

Quad 2-input NAND gate

BU4011B/BU4011BF/BU4011BFV

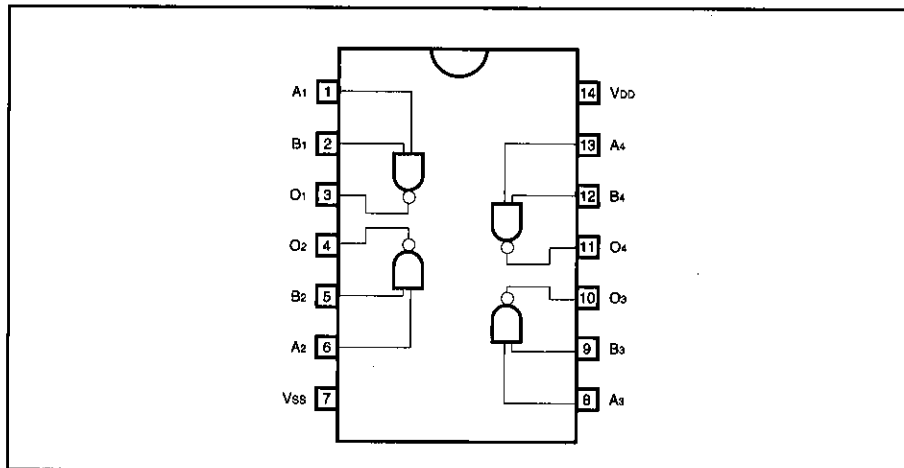
The BU4011B, BU4011BF, and BU4011BFV are dual-input positive logic NAND gates.

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 consumption.
- 2) Wide operating power supply voltage range.
- 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 (Ta=25°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	°C
Storage temperature	T _{stg}	-55~150	°C
Input voltage	V _{IN}	-0.3~V _{DD} +0.3	V

● Electrical characteristics

DC characteristics (unless otherwise noted, Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V _{DD} (V)	Conditions	Measurement Circuit
High-level input voltage	V _{IH}	3.5	—	—	V	5	—	Fig. 1
		7.0	—	—		10		
		11.0	—	—		15		
Low-level input voltage	V _{IL}	—	—	1.5	V	5	—	Fig. 1
		—	—	3.0		10		
		—	—	4.0		15		
High-level input current	I _{IH}	—	—	0.3	μA	15	V _{IH} =15V	Fig. 1
Low-level input current	I _{IL}	—	—	-0.3	μA	15	V _{IL} =0V	Fig. 1
High-level output voltage	V _{OH}	4.95	—	—	V	5	I _O =0mA	Fig. 1
		9.95	—	—		10		
		14.95	—	—		15		
Low-level output voltage	V _{OL}	—	—	0.05	V	5	I _O =0mA	Fig. 1
		—	—	0.05		10		
		—	—	0.05		15		
High-level output 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	
Low-level output 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	
Quiescent supply current	I _{DD}	—	—	1	μA	5	V _I =V _{DD} or GND	—
		—	—	2		10		
		—	—	4		15		

