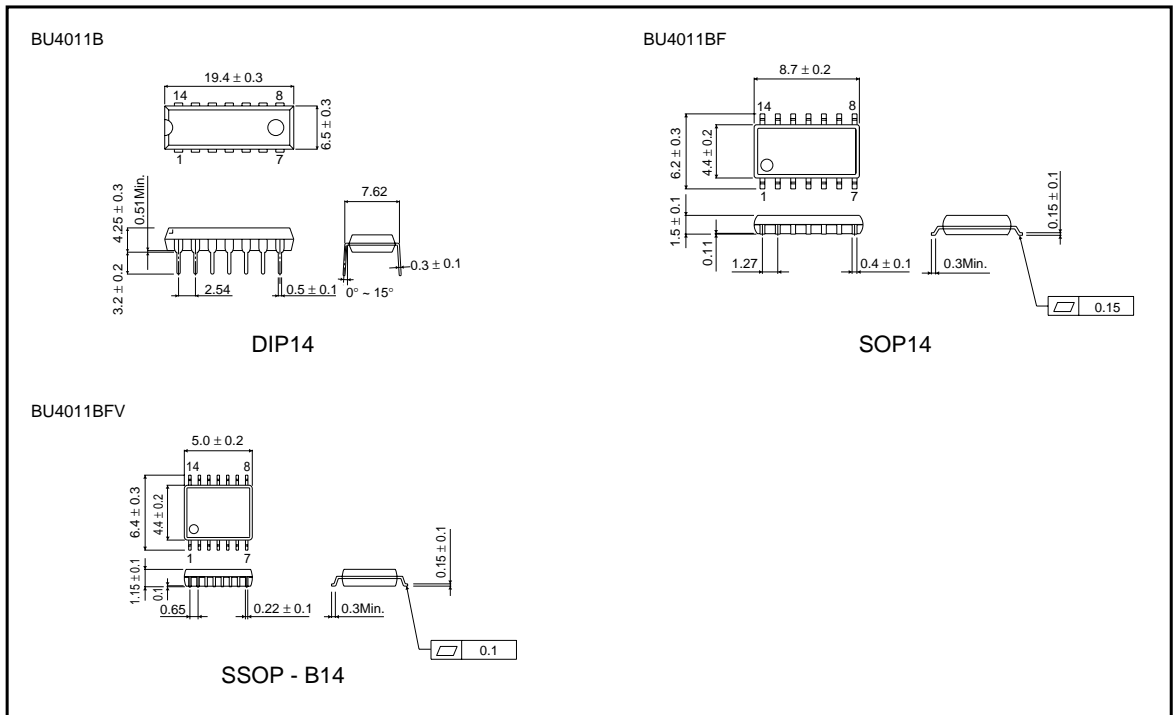


Fig. 3 Power dissipation vs. Ta

●External dimensions (Units: mm)



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