

# Single 2-input NAND gate

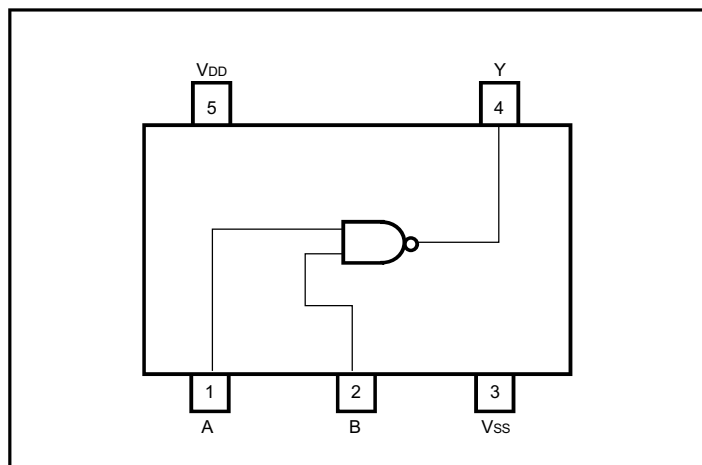
## BU4S11

The BU4S11 is a dual-input positive logic NAND gate. This is an ultra-compact logic IC with one circuit of the BU4011B built into an SMP package.

### ●Features

- 1) Low current dissipation.
- 2) Super-mini mold package designed for surface mounting.
- 3) Wide range of operating power supply voltage.
- 4) Capable of driving two L-TTL inputs and one LS-TTL input directly

### ●Block diagram



### ●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>DD</sub>	V <sub>SS</sub> - 0.3 ~ V <sub>SS</sub> + 18	V
Power dissipation	P <sub>d</sub>	170	mW
Input current	I <sub>IN</sub>	± 10	mA
Operating temperature	T <sub>opr</sub>	- 40 ~ + 85	°C
Storage temperature	T <sub>stg</sub>	- 55 ~ + 150	°C
Input voltage	V <sub>IN</sub>	V <sub>SS</sub> - 0.3 ~ V <sub>DD</sub> + 0.3	V

Note 1: These values indicate the range limits of the voltage that can be applied to each pin without destroying it. Operation cannot be guaranteed at these values.

Note 2: Power dissipation is reduced by 1.7mW for each increase in Ta of 1°C each 25°C.

### ●Recommended operating conditions (Ta = 25°C, V<sub>SS</sub> = 0 V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V <sub>DD</sub>	3	—	16	V
Input voltage	V <sub>IN</sub>	0	—	V <sub>DD</sub>	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	$V_{OUT} = 0.5V$ $V_{OUT} = 1.0V$ $V_{OUT} = 1.5V$ $ I_{OUT}  < 1\mu A$	Fig.1
		7.0	—	—	V	10		
		11.0	—	—	V	15		
Input low level voltage	$V_{IL}$	—	—	1.5	V	5	$V_{OUT} = 4.5V$ $V_{OUT} = 9.0V$ $V_{OUT} = 13.5V$ $ I_{OUT}  < 1\mu A$	
		—	—	3.0	V	10		
		—	—	4.0	V	15		
Input high level current	$I_{IH}$	—	—	0.3	$\mu A$	15	$V_{IH} = 15V$	
Input low level current	$I_{IL}$	—	—	-0.3	$\mu A$	15	$V_{IL} = 0V$	
Output high level voltage	$V_{OH}$	4.95	—	—	V	5	$ I_{OUT}  < 1\mu A$ $V_{IN} = V_{SS}$	
		9.95	—	—	V	10		
		14.95	—	—	V	15		
Output low level voltage	$V_{OL}$	—	—	0.05	V	5	$ I_{OUT}  < 1\mu A$ $V_{IN} = V_{DD}$	
		—	—	0.05	V	10		
		—	—	0.05	V	15		
Output high level current	$I_{OH}$	-0.51	—	—	mA	5	$V_{OH} = 4.6V$	
		-2.1	—	—	mA	5	$V_{OH} = 2.5V$	
		-1.3	—	—	mA	10	$V_{OH} = 9.5V$	
		-3.4	—	—	mA	15	$V_{OH} = 13.5V$ $V_{IN} = V_{SS}$	
Output low level current	$I_{OL}$	0.51	—	—	mA	5	$V_{OL} = 0.4V$	
		1.3	—	—	mA	10	$V_{OL} = 0.5V$	
		3.4	—	—	mA	15	$V_{OL} = 1.5V$	
		—	—	—	—	—	$V_{IN} = V_{DD}$	
Static current dissipation	$I_{DD}$	—	—	0.25	$\mu A$	5	$V_{IN} = V_{SS}, V_{DD}$	
		—	—	0.5	$\mu A$	10		
		—	—	1.0	$\mu A$	15		

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	V <sub>DD</sub> (V)	Conditions	Measurement circuit
						5		
Output rise time	t <sub>TLH</sub>	—	70	—	ns	5	—	Fig.2
		—	35	—	ns	10		
		—	30	—	ns	15		
Output fall time	t <sub>THL</sub>	—	70	—	ns	5	—	
		—	35	—	ns	10		
		—	30	—	ns	15		
Propagation delay time	t <sub>PLH</sub>	—	85	—	ns	5	—	
		—	40	—	ns	10		
		—	30	—	ns	15		
	t <sub>PHL</sub>	—	85	—	ns	5	—	
		—	40	—	ns	10		
		—	30	—	ns	15		
Input capacitance	C <sub>IN</sub>	—	5	—	pF	5	—	—

● Measurement circuits

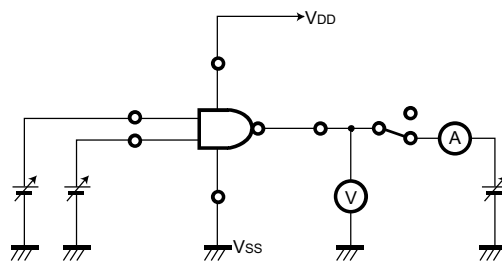


Fig.1 DC characteristics measurement circuit

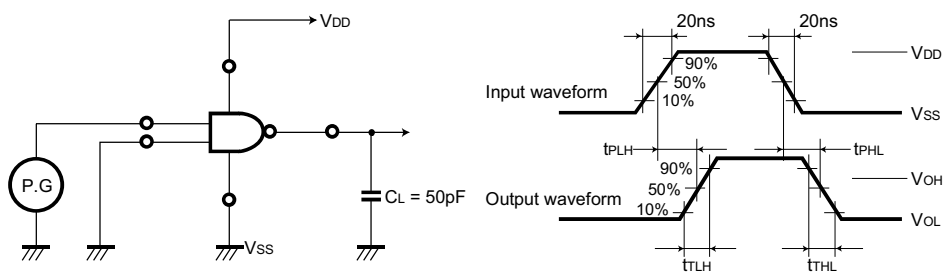


Fig.2 Switching characteristics measurement circuit

●External dimensions (Units: mm)