BU4000B series

CMOS logic

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

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

● Measurement circuits

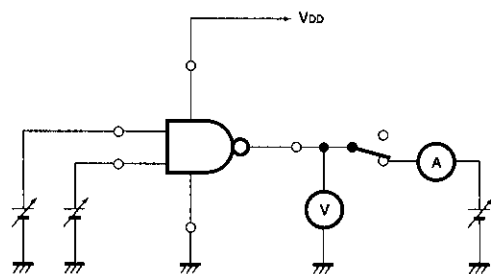


Fig. 1 DC characteristics measurement circuit

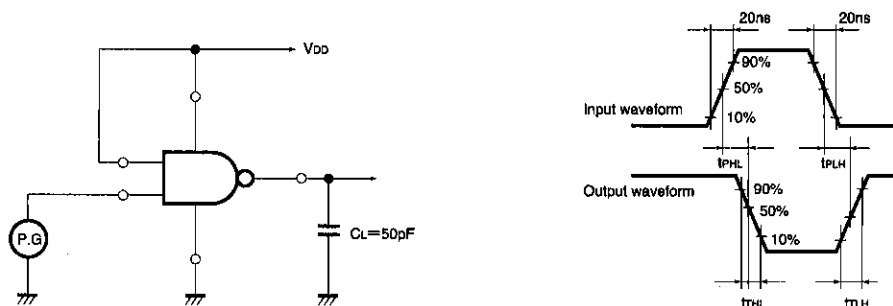


Fig. 2 Switching characteristics measurement circuit

● Electrical characteristic curve

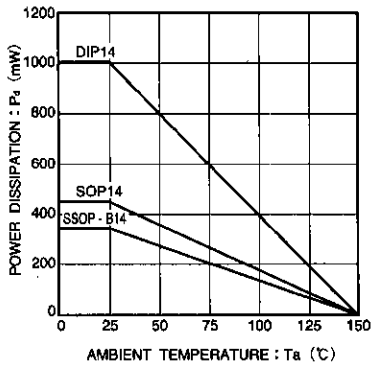
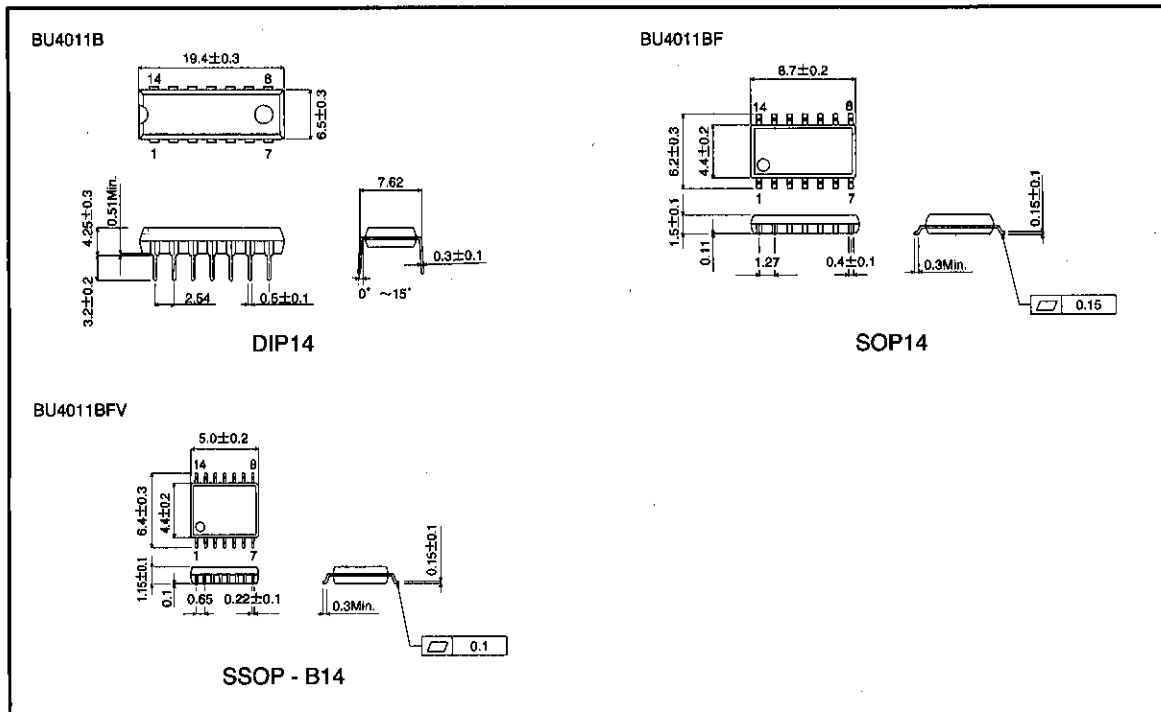


Fig. 3 Power dissipation - Ta characteristic

● External dimensions (Units: mm)



BU4000B series

CMOS logic

Series Standard

BU4000B

The BU4000 Series are CMOS ICs featuring low voltage and low power consumption. The wide range of operating power supply voltages is compatible with the general-purpose 4000B Series, and when a 5V power supply voltage is used, the LS-TTL IC can be driven directly.

These ICs are available in SOP and SSOP packages as well as the standard DIP package.

●Features

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

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{DD}	18 *1	V
Input voltage	V _{IN}	-0.3~V _{DD} +0.3	V
Power dissipation *2	P _d	Please refer to specifications for individual package	mW
Storage temperature	T _{stg}	-55~150	°C

*1 For the BU4XXXBC type, V_{DD} = 20 V.

*2 The values for the SOP and SSOP packages are the values when mounted on a glass epoxy PCB (50 mm x 50 mm x 1.6 mm).

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{DD}	3~16 *	V
Input voltage	V _{IN}	0~V _{DD}	V
Operating temperature	T _{opr}	-40~85	°C

* For the BU4XXXBC type, V_{DD} = 3 to 18 V.

