

# Single 2-input NAND gate

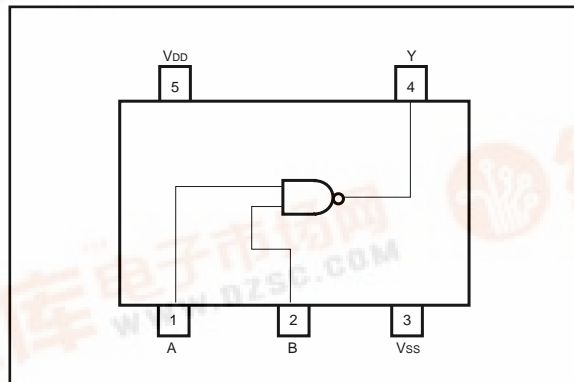
## BU4S11

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 <sub>DD</sub> (V)	Conditions	Measurement circuit
Input high level voltage	V <sub>IH</sub>	3.5	—	—	V	5	V <sub>OUT</sub> = 0.5V V <sub>OUT</sub> = 1.0V V <sub>OUT</sub> = 1.5V    I <sub>OUT</sub>   < 1μA	Fig.1
		7.0	—	—	V	10		
		11.0	—	—	V	15		
Input low level voltage	V <sub>IL</sub>	—	—	1.5	V	5	V <sub>OUT</sub> = 4.5V V <sub>OUT</sub> = 9.0V V <sub>OUT</sub> = 13.5V    I <sub>OUT</sub>   < 1μA	
		—	—	3.0	V	10		
		—	—	4.0	V	15		
Input high level current	I <sub>IH</sub>	—	—	0.3	μA	15	V <sub>IH</sub> = 15V	
Input low level current	I <sub>IL</sub>	—	—	- 0.3	μA	15	V <sub>IL</sub> = 0V	
Output high level voltage	V <sub>OH</sub>	4.95	—	—	V	5	I <sub>OUT</sub>   < 1μA V <sub>IN</sub> = V <sub>SS</sub>	
		9.95	—	—	V	10		
		14.95	—	—	V	15		
Output low level voltage	V <sub>OL</sub>	—	—	0.05	V	5	I <sub>OUT</sub>   < 1μA V <sub>IN</sub> = V <sub>DD</sub>	
		—	—	0.05	V	10		
		—	—	0.05	V	15		
Output high level current	I <sub>OH</sub>	- 0.51	—	—	mA	5	V <sub>OH</sub> = 4.6V	
		- 2.1	—	—	mA	5	V <sub>OH</sub> = 2.5V	
		- 1.3	—	—	mA	10	V <sub>OH</sub> = 9.5V	
		- 3.4	—	—	mA	15	V <sub>OH</sub> = 13.5V V <sub>IN</sub> = V <sub>SS</sub>	
Output low level current	I <sub>OL</sub>	0.51	—	—	mA	5	V <sub>OL</sub> = 0.4V	
		1.3	—	—	mA	10	V <sub>OL</sub> = 0.5V	
		3.4	—	—	mA	15	V <sub>OL</sub> = 1.5V	
		—	—	—	—	—	V <sub>IN</sub> = V <sub>DD</sub>	
Static current dissipation	I <sub>DD</sub>	—	—	0.25	μA	5	V <sub>IN</sub> = V <sub>SS</sub> , V <sub>DD</sub>	
		—	—	0.5	μA	10		
		—	—	1.0	μA	15		

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	$V_{DD}$ (V)	Conditions	Measurement circuit
						5		
Output rise time	$t_{rLH}$	—	70	—	ns	5	—	Fig.2
		—	35	—	ns	10		
		—	30	—	ns	15		
Output fall time	$t_{fHL}$	—	70	—	ns	5	—	
		—	35	—	ns	10		
		—	30	—	ns	15		
Propagation delay time	$t_{PLH}$	—	85	—	ns	5	—	
		—	40	—	ns	10		
		—	30	—	ns	15		
	$t_{PHL}$	—	85	—	ns	5	—	
		—	40	—	ns	10		
		—	30	—	ns	15		
Input capacitance	$C_{IN}$	—	5	—	pF	5	—	—

● Measurement circuits

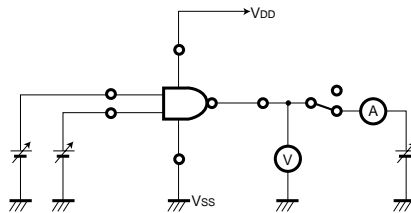


Fig.1 DC characteristics measurement circuit

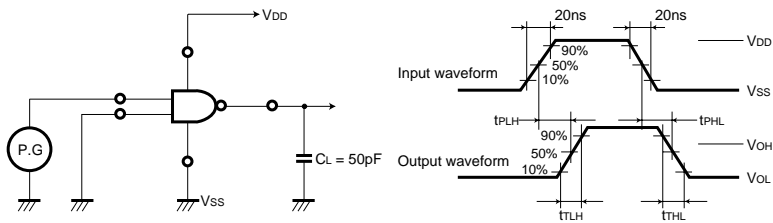


Fig.2 Switching characteristics measurement circuit

●External dimensions (Units: mm)