●Electrical characteristic curves

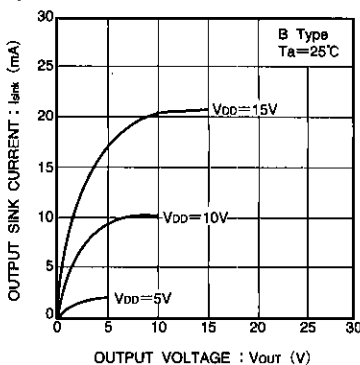


Fig.1 Output sink current - output voltage characteristic

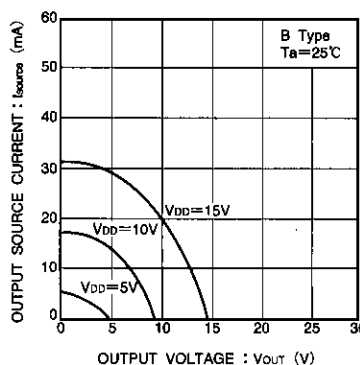


Fig.2 Output source current - output voltage characteristic

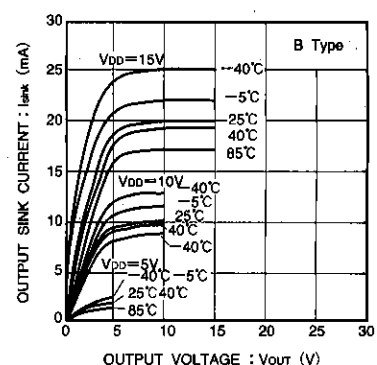


Fig.3 Output SINK current - output voltage characteristic

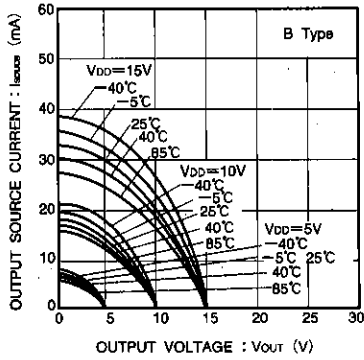


Fig.4 Output source current - output voltage characteristic

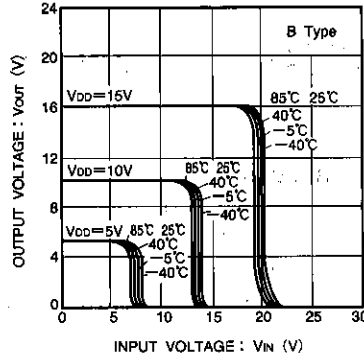


Fig.5 Output voltage - input voltage characteristic

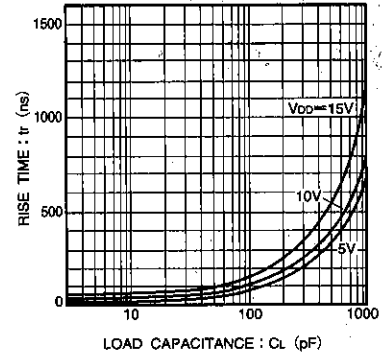


Fig.6 Rise time - load capacitance characteristic

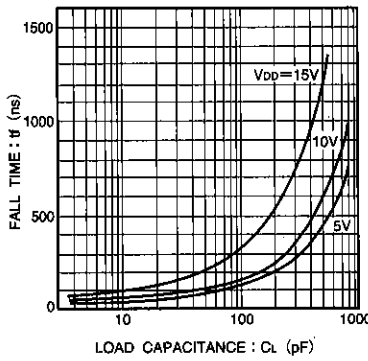


Fig.7 Fall time - load capacitance characteristic

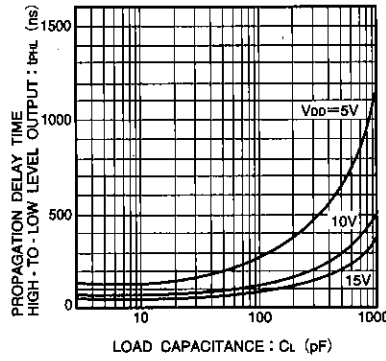


Fig.8 "H" to "L" propagation delay time - load capacitance characteristic

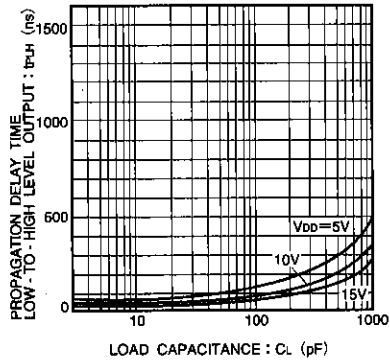


Fig.9 "L" to "H" propagation delay time - load capacitance characteristic

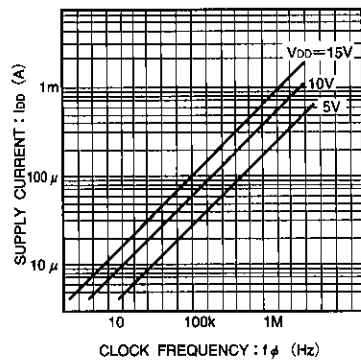


Fig.10 Supply current - clock frequency characteristic

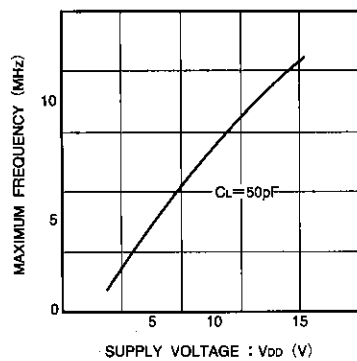


Fig.11 Maximum clock frequency - power supply voltage characteristic

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